gest possible uses for this source book as a teaching aid or for use by the student who is studying on his own. I sincerely hope to see the day when I can submit these reprints, or any other comparable set of research papers, as a reading assignment to first-year chemistry students. It is exactly in such a context that we cannot but wonder how much more useful a publication of this type would be if supplemented with, say, 50 pages of accompanying text.

The text should not only provide a preface to, and critical summary of, what is presented in the present volume, but also contain appendices clarifying many features that of necessity had to be compressed in the research papers involved. Finally, a survey of the related work of other authors, merely referred to in Platt's preface, would be very much apropos here (particularly the later developments due to H. Kuhn). In the meantime we can only hope that the publication of this "source book" will create renewed and broader interest in this beautiful method of quantum chemistry. Perhaps this will help point toward the need for a true and comprehensive textbook on free-electron theory.

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Paleontology

Colloque sur le Paléogène (Bordeaux, September 1962). Mémoires du Bureau de Recherches Géologiques et Minières, No. 28. vols. 1 and 2. Éditions Technip and Éditions B.R.G.M., Paris, 1964. vol. 1, xvi + 544 pp.; vol. 2, iv + 563 pp. Illus. Paper, F. 240.99; cloth, F. 270.

The publication of Lyell's *Principles of Geology*, 1830 to 1833, was one of the outstanding milestones in the development of the science of stratigraphy. Since that time changes in the concepts, methods, and techniques have been produced at an ever increasing tempo. Unfortunately much of the development has been haphazard, and many cherished ideas have "grown like Topsy," with little discipline apparent in their establishment and acceptance.

In the third volume of his work, Lyell subdivided the Tertiary into four periods (nowadays usually ranked as *epochs*): Eocene, Miocene, Older Pliocene, and Newer Pliocene. Later Pleistocene was substituted for Newer Pliocene. Lyell expressly provided for the intercalation of new periods, and subsequently Beyrich created the Oligocene and Schimper the Paleocene to complete the usually accepted sequence. The types (all in western Europe) of these periods were not indicated with a precision suitable to present day needs and their limits were vague, but they form the standard with which the sequences of other parts of the world are sooner or later compared.

Two decades after Lyell's book, Alcide D'Orbigny proposed other stratigraphic subdivisions, which he termed *étages*, or in English, *stages*. Subsequently modified in concept and refined, the stages of the Tertiary have subsequently usually been ranked as subdivisions of Lyell's periods. Since then proposed stages have proliferated apace, especially within the Tertiary, and often, until relatively recently, with little discipline. Many have as rapidly passed into limbo; some have had only local use, but others have been utilized on a worldwide basis. Modern analyses and needs have brought to light many contradictions, inconsistencies, and inadequacies in the definitions and usages and hence emphasized the need for worldwide agreement on stratigraphic standards and interpretations. The Colloque sur le Paléogène, held at Bordeaux in September 1962, is one of several noteworthy attempts in recent years to improve the situation for the Tertiary; the present volumes represent the results of that gathering.

The 1107 (+ xvi + iv) pages (the review copy has paper covers and a weak back) include 102 separate papers, a terminal table of contents listed alphabetically by senior author, and an introductory table of contents in which the papers are classified according to various categories. There is no general introduction giving the purpose of the conference, no listing of participants, nor any general index. It is thus exceedingly difficult to locate considerations of specific subjects, places, or individuals. A little more editorial care would have made these meaty volumes much easier to utilize and thus better serve the purposes of the conference. The first set of papers is concerned with the following areas: the Paris Basin (169 pp.); the Aquitaine Basin (307 pp.); other parts of France (63 pp.); the Nordic Basin (52 pp.); Mediterranean and Alpine areas (142 pp.); the U.S.S.R. (84 pp.); Africa (28 pp.); and Greenland (4 pp.). Papers on boundary problems of the Paleogene occupy 66 pages. Forty-six pages are devoted to consideration of new and better ways of subdividing the Paleogene. Paleontological papers take up 108 pages. In the final 28 pages the sedimentary facies of the Montian of western Europe are considered.

As in all gatherings of this sort, the participants were of diverse calibers, training, and viewpoints, and the resulting papers represent various degrees of scholarliness and preparation. In consequence, no matter what his philosophy or background, a user will find something of which he will approve or disapprove. However, one thing is certain: anyone attempting to correlate with the "standard" sections in Europe, or to use them as a standard, should consult these volumes.

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Chemical Propellants

Energetics of Propellant Chemistry. Bernard Siegel and Leroy Schieler. Wiley, New York, 1964. xiv + 240 pp. Illus. $10.

This new addition to the rapidly growing library of texts on rocket propellants and propulsion is simply, if not too efficiently, organized. The authors begin with a discussion of the basic principles of propulsion and methods of calculating the performance of propellants (chapter 1). The energetics of propellant combustion products (chapter 2) and of propellant reactants (chapter 4) are considered individually but with the common theme of the fundamental role played by molecular bonding. The behavior of the combustion products as a working fluid with dissociation-limited temperature is discussed in chapter 3. This background is fused into a treatment of actual, or at least possible, propellant systems in chapter 5. Such an organization inevitably leads to considerable repetition which sharper editing could have reduced. For example, the outline of the book is given in the preface, in the last paragraph of chapter 1, in the first paragraph of chap-