

research that Sprat was to include in his history and of the way he would describe the structure of the society. Nothing she cites indicates that the society's supervision extended beyond these limited parts of his history. She takes most of Sprat's claims as gospel and lauds his objectivity, ignoring the role of his history as propaganda for the society. At least in part, Sprat's history was clearly an attempt to ingratiate the young society with Charles II on the grounds that it would help preserve order and stability; in fact, Sprat went so far as to claim that the presence of natural philosophers at Oxford after the Civil War had saved the university from ruin. Purver's suggestion that, had the society wished to obscure its origins, it would undoubtedly have hidden its Parliamentary associations at Oxford during the 1640's ignores the fact (alluded to in H. R. Trevor-Roper's introduction to this book) that Oxford had been an important center of Royalist sentiment; in addition she overlooks the possibility that the society, under heavy attack from the universities, might well have wanted to claim a fictitious university parentage.

The second part of her thesis is an interpretation of Baconian philosophy, in connection with which she lays great stress on Bacon's influence on the Royal Society. Here she rightly stresses that Bacon's insistence on the applicability of theories was for him primarily a means of insuring that there would be some connection between scientific theories and the real world, rather than the more common view that he was interested primarily in utilitarian ends. She provides a valuable illustration of the way the Oxford Experimental Science Club tried to follow Baconian principles in gathering accounts of natural phenomena from various books. But most of her rather polemical discussion of Bacon is puzzling. Against whom is it aimed? Her discussion of his philosophy is apparently an attack on certain accepted views, but her failure to cite any scholar later than the 19th-century historian Macaulay leaves us little way of knowing whether she is attacking real or straw men; in most instances, the latter seems to be the case. And her lengthy attempt to show the society's debt to Bacon is an exercise in the obvious.

A series of chapters discussing each of the suggested "precursors" forms the second half (or appendix) of the book. Here Purver is much better, and only here does she employ the scholarship of

this century. She has interesting things to say about inconsistencies in the accounts of the society's origins by Wallis which are used to support the claim that the society began in London; she makes clear the complete lack of proof that the society had its origin at Gresham College. There is also a valuable discussion of the Invisible College of Boyle.

These high points in the second half cannot, however, overshadow the deficiencies of most of the book. Purporting to be a discussion of the philosophical context of the Royal Society and its work, the book virtually ignores the crucial role played in this philosophical context by the atomists, the Cartesians, the anti-Cartesians, and the Cambridge Platonists. We are expected to believe that Baconianism was virtually the only engine propelling the scientific revolution. With such an engine it is doubtful that the scientific revolution could have gone very far.

DAVID KUBRIN

Department of History, Dartmouth College, Hanover, New Hampshire

A Culture Area

The Philadelphia Anthropological Society. Papers presented on its Golden Anniversary. JACOB W. GRUBER, Ed. Temple University Publications, Philadelphia, 1967 (distributed by Columbia University Press, New York). xiv + 162 pp. \$7.50.

These papers commemorating the 50th anniversary of the Philadelphia Anthropological Society represent something of an unfulfilled hope. I say unfulfilled, because the seemingly ambiguous charge given to the individual contributors results in a very uneven volume. The steering committee's plan was to invite specialists to deliver papers on selected topics viewed in historical perspective in the hope that, by choice of topics and resourcefulness of authors, Philadelphia's significance in the development of American anthropology would be duly reflected. Some authors stress Philadelphia at the cost of balanced coverage of their topical subject; others successfully interweave appropriate Philadelphia scholars and institutions into their presentations; still others manage either to avoid urbi-culture entirely or to resolve the difficulty by perfunctory bows in the direction of the City of Brotherly Love. The result of these compromise formations is neither a balanced set of arti-

cles dealing with historical dimensions of specific anthropological domains nor an integrated picture of Philadelphia's position in the development of anthropology.

Now let us count blessings. A. Irving Hallowell's excellent baseline essay discovers and brings together much new material on 18th- and 19th-century anthropology in Philadelphia. It is to be hoped that Hallowell will one day enlarge the perspective by treating the later history of Philadelphia anthropology, particularly as localized in the University of Pennsylvania. No one is better qualified to undertake the task. The late John Freeman's article on the American Philosophical Society complements Hallowell's contribution, but again stops short of the 20th century. Chester Chard provides a most useful survey of problems and accomplishments in the ever-changing field of Arctic anthropology. As a synthetic overview, this article should prove rewarding to Arctic specialists and non-specialists alike. Equally valuable is Fred Eggan's concise summary of Northern Woodland Ethnology. Eggan's discerning eye catches many problems in the Northern Algonkian area deserving primary research or reinvestigation.

Less of a blessing are the articles by Shapiro (on physical anthropology), Wormington (on the paleo-Indian), and Ekholm (on Mesoamerican archeology). The immensity of their subjects or the constraint of a Philadelphia perspective leads to a certain superficiality.

The last two essays, by Chafe and Dockstader, are essentially impassioned pleas for help. Chafe notes the steady incremental shrinking of linguistic diversity in North America and urges increased effort in the recording and description of these languages before they pass beyond recall. While this call to arms has a familiar ring, echoing at least back to 19th-century linguists, Chafe argues persuasively that the rate of linguistic loss is increasing not only in an absolute sense as more and more Indians accommodate to our society but in the relative sense that Indian children use their native languages with less facility and competence than their fathers and grandfathers. Dockstader bemoans the eclipse of museums by universities as centers of anthropological research and training. Although it is true that study of material culture is badly neglected in contemporary anthropology and that the museum is the appropriate laboratory for such study,

one senses in Dockstader's remarks an implication that "true" anthropological endeavor in museum settings has been subverted by the insidious forces of social science as localized in universities. Perhaps, however, museums should put their own houses in order and reassess their own failings before attributing their loss of centrality in the anthropological establishment to outside forces. Statements such as "a student who studies anthropology without access to material culture is like a chemistry student who has never been in a laboratory" are not apt to gain Dockstader many converts.

