tion) be represented by potential evapotranspiration/precipitation gives an arid-humid boundary at 3160 m (Major, 1977)—well within the open forest belt, which is reasonable.

In the USSR also, the mountains may be arid below but humid above (p. 18). This is obviously true where a zonal glaciated zone occurs at high elevations. With increasing altitude mountain climates usually change from arid to humid. Even if precipitation does not increase with altitude, potential evapotranspiration usually decreases as temperatures lower. However, arid sites can occur in humid belts. Much of the area of any alpine or nival belt is not zonal, and such nonzonal sites may be arid. For the outer ranges of Middle Asia, Agakhaniants gives a graph showing least aridity at 1800 m elevation, becoming more arid again at 2300 m and above. Finally, in all cases, the floras of his arid mountains are surrounded by arid lowland terrain, by floras of arid adaptation. In the innermost ranges (Tien Shan and Pamir) stations as high as 3000 m are arid and in the eastern Pamir at 3920 m exremely arid.

Agakhaniants discusses his theme of florogenesis in these arid mountains under the following chapters: Introduction (3 pp.); 1—The arid mountains of the USSR (15 pp.); 2—Geographical effects of fault block tectonics (16 pp.); 3—Physicogeographic properties of arid mountains (14 pp.); 4—Phytogeographical properties of arid mountains (57 pp.); 5—Qualitative geographical models of mountain florogenesis (51 pp.); 6—Genesis of the vertical belts of types of vegetation of the arid mountains of the USSR (41 pp.); 7—Regional survey of arid mountains of the USSR (35 pp); Conclusions (8 pp.); and References (26 pp., almost one-seventh non-Soviet).

He brings together a great wealth of material to substantiate the thesis that the floras of his arid mountains have been formed under the strong influence of events accompanying their geologically recent increase in elevation. For the last few tens of millions of years, rates of uplift have increased to 20 mm/yr (2000 m/100,000 yr!). Concomitantly increased continentality and aridity produced new altitudinal belts of vegetation. An arid series of plakor belts is accompanied by small areas of an older, mesic sequence. Increased aridity fosters speciation. Ephemerals ascend. Many other changes effected by aridity are discussed, with examples. Steppe at alpine altitudes is one result, not tundra. Agakhaniants includes diagrams and discussions of altitudinal belts, maps of phytomass amounts, its variation with altitude, partitioning into above- and belowground fractions, by types of vegetation.

The species of mountain floras are locally derived, the result of migration, and endemic. While the total floras of the mountain areas are rich (5000 to 6000 species), species number decreases exponentially upward as temperature decreases. But occasional interchange could evolutionarily complicate this simpler picture. Agakhaniants is excellent on the multifarious possibilities of florogenesis. He uses paleobotanical data on *Pinus*, family composition of mountain floras, elevation limits of species. *Ceratoides papposa* (*Eurotia ceratoides*) extends from 400 to 4600 m, *Halogeton glomeratus* and *Salsola paulsenii* 400 to 4000 m, etc.

Given floras, the genesis of the different kinds of vegetation that form elevational belts in the arid mountains is of interest. Vegetational relationships of genera such as Ferula, Amygdalus, Juniperus, Stipa, Acantholimon, etc., are discussed. Finally, a systematic survey of the different mountain ranges is presented—properties, genesis of specific flora and vegetation, including vegetation belts.

Agakhaniants's book is a most stimulating one. It covers an enormous range of subjects in treating the fairly narrow theme of florogenesis. It is interesting, thorough, thoughtful, spritely, full of information, a considerable achievement, a stimulus for similar American work. There is nothing like it in English, and one reason is that our background in comparative floristics is lacking.

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Big Game in Alaska: A History of Wildlife and People. By Morgan Sherwood. (Yale Western Americana Series, 33.) New Haven and London: Yale University Press, 1981. xii + 200 pp. $27.50. ISBN 0-300-02625-0.

This book is a political history of big-game management on the Alaskan frontier from the late 1800s to post-World War II. It is not an environmental history as suggested by the title and contains little on changes in numbers and distributions of wildlife in response to settlement and resource development. Nevertheless, Morgan Sherwood has chronicled the development of conservation legislation and identified the forces, both environmental and social, which have shaped evolving policies.

This work joins a growing number on changing attitudes to wildlife and environmental conservation in frontier territories. But unlike many others, the author has spared the reader from emotive cynicism and indeed despair with basic human nature, the often presumed root of ecological crises. His treatment is well researched and factual, but always interesting reading.

