BOOK REVIEWS

Gretchen Luepke Bynum, Book Review Editor

A GEOLOGIST REMEMBERS. Maxwell Gage and Simon Nathan. 1999. Geological Society of New Zealand Miscellaneous Publication 102. 52 p. Softcover, US$16.00.

FROM MOUNTAINS TO METEORITES. Brian Mason and Simon Nathan. 2001. Geological Society of New Zealand Miscellaneous Publication 109. 73 p. Softcover, US$16.00.

Of the populous and civilized nations of this planet, New Zealand is the most remote, very much an entity to itself. Yet its situation astride a major plate boundary—the junction of the Australian and Pacific plates—means that its geology is of particular international interest. The history of its geological exploration has been, for a number of years now, under examination by the Historical Studies Group of the Geological Society of New Zealand. Its Newsletters, inspired and edited by Brian's brother Alan Mason, feature extracts from a variety of earlier writings, historically important photographs, and much original information that might otherwise have been lost. This is a rich lode for mining by historians of geology at large.

The two works here reviewed are further products of this Group. The two geologists who were prime authors had careers which, though overlapping, were very different, the first devoting his entire career to the geology of his own country, the second moving out into a larger international stage without ever forfeiting his loyalties to the land of his birth.

Maxwell Gage's account begins somewhat abruptly with his arrival at Auckland University College in 1931 as a student without any interest in geology. He explains how the inspiring lectures of one professor, J. A. Bartrum, made him see landscapes with new eyes and gave a lifetime focus to his career. Thereafter he describes his initiation into the techniques of geological mapping, in particular under guidance from Montague Ongley of the New Zealand Geological Survey, with which Maxwell was soon to gain employment. Under its auspices, he was involved successively in the surveying of the Reefton goldfield, then so much on the wane that fresh lodes were eagerly desired. (Frustratingly, we are not told whether any of the discoveries proved economically significant). After that, he was involved in surveys of the Greymouth coalfield and other New Zealand coalfields. Then, during the Second World War, he participated in the very hush-hush task of choosing sites for radar stations (so hush-hush, indeed, that communication between the different armed services was almost nil!). After that, he took part in mapping the Tertiary strata of the Oamaru district of South Island. His account ends with his appointment to a lectureship at Canterbury University College in 1947. The balance of his career was to be spent there. He served as Head of the Geology Department, and saw the College gain full University status, before eventual retirement in 1974.

This, then, is an account of eleven active years of field work, at a period when public transport (trains, buses, and the limousines which New Zealanders called "service cars"), the riding of bicycles and good, solid foot-slogging were the means of access to, and travel about, field areas. At this time such now-standard techniques of geological exploration as the study of microfossils (p. 12) and geological prospecting (p. 14) were barely beginning; geologists were rare creatures and strange (we are still strange, but no longer rare!); and major discoveries were everywhere waiting to be made in all fields of our discipline, from basic paleontology and mineralogy to global dynamics. Geological exploration then was demanding, yes. It was often exhausting and sometimes dangerous; salaries were low; base-maps were primitive and aerial photography not yet an available back-up technique; even automobiles were a rare luxury. Yet, if one liked the outdoors, it was a good time to be a geologist and the rewards—not just scientific—could be ample.

Maxwell does not mention his birth year (1913) and early upbringing, and his marriage is mentioned only, one feels, because it was a happy incidental consequence of fieldwork (p. 13). A fuller autobiography, or biography, must be awaited, for those later years at Canterbury were certainly productive.

In contrast, the account of Brian Mason's life is very much ampler, not only recounting briefly the circumstances of his birth and schooling but also a little of his family background (p. 3). His academic career began later than Maxwell Gage's, in 1936. He was also a student at Auckland University College and likewise enticed into geology by lectures on landscape shaping. But the lecturer who inspired him was George Jobberns, not Bartrum (who had by then left the College). Brian likewise undertook early field work with the New Zealand Geological Survey, in part under guidance from Montague Ongley, but he was never to be employed full time by the Survey. Instead, his first brief engagement was in the search for petroleum in Westland, South Island. After that, his life path diverged ever more widely from Maxwell Gage's, with whom only two passing encounters are reported (pp. 36, 47).

