shall speculates on the convergence of natural and man-made systems and makes some sketchy remarks about symbols and processes in nature and culture. One may throw out interesting asides about such matters in a lecture, as Marshall obviously did, but in print a three-page treatment of these matters is not adequate. Apart from this, he deals with his large and complex subject in a lively fashion; there are many terse descriptions, and the style is such that fairly complex details are conveyed with ease. The illustrations are well worth mentioning; they are mostly fine-lined drawings on the margins of the pages, an arrangement which makes for a particularly attractive book. *Explorations in the Life of Fishes* certainly should be in the libraries of skin-in and skin-out biologists alike.

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Mollusca

Terrestrial Slugs. N. W. RUNHAM and P. J. HUNTER. Hutchinson University Library, London, and Hillary House, New York, 1971. 184 pp., illus. Cloth, $6; paper, $2.50. Biological Sciences series.

Although mollusks are one of the largest groups among the invertebrates, there are few books on them that would interest and assist the reader with broad or general interests. This small volume on the widely distributed group called "slugs" should serve to stimulate interest in the use of slugs for teaching and research purposes. Well organized and informative, it brings together much salient information on these animals—information that has been somewhat buried in scattered papers and volumes not readily available to most persons. The text covers a wide range of topics, such as general features of the animals; their classification; foods and feeding habits; respiration; blood composition and circulation; excretion, reproduction, development, and growth; locomotion and mucus production; sensory and nervous anatomy with their functional relations. All of the morphological material is illustrated with good text figures. The ecology section includes a description of methods for sampling, discussions of the responses of the animals to humidity and temperature and of seasonal variation in aggregation and dispersal, and an analysis of what factors are important in their ecology.

A concluding chapter discusses "slugs as pests." Useful information, much of it dealing with the more recent literature, is reviewed. In England slugs are a serious garden pest, and they are not welcome in areas under cultivation in many other parts of the world. On the whole, this chapter is well written and contains pertinent material. Some helpful citations are missing, for example an excellent review of methods of snail control in A. R. Mead's *The Giant African Snail* (University of Chicago Press, 1961), but after all the book is not a manual on slug control and actually there are as yet no good methods, as the authors clearly indicate.

One of the noteworthy features of the book is the excellent series of well-integrated references. The 21 pages of citations will serve as a useful tool for anyone wanting to work in a wide field of interests in which slugs would serve for field and laboratory studies. It seems almost pedantic to point out that there are references that might have been added to assist those wanting additional information. A few that come to mind that could be helpful are as follows: The veronicellids, as is stated, are poorly known, but they are widespread in the tropics; some of a series of papers by Hans Hoffman could have been cited. The preservation of slugs is important and should at least have been mentioned; among others a paper by Hubricht (*Nautilus* **64**, 90 [1951]) would be helpful. The role of galactogen is discussed, and in this connection a reference to the work of E. M. Goudsmit and G. Ashwell (1965) would be timely. With regard to the parasite and predator relationships, the compilation of S. V. Wild and A. E. Lawson (*J. Conch.* **20**, 252 [1937]) on the enemies of land and freshwater mollusks of Britain would be a useful reference; also, an account of the more recent serious spread of rat lungworm (*Angiostrongylus cantonensis*), which also has slugs as hosts in many regions, was published in 1969 in a book by Alicata on parasites of man and animals in Hawaii.

Terrestrial Slugs will be helpful not only to those involved in classroom and laboratory programs; agencies concerned with control of slugs also will find a wealth of useful basic information in it.

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Crucial Numbers

Geography and a Crowding World. A Symposium on Population Pressures upon Physical and Social Resources in the Developing Lands, University Park, Pa., Sept. 1967. WILBUR ZELINSKY, LESZEK A. KOSINSKI, and R. MANSELL PROTHERO, Eds. Oxford University Press, New York, 1970. xvi, 602 pp., illus. $10.95.

Ironically, a three-year delay makes the publication of these conference proceedings more timely. The book outclasses this year's hundred bad books on the subject of a crowding world. It is coherent and broad-minded —better still, mind-stretching.

The conference topic, "population pressure upon resources," eluded the attempt at a single definition, but the participants did arrive at a consensus that it entails not one worldwide threshold of overpopulation, but three thresholds, each of them now critical somewhere. There is a lower threshold of insufficient population: "A certain degree of demographic pressure is necessary for man to seek to improve the utilization of his resources" (Tricart). There is an intermediate threshold above which one goes from extensive exploitation (long fallow) to intensive systems of cultivation which conserve or enhance environmental possibilities (soil fertility, streamflow processes, variability of species, and so on—see the contribution of Boserup or Mabogunje); and there is a more widely discussed upper threshold beyond which food crises recur, and at which urban assimilation capacities become critical (Beaujeu-Garnier, C. G. Clarke). As societies move along this path of development, they seem to go through an "optimum period" between the middle and upper thresholds, "in which one may have the impression of prosperity for one or two generations" (Pierre George).

The thresholds of population density or carrying capacity are not everywhere the same, and some geographical environments are more tolerant or more resilient than others. Many regions of "population pressure" are at the intermediate threshold, where a cultural and technical transformation must take place. "The passage from one equilibrium to another is precarious and always accompanied by serious tensions" (Tricart).

