knowledge of these objects. The study of cosmic dust, for instance, is attracting special attention in the present space age. Though not differentiated by Hawkins, cosmic dust consists of particles generally smaller than micrometeorites, as defined by the International Astronomical Union, and an understanding of the identification and analysis of cosmic dust demands some astronomical knowledge of the nature, composition, and motion of interplanetary bodies.

One feature would have increased the value of this little book enormously —a bibliography to help the student who wants to investigate further many of the original discoveries and theories. However, the 27 problems, with some answers, will satisfy many students.

The layman will probably be satisfied by the book in its present compact form. Meteors, comets, meteorites, and micrometeorites will soon be of even more intense interest to all, since these interplanetary bodies, in one form or another, visit the Earth from the realm into which man himself will soon venture.

FRANCES W. WRIGHT
Smithsonian Astrophysical Observatory, Harvard College Observatory, Cambridge, Massachusetts

Mineral Resources

Les Péridotites Serpentinisées en France. Groupe 1, *Péridotites Intracristallines.* pt. 4, *Massif Central Médian: Bassin du Haut-Allier.* F. H. Forestier. Bureau de Recherches Géologiques et Minières, Paris, 1964. 291 pp. Illus. Map.

As part of its broad mineral program in France, the Bureau de Recherches Géologiques et Minières is publishing three series ("suites"), on mineral resources, hydrogeology, and serpentinized peridotites, respectively. Reports on fluorspar and barite have been published. The present paper is one of a series of 12 loose-leaf reports that supplement the author's general review *Les Péridotites Serpentinisées en France* (1962). Ten of the reports are concerned with pre-Hercynian peridotites by districts; one is concerned with Hercynian peridotites of the Massif Central, and one with the "alpine" (Mesozoic and Tertiary) peridotites. Forestier believes, despite recognized objections, that the ultramafites were emplaced as fluid magma, possibly as submarine (ophiolite) flows, before the principal regional metamorphism of their country rocks, and that they were serpentinized at various times.

Fascicule 4, "Massif Central Médian: Bassin du Haut-Allier," is the first of the series on pre-Hercynian peridotites to be published. It describes 83 peridotite occurrences which are indexed by number on a geologic map at 1:300,000 scale and which appear to be closely associated with pyroxenites and amphibolites. Each occurrence is systematically treated under 16 headings that range from name, location, form, and size to nature of the original peridotite, degree of serpentinization and kind of serpentine (antigorite or chrysotile), atmospheric alteration, contact relations with country rocks, acid dikes and features related to them, previous descriptions, and dates of the author's visits. In essence the descriptions are detailed field notes that are illustrated by numerous sketches and sketch maps, and laboratory notes that include thin-section descriptions and a few chemical analyses. Many of the descriptions of mineralogy and rock relations are excellent and would apply equally well to ultramafites in the gneissic terrain of our southern Appalachian region.

The format and scope of the series evoke a mixed response. The loose-leaf format must be expensive; it has the usual drawbacks of large bulk and pages that tear loose, although good paper is used; and it is designed primarily for someone working in the field in France. The method of presentation, although effective for scattered small bodies, is not suitable for complex masses more than a few tens or hundreds of feet across. The descriptions are quite repetitious because most of the masses are small and very similar, and they do not seem to have the economic purpose that justifies the descriptions of individual deposits in the barite and fluorspar series. The publication of several hundred more similar descriptions will have limited scientific value; I hope that the series will also include modern large-scale maps which show the detailed structure and lithology of some larger and less fragmented Hercynian and "alpine" peridotites.

T. P. THAYER
U.S. Geological Survey, Washington, D.C.

Mathematics

A Textbook on Analytical Geometry. Joseph S. Mamelak. Pergamon, London; Macmillan, New York, 1964. viii + 247 pp. Illus. $6.

At a time when combined analytic geometry and calculus courses are much in vogue and when much effort has been turned toward producing elementary mathematics books that are reasonably sound, a book such as this is something of a novelty. It covers the usual topics associated with older books of similar titles, in much the same way, although there is some attempt to introduce significant geometric exercises with physical and engineering overtones.

In general there is no attempt to be rigorous despite the publisher's claim that "new concepts are developed in a rigorous manner." A typical beginning is "choose a straight line which extends indefinitely in both directions." Such words as infinite, direction, and extension are carelessly used. The popular phrases "draw a line" and "a point which moves" are used extensively. One exercise begins as follows: "A basic assumption of synthetic geometry is: figures can be moved in the plane without changing their form."

It is doubtful that the intended users, students of engineering and science, will profit much mathematically from exposure to a geometry course based on this book.

EDWIN HALFAR
Department of Mathematics, University of Nebraska

Laboratory Procedures

Theory and Practice in Experimental Bacteriology. G. G. Meynell and Elinor Meynell. Cambridge University Press, New York, 1965. xii + 274 pp. Illus.

This book of laboratory procedures is divided into seven chapters. The first, "Measurement of bacterial mass and number," includes plating, turbidometric, and chemical methods, with a rather detailed discussion of growth rates. The second chapter, on media, contains a discussion of the inhibitory factors sometimes found in media, as well as consideration of the usual topics. Methods of oxygenation, meth-