survey course is included, but the enterprising student will find it difficult to go beyond the scope of the book, for the author provides neither an organized bibliography nor footnotes, although many references are scattered throughout the text.

The book is worthy of consideration, and indeed has much to recommend it, as a text for use in one-semester survey courses designed for students with nonscientific backgrounds. But one wonders whether, for students who wish to become secondary school science teachers, the introduction to the subject of earth science must be written at such a low level.

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Metabolic Aspects of Cancer

There is at present no particularized and generally accepted theory of cancer, biochemical or otherwise, and any author who attempts to write a book like this one—**Biochemical Approaches to Cancer** (Pergamon, New York, 1965. 210 pp., $3.95)—will inevitably find himself cursing the darkness even while trying to light a candle. The author, Eric Reid, set out to examine cancer as a metabolic derangement, and to inquire whether there are any molecular defects which distinguish cancer tissues or which occur in precancerous tissue, but more particularly to emphasize the areas that are worthy of attention. The approaches chosen are necessarily coupled to existing theories of carcinogenesis, and Reid quickly passes over the theories of Warburg, Greenstein, and Green, dismissing the latter with a quotation by Sir Macfarlane Burnet. Later in the book (p. 155) Reid again dismisses immunological theories with the following comment— " . . . there being at present no imaginable mechanism whereby immune processes, for example at the cell surface, could influence genetic processes." Of course there *are* imaginable mechanisms, and their conception should not be discouraged in a book of this type. Reid's main preoccupation is *metabolism*, the dynamic, branched, flow pattern of chemicals that is the pulsating heart of life processes. Carbohydrate and fatty acid metabolism are discussed together, with deemphasis of the Warburg theory—"at least it seems that a respiratory defect is not a prime cause of cancer" (p. 24). Reid cited evidence that high glycolysis is probably a feature of only the advanced malignancies, and he did not have an opportunity to examine more recent claims made by Burk that, under special conditions, detectable differences between glycolysis in minimal deviation hepatomas and normal liver could be shown.

Protein and nucleic acid metabolism were covered in detail, and a special chapter on control mechanisms led to the conclusion that the choice between DNA, RNA, or protein as primary targets for carcinogens is still unclear.

Reid, who clearly favors the general idea of somatic mutation, achieves a tentative synthesis of this with the viral theory and the deletion theory, especially the more recent concept of feedback deletion. The final chapter, on biochemical pharmacology, is useful in relation to cancer chemotherapy and reiterates the earlier distinction (p. 23) between the biochemistry of carcinogenesis and the biochemistry of chemotherapy.

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Crystallography

Sir Lawrence Bragg's well-known, classic, original edition (1937) has been revised and updated in an expanded version, **Crystal Structures of Minerals** (Cornell University Press, Ithaca, N.Y., 1965. 419 pp., $11.50) by Bragg and G. F. Claringbull, with a chapter by W. H. Taylor. Whereas the earlier edition described all of the then-known mineral structures, the present version describes all the *important* ones (the term is interpreted liberally to allow inclusion of wadeite, for example, to represent rare structure types); all other structures published by the end of 1963 are cited in useful lists at the ends of the several chapters. The broad outlines of the book are unchanged; a crystallographic information "explosion" has caused the authors to omit unnecessary sections dealing with methods of x-ray analysis, and to condense the section on the relation between optical properties and crystal structure that was an impressive addendum to the description of the structure of calcite in 1937. Important extensions of knowledge between 1937 and 1965 are reflected in the increases of certain chapters shown in the accompanying box. Certain other chapters are almost unchanged in length or, as noted above, are reduced in some sections or even deleted.

A few changes in terminology—such as that from *vesuvianite* to *idocrase* and that from *titanite* to *sphene*—may bring smiles to the faces of some mineralogists who are interested in nomenclature, and in one or two instances the lack of such change may result in critical comments. In the latter group is the failure to adopt Strunz's useful Greek names for the subgroups of the silicates. The heading of chapter 9, for example, "Silicates containing separate SiO_4 groups," could more concisely and more elegantly be "Nesosilicates," which surely is no less comprehensible to most mineralogists today. The first step in this direction had already been taken on page 172, where the Strunz names are listed. I would be better pleased if the second step had also been taken, but that is of course a matter of opinion.

Like the first edition, this new edition, published almost 30 years later, will surely become an important reference source for students at all levels

	1937 edition	*1965 edition*
Chapter 7, on oxygen compounds (carbonates, sulfates, and the like)	25 pp. 10 minerals	39 pp. 15 minerals + 112 references to other minerals
Chapter 12, on chain-structure silicates (pyroxene and amphibole)	19 pp. 2 mineral groups	27 pp. 5 or more groups + 12 references to other minerals
Chapter 13, on sheet-structure silicates	27 pp.	40 pp.

in the study of mineralogy and crystallography. It is clearly essential for the beginning student, and its relative completeness makes it valuable for the experienced professional.

