Book Reviews

On the Uniqueness of Man

Biology and Man. GEORGE GAYLORD SIMPSON. Harcourt, Brace and World, New York, 1969. xii + 180 pp. $5.95.

"Looking at man as a biological species, some biologists, professional and amateur, have become so preoccupied with the fact that man is an animal that they have neglected the fact that he is an absolutely unique animal."

Simpson's book is a sensible corrective to the neglect which this sentence from his preface (p. viii) characterizes. It is made up of ten essays, seven of which have been published before, but which are all recent and up to date. Through them there runs the urbane and cultured singleness of mind that is the thumbprint of Simpson's style and of his outlook, in which scientific seriousness and a pervading sense of human responsibility are fused together.

Because it expresses the coherence of Simpson's outlook, the book stands together: there is no feeling that the essays are separated by their particular subjects. They are arranged in a natural order, and move from the discussion of biology on the small scale to the evolution of man and so to his culture, including his ethical systems. Naturally Simpson has his prejudices, and occasionally they betray him into an unguarded sentence. He is tetchy about molecular biology, for instance, so he writes, "Since biology is the study of life, and molecules, as such, are not alive, the term 'molecular biology' is self-contradictory" (p. 7). And he thinks that we pay too much attention to physics, so he claims that the interpretation by Karl von Frisch of the dance of the bees "required considerably more ingenuity . . . than splitting the atom" (p. 109).

But no doubt the prejudices are a necessary part of Simpson's personal involvement with his subject, and the strength of that is seen whenever he comes to comment on an important scientific or social issue. Nothing could be better, for example, than his discussion of teleology as a pseudoscientific notion (p. 34), or of the other self-deceptions which laymen and scientists alike practice when they cast their prejudices in the form of pseudoscientific statements (pp. 72–73). Among the most telling passages on social issues are those which examine the dependence of science now on grants from government agencies that want to turn it toward mission-directed research (pp. 54–55 and elsewhere), and what he says here deserves to be read and pondered in every laboratory.

Let me turn now from these general matters, some of which Simpson has discussed in earlier books, to what seem to me the crucial new topics in this book. They deal specifically with the subject raised in the title and in the sentence from the preface that I began by quoting: the uniqueness of man. The subject is introduced in the sixth essay, "The Biological Nature of Man," and important applications of it are then discussed in detail in the eighth essay, "Language in Evolutionary Perspective," and the tenth, "Biology and Ethics."

"The Biological Nature of Man" (which was first published in *Science* in 1966) seems to me the best essay in the book, and shows Simpson's talents in their full lucid and logical (and slightly avuncular) majesty. He surveys the evidence for the evolution of man that has been gathered in Africa in the last 40 years, and draws a clear picture of the line of descent from lower primate to *Australopithecus* and on to modern man. The picture has an inner coordination which convinces the reader of itself, without fuss or rhetoric. We see the unfolding of some of the main human gifts as a single process, and recognize the product as combining in one much of what we know ourselves to be. I can think of no other account as concise and well reasoned as this that transmits to the reader the sense that man is indeed unique as a biological unit, and not merely as an example of particular traits.

It is therefore a disappointment to find that the essays that one expected to continue this account into two of man's most remarkable cultural expressions, language and ethics, fail to carry it forward; and they are the least satisfactory in the book. "Language in Evolutionary Perspective" does not even live up to its title, for Simpson concludes in it that no evolutionary continuity can be found between the utterances and signals of animals, including primates, and those of man. So complete is the division, in his view, that he classifies those exclamations and simple cries that man shares with the animals as an evolutionary vestige, and labels them "the negative of language" (p. 92) or "antilanguage" (p. 112).

It would be unfair not to say that this antievolutionary view is indeed held by one school of linguists. Simpson takes it mainly from the work with primates of Jane Lancaster, who believes that human beings are unique in their ability to name things, and that this is the underlying specification of our language. But it is not these partisan issues that trouble me in reading his essay. What seems to me to go wrong at this stage of Simpson's analysis lies deeper. It is the acceptance of a view of language as a mere mechanism, an instrument that man is endowed with like a personal telegraph, which extends our power of communication in a purely functional manner. This is quite out of keeping with the task he sets himself elsewhere, of seeing man as an integrated organism whose biological peculiarities enter into his whole makeup—as the evolution of the upright gait (for example) has played a part in everything that man does, from research to making love.

The fact is that Simpson has not tried to single out the special features of human language at all, in a way which could connect them with the other gifts that man and only man displays. Let me give three examples. Human language is unique because, among other things, it has a grammatical *structure*: and the search for structural rules within the events of the

natural world (not merely predictions but explanations—see p. 10) is a characteristic way in which man and man alone tries to understand his environment. The grammatical rules of human language enable us to form sentences which *predicate*, that is, which communicate cognitive information (and not merely an emotion or a signal). This is a second activity that is unique to the human mind: the ability to say things about physical and human nature which have universal references, and which are not bounded by the domination of the immediate environment. And human beings are alone (on present evidence) in the capacity to *paraphrase* a message, so that the same content can be conveyed in subtly different forms—a third fundamental effect which makes poetry possible, and gives it a status as remarkable and species-specific as science.

