

## Brief, Clear, Elementary

**The Great Mathematicians.** Herbert Westren Turnbull. New York University Press, New York, 1961. xv + 141 pp. Illus. \$3.50.

This recently published version of a popular work was edited and provided with a two-page biobibliographical "Introduction" by James R. Newman. It differs little from the four earlier editions although one cannot help but note the unpardonable omission of the index. In the opening "Date list" (page xv) the birth of Cauchy is still given as 1759 instead of 1789; the account incorrectly reports (page 64) that Cardan published the solution of the cubic as "his own unaided work"; and despite Mengoli's death in 1686, one still reads (page 92) that a "very fine piece of work was done in 1695 by Pietro Mengoli." The positional principle should not be attributed to India (page 57), nor is it fair to write (page 135) "Our ancestors in the Middle Ages received a shock when it was found that the surface of the earth . . . was limited and could be circumnavigated."

Notwithstanding the persistence of some minor inaccuracies, the book continues to be one of the more dependable of the brief, elementary histories of mathematics. Chapter headings remove some of the disjointedness suggested by the title, for these headings include, along with the names of specific individuals, such all-embracing phrases as "The Renaissance" and "The rise of analysis"; and the account is indeed a smooth-flowing narrative. The last chapter, purported to describe "More recent developments," is one of the least successful. Here attention is concentrated on Ramanujan, a figure bound to invoke the reader's sympathies, but Ramanujan's work can scarcely be compared in significance with the far more representative contributions of Poincaré or of Hilbert. Nor is this the only point at which the selection of the *dramatis personae* appears to be questionable. One suspects it may be no coincidence that the author, long professor of mathematics at St. Andrews University, devoted more space to Napier than to any other figure, with the exception of Newton, and that he assigned substantial roles to two other Scotsmen, James Gregory and Colin Maclaurin (as well as to

Hamilton, also of Scottish ancestry). In the selection of mathematical themes, one may perceive some predilection for algebra and analysis at the expense of geometry, for Turnbull, who died in 1961, wrote books on determinants and theory of equations, and he edited the correspondence of Newton and the work of Gregory.

Nevertheless, for nicety of balance between folksy biography and significant mathematical development, as well as for clarity in elementary presentations of abstruse concepts, this little book ranks high. Its appearance in still another printing is easily justified by the pleasure and profit it will bring to mathematicians and laymen alike, for it was written in an engaging style by one who had palpable command of his subject.

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## Tangible Evidence

**Studies in Paleobotany.** Henry N. Andrews, Jr. (with a chapter on palynology by Charles J. Felix). Wiley, New York, 1961. xii + 487 pp. Illus. \$11.75.

These fascinating studies are a welcome addition to paleobotanical literature. Careful selection of interesting and fundamental aspects of fossil botany has been successfully combined with thought-provoking points of view and enhanced by a vivid literary style to form a stimulating introductory work. A concise introduction deals with the general nature of the subject. The arrangement of subsequent chapters which deal with the groups of vascular plants, reflects the author's views on their evolution and is somewhat novel. A tentative broad stream of evolution starts with the psilophytes and continues through protopterid and coenopterid ferns to the true ferns and the pteridosperms. The most likely origin of the flowering plants is seen in the pteridosperms, while the gap between cycadophytes and pteridosperms is large. Lycopods, articulates, coniferophytes, and ginkgos do not fit this line, and they are treated as having separate origins. This bold presentation does much to emphasize to students the great significance of the study

of fossils for understanding modern plant groups. Doubtless the points of view presented will provoke much rewarding discussion. There is no attempt to force imperfectly known plants into artificial categories. Instead, problematical fossils are discussed in separate sections of the chapters that deal with those plants to which they are probably related, and a whole chapter is devoted to some of the more spectacular gymnosperms of uncertain affinities. Although the limitations of the fossil record are faced honestly, in this manner, there is, throughout the book, a strong sense of optimism concerning future development of the subject, especially through more widespread application of existing techniques, which should be most encouraging to beginning students.

Chapters are devoted to general discussions of the evolution of pteridosperm seeds, Paleozoic and Mesozoic floras, the principal techniques for studying fossil plants, and basic paleobotanical literature (in this chapter, page 472, line 6, "potassium hydroxide" should read "potassium chlorate"). Special praise must be reserved for the inclusion of a useful chapter on palynology. The study of dispersed spores and pollen has led to so many advances in stratigraphy, and in the general interpretation of the fossil plant record, that an adequate introduction to this vast and rapidly expanding subject has become an essential part of paleobotanical training.

Sometimes formal presentation of material has been sacrificed in favor of interesting presentation, and the results obtained certainly justify this departure. Thus, there are no separate chapters on algae and fungi; instead, some of the most interesting forms are woven into the introduction and into the chapter which deals with pre-Silurian and early land plants. A high degree of interest is sustained by the inclusion of a chapter devoted to bryophytes, which discusses some of the most startling of the few known fossils of these delicate plants, and by the inclusion of a chapter on fossil plants of the Arctic and the Antarctic, regions of great paleogeographic significance. Space is also usefully devoted to two chapters on flowering plants, for their origin, a source of perennial interest, remains as shrouded in mystery and controversy as ever.

