

In summary, let me urge everyone with any conceivable interest in the subject to read the book. It can be read in two hours or in two days; I recommend the latter. It is an extremely well-written book (rare in psychiatry), literate, lucid, often witty. It provides a set of potentially motivating ideas for a whole range of readers, from the urban planner to the public health expert to the potential community mental health worker to the citizen at large. It gives an exciting notion of what community psychiatry could be all about if intelligent community psychiatrists like Matthew Dumont have their way.

WILLIAM RYAN

*Yale School of Medicine and
Connecticut Mental Health Center,
34 Park Street, New Haven*

Not a Bad Idea

The Systems Approach. C. WEST CHURCHMAN. Delacorte, New York, 1968. xii + 243 pp. \$7.50.

It is perverse to deny the obvious, so what does one say of a book with the modest thesis "The systems approach is not a bad idea" (p. 232)? Churchman set out, he tells us, to write a book explaining the idea to laymen. There being wide disagreement about the benefits of the systems approach, he decided to let its advocates argue it out with their critics. The author himself sits back and watches, appearing only at both ends of the book. The names he gives to the two sides change bewilderingly: enthusiast, efficiency expert, management scientist, planner—these advocate systems; skeptic, humanist attack them. Their argument revolves around five basic considerations: (i) the objectives or performance measures of a total system; (ii) the fixed constraints (environment); (iii) the system's resources; (iv) the components—their activities, the goals and measures of their performances; (v) the management of the system.

It appears in the discussion that there is a recurrent problem: None of the five points can be easily isolated, because every system is embedded in or is a subsystem of a wider system (General Motors is embedded in, among other systems, the automobile industry, which in turn is embedded in, among other systems, the transport industry, and so forth) and, more problematic still, phenomena viewed in one

way are one system, in another way another system (automobiles may be seen as a transport system, as a status system, as an economic linchpin; every government department is a system and is also a subsystem of the bureaucracy; also, all departments dealing with, for example, alcoholism form a system). This makes for great difficulty in isolating a system even for analysis, and thus for discussing the five points.

Efficiency experts who want to brush all this aside and get on with making operations work more efficiently are reminded that what is more efficient depends on what the performance measures for the total system are—they may be various—and these turn on what it is that is taken to be the total system. The economically hard-headed who offer money measures are attacked with arguments from welfare economics. Two-thirds of the way through the book the reader could be forgiven for thinking that Churchman is showing up the looseness, muddle, and inapplicability of systems analysis. But this turns out not to be so. Although there are still further problems, such as politics and values and the burgeoning of information and information about information, the author comes out strongly for the systems approach as a first approximation. Against behaviorists, skeptics, the religious, he suggests that the systems approach can absorb their criticisms, indeed that a model of a system needs constant checking, holding up to reality, and hostile criticism.

At this point the philosopher of science in Churchman has taken over completely. In effect he equates the systems approach with the critical scientific method of approximating truth by trial and error. Well and good. But in analyzing an organization *qua* system, how can the earlier objections be handled? Churchman gives no clues. Yet successful systems analysis goes on all the time—some of it under the aegis of Churchman himself. Perhaps here the single clear deficiency of the book shows up. No central controlling problem is ever articulated. "What is the systems approach?" is hardly a serious problem. This lack of problem gives a feeling of weightlessness. It is also responsible for the impression that the critic of the systems approach—with his quibbles and conceptual difficulties—wins all the arguments. If only the systems analyst would come back at his critics as hard as he does in real life with a concrete problem or a brief,

he would be in a much stronger position. Systems analysis, like science, is controlled only by the problem at hand. Sometimes the result of inquiry is to attack the formulation of the problem. At other times it is possible to use the problem as a way of excluding endless ramifications into other problems. Of course, this raises the problem of what constitutes a problem, but that is another problem.

I. C. JARVIE

*Department of Philosophy,
York University, Toronto, Ontario*

Naturalists from Spain

For Science and National Glory. The Spanish Scientific Expedition to America, 1862–1866. ROBERT RYAL MILLER. University of Oklahoma Press, Norman, 1968. xiv + 194 pp. + plates. \$5.95.

In the days when Spain was in sad financial state and still in uncertain difficulties with some of its former colonies, the Spaniards nevertheless attempted a full-scale scientific expedition to South America, called the Scientific Commission of the Pacific, to enrich the collections and increase the competence of its natural historians. Their skills were considerable, although most of them are not remembered outside of Spain, and the expedition was carried off surprisingly well in spite of bitter personal differences that developed, the primitive nature of transportation in South America a hundred years ago, and the difficulties of civilian and naval collaboration on a project of no particular interest to the naval officers. More than 80,000 items were collected and returned to Spain, including valuable archeological and ethnological items as well as the usual fossils, plants, and animals which were the bag of the traditional natural scientist of the day. While some of the collections still remain in various parts of Spain and constitute a valuable scientific and historical record, for the most part the material was unstudied at the time, notes were lost, and the surviving personnel of the expedition dispersed to various institutions. It is a brave story of persistence under difficulties, especially as "it was a mistake to attach the scientists to a naval squadron whose officers were unsympathetic and bellicose, as the naturalists themselves recognized." Unfortunately this sort of thing can still happen in South America.