The difference in their careers stemmed, in large part, from two factors. First of all, Brian Mason had been very much interested in chemistry before being beguiled into geology; and secondly, he was able not only to write a successful Master's thesis (on the geology of the Mount Grey region, close to Canterbury), but also to gain a Graduate Fellowship of the University of New Zealand to proceed toward a doctorate. That meant leaving New Zealand, where no Ph.D. degrees were yet offered. He decided to focus on geochemistry and (most unusually for a New Zealander) chose to study in Norway, under the great Viktor Moritz Goldschmidt.

That proved an awkward choice since, before Brian sailed from New Zealand to Europe in November 1939, the Second World War had begun. He arrived in Norway on 10th January 1940 and commenced researches under Goldschmidt. But early in May, the Germans invaded. With a Norwegian colleague who had also a British passport, Brian escaped into Sweden, but it was long before he could proceed homeward or even leave that neutral haven. Instead, under the kind guidance of Swedish mineralogist Percy Quensel, he made studies of minerals in the pegmatites of northern Sweden and of the rich iron-manganese mineralogy of the Langban Mine in the west of that country. He also married a Swedish lady.

It was not till 1943 that his wife and he were able to travel from Sweden to England. Brian gained brief employment with the New Zealand High Commission, undertaking preliminary studies of china clays in Cornwall; but when he and his wife returned to New Zealand, he accepted instead a lectureship at Canterbury University College. His teaching load there was heavy. In absence of satisfactory facilities for geochemical studies, he undertook field studies of the

Island Hills pluton and other areas in the Southern Alps, developing what was to prove a lifetime concern with the structure of that range of mountains.

However, academic salaries in New Zealand were not ample. When the University of Indiana offered him the appointment of Professor of Mineralogy, at a salary twice as large, it was a blandishment not to be resisted. Brian was to spend the balance of his distinguished career in the United States; however, he returned often to New Zealand and was eventually to endow a major trust fund at the University of Canterbury.

Though teaching duties at the University of Indiana were almost as heavy as at Canterbury, Brian was not only able to develop a geochemistry seminar class but also to write his first textbook in that field (*Principles of Geochemistry,* 1952). Before it was published he had moved to New York, becoming Curator of Mineralogy at the American Museum of Natural History, with an adjunct professorship at Columbia University.

Here commenced a further career shift, for his prime task was to catalogue its long-neglected collection of meteorites. Their geochemistry and classification became an absorbing interest, taking him on collecting trips into Texas and Western Australia (pp. 51–57), engaging him in the brief controversy concerning the claim that life-forms were present in certain carbonaceous chondrites, and involving him in many years of research on meteorites collected in Antarctica. There was a Fulbright Professorship in Japan (1961) and, four years later, the move to a position in the Smithsonian Institution (1965), where he took part in early studies of geological samples brought back when Apollo 11 made the first successful landing on the Moon. Retirement in 1984 did not bring Brian's researches to an end; instead, they are continuing to this date.

Both accounts are attractively type-set and illustrated by photographs that are excellently reproduced, but those photographs are often so small (in Gage's account, in particular) that one needs a magnifying glass to appreciate them properly. The repeated interpolation of framed sections (devoted to relevant but incidental themes) is a mixed blessing. This is a fashionable approach, but unduly distracting. On the one hand, it adds useful supplementary data but, on the other hand, it breaks the flow of reading and leads one away onto intellectual sidelines. Commendably, the texts are almost free of typographic errors: the only one I noted was "Fulbright" (Gage and Nathan, p. 49).

All in all, these are good reads for any geologist and thoroughly recommended. It is not evident how much Simon Nathan contributed to these accounts. Whatever he did, either in stimulating these two distinguished geologists to writing or in supplementing their writings, he is to be congratulated on contributing to a very worthwhile achievement.

William A. S. Sarjeant (deceased), Department of Geological Sciences, University of Saskatchewan, Saskatoon, S7N 5E2 Canada. [Ed. note: Bill Sarjeant passed away on July 8, 2002.]

MAMMOTHS, SABERTOOTHS, AND HOMINIDS: 65 MILLION YEARS OF MAMMALIAN EVOLUTION IN EUROPE. Jordi Agustí and Mauricio Antón. 2002. Columbia University Press, New York. 313 p. Hardcover, $39.50/£27.50.

