would like to see more fully explained. For example, the discussion of the cosmic time scale, does not mention the fact that a world model *must be assumed* before an age can be assigned to the expanding universe from our knowledge of the present expansion rate. Furthermore, the most important method of dating stars in our galaxy—the use of H-R diagrams of galactic clusters—is not mentioned. Also, Figure 6 on page 87, which shows the evolution of stars of solar mass, is somewhat misleading because stars of 1.2 masses are very probably not operating on the carbon cycle as shown, but rather generate energy by the proton-proton chain. For this reason, it is quite likely that these stars do not have a convective core. If a convective core were present the characteristic Hertzsprung gap would occur in the diagram. Its absence is a notable feature of the H-R diagram for globular clusters. Finally, it is nowhere mentioned that the track shown in Figure 6 is for a star with very low metal abundance such as the stars in globular clusters. Stars with a normal chemical composition (like the sun) will have evolutionary tracks which differ greatly from the track shown.

Bok's book, although not as detailed or as carefully written as many professional astronomers might wish, should appeal to the lay reader, especially if it is used in conjunction with more comprehensive books such as *The Milky Way* (Bok and Bok) or the other works listed in the extensive bibliography at the end of *The Astronomer's Universe.*

ALLAN SANDAGE
*Mount Wilson and Palomar Observatories, Carnegie Institution of Washington,* and *California Institute of Technology*

**The Population Ahead.** Roy G. Francis, Ed. University of Minnesota Press, Minneapolis, 1958. x + 160 pp. $3.75.

"Man knows more than he thinks he does," says Roy Francis, the editor of this symposium volume. Unfortunately, it is often difficult to apply what is known to some of the acute social and economic problems confronting the modern world, because a good deal of the existing store of knowledge is not really in the public domain. Though not under security wraps, it is virtually inaccessible because it is presented in the strange jargons of scientific specialization. It may be food for pedantic thought, but it is not "Gerberized" to titillate the intellectual palate of the layman. Francis' solution for this problem is "the desegregation of knowledge." Such a term, to be sure, is not now current: "in today's lexicon one 'segregates' on the basis of skin color, not of academic hue." The segregation of ideas, by preventing knowledge from being an effective power for reform or reorientation, can be devastating in its effects.

An area gravely befogged by segregated knowledge is that of population dynamics. The human race is in the midst of an explosion of people the like of which has never occurred before. The rate of this explosive increase—1.5 percent a year—would not impress a financier. Yet it means that when next week's edition of *Science* is distributed, there will be nearly a *million* more human beings on this earth than there are today. In the book under review, P. K. Whelpton notes that if the one-third of a billion human beings presumed to have been living at the time of Christ had increased since that time at a mere 1.5 percent a year, the present population of the planet would be more than a million persons per *square foot* of the earth's land surface. Clearly, this far outdoes the mediaeval concern over balancing angels on the head of a pin.

*The Population Ahead* is a laudable attempt to desegregate knowledge regarding the population question, which is now cooped up behind the conceptual curtain raised by social scientists, economists, nutritionists, demographers, geographers, and anthropologists. In 1957, the University of Minnesota's Center for Continuation Study (a sort of perpetual idea-desegregating apparatus that ranges widely over many domains of knowledge) brought together a panel of experts and *begged* them to talk in plain English to each other and to a participating audience of several hundred. The result was by no means an intellectual Little Rock. Everybody was eager to live and let live, and there was a very free exchange of ideas, but some of the audience may have been on the verge of conceptual anoxemia. The wide range of views presented does throw considerable light on the population problems, even though the focus is not always sharp.

The question which stood out as the theme of the conference was, "What constitutes an optimum population?" Though opinions vary greatly, this is a question which deserves far more thought than it is now getting. Even in most fortunate America, it is by no means an academic question. The idea is abroad that by 1975 two-thirds of the population of the United States (perhaps 235 million) will be living in the 165 to 170 standard metropolitan areas, and that this will necessarily be a good thing. Well, will it be or not? Is there a more favorable distribution of people, and what might be done to bring about such a distribution in a free society? These are the questions that are not asked, perhaps because nobody wants to look straight at them.

One thing is certain: population is definitely everybody's business, and the most complete desegregation of knowledge is necessary if what man knows about this subject is to be put to work short of disaster. If the population explosion continues at the present rate, something will have to give. And some of the things which will inevitably give, and before very long—in the United States as well as everywhere else—are the level of living and freedom of thought and action and initiative. Ancel Keys is sure that the earth can provide a survival diet for a good many billion people. Before we test that conclusion let us try to reach some decisions regarding the kind of planet we want to live on.

The varied ideas of nine experts, plus the supporting commentary by a somewhat larger chorus, that make up this symposium volume hardly give a microscopically clear image of the problem. But the book contains more than a K-ration of food for thought.

ROBERT C. COOK
*Population Reference Bureau, Washington, D.C.*

**The Earth beneath the Sea.** Francis P. Shepard. Johns Hopkins Press, Baltimore, 1959. xii + 275 pp. Illus. $5.

Francis Shepard's newest book deals with the vast area, three-fifths of the earth's surface, which lies under the sea. He writes in a simple, direct style which requires no specialized vocabulary from the reader, yet he covers salient aspects of all of the basic geologic problems one encounters beneath the sea. Laymen will find this book well worth reading. In it they will find discussion of many things which are readily observable near the sea—coastal erosion and engineering, currents, waves, and coral reefs. The more exotic phenomena, such as submarine mountains and canyons, are treated in an equally readable manner.

