

by Lerner more easily deals with the dynamics of race formation and admixture. "Races are populations which differ in incidences of some genes" (p. 223). Undoubtedly some anthropologists will find this awkward; only populations, not individuals, can be classified. Nevertheless, it is a biologically valid definition of race. The non-typological definition illustrates clearly that diversity occurs within a race as well as between races, simplifying discussions of social and ethical issues.

It may seem that the reviewer has dwelled too long on Lerner's accounts of eugenics, intelligence, and race. However, the treatment of these topics exemplifies the unique nature of this book. Lerner's concern here is more with the implications of genetics in modern society than with genetics as a science *per se*.

The number of errors is probably about average. Since one is more disturbed by such in one's own area of specialization, I feel constrained to point out just one. Box 3C contains the following statement: "These antigens then produce specific antibodies" (p. 42). Antigens do not produce antibodies; rather, antibodies are produced in response to antigens. Several labels on the drawing are incorrect. Twice antibodies are mislabeled as antigens.

The possibility of genetic manipulation is leaving the realm of science fiction. Lerner has provided a book to give the layman the tools necessary to come to grips with some of the social and ethical questions that may arise. As student cries for relevance in collegiate courses increase in volume, this text should surely find its way into many classrooms, providing a theoretical framework and a factual basis for intense discussion.

*The Evolution of Man and Society.* C. D. DARLINGTON. New York: Simon & Schuster, 1969. 753 pp., figures, maps, tables, 3 appendices (bibliography, index). \$12.95 (cloth).

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This book is an embarrassment, not, apparently to its author, but certainly to any reviewer. The author is a Fellow of the Royal Society, Sherardian Professor of Botany and Regius Professor of Biology at

Oxford University, Director of the Innes Horticultural Institution, and Keeper of the Botanical Gardens at Oxford. He is regarded as a specialist in the genetics of the cultivated plant.

The book is a chaos of factual errors, gross omissions, deficient thinking, and careless verbal expression. Part I, with three chapters, is concerned with human evolution, while the remaining twenty-six chapters largely ignore the important subject of the evolution of human society, offering, instead, a third-rate history textbook. The bibliography of thirty-one pages is divided by chapters and shows wide, indiscriminate, and uncritical reading, with extensive omission of the significant books, even in his own specialty.

It is generally agreed today that the evolution of man has been a process, covering over fifteen million years, by which a primate almost totally dependent for its survival on inherited characteristics was changed into a primate whose survival today is almost totally dependent on learned behavior. There is no similar agreement on the nature of social evolution, but many would feel that the subject should cover the process of change in human social groupings from cooperative bands to kinship groupings to large tribes, larger and more powerful organizations based on religion (in two distinct sub-stages, which we might call Archaic Kingship and Providential Monarchy) and secular states (also divisible into sub-stages, such as feudal monarchy, dynastic monarchy, the national state, and, today, ideological blocs). I would be prepared to accept on their merits any evolutionary stages Darlington might suggest. However, he suggests none; he never discusses the subject. He also omits almost all discussion of human evolution.

This book does not deal with either of the subjects suggested in the title because Darlington does not believe that either man or society evolved in the sense that most people would use the expression. All he believes happened is that men moved about more and more *in the Pleistocene* and, as a result, got more and more hybridized. Throughout the book Darlington avoids the use of the word "evolution," replacing it wherever possible, with the word "hybridization." This is about the only case where I

can commend his use of a word, for he not only does not believe in the evolution of either man or society, he also does not understand the meaning of the word as generally used by others. To Darlington, men, like hybrid plants, are simply collections of genes, the units of hereditary characteristics, just as they were millions of years ago. Each individual has his own distinctive gene assortment planted in the individual's particular social environment. If that social context, like soil for a plant, is favorable for the coding in the genes, the person will develop the characteristics he inherited from his ancestors. But if the social environment is not of the kind necessary for his gene assortment, like a plant in poor soil, he will be distorted and crippled in his growth. Darlington is no more interested in the evolution of society than he, as a grower of plants, is concerned with the geological evolution of the soil into which he puts his seed. As for man, Darlington has no conception of the process by which man evolved a less and less fixed and an increasingly plastic potentiality, capable of learning a wide range of behavioral patterns depending on his social group. That would mean that men have many areas of flexibility in learned behavior; to Darlington they are not flexible at all, but either develop in the way their genes indicate or are unable to do so and are distorted.

