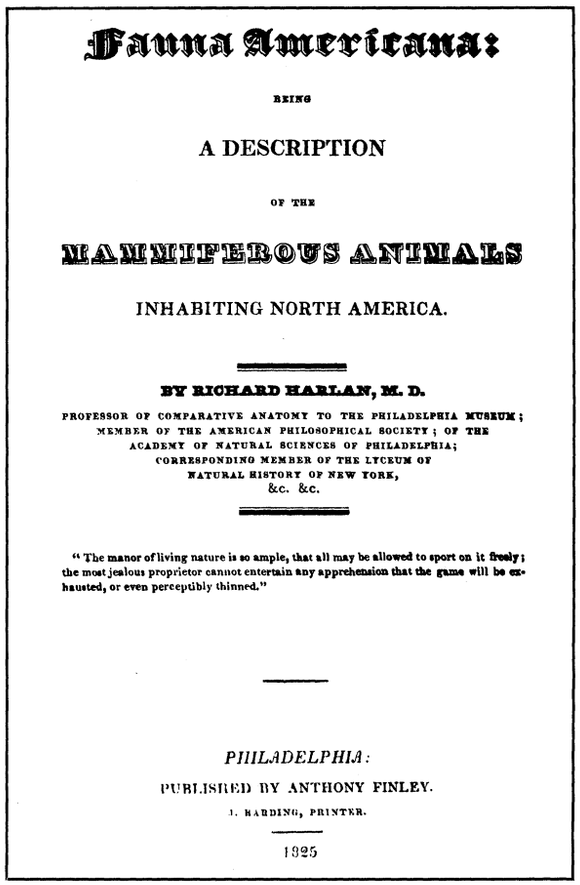

Fauna Americana:

BEING

A DESCRIPTION

OF THE

MAMMIFEROUS ANIMALS

INHABITING NORTH AMERICA.

BY RICHARD HARLAN, M. D.

PROFESSOR OF COMPARATIVE ANATOMY TO THE PHILADELPHIA MUSEUM; MEMBER OF THE AMERICAN PHILOSOPHICAL SOCIETY; OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA; CORRESPONDING MEMBER OF THE LYCEUM OF NATURAL HISTORY OF NEW YORK, &c. &c.

"The manor of living nature is so ample, that all may be allowed to sport on it freely; the most jealous proprietor cannot entertain any apprehension that the game will be exhausted, or even perceptibly thinned."

PHILADELPHIA:

PUBLISHED BY ANTHONY FINLEY.

J. HARDING, PRINTER.

1825

"Title page of the earliest systematic description of American mammals, which drew heavily on Anselme Desmarests's *Mammalogie* but added much new information." [From *American Science in the Age of Jefferson*; courtesy of the American Philosophical Society]

to intellectual achievement as they were to liberty" (p. 6).

Greene concludes that these efforts met with some but not outstanding success. Post-Revolutionary American scientists pursued their tasks during a titanic struggle between the world's two superpowers, Great Britain and France, a contest that badly buffeted many Americans even though they remained on the political and military periphery. Yet scientists in the new nation remained largely unscathed. As Greene says, they were animated by "patriotism, utilitarianism, love of science and scientific reputation, and admiration of the Creator's wisdom, power, and goodness" (p. 418). Their basic cosmology remained whole and strong. They had no notion that scientific inquiry might produce dangerously ambiguous results for human society. They were not yet fully aware that they were helping to construct an arena for combat between science and religion. To be sure, if they had listened they could have heard faint rumblings of such construction, but most American scientists paid little attention and remained convinced that the revelations of scientific inquiry could only do honor to the truths of a faith that had long since been revealed. As the author says in a vivid summation that makes one itch to put Thomas Jefferson and Jerry Falwell in the same TV studio: "And Jefferson considered it an unanswerable and uninteresting question whether God had created the world in six days or in six million years" (p. 412).