The task of writing trade books on fossils (other than dinosaurs) is a difficult one. The author cannot assume that the targeted audience of "intelligent lay readers" knows very much about the systematics or anatomy of the organisms, and the market for such books (without dinosaurs to sell them) is very small. Even

though there has been an explosion of science shows on cable television (including the recent BBC production, "Walking with Prehistoric Beasts," which largely focused on Cenozoic mammals of Eurasia), the actual market for trade books on fossils other than dinosaurs is shrinking. The author of a book on fossil mammals has at least some advantages in that most of the living representatives are familiar from the zoo (although few people other than zoologists recognize much beyond lions, tigers, and bears). But one is still confronted with two problems. The first is how to introduce hundreds of extinct taxa, many with no living analogue or even a good proxy (without illustrating every one and running up a huge art budget). The second is the dilemma of how much anatomy to introduce when the level of biological literacy of most non-scientists is decreasing every year. One can use "shin bone" rather than "tibia" only so much! What does one do about tooth nomenclature, which is *de rigeur* among paleomammalogists, but incomprehensible to nearly everyone else (even vertebrate paleontologists not specializing in mammals)? I've struggled with this challenge in two different books (*The Eocene-Oligocene Transition,* 1994, Columbia University Press; *Horns, Tusks, and Flippers,* with R. M. Schoch, 2002, Johns Hopkins University Press), and I've learned much about the difficulty of the task in the process.

Jordi Agustí makes a valiant attempt in *Mammoths, Sabertooths, and Hominids.* He claims (in the Preface) that his book is written as a successor to Bjorn Kurten's *The Age of Mammals* (Columbia University Press, 1971), or earlier books such as Henry Fairfield Osborn's *The Age of Mammals in Europe, Asia, and North America* (Macmillan, 1910). However, both of those authors wisely kept the list of names and taxa very short and simple, and introduced as little anatomy as they could get away with, while generously illustrating these strange and unfamiliar beasts to get around the lack of words to describe them. Agustí on the other hand, plunges immediately into description of taxa at the species level (especially in the Neogene chapters), and freely uses anatomical terms on the assumption that the readership will know what they mean. Consequently, although the book is promoted as written for a general scientific audience of geologists, anthropologists, and students of paleontology, most of those readers will immediately be lost with all the unfamiliar names and anatomical and dental terminology. Even a specialist in fossil mammals must read closely to follow all the details, so the book will be tricky for most people to use.

Nonetheless, it is an important resource for specialists who wish to know the latest about European mammal evolution, because so much has changed since Kurten (1971). Not only have the number of discoveries and new taxa increased, but even our fundamental phylogenetic framework for fossil mammals is radically different with the advent of cladistics. More importantly, thirty years of developments in paleoclimatology and chronostratigraphy have meant that we can now date many Cenozoic deposits and fossils to the nearest 100,000 years, and also decipher the details of global climatic change and their potential effects on terrestrial faunas. Agustí has done an excellent job of bringing these latest developments into the text and integrating them with the great increase in our understanding of European tectonics as well. This is a huge improvement over earlier books, which could talk only vaguely about the time framework (much of which was erroneous), and say very little about global paleoclimate. In this area alone, paleontology has made quantum leaps in our understanding, mostly within a single generation.

Naturally, there are problems that are inherent when one author tries to tackle such a broad spectrum of topics and tries to write outside the areas of his own research expertise. Agustí works on Neogene mammals, which are covered exhaustively (separate chapters on the early, middle, and late Miocene, for example), while the Paleogene (two-thirds of the Cenozoic) zips by in the first third of the

book. As a result, much of what is said about Paleogene mammals is very brief and sometimes cryptic—largely because these animals are so unfamiliar and have few living analogues. Most species of Neogene mammals are given much greater coverage, usually with several sentences speculating on how their ecology differs from other related animals. In some cases, one can see the European perspective on paleomammalogy (in contrast with that of North American paleontologists) in the writing. For example, Agustí follows the view (with which I agree) that hyraxes are closely related to perissodactyls, not tethytheres, even though that idea is out of vogue on this side of Atlantic. Although Agustí is familiar with cladistics, he uses a mixture of that method and older ideas, so there are frequent references to ancestors, widespread use of paraphyletic taxa, and (unfortunately) the persistence of obsolete taxa such as "condylarths" and "Bunodontia" that vanished from paleomammalogy years ago.