Scientists active in marine research

will enjoy the pungent restatement of problems and will appreciate Shepard's treatment, based on long familiarity with marine science. The point of view is stimulating and provocative in many places—for example, in the discussion of the effects of turbidity currents, the origin of continental shelves, and the origin of submarine canyons. Students interested in geology or marine science should read this book carefully for here, in one small volume, are many of the ideas of one of the pioneers and leaders in the field. The book is not a textbook and does not attempt to outline all points of view on specific subjects; yet there is adequate documentation of the views presented.

Shepard is professor of submarine geology at Scripps Institution of Oceanography, University of California. He was one of the first Americans to study marine geology. From the first days of his study of marine science, 35 years ago, he has always been an active field investigator, going out on ships and making studies on the beaches. His book is particularly timely in this era when the American people have suddenly become aware of oceanography as something of crucial importance to national safety and welfare.

JOHN M. ZEIGLER
*Woods Hole Oceanographic Institution, Woods Hole, Massachusetts*

**Primitive Peoples Today.** Edward Weyer, Jr. Doubleday, Garden City, N.Y., 1959. 288 pp. Illus. $10.

Shortly after the mailman brought my review copy of *Primitive Peoples Today,* our 16-year-old baby sitter (for grandchildren) appropriated it. "I could understand every word of it," she said. "It should be in every high school in America." Later on I read it, and I am not sure that it will be in every high school. Weyer has not hesitated to discuss forms of human behavior rarely mentioned in high schools, except in the washroom. But I may be wrong, for I have not been to high school for 40 years, and things may have changed.

Edward Weyer, Jr., has been on archeological and ethnographic field trips in Egypt, in the arctic, and in Mato Grosso, Brazil. He has been a professional photographer and president of the Explorers' Club. He was editor of *Natural History* for 22 years, during which time his magazine contained few articles incomprehensible to a 16-year-old, though it did contain some magnificent pictures. The success of *Primitive Peoples Today* should surprise no one familiar with the details of Weyer's career.

For some years jumbo books, printed in Switzerland, have been appearing, full of illustrations, particularly in color, but they have dealt primarily with zoology and have borne names such as Bourlière and Sanderson on the title page. Now Weyer has carried this format into anthropology. In appearance, his book compares favorably with the lion and baboon atlases.

Weyer begins with a short introduction, called "The world of primitive man," in which he first defines the objective anthropological viewpoint, with its sliding scale of moral values, and then develops an essentially Boasite attitude toward culture, in which attempts to establish levels of complexity are discouraged. He then discusses the races of man from the same point of view, favoring nurture over nature as a cause of differences in achievement. Blood groups and other hereditary traits are discussed in simple language. He produces the old saw that "between 90 and 99 percent of the approximately 44,000 pairs of genes in each individual are shared by all other groups of men," without saying how many may be shared with apes (which have the same chromosome count that we do), or even with frogs. Again, he says, "a child will *look* like an Eskimo or Zulu depending entirely on whether he is born one, [but] he will grow up *acting* like an Eskimo or a Zulu depending on the culture in which he is raised." This is standard Boasism, which bypasses many issues. No Eskimos have been fostered by Zulus, or vice versa.

We move on to a series of cultural vignettes of the Eskimos, Aleuts, Navahos, Lacandones, San Blas Indians, Jivaros, Camayurás, Lapps, Ovimbundu, Bushmen, Ainus, Lolos, Aruntas, and Samoans, to each of which about six large pages are devoted. In ten instances these vignettes are illustrated by photographs of the tribe under discussion. There are no illustrations of the Aleuts, Ovimbundu, Lolos, and Aruntas. Instead we are shown pictures of 40-odd other peoples.

The vignettes are arranged geographically, without regard to race or cultural connection, and the pictures follow this same pattern. In each vignette a striking feature of the particular culture is emphasized, and often a personal-narrative technique is used. The style is lively, and the people are made to seem alive.

The splendid pictures are reproduced on pages 8½ by 11 inches, and some are run across two pages. They were taken by 40 different photographers, of whom many are professionals, such as Fritz Goro, Alfred Eisenstaedt, and Eliot Elisofon. Both the black-and-white and the color reproduction are superb. The selection is also excellent in that few of the photographs are static and nearly all show people doing things that are of interest to anthropologists. Even the posed shots of the Ainu "chief" Miyamoto and his group (who have their pictures taken every day) are convincing to those who do not know him. A few illustrations are miscaptioned—for example, number 83, "Tuareg men eating on the desert trail near the Hoggar Mountains. One man has lowered his veil. Popular accounts have overstressed the importance of the veil among Tuareg men. . . ." The man with the lowered veil is no Tuareg, but a slave. The importance of the veil has not been overstressed.

It is hard to figure out exactly what audience this book is intended for. Too spicy, perhaps, for high schools, it is too naive for most anthropologists. However, there is a vast public in this space age which thinks the world is as homogenized as their breakfast milk, that everyone who lives in Russia is a Russian, and that all Africans are Negroes. As painlessly absorbed as a magazine in a barber shop, *Primitive Peoples Today* can show these folk how wrong they are. In this conquest of complacency I wish it luck.

CARLETON S. COON
*University Museum, University of Pennsylvania*

**Vegetation of the Outer Banks of North Carolina.** Clair A. Brown. Louisiana State University Press, Baton Rouge, 1959. x + 179 pp. Illus. $3.

*Vegetation of the Outer Banks of North Carolina* is the result of a reconnaissance of the area to study the effectiveness of the sand-stabilization projects of the 1930's and to secure information on other sand-binding plants in the native vegetation. A botanical study was also made.

On the outer banks, sand fencing has been effective in establishing barrier dunes. American beach grass, sea oats, salt meadow cord grass, and Bermuda grass are the important grass binders. *Paspalum vaginatum* seems to offer the greatest possibilities among binders not