Book Reviews

Of Stars and Men. The human response to an expanding universe. Harlow Shapley. Beacon Press, Boston, 1958. vi + 157 pp. $3.50.

In this book, Harlow Shapley seeks to overthrow the anthropocentric view of the universe. So, far from believing the sun's system of planets, the earth, and its life and intelligent creatures to be unique, he would make them of common occurrence. If many stars besides the sun have planetary systems, and if there is no direct observational evidence for the existence of these systems, it is necessary to argue from theories of the origin of the solar system and from probabilities. Fifteen theories are listed on pages 66 and 67; six are rejected, two are classified as doubtful, and seven may pass muster, though Shapley admits that he is not entirely satsified with any of them.

The number of stars in the universe is estimated at 10^{20}; in order to find the number with planetary systems, Shapley multiplies together four probabilities, each equal to 10^{-3}, thus arriving at the conclusion that one star in 10^{12} has a planetary system like the sun's. Thus, there are 10^{8} such systems in the universe. It is most unfortunate that, in the compass of a small book, Shapley can devote only two or three pages (pages 72 to 74) to this important argument. The curious reader would have liked a detailed presentation of the evidence for the value of 10^{-3} assigned to each probability; if 10^{-5} is used instead, one predicts that only a single star out of the 10^{20} has planets.

The title of Chapter 6, "Rainbows and cosmic chemistry," seems to imply that the astronomer has found spectroscopic evidence of chemical processes—that is, of molecular combinations and interactions—taking place in the universe. This is difficult to reconcile with the observations, which indicate that matter in the universe occurs overwhelmingly in the gaseous state and as separate atoms. Only the simplest types of molecules are detected spectroscopically. Indeed, it is a curious fact that chemical compounds possessing any degree of complexity are detected by direct observation only on the earth, in meteorites, and in the atmospheres of the sun's planets.

In chapter 9, Shapley regards the artificial production of amino acids in the laboratory as evidence that, apart from some minor details, the nature and origin of life are understood. The prime difficulty—namely, that the artificial synthesis of amino acids, proteins, and other elaborate chemical compounds found in living matter produces materials that are as "dead" as the hydrogen, nitrogen, carbon, and oxygen of which they were compounded—is not discussed. In his final chapter, "What should be the human response?," Shapley pleads for humility in man as he contemplates the astronomical universe, and he has some encouraging remarks to make regarding the probability that man will continue to survive on this planet.

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Some Applications of Behavioural Research. Rensis Likert and Samuel P. Hayes, Jr., Eds. UNESCO, Paris, 1957. 333 pp. $3.25.

This little book is a product of the Foundation for Research on Human Behavior, an organization that over the past five years has pioneered in the interpretation of research in the social sciences to representatives of industry and government and in the solicitation from industry of long-term support for research by university-based social scientists working on problems where "basic" and "applied" interests converge. One of the activities of the foundation has been a series of brief seminars in which behavioral scientists discuss a particular research topic with persons from business and government thought to have potential interest in its application. Typically, a panel of several "experts" on the topic covers much the same ground with several seminar groups, and a report on the material presented and discussed is subsequently prepared for distribution to the participants. Most of these reports have been admirable examples of responsible popularization; while copies of them could be obtained from the foundation, their circulation has not been as wide as they deserve. The present volume, mainly composed of these seminar reports, thus performs a useful service in making them more widely available.

It is in this connection that the volume is appropriately evaluated. Its production under UNESCO auspices might, on the other hand, give rise to different expectations that the book would disappoint. Not only is the research reviewed an entirely American product but the interests of behavioral scientists associated with the Institute of Social Research at the University of Michigan, with which the foundation has an informal symbiotic relationship, are preponderantly (though by no means exclusively) represented. And the areas of application emphasized fall heavily within the sphere of American "big business." The reader in this country or abroad should realize that the reports gathered here are not intended as a representative sampling either of American "behavioral science" or of its actual or potential fields of application, but that he would nevertheless find a number of able, nontechnical, and practically oriented summaries of recent research, together with references to selected primary sources.

The topics treated fall into four program areas in which the foundation has been interested: leadership, management, and organization; public communications; economic behavior; and cross cultural operations. The chapter headings indicate the subject matter: "Administrative leadership and organizational effectiveness," "The training of leaders for effective human relations," "Human factors in effective research administration," "Training foreign nationals in the United States," "Group influence in marketing and public relations," and "Psychological surveys in business forecasting." Initial and final chapters deal in more general terms with problems of applying behavioral research effectively.

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New Bottles for New Wine. Julian Huxley. Harper, New York, 1958. 318 pp. Illus. + plates. $4.50.

This latest collection of Huxley's entertaining essays on scientific subjects is treated with his usual broad understanding of the relation of science to man. Huxley is again concerned with evolution in its broadest sense. His primary theme is where man is going and why. In the best tradition of British popularization, the book is filled with interesting

examples from its author's vast store of biological and literary knowledge.

Huxley gives as the most remarkable development of the present century "man's unveiling of the face and figure of the reality of which he forms a part, the first picture of human destiny in its true outlines." He feels that "the most important, if not the most urgent task of our times, is the development of a new set of integrated, directive and transmissive mechanisms for human societies and for their continuity down the generations." He criticizes the Marxian system and the behaviorists on the one hand for trying to deny the validity of the mental and spiritual elements in the universe and, on the other, the mystics, the idealists, and the theologians, some of whom try to deny the importance of the material elements. Man must, he says, learn how to think in terms of organization and pattern, and in terms of trend and process.