Darlington carries his belief in inherited characteristics to an extreme degree, believing that all man's activities are inherited, including language, tools, and all social organization. When I visited him in his laboratory in Oxford in 1961, he told me that "a pure Negro" whose family had lived in America for centuries still inherits the ability to speak the Bantu languages of Africa and can learn to speak English "only with great difficulty and never correctly." He states this belief here in general terms (pp. 35-37; see also Darlington 1947; 1961). Thus to Darlington, as to Plato (in *Meno*), all education or growth through human experience is either evocation of inborn knowledge and inherited characteristics or it is distortion of these in an unfavorable context. To Darlington, all culture, including artifacts, has a similar basis. Thus, he says, the Tribe of Judah used spear and shield, while the Tribe of Benjamin used bow and sling, because these tribes of Israel had different "racial

origins" (p. 174, n. 3). It might be mentioned in passing that Darlington still believes that sickle-cell anemia is a Negro racial characteristic (p. 40). Yet he is not really a racist, although he believes in "pure" races, for, like any horticulturalist, he is all for hybridization. Until that is achieved completely (which he seems to consider impossible), Darlington is all for "stratified societies" in which persons of different inherited talents can find places to express these. In fact, on this matter, he is very tolerant, because he regards such stratified societies, with room even for criminals, as inevitable. Thus he tells us that the Mafia were able "to grasp the opportunities of the modern world. . . . They came to America" (p. 610).

Darlington's outlook is of the era about 1880, and seems to have been shaped largely by the ideas of Francis Galton, Darwin's cousin. The volume consists largely of unproved assertions that what happened in the past was the result of shifts in gene pools. Many of his statements are demonstrably untrue, irrelevant, or outrageous. The real difficulty is that Darlington is so convinced that hybridization is the total key to the events of the past that he feels under no necessity to find out what actually happened in the past or even to be familiar with the literature on the subjects he discusses, since he already has the correct answer. The rest of this review will be aimed at showing that Darlington's numerous errors could have been easily checked if he had had any interest in doing so.

According to Darlington, all past events arose from mixtures of gene pools. These mixtures came from increased human hybridization, caused by increased human mobility, which arose from the climate changes of the Pleistocene (p. 27). This concentration on the Pleistocene, which he dates as "the last million years" (p. 27), means that he ignores the evolution of man, which took place largely in the interval from about nineteen million to about one million years ago. In fact he seems totally ignorant of the events of this period, including the fact that it also had very significant climate changes. His efforts to discuss what he calls the "Origin of Man" are hampered by this omission and thrown into total confusion by his unbelievable carelessness with words. The

slovenliness with words is typical of his attitude to the subject. He speaks of "the genealogy of alphabets" (p. 101), when he means of writing, since he begins his list with "Sumerian ideographs"; he calls Sumerian a "tonal" language (p. 100); he uses "Aryan" when he means "Indo-European," and tells us that the Bronze Age invaders of Italy were "Aryans," as were the similar invaders of Anatolia who destroyed the Hittites (p. 235). As we shall see, he says "monkey" when he means "primate" (p. 21). He constantly says "habits" when he means "customs" (as on pp. 90-91). All words for races, customs, time periods, and languages, are used without discrimination, because to him they are all gene pools. Thus he speaks of paleolithic men, paleolithic languages, paleolithic times, and even "paleolithic plants" (p. 75). All hunters of today, whose nature he totally misunderstands (p. 70), are "paleolithic." Their customs ("habits") are genetic and "can be described most exactly in terms of the genetics of colour blindness" (p. 29). Thus he can tell us what men of twenty thousand years ago were like by looking at the Bushman: neither he nor any other hunter can be changed into farmer or herdsman by "training or persuasion... Nothing but hybridization will change him. His instincts reappear in some classes, professions, and peoples in advanced societies and are altogether excluded from others. . . found at the top and at the bottom of society" today (p. 30); Lenin, he says, was "paleolithic" because he liked to hunt (p. 558).

