and also from a rather intensive study of 22 surgical patients in hospital. These hypotheses formed the basis of questions employed in a questionnaire-type survey of some thousand Yale students, yielding 149 cases who had undergone surgery that had been anticipated in advance.

The main approach to all of the psychological problems is psychoanalytic, and the data are almost entirely verbal (sometimes even bordering on the anecdotal) in character. The bond with psychoanalysis is easy enough to see, but the relationship between this study and other current investigative work in the field of psychology is much less clear. In his preface Janis deplores two extremes: the superficiality of the anecdotal accounts that abound in field studies of "stress," and the pedanticism of attempts to investigate stress phenomena in the psychological laboratory. He considers that his materials and methods (in the setting of the surgical wards) may represent an optimal admixture of breadth and rigor. While the author is to be commended for his originality of approach, I doubt that he has achieved this happy balance. By comparison with the hard core of objective data that constitute anything like solid evidence, discussions, speculations, and detailed accounts of what patients said in interview bulk very large indeed.

The author is well aware of the limitations placed upon any conclusions about "stress" in general from material obtained entirely from surgical patients, and in the concluding paragraph of the book he mentions other situations that should be studied in the next step of a general program for the study of stress. One might wish, then, that Janis had chosen to use his subtitle for the title of this book.

ROBERT B. MALMO
Allan Memorial Institute of Psychiatry, Laboratory for Psychological Studies, McGill University, Montreal, Canada

Radioaktive Isotope in der Biochemie. Engelbert Broda. Deuticke, Vienna, 1958. 326 pp. Illus.

This book was written to introduce the reader to the "methodicalness" of biochemical research with tagged atoms. A presentation of the fundamentals of radioactivity and radiation chemistry is followed by a detailed discussion of special, well-selected problems. These are closely connected with the chief principles of biochemical isotope research and constitute an extensive survey of the applications and possibilities in this field and in neighboring disciplines.

A good bibliography, with emphasis on foreign—especially American—literature, supports the monograph and makes it a stimulating, rewarding study. The chapter on radiation biology and radiation protection is of importance for every research worker in the field, whether he is a chemist, biochemist, physiologist, microbiologist, or medical man. All such workers may use this book to advantage, since the author has more than achieved his goal.

A. T. KREBS
Radiobiology Division, U.S. Army Medical Research Laboratory, and *Biology Department, University of Louisville*

The Earth and its Gravity Field. W. A. Heiskanen and F. A. Vening Meinesz. McGraw-Hill, New York, 1958. x + 470 pp. Illus. $12.50.

Here is one of those very important unifying monographs of which there are always too few. Written for the small group of specialists by recognized experts in the field, it is probably of equal, if not greater, importance to the much wider group of physicists and geologists who are interested in the subject but do not have the time or background to read the original papers.

With this larger class of readers in mind, the authors have discussed not only the instruments and methods used to obtain and analyze gravitational data but the important geological questions which are answered in part by these data. Thus, the problems of gravitational anomalies and the isostatic adjustment of the earth's crust are discussed as well as such topics as convection currents in the mantle, the origin of continents, polar migration, the shear pattern of the earth's crust, the implications of the deviations from isostatic equilibrium, and the formation of geosyncline belts. Of more direct concern in connection with gravitational questions are the problems of earth tides and of physical geodesy (which is discussed in considerable detail).

Reading this book as a physicist, not a geophysicist, I was struck by a curious situation. Gravitation, and its nature, had long been considered to be a dead issue for physicists. Newton's theory of gravitation, dating from the 17th century, had been presumed correct except for small relativistic effects. In any case gravitation was considered to be far too weak an interaction to be important. (The gravitational interaction between an electron and a proton is 10^{-40} times the electrostatic interaction.) Why, then, was I reading this book? The answer is strange. Some of us—by no means the majority of physicists—suspect that because of the very great concentration of energy at the center of a particle, gravitation may be the dominant interaction which holds a particle together. Whether or not gravitation is important depends upon the characteristic size of a particle, and concerning this we know essentially nothing. Some of us also have doubts about the relativistic gravitational effects. Furthermore, some relativistic effects may be large, and this would have led, for example, to a substantially stronger gravitational interaction in the past.

The earth is an important source of answers to these questions. First, it contains a history of the past four billion years. Second, it is a remarkably stable laboratory, which can be used to answer fundamental questions concerning the gravitational interaction. Thus, this well-written new book by Heiskanen and Vening Meinesz is of importance, not only to the geologists and geophysicists, but to a small group of physicists interested in the nature of the gravitational field.

ROBERT H. DICKE
Palmer Physical Laboratory, Princeton University

Moments of Discovery. vol. I, *The Origins of Science.* vol. II, *The Development of Modern Science.* George Schwartz and Philip W. Bishop, Eds. Basic Books, New York, 1958. 1005 pp. Illus. $15.

This anthology contains numerous brief but interesting selections from scientific writers, from Hippocrates to Oppenheimer, accompanied by an editorial commentary incredibly inaccurate in its history and sophomorically naive in its conception of science. Galileo's dates are given as 1565–1642 on one page and as 1564–1643 on another (both are wrong); Harvey's death is given as 1657, then as 1667; Kepler dies first in 1620, then in 1630. The history is often as bad as the chronology. How surprising to read that Roger Bacon deserves credit for "promoting the idea of the sphericity of the earth" (shades of Eratosthenes!); that Galileo invented the telescope and with it produced "experimental support" for the Copernican hypothesis; that Huygens constructed a pendulum clock 12 years before he was born; that Halley visited Newton "to discuss the validity of Kepler's theory of elliptical orbits"; that "Galileo's system" became Newton's first and second laws!

The historical sketch which opens the first volume might well have been written 50 years ago (parts of it by Voltaire himself); it ignores completely the results of modern research on Babylonian astronomy, the mechanical investigations of the Middle Ages, and the like. The succeeding essay, on "The nature of science and discovery," with its picture of the