subject that appeared in the *Anatomischer Anzeiger* (Nr. 15/16, 1923) and with the more extensive paper on the same subject published in Palaeontografica (1923). I therefore regard his objections to the use of the term arrostic as invalid.

BARON FRANCIS NOPCSA

QUOTATIONS

GOVERNMENT PUBLICATIONS AND THEIR DISTRIBUTION

WHEN a government takes in its own hands the publication of matters of scientific interest, it may be assumed that this is done with three distinct objects in view. In the first place, it wishes to bring to the notice of scientific workers the results of original researches carried out by experts in departments under its control, in order that these results may form a foundation for further advance in knowledge. So are published the papers comprised in the excellent scientific reports of the Ministry of Agriculture and Fisheries in England, and of the Fishery Board for Scotland. Or it desires to bring to the notice of the public, for the sake of the individual and through him of the nation at large, the condensed wisdom of science as bearing upon matters of practical importance. Such is embodied in the pamphlets and leaflets dealing with agricultural pests and plant diseases, with methods of land-cultivation and stock-raising, issued by the Ministry of Agriculture and Fisheries and the Board of Agriculture for Scotland. Sometimes these two aims are seen to run side by side, as in the Journals of Agriculture published both by the English Ministry and Scottish Board, in which matters of both scientific and practical interest appear.

The third object is very different from either of the above, its end being to inform the outside world, scientific and non-scientific, regarding the activities of institutions in which a general interest is taken; it takes its typical form in the annual reports of such establishments as the British Museum, the Natural History Museum, and the Royal Scottish Museum. This last object may seem to have little of scientific value to commend it, but it is in reality of prime importance; for institutions of the kind mentioned depend for many of their most valuable acquisitions upon the generosity of the public, and unless public interest is stimulated by full knowledge of progress and requirements, the national collections, and science, must in the end suffer.

The duty of scientific publisher assumed by the government does not end, however, with the printing of pamphlets, nor are its aims thus attained; the question of distribution is second only to that of printing, and it is to this that we wish particularly to direct attention. Every scientific worker is aware of the generous and even lavish free distribution of scientific publications carried out by government departments of the United States of America; and one is tempted to speculate whether the activity and originality of research now apparent there may not be due in part to this sustained appeal to the scientific mind.—*Nature.*

SCIENTIFIC BOOKS

Eclipses of the Sun. By S. A. MITCHELL, professor of astronomy at the University of Virginia and director of the Leander McCormick Observatory. Published by the Columbia University Press. Pp. XVII + 425, with 59 illustrations.

THIS is far more than a book on eclipses of the sun. It deals also with chronology, history, travel, spectroscopy, atomic theories, ionization and relativity, all presented in non-technical language, so it will be as interesting to the layman as to the scientist.

The author states that he has traveled more than 40,000 miles to witness four total eclipses of the sun and that the total time afforded him for scientific observations was less than eleven minutes. This illustrates the modern astronomer's idea of the importance of the observations of the sun during a total eclipse.

Up to about the middle of the nineteenth century an eclipse was observed only if its track happened to pass over the home of the observer and the observations made were simply the times of contacts and crude sketches of the corona. Now, whenever a total eclipse of the sun occurs anywhere short of the polar regions, many expeditions are sent to the narrow path of totality to take advantage of the few precious minutes during which the moon completely covers the sun. Professor Mitchell devotes several fascinating chapters to his personal experiences on four such expeditions.

The first two chapters of the book give an account of early eclipses and the part they have played in fixing historical dates, the earliest date thus determined being October 22, 2137 B. C.

Subsequent chapters trace the evolution of ideas in regard to the cause of eclipses, their prediction, the motion of the moon; size, shape and distance of the sun; sun-spots and their periodicity; the evolution of the spectroscope and its application to solar eclipse problems. Of these problems, two stand out conspicuously above all others in this book, *viz.*, the "flash spectrum" and the corona. These are of special interest at the present time in connection with their bearing upon the interpretation of spectra, the quantum theory, the structure of the atom and ionization.

Professor Mitchell, of course, discusses fully the eclipse observations to test the Einstein Theory. He gives an outline of the theory and the status, at the time the book went to press, of all the attempts to verify it.

