message of this volume is that genetic variation at the intraspecific level can be critically important to ecological processes. But equally this volume impresses upon us the fact that our knowledge is at best fragmentary."

Nevertheless, the book leaves us with an optimistic vision of the future. As several authors point out, the development of molecular techniques makes the study of plant-enemy interactions ripe for accelerated progress. Whereas it has previously been difficult to track resistance genes in natural populations, we can now make use of restriction fragment length polymorphisms. And whereas it has previously been difficult to disentangle the effects of resistance genes from other linked traits, it is now possible to manipulate levels of resistance through genetic engineering. These and other techniques open new avenues for examining how plant resistance influences the ecology and evolution of species assemblages, and it is certainly hoped that evolutionary ecologists will exploit these techniques fully. As our ability to detect and manipulate genetic variation becomes more sophisticated, it should be possible to explore how genetic changes alter interspecific, and even community, dynamics. Antonovics dubs this new pursuit "community genetics" and in his concluding comments meets the organizers' second stated goal, which is to "show how research in these fields, by integrating genetic with evolutionary and ecological methods, can contribute to a new evolutionary synthesis."

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Altamira and Environs

Iberia before the Iberians. The Stone Age Prehistory of Cantabrian Spain. LAWRENCE GUY STRAUS. University of New Mexico Press, Albuquerque, 1992. xiv, 336 pp., illus. $40.

Cantabrian Spain is that narrow band of mountainous north coastal Spain that faces the Bay of Biscay, also known as the Cantabrian Sea. Since the 19th century, this rugged, magnificently beautiful region has played a critical role in archeology's struggle to construct an understanding of human life in the Upper Paleolithic. Straus has attempted in this book to redress what he considers to be an undue scientific and journalistic emphasis on the overpowering French Paleolithic record just to the north.

One of the more important contributions of the book for English-speaking readers is Straus's sensitive treatment of the history of Paleolithic research in Cantabrian Spain. He reminds us that Paleolithic cave art was first recognized in Cantabria, at Altamira, and that prior to the Spanish Civil War the level of research activity in Spain equaled that in France. A particularly interesting aspect of Straus's historical treatment is his discussion of American involvement in Cantabrian Paleolithic research both before and after that war. With this history in mind, Straus notes that his synthetic treatment of Cantabrian prehistory is the first in English since the 1924 translation of Obermaier's *Fossil Man in Spain.* Rather than an encyclopedic work documenting discoveries and stratigraphic complexities brought to light in the past 70 years, however, he has provided us with a work most suitable and effective as an introduction for the nonspecialist.

The poverty of illustrated artifacts, stratigraphies, features, and sites in the book means that for encyclopedic coverage of Paleolithic archeology in Cantabrian Spain scholars will still have to turn (with the aid of Straus's comprehensive bibliography) to Spanish works by Barandiaran, Jordá, Bernaldo de Quirós, and Utrilla. This is not to underestimate the importance of the 47 pages of appendixes containing site-specific data on lithic artifacts, faunal remains, organic tools, and radiometric dates, which provide a precious and enduring research resource for American scholars.

This book deals overwhelmingly with the Upper Paleolithic, the complex sequence of cultural innovation and change that began with the first appearance of *Homo sapiens sapiens* in Europe (about 40,000 years ago) and ended at the close of the last glaciation (about 10,000 years ago). It focuses on Cantabrian Spain and does not address the entire Paleolithic sequence of Iberia as a whole, as one might expect from the title. This geographic and temporal unevenness in coverage reflects Straus's own research specialty, and to some extent the patchiness of the known archeological sequence. Anyone interested in periods other than the Upper Paleolithic and places other than north coastal Spain should look elsewhere.

Straus is committed to the view that we must understand the developments of prehistory from an ecological perspective, that is, as a series of readjustments to changing environmental circumstances. To that end, he has provided perhaps the best environmental and paleoenvironmental overview of Cantabrian Spain available in any language. The waxing and waning of various archeological cultures are clearly situated in their paleoenvironmental contexts, although we remain far from having a thorough understanding of the place of humans in these ancient ecosystems.

Straus's interpretative style, conservative by the standards of American archeology, reflects both the best and, from a European perspective, the worst of Paleolithic archeology as practiced by Americans. Its strength is that Straus asks questions about human behavior (settlement patterns, subsistence practices, mortuary behavior) and adaptation in a field in which European practitioners often glorify the artifacts as such. But many Europeans will see it as exemplifying an American tendency to pursue broad generalizations based on too few cases.

