modern capacity for language roughly 50,000 years ago.

The present book focuses on the earliest evidence for fully modern human behavior in Europe and on what this implies for modern human origins. If the out-of-Africa hypothesis is correct, for example, the demise of the Neanderthals between 50,000 and 40,000 years ago should coincide closely with the appearance of people who were more modern not only in anatomy but also in behavior. In fact, most specialists, including the editors of the book, see strong evidence for such a coincidence in advanced cultural traits that appear widely in Europe beginning roughly 40,000 years ago. The indications include the manufacture of more sophisticated and more highly standardized stone artifact types; a radical increase in the degree of geographic and temporal variation in artifact types (suggesting the fully modern human ability to innovate); the earliest evidence for routine, long-distance transport of stone and other raw materials (implying wider and possibly more complex social networks); the oldest traces of substantial dwellings, sophisticated hearths, and tailored clothing (allowing the first colonization of truly arctic environments); the initial manufacture of points, awls, and other formal artifacts from bone, antler, ivory, and shell; the oldest unquestionable evidence for art and items of personal adornment; and the oldest secure evidence for ritual or ceremony as reflected in both art and burials. In both Europe and western Asia, the advanced culture complex marked by these traits is commonly called the Upper Paleolithic, as distinct from the preceding and more primitive Middle Paleolithic culture complex of the Neanderthals.

A few authorities have argued that only the Late Upper Paleolithic, after 20,000 years ago, was truly progressive and that the Early Upper Paleolithic, between roughly 40,000 and 20,000 years ago, was actually more like the Middle Paleolithic. If this is true, it might imply that Early Upper Paleolithic people evolved directly from their Middle Paleolithic, Neanderthal predecessors, in contradiction to the out-of-Africa hypothesis. All authorities acknowledge that the famous paintings and engravings in caves like Lascaux belong mainly to the Late Upper Paleolithic, but the editors of the present book and many other specialists believe that in all other important respects the Early and Late Upper Paleolithic form a unitary whole that departed dramatically from the Middle Paleolithic. It was to underscore this point that the editors invited other archeologists to join them in a wide-ranging discussion of the Early Upper Paleolithic. In total, 20 specialists have contributed 16 essays, focusing variously on Early Upper Paleolithic stone artifacts, bone artifacts, art, or food debris (animal remains) in parts of western Asia, Spain, France, Germany, the Czech and Slovak Republics, and Russia.

Unfortunately, few of the contributions explicitly confront the issue of continuity within the sequence from Middle to Early Upper to Late Upper Paleolithic, and those that do sometimes conclude (unconvincingly, I believe) that there was no break between the Middle and the Early Upper Paleolithic. For the most part, the authors show little or no interest in prehistory outside their target areas, and this inevitably limits the applicability of their conclusions to any broadly interesting question. As a group, then, the essays are valuable mainly for their technical description of various Early Upper Paleolithic sites or objects and not for their analytic or evolutionary insights. There are some conspicuous exceptions, of which the most notable are the chapters by Knecht on Early Upper Paleolithic antler working, by Soffer and her colleagues on spectacular 26,000-year-old fired ceramic objects from Early Upper Paleolithic sites in Moravia, and by White on Early Upper Paleolithic beads and pendants from across Europe.

In sum, the book was meant to address a crucial evolutionary event in the history of our species but falls short of its goal because most of the contributors focus on more parochial issues or take a descriptive approach. Where the book succeeds, it is as an authoritative, up-to-date source for detail on selected Early Upper Paleolithic cultures and culture traits, including some in central and eastern Europe that have never been treated so fully in English before.

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New World Representations

Picturing Nature. American Nineteenth-Century Zoological Illustration. ANN SHELBY BLUM. Princeton University Press, Princeton, NJ, 1993. xxxiv, 403 pp., illus. $59.50 or £50.

The 19th century was an expansive one for the field of natural history in a young nation whose natural history was very nearly its only history and whose social and political system was conceived with the laws of nature in mind.

