



"The holotype, UNSM 1110, of *Anser thompsoni* new species approximately as it appeared in situ." [From Martin and Mengel's paper in *Papers in Avian Paleontology Honoring Hildegard Howard*]

[*Science* 206, 688 (1979)] for additional details.) Martin and Mengel describe an extinct goose of the modern genus *Anser* and then, using statistical data on limb proportions, attempt to understand some of its habits. Their work emphasizes the need for functional analyses of the skeletons of modern birds, for which series of complete skeletons can be obtained.

Several families are reviewed. Mourer-Chauviré erects a new family, Archaeotrogonidae, for several fossil taxa from the early Tertiary of France that show affinities with modern trogons and certain birds traditionally included in the Coraciiformes. Hoch describes a shorebird from the Eocene with strong perching feet and other features found in doves. Campbell and Tonni describe a new teratorn from Argentina with a wingspan of 7 meters and review this family of vultures. Brodkorb describes a new heron and provides a partial review of the family. Rich reviews the family Dromornithidae, extinct large ratites from Australia.

I have reserved last place for the paper that impressed me most, namely Steadman's review of the osteology and paleontology of the turkeys. On the basis of hundreds (probably thousands) of specimens from several epochs and numerous localities, Steadman concludes that three genera are recognizable, with several species in the type genus *Meleagris*. Because of the numerous specimens available, for some species Steadman can give quantitative as well as qualitative

characteristics. As paleornithology progresses, which now surely it will, more such studies can be anticipated.

GLEN E. WOOLFENDEN

Department of Biology,
University of South Florida,
Tampa 33620

A Mammalian Fauna

Pleistocene Mammals of North America. BJÖRN KURTÉN and ELAINE ANDERSON. Columbia University Press, New York, 1980. xviii, 444 pp., illus. \$42.50.

The appearance in 1968 of Kurtén's *Pleistocene Mammals of Europe* was warmly welcomed, for the book drew together a great deal of information from widely scattered sources and helped to unravel the complex history of the Ice Age mammals of the region. The long-awaited companion volume on the corresponding North American fauna is equally welcome for similar reasons but has the added merit of a more strictly scientific presentation and a more comprehensive text. The European volume included the Villafranchian as the "Lower Pleistocene" and the new work includes the Blancan as well as the Irvingtonian and Rancholabrean, so both volumes cover approximately the last 3½ million years of geologic time. Kurtén has worked personally on most of the major collections in North America, and his

collaboration with Elaine Anderson of Colorado, herself an authority on Pleistocene mammals, is a happy and successful one.

The book is divided into two parts, of very unequal length. Part 1 (96 pages) provides the geological framework, and part 2 (270 pages) is a description of the taxa recognized.

Chapter 1, entitled "Chronology," is unfortunately the weakest part of the volume, primarily because of its brevity—it is impossible in a mere three pages to do justice to this important topic. Discussions of rhythmites and the Milankovitch hypothesis, brief though they may be, are scarcely relevant, and the space might have been used more profitably. It is also curious that there is no discussion at all of the concept of the "local fauna" or of the way in which Land Mammal ages or stages are constructed, apart from a two-line definition and a reference to Tedford's admirable review of the complex principles and practices of mammalian geochronology in North America (*Proc. North Am. Paleontol. Congr.* 1969, vol. F, p. 666). However, this lack does not really affect the basic acceptability of the chronology set out in figure 1.1 to show the Land Mammal ages against a time scale controlled by paleomagnetic and radiometric data, although the exact fit of the glacial stages is still rather poorly known.

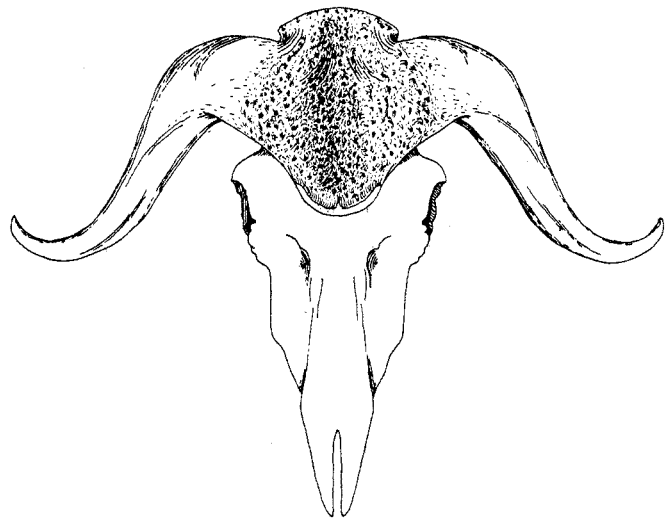
Chapters 2, 3, and 4 deal with the localities from which the local faunas have come and cover, respectively, the Blancan, the Irvingtonian, and the Rancholabrean. Each chapter begins with a very brief summary of the relative chronological placement of the major local faunas and of the dating controls. Each locality is shown on a distribution map. There follows a site-by-site description, with a brief account of the geological setting of each site and a short discussion of the important mammalian fossils represented; the number of taxa recognized from each site, which ranges from one for the Tabor Child Site to over 50 at a few localities, is noted. The authors have made their own assessments and place the faunas into subdivisions such as early, middle, and late wherever possible. References to the most important papers are given, and the locations of the major collections are indicated by acronyms for 46 institutions. Some 250 local faunas are covered, and there are few omissions.