Many Europeans and Americans will also disagree with the strictly functionalist interpretative stance. In a time when so-called positivist research strategies in archeology are under attack, it is refreshing to see a commitment to and optimism about the ability to gain access to the past using the tools and research strategies of a "scientific" archeology. But I believe that Straus's embracing of a view of Cantabrian cave art that sees it as a sort of primer for educating young hunters, which he prefers to "grand interpretive schemes that somehow want us to enter into the minds of long-dead people," makes insufficient use of anthropological archeology's great strength: its ability to juggle simultaneously a diversity of theoretical perspectives from the natural sciences, the social sciences, and the humanities. In ignoring the degree to which the content of people's minds conditions what goes into their stomachs, Straus's view of graphic representation as merely a system "for gathering, storing and transmitting important survival information" is as extreme as the speculative approaches he seeks to avoid.

In the end, Straus has done for the Cantabrian Paleolithic what Richard Klein achieved for the Paleolithic of Russia: He has rendered it more visible, immediate, and accessible to a broad American scholarly and lay audience. Not only does this move us away from the traditional Francocentric view of Paleolithic Europe, it is likely to stimulate considerable interest among a new generation of English-speaking researchers.

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Aeronautical Entrepreneur

The Universal Man. Theodore von Kármán's Life in Aeronautics. MICHAEL H. GORN. Smithsonian Institution Press, Washington, DC, 1992. xiv, 202 pp. + plates. $24.95. Smithsonian History of Aviation Series.

Theodore von Kármán, the great Budapest-born aerodynamicist, was one of the earliest representatives of the Central European diaspora that infused American science in the

"At the dedication of the Theodore von Kármán Gas Dynamics Facility, Arnold Engineering Development Center, Tullahoma, Tennessee, October 1959. The Air Force defied its own traditions by naming an institution for a living person. At the ceremony . . . the portrait of Josephine and Theodore von Kármán, pictured here, was unveiled." [From *The Universal Man*; USAF photograph]

1920s and '30s. A formidable combination of brilliant theorist and institution-builder, he caught the eye of Robert A. Millikan, the Nobel Prize physicist and master academic entrepreneur who headed the California Institute of Technology. Millikan lured the restless, ambitious Kármán to Caltech in 1929 as director of its Guggenheim Aeronautical Laboratory (GALCIT). Kármán went on to exert unequaled influence on the development of aeronautical science and engineering and played a major role in forging the scientific component of the Cold War's military-industrial nexus. For these contributions he was honored with the first presidential medal of science in 1963, just weeks before his death.

The only previous accounts of Kármán's life have been his marginally reliable autobiography, *The Wind and Beyond* (written with Lee Edson, 1967), and a few scholarly articles. Michael Gorn's admiring biography thus addresses an important gap. Gorn grounds his study in primary sources, particularly Kármán's papers (though not his extensive correspondence in Hungarian), and some oral history interviews. He emphasizes Kármán's role as personality and institution-builder but only occasionally brings to life his subject's legendary wit and conviviality.

Kármán was born in 1881; he studied at his stern father's innovative Minta Gymnasium, which boasted such graduates as John von Neumann, Leo Szilard, and Edward Teller. (His father received the hereditary *von* for serving as tutor to Archduke Albrecht.) Exhausting Budapest's educational resources, Kármán pursued a Ph.D. at Göttingen under Ludwig Prandtl, the austere eminence in fluid mechanics, with whom he felt a rivalry almost from the start. As a Hungarian and a Jew, Kármán faced limited academic possibilities in Germany; he was shunted to an academic backwater, the Technical University at Aachen. Kármán turned this unpromising post into his international launching pad with techniques that he deployed throughout his career—brilliant theoretical advances that had practical applicability, fund-raising with industrialists, and international networking.

Upon moving to Caltech Kármán combined theoretical virtuosity with Old World charm to build GALCIT into a leading aeronautical laboratory. GALCIT's prominence, buttressed by Kármán's teaching and consulting, underwrote California's rise as a center of aircraft and aerospace industry. Lubricating the lifelong bachelor's work was the *gemütlich* environment of the Kármán home, the scene of countless parties presided over by his mother (who opposed moving to this "land of outlaws" but came to like America) and his devoted sister, Josephine (whose death in 1951 clouded his last years).

In the 1930s, when most scientists relegated rockets to the realm of Buck Rogers, the perspicacious Kármán supported his students' initial forays into rocketry. With crucial theoretical analysis and institutional support from him, their work blossomed into the Jet Propulsion Laboratory during World War II. Kármán also played a key role in founding the Aerojet Corporation, which helped him amass a small fortune. As World War II ended he played a major role in organizing the retrieval of Axis science and scientists, including a memorable, bitter interview with Prandtl. During the Cold War Kármán as chairman of the Air Force's Scientific Advisory Board and the NATO Advisory Group for Aeronautical Research and Development was the embodiment of the scientist who knit together the Pentagon and industry.

