which cash actually works (and does not work) when it becomes a part of marriage exchange. Although no Pedi will ever pay bridewealth wholly in cash, it is common for some of the customary animals to be replaced by cash payments. In such transactions, a cow is replaced by a cash payment of £5. Most cows are in fact worth more than that if sold at auction to white buyers. Cash substituted for cattle follows the equivalence rate of £5 per animal; fractions (amounting to "part animals") are ruled out. This equivalence ratio makes "economic nonsense," but it is social meaning rather than economic sense that lies at the base of Pedi marriage exchanges. The Pedi taboo discussions of direct economic equivalence when arranging bridewealth. Indirection ("Does your cow have horns?"; "Does it walk home at night?") is demanded by custom. Maximizing (in a strict economic sense) does not represent the Pedi's own view of what marriage transactions are all about. These are instead transactions first and foremost of social exchange. Economic considerations are, according to Sansom, secondary.

In another essay, A. P. Cohen and J. L. Comaroff focus on the management of meaning in political transactions. An ethnographic account of a broker operating between external government and a local community of Newfoundland fishermen reveals the importance of the broker's strategic management of the impression that his brokerage role is both needed and important. Details of marriage arrangements among the Tswana of southern Africa in the same article show how politics and strategy enter into the interpretation of the kind of marriage that has been effected. In this society where multiple ties of kinship provide many alternatives for interpreting the relationship between bride and groom and their respective families, which of the possible interpretations of the marriage form will be applied is an important issue. The implications of a particular marriage are not based on intrinsic aspects of the contractual relationship, but are attached extrinsically to marriage forms as outcomes of the competition to manage their meaning.

Another significant theme in this collection is the emphasis to be placed on individuals as opposed to groups. Many British anthropologists are uncomfortable when the individual or interactions between individuals become the focus of attention rather than social groups or institutions. Some would ask whether individual decision-making is even a proper subject for anthropology. Is it a reductionistic shift away from the traditional (and thus appropriate) subject matter of social anthropology? Can—and if so should—social behavior be explained as a composite of individual action rather than enduring institutions? For social science in general, these may not seem to be very grand questions. For British social anthropology, whose own history has been characterized more by the constraints of orthodoxy rather than by a predilection for eclecticism, they are indeed new ones.

It was the inability of British social anthropology to deal with change that in part motivated Barth's critique, and in a short section of the book two contributors attempt to deal with change. Barth's focus on the system as generated from individual decisions left room for change in a way the fixedness of institutions and structures in traditional British anthropology did not. When social structure is seen as resulting from rather than determining behavior, then changes in resources, decisions, strategies, and the like can account for changes in social forms. But, as Kapferer points out, the problem for social theorists is not merely accounting for change in society. It is equally problematic to explain the why and how of the persistence of social forms. Actor-oriented transaction theory enables the explanation of both.

The ASA, through its conferences and publications, has provided a significant contribution to anthropology that has no genuine American parallel. Detailed consideration of a timely topic, its relevance to the field, and the approaches utilized by contemporary practitioners is the hallmark of the ASA volumes. The busy schedule of the annual meetings of the American Anthropological Association, the concurrent panels, often on closely related topics, and the limited time for presentation of papers and discussion of them make us envy our British colleagues who have devised a forum that allows for wide discussion of timely topics in anthropology and for dissemination of the symposia to a much wider audience. *Transaction and Meaning*, itself worthy of attention from social scientists interested in the specific topics mentioned, is perhaps most important as a member of the continuing series of volumes that regularly examines and evaluates various topics and approaches in social anthropology. We Americans, whose professional societies have grown to unmanageable proportions and whose annual meetings have lost the intimacy and depth of analysis the ASA volumes represent, stand to learn from the consideration of substantive issues provided by this series. We might also use the volumes as a model for rethinking the role of a scientific society and its responsibilities to its membership.

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An Adversary View of Sociobiology

The Use and Abuse of Biology. An Anthropological Critique of Sociobiology. MARSHALL SAHLINS. University of Michigan Press, Ann Arbor, 1976. xvi, 120 pp. Cloth, $8; paper, $3.95.

From antiquity onward philosophers, theologians, and eventually scientists have been concerned with relationships between the physical and biological aspect of mankind and the behavioral and social aspect. In times relatively recent although already extending over generations the discussion has been complicated and obfuscated by extension into other realms, notably those of economics and of politics. Even within more restricted frames of reference obscurity has arisen by adversary approaches based on "either-or" propositions that are almost always inappropriate in that form. Pertinent examples are the premises that human behavior (including social behavior) is either innate or learned and, at another level, that natural selection is either by individuals or by groups.

Discussion of these subjects has recently been stimulated by the publication in 1975 of *Sociobiology* by Edward O. Wilson, an accomplished biologist whose basic objective research is on the behavior of ants. Marshall Sahlins, an accomplished ethnologist whose basic objective research is on the sociology of tribal peoples, now joins the fray. Sahlins's small book is an all-out attack primarily on Wilson, secondarily on others bearing what is in Sahlins's view the sociobiological stigma. The question posed is, "What is the relationship between biology and sociology?" Sahlins has cast this in the "either-or" mold. For him Wilson's view, held to be incorrect, is that the two, biology as evolutionary genetics and sociology as broadly comparative ethnology, are isomorphic, approaching identity. That is an extreme not literally reached by Wilson's own

words, but it is an impression that can be given by them. For Sahlins there is no relationship between the two, again a flatter extreme than Sahlins may accept but an impression almost inevitable for anyone reading this book.

