usually vary together, adequate controls for a single parameter are difficult to find. Third, it is nearly impossible to perform valid ecological experiments, except to gain pragmatic knowledge, because natural systems represent evolutionary equilibria and any manipulation upsets evolved balances. There is simply no time to wait for an ecologically interesting system to evolve into equilibrium with an experimentally altered environment. Fourth, attempts to build models of community interactions have been plagued with difficulties in verifying assumptions and premises and in eliminating alternative models that predict similar patterns.

Whatever the state of ecology as a science at present, David Lack has produced a thorough summary of one of its small, but more lustrous, facets that will be a springboard of patterns and ideas for the future. The book generally reads easily, except through some of the long series of examples and scientific names. Although Lack is somewhat guilty of the teleology which is rampant in ecology and which has engendered many ecological myths, he also displays the keen intuition about birds that has made him one of the foremost modern ecologists.

The book is attractively produced and it is handsomely illustrated by Robert Gillmor.

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Man

The Imperial Animal. LIONEL TIGER and ROBIN FOX. Holt, Rinehart and Winston, New York, 1971. xii, 308 pp. $6.95.

If a reader of the classical 19th-century novels that deal with the growth and structure of human families were, on the evidence they provide, to enumerate and describe the major features of human social existence (such as mother-child and sexual bonding and male contention for status) and further, to delineate the features common from one family to the next, the basic "biogrammar" of Lionel Tiger and Robin Fox would emerge. This comment is not meant to detract from the work under review but only to point out that *The Imperial Animal* has a strong line of common sense running through it and has been conceived in a humanistic tradition. This book shares with recent bestsellers by Desmond Morris and Robert Ardrey a view of man as a biological being possessing an evolutionary heritage. The effort by Tiger and Fox is unique, however, in that, in addition to attempting to extrapolate from the study of other higher primate species to man, it draws heavily on the combined knowledge of anthropology and sociology. Thus the authors have produced a document which presents a picture of the basic human, its needs and recurrent patterns of expression, that takes into account data provided by the study of mankind in many of its cultural manifestations.

Tiger and Fox's writing is interesting and lively. A tendency to depart from fact to weave a convincing argument from analogies bordering on poetic metaphor emerges from time to time, but the book is nevertheless an objective and a serious one.

One of the cornerstones of the book is the assumption that modern man has carried forward a heritage from the time when man was a seminomadic hunter living in small groups. Tiger and Fox argue that man is preadapted for certain forms of social interaction. That is to say, unless the environment he is presented with conforms in its essential parameters to the environment for which he was adapted 20,000 years ago, he may suffer emotional dislocations. To quote: "But this brain is still the old primate brain with an overlay of gray matter wrinkled into self-consciousness by the hunting transformation," and "the pitifully short time since we invented agriculture (about ten thousand years ago), and the even shorter time since industrialization began in earnest (perhaps two hundred years ago), should not blind us to the reality of our evolutionary heritage. In our economic behavior, as in so much else, we are still Paleolithic hunters." By contrast, in a recent publication ("Competitive and aggressive behavior," chapter 6 in *Man and Beast*, J. F. Eisenberg and W. S. Dillon, Eds., Smithsonian Institution Press, 1971) E. O. Wilson presents an argument which he summarizes by the statement, "There is every justification from both genetic theory and experiments on animal species to suppose that rapid behavioral evolution is at least a possibility in man. By rapid I mean significant alteration in, say, emotional and intellectual traits within no more than ten generations—or about 300 years." The viewpoints presented by Tiger and Fox on the one hand and by Wilson on the other bracket the dilemma of human sociobiology. We simply do not know, at present, what biological limits are present within the "wiring pattern" of man's brain.

In their zeal to relate man's present-day behavior to a past which man is apparently carrying forward into the present, Tiger and Fox develop criticisms of current aspects of Western society, such as educational systems, medicine, and international politics. Social criticism based on the assumption that man is preprogrammed for a certain type of stimulus input is certainly a valid approach, if we can reasonably demonstrate that man is indeed predisposed to live and act in a certain social milieu. It would seem that before such far-reaching recommendations as the authors make in their book are set forth, however, the limits of man's biogrammar should be more firmly established. The case presented by Tiger and Fox rests upon inference that is tenuous in some instances. There are certain attributes of man's behavior that are so consistent across cultures that one can only conclude that the authors must certainly be right in some of the generalizations they make. The question, then, is which ones. I do not believe that we have at our disposal the evidence to decide in many cases.

The Imperial Animal, in any event, is an interesting synthesis and a humane one. It is certainly far more successful as a discussion of human behavior patterns than any previous book written in this genre, and may be read with much profit by zoologists and social scientists.

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Historical View

Molecular Genetics. An Introductory Narrative. GUNTHER S. STENT. Freeman, San Francisco, 1971. xviii, 650 pp., illus. $12. Biology Series.

Question: What kind of introductory molecular genetics text is it that has no hurdles to exercise the student, that presents its "science" as a body of established knowledge too cleverly and definitively secured to be challenged, and that poses only one question for the future—and promptly declares that to be unanswerable? Answer: It is one written by a former geneticist who has previously declared his field to be dead.

