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 professer 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-