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Adaptational Analysis

The Explanation of Organic Diversity. The Comparative Method and Adaptations for Mating. MARK RIDLEY. Clarendon (Oxford University Press), New York, 1983. viii, 272 pp. $37.50.

This ambitiously titled book has two more modest goals. The first is to strengthen our ability to test evolutionary hypotheses, which are difficult to approach experimentally. The second is to use the suggested techniques to understand why males in some species guard females before mating and why mating in some species is positively assortative with respect to size.

Many evolutionary hypotheses have the general form "Character A is more likely to evolve when condition B exists." The diversity of characters and conditions in the natural world can be used to test such hypotheses, but, as with any experimental test, the comparisons to be made and their implicit assumptions must be carefully thought out.

Ridley argues that to test such a hypothesis one needs to know how often character A has evolved in the presence and absence of condition B and how often character A has been lost in the presence and absence of condition B. This application of cladistic techniques (that is, the focus on shared, derived characters) allows him to range freely across taxonomic levels, which is useful because the relevant variation may exist among genera in a family for some groups and among families in an order for others. Thus sample sizes for statistical tests are increased by combining data from the most appropriate taxonomic level for each of many groups.

The first hypothesis tested is that precopulatory mate guarding should evolve when female receptivity to mating is limited to a short and predictable interval. The second is that correlation in size between males and females of mated pairs should be found when larger females are more fecund, when larger males are more effective competitors for mates, and when mating is time-consuming. In each case Ridley reviews an enormous amount of widely scattered literature on the mating habits of many groups, particularly the Crustacea, and concludes that the hypothesis is supported.

There is no question that students of the reproductive biology of the groups covered will find Ridley's review of considerable use; the bibliography and index make up 50 of the 272 pages. The predictions are interesting in their own right, and those looking for support for the adaptationist program will appreciate the pointed commentary of chapter 1. But the most important measure of the success of this book depends on the extent to which the author has contributed to our ability to test evolutionary hypotheses with comparative data.

My overall assessment is that the suggested method is sound in theory but, like cladistics, not always easy in practice. Much of the book consists of detailed justifications for the many decisions that were necessary in order to score the data—for example, for a particular taxon does precopulatory mate guarding occur, is it primitive or derived, and is female receptivity short and predictable? The necessity for dealing with the first and last of these is not unique to

Ridley's method, but accurate determinations of primitive and derived are both critical for the validity of the test and potentially controversial. In addition, the method typically requires that the data for character and condition be scored nominally; thus it will not replace the more powerful statistical analyses discussed and used by Harvey, Clutton-Brock, and their colleagues, which remain extremely valuable whenever appropriate data are available.

In summary, this book could perhaps have been written as three papers. Although together they do not live up to the scope of the title, they are carefully prepared and clearly written and will be both useful and interesting for their respective audiences.

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Scottish Geology

Geology of Scotland. G. Y. CRAIG, Ed. Second edition. Halsted (Wiley), New York, 1983. xiv, 472 pp., illus., + plates. $54.95.

For two hundred years Scotland has been the breeding ground for many of the fundamental principles and ideas of geology because of its superbly exposed, rich, and varied terrain containing and adjacent to many ancient seats of learning. Consequently, many of the great names of the earth sciences are closely linked with Scottish researches: Hutton's elucidation of the stratigraphical principles involved in unconformity, Peach and Horne's discovery and mapping of the Moine Thrust, Lapworth's work on the stratigraphical paleontology of graptolites, Clough's analyses of fabrics and minor structures that were to pave the way for modern structural work, Read's work on the granite problem, Sutton and Watson's mapping of the Lewisian to show how complex event sequences can be deciphered in basement terrains, Kennedy's demonstration of major sinistral offset on the Great Glen Fault, and Ramsay's structural work that has led to the techniques of modern structural analysis.

