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starts with a stated problem or question in nature to be investigated. This is then followed by a short paragraph giving a brief overview of the total procedure. An experiment is then devised to enable the student to find the answer. Where possible, experiments are made quantitative with the construction of graphs and data tables used to record and interpret results.

A teacher's manual has been prepared to give valuable suggestions for general laboratory procedures, safety precautions, problem reporting, and evaluation of student reports. Acceptable results and answers to questions are given, making it unnecessary for the teacher to conduct the experiment before giving it to the students.

Any high school chemistry teacher who is not familiar with this manual should certainly give it careful attention.

Virgil Heniser
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CHEMISTRY IN NON-AQUEOUS SOLVENTS, Harry H. Sisler; Calvin A. VanderWerf, Ed., 119 pp., \$1.95, Reinhold Publishing Corporation, New York, 1961.

This is one of a series of paperback books designed as supplementary material for the more able chemistry student. The complete series, *Selected Topics in Modern Chemistry*, would be most useful for advanced high school students or in a seminar program for the enrichment of any undergraduate course. Because of the large number of non-aqueous solvents which have been studied, the author has chosen to present only the characteristics of four; liquid ammonia, 100% sulfuric acid, liquid dinitrogen tetroxide, and liquid sulfur dioxide, and treat them as representative models. These were selected as typical examples because the first, liquid ammonia, is much more basic than the most commonly used solvent, water, and the second, sulfuric acid, is much more acidic. Since they both contain hydrogen, the Brønsted definition of acids and bases is used in discussing the role of the solvent in chemical reactions. The final two contain no hydrogen; therefore the reactions are explained in terms of the Lewis definition of acids and bases.

Considerable attention is given to the role of the solvent in all chemical reactions and to the scope of non-aqueous solvent chemistry.

Virgil Heniser
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LABORATORY GUIDE FOR GENERAL CHEMISTRY,
A RESEARCH APPROACH, Henry S. Gates, 97

pp., \$2.25, Houghton-Mifflin Company, Geneva, Illinois, 1962.

This laboratory guide is one of the best and should be given careful attention by those teaching beginning college chemistry and by high school teachers of academically talented students. The laboratory problems to be investigated are those usually considered essential for beginning students but without the common cookbook instructions and fill-in write-up.

Other features of the guide give students valuable information which is essential for meaningful laboratory experiences but which is often omitted. A section devoted to accuracy and precision measurement with instructions for average deviation, systematic and random errors, and combination of average deviation develops a most important concept for science students. The explanation of the value and use of significant figures is clear, brief, and accurate. One of the best features of the guide is the section titled "The Laboratory Notebook." Here students are made aware of the value of accurate reporting and are given instructions as to how it might be done along with illustrative sample reports. All projects require a separate report including all pertinent information.

This laboratory guide is designed to fill the gap between the typical cookbook manual and the extreme research type. Much more instructor time is required in grading the reports suggested by the author's statement, "A laboratory course that requires little of the instructor does not demand much from the student" is worthy of second thought.

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Physics

PHYSICS IN THE SOVIET UNION, A. S. Kompanayets, Ed., 592 pp., \$7.50, Philosophical Library, New York, 1962.

The unsigned introduction to this book begins with the following sentence. "This book could very well have been entitled 'Theoretical Physics for Engineers and Physicists.' It is a contemporary, nonspecialized exposition of accepted physical theories governing today's exploding technology." One wishes that this anonymous editor had used the more descriptive title. In point of fact the only connection that this book has with the Soviet Union is that the author lives there. The author can be forgiven perhaps in that the responsibility with the title of this translation probably did not rest with him.

The book itself is a rapid excursion through theoretical physics at a level usually taught in

the first year of graduate study. In attempting to span the fields of mechanics, electrodynamics, quantum mechanics, and statistical physics in 592 pages, the author must sacrifice depth and motivation. I am afraid that for the American reader quite a high level of sophistication is anticipated in spite of the author's disclaimer to the contrary. If one has not had a course in the introduction to theoretical physics in this country, he is not likely to find this book a useful text from which to learn it.

Richard B. Curtis
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Earth and Space Science

THE FIRST BOOK OF SPACE TRAVEL, Jeanne Bendick, 93 pp., \$2.50, Franklin Watts, Inc., New York 22, 1963.

This is an informative book on space travel for intermediate grades and above. Children ask questions such as, "What is space?" "Where does space begin?" "What is in space?" "How big is space?" and "How can we travel in space?" These and many other questions are answered in a simple direct fashion. The illustrations are also interesting because they add clarity to the written word.

One area that should prove to be of great interest, especially to boys, is the section on rockets, missiles, and satellites. Many are described as to appearance, but prime importance is given to the function they serve. Telstar is shown in this book which indicates that the book is up-to-date.

This is a book that I would definitely recommend for all elementary and junior high libraries.

James Weigand
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SPACE CHEMISTRY, Paul W. Merrill, 166 pp., \$1.95, The University of Michigan Press, Ann Arbor, 1963.

Another one of the very fine paperback books in the Ann Arbor Science Series. As the title indicates, the book is concerned with the chemistry of the planets, satellites, galaxies, nebulae, etc. As may be inferred by this description, the chemistry involved is by indirection and by the use of spectral phenomena. However, the fascinating possibilities of the information this book has for those interested in the possibilities of life elsewhere is considerable. The author has a very fine gift of writing, and the book reads easily and well, and quickly. It is fully illustrated. One of the significant points raised is the importance to