Throughout the book there are numerous references to original sources, so it will serve not only to give the layman a comprehensive idea of ancient and modern eclipse problems, but will also furnish the scientist with an invaluable book of reference.

The book is well written, well printed and profusely illustrated.

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SPECIAL ARTICLES

ABNORMAL DIPS NEAR THE EASTERN BOUNDARY FAULT OF THE CONNECTICUT TRIASSIC

ONE of the principal means of establishing the exact position of the faults which have broken the trap sheets of the Connecticut Triassic is by observing drag dips along the fault zone. The normal dips of the sediments are towards the east, but, if exposures may be found in the vicinity of the fault zones, they frequently show decreased angles of dip or the dips may be shifted towards the west.

In contrast with fault zones which cross the valley the eastern marginal fault zone, which is supposed to have the largest throw, shows only exceptional drag dips. As one approaches the Eastern Upland the dips of the Upper Triassic sandstones rapidly increase from approximately 10° or 15° E at a distance of one half of a mile from the fault line to 40° or 50° E near the fault line. An occasional drag dip may be noted, as in a quarry on the grounds of the Connecticut State Hospital at Middletown, but, in general, Longwell[1] and others have noted the occurrence of steepened dips in the vicinity of the eastern marginal fault.

Similar increased dips have been noted near the faults which cut the rocks of the Grand Canyon district. D. W. Johnson[2] and others have argued that the conditions were produced by monoclinal folds towards the east, followed by normal faulting towards the west. No one has ever argued, and it is not believed, that the Connecticut sediments were ever folded towards the east before the boundary fault developed. A considerable body of evidence goes to prove that the depression within which the Connecticut valley sediments collected was developed by fault movements along its eastern border, taking place *pari passu* with the deposition of the sediments. Such a hypothesis can not account, therefore, for the abnormal dips observed.

For reasons stated elsewhere[3] the writer is wholly convinced that the boundary fault to the east is a normal fault with a hade towards the west. The fact is further established by driven wells along this zone which penetrate from Triassic sandstone above to crystalline rocks at depth. In view of the number of cases of drag dips found near the fault lines crossing the Connecticut valley the writer has been greatly puzzled by the increased dips to the east characteristic of the boundary fault.

Only one possible hypothesis to account for the facts has suggested itself. The condition of tension near the earth's surface which allowed the Triassic fault valley to develop is believed by most geologists to be abnormal. Compressive strains resulting from the earth's contraction usually dominate within the earth's crustal rocks. After the development of the Triassic fault valley of Connecticut is it not possible that the abnormal tensional strains were replaced by the normal compressional strains which were propagated across the valley from the west by the competent sandstones and trap sheets of the Newark series, to be dammed back at the eastern border by the resistent rocks of the crystalline uplands, and that these strains developed a slight monoclinal fold to the east at the contact between the two unlike formations. Certain facts combine to make this hypothesis plausible:

(1) Anticlinal structures similar to the one occurring immediately east of Cedar Mountain, south of Hartford, are known within the valley. They are cut by the faults crossing the area and hence must have been developed between the two faulting periods, *i.e.*, between the period of the eastern fault which developed the trough in which the Newark sediments rest and the period of the cross faults which break the trap flows. The compressional movements which formed the anticline would have effected the dips along the earlier fault zone but could not alter the drag dips along the later fault zone. Thus the abnormal dips at the east may be accounted for.

(2) A study of the crystalline rocks shows that the preTriassic compressional stresses were directed from the west causing overthrusting towards the east in the Eastern Upland. The Triassic thrusts follow, therefore, the usual direction within the area.

And (3) the two distinct periods of faulting seem to call for an intermediate period of compression which must have produced at least minor disturbances at the eastern boundary fault.

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[1] C. R. Longwell, *Am. Jour. Sci.*, Vol. 4 (1922), p. 236.

[2] Proc. Boston Soc. Nat. Hist., Vol. 34 (1909), p. 158.

[3] *Cf.* W. G. Foye, *Jour. of Geol.*, Vol. 30 (1922), pp. 690–99.