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Science and Philosophy

The largest part of this volume, **The Foundation of Metaphysics in Science** (Humanities Press, New York, 1965. 512 pp., Illus., $10), by Errol E. Harris, is a summary of scientific theories in physics, biology, and psychology. Happily, that part can be recommended for its own sake. The purpose of its inclusion is to support a metaphysical view of a Leibnizian-Whiteheadian stock, which utterly failed to excite me. "Contemporary science of physics, biology, and psychology," the author claims, "all presume, with abundant empirical justification, continuity of gradation from the inorganic to the organic and from the physiological to the psychological" (p. 290). He admits that the situation is not yet entirely satisfactory and promises to fill one gap in our knowledge, to clear one of the remaining difficulties. If he could do that, he would be contributing to our scientific knowledge; even doing so by the use of a philosophical method would constitute a contribution which would make his exercise most exciting.

The author's own claim is not to add to but to use science. The science he uses he presents well, so that one can easily see that the author often rejects views presented by the majority of scientists—usually as oversimplifications—in favor of views advanced by scientists holding his own philosophical convictions. When such alternative views are not available, he may present a dream as if it were a fact. Thus, he says that there exists one single equation from which all equations of physics, micro or macro, follow logically (p. 145).

In my opinion both oversimplification (idealization) and unification (universality) are of equal importance, and the dialectic between them keeps science going. When the fashion, however, is in favor of oversimplification and overcompartmentalization, and even of hypostatizing such transient defects, it is refreshing to see an attempt, however exaggerated in its claims, in the opposite direction.

The scientific parts of the book are uncommonly interesting, popular though high-level, and even up-to-date. The author's heterodox views do sometimes come in his way, but they also afford him a fresh look and a frequent new flash of imagination that may intrigue a reader and lead to further ideas. On the whole his survey is somewhat less ordinary than surveys which show no idiosyncracy. It is delightful to see a list of criticisms of neo-Darwinism, for instance, whether these are answerable or not. One may complain that the author does not expand on his view that photosynthesis converts noise into a message. But one may take it as a suggestion, and work out a variety of criteria which may or may not include self-winding watches in the same class as chlorophyll, and possibly even make such mechanisms more efficient than chlorophyll.

All this may be useless fun. And, in any case, owing to the author's philosophical bias and wishful thinking, the book requires discrimination on the part of the reader. But it will be read, then, with one sort of profit or another. It may serve as a refresher for high-brow conversationalists. It may also serve as a source of, and a reference for, information for the more thoughtful. It may even help some to write better science surveys.

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Prehistoric Expedition Report

This volume, **Contributions to the Prehistory of Nubia** (Fort Burgwin Research Center and Southern Methodist University Press, Dallas, Texas, 1965. 200 pp., $6.50), contains a series of preliminary reports on the prehistory and geology of lands bordering the Nile River in Sudanese and Egyptian Nubia, most of which have been, or will be, inundated by waters rising behind the New High Dam at Aswan. The papers were assembled by Fred Wendorf.

The research was accomplished by the Combined Prehistoric Expedition which included participants from Columbia University, the Museum of New Mexico, and Southern Methodist University. Egyptian, French, Belgian, Polish, and British scholars also have participated in the investigations. This expedition is one of numerous scientific teams that have engaged in salvage archeology in an area where some of the most important developments in the cultural history of man have occurred, developments that extend from Early Paleolithic times to the Pharaonic and later historic periods of Egyptian civilization.

The report contains six articles: A summary of work during the field season 1963–1964 (by Wendorf, Shiner, and Marks) correlates archeological and geological sequences in Nubia from Early Paleolithic industries to Neolithic remains. Said and Issawy, in a paper on the geology and geomorphology of Lower Nubia, Egypt, attempt to account for the geological evolution of the Nile. De Heinzelin and Paepe present preliminary results of their analysis of the geological history of the Nile Valley in Sudanese Nubia. A statistical and typological study of the Early and Middle Paleolithic industries is presented by J. Guichard and G. Guichard. Waechter describes four sites that have complexes identified as epi-Levallois. Chmielewski reports on investigations aimed toward obtaining information on the formation of the Nile Valley.

Although it is stated in the volume that some of the interpretations in these preliminary papers need revision, it is unfortunate that such revisions were not made before publications. Discrepancies between articles and the inclusion of inferences based upon data obtained after certain articles were written are confusing. Obviously, divergent opinions among staff members of such a large endeavor are to be expected, but the reasoning behind some highly conflicting statements should be explained. For example, in one article it is related that investigations were made at "thirty-six sites where archaeological industries were found associated with pre-Nile deposits" (p. xv), and in another paper it is stated that "no industry is as old as the Pre-Nile System" (p. 55).

Publication of preliminary statements upon continuing research generally is appreciated, but such papers should be carefully scheduled and edited in order to present a clear, comprehensive account of the then current status of the program.

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