and arithmetic, but it provides no real substitutes for them. On the whole, therefore, I must confess that I found the economic chapters of the work somewhat disappointing, though in many ways highly suggestive and interesting. One hopes that the author will go on to develop these chapters into a major systematic work.

In spite of some very real defects, this is a remarkable book, just as Georgescu-Roegen is an extraordinary man. I know of no one in the intellectual community who achieves his level of competence and creativity in both the physical and the social sciences. One could almost found a sect with the sole purpose of producing a Talmud on him, of criticism and expansion. This is not a book that may appeal to a very wide circle of readers. If, however, the right 500 people were to read it, science perhaps would never be quite the same again.

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A Study of Intellectual Change

Freud and the Americans. The Beginnings of Psychoanalysis in the United States, 1876–1917. NATHAN G. HALE, JR. Oxford University Press, New York, 1971. xvi, 574 pp. $15. Freud in America, vol. 1.

Thomas S. Kuhn's "paradigm" model of scientific innovation has been applied mostly to the physical sciences, within which systems and ideas have been relatively well defined. Now Nathan G. Hale, Jr., a historian, would like to apply Kuhn's model to the historical process by which psychoanalysis penetrated into American culture. Hale, however, wants to use, instead of cognitive systems, "styles," in the sense of life-style now familiar in personality theory. Freud's teachings came in, Hale suggests, just when a completely somatic view of human behavior and personality was at the height of a crisis, the Kuhnian stage preliminary to a scientific revolution. Freud, according to Hale, provided the model by which medical psychologists and other intellectuals could reintegrate their conceptualizations. Present-day scholars who have been uncomfortable with what they perceive as looseness of definition of Kuhnian paradigms will hardly welcome the use of an even vaguer and slipperier concept, style, even though Hale's extension may be entirely in keeping with the psychological-sociological level of discourse appropriate for discussing paradigms.

Nor would Hale reassure anti-Kuhnians by associating with his first theme a second, that Freud was taken up by the vanguard of another revolution, that of "the repeal of reticence" about sexual matters. Although, Hale maintains, reticence and the somatic style were subtly interconnected in the minds of turn-of-the-century Americans, changes in sexual attitudes stray far from the neat models of scientific ideas with which Kuhnians are familiar. Yet Hale's application is in the spirit of the paradigm theory, and style is functional in the same way that crucial problem solving is.

Hale raises these interesting questions as general themes and chapter headings in a very detailed narrative history of a limited subject. With exhaustive coverage of sources he recounts the ways in which Americans came to know and understand the work of Freud and his followers up to about 1920. World War I as a special topic and the 1920's are to be covered in a subsequent volume. The bulk of Hale's exposition is devoted to explaining carefully what was in the European psychoanalytic literature and how American physicians and other literate Americans came to conceptualize it. Freud's American audience often saw his work in terms already familiar, especially philosophical idealism and popularized Darwinism and reductionism. Indeed, Hale suggests that virtually no current of contemporary thinking was irrelevant to Americans' understanding of psychoanalysis. Much of the text is background, consisting of social-intellectual history and Hale's popularization of psychoanalytic ideas.

Two books, at least three doctoral dissertations, and innumerable articles, biographies, and institutional histories have already elucidated much of the early history of psychoanalysis in America. Hale nevertheless chose to start over from the beginning and recapitulate details, especially how the congeries of ideas associated with Freud gained a unique place in both medical and popular writings because of the aggressive crusade carried out by such proponents as the sensitive and idealistic puritan James J. Putnam of Boston and the dedicated immigrant A. A. Brill of New York. Hale does offer many incidental insights as he explores the interplay of idea, personality, and historical change, and a leisurely reader will find these byways rewarding. But in the mass of specifics Hale's chief themes, somaticism and sexual liberation, do not come through with the clarity and consistency they deserve. They remain tantalizing suggestions that Kuhn's model of change may be more broadly applicable to history than most thoughtful students of intellectual change have seen clearly heretofore.

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Cultural Ecology

Amazonia. Man and Culture in a Counterfeit Paradise. BETTY J. MEGGERS. Aldine-Atherton, Chicago, 1971. x, 182 pp., illus. Cloth, $7.50; paper, $2.95. Worlds of Man series.

Betty J. Meggers, who has undertaken the only extensive archeological research in northeastern Amazonia, has for many years been concerned with the relationship of tropical forest environments and human societies in South America. More particularly, she has advocated the view that the South American tropical rain forest is an unsuitable environment for the development and persistence of societies characterized by internal complexity, high population density, and intense agricultural exploitation. Her latest book, *Amazonia*, can in fact be considered an attempt to demonstrate why this is so.

In general, however, the aims of the book are to specify variables influencing cultural adaptation in the Amazon basin and to present a set of general principles constituting a theory of cultural evolution. Meggers has countered the usual dearth of environmental detail characteristic of cultural ecological theory concerning the Amazon basin with extensive descriptions and provocative hypotheses about the constraints and requirements imposed upon human society by particular features of the habitat. For this reason, the book should be read by all who wish to understand, modify, or preserve the tropical forest environment.