Gorn, a former Air Force historian who now heads the Environmental Protection Agency history program, is strongest on Kármán as institution-builder. But he regrettably avoids probing the Hungarian's motivation for his lifelong association with corporate and state power. There are clues perhaps—mostly undeveloped—in Kármán the outsider's desire to be an insider, his zeal to expand the horizons of aviation, his gratitude to his adopted America, and a deep-seated anticommunism dating to his distasteful service with Bela Kun's revolution in Hungary in 1919. Pages devoted by Gorn to dreary bureaucratic wrangling in the 1950s—when Kármán was past his prime—would have better been spent on analyzing the tantalizing broader questions that are suggested by a major scientist's intimate involvement with industry and the military.

"Frank J. Malina, William F. Durand, and [Theodore von] Kármán ponder the success of jet-assisted takeoff (JATO) before its first flight test in August 1941." In 1938 Kármán and his associates, known to his students as the Suicide Club, had been asked to investigate the usefulness of rocketry in the takeoff of heavy bombers from rough fields. With this project "the Suicide Club was transformed; they . . . began 1939 as the Air Corps Jet Propulsion Research Project." [From *The Universal Man*; courtesy of the Archives, California Institute of Technology]

Kármán as scientist emerges in shadowy form, perhaps because the Smithsonian series to which the book belongs aims at the general reader. Gorn discusses some theoretical contributions (such as Kármán's law of turbulence and the Kármán vortex streets), but the treatment is too truncated and divorced from context to give a full sense of Kármán's scientific importance. His distinctive intellectual approach, which combined intuitive insight and mathematical sophistication, deserves deeper treatment. By choosing to limit the subject to aeronautics, Gorn ignores important aspects of Kármán's career, such as his consulting on the collapse of the Tacoma Narrows Bridge ("Galloping Gertie"). And it would not denigrate Kármán's brilliance to acknowledge that he was not infallible, as indicated by his preoccupation with ramjets. But until a biographer probes its subject more fully, this book stands as a useful introduction to the multifaceted life of this complex figure.

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Reprints of Books Previously Reviewed

After the Ice Age. The Return of Life to Glaciated North America. E. C. Pielou. University of Chicago Press, Chicago, 1992. Paper, $13.95. *Reviewed* **252**, 1006 (1991).

The Dinosauria. David B. Weishampel, Peter Dodson, and Halszka Osmólska, Eds. University of California Press, Berkeley, 1992. Paper, $40. *Reviewed* **252**, 1437 (1991).

Family Size and Achievement. Judith Blake. University of California Press, Berkeley, 1992. Paper, $15. *Reviewed* **245**, 199 (1989).

Infectious Diseases of Humans. Dynamics and Control. Roy M. Anderson and Robert M. May. Oxford University Press, New York, 1992. Paper, $47.50. *Reviewed* **254**, 591 (1991).

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The Atmospheric Boundary Layer. J. R. Garratt. Cambridge University Press, New York, 1992. xviii, 316 pp., illus. $79.95. Cambridge Atmospheric and Space Science Series.

Creative Cognition. Theory, Research, and Applications. Ronald A. Finke, Thomas B. Ward, and Steven M. Smith. MIT Press, Cambridge, MA, 1992. x, 239 pp., illus. $24.95.

Cybernetics and Applied Systems. Constantin Virgil Negoita, Ed. Dekker, New York, 1992. xiv, 358 pp., illus. $135.

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Principles and Practice of Environmental Medicine. Alyce Bezman Tarcher, Ed. Plenum, New York, 1992. xvi, 632 pp., illus. $85.

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Space Policy Alternatives. Radford Byerly, Jr., Ed. Published in cooperation with the Center for Space and Geosciences Policy by Westview, Boulder, CO, 1992. x, 285 pp., illus. Paper, $37.50. Westview Special Studies in Science, Technology, and Public Policy.

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Stopping Times and Directed Processes. G. A. Edgar and Louis Sucheston. Cambridge University Press, New York, 1992. xii, 428 pp., illus. $54.95. Encyclopedia of Mathematics and Its Applications, vol. 47.

Storm over Iraq. Air Power and the Gulf War. Richard P. Hallion. Smithsonian Institution Press, Washington, DC, 1992. xiv, 383 pp., illus., + plates. $24.95. Smithsonian History of Aviation Series.

Strategies for Physical Mapping. Vol. 4, Genome Analysis. Kay E. Davies and Shirley M. Tilghman, Eds. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1992. x, 165 pp., illus. $49.

Stress. Neuroendocrine and Molecular Approaches. Richard Kvetňanský, Richard McCarty, and Julius Axelrod, Eds. Gordon and Breach, Philadelphia, 1992. 2 vols. I, 1044 pp., illus. $95. From a symposium, Smolenice, Czechoslovakia, June 1991.

Structural Geology of Fold and Thrust Belts. Shankar Mitra and George W. Fisher, Eds. Johns Hopkins University Press, Baltimore, MD, 1992. x, 254 pp., illus. $55. Johns Hopkins Studies in Earth and Space Sciences.

Supercollider 4. John Nonte, Ed. Plenum, New York, 1992. xxvi, 1249 pp., illus. $195. From a symposium, New Orleans, March 1992.

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