Book Reviews

Genetics and History

The Evolution of Man and Society. C. D. DARLINGTON. Allen and Unwin, London, 1969; Simon and Schuster, New York, 1970. 756 pp., illus. $12.95.

This is a history of the world written by a cytogeneticist. When a great specialist tackles the most general of all topics the reviewer may surely be forgiven for asking why.

Partial answers to this question no doubt could be found in the particularities of the life of the author, but I believe a general issue is involved. It is surely common (though not universal) for a man's interest to shift from specialized subjects to more general ones as he grows older. Aside from professional historians (an exception that needs accounting for), men's interest in history generally increases as they grow older. The meaning of this association can be interpreted in two contradictory ways (depending on the age of the interpreter): as either a mark of maturity or a sign of senility. In the absence of age-free arbitrators no resolution of this conflict seems possible.

A psychoanalytic explanation can be suggested. It is often said that every man has one book in him—his autobiography. Such a book, if written, is usually produced before the author is 25, usually in the form of a novel. The anguish and *Weltschmerz* it wallows in are terribly important to the writer but rather less so to the rest of the world. We forgive the production because we recognize it as part of the Oedipus process. The young man must kill his father before he can be free to become himself. The autobiographical novel is a parricidal weapon. "The pen is mightier than the sword"—or at any rate safer for the wielder thereof.

I think it may also be said that every man has in himself a second book, which he may produce only if he lives long enough. After symbolically killing the father-figures in his life and finding his own identity he becomes free to review his past objectively a second time. If he does so he becomes fascinated with both his ontogeny and the limited phylogeny we call history. He resurrects his father, as it were, and erects a monument to him. Approaching the end of life, he creates a kind of immortality for himself by reaffiliating himself with his personal past and with history, which is eternal.

Most scientists never write the first book; the Oedipus process, possibly less compelling, releases its power through less harrowed channels than those followed by literary men. Some scientists write the second book, however, and such a book Darlington's appears to be. "What is my nature? Where did I come from? How did I get here?" These seem to be the questions that moved the author. Seeking answers, he surveys the history of the entire world, both East and West (and Oceania as well). The result is an act of filial piety.

This is a hard book to review; the reviewer should be a triumvirate: historian, sociologist, and biologist. Claiming no more than the last third of the requirement I will confine my remarks to the biological aspects of this history.

History, says Darlington, must have been affected by natural selection "with all its special forms of sexual selection, artificial selection and unconscious selection." This conclusion, which seems self-evident to biologists, is viewed askance by most sociologists and many historians. They seem to think that a nonselective historical process is possible. The improbability of this is easily seen if one carries out this thought-experiment: How would we ensure the absence of selective factors? We could do so only by using a table of random numbers in choosing the parents of the next generation. Since we see nothing in recorded history that remotely resembles a random-numbers selection apparatus we can only conclude that social processes are always genetically selective, even though usually unconsciously so.

The problem is to determine what the unconscious selective biases of history have been. At this point, to quote Carl Becker, "Everyman [becomes] his own historian." Darlington has a number of interesting, and perhaps unprovable, hypotheses to suggest. He ascribes the downfall of Byzantium in part to the large role of eunuchs in its governance: by coupling social dominance with biological sterility they insured that the qualities socially selected for would be biologically selected against—surely an unstable system. The corresponding system in the Western world depended on the *nominal* celibacy of powerful clerics who in fact often reproduced themselves luxuriantly: they only gave up the possibility of having legitimate offspring. Darlington's hypothesis is plausible; but we should not forget that eunuch-ruled Byzantium lasted a thousand years.

The author writes: "The superiority of the hunter collector over the civilized man in what concerns his own survival is . . . unquestionable. It is a genetic superiority for which no training can compensate." I suspect he is right; but it would be gratifying to have an indisputable corpus of evidence supporting this belief. There is Richard Post's study showing the superiority in vision of a hunting tribe in Brazil; but what else?

Selection in human societies is, of course, fantastically complex, often operating in contradictory ways in different social strata. Darlington points out that selection and geographical stability are associated in peasants but disjoined in craftsmen, priests, and ruling types. Talent in the latter classes is ever on the move toward greener pastures. The genetic history of a nation is no straight-line progression. There is no reason to expect it to be, for "intelligence is of many kinds. It has to be measured not on one scale but on many. And its diversity, if lost, cannot easily be recovered. We have therefore to preserve these diverse habitats, along with their diverse inhabitants, from damage which civilization has so far so wantonly wrought upon them."

A deliberate policy of preserving diversity is made difficult by the natural (social) processes of ecological succession: Alexander von Humboldt and George Perkins Marsh "have taught us . . . that every new source from which man has increased his power on the earth has been used to diminish the prospects of his successors. All his progress has been made at the expense of damage to his environment which he cannot repair and could not foresee." One has only to tour the shores of the Mediterranean to be overwhelmed with

the melancholy evidence that man habitually despoils his own nest. We understand this fault now: we have yet to eradicate it.