The premise of *Amazonia* is that of cultural ecology in general, namely, that "the similarity in the behavior of biological and cultural phenomena indicates that the same processes underlie both cultural and organic evolution" (p. 161). Culture is an adaptation (but also determined by adaptation) guided

by natural selection and a tendency toward diversification which have parallels (not merely analogies) in the biological realm. However, the biological notion of the population and Meggers's concept of "culture" or "cultural configuration" are not equivalent. The latter are catchall labels that cover an unsystematic assortment of beliefs, practices, and objects "that characterize a particular group and distinguish it from similar groups" (p. 42). A culture thus consists of *traits* which are each assumed to be separately "adaptive" in a particular ecological situation. Natural selection is reduced to a functional adjustment of miscellaneous traits to environmental pressures, and evolution as applied to culture remains an analogy, despite the author's insistence to the contrary.

More successful are the descriptive sections of the book, in which Meggers analyzes the selective pressures in two distinct geographical zones, the *terra firme* or unflooded land, and the *várzea* or periodically inundated floodplain. In my opinion, however, the ethnographic illustrations do not adequately demonstrate the significance of these pressures for the *terra firme*. It is surprising that Meggers does not refer to published sources (including the work of Goldman, Carneiro, Murphy, and Wagley and Galvão) which contain considerably more ecological information than some of those upon which she relies, whose data are fragmentary.

Despite these shortcomings, *Amazonia* provides the most comprehensive anthropological discussion so far of the Amazon basin as a human habitat. For this reason, and because it does indeed pose some critical questions about modern man's attempts to exploit the tropical rain forest, this book will stimulate interest in what is most obviously needed: a program of intense, multidisciplinary research in the Amazon basin.

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Evolutionary Anthropology

The Brain in Hominid Evolution. PHILLIP V. TOBIAS. Columbia University Press, New York, 1971. xviii, 170 pp., illus. $10.

Tobias has written, as we have come to expect, a solid and scholarly book that will be of great interest to paleoanthropologists. Tobias concentrates his efforts mainly on brain size, since that is the parameter most easily measurable, although he cautions that studies of brain size and external shape have to be approached with great care. The primary brain data with which paleontologists generally deal are endocranial casts, and these differ from actual brain casts to a greater or lesser extent because of the presence of the meninges, blood vessels, cranial nerves, and so forth between brain and bone.

Nonetheless, Tobias's useful review of volume measurements, including many new ones, indicates that the hominid brain was expanding steadily from at least 2 million to around 40,000 years ago. When adjustments are made for new dates and other stratigraphic details, this expansion is seen as being steady and fairly regular. The chapters dealing with volume measurements are exhaustively detailed, and are marred only by the fact that the author constructs confidence limits on both means and populations incorrectly.

Tobias emphasizes that paleoanthropologists concentrate on brain size only because that is all they can measure. In fact, increasing brain volume of itself tells us little, since it merely reflects changes in internal brain organization at a variety of levels. The interrelationships are represented by Tobias thus:

Increasing brain size ⇌ Increasing complexity of internal organization ⇌ Changing functional patterns ⇌ Changing behavior patterns.

For the first time, a distinguished physical anthropologist has shifted away, however tentatively, from an excessive concentration on brain size alone. For this shift in emphasis, we must thank most of all the work of Ralph Holloway, Jr., on whom Tobias relies quite heavily for much of chapter 7.

In the final chapters, Tobias discusses the reasons for the brain expansion during hominid evolution. Here he gives what has come to be the "traditional" or "consensus" view, that tool-making was the most important factor, or one of the most important ones, in molding man's evolution. This idea can be traced back at least to Darwin's *The Descent of Man*. Recently, however, a variety of lines of evidence are beginning to suggest that tool- or weapon-oriented theories may not be telling the whole story of human origins and evolution.

There is more to human cultural behavior than the ability simply to learn, or to chip flint. Our behavior differs from the learned behavior of all other animals, including chimpanzees, in such important ways as to render descriptions of nonhuman primate learned behavior as examples of "crude and primitive culture" potentially highly misleading. Human cultural behavior involves a very special form of learning, depending upon learned rules, norms, and values which vary arbitrarily from one culture group to another; our behavior is highly context-dependent, contexts being defined or delimited by the arbitrary learned rules. Tools can be detected in the fossil record; this helps explain, at least in part, the emphasis that anthropology has placed on them. Context-dependent cultural behavior is much harder to detect in the fossil record. One of the great challenges for anthropologists with evolutionary interests in future will be to propose plausible model schemes of behavioral evolution based on what we know of behavior, at all levels, in living primates, including man. There are a few brave souls working in these areas already, but evolutionary anthropology will not come of age until such problems are tackled in a much more sophisticated way.

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Paleoecological Methodology

Introduction to Quantitative Paleoecology. R. A. REYMENT. Elsevier, New York, 1971. xiv, 226 pp., illus. $16.75.

This relatively small book, a first in its field, is well written, lucid, and a delight to read. Potential readers should not be put off by the somewhat austere title, which does little to encourage would-be readers with scanty mathematical knowledge. In fact the book presents a clear account of how one mathematically inclined paleoecologist tackles his subject, and it requires of the reader little more than high school mathematics. The highly personal style will not suit all tastes, but it does result in a very readable account of subject matter which easily could become heavy going.

Apart from a brief, but nonetheless useful, introduction to statistical ideas, the book consists of 28 examples of common paleoecological problems, which are grouped according to the broad topics of orientation dynamics; environ-