This carelessness with words begins on the first page of the text (p. 21), where he begins his examination of "human origins" with "the monkey family"; to do this he enumerates the chief evolutionary changes of the lemurs (all without dates), and immediately talks of *Australopithecus*, to which he attributes four features of which the first is disputed in the only citation he gives and the second is untrue. On this same page he mentions and passes *Homo erectus*, calling him *Pithecanthropus*. On the next page he has man cooking "grain and roots as well as meat over fire," the beginnings of speech, and a great increase in brain size. None of these is discussed, no effort is made to put them in relative chronological order, and all the great changes which led up to

them are left out. These changes include the shift from arboreal to terrestrial living and from forest to savanna, upright bipedalism, development of the hand, increase in body size, loss of hair, changes in diet and dentition, growth of human emotions, increased cooperation and mutual dependence. His failure to understand what he says can be shown in connection with the only development he more than mentions, man's increased head size. He says (p. 24), "Woman's pelvis grew no larger and pregnancy remained of the same length at about 38 weeks." This confident assumption about the duration of the gestation period hundreds of thousands of years ago is as typical of Darlington as is his failure to realize that his statement is impossible and his ignorance of the accepted current ideas on this subject, namely that increasing head size in the infant gave increased survival value to any tendency toward premature birth, shortened the period of gestation, and did so at the cost of increased infant helplessness and increased adult cooperation and mutual dependence. In this discussion it is evident that Darlington has little understanding of the theory of organic evolution and almost no knowledge of the subject at issue—human origins. He does not use the following words: primate, hominoid, pongid, hominid, *Homo erectus*, *Homo sapiens*, *Ramapithecus*, Oligocene, Miocene, Pliocene, or many others. It is clear from the bibliography of this section of three chapters that he has no familiarity with the scientific literature on the subject. His list begins with Robert Ardrey's *African Genesis*, but it includes no books by these men: C. L. Brace, D. R. Brothwell, J. Buettner-Janusch, J. D. Clark, Le Gros Clark, R. Dart, T. Dobzhansky, G. Heberer, F. C. Howell, W. W. Howells, L. S. B. Leakey, E. Mayr, A. Montagu, J. T. Robinson, A. H. Schultz, E. L. Simons, J. N. Spuhler, P. V. Tobias, or S. L. Washburn. His chief reliance is on Carleton Coon and articles in *Scientific American*. In general here, and throughout the book, grave doubts arise that Darlington has actually read or seen the literature to which he refers. For example, on p. 48 he refers incorrectly to Goodall and Schaller on the social life of chimpanzees and gorillas. Any undergraduate who handled references as Darlington does would be failed for faking his citations. For example,

he has only two references to material on *Australopithecus* in the bibliography, one the original article by Dart in 1925, the other as follows: Robinson, J. T. 1962. "Origin and adaptive radiation of the Australopithecines": in *Evolution und Hominisation* (Ed. Kurth). Fischer, Stuttgart (Smithsonian Report for 1961). There are many fine articles in the Kurth volume, to which Darlington makes no reference, but the one by Robinson is the only one he should not have cited, not only because it does not agree with his flat statement about the Australopithecines having tools, but also because Robinson repudiated this article in the new edition of the volume in 1968 (Kurth 1968:150-175). Moreover, the reference to the Smithsonian Report for 1961, indicates that Darlington believes that an article by Robinson reprinted there is the same article as the one in Kurth; it is not, but quite a different paper with a different title, reprinted from *South African Journal of Science* 57:3-12, 1961. It is doubtful if Darlington ever saw the Kurth volume, in either edition, while he probably did see the Smithsonian volume since he also had in it a reprinting of his Royal Society Tercentenary Lecture of 1960. What is clear is that Darlington cited a reference that did not support his statement without checking the citation.

Darlington's discussion of the origins of agriculture, close to his own specialty, is as full of errors and ignorance as his discussion of human origins. For more than twenty years, the best work on the origins of agriculture has emerged from the ecological approach, especially on the mesolithic context, with emphasis on the non-food factors in planting. Darlington seems totally unaware of this work. He uses the word "mesolithic" only once, incorrectly (p. 30). He says that the Neolithic came directly out of the Paleolithic (p. 69); that barley and wheat were "the first crops" (p. 71; that there are no remains of human settlements outside caves until men had agriculture (p. 69); that the early neolithic peoples cultivated the steppe (p. 81); that the distinction between "slash-and-burn" and irrigation agriculture came from the difference between genetically "short-sighted" and genetically "prudent" people (p. 82); that terrace irrigation was earlier than alluvial valley

planting in the Near East (p. 84); that agriculture was introduced to Mesopotamia by the Semites (p. 327); and (p. 86) that "with the discovery of rice in the Ganges delta came the wonderful organization of the wet paddy fields in the terraces which spread into South East Asia."