The final chapter of part 1, entitled "Intercontinental correlation and migrations," is useful but suffers from overcondensation and presents rigid correla-

tion tables with insufficient discussion of possible alternatives. The European chronology neglects the important Italian work, which was surely available to the authors, although some important paleomagnetic data have appeared only very recently (Arias *et al.*, *Quat. Res.* 13, 65 [1980]). The correlation with the Russian sequence is rather too simplistic and would have been better presented as a figure with a linear time scale to allow greater freedom of matching than in a table constrained by ruled "compartments." However, the final section of this chapter is very interesting, showing that the inauguration of the Blancan, the Irvingtonian, and the Rancholabrean coincided with faunal interchanges between North America and Eurasia.

Part 2 is arranged systematically, with a chapter for each order. The presentation is excellent. There is a short discussion of each family and brief consideration of generic and subgeneric characters, but the emphasis is on species. Data routinely given include a vernacular name (unusual for fossil species), the scientific name, author and date of initial description, significant synonymy, and citations of the most important literature. The descriptions are reasonably diagnostic, and an attempt is made to indicate habitat and distribution. The amount of detail varies greatly, from a few lines to a page or more, but this is hardly surprising in view of the wide

"Bovidae. *Symbos cavifrons*, Rancholabrean, skull, composite drawing. Not to scale." This species, woodland muskox, "was taller and had a more slender build than the extant muskox. Diagnostic of *Symbos* is the pitted, rough-basined surface (exostosis) between the horn-cores." [From *Pleistocene Mammals of North America*; drawing by Barbro Elgert]



variation in the quality and quantity of the material available. There are distribution maps for nine of the species and illustrations for 68 out of the 562 that are described. The illustrations are very good, and the dozen reconstructed scenes (mostly by Margaret Lambert) that accompany the site descriptions in chapters 2 through 4 are both scientifically accurate and artistically delightful. The stratigraphic ranges of the taxa are presented in tabular form in an appendix, and the information is both useful and enlightening.

The final chapter, on extinction, contains useful statistical analyses and indi-

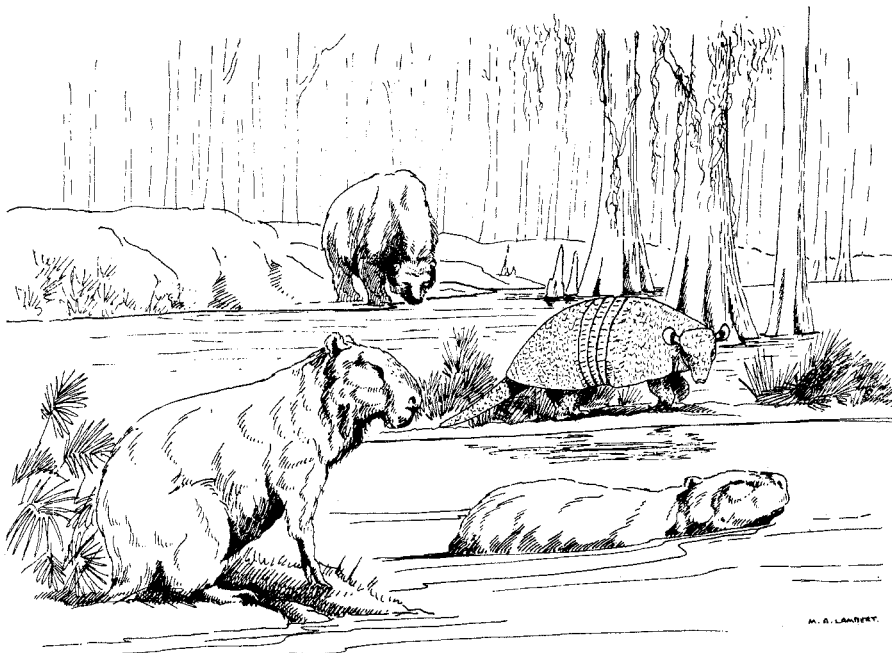
cates that the process was continuous, although it is suggested that endemic American species were more prone to extinction than Beringian immigrants. Possible causes are discussed, but the results are inconclusive.

In addition to an extensive (37-page) reference section and two appendixes the book has four indexes—of Latin names, vernacular names, localities and stratigraphic terms, and authors—all of which make for ready access to the immense amount of information that is present in this compact volume. The book is well produced, attractive in layout and design and having remarkably few typographic errors.

It must be emphasized that this is not a mere compilation but a critical revision and overview that will be an essential reference for all students in the field and will form a basis for further advances in the discipline. The criticisms that have been offered are very minor in relation to the importance of the work as a whole.

H. B. S. COOKE

Department of Geology,
Dalhousie University,
Halifax, Nova Scotia, B3H 3J5, Canada



"The late Rancholabrean fauna in coastal Florida near Melbourne included *Nechoerus pinckneyi*, *Tremarctos floridanus*, and *Holmesina septentrionalis*." Among the 49 mammalian species of this fauna there was "an important element of browsers and other swamp . . . , river . . . , and forest . . . species, as well as some plains species. . . . Twenty-three mammals are extinct." [From *Pleistocene Mammals of North America*; drawing by M. A. Lambert]

Respiratory Specializations

The Evolution of Air Breathing in Vertebrates.
DAVID J. RANDALL, WARREN W. BURGGREN,
ANTHONY P. FARRELL, and M. STEPHEN
HASWELL. Cambridge University Press, New
York, 1981. viii, 134 pp., illus. \$27.50.

By most accounts the acquisition of aerial oxygen uptake was a unique and major event in the evolution of terrestrial vertebrates from their aquatic ancestors. In contrast, this innovative and exciting