doesn't have time. I think he needs help, and expert help at that. If the boss won't listen to his own reporters, he might listen to a science consultant who is a postgraduate in his own medium.

I would now like to see a survey of scientists made to uncover and examine in detail their misconceptions about "the press"—meaning all mass media and those who work in these media. At the same time, I would like to see a survey made of the media themselves, from top to bottom, to uncover and examine *their* misconceptions about science and scientists. If, as I suspect, a need exists for a bridge between top media men and the scientists, a new profession may arise: consultants on science to the mass media or, alternatively, consultants on mass media to the scientists.

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Elementary Seismology. Charles F. Richter. Freeman, San Francisco, Calif., 1958. viii + 768 pp. Illus. $12.

This fascinating and beautifully illustrated account of the earth's shivers is composed of three parts, all emphasizing the general relation of faulting to earthquakes. The first part, "Nature and observation of earthquakes" (388 pages), provides a fine historical perspective while presenting basic phases of the science, ranging from elastic waves to earthquake risk. The second part, "Geography and geology of earthquakes" (242 pages), relates earthquakes to major and minor structural features of the earth. New Zealand, California (plus Nevada), Japan, and Formosa are selected for detailed analysis, but other regions are not neglected. The third part of the book, "Appendixes" (97 pages), includes tables, mathematical derivations, and a chronologic list of important earthquakes, with bibliography. A 29-page index completes the volume.

In a lively, conversational style Richter presents a distillation of much information, with penetrating critical interpretation in the areas of his own interests. Humor appears in unexpected places, some barbed in the direction of related sciences but always constructive, some even directed at the author himself. The treatment conveys a nice sense of strategy in attacking the scientific problems, many as yet unsolved. Although intended primarily for students, the book includes much valuable material for instructors and research workers. Richter has unlocked the mysteries of seismology for all who are interested in the earth.

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Science and Education at the Crossroads. A view from the laboratory. Joseph William Still. Public Affairs Press, Washington, D.C., 1958. xi + 140 pp. $3.25.

Joseph Still, with obvious sincerity and concern, has written, in part I of this book, a series of short essays on various aspects of scientific work and some related educational problems. In part II he discusses the potential contributions of the biological sciences (with stress upon disease control) to international affairs, especially in the tropical countries. As promised on the dust jacket, the book contains a number of interesting and even controversial observations and proposals.

Part I consists of ten short chapters—90 pages—on "The short-range view." The author contends that scientific representation at the top policy-making level in our government is essential. To accomplish this, "the President should appoint one or more Secretaries of Science, without portfolio" (page 13). At least two, representing the biological and the physical sciences, are suggested. Further, he suggests "establishment of Delegate Senators and Representatives" in the Congress. They would "have the power to introduce legislation and enjoy full floor and perhaps limited committee privileges" (page 14) but would not vote on committees or vote on the legislation.

A National Education Council of distinguished citizens is proposed "1) to constantly study and report on our total educational system, 2) to report frequently on future educational needs, and 3) to recommend in broad terms the curriculum and standards our schools must follow to prepare youngsters for the estimated future" (pages 14–15). Presumably this would be a formalization and continuation of the type of temporary study being made by James B. Conant.

Apparently Still desires some new permanent mechanism because he believes that the U.S. Office of Education, the American Council on Education, the National Education Association with its Educational Policies Commission, the separate state departments of education with their numerous nationwide committees, and many other groups are not accomplishing the task. Possibly this conclusion is correct, but strengthening one of the existing groups, which he does not suggest, might be more effective in producing quick results than would be efforts to create another agency.

Several interesting chapters are concerned with the "housekeeping" of American science. These deal with closer cooperation between existing specialized societies (but without mention of the American Association for the Advancement of Science); with current procedures for making short-term research grants; with the need for better abstracting and translating services; and with the importance of scientific libraries.

In two chapters he considers the search for the gifted student and the encouragement of curiosity. He properly warns against using only IQ scores to identify promising students. However, educators have long recognized the difference between defining the academically gifted and identifying and instructing such students in schools.

Part II, "The long-term view," stresses the world-wide social impact of disease-controlling techniques. The author stresses the effectiveness of DDT in overcoming malaria and indicates some of the social and political implications of this action. Elimination of this delibitating disease opens to many countries their first opportunity to develop a vigorous economy. But the race between production and population is still with us.

The inevitability of reaching some "world population ceiling" and the importance of population control are pointed out. The author avoids becoming entangled in arguments over various means of population control but observes that a rising standard of living has been followed by lower birth rates. This line of argument reinforces his proposal that biologists be included at policy-making levels in government.

Unfortunately the book contains no bibliography, and the sources of Still's references are not explicity cited. As claimed, this is one man's view of some of the vexing problems we face. His suggestions for action would require marked changes in public opinion; how these could be obtained still eludes many already immersed in the problems.

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Psychological Stress. Psychoanalytic and behavioral studies of surgical patients. Irving L. Janis. Wiley, New York; Chapman and Hall, London, 1958. xiv + 439 pp. $6.95.

Janis, author of the scholarly *Air War and Emotional Stress,* has in the present book approached the rather poorly defined concept of stress with quite different data—those obtained from persons in hospital undergoing surgery, and from a questionnaire survey of former surgical patients (Yale students all). The book commences with a long detailed account of the author's psychoanalytic treatment of a patient who happened to require surgery during the period of the analysis. Various hypotheses concerning interactions between psychological variables (for example, "anxiety" and "hostility") were derived from the interview notes

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.

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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.

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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.

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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