The conference was an attempt to restore a sense of priorities among geographers, by focusing on the interaction of fundamental human problems

—the production of enough food (and other goods), its equitable distribution, and rates of reproduction. For centuries these questions were recognized as the vital ones in "political economy." Since 1900, they have been progressively zoned out of the offspring social sciences—economics, political science, sociology—whose practitioners, ever more ramified, have lost their capacity to cope with earthy variables such as mosquitoes, microbes, genes, proteins, soils, and rainfall (Philip Porter). Meanwhile, the bulk of geographers and ethnologists have dispersed into far corners of the globe to stake out private scholarly claims. (There have been individual exceptions, of course, of the stature of Isaiah Bowman, Owen Lattimore, Ruth Benedict, and Gilbert White.) The 1967 conference was a major step toward reversing the trend toward exotic fragmentation, and "reintegrating" geography. The participants were of a dozen nationalities, with strong input from America, France, and Poland. Several were elder statesmen of their faculties, who formulated crucial problems of distribution of wealth and the ecological balance long before these hit the comic strips, *Fortune*, and the *National Geographic*. The geographical coverage of the contributions is remarkable: de Planhol compares societies along the mountain backbone of Eurasia; Brookfield compares social systems in Malagasy, Mauritius, and New Guinea; Kempton Webb reports ten years of study of northeast Brazil, and Gerhard Sandner of Costa Rica. Urban population structures are discussed for cities of India, Japan, and Jamaica. The historical perspective is also broad: Pokshishevskii takes the millennial view, Bonasewicz and Taeuber a scale of generations; and William Vogt reminds us of our short collective memory ("What ever happened to Krilium?"—the miracle fertilizer reported at the AAAS meeting of 1951). The bibliographies extend the horizons still farther.

In contrast to any textbook of world geography, this volume is an impressive answer to the question (fair enough), What are geographers good for? If they continue in this direction, putting first things first, posing the questions carefully, comparing, exploring the political implications, then Pierre George's comment is indeed prescient: "It is not surprising any longer that geography is considered by some to be a dangerous discipline."

The medium does not do full justice to the message. As with other "proceedings," one doesn't read the 600 pages cover to cover. But anyone who dips into this work frequently enough or long enough becomes another Jacob wrestling with the angel. He confronts the issue of his own relevance and the problem of reintegrating or collapsing the fragmented "sciences."

Is there no new medium for capturing the magnificent spectacle of 40 people thinking? A good scholarly symposium is a Woodstock and wants sharing. In this particular case, revolutions, political and technological, are the substance. Yet, as the editors comment, "despite deep anxieties and a lack of agreeement on remedial strategies, there was almost no gnashing of teeth and crying of havoc." The humanity of this work, in the midst of the clamor, calls for a more powerful means of expression.

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Psychoanalytic Theory

Freud and Philosophy. An Essay on Interpretation. PAUL RICOEUR. Translated from the French by Denis Savage. Yale University Press, New Haven, Conn., 1970. xviii, 574 pp. $15. Dwight Harrington Terry Foundation Lectures, vol. 38.

This book, with its many insights into Freud, psychoanalysis, religion, and the theoretical structure of psychoanalytic psychology, is both stimulating and frustrating. The conceptual framework is difficult and the argument somewhat elusive, being a mixture of Hegelianism and phenomenology with some cogent comments about the causal nexus of behavior as distinguished from the reasons that are often given for behavior. The distinction attempted between causes and reasons is not spelled out in the usual terminology employed in the philosophy of science. Rather, the terms "archeology" and "teleology" are used to express these concepts. Although Ricoeur, a philosopher and professor at the University of Paris, disarmingly disclaims expertise as a psychoanalyst, or even having been psychoanalyzed, it is apparent that his theoretical knowledge about Freudian analysis (to which he restricts his discussion) is greater than that of most psychiatrists and a great many analysts.

Ricoeur's concern is not with the therapeutic efficacy of psychoanalysis but rather with the implications of the Freudian view of man, which in effect he sees as a particular view of the development of culture. He has constructed his exposition in three "books": the "problematic," in which questions are raised about Freudian philosophy, principally through the analysis of language and its variations in terms of "ordinary usages"; the "analytic," composed of the author's insights from his reading of Freud utilizing the rules of symbolic transformation and language; and the "dialectic."

It is in the dialectic section that the philosophical problems most relevant to the current scene in psychoanalysis emerge, problems that are of particular concern to the psychologist with an interest in problems of theory or the philosophy of science and that should also concern clinicians who blindingly use theoretical notions with few questions regarding the nature, validity, or generalizability of the theories they use. Here perplexing and unresolved problems arise, such as the disparity between giving reasons why a given child or adult has followed particular pathological lines of development and demonstrating the necessity of the development's having taken that particular route. Our theories can give us reasons, but these reasons never achieve a state of sufficiency. Hence the possibility for an endless multiplication of reasons, none of which are compelling. What this means is that psychoanalytic theory—like other psychological theories—is left at the level of lacking a causal network of explanation.

Perhaps the problem resides in our inability to get at sufficient numbers of independent variables that may then achieve causal status in a nomological system. During the course of psychoanalytic therapy relying on a reconstructive model many significant variables are elicited. Yet still we can provide only insightful explanations which are based on alleged and inferred reasons for development and behavior but which can be rejected. Theory formation in psychology has come a long way since the proposed hypothetical-deductive model, but even employing a probabilistic-statistical model we arrive only at a partial theory which at best has many difficulties in terms of confirmation or disconfirmation. The original strict criteria for a scientific theory set forth by Karl Popper are