There are also problems inherent in writing a book in English when it is not your native language. The copy editor did an excellent job of getting most of the conventional prose and spelling right (although I did find a few typos, such as "staving" instead of "starving," p. 62, and mistranslations, such as "loosening" when the author means "loss," p. 35), but was less successful in getting the spelling of scientific terms correct. Anatomical terms such as "condyl" instead of "condyle," "diasteme" instead of "diastem," "symphisial" instead of "symphysial," and "ectolophes" instead of "ectolophs" are difficult for a non-specialist copy editor to correct, and are misspelled consistently (or transliterated from their Spanish spelling, which is not the accepted English spelling). Likewise, taxonomic names are often incorrectly spelled: "Hyrachius" and "hyrachid" instead of *Hyrachyus* and hyrachyids; "*Parodectes*" instead of *Paroodectes*; "*Kolpiodon*" or "*Kopiodon*" instead of *Kolpidodon*; "menoceratheres" instead of menoceratines; "rhinocerathine" instead of rhinoceratine, and so on. The book could have used a technical review to catch these problems, since copy editors cannot be expected to have that expertise.

And of course, there are a few technical errors that the author (or a scientific reviewer) should have corrected. For example, Agustí repeats the old myth that shovel-tusked mastodonts ate marsh vegetation, while the wear on their tusks shows no such thing (p. 106). He recycles the outdated notion that *Pliohippus* was ancestral to *Equus,* whereas horse specialists have known for twenty years that *Pliohippus* is a side lineage of independently one-toed horses; *Equus* is descended from *Dinohippus.* He uses the old magnetic "epoch" terminology, which has been replaced by magnetic "chrons" (since they are not "epochs" in the sense of subdivisions of geochronological periods). In one place, he suggests that there were Oligocene multituberculates, whereas all the re-dating of the Eocene-Oligocene transition has placed the extinction of the multituberculates (and the brontotheres, which are ignored here, even though they occurred in Europe) in the late Eocene.

On the positive side, the book is gloriously illustrated with original line drawings (plus color plates in the center) by Mauricio Antón, including illustrations of many animals that have never been reconstructed before. In this respect, the authors have surpassed many other books like this, which are forced by their low budgets and small sales to do their art programs on the cheap, and thus recycle many outdated and inferior illustrations of variable sources and quality.

For the historian of science, this book would be excellent for a comparative study of how much our understanding of fossil mammals has changed in a century from Osborn (1910) through Kurten (1971) to the present book. Clearly, the quality and quantity of data about fossil mammals has increased enormously, which requires somewhat longer and more detailed treatment than Osborn could attempt in 1910. And, as mentioned above, the biggest transformation since 1971

has been the enormous expansion in our knowledge of Cenozoic global climatic changes and how they are precisely correlated to the terrestrial record, which are developments that were only vaguely (and incorrectly) understood in 1910 or 1971.

On the whole, the book is a worthy successor to Kurten (1971), even if it is written at a level that will make it comprehensible only to fossil mammal specialists. Still, for those who must keep up to date with European mammals, there is no better source other than the primary technical literature, which is even more inaccessible to the non-specialist.

Donald R. Prothero, Department of Geology, Occidental College, Los Angeles, CA 90041; Prothero@oxy.edu

---

DRAWING OUT LEVIATHAN: DINOSAURS AND THE SCIENCE WARS. Keith M. Parsons. 2001. Indiana University Press, Bloomington. 224 p. Hardcover, $29.95.

Reading this book provoked in this reviewer a storm of uncharitable thoughts and clichés. One found oneself thinking that my consternation with parts of the book perhaps arose from my perspective as a historian. This book is after all supposed to be a study in the philosophy of science, or at the least in the philosophy of the history of science. Much of this book is historiography. That is something that a historian can comprehend regardless of whether it was a beloved topic in graduate school. The problem for this reader was that the author seemed to have made an uncomfortable amalgam of historiography and criticism with some information about the history of paleontology.

Historical training, not in Parsons's "Whig history," but in the old school stuff of "one damn fact after another," the sort of training this reviewer had, made it possible for me to identify with such statements by the author as "So what do we really know about dinosaurs? They were big and fierce and are now extinct. What else? Dinosaurs are not social constructs. They really existed, and we definitely know certain things about them." But such an old-fashioned historical training also makes one object immediately to these remarks. Not all dinosaurs were big, some were not much bigger than a Shih Tzu puppy; how does he know they were fierce? We don't know that at all. And while I agree with the premise that dinosaurs are not social constructs, critters made up by the public, the press, certain scholars, theologians, rich museum patrons, etc., I am not prepared to agree that they are necessarily extinct. I would agree that we definitely know certain things about dinosaurs, but actually I would suggest we only definitely know certain things about the fossil remains of some dinosaurs. Even Parsons agrees with this.