When the Comte de Buffon assigned the New World a deleterious climate and its flora and fauna low rank, he sparked in Americans a patriotic interest in natural history. The summum bonum for the naturalist would be an American natural history that by setting Europe straight about New World nature would elevate American science to parity with European. "Picturing nature" was thus a matter of more than ordinary importance. On it depended public support for government enterprise in science. The author of this handsome volume tracks science and art as, yoked to natural history, they jog along through the century, in harmony or in discord as may be.

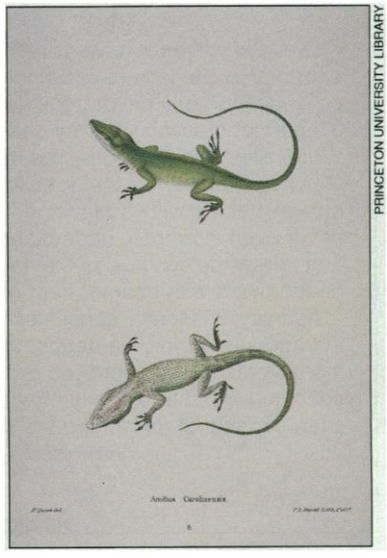
Early American zoological illustration achieved a distinctiveness by departing from the English tradition of the late 18th century, in which the patron-collector "wrote and published, and the traveler-illustrator . . . supplied his patron with specimens and drawings, often from the colonies" (p. 117). When the American insisted on doing his own illustrations for publication, art and science met in an arrangement that doubtless owed much to the paucity of patrons in an equalitarian society. Alexander Wilson, whose nine-volume *American Ornithology* (1808–14) was "the first comprehensive work of American natural history" (p. 30), might be taken as the type specimen of the naturalist-illustrator. Wilson's was a personal production. Putting himself in the text, he enthusiastically described his encounters with individual birds, some of them pets, and when prose failed him he turned to verse.

That stance was soon challenged by Thomas Say, who declined to intrude in the text and, confining himself to the roles of collector and entomologist, betrayed no interest in forming personal relationships with his subjects. "Physical detail of the insect alone, translated into text and illustrations, had to authenticate his observation" (p. 57). Say's illustrations, luminous hand-colored engravings from drawings by his wife, Lucy, would appeal to non-specialist readers. Those readers found a still greater appeal in John James Audubon's bird paintings, for whereas Wilson strove to render great birds, Audubon presented great art in which birds figured largely, winning thereby a large public audience while losing a smaller but influential scientific one.

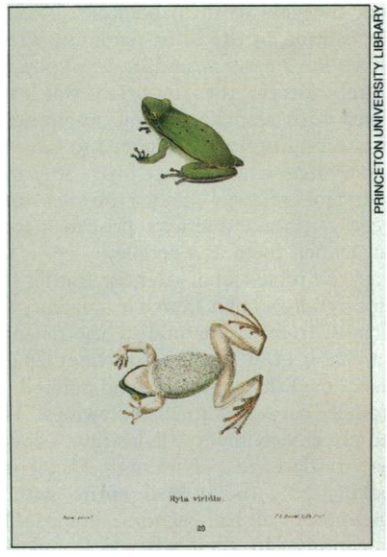
The greater part of zoological illustration appeared in government documents: the reports of the state geological and natural history surveys, the Bureau of Topographical Engineers, the United States Exploring Expedition of 1838–42, the Smithsonian Institution, and after the Civil War, the United States Geological Survey. Blum traces developments through the century in

Zoological Illustrations

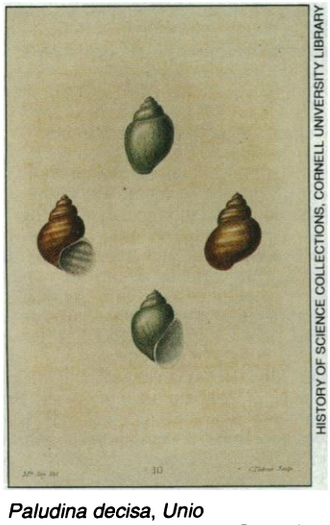
Kingfisher and warblers, with pond and mill in the distance. Drawn by Alexander Wilson and engraved by Alexander Lawson for Wilson's *American Ornithology*, vol. 3 (Philadelphia, 1811).