These are three features of human language, but they are not peculiar to language: they are peculiar to man—they are projections into language of the whole human personality. But when Simpson comes across such connections he always puts them aside. For example, he writes, "One of the enticing side tracks to which I can point here but which I cannot follow far is a relationship between language and ethics" (p. 113). With this ominous remark, which firmly separates the discussion of man the speaking animal from that of man the ethical animal, I turn to the essay on "Biology and Ethics."

The essay on ethics is a sober and reasonable analysis of previous attempts to set up either an evolutionary or a naturalistic ethic, for example by Julian Huxley and by C. H. Waddington. Simpson rightly criticizes these attempts because they do not sufficiently take account of the special nature of man. But in fact what he has to say shares the same fault: it treats man as a unique creature because he is the only "ethicizing" animal, but it fails to connect the existence in all cultures of ethical rules with other universals of culture. He does draw attention to the importance of human foresight as a gift which plays a part in ethics (p. 146). But he does not extend the notion of foresight to that inner creation of a generalized future, a domain for strategy rather than tactics, which characterizes the human imagination. Here again he seems unable to get beyond the concept of man as a problem solver, to the concept of man as a creator of open or unbounded futures which have to be controlled in spite of the high uncertainty they contain. It is in the balance of these concepts that the conflicts between individual and society have to be resolved, and that biological and social trends have to be matched. But Simpson evades dealing with such conflicts: "I cannot here discuss the nature of these two factors in human evolution or the relationship between them" (p. 145).

In an earlier essay Simpson rightly complains that in the past "philosophy of science" simply meant "philosophy of the physical sciences" (p. 45). But the unexpected discovery that has to be faced by those of us who want to create a philosophy of biology is that such a philosophy has a different character from the philosophy of physics. A biological system, even a single human being, is not a mechanism that can be isolated, or whose parts can be treated as separable. Something more is asked of philosophy in biology than an extension of the traditional analysis of the modes of scientific reasoning. And it is not even a question of making sure that one group of cells is seen in the context of another. The behavior of an organism, and of man above all, is an expression of gifts which are internally connected and intertwined, so that they all project into every activity. The coherent analysis of these connections is a new problem in the philosophy of science.

Simpson has in the past shown a subtle appreciation of the coordination of an organism, in his analysis, for instance, of species in evolution. But in the crucial essays in this book he fails to bring the same sense of inner unity to the study of two gifts of man which, in my view, most require it. Language and ethics are universals of culture in all human societies. It is understandable that linguists and philosophers of ethics should treat them in isolation; but it is precisely the business of the philosophical biologist to trace in them expressions of the total human makeup. Their philosophical content is that they particularize a central issue in epistemology: the special ability of man to modify both his physical and his social environment by a progressive process of understanding.

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Astronomical Manual

Observation in Modern Astronomy. DAVID S. EVANS. Elsevier, New York, 1968. xiv + 274 pp. + plates. $14.

The tone for this unique book is set in the author's preface: "There is a need for a kind of manual for the student who aspires to be a working astronomer, or the physicist who wants to know what goes on in observatories" and "many recruits to the astronomical profession have a very limited experience of optical observational practice." The book is indeed written to benefit the professionally inclined student or the dedicated amateur. Evans was for many years the Chief Assistant of the Royal Observatory at the Cape of Good Hope, and in this capacity he was deeply involved in problems of the measurement of fundamental time and star positions. He contributed significantly to the measurement of stellar radial velocities and proper motions. He was engaged in photometric research by photographic, photoelectric, and spectroscopic techniques. In this book he explains how he did it all—and the student who reads the book will be ready to go to work for himself. Evans's training was in astrophysics, with the emphasis on good Oxford physics.

I like the first two, long chapters best of all. The first deals with "Astronomy of Position," a subject in which Evans is truly a master, also one that remains a closed book to many younger astronomers. My only criticism is that I wish he had been more precise in some definitions. For example, I looked in vain on pages 24 to 26 for a precise definition of ephemeris time, a most significant concept and one that is difficult to grasp for most students. In spite of this reservation, I intend to urge all my students to study this chapter with care. The second chapter deals with "Measurement and Analysis of Stellar Radiation." It is comprehensive and excellent. I only wish that it were more up to date. There is, for example, no reference to the techniques and potential of astronomy in the infrared. The radio spectrum is deliberately ignored—which I for one regret. I wish that in these early chapters Evans had spent more time describing techniques for the adjustment of optical telescopes and of stellar spectrographs, both problems with which he is well acquainted.

Personally I do not care especially for the presentation of the universe of