There are numerous valuable refer-

ences and a large number of well-selected illustrations of uniformly high quality, which will do much to help the student's understanding of the subject. The omission of magnifications from some illustrations is a minor deduction from their value.

A thoroughly good book, eminently suitable as an introduction to past vegetation.

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## Comets and Minor Planets

**La Poussière Cosmique.** Les milieux interplanétaire, interstellaire, et intergalactique (*Évolution des Sciences*, No. 19). A. Dauvillier. Masson, Paris, 1961. 212 pp. Illus.

This French book on "cosmic dust" is essentially an account of the author's theories about the intergalactic, interstellar, and especially interplanetary media. After a 19-page introduction, and out of 177 pages of text proper, no less than 144 pages are devoted to the minor bodies of the solar system, with well over half on comets; much of the rest is devoted to meteors, meteorites, and asteroids. Few of the modern data on the gas are discussed. Nevertheless, this section includes the more interesting part of the book, in that it exposes the fallacies in some of the currently fashionable theories and describes at length the arguments for the author's own thesis, namely, that cosmic dust, micrometeorites, meteorites, cometary nuclei, microsattellites (of Mars, Jupiter, Saturn), and asteroids are all vestiges and products of the breakup of the terrestrial planet postulated by Olbers to account for the minor planets—and possibly of a lost satellite of Neptune. The references are curiously loaded with obscure popular or semi-popular papers of old authors (mainly 19th-century French), while modern references are sketchy. For instance, other theories of the origin of comets are either ignored (Oort's is not even mentioned), or given short shrift (Littleton's is dismissed in one paragraph); Whipple fares better: two paragraphs, one of which gives priority for the icy conglomerate model to G. A. Hirn in a book published in Paris in 1889! A more serious defect is the evidence of excessive haste and care-

lessness in putting together the author's reading notes into a book. For example, the statement on page 78, which is used to describe the polarimetric observations of the nucleus of a comet, "the polarisation . . . decreased with phase angle," is obscure because the range of phase angle is not stated. Furthermore, there are occasional plain errors of fact: the motion of Phobos, the inner satellite of Mars, is shown and described, on pages 47 and 48, as retrograde; the motion is direct.

The two brief chapters on interstellar gas and dust are extremely poor and sketchy; the last chapter (nine pages on intergalactic matter) is even worse and shows that the author is here way out of his field. The author (or the editors of the series) should have had the good sense to recognize it and to limit the discussion to the solar system.

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## South Sea Island Immigrants

**Peasants in the Pacific.** A study of Fiji Indian rural society. Adrian C. Mayer. University of California Press, Berkeley, 1961. 201 pp. Illus. \$6.

The British Crown Colony of Fiji has been called "The Little India of the Pacific," because agricultural labor brought there, as to other British Colonies during this and the last century, and their descendants, now 170,000 strong, outnumber native Fijians and all other peoples residing in these South Sea Islands. No longer bound by indenture and despite government regulations which virtually exclude them from acquiring freehold farm lands of their own, most Fiji Indians have preferred to stay in these islands rather than return to India. In so remaining, they have become a peasantry dominated by the economics of sugar production and also the largest overseas Indian community to be found anywhere.

During 1950 and 1951 Mayer studied three settlements, which represented about one percent of the population, located in each of the rural areas where Fiji Indians are concentrated. In his presentation of this research, he gives a concise review of the historical and cultural factors that have influenced some of the settlement and so-

cial patterns and a brief and excellent analysis of the major activities upon which this rural economy rests, as well as of the relations of these to certain aspects of the social structure. Variations and changes in caste, kinship, and the ritual life are described and related to the different localities of origin in India and to the effects of emigration and adaptation to a new social and economic order. Most interesting here is the effect that reliance on a single productive economy—growing sugar cane—has had upon that bulwark of Indian social and economic organization, caste, for in India caste is as much a system of economic interdependence between occupationally specialized groups as it is a matter of social rank and religious life. Greatest emphasis, however, is placed on the local political scene and its various organizational contexts, and on factionalism, leadership, and some aspects of social control. The manner in which these cut across the diversities of caste, linguistic affiliation, and religion brought from India is of utmost importance, for in these political activities are to be found the interests and values around which this new and emergent version of Indian society has become integrated in a multiethnic setting that includes Fijians, Europeans, and Chinese. The scope of this analysis is purposely restricted to rural settlements, but in an attempt to relate these to Fijian society at large, the author has, in a concluding chapter, summarized some of the attitudes and stereotypes Fiji Indians have toward each other, toward Fijians and Europeans, and toward their Indian homeland. As the subtitle indicates, the urban residents of the Fiji Indian community, whose importance and power derive from their participation in trade, finance, and Colony politics, are hardly discussed, yet their relation to the rural population is made abundantly clear.

Peasant communities, which form but a part of a large, heterogeneous, and complex society, are anything but easy to describe analytically, for they lack the unity and clearly defined social structures which relatively autonomous primitive societies possess and which social anthropologists have become skilled in handling. In this case the difficulties are amplified by the fact that Fiji Indians themselves come from diverse regional and social backgrounds, and many of these differences are perpetuated in the new setting.