laboratory and field. Static pressures up to about 2×10^5 atmospheres (corresponding to about 500 kilometer depth) are still difficult but are no longer major research enterprises. Considerable temperature variation at these pressures has become accessible as well.

Bridgman's ancient prediction that polymorphism (lattice transformations) will be ubiquitous has been fully verified. For higher pressures found in the earth, up to several million atmospheres, one must be satisfied with simulation by shock-wave measurements. In recent years these, combined with relatively crude theory, have given us at least an approximate account of the state of matter throughout the earth. In formulating such an account we are helped by our knowledge that nuclear abundances vary, on the whole, exponentially, so that the number of elements that predominate in any one layer of the earth is small indeed. Although Stacey does not lead his readers directly to the border of the promised land, he brings them far enough, so they can do some exploring of their own.

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Aphorism XXXI

Elementary Mechanics should now form a part of intellectual education, in order that the student may understand the Theory of Universal Gravitation: for an intellectual education should cultivate such ideas as enable the student to understand the most complete and admirable portions of the knowledge which the human race has attained to.

Aphorism XXXII

Natural History ought to form a part of intellectual education, in order to correct certain prejudices which arise from cultivating the intellect by means of mathematics alone; and in order to lead the student to see that the division of things into Kinds, and the attribution and use of Names, are processes susceptible of great precision. . . .

Whewell's suggestions for an intellectual education. From book reviewed below.

Elements of Quantum Theory

By Frank J. Bockhoff
304 pp. Addison-Wesley, Reading, Mass., 1969. $10.50

This book is intended to initiate undergraduate chemistry students with very limited physics and mathematics backgrounds into the concepts and elementary applications of quantum mechanics.

The author, professor of chemistry and chairman of the department at Cleveland State University, has gone to some pains to give a detailed development of those aspects of the subject that the beginner usually finds most difficult. The text divides roughly into two sections. The first half leads to a statement of the postulates and their application to the standard problems of particles in boxes and barrier penetration, and the second half treats the quantum description of atomic and molecular structure with emphasis on the hydrogen and helium atoms.

The book's principal merit is its detailed exposition. There is nothing in the subject matter here that is not found elsewhere, but an undergraduate encountering quantum mechanics for the first time may find it a useful adjunct to his reading.

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William Whewell's Theory Of Scientific Method

Robert E. Butts, *ed.*
358 pp. Univ. of Pittsburgh Press, Pittsburgh, Pa., 1969. $8.95

William Whewell (1794–1866) was a noted representative of mid-19th century British science and philosophy. Master of Trinity College, Cambridge from 1844 to his death, he held a distinguished position in scholarly and scientific circles. He was also a prolific writer with a considerable vogue in his day. Physicists pay little attention to him today, though his *History of the Inductive Sciences* (1837) was probably the first serious history of science to be published in English.

In this volume, Robert Butts, who teaches philosophy at the University of Western Ontario, has revived interest in Whewell by reprinting some of his writings on scientific method. Butts has also prefaced the anthology with an instructive commentary on Whewell's ideas, which covered a wide range of topics in both the logic of the physical sciences as well as what is now called "the psychology of scientific research."

The reader brought up on the modern views of philosophy of science iniated by Mach, Duhem and Poincaré and reinforced by the successes of relativity and quantum theory, will obviously find Whewell's ideas outmoded, not to say quaint. He lived in an age in which the rapid progress of science led many to the optimistic belief in successful scientific theories as "necessary truths." This is well brought out in his discussion of the laws of motion. It is true that Whewell laid considerable stress on the use of hypotheses in science, differing therein considerably from John Stuart Mill, whose views he criticized with some severity. Whewell also paid great attention to, and had great faith in, induction as a basis for scientific discovery. But he failed to see the advantages of the deductive–inductive method, which has proved so powerful in modern scientific theorizing.

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Nuclear Quadrupole Coupling Constants

By E. A. C. Lucken
360 pp. Academic, New York, 1969. $14.50

Several firms have sensed a burgeoning interest in nuclear-quadrupole resonance studies, if the reports of commercial designs to market a general purpose NQR spectrometer are correct. Edward Lucken's book thus makes a timely appearance, and, in fact, is the first comprehensive review to appear since the pioneer monograph in 1958 by T. P. Das and E. L. Hahn (*Nuclear Quadrupole Resonance Spectroscopy*).

Lucken has given a somewhat broader coverage of quadrupole-coupling constants by including useful introductory material on their measurement in nuclear-magnetic resonance, electron-spin resonance, microwave, optical and Mössbauer spectroscopy, although it is quite natural to emphasize the results of solid-state NQR. In language familiar to chemists, the book provides a very readable summary of the NQR field, both from the view of theory and of accumulated experimental data. It will be an admirable introduction for graduate students as well as an updated survey for their professors.

Lucken has concentrated on giving a detailed discussion of the origin of quadrupole-coupling constants and their interpretation in terms of the nature of the chemical bond. Starting with a good chapter on coupling constants in atoms, and a clear presentation of electron-