day work, of who did what, of change in roles over time, of the cost and procurement of apparatus, of the physical layout, of all the material aspects of the enterprise. How often did Rutherford and Soddy repeat their measurements? How accurate were their results? What did the three other investigations of radioactivity in which Rutherford was then engaged with his advanced students contribute? Trenn mentions only one of these lesser collaborations. This is not to hint that the true inventor of the disintegration theory was a graduate student, but that the range of questions against which the theory developed may have been wider even than Trenn suggests.

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Diamonds

The Mineralogy of the Diamond. YU. L. ORLOV. Translated from the Russian edition (Moscow, 1973). Wiley-Interscience, New York, 1977. xii, 236 pp., illus. $28.50.

This book is a timely contribution summarizing what is known of the physical and chemical properties of diamonds, their distribution, and what constraints their presence imposes on the genesis of kimberlite. In particular, the book provides the Western scientist with a review of the little-known and relatively inaccessible Russian literature on diamonds and kimberlites. About 40 percent of the close to 700 references are to Russian papers, and this proportion reflects the dominance during the past few decades of the Soviet researchers in this field. The weakest points are the spotty coverage of the most recent foreign papers and the glossing over of technical details, especially with respect to the nonconventional synthesis of diamonds referred to in the Russian literature. The "selective" coverage gives the reader the impression that the author had access to only a limited number of translated papers.

The text has suffered in translation: sentences are cumbersome, and time and place terms are used without regard to the context of the sentence. Good editing would have made the book more readable. I also fault the publisher for the use of unfamiliar units, the undefined notations and conventions, and the omission of reference standards for measurements; for example, the ΔC^{13} (sic) notation usually refers to the difference of carbon isotope abundance between two samples ($\delta^{13}C_1 - \delta^{13}C_2$), given in per mil rather than percent with respect to the Pee Dee Belemnite standard.

The ten chapters cover the varieties (based on crystal habit and form), structure, composition, structural defects, morphology (growth and dissolution features), properties, natural occurrence, paragenesis (syngenetic and epigenetic inclusions), synthesis, and genesis of diamonds. The chapters on composition, morphology, paragenesis, and genesis provide a good review of the literature; the chapter on morphology, in particular, has an excellent concluding summary. Perhaps the most important chapter is the first, which outlines the classification of diamonds into ten morphological varieties and sets the tone for comparing these with the chemical types of diamonds and the petrological conditions for their formation. The coverage in the chapter on the occurrence of diamonds in nature would be more complete if the author had incorporated data from the issue of *Physics and Chemistry of the Earth* devoted to kimberlites (vol. 9, 1975), which he cites. The chapter on diamond synthesis is disappointing, with an overemphasis on the work reported in Western literature and a rather sterile account of the Russian work.

I judge this book to be the best available on the mineralogy and petrology of diamonds, despite the flaws.

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Carbonate Deposition

Deep-Water Carbonate Environments. Papers from a symposium, Dallas, April 1975. HARRY E. COOK and PAUL ENOS, Eds. Society of Economic Paleontologists and Mineralogists, Tulsa, Okla., 1977. vi, 336 pp., illus. $14; to SEPM members, $12. SEPM Special Publication No. 25.

Deep-Water Carbonate Environments consists of a number of case histories detailing the facts and interpretations that lead the authors to consider that their particular carbonate sections were deposited in deep water. An introductory paper by the editors very nicely summarizes the volume.

Several of the 15 papers are of a general nature. Byers discusses a basinal biofacies model based on oxygen zonation with depth to explain alternating zones of burrowed shelly facies with zones lacking bioturbation and fossils. Fischer and Arthur have assembled a tremendous quantity of data from the JOIDES Deep Sea Drilling Project and from outcrop studies to develop a cyclic global model for the last several hundred million years. Cycles of approximately 32 million years' duration are characterized by alternations of times of high diversity of pelagic biota with times of low diversity. These cycles are believed by the authors to be the result of climatic variations. The editors rightly refer to this as a thought-provoking paper.

There are three papers that emphasize the shelf-to-basin transition from highly fossiliferous wackestone and grainstone of the shallow-water shelf to thinly-bedded-to-laminated, dark-colored wackestone and mudstone of deep-water basins. Truncation surfaces and broad, shallow channels are common in the basinal settings. All three papers describe this transition in Mississippian section, from the western Cordilleran of Utah, from the northern Rocky Mountains of Montana, and from New Mexico and West Texas.

The majority of the papers in the volume report on basinal sections that consist of widely distributed, laminated, dark-colored wackestone and mudstone with interbedded lens-shaped bodies of breccia and grainstone. The breccia and grainstone lenses are referred to by the various authors as having been transported from shallow-water settings into the basin by mass flow, turbidity currents, submarine slides, debris sheets, downslope displacement, debris aprons, and gravity flow. Petroleum geologists have been particularly interested in these lenses because they offer the possibility of porous reservoirs in an otherwise nonporous section. This fascinating combination of rock types has received considerable attention over the past 15 years, as is evidenced by the large number of papers on them and the diversity of geologic ages dealt with; Cambrian, Devonian, Pennsylvanian-Permian, Jurassic, and Cretaceous models are described in detail. Some authors point out, however, that the interpretation is still in question in some cases.

The editors have done an excellent job of organizing this group of papers from diverse authors. Their effort in preparing the extensive index will be appreciated by all those who use the book, which doubtless will be a basic reference on deep-water carbonate models for years to come.

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