set of considerations there is recurrent mention of fronts and other regions of locally significant physical activity. Though this may be a fad of the moment, fronts certainly are regions of unusual biological activity and therefore deserve attention. At the same time, they are dynamically complex physical phenomena that have been understood only recently. Several authors consider the roles of nonliving particulate and dissolved organic matter in a way that reflects accurately the current controversies about their roles in the flow of energy through marine ecosystems. This subject is being reopened as new and powerful chemical methods are applied to some long-standing questions about the composition, residence time, origin, and fate of the largest pools of organic matter in the ocean.

The exposition leaves the reader to accept or resolve some contradictions. The unevenness and contradiction from one chapter to another accurately reflect the state of marine ecosystem research. Indeed, no general agreement exists about such basic questions as the structure of food webs, the interaction of their component populations, or whether current methods successfully measure rates of ecosystem processes. Various authors make a case for the special significance of large organisms in one chapter and that of microorganisms in another. The tendency toward bias in favor of certain organismal or trophic groups, which must be inherited from the days when organisms, not ecosystems, were the only formal subjects of study, is seen even in the section on modeling. Most extant models emphasize some specific food chain, usually grazing and predation, and in that they may be less than ecosystem models. Such condensation is not a limitation inherently imposed by computing capabilities, and it tells us how little we understand ecosystem processes.

Though no chapter is devoted specifically to fisheries, a number of the authors are fisheries specialists. Basic questions that have significance for fisheries management are considered, usually in the context of ecosystem function or ecosystem analysis rather than as strictly practical considerations. In this as well as in other respects, the editor avoids creating a cookbook. Methods are discussed primarily in those circumstances where their development has been a crucial and current part of important basic advances or where potential shortcomings in methods may be limiting our understanding.

The coverage and balance among subjects are good. The treatment assumes that the reader needs no descriptive introduction to the ocean or its populations. The chapters are succinct, with citations of more detailed reviews and other relevant literature. The book was obviously produced without delay, because it is up to date with many 1979 and 1980 citations. Topics of current interest are emphasized, and many matters of controversy are discussed. The volume will be especially valuable to graduate students and to investigators who seek an overview of the current state of ecosystem analysis in the marine biome.

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Polymorphism and Selection

Genetic Variability. CHRISTOPHER WILLS. Clarendon (Oxford University Press), New York, 1981. xiv, 312 pp., illus. $49.50.

A principal theme of *Genetic Variability* is that virtually unlimited amounts of polymorphism can be maintained by selection. Wills argues that the neutral theory has gained credibility largely because the "many compelling arguments that neutral alleles should be the most numerous are the result of the properties of the multiplicative selection model." With multiplicative selection, loci have independent effects on viability so that the average fitness of a population decreases exponentially with the number of loci maintained by selection. He would like to bury this multiplicative bugbear once and for all but feels "how tenacious the grip of the multiplicative way of thinking has been and how difficult . . . for population geneticists to escape from it."

The escape proposed is a multifactorial model in which genes do not determine "fitness" but rather "fitness potential" and in which natural selection acts on fitness potential in much the way an animal breeder practices directional selection—to save the best and cull the rest. Wills is a proponent of balancing selection, and his favorite multiple-factor model is "balancing rank-order truncation selection" or brots (my acronym), in which the fitness potential of an organism is proportional to its number of heterozygous loci. Much of the book deals with the implications of brots as inferred mainly from numerical analysis and computer simulation, and few implications are surprising: (i) a large number of segregating loci can be maintained by selection because the selection coefficient per locus varies inversely as the square root of the number of segregating loci; (ii) inbreeding depression is relatively mild and can be accounted for by a residuum of unconditionally harmful alleles that act in multiplicative fashion; (iii) chromosomes do not "crystallize" as a result of buildup of linkage disequilibrium; and (iv) there may be selection for increased recombination. To be sure, brots predicts that a much higher proportion of polymorphisms should have alleles at intermediate frequencies than is actually observed, but this problem is dispensed with by invoking heterogeneous environments and genotype-environment interaction to skew the equilibrium frequencies.

Some readers may object because the brots model is discussed to the virtual exclusion of many other multiple-factor possibilities. Others may question the brots model itself. In assuming that fitness potential is proportional to the number of heterozygous loci, doesn't the model beg the question of the selective maintenance of genetic variation? What is the biological justification of such a model? After all, allozyme polymorphisms are even more widespread in haploid *Escherichia coli* than they are in diploid organisms (R. K. Selander and B. R. Levin, *Science* **210**, 545 [1980]), which suggests that heterozygosity per se may be irrelevant to their maintenance. Yet Wills develops the case for balancing selection in his detailed discussions of hemoglobin structure and function, blood groups, G6PD, and HLA. These minireviews are excellent summaries of a diversity of molecular and epidemiological data relevant to human population genetics. Extrapolation from these few loci to the entire genome requires a leap of selectionist faith, but Wills expresses confidence that the few well-studied human polymorphisms will prove to be typical.