Errors such as these show what used to be called "invincible ignorance." Agriculture almost certainly did not begin, as Darlington still maintains, with men "planting and reaping barley and wheat on the highlands of western Asia." His assumptions that men without plows in the earliest stages of planting could till steppe or that the chief distinction between slash-and-burn and irrigation is a matter of being short-sighted or prudent shows no familiarity with the practical problems of crop raising under primitive, or even modern, conditions. The work of men like the Sauers, father and son, or the wonderful book of his fellow specialist in the genetics of the cultivated plants, Edgar Anderson (1952; 1967); or the more recent work of students like David R. Harris or J. G. Hawkes or Kent V. Flannery; all this work on the ecology of the origins of agriculture is ignored by Darlington, in spite of the fact that he was present in London, on May 18-19, 1968, and delivered a paper, at the best conference ever held on this ecological approach. At this conference the men whose work he ignores in this book, like Harris, Hawkes, and Flannery, also delivered papers, and these papers specifically correct most of the errors I have just mentioned (Ucko and Dimbleby 1969). At that conference Allchin showed that the earliest rice is not from the Ganges, but from western India, in the late Harrapan period (possibly about 1800 B.C.), while Watson reported rice in China "a little before" 1650 B.C.—both before Ganges rice (Ucko and Dimbleby 1969:323-329, 398). From his own specialty Darlington should have known that in Southeast Asia, vegetation of root crops is much older than rice, and that swidden (dry) rice cultivation there is older by about 2000 years than paddy rice. This priority of root crops and of vegetal planting over seed planting and especially over cultivation of *Gramineae* was frequently discussed at this conference and in other scientific literature over the last quarter century. It is strange that Darlington has not heard of it. At the

conference Harris said, "A similar historical pattern of seed culture expanding into areas of vegiculture is apparent in Southeast Asia, where an intrusive rice culture has progressively replaced an indigenous vegicultural system based on yam and taro cultivation" (Ucko and Dimbleby 1969:13-14). Flannery gave a brilliant ecological exposition of the beginnings of grain cultivation in the Near East, which Darlington ignores, although in the report it is printed directly following his own paper. He also ignores the reports of Flannery and others that cultivation of squash and beans probably goes back in Central America before 7000 B.C. and before maize (Flannery et al. 1967).

Darlington's neglect of the ecological approach, or any other approach, to agricultural origins rests on the same basis as his neglect of human origins. Both are simply the magical consequence of man's reaching a certain degree of hybridization. When this point was reached, new developments in artifacts or behavior became *not only possible but compulsory*. This is why agriculture occurred simultaneously and independently in both hemispheres. He says:

Man had reached at this moment the limits of mental and physical evolution, of tribal organization and above all genetic and consequent cultural diversity, which were obtainable under conditions of hunting and collecting. . . . The change of the climate at the end of the last ice age between 10,000 and 8,000 B.C. had the most drastic effect on man of any change in his history. For the first time his movements all over the world were affected. Never before can there have been so much hybridization yielding so many new kinds of people and so many new ideas. And the greatest effect was inevitably at the cross-roads of movement, in the fertile corners of South-west Asia and of Central America. Now men learnt not merely to dig for roots but to plant them; not merely to collect seed but to save it and to sow it [p. 70].

Thus the vitalism of two generations ago is now being replaced by the morass of the individual gene pool to provide cause without explanation.

The historical portion of this book is filled with errors. We all make errors, but it requires a special kind of intellectual arro-

gance to write a book on a scholarly subject without knowing anything about the subject or without bothering to check the simple facts. There are many pages here with from three to five such errors, and the volume as a whole must have close to a thousand. He mistakes the dates of pastoralism and the smelting of copper by two thousand years (pp. 89, 110), says (p. 92) that "texts show that the sales of slaves became more numerous after 3000 B.C.," when writing did not begin until that date and there are probably no texts on such sale at that time. He says men "first studied astronomy" in Sumer, when the zodiac, which is almost worldwide, goes back to neolithic peoples who used a duodecimal number system (p. 93). He says (p. 96) that the "first exact date" in history is the founding of the Akkadian Empire in 2371 B.C., when there is no agreement or knowledge of this date. He says (p. 196) that the invasions of Scythian and Cimmerian horsemen after the eighth century forced the Assyrians, the Greeks, and the Romans to "adopt cavalry as the decisive arm in war," when it is well known that the weapons development of all three was away from cavalry toward the famous hoplites and legions. He believes that "hardened steel" was used for peasants' plowshares a thousand years before the Assyrians (that would be before 1500 B.C.) and that the Hittites had a "steel dagger" about 1260 B.C. (p. 130), when the present knowledge of steel-making brings it westward, along with "Arabic numerals," from India to Damascus and then to Europe in the period A.D. 500 to 1200. There are many similar errors throughout the book.

