# Book Reviews

*Silicones and Their Uses.* Rob Roy McGregor. McGraw-Hill, New York, 1954. 302 pp. Illus. $6.

This volume, the third to appear in this country on the general subject of silicones, is a practical treatise about what silicones are, how they are made, and in what ways they are useful. The author has enjoyed a close connection with the science and technology of silicone materials for 15 years, principally as administrative head of the multiple fellowship at Mellon Institute sponsored by the Corning Glass Works and The Dow Corning Corporation. He has put this experience to good use in the present task, coming up with an authoritative discussion of all the practical aspects of silicone polymers.

After a brief introduction, the author devotes a chapter to each of the five major aspects of the subject. Chapter 1, on the history of silicones, is short, interesting, and at times fanciful. Chapter 2, on the general types of commercial silicones, constitutes half of the book—silicone "fluids," "compounds" (in the sense that the rubber compounder uses the term), lubricants, resins, rubber, and bouncing putty are treated in separate sections, each complete with tables of properties of the representative Dow Corning materials appropriate to that section. Past and present uses for each type of polymer are described, and some projected uses are discussed. Chapter 3, on the physiological response to silicones, devotes 11 pages to the investigations of effects on experimental animals, proving mostly that there is no physiological response. This conclusion opens the way to a variety of interesting proposed uses in medicine and in the cosmetics industry. Chapter 4 takes up the applications of silicones in specific industries, in the form of a well-organized list of such applications according to type of industry. Several pages on cost considerations follow, showing that the price of silicone materials has been falling since 1942, while everything else has been going up. Chapter 5 reviews the preparation of silicone intermediates and then takes up the various methods of polymerization. A bibliography of 152 listings and an index of eight pages complete the volume.

McGregor plainly states that he is writing for the general reader, and especially for engineers, designers, and practical scientists who may want to use silicones to solve a particular problem. He makes it equally plain that he is not writing for the research chemist or chemical specialist in the field of silicones. This is not to say that the book contains little about the chemistry of silicones; it contains a great deal of chemical information, some of it in unexpected places. However, the chapter expressly devoted to the chemistry of silicone preparation takes up matters from an elementary level, and anyone with at least freshman training in chemistry should be able to follow the narrative and the reactions. If he does, the reader will have a reasonably good understanding of what goes on in the manufacture and use of silicones. He may then want to proceed further in other sources.

There is no doubt in my mind that this book has accomplished the author's purpose and that many people in applied science and the practical arts will find it exceedingly useful. Another author might have defined and described things quite differently, but none could have achieved in the final result any greater practical utility.

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*Methods of Theoretical Physics,* pts. I and II. Philip M. Morse and Herman Feshbach. McGraw-Hill, New York–London, 1953. xxx + 1978 pp. Illus. $30 the set, $15 each volume.

This is a monumental work. At first glance, one wonders at the enormous effort involved in collecting, organizing, systematizing, and presenting such a mass of material. Further study evokes a steadily growing admiration and gratitude that the tremendous work has been done and that an amazing amount of useful material has been made available to physicists. This is not to say that it can be read in a hurry. It must be studied. But one who needs to know the subject matter can find it.

The title is an accurate description of the contents. The unity, the organization, and the material of the book are based on the methods rather than on the subject matter of theoretical physics, which means that the book is on mathematics but mathematics in the physicist's sense. Little attention is paid to rigor as a mathematician understands it, but much attention is given to the applicability to physical problems. Classical mechanics, optics, electromagnetic theory, and quantum mechanics are frequently dealt with together, as in the sections on field theory.

Some of the chapters would make, in themselves, good courses in mathematics for physicists. One hundred forty pages on functions of a complex variable and 180 pages on ordinary differential equations provide, in a concise form, most of the techniques needed in these fields and provide them with minimum emphasis on analytic rigor and maximum emphasis on intuitive (geometric) understanding.

Extensive discussions of approximate methods prepare the reader for the "facts of life" in theoretical physics, as opposed to classroom situations where most problems can be treated in closed form.

As is to be expected from the activities and interests of the senior author, the solutions of Laplace's and Poisson's equations and of the wave equation are given full attention. In these chapters, as in most other chapters, a valuable tabulation of solutions, functions, and other material is appended. In fact, the tabulations at the ends of the various chapters