In *Molecular Genetics: An Introductory Narrative*, Stent has given us a historically precise and highly readable account of how our molecular picture of heredity developed. Molecular genetics is no longer something to do (it seems) but has become something to recount, and Stent's talents as a raconteur combine well with his personal experiences, which cover almost the entire period and touch upon many of the subjects about which he writes. The book is the distillate of six years of teaching to upper-division students at Berkeley, and is intended as an introductory text for similarly prepared students. It will be appreciated by most of its intended audience—it's clear and it's comfortable. In addition, teachers who do not elect to adopt it will find it useful in the preparation of scholarly lectures. Authors at large might study it as an example of effective narration, though I'm not sure that a skill like Stent's can be learned.

The book is beautifully produced and even more beautifully illustrated; at $12 it gives value for money.

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Parts of a Famous Biota

Flora of the Galápagos Islands. IRA L. WIGGINS and DUNCAN M. PORTER. Stanford University Press, Stanford, Calif., 1971. xxii, 998 pp. + plates. $37.50.

William Beebe called the Galápagos Islands "World's End." Herman Melville called them "the Enchanted Isles." For biologists this archipelago of volcanic islands 500 miles off the coast of Ecuador has become the shrine of evolutionary theory. Here it was that Darwin observed the remarkable racial differentiation of birds, tortoises, and lizards that planted in his mind the seeds of the theory of natural selection.

For a variety of reasons—remoteness, inhospitable terrain, the great expense of exploration—investigation of the biota of these islands has been slow and spasmodic. In over a century of study, no one has produced either a comprehensive flora or a fauna of this classic biological area.

Television has now discovered the islands, a tourist invasion has begun, a Darwin Research Station on Santa Cruz Island has been established, and ecological research is in full swing. Most of this activity owes its inception to the Galápagos International Scientific Project, a multidisciplinary field trip undertaken in 1964 to focus international attention on the islands, to stimulate serious study of their natural history, and to foster a National Park concept for Ecuador (see R. I. Bowman, Ed., *The Galápagos*; reviewed in *Science* **156**, 55 [1967]).

Ira L. Wiggins, a botanist with this project, decided it was time for a complete review of the flora, and he and Yale Dawson set about the preparation of a full-dress, modern illustrated flora with keys, descriptions, and ecological notes. After Dawson's death the coauthorship was taken up by Duncan Porter, and specialists were enlisted to treat certain families. The result is a prime example of what a modern flora should be—complete and scholarly, a handsome example of the publisher's art, with excellent line illustrations and a selection of small color plates. The taxonomic arrangement is a pleasant compromise for the nonprofessional user, with the families, genera, and species arranged alphabetically within five easily recognized groups—Ferns and Fern Allies; Dicots: Apetalae, Gamopetalae, and Polypetalae; and Monocots. The glossary is correct and meticulous, and there is hardly a typographical error anywhere. The illustrations give an example of almost every genus and are scientifically accurate and realistic.

Unfortunately the large size of the book precludes its use as a field manual. When they planned the book, the authors could not have foreseen the great surge of popular interest in the Galápagos that has taken place. Now it is imperative, in the interests of education and conservation, that an effective small field guide be prepared for the use of serious tourists. The *Flora's* introduction is so useful and so broadly descriptive of all aspects of natural and human history that it should be reprinted for general use. This could be complemented by the abstracted keys and by illustrations of the more conspicuous floristic elements. The cultivars should be treated (only those that survive on their own are listed in the present text), and the index should include their vernacular names. It is a pity that these are not included in the present index or given prominence in the text.

The obvious errors in the *Flora* are few and easily corrected. Plates 3 and 4 are mislabeled; plate 3 shows Academy Bay, Santa Cruz, not Wreck Bay, San Cristóbal, and the legend of plate 4 is a mixture. Plate 31 is printed upside-down, and there are a few errors in the captions of the bird plates, according to local ornithologists. Figure 198(a–c) seems to represent *Oxalis corniculata* rather than *O. cornellii*, and fig. 136a (*Bixa orellana*) is incorrect, the plate having been drawn from the same herbarium specimen as fig. 161 (*Caesalpinia bonduc*).

Controversy concerning the geographical affinities and the endemism of the Galápagos flora abounds, and it is disappointing not to find a review of the situation in the light of our revised understanding of the taxonomy. How much of the flora is thought to have arrived in the historic period, what percentage is Caribbean and Central American, what Andean, and how do the facts square with recent theorizing on migration tracks, continental drift, and land bridges? A statistical table shows a total of 642 species, of which some 30 percent are endemic. Balancing this extraordinary picture of endemism, I calculate roughly that 185 species (about the same percentage) represent widely distributed tropical weeds and 53 (8 percent) are escaped cultivars. And although 642 species, from any viewpoint, looks like a small flora, it is not an easy flora to master if one considers that 236 (67 percent) of the genera are represented by a single species, while only 58 (16 percent) are represented by three or more. The largest genus (excepting *Cyperus*, which contains a number of weedy introductions) is the dominant endemic tree-composite *Scalesia*, with 11 species. This genus along with the tree cacti gives the Galápagos its uniquely exotic forest aspect.

This reviewer brought the first copies of this book to the Galápagos in June 1971 with the first study tour for university credit, so had an opportunity to test it on location. I can report that the keys work beautifully. The strongest impression I have from the experience is that the book is still a preliminary treatment. The islands will not be adequately known until there are resident botanists studying the flora and until the Darwin Research Station is equipped for the handling, drying, and proper storage of botanical materials. The microcosm of high endemism, casual and intentional introduction of weeds and cultivars, and tropical agriculture on a small scale in such an isolated and neatly circumscribed area is a situation that cries out for students. A thorough