Anolius Carolinensis. Hand-colored lithograph drawn by James Queen and lithographed by P. S. Duval for John Edwards Holbrook's *North American Herpetology* (Philadelphia, 1842).

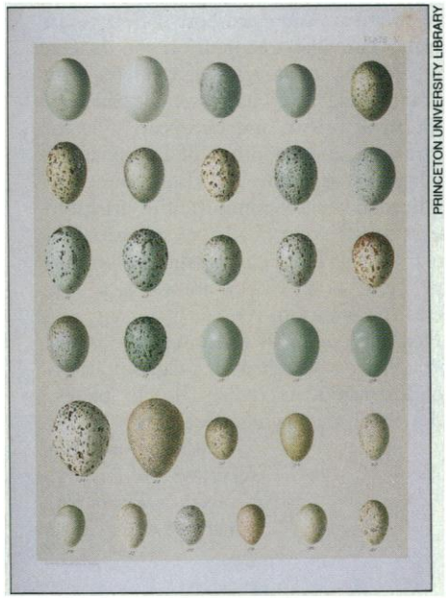


Hyla viridis. Hand-colored lithograph by P. S. Duval for John Edwards Holbrook's *North American Herpetology* (Philadelphia, 1842).



Paludina decisa, *Unio ventricosus*, *Arca leinosa* S., and *Arca staminea*. Hand-colored engravings by Cornelius Tiebout and L. Lyon from drawings by Lucy Say for Thomas Say's *American Conchology* (New Harmony, Indiana, 1834).

Pterinae. Chromolithograph from 12 stones by Thomas Sinclair and Son, after drawings by J. H. Blake, Sidney L. Smith, and G. A. Poujade, as published in Samuel Hubbard Scudder's *Butterflies of the Eastern United States and Canada* (Cambridge, Massachusetts, 1889).



Cuckoo, jay, crow, and lark eggs. Color lithograph by Ketterlinus for Charles Emil Bendire's "Life Histories of North American Birds," *Smithsonian Contributions to Knowledge* 32 (1895).

Illustrations reproduced in *Picturing Nature*. Taxonomic usage is that of the original authors.

the technical processes of production—drawing, engraving (copper, steel, and stone), coloring, and photography.

As systematics came to figure ever more largely, the naturalist gave way to the zoologist, the field to the laboratory. Though the tradition of the artist-naturalist would survive for a century and more in popular natural history, the transition was early viewed with alarm and some resentment. For natural history was assumed to have an "improving social influence" (p. 116), and, Americans believed (and a hostile world agreed), it was America's pristine nature that defined them as a people.

As the professional scientist (rather fastidiously) drew apart from the amateur, the specialist from the naturalist, the magnificent plates of an earlier day, whether engraved or lithographed, hand-colored or chromos, gave way to line drawings. The natural environment, landscape, drama (the rattlesnake charming Audubon's mockingbird), the animal entire with a page to itself, all had begun to disappear by mid-century. In their place a composite animal was depicted on a composite page, anatomy awaiting assembly.

"What then, if anything, distinguished American zoological illustration as American?" (p. 345)—or, for that matter, distinguished American science? (Recall that among the pioneers of American ornithography Wilson, Audubon, and Catesby were none of them American-born.) Success in winning European recognition for American scientific achievement rendered the question irrelevant. Success came through adoption of British and European styles of illustration, and adoption of European lithographers as well. But how came an equalitarian society committed to utility to possess science of a quality to win recognition from the European scientific community? That, as this book shows, is a very interesting question.

Picturing Nature is an impressive book, thorough in research and documentation. The illustrations, including 74 color plates, lend a touch of magnificence.

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Vignette: A Letter from Nobel

Nowadays, when I have to associate with people, I cannot fail to notice how enormously the lack of social intercourse these last few years has damaged me. . . . I will probably never again in my life recapture my spiritual sprightliness.