There is no need to enumerate these endless errors, but I do wish to show that the pages where they are most numerous are just the pages where the correct information is easily available.

Errors are most numerous in the chapter on Greece. There are, for example, six on page 166. On page 208 he refers back to this page saying that Pericles, "grandson of Cleisthenes," in 451 B.C. reversed the reform of Cleisthenes. Any Classical dictionary could have told Darlington that Pericles was not the grandson of Cleisthenes and that the reform of 451, which required that both parents of a citizen must be citizens, had nothing to do with the earlier reform that

shifted the units of voting from four tribes based on kinship to ten territorial districts.

Darlington's chapter on Islam is just as bad, with twenty-three errors on seven pages (pp. 333-339). Mecca, he says, had thirty-six clans (Lammens say "ten"); the Ka'ba in the sixth century, was "a great stone cube" (according to Wansinck, in the sixth century, it was still a wooden enclosure, without a roof, and, when it was burned down in the seventh century, it was re-built, with a roof, of wood from a wrecked ship). According to Darlington, Muhammad's revelations "were passed on in secret so that a secret brotherhood was created." This is a total misconception of Muhammad and his mission which was to be a "Messenger of God," "a Warner," who would tell the people of Mecca as soon as possible of the Last Judgment, which he believed was probably imminent. When Mecca rejected him, according to Darlington, "Muhammad with his faithful band took refuge in flight. They escaped to the north to a rival commercial settlement high up on the mountain ridge. It was a place called Yathrib. . .with a rich cultured governing class using the Hebrew alphabet for a Yiddish kind of language." There are five errors in that quotation: Muhammad fled with no band, but with a single companion; they went to a purely agricultural oasis with no commercial interests, which was on a flat plain so long that the view south "stretches away farther than the eye can reach," according to Buhl, the standard biographer of Muhammad. The Jews in the town spoke and wrote the same language as all other Arabs there and were not distinguishable from them except by religion. The idea that they spoke anything remotely like a Germanic dialect such as Yiddish is a fair sign of Darlington's ignorance of language, shown by many errors on the subject in this book, and despite his "scholarly publications" on this subject.

There is no need to continue to belabor Darlington's ignorance of the facts of history. They could mostly have been corrected by recourse to a few simple handbooks, as I used the *Shorter Encyclopedia of Islam* for the previous paragraph. But Darlington did not need to check anything or to investigate any of the subject matter of this book because he has the key to all knowledge and to all the events of the past in his theory of the

"hybridization of man." That is why he wrote a book of over seven hundred pages on the evolution of man and society without dealing with either subject. But that a man who does this is a world renowned scholar and an F.R.S. does raise questions about contemporary universities.

#### References Cited

- Anderson, E.  
1952, 1969 *Plants, man, and life*. Boston: Little, Brown. (Reprinted Berkeley: University of California Press.)
- Darlington, C. D.  
1947 The genetic component of language. *Heredity* 1: 269-286.  
1961 Speech, language, and heredity. *Speech Pathology and Therapy* (April), 3-6.
- Flannery, K. V., et al.  
1967 Farming systems and political growth in ancient Oaxaca. *Science* 158:445-454.
- Kurth, G., ed.  
1968 *Evolution and Hominisation*. 2nd edition. Stuttgart: Gustav Fischer Verlag (1st edition, 1962).
- Ucko, P. J., and G. W. Dimbleby, eds.  
1969 *Domestication and exploitation of plants and animals*. London: Duckworth.

*Rassengeschichte der Menschheit*. 1. Lieferung: *Australien-Indochina-Indopakistan—Die Zigeuner*. KARL SALLER, ed. Munich: R. Oldenbourg, 1968. 221 pp., figures, plates, tables, chapter bibliographies. DM 39.60 (paper).

Reviewed by KENNETH A. R. KENNEDY  
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This volume includes articles by four of the thirty-four contributors to Karl Saller's series on the races of mankind. The focus of study is the biological anthropology and culture history and prehistory of four human populations. No format of topical subject and arrangement appears to have been prescribed by the editor, and there is consequently a certain unevenness in the coverage of data. Abstracts of the articles are not present nor are bibliographical data concerning the authors, although the names are familiar to European anthropologists.

The first article by A. A. Abbie is in English. He clarifies some widespread no-