It was against this background of geological discovery that Craig and Walton, the editors of the first, 1965, edition of *Geology of Scotland*, set themselves the formidable task of finding a group of authorities to summarize the geology of this small but well-known piece of Europe, with successful results. For the second edition, Craig's task was compounded by the occurrence of the plate tectonic revolution and the availability of many geophysical data, so that the rocks are susceptible to new interpretations. Assemblages in which this is the case include the Southern Uplands, an extensive zone of Ordovician-Silurian turbidite, shales, and cherts, interpreted by Legget and McKerrow as a subduction accretion prism, and the Ballantrae Complex, interpreted by Church and Gayer as an early Ordovician ophiolite complex; these interpretations allow more cohesive, less ad hoc analyses and syntheses of these terrains.

A book on a region, such as this, must be primarily a reliable source of data that are not overinterpreted. The second edition, with the addition of excellent new chapters on Devonian stratigraphy by Mykura and Devonian magmatism by Brown, has succeeded very much better than the first in this role. It is perhaps invidious to select individual contributions, but special mention must be made of the masterly summaries of Carboniferous stratigraphy and magmatism by Francis and Tertiary igneous rocks by Emeleus. The role of a regional text must, as a source of data, to a large extent subjugate the more expansive role as a purveyor of analysis and synthesis, but it is nevertheless a pity that there is not more interpretation of the Lower Palaeozoic rocks in the context of a broader regional Caledonian, perhaps even Appalachian, view. The broader view is to some extent provided by the beautifully organized and written introductory chapter by Harris on the growth and structure of Scotland, but more short, interpretative sections in individual chapters would enhance coherence for a non-British reader. However, in fairness, the overwhelming mass of data makes any interpretation vulnerable. The geological corollaries of plate tectonics are very complicated and still rather poorly understood on the medium and small scales. It is therefore easier to erect novel and provocative explanations for poorly known regions than for areas like Scotland.

Geology of Scotland is a scholarly work that will be the definitive source book for many years to come. The authors deserve praise for summarizing so many data in so modest a space. The work should be on the personal bookshelves of geologists worldwide; it is good reading and an inspirational source.

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The European Landscape

Geomorphology of Europe. CLIFFORD EMBLETON, Ed. Wiley-Interscience, New York, 1984. x, 465 pp., illus. $79.95.

The phenomenal diversity of the European landscape is matched only by the remarkably different approaches and assumptions of those who seek a scientific understanding of it. This book, a compilation of writings by members of the International Geographical Union Commission on Geomorphological Survey and Mapping, is the first comprehensive survey of the geomorphology of Europe. Similar regional landform analysis, sometimes called "physiography," was once the major activity of geomorphologists. In the first half of this century, regional landscapes were explained in terms of their structure, processes of erosion, and stage of development. Although this type of analysis continues in many countries, it has generally fallen from favor in Britain and the United States, where attention in recent decades has focused on small-scale landforms and short-acting processes that are most amenable to quantitative measurement, statistical analysis, and incorporation into a systems-analytical framework.

The key to appreciating this volume is the international perspective on geomorphology provided by abundant examples of what different geomorphologists do. Unfortunately, because author affiliations are not given, the matching of regional problems to regional methods of problem-solving becomes an exercise in library biographical searching. Moreover, the frustration of such searching is compounded by the more extensive representation of some nationalities (and nations) than of others. The major contributions in the book come from and deal with the United Kingdom (C. Embleton), the western Soviet Union (A. A. Aseev, N. V. Bashenina, O. K. Leont'ev, and others), Sweden (S. Rudberg), Czechoslovakia (J. Demek), and Spain (M. Sala). Shorter contributions come from Poland (R. Galon), France (F. Joly), Germany (J. F. Gellert), Switzerland (H. Leser), Austria (J. Fink), the Netherlands (J. A. ten Cate), Yugoslavia (I. Gams), Bulgaria (I. Vaptsarov), and Italy (G. B. Castiglioni and A. Sestini). Of the 16 geomorphological regions into which Europe is divided in the book, Hercynian Europe, with its Appalachian-type relief, receives 66 pages of discussion whereas the Balkans receive only 13 pages. Description of the fascinating landscapes of Greece is attempted in two pages.