There are many other instances of using the insights of biology to illuminate the problems of history; but proportionately, these constitute only a small part of the book. Well over nine-tenths of Darlington's opus is just straight history, in the ordinary sense. To a biologist-reviewer it is somewhat disappointing that the biologist-author has not spent more time on the biological interpretation of history. Had he done so the resulting story would have been more biased—but in a desirable way, for it would have helped correct for most other books of history which have been written in almost complete ignorance of biological processes, which surely must have been important vectors in the story of mankind, however problematical their importance may have been.

GARRETT HARDIN
Department of Biological Sciences, University of California, Santa Barbara

Worldly Problems

Biological Conservation. DAVID W. EHRENFELD. Holt, Rinehart and Winston, New York, 1970. xii + 228 pp., illus. Paper, $3.50. Modern Biology Series.

This book describes a branch of applied biology which has been treated patronizingly by academics for too long. It is written simply and directly, yet with sufficient imagination to appeal to college students and those older persons whose interest in the general subject has recently been aroused. Ehrenfeld, a biologist trained also as a physician, provides a certain fresh perspective, as follows:

> Ecology . . . is not yet a fully predictive science; community management, to be successful, must strive to base itself on the maximum amount of ecological data, be responsive to change, not be unduly influenced by rigid ecological theories and models, and must utilize the best historical information available.

The first chapter reviews the conservation movement in the United States and points out the differences between the philosophies of the early leaders: Murie's wilderness, Marsh's balance of nature, and Pinchot's sustained yield. In the 1920's the elder Leopold added the idea of the land ethic and management of population surplus for man. Thus, as Socrates said, the important ideas have been around a long time.

Ehrenfeld's primary targets are the mammoth forces of the U.S. Corps of Engineers and public works projects and their tragicomic apologists who still believe that progress is synonymous with civil engineering. Oddly, he almost ignores Rachel Carson and pesticides and in so doing neglects the part they have played in arousing contemporary public concern for the environment.

Conservation is still primarily a negative effort, as is shown by a sample of the author's chapter titles: "Endangered natural communities"; "Factors that threaten species"; "The preservation of natural communities." He dwells on pollution, major disasters, and industrial accidents, and he includes with these introductions of exotic species. Later on he deals with positive enterprises, such as zoos as genetic banks for endangered species, and analogues of natural communities such as the English hedgerows and gardens. In the last chapter he discusses the social traditions that have allowed the current process of environmental deterioration to thrive: the tragedy of the commons, the perpetually expanding economy, public acceptance of gradual deterioration, and the mystique of technology and progress.

His theoretical basis, stated in chapter 2, is that of the American ecological Establishment: complexity and diversity buffer the community against disturbance from the physical environment; the diverse, buffered community is the evolutionary purpose of ecological succession. The theme emerges repeatedly:

> . . . an ecosystem at less than optimum—merely a loose assortment of animals and plants.

> The water hyacinth is not new to Central America, and there it is under control by virtue of its integration in the natural community, where checks and balances exist to prevent one species from aggrandizing itself at the expense of the rest.

> Loss of a mature ecosystem . . . is as permanent, on the time scale of human civilizations, as the extinction of a species.

I think the author errs in ignoring the fact that these assumptions have been repeatedly challenged by other American ecologists, following Gleason's extreme opposite view. Ecologists in Europe, Australia, and elsewhere have avoided this polarization into extreme theoretical positions and have developed more objective means of describing ecosystems, which provide more rational bases for managing them. Because American ecologists do not resolve, or even recognize, these underlying theoretical problems, contemporary American conservation efforts face an unresolved conflict between two concepts, each apparently justified by successional theory: the wilderness-climax and limitless progress. In order to become acceptable to ordinary Americans (the city folk), the conservation movement must resolve this gratuitous dilemma. It must accommodate as part of its goals man-made systems such as the Tuileries gardens, the Vermont hillside meadows, the Japanese villages, and the Alpine pastures of Norway and Switzerland. The sympathetic interaction between man and his landscape which these represent is the basis of the rational movements in schools of design that Ehrenfeld mentions—the open space for leisure where urban residents need it, or the environmental corridors of McHarg and Lewis.

For the future, practical goals must be defined so that everyday small decisions can help work American society out of the mess into which everyday small decisions have brought it. At an early stage ecologists must present a rational body of community theory freed of the Procrustean concepts of succession and climax about which (as Egler said) ecologists have been mumbling in academese while hiding in their ivory towers.

As a capitalist society we should acknowledge that money attracts able people. My personal experience leads me to assert strongly that there is no shortage of students, of all ages and abilities, interested in field biology. Yet, as a recent article in *Science* pointed out, in the current cuts in jobs and research funds field biology has suffered least—because it was already at the bottom. Even this year many able people have been shunted off into other fields by the absence of jobs and money. If the environmental commitment is to be more than a NATO endeavor (No Action, Talk Only), the academic establishment must be forced to accept priority shifts from the glamor fields of molecular biology, neurophysiology, and cancer and heart research to a major effort in practical natural history.

WILLIAM H. DRURY
Massachusetts Audubon Society, Lincoln