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While tracing the history and development of the art of measurement, this book brings out the importance of the quantitative aspect of science.

The competent twelve-year-old reader can extract a good deal of information from *Exploring the Moon*, by Roy A. Gallant (Garden City). The exposition is somewhat advanced but current interest in the subject on the part of children justifies having the book around for browsing.

An Adventure in Geometry (Viking) was written as well as illustrated by Anthony Ravielli. His exquisite drawings and expressive text give this work a deserved place on the reading list of any perceptive youngster. A description of basic geometric forms leads into a display of how they occur in nature and even touches whimsically on their psychological effects.

Archimedes and His Wonderful Discoveries (Prentice-Hall), by Arthur Jonas. An absorbing description of Archimedes' ingenious mechanical ideas and their applications.

The First Book of Color (Franklin Watts), by Herbert P. Paschel. The title had better not be taken too literally by the youngster who is trying to find out about light and color for the first time. On the second page he will encounter "radiant energy," "electromagnetic spectrum," "infrared," etc. The text continues in this blunt and compact manner all the way through, resulting in a superficial treatment of involved and abstract concepts. However, for those who have already been introduced more basically to the concepts of light, this could be a useful little book. The full-color illustrations contribute much.

Really a textbook

HANDBOOK FOR THEORETICAL COMPUTATION OF LINE INTENSITIES IN ATOMIC SPECTRA. By I. B. Levinson, A. A. Nikitin Trans. from Russian. 242 pp. Daniel Davey, New York, 1965. \$12.75

by Harold Mendlowitz

From a glance at the title, one might assume that the book contained a series of tables or graphs on line

For a well constructed and inviting introduction to crystallography, look at *The Curious World of Crystals* (Prentice Hall), by Lenore Sander. There are a few suggested experiments that point up the text. The illustrations are largely diagrammatic and will invite only the more serious reader. To be realistic, I would suggest leaning toward the top of the publisher's indicated age bracket of 9 to 12 years. This is a good book to precede the Science Study Series paperback *Crystals and Crystal Growing* (Doubleday), by Holden and Singer.

The New World of the Atom (Dodd-Mead), by David O. Woodbury, is predicated on the reader's having a fairly comprehensive familiarity with atomic physics. It is concerned more with applications, taking for granted some knowledge of the underlying principles. The glossary of the more important terms is helpful and so are the figures.

Of interest to the particularly precocious young person is *Relativity for the Million* (MacMillan), by Martin Gardner, a clearly written, nonmathematical introduction to the ideas of relativity, beautifully illustrated by Anthony Ravielli.

The Universe of Galileo and Newton (American Heritage), by William Bixby, is a very handsome book, strikingly illustrated in color with reproductions of paintings, drawings and documents. It is written for young adults, but an interested 10- or 12-year-old will be fascinated by the illustrations which will lead him to pick up what he can from the text. It is a book he will keep and enjoy looking at again and again—and so will his parents.

intensities in atomic spectra. However, the word, "Handbook" in the title is more in the German sense than in the American sense. This is primarily a textbook for workers in atomic physics and astrophysics. There are eleven chapters dealing with the basic theoretical background required for the calculations of the intensities. Some of the types of transitions treated in-