Wills concludes on a pessimistic note because, in the end, "it seems unlikely that we will ever be able to determine with certainty what proportion of alleles in a population is neutral and what proportion is subject to selection." My own view is that the sharp dichotomy between neutral and selected alleles is unnecessary and rather artificial. In the first place, alleles can be important in adaptation and nevertheless change in frequency because of random genetic drift, and Wills himself cites founder effects among the Yanomama Indians as an example. Second, alleles at loci with small effects on characters under stabilizing selection are slightly deleterious

but so nearly neutral as to be susceptible to random drift (M. Kimura, *Proc. Natl. Acad. Sci. U.S.A.*, in press). And third, naturally occurring allozyme alleles of *E. coli* that are nearly neutral under some conditions of growth in chemostats can be shown to be subject to selection when the environment or genetic background is altered (D. Dykhuizen and D. L. Hartl, *Genetics* **96**, 801 [1980]). Although the selection-neutrality issue may never be resolved in its original framework to everyone's satisfaction, it may be that the original framework was at fault in being overly simple.

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Views of Personality

Personality, Cognition, and Social Interaction. Papers from a conference, Princeton, N.J., March 1979. NANCY CANTOR and JOHN F. KIHLSTROM, Eds. Erlbaum, Hillsdale, N.J., 1981. xvi, 362 pp., illus. $24.95.

Cantor and Kihlstrom have put together a set of papers that describe several reactions to traditional trait theories of personality. These reactions have in common the rejection of classic trait concepts and the acceptance of current method and theory from cognitive psychology in developing alternative formulations. The volume is an interesting sample of the creative thinking that occurs when a traditional viewpoint is dropped and novel solutions are sought for perennial questions. The volume is also exceptional in that it is well edited and the commentaries (Walter Mischel's historical introduction and Samuel Glucksberg's and Michael Posner's concluding discussions) are comprehensive, stimulating, and wise.

The study of personality has been dominated by its quest for solutions to the problem of identifying stable personal characteristics that are predictive of behavior across situations. Probably the most familiar solutions to this problem are the personological typologies that underlie many personality inventories. These typologies have much in common with commonsense or "naïve" personologies that have appeared throughout Western history (an example being Theophrastus's *Characters* from fourth century B.C. Greece). Underlying this approach to personality is the notion that there are a finite number of personality types. Once a person has been classified into the appropriate pigeonhole, his or her behavior can be predicted. As many of the authors in this volume note, the pigeonhole typologies have not been dramatically successful, and there is even doubt about the cross-situational consistency of individual behavior. However, the rejection of the traditional trait-theory approach does not remove the imperative of answering the fundamental question concerning stable personal characteristics and their relationships to behavior.

The contributors have taken a variety of directions in seeking solutions to this problem. First there are papers, by Cantor, by Higgins and King, and by Borgida, Locksley, and Brekke, that hypothesize that the stable characteristics take the form of categories of social perception. These authors assert that much of the apparent stability of personality is in the eye of the beholder. The implication is that if the perceiver's categories for personality are stable the perceivers and the objects of their perception will also exhibit some stability of behavior. Another group of papers, by Rogers, by Kuiper and Derry, by Markus and Smith, and by Locksley and Lenauer, hypothesize that the stability in an individual's behavior comes from the stability of self-perception. Thus a person's labels or categorization of himself or herself are enduring and create consistencies in the person's behavior over time and across situations. Other papers in the volume suggest a variety of other answers to the "what is stable?" question. Cohen suggests that an individual has enduring "observational goals" that control behavior. Fiske and Kinder emphasize stable individual differences in sophistication or expertise in areas of factual knowledge. Kihlstrom suggests that differences in memories of personal experience and differences in cognitive capacities account for differences in behavior. Athay and Darley emphasize individual differences in social competencies. Snyder subscribes to a fairly conventional trait theory and emphasizes the role of choice of situations in which to interact socially as a source of consistency in behavior.

The one common factor in the papers is a subscription to cognitive information-processing theories. These theories include a generally accepted set of constructs to describe attention, perception, memory, judgment, and decision processes. These constructs provide a logic that relates an individual's behavior to the underlying stable personal characteristics that each of the authors has identified as fundamental to personality. In addition, the cognitive approach includes prescriptions about methods. Throughout the volume we see recognition memory ratings, recall memory measures, and choice and judgment reaction times as the major data cited in support of theoretical hypotheses. The two discussion papers, written by prominent cognitive psychologists (Glucksberg and Posner), are cautionary notes emphasizing the dangers of casual importation of constructs and methods from laboratory cognitive psychology into the study of personality.

My personal favorites in the volume are the paper by Cohen developing the concept of observational goals, probably the most important and neglected contribution of the cognitive viewpoint; Higgins and King's paper providing empirical demonstrations of subtle effects of linguistic set; Kihlstrom's thoughtful review of memory processes and autobiographical memory contents; and Markus and Smith's paper reporting empirical demonstrations of effects of self-concept on the perceptions of other individuals.

I have suggested that the cognitive information-processing theory serves as a logic that relates the hypothesized stable personal constructs to the relatively variable manifest behavior. In this sense it functions in much the way in which psychodynamic principles functioned in traditional psychoanalytic theories of personality. There may be an important lesson from this historical analogy. As Mischel points out, the psychoanalytic theories were generatively rich and virtually unfalsifiable in academic research tests. One of the weaknesses of the proposals in the present volume is that none of them have faced serious tests of adequacy. For example, only Rogers and Kuiper and Derry address issues raised by consideration of psychopathological personality, and of course all the research programs are too young to have faced extensive practical or laboratory tests.

If I were to voice a major criticism of the volume it would be concerned with the limited range of viewpoints presented. There are many young researchers who still subscribe to more traditional trait concepts of personality and others who are exploring noncognitive alternative directions. None of these views are represented. Thus the volume does not represent central views in current personality theory but rather one energetic departure from the major traditional