The target readership is hard to identify. It introduces the biological scientist to political innuendo, but the casual use of terms (e.g., elk horns) and dubious biologi-

cal interpretations (e.g., the often-cited Kaibab story) are somewhat annoying. Descriptions such as "a more ungainly beast than a long-nosed, humpbacked, bearded moose is hard to find in Mother Nature's cupboard . . . the moose is a horse designed by Congress" are directed to a different audience.

Like other authors, Sherwood traces conservation policy to European hunting traditions and their democratization in America. He describes the emergence of an "aristocratic social philosophy" called sportsmanship which was needed to counter wanton exploitation of a common-property resource. Alaska, the last frontier, offered a chance to learn from past mistakes in America. Understandably, sentiments outside Alaska figured importantly in emerging conservation policy.

Resident Alaskans responded to outside influence in several ways. One of these was control of nonresident hunting which led to a politico-legal landmark: the Buchner case in 1941, which tested the right of military personnel to hunt on the same terms as resident Alaskans. But wildlife was more than just an object of conservation policy. Controversy regarding management of game, particularly bears, also was used as a magnet for local support of the more fundamental issue of home rule. Sherwood observes that "the history of Alaska game laws from about 1900 to 1941, the year of the Buchner case, and even later, can be written as the political history of Alaskan brown bears."

As a backdrop to political events, the author presents a description of the hunted, the succession of hunters, and the emergence of scientific management. Treatment of the hunted is limited mainly to notes on life history rather than changing status as suggested by the title. The hunters were indigenous people, Euro-American residents and nonresident sport hunters. For each group, the author attempts to outline their technology, attitudes and impact. Particularly valuable, in spite of a rather harsh assessment, is his chapter on emergence of scientific knowledge and its relationship to conservation policy.

A brief but important synthesis is contained in "Afterword: A Big Game Plan" where developments in Alaska are compared with those repeated elsewhere. Sherwood notes that the "continual squabbling of Alaskan entrepreneurs and political leaders with conservationists and federal bureaucrats resembles a quarrel over territoriality and resources of the kind ethologists and sociobiologists have noted among animals" and offers that "human history and natural history are not far apart." Of course, this interpretation has been a central theme of other authors.

Sherwood identifies four primary variables that have determined how large mammals survived the impact of settlement: (1) population ratio of hunters to game animals, (2) demand for meat and by-products; (3) hunting technology; and (4) attitudes. These may be obvious but they do provide an interpretive framework for historical analysis and future planning. The Alaskan response to wildlife management has been traditionally utilitarian. Sherwood argues that the future of wild animals depends upon recognition and demonstration of their tangible benefits.

This is scholarly work, well documented with lavish notes and a lengthy bibliography. But it is more than a source book. The prevailing political climate and major actors in frontier Alaska are vividly portrayed. The book provides compelling reading for anyone interested in the past and future of wildlife.

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Peat Stratigraphy and Climatic Change: A Palaeoecological Test of the Theory of Cyclic Peat Bog Regeneration. By K. E. Barber. Rotterdam: Balkema, 1981. xii + 219 pp. Hfl. 60, $29.00, £12.50, DM58. ISBN 90-6191-087-0.

The North American study of peat stratigraphy as a vital part of paleoecology is remarkably neglected, by comparison with North European work. In Britain such studies are linked directly with the pioneering studies on Scandinavian peat in the 19th century (Blytt and Sernander), which were passed on to the students of Quaternary pollen analysis and phytogeography (Godwin, Walker, Oldfield, Barber). By contrast the United States studies in Quaternary paleoecology, beginning with E. S. Deevey in the late 1930s, were always linked with limnology at Yale (through G. E. Hutchinson) and have continued that tradition, preferring the use of lacustrine sediment samples for palynology. The study of peat stratigraphy and climatic change by K. E. Barber should help to reemphasize for North American paleoecologists the value of nearly perfect preservation of plant remains found in peat bogs, and the climatic inferences which can be drawn from peat stratigraphy.

Barber's study examines the relationship between bog growth and climatic change and is designed to test the validity of the pool and hummock hypothesis, in which contiguous high and low spots on the peat surface are supposed to grow at different rates, according to the Cyclic Theory of Osvald (1923). Dry, slow-growing hummocks (*Calluna, Eriophorum*) supposedly become hollows as wet, quick-growing *Sphagnum* hollows fill in and overtop them. Barber shows, through a substantial and very valuable historical introduction, how acute early observations by Scots such as Aiton (1811) on the hummock-hollow peat complex and Rennie (1807–1810) on bog succession were followed by peat studies by von Post and Sernander (1910) and Osvald (1923), who provided the pool and hummock theory in its modern form. An example of Dr. Barber's care in research is his commissioned translations and lengthy summaries and quotations