After casually but properly brushing off "vulgar sociobiology," exemplified by such extravaganzas as *The Naked Ape*, Sahlins goes after "scientific sociobiology." He believes that the success of scientific sociobiology depends largely on its theory of kin selection, and in a long chapter occupying half the text pages of his book he seeks to demolish sociobiology by demonstrating that it is contradicted by ethnological studies of tribal kinship. His account is interesting, indeed fascinating, and in its own frame of reference it is convincing. As a rebuttal of sociobiology it is less so. The argument is too complex for summary here, but its basis is that according to sociobiology social organization should be ordered by kinship and that in fact it is not. What seems to be actually demonstrated is that among tribal peoples, at least, social organization produces relatively small coefficients of relationship within a given social unit. On this Wilson's views may be somewhat equivocal but are not in flat contradiction, and I believe that most evolutionary biologists would expect an approximation of the observations reported by Sahlins. The "either-or" question of individual or group selection becomes involved, and this is a false alternative. Other problems arise from the fact that the "relationship" of biologists and the "kinship" of ethnologists do not have the same meaning and both sides have confused them. It is also questionable whether the whole structure of sociobiology can be brought down on the question of kinship, a small part of that broad structure.

Sahlins next devotes some 20 pages to his view that "the Darwinian concept of natural selection has suffered a serious ideological derailment" by expression in economic, rather than directly biological, terms. Such usage is a source of confusion and unnecessary conflict, and the matter deserves serious attention on the part of biologists. In some instances economic terminology represents an inappropriate approach. (The same may be said of some basically political attacks on sociobiology.) In others it introduces problems about the use and validity of analogies. The problems are real, but my impression is that relatively few evolutionary biologists have suffered this "derailment."

Much of the critical discussion of sociobiology, including this book, has been another form of the nature-nurture debate, a discussion that has proved futile and indeed meaningless because that is not a legitimate either-or question. Man is not born a tabula rasa, nor is he born a programmed automaton. When the argument approaches that extreme polarization, it is sensible to say, "A plague o' both your houses." That does not stand as an overall judgment of Sahlins's book. It is interesting and well written. It will be valuable reading for biologists, perhaps less so for ethnologists to the extent that it may more largely reenforce than modify or enrich their existing views.

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The Anatomy of Speech

On the Origins of Language. An Introduction to the Evolution of Human Speech. PHILIP LIEBERMAN. Macmillan, New York, and Collier Macmillan, London, 1975. viii, 196 pp., illus. Paper, $4.95. Macmillan Series in Physical Anthropology.

Based on the premise that "human speech shapes human language," this little volume outlines the evidence relevant to tracing the evolution of this primary human communication medium. Whether the book actually traces the origins of language is open to question, but the introduction it affords to the author's research method makes it worthwhile reading.

It is in the first two-thirds of the book that Lieberman is at his strongest. A discussion of the cognitive and communicative factors underlying language lays a foundation for the working principle that speech and language are interdependent and that the evolution of the one affected that of the other. By using the comparative method, citing functional examples from Darwin, Negus, and others, Lieberman discusses the relations between specific anatomical arrangements and the communication systems of various species. To one trained in vertebrate paleontology such an approach is so basic as to seem obvious. Its application in the study of the evolution of language has not been straightforward, however. Until the late 1950's, it was generally believed that the capacity for articulate speech depended primarily on the proper anatomical arrangement in the central nervous system.

Lieberman is to be given particular credit here for providing a clear introduction to basic acoustics to aid his demonstration of what Fant pointed out in 1960: that the capacity for articulate speech is dependent not only on the central nervous system, but also on a particular shape and functioning in the region of the head and neck referred to as the supralaryngeal vocal tract. This approach (the source-filter theory of speech sound production) is basic to Lieberman's method. With Lieberman's exposition of it as background, the reader is able to make the conceptual leaps that the remainder of the book requires.

On the basis of the phonetic features of language and what is known of the physiology of speech production, Lieberman compares the speech production capacities of human and nonhuman primates. This comparison centers around the production of formant frequencies. Roughly speaking, an animal is articulate to the degree that it can manufacture a range of formant frequencies corresponding to the vowel triangle [a], [i], [u]. The greater this range of frequencies, the greater the capacity for articulation.

A well-developed pharynx with the posterior one-third or so of the tongue forming its anterior wall is the arrangement required for the generation of the wide range of formant frequencies that facilitates speech. On this anatomical criterion adult humans are found to be able to produce the greatest range of such frequencies. Chimpanzees are found to have a limited capacity to generate them, and the human newborn is found to have a capacity only slightly greater than that of the chimpanzee. Lieberman notes that, in the adult human, the hyoid bone and the associated larynx are low in the throat, causing the posterior one-third to two-thirds of the tongue to lie below the oral cavity (rather than in it) and to form the anterior muscular wall of the pharynx. In the newborn, the hyoid is high in the throat, so that the tongue lies completely within the oral cavity and there is little or no pharynx. This latter arrangement is found in the nonhuman primates as well. Early in human ontogeny the larynx descends, forming the pharynx and making the production of speech sound possible.

Thus far, then, Lieberman has used comparative and developmental evidence in exploring the nature of human speech. Experimental evidence is added with the introduction of a computer-implemented analog of speech sound generation capacity. This program is capable of calculating what range of formant frequencies a vocal tract of a particular size and shape would be able to generate. The analog substantiates what is already known from direct measurement with