RAYMOND D. FOGELSON
*Department of Anthropology,
 University of Chicago,
 Chicago, Illinois*

Lectures by Scientists

Science in Progress. Sixteenth Series. WALLACE R. BRODE, Ed. Yale University Press, New Haven, Conn., 1967. xiv + 390 pp., illus. \$10. Sigma Xi National Lectures, 1964-1966.

In a brief preface the editor announces the decision of the executive committee of Sigma Xi to discontinue publication of this series, a step that has long seemed overdue. In spite of the fact that all the articles in each volume have been outstanding, the volumes have lacked unity and purpose as books, and since the lecturers are conspicuous contributors to their fields of research, the material they present in their Sigma Xi lectures has as a rule already been published elsewhere. The decision to discontinue publication serves, however, to single out the present volume as the swan song of the series, and it acquires itself nobly of this distinction.

Of vital interest to all scientists regardless of specialization are the articles by J. Bronowski and René Dubos. Bronowski's essay on the limitations of logic and the nature of the mind is even more keenly challenging than his *The Identity of Man*, upon which it is largely based. The essay by Dubos, though addressed directly to biologists, is fully its equal in incisiveness and depth. Together the two essays hold up a mirror to man in which he may see himself better as he seeks to understand his own quest for knowledge of the external environment and himself. Both essays deal essentially with human biology—or specifically, with the nature of that aspect of the human organism's

behavior which we call mental. In the field of straightforward biology, Norman H. Cromwell's article on carcinogenesis, Ernest C. Pollard's on genic action in plants, and Talbot H. Waterman's sophisticated discussion of orientational aspects of visual interactions in invertebrates constitute as good a segment of the advancing front of modern biology as one could hope to find.

The same excellence obtains, of course, in the sampling of the physical sciences and technology, though the items presented comprise a far smaller and hence less dramatic and less representative selection of the period's lectures. The essays offered consist of Lyle B. Borst's review of the unique properties of liquid helium, C. J. Phillips' exhaustive discussion of brittle materials, and C. M. Sliepcevich's account of the history and potential uses of liquefied natural gas. The lone venture into psychology or something akin to it by Alphonse Chapanis merely serves to add diversity.

Of general interest also are the opening essay by Hugh Taylor and the closing one by W. H. Pickering. Both are addresses delivered when their authors were awarded Procter Prizes, in 1964 and 1965, respectively. Taylor's essay is packed with valuable information on the wonderful cooperation between industry and free scientific research that a democratic or nontotalitarian society is capable of. Pickering gives an equally rich and lucid account of cooperation between government, engineering, and research in carrying out the space program in the United States. Clearly, this volume is one which any library of science would much benefit in having.

MARK GRAUBARD
*Natural Science Program,
 University of Minnesota, Minneapolis*

Chemical Physics

Intermolecular Forces. JOSEPH O. HIRSCHFELDER, Ed. Interscience (Wiley), New York, 1967. xii + 643 pp., illus. \$22.50. *Advances in Chemical Physics*, vol. 12.

Recent advances in both experimental methods and theory related to intermolecular forces are excellently presented in this volume to readers already generally familiar with the subject. This is not an introduction; it is addressed to those who have command of the fundamental theory and older experiments but have not kept up with the journal articles in the last few years.

As in any volume made up of contributed chapters, the quality is uneven and there is some overlap.

Particularly masterly is the chapter by Hirschfelder and Meath on the quantum theory of intermolecular forces, in which particular attention is given to very simple cases such as two hydrogen atoms. For a time it was thought that dispersion (or London) forces could be treated as additive pairwise even in dense gases, liquids, or solids; but it is now realized that three-body interactions are significant, and Sinanoglu presents an excellent summary of this theory and its application in condensed states. On the experimental side, molecular beam experiments have been very fruitful, and these are reviewed by Bernstein and Muckerman. In all there are six chapters on theory and four on experimental methods, and each is important for some aspect of this subject. This volume is a valuable addition to the literature on chemical physics.

KENNETH S. PITZER
Rice University, Houston, Texas

The Sun

Solar Activity. EINAR TANDBERG-HANSEN. Blaisdell (Ginn), Waltham, Mass., 1967. xvi + 464 pp., illus. \$16.50. *Pure and Applied Sciences* series.

Solar activity in general concerns the sun's outer layers, the photosphere, chromosphere, and corona, where magnetic fields undoubtedly play a vital role in most of the observed phenomena. The sources of these fields may well lie deep within the sun, but their influences extend to the orbit of the earth and beyond. As the nearest star, the sun should be an example for astronomers of how complicated things can be nearby that seem straightforward from afar. This book illustrates the point effectively.

Tandberg-Hansen advocates application of the physics of plasmas to solar problems. A little like being for mother, country, and God! Everyone can praise these objectives. The book organizes itself from the point of view of the solar atmosphere as a natural example of a multicomponent, magnetic plasma. The problems that present themselves, difficult physically, and horrible analytically, are nevertheless the obstacles in the path of deductive solar physics. Progress has been slow and therefore welcome even in tiny