Book Reviews

Comparison of the Large-Scale Structures of the Galactic System with that of Other Stellar Systems. International Astronomical Union Symposium No. 5. Held in Dublin, 2 September 1955. N. G. Roman, Ed. Cambridge University Press, New York, 1958. 72 pp. + plates. $3.

Nineteen workers in the general field of galactic structure give, in this thin volume, abstracts of papers they presented at a symposium in Dublin in 1955 on the occasion of a meeting of the International Astronomical Union. The volume is valuable as a record of progress in the study of galaxies, especially of our own. It will not be so valuable to the general reader in search of final answers because the subject is now in agitated flux. Radio astronomy has entered the field. Neutral hydrogen radiation from interstellar space has opened new chapters in the astronomer's "Book of Knowledge" of matters cosmic. The Cepheid variables and the high-luminosity blue stars have to some extent betrayed us and made a confusion of the extragalactic distance scale. The universe expands at a lesser speed than we thought a decade ago, and therefore the age of the expansion and the speed of the evolution of galaxies and stars is under revision.

In the face of these semichaotic conditions, the astronomers from five countries have, in the symposium under review, clearly pointed the way to a better understanding.

Unfortunately, Walter Baade's excellent interim report on the structure of the Great Andromeda galaxy is made nearly useless by the omission from the book of the revealing photographs made by him with the giant reflectors in California. The reports on radio astronomy by the Dutch and English astronomers, however, are full of good results and speculations, and one can see that the greater radio equipment of the near future will revise numerous conclusions, answer many questions, and ask still more. The contributions from the Soviet writers are outstanding in special subjects: Kukarkin on the use of variable stars for the analyzing of galactic structure; the late G. A. Shajn on the short durations of diffuse nebulae; and Ambartsumian on the possible existence of scattering "associations" of galaxies, analogous to the scattering associations of stars which he has discovered and explored.

One of the Soviet writers (Vorontsov-Velyaminov) is a strong dissident, openly challenging the conclusions of practically everybody. Although he was not a participant in the symposium, his paper was included in the volume at the special request of the Russian leader, Kukarkin.

One result has clearly emerged from the conference and its book-length report; it is that both the structure of our galaxy and the evolution of all galaxies are more complicated than we thought in the simple days of ten years ago.

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Physical Geology. L. Don Leet and Sheldon Judson. Prentice-Hall, Englewood Cliffs, New Jersey, ed. 2, 1958. ix+502 pp. Illus. $7.50.

Four years ago, after publication of a review commending the inclusion, in the first edition of this text, of some elementary chemistry and atomic theory as background for an understanding of geology, I was mildly dumbfounded by one professor who wrote, "The book contains too much on atomic structure . . . we fear that these pages would floor the student and he would never see the next chapter."

Thus one teacher's respected text may be another's doorstop. But those who wish to introduce into elementary geology courses some background information in fundamental principles from related sciences will find that this book employs the approach introduced in the first edition, refined and sharpened by several years of practical use in hundreds of classrooms throughout the country.

The organization of chapters is changed and improved. "Minerals" and "Igneous rocks" are now considered separately near the beginning of the book; they are followed immediately by a discussion of "Igneous activity," which formerly was rather illogically lumped with "Metamorphism" near the end of the text. "Geologic time" is removed from the appendix, expanded considerably, and given separate chapter rank. The discussion of wind action now appears in a chapter headed "Deserts," though some of the activity described does not occur under desert conditions. "Lakes and swamps" have a chapter of their own instead of being immersed in "Running water," "Underground water," and "Glaciation"; all of these chapters remain otherwise not greatly altered. "Earthquakes" and "The earth's interior," specialties of the senior author, now are separated and splendidly presented in relatively compact form. Several new diagrams on "Rock-deformation and mountain-building" clarify the presentation of this complex subject. The final chapter on "Useful materials and energy" is greatly expanded and offers much up-to-date information in this fast-changing field.

Many portions of the book have been rewritten, and new illustrations and diagrams have been added. The approach is stimulating and rigorous. Geology is presented as an exact science, drawing support from mathematics, physics, chemistry, and other disciplines, but still finding uncertainties on its own doorstep. For example, in the discussion of exfoliation we read, "How these slabs of rock come into being in the first place is still a matter of dispute," or in the section on feldspars, "Mineralogists still do not understand the precise process by which the feldspars weather." Here is refreshing departure from the practice of pretending in an elementary text that all answers in the science are known.

Unfortunately, few direct references are made to controversial views in ways which will enable the curious student readily to seek additional information. For instance, although Johnson's and Shepard's classifications of ocean shorelines are briefly summarized, neither authority is cited by name. Only one reference to the subject is given at the chapter's end, and that not in a way which shows the student that it has any connection with the controversial views previously discussed.

Considerable reference material is included at the end of the book. A 27-page glossary covers most of the technical terms used in the text. There also are appendices on the chemical elements, on mathematical exponents and their use in expressing distances and sizes, on minerals and their characteristics, and on topographic and geologic maps.

In all, the book provides a sound elementary foundation in geology for serious and competent nonmajors, as well as for students who plan further work in the science.

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