Most of the essays have appeared in print over the past seven years as lectures and general articles, although some are here considerably expanded. There are minor repetitions in the book, and somewhat closer editing would have reduced the impression that the author produces a new volume whenever the storage bin of lectures and articles gets filled to appropriate depth. Thus, the essay entitled "Knowledge, morality, and destiny" starts out, "Our Western world in this year 1951 is psychologically in a bad way."

But it is all prime Huxley, which is very good indeed, quoting Walt Whitman or Darwin with equal facility, free-ranging, sparkling, imaginative, comprehensive, factual, speculative, interesting, and stimulating. It is good to have these essays under one cover.

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Exotica. Pictorial cyclopedia of indoor plants. Alfred Byrd Graf. Roehrs Company, Rutherford, N.J. 1958. 4000 illus., 644 pp. $17.50.

The last two decades have seen a revolution in the way tropical and subtropical plants have been introduced into cultivation in the temperate zone. Glass-sided homes, fluorescent lighting, plastic glass, and air-control equipment have made it possible for millions of Americans to live with tropical plants throughout the year if they so desire. The five-day week has brought to people with lively minds the need for more absorbing hobbies. The rise of mass-production ornamental horticulture has been one of the results. The gardens and the jungles of the tropics and subtropics are being combed for likely plant material.

A little-known species or hybrid of *Peperomia* or *Syngonium* may now be in mass production within two years from the time it was first collected in the back corners of Brazil. There are already over 150 species and varieties of *Philodendron* in cultivation in this country; hybridization programs are well under way which will multiply the number of named varieties in another decade. The total national business in African violets alone, I am reliably informed, now grosses more than all the nursery business in temperate and tropical fruits, apple trees, peach trees, current bushes, avocado trees, and so on. The poorly known genus *Schefflera* was of so little commercial importance when the last edition of Bailey's *Manual of Cultivated Plants* was being planned that it did not even qualify for admission. Today the production of large tubbed specimens for glass-sided office buildings has become big business. One can scarcely stroll through the business district of a city in the eastern United States without seeing a *Schefflera* (or near-*Schefflera,* for the precise limits of the genus have not yet been worked out) in a bank or cafeteria.

This trend is the raw material of social history; it is changing various kinds of attitudes towards plants and towards their cultivation and study, in all classes of society in the United States. Eventually our technical, botanical and horticultural works will catch up with this flood of new introductions and reduce to some kind of order their identification, history, and significance. Until then, the amateur, the social historian, the horticulturist, even many taxonomic botanists will get their most immediate help out of Graf's remarkable book. Most systematists who give their concentrated attention to the sections of the book dealing with their own specialties will wince at the inaccuracies they find; many of them, however, will learn to use the book as an effective first approach to the other fellow's specialties. That anyone should have been able to survey this rapidly growing flood of exotic plants is a marvel; that a busy executive like Graf should have produced this 644-page compendium approaches the miraculous. He is the manager and a director of the Roehrs Company of Rutherford, New Jersey, one of the principal dealers in and growers of this kind of plant material.

The chief feature of the book is some 450 pages of clear photographs illustrating close to 4000 of the species and varieties of tropical and subtropical ornamental plants. There are indices to common names and scientific names, a glossary of botanical terms, short semi-technical descriptions, a section on pest control, and a discussion of the climates from which these plants came, complete with a climatic map of the world. There are short introductory pages on the care of house plants (don't overfeed and don't overwater!) which are of more practical help to the average intelligent person than most books on the subject.

One of the most valuable features of the book is a 40-page summary of the kinds of places where these plants have been collected. There are on each of these pages three or four of Graf's excellent photographs showing the deserts and jungles, the temples, gardens, and nurseries from which ornamental plants have been gathered. Graf's comments supply an effective summary of the conditions under which ornamental plants are being grown in various parts of the tropics, as well as considerable insight into why they are being grown and the various ways in which they are being used. Since he has traveled and collected throughout the tropics with an inquiring mind and a good camera, he has unwittingly produced our first compendium of tropical man's attitudes towards plants.

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L'Enfant Néanderthalien du Pech de l'Azé. Etienne Patte. Masson, Paris, 1957. 234 pp. + viii plates. Illus. Paper, F. 2500.

The infant which is the main subject of this impressive study is represented by only an incomplete skull and lower jaw. Not indicated, but also included (pages 197–226), is the description of another Neanderthal infant (from Chateauneuf-sur-Charente) represented by only a fragment of mandible. Both specimens were between 2 and 3 years of age; they were discovered nearly a half century ago by Peyrony and Chauvet, respectively. The second specimen is so little known that it was not included in the *Catalogue des Hommes Fossiles* (Vallois and Movius *et al.,* 1953).

Reading soon reveals that this report is padded with somewhat irrelevant and outmoded data. For instance, the presence of ununited frontal bones—a normal feature in infancy—is used as an excuse for a 3-page dissertation on metopism in adult human beings and in other primates. Here the references go back to 1885.

The author, who is dean of the faculty of sciences at the University of Poitiers, does not clearly separate information about his own specimens from that of the authorities he cites. In fact, on going through the nearly five pages on the status of the sutures, I find less than a