The story is told in solid, sometimes

humorous, historical style. One of the interesting products of the expedition was a remarkable series of photographs. Some 25 of them, mostly of buildings and streets, are reproduced in this volume. Included are such views of San Francisco, which was visited by the expedition in 1863, as the Broderick fire house. One wonders if there were not in the collection a few more photographs of scientific or geographical interest that might have been selected; undoubtedly had the book been written by a naturalist rather than a professional historian some effort would have been made, if the photographs existed, to reproduce fresh earthquake faults, animals, and so forth. In any event, a notable effort has been made to rescue from oblivion the record of a brave and creditable venture in scientific exploration.

JOEL W. HEDGPETH

*Marine Science Laboratory,
Oregon State University, Newport*

Biology of Populations

Topics in Population Genetics. BRUCE WALLACE. Norton, New York, 1968. x + 486 pp., illus. \$14.

Textbooks on population genetics deal mostly with the mathematical foundations formulated around 1930 by Fisher, Haldane, and Wright, and with the extension of those foundations; biological observations are largely relegated to illustrating the mathematical formulations. Wallace has shifted the emphasis from the mathematics to the biological realities. To be sure, he discusses, if in a somewhat elementary fashion, the Hardy-Weinberg equilibrium and the algebra of migration, non-random mating, mutation, and selection. The muscle of the book, however, consists of experimental studies of animal populations. Mathematical and statistical methods are brought in to interpret and evaluate the experimental observations. In this respect *Topics* fills a serious gap in the literature.

Population geneticists have dedicated considerable effort to the study of genetic polymorphisms, that is, the presence in a population of two or several alternate genetic constitutions affecting the same character or characters of the organisms. Many polymorphisms observed both in nature and in the laboratory are balanced: the alternative genotypes coexist at equilibrium

frequencies very often owing to the superior reproductive fitness of the heterozygotes over the corresponding homozygotes. Members of a Mendelian population face environmental heterogeneity of a multidimensional nature: heterogeneity of functions or roles that the organism must be able to fulfill at any one time and place; spatial heterogeneity, since such conditions as food, temperature, and competitors are not likely to be uniform even in a limited environment; temporal heterogeneity, from fertilization through sexual maturity to death and through the daily and seasonal cycles. Wallace proposes the concept of "marginal overdominance." In a balanced polymorphism one homozygous type is likely to have a higher fitness than the alternative homozygote in certain environmental situations but a lower fitness in others. If the heterozygous organisms always or in most cases have the same fitness as the superior homozygote, the average fitness of the heterozygotes in the population will be higher than that of either homozygote and will lead to a stable polymorphism. This concept is worth further experimental exploration.

The geneticists' debates concerning such questions as genetic load, rate of evolution, and population fitness are largely deadlocked, owing to the population geneticist's habit of ignoring the ecological complexities of nature and demographic realities such as population size, age distribution, and rates of birth and death. The most promising developments of population biology for the years ahead lie in endeavors to bridge the gap between population genetics and population ecology. Wallace has given attention to the ecological aspects of population genetics. The geneticist's calculations of average population fitness and genetic load bear no necessary relation to the adaptedness of the population to its environment. Introduction of a genetic polymorphism in a monomorphic population may increase the adaptedness of the population to its environment but will decrease the average fitness of its members. Wallace points out that population fitness—or, as I would prefer to call it, population adaptedness—is a concept which has escaped adequate and operationally valid definition. The average reproductive fitness per individual of a population at equilibrium size is 1. This does not mean that all populations of approximately constant size are equally

adapted to their environment. Population size itself may serve as a measure of adaptedness for populations of the same or of related species of organisms. Wallace's distinction (chapter 24) between "hard" and "soft" selection—referring to selection due to genetic causes and that due to density-limiting environmental factors—may prove to be helpful in solving this problem.

As a textbook on population genetics, this volume has some obvious biases. Certain topics are ignored altogether or nearly so, notably those pertaining to plants, such as self-pollination or polyploidy. The book leans heavily on *Drosophila* studies; according to my count only 32 other species of animals, plants, or microorganisms are mentioned, most of them briefly. The author's own experimental studies are overrepresented. Wallace is aware of these biases. "I have attempted to present topics much as they might be presented in a series of seminars. Consequently, *Topics* is not a tightly knit, precisely organized textbook." For a course it may need to be supplemented by an additional text or by the instructor. In spite of its limitations, *Topics* is a major contribution to the literature, likely to be indispensable in the library of students of population genetics.

The volume suffers from insufficient editorial care. Table headings and figure legends are not always clear; misprints are frequent; at least five times the reader is referred to p. 000.

FRANCISCO J. AYALA

Rockefeller University, New York City

Immunology

Biochemistry of the Acute Allergic Reactions. A symposium organized by the Council for International Organizations of Medical Sciences. K. FRANK AUSTEN and ELMER L. BECKER, Eds. Davis, Philadelphia, 1968. xii + 340 pp., illus. \$12.

This volume, based on a symposium held in June 1967, is really a progress report on an interdisciplinary field shrewdly designated by J. H. Humphrey as "immunopharmacology." The participants are experts, each with a substantial record of accomplishment, speaking mainly to each other rather than to a larger audience. This monograph should be especially useful to advanced students and investigators of allergic reactions. For less specialized workers, including many immunologists,