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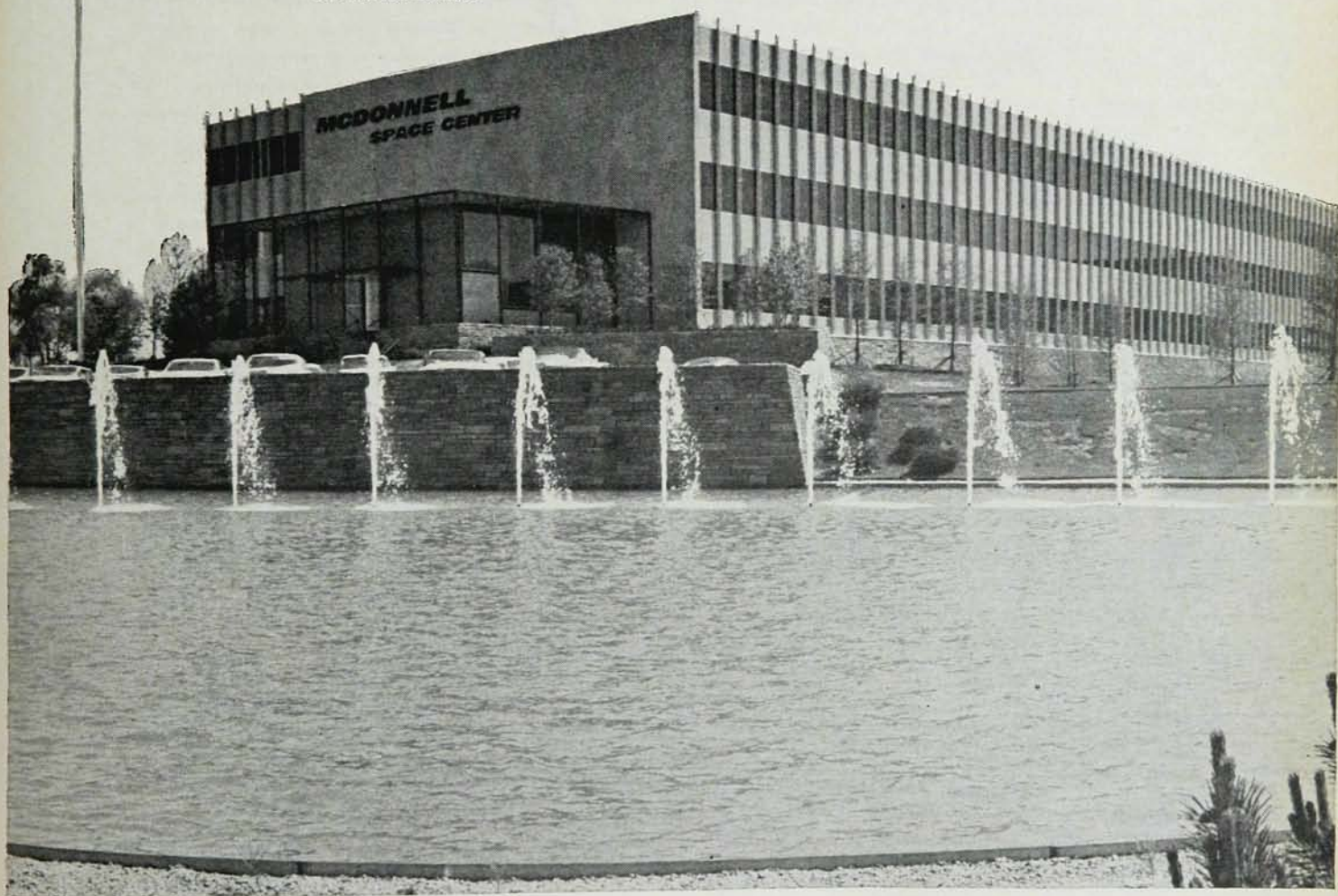
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clude: electric dipole, magnetic dipole, and electric quadrupole. Primarily, the central-field approximation is the basis of the calculations. One is then able to separate out the radial and angular contributions to the matrix elements of the transitions. The methods of Racah's tensor algebra are used mostly in calculating what the author calls "reduced strengths" of the transitions. This is the contribution to the strength of the transition that comes from the angular part of matrix elements. There is also a short discussion on absolute line strengths by means of the Bates and Damgaard approximation. Many types of coupling are considered such as: LS , jj , jL and also transitions between states that are not describable by one configuration.

About 20-25% of the book is devoted to tables. Unfortunately, there is not a one-to-one correspondence between the references of the text to the tables and the tables that appear in appendix. This may be a result of a deficiency in the translation. For example, in some of the legends of the tables there is a reference to a particular page. However, one finds that the tables under discussion appear elsewhere. The page number was apparently from the original Russian text. Except for a few notable exceptions that are pretty obvious for anyone with some familiarity with the field, the translation is generally good. The translators have been careful to reproduce the various formulas by photographic means. Because of this, the proof-reading errors in the original were simply incorporated here too. A notable deficiency in this book is the lack of an index. Although there is a fairly comprehensive table of contents, it still does not take the place of an index.

A major point of disagreement between the authors and myself is in regard to method. The authors emphasize in all the calculations the strengths of the transitions. Therefore, they list the strengths in the tables to about three decimal places. This is fine if all atoms obeyed what the authors call "normal coupling." However, most elements do deviate somewhat from "normal coupling" and are better described by intermediate coupling schemes. In this case it is

more important to know for each of the various transitions in a transition array in a "normal coupling" representation, the square roots of the strengths and their phases. One can treat these as matrix elements and find the strengths in intermediate coupling. With the availability of electronic computers, these calculations are quite feasible. The formulas for calculating the square roots of the strengths are obtainable from the text, but in these cases the tables are useless.

In spite of the above criticisms, I find that this book is a welcome addition to the library on atomic physics.

Harold Mendlowitz has been calculating transition probabilities for atoms and ions at the National Bureau of Standards.

Unconventionally viewed

FROM PYTHAGORAS TO EINSTEIN. By K. O. Friedrichs. 88 pp. Random House, New York, 1965. Paper \$1.95

by R. Bruce Lindsay

One of the beauties of mathematics and the sciences that use it is the great variety of ways in which one can look at a given theorem or law. This is well brought out in the little book by the well known professor of applied mathematics at the Courant Institute of Mathematical Sciences of New York University. He has taken the Pythagorean theorem, and starting from its significance in elementary geometry shows how it can be viewed in different lights in more sophisticated branches of mathematics and even in kinematics. He ultimately finds himself involved with special relativity. The book is one in a series entitled "The New Mathematical Library" intended to provide stimulus, excitement and new depth to the teaching of mathematics on all levels from secondary school through college.

Much of the material in this book is readily usable in high school and is calculated to add interest to the conventional presentation of geometry. The notion of vector is introduced early, not from the normal standpoint of its transformation properties but in

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