urge to solve difficult problems, competition in so doing, and the ambition to contribute to the progress of science. Without doubt an outstanding motive is simply the deep satisfaction in doing a job which one can do well.

Perhaps it may be constructive to point out that in any analysis of scientists' behavior, two outstanding characteristics of science should be emphasized. They appear to be unique in scholarly work. First of all, the establishment of the validity of a scientific finding is an objective process, as far as that is humanly possible; in general it does not depend on opinion. Einstein's special relativity theory, for example, rests on the accuracy of its factual scientific bases and the logic of its analysis, and not on any scientist's opinions regarding the theory. The rules of this game are, of course, man-made but they have been formulated so as to be as free as possible from individual opinion or bias. As a result the reputation of a scientist, as judged by his research, partakes in this objectivity.

Second, the scientific profession does not depend on the existence of scientific critics as such; the only valid critics are the experienced research workers in the field concerned. On the other hand, in most academic fields, social recognition within a discipline is accorded primarily by its scholarly critics, an identifiable class who may or may not be active in research.

Important consequences follow from this circumstance. The body of science and the career of scientists in basic research may tend to become more insulated. The structural foundation and the sound progress of science demand the utmost in objectivity, and the exclusion of desires and opinions, especially wishful thinking. The laws of nature are not subject to popular vote or to dictatorial decree. This tends further to isolate science and the scientific community from dependence on social affairs. However, at the same time, the increasing importance of science-based technological achievements and the growing dependence of scientific research on public support have introduced pressures on and strains within the scientific community which challenge this isolation and may thereby jeopardize its own standards of objectivity.

In his brief closing remarks concerning the future of science, the author mentions prevalent concern on this point—namely, the danger lest pressures and incentives from society may in some degree warp the ideals and standards of scientists. He adds as another possible concern that some eclectic disciplinary groups may in self-protection isolate themselves more or less completely from society. But he is reasonably optimistic that a satisfactory working relationship may be found between science and society. Thus far, for instance, it has been found possible for science to serve government without exercise of undue government control. Indeed, as he says, under our democratic system the identification and expression of tensions that may exist is the best guarantee of their relief.

In this concluding thought Hagstrom has touched on what is clearly a major problem for the future of science and society, one which will be watched with grave interest by the scientific community.

Astronomy

For more than 30 years, discussions of current research and review articles in astronomy and related sciences have been published in *Sky and Telescope* and its predecessors. The editors of this book, **Neighbors of the Earth—Planets, Comets, and the Debris of Space** (Macmillan, New York, 1965. 341 pp., $7.95), Thornton Page and Lou Williams Page, have selected some 113 articles, by 38 contributors and the staff of *Sky and Telescope*, and have arranged them with "historical development" as the general motif. The inhomogeneous nature of the material required the insertion of considerable commentary to provide explanation and to preserve continuity. The general level and scope can be seen from the chapter titles: "The warmer planets, Mercury and Venus"; "Mars, abode of life?"; "The major planets and Pluto"; "Asteroids: Bits or pieces?"; "Comets, so different from the rest"; "Meteors, meteorites, and meteoroids"; "Atmospheres, aurorae, and exospheres"; and "The debris of interplanetary space." The text contains numerous illustrations, but some of the photographic reproductions are very poor.

The approach attempted by the Pages seems fraught with hazards. The treatment is restricted to areas specifically covered by articles published in *Sky and Telescope* (a problem that is apparent in chapter 8), and the presentation often suffers from the journalistic style of magazine reporting (more noticeably in the unsigned articles). However, many of the articles make very interesting reading and are valuable, particularly those by the late Otto Struve.

The editors have done a commendable job in overcoming many of the difficulties inherent in such a treatment and have produced a volume that contains much of value. The historical material will be welcomed by teachers and others interested in the evolution of concepts and ideas. This is particularly true because astronomical departments tend to turn out students whose grasp of the historical roots of astronomy is virtually nil.

On the other hand, the dust jacket states that the book is "designed to inform the public of developments in astronomy that have led to space exploration and space technology." Here, success is limited, and any recommendation of the book must be rather qualified. For the more straightforward subjects, such as surface markings on Mars, the treatment hangs together and a lay reader can absorb a substantial amount of material and gain a general understanding of the subject. But it will take a rather knowledgeable, well-informed, and persistent member of the public to understand much that is treated—for example, the physics of the aurora or the higher energy solar particles in interplanetary space.

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Ibero-Americana Studies

Aboriginal Watercraft on the Pacific Coast of South America (University of California Press, Berkeley, 1965. 148 pp., $3.50), by Clinton R. Edwards, bears directly on one of the most important problems facing archeologists today—that is, was ancient man capable of making transoceanic voyages? Unlike landlubber anthropologists who tend to regard early man as essentially landbound, and view water masses as cultural barriers, Clinton R. Edwards is refreshingly sea-oriented. He justifiably points out that for many people "water has not separated places; it has joined them." Moreover, he postulates that "man had learned much about the building of adequate craft well before