Paleontology can only tell the scientist so much. That is where the possibility of socially constructed dinosauria comes in. The author's premise is to examine various case studies, as he puts it, in dinosaur paleontology over the last one hundred or so years and to decide whether scientists were objective and not guided by those who would make science a social construct. He believes that there are "objective rational standards." In the end, he concludes that in essence, scientists were and are objective and empirical and not too frequently guided by outside influences. He writes, "Dinosaurs may not be cultural constructs, but the sciences that study them definitely are." Because of that science is, as he puts it, "fair game" for sociologists, historians, and philosophers.

Also, of course, philosophy is "fair game" for the reviewer. This is why it

seemed necessary to bother the readers of this review with my foregoing opinions about dinosaurs. Let us proceed to the "fair game." Readers of this book who are not philosophers will be pleased to know that Parsons wrote a rather lucid introduction to this book. He lays out his points and theories and gives brief overviews of the contents of the chapters. The real strength of this book lies in Parsons's critical discussions of the writings of various sociologists and philosophers. In a sense it is almost too bad that he wove these discussions into the format of an overview of the history of dinosaur paleontology.

Parsons opens his book with a passage from the Book of Job, Chapter 41: "Canst thou draw out leviathan with an hook? Or his tongue with a cord which thou lettest down? Canst thou put an hook into his nose?" Since I knew that Parsons intended to write at length about Edward Drinker Cope and Othniel C. Marsh in this book, I was pleased with this quotation and the book's subsequent title. Certainly Parsons had read Henry F. Osborn's 1931 biography of Cope or Davidson's 1997 biography of Cope and knew that these very passages from the Book of Job were read at Cope's funeral. "Where wast thou when I laid the foundations of the earth? Declare, if thou hast understanding." Well, imagine the reader's surprise to find that Parsons did indeed write at length about Cope and Marsh in his first chapter, "Mr. Carnegie's Sauropods," and did not cite biographies of either man. It would seem that these two, embroiled as they were in their rivalries, might have been candidates for scientists influenced by social constructs. Yet, I don't think Parsons feels this was the case. With that I would agree. Hurried, competitive, or sloppy they may have been, but if anything, Cope and Marsh were *making* the social constructs about dinosaurs, not bowing to some constructs made by outsiders. I found this chapter interesting in its discussion of what sort of skull should be placed on the *Apatasaurus* in the Carnegie Museum. I found the author's sloppy treatment of Cope and Marsh annoying.

Parsons's lengthy discussion of Robert Bakker and his proposals of endothermic dinosaurs is a similar case of annoyance. Parsons went to great length to establish Bakker as an important theorist and a maverick in paleontology. Bakker would be a fine model for a scientist who is not influenced by social constructs. But one has to wonder why Parsons went over such old materials in respect to the whole issue of research into the possibility of dinosaur endothermy. For example, Parsons writes at length about the AAAS "hot blooded dinosaur" symposium held in 1978. At this point one had to remind oneself that the author was writing historiography and philosophy. But it seems it would have been a better chapter if he had updated this chapter with more of the recent discussions of this question and the introduction of the theory that dinosaurs evolved into birds. In a sense Bakker's theories as discussed by Parsons seem almost passé.

The chapter entitled "Le Dinosaure Postmoderne" is rather entertaining. Much of it is devoted to a scathing critique of W. J. T. Mitchell's *The Last Dinosaur.* This chapter resonated with the reviewer whose opinion of Mitchell's book did not permit its being purchased. A perusal in the bookstore was sufficient. I wish, however, that Parsons had placed this chapter in some other position in his text. Perhaps it would have been more logically situated after his chapter on the question of dinosaurs as social constructs.

Similarly, I found the discussion of Adrian Desmond's *Archetypes and Ancestors* interesting, but perhaps better placed in some other part of the book. Again, as with Bakker, the author dealt with a book by Desmond that is now twenty years old as though it were a rather recent publication. After all, Desmond was discussing Owen and Huxley. Might it not have been better to place these two paleontologists, their issues of social constraints in Victorian England, and Desmond's opinions at an earlier point in this book instead of jumping in with a turn

of the twentieth-century problem, that of the placing of an appropriate skull on the Carnegie *Apatasaurus*?