I am not blaming you, my dear sweet little one, for things turning out this way. When all is said and done, it is my own fault, and you cannot be held responsible. Our views of life—on the need for constant mental improvement, on our duties as human beings with a higher education—are so hugely different that we should never even attempt to understand each other in these matters. It is with great pain that I draw the conclusion that my own nobility of soul has withered away and, my head bowed with shame, I am stepping out of the circle of educated persons.

Actually, it is totally senseless for me to write this to you. You will never be able to understand me on a deeper level. . . . You are not capable of grasping that for many years I have sacrificed my time, my reputation, all my associations with the educated world and finally my business—all for a self-indulgent child who is not even capable of discerning the selflessness of those acts.

Alfred Nobel, letter to Sofie Hess, 5 December 1880, as quoted by Kenne Fant in *Alfred Nobel: A Biography* (Arcade)

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Biomembrane Protocols I. Isolation and Analysis. John M. Graham and Joan A. Higgins, Eds. Humana, Totowa, NJ, 1993. x, 313 pp., illus. Spiral bound, $49.50. Methods in Molecular Biology, 19.

Birth Weight and Economic Growth. Women's Living Standards in the Industrializing West. W. Peter Ward. University of Chicago Press, Chicago, 1993. xvi, 218 pp., illus. $38.

The Blood-Brain Barrier. Cellular and Molecular Biology. William M. Pardridge, Ed. Raven, New York, 1993. xx, 476 pp., illus. $85.

The Bowhead Whale. John J. Burns, J. Jerome Montague, and Cleveland J. Cowles, Eds. Society for Marine Mammalogy, Lawrence, KS, 1993. xxxvi, 787 pp., illus. $75. Society for Marine Mammalogy Special Publication no. 2.

A Bright and Savage Land. Ann Moyal. Penguin, New York, 1993. viii, 240 pp. + plates. Paper, $16.95. Reprint, 1986 ed.

The Cache Memory Book. Jim Handy. Academic, San Diego, CA, 1993. xviii, 269 pp., illus. $44.95.

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Cell-Cell Signaling in Vertebrate Development. Elizabeth J. Robertson, Frederick R. Maxfield, and Henry J. Vogel, Eds. Academic, San Diego, CA, 1993. xii, 269 pp., illus. $79.

Cellular and Molecular Biology of Bone. Masaki Noda, Ed. Academic, San Diego, CA, 1993. xxii, 567 pp., illus. $99.

Embryonal Stem Cells. Introducing Planned Changes into the Animal Germline. Martin L. Hooper. Harwood, Langhorne, PA, 1993. xii, 147 pp., illus. $35 or P19; to institutions, $58 or P31. Modern Genetics, vol. 1.

Endosomes and Lysosomes. A Dynamic Relationship. Brian Storrie and Robert F. Murphy, Eds. JAI, Greenwich, CT, 1993. xiv, 433 pp., illus. $90.25. Advances in Cell and Molecular Biology of Membranes, vol. 1.

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Glow Discharge Spectroscopies. R. Kenneth Marcus, Ed. Plenum, New York, 1993. xx, 514 pp., illus. $95. Modern Analytical Chemistry.

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Medical Statistics. A Commonsense Approach. Michael J. Campbell and David Machin. 2nd ed. Wiley, New York, 1993. x, 189 pp., illus. Paper, $28.95.

The Membranes of Cells. Philip L. Yeagle. 2nd ed. Academic, San Diego, CA, 1993. xiv, 349 pp., illus. $75.

Metaman. The Merging of Humans and Machines into a Global Superorganism. Gregory Stock. Simon and Schuster, New York, 1993. 365 pp., illus. $23.

New Concepts in AIDS Pathogenesis. Luc Montagnier and Marie-Lise Gougeon, Eds. Dekker, New York, 1993. xiv, 323 pp., illus. $99.75.

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Preschool Issues in Autism. Eric Schopler, Mary E. Van Bourgondien, and Marie M. Bristol, Eds. Plenum, New York, 1993. xviii, 276 pp., illus. $45. Current Issues in Autism.

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