Parsons's closing remarks in *Drawing Out Leviathan* sum up this reader's consternation with his book. He comments that we can draw out Leviathan and say what the dinosaurs were really like, but that it is a "yes and no" situation. We are still learning, but we know some things. Science is mutable. That is an important point for Parsons. Science is mutable and, for him, scientists' theories are also mutable. In general these theories are derived from honest and empirical effort on the part of the scientists. This is all very well and good and puts *finis* to the text, but it still leaves the reader wondering why he chose dinosaurs for the subtext of this book? Why not have selected the whole conflict of the Bible versus geology or the questions concerning the origins of humans? These too have been written about frequently, as have dinosaurs and the history of dinosaur paleontologists. To have selected dinosaur paleontology for this excursus into philosophy of science was not a mistake on Parsons's part, but one wishes he had made his excursus differently.

Jane P. Davidson, University of Nevada-Reno, Reno, Nevada 89557; jdhexen@unr.edu

---

EYEWITNESS: EVOLUTION OF THE ATMOSPHERIC SCIENCES. Robert G. Fleagle. 2001. American Meteorological Society, Boston. 129 p. Hardcover, $70.00.

The period from World War II marked the steady, forward half-century of formative development of meteorology into the expanded field of atmospheric sciences. This was the sphere of Robert Fleagle's education and career in meteorology, the latter spanning academic along with a range of other institutional and governmental science policy experience. As the title of the book implies in the word "Eyewitness," this is a personal reminiscence of Fleagle's working life.

As an addition to the AMS Historical Monographs Series, the burden of presenting the "Historical" aspect of the material should not be taken for granted. Yet the circumstance foretells a rudimentary historiographical framework, for Fleagle is not playing at historian of meteorology's half-century metamorphosis toward the more exacting atmospheric sciences. The book is basically a supplement to an AMS oral history interview with Fleagle, and as such, the reader can expect an extempore style of presentation. While the approach can provide a candid view of the past, potential drawbacks to historical value may rise in the form of uneven as well as incomplete presentation. Ultimately, the editor has the final responsibility to appraise and, if need be, augment the material with these factors in mind.

The general topic of "Evolution" has a good deal of latitude beyond the progression of atmospheric knowledge, including academic and governmental recognition and growth and also global-scale cooperation in research and environmental policy. Fleagle is conscientious about what he has to say. In the Preface, he notes that files of pertinent letters and documents to ameliorate human memory errors bolster a lifetime of memories. In the course of fifteen chapters he covers many subjects. He reviews his education, his career, and the development of the atmospheric program at the University of Washington (abbreviated to UW). He also examines national and international meteorological endeavors; the ins and outs of atmospheric science thrown into the political arena; the development of the National Center for Atmospheric Research (NCAR) and the National Oceanic

and Atmospheric Administration (NOAA); and the global maturation of the atmospheric sciences.

Fleagle started his career as part of the American military's mandated need for qualified weather forecast officers as World War II loomed closer. Five universities were chosen to provide a program of instruction based on the incipient program at the cradle of academic meteorology in America—the Massachusetts Institute of Technology (MIT). Within this context Fleagle rather tentatively introduces the man at the forefront of both the military and academic efforts—certainly the beginning of the evolution. It seems somewhat understated to describe Carl-Gustav Rossby thusly: "... a Swedish meteorologist, trained at the University of Bergen, was appointed to lead the program." (p. 1). Rossby came to the US (1928) as one of the most important disciples of the Norwegian Bergen School of dynamic meteorology originating with theoretical physicist Vilhelm Bjerknes. He was the driving force behind founding a department of meteorology at MIT.

Though Fleagle's overall presentation assumes a basic foreknowledge of the reader, a footnote to Rossby (footnote 4, p. 1) seems to point to the uninitiated, who is directed to two sources for details on Rossby. It seems far simpler and logical using text space to appropriately introduce the important Rossby. This relieves the uninitiated from the recourse of running for other sources or remaining thereafter unduly curious about this man. Rossby is more generously served (p. 6) in regard to his presidency of the AMS but his even more significant role as torchbearer of modern meteorology as head of the US Weather Bureau should also have been emphasized.

The flow of Fleagle's narrative in regard to his own home ground of career experience, after his arrival (1948) at the University of Washington's year-old department of meteorology, remains even and informative. Although the reader wades through more minutiae than required about this meteorology department's formative years, academic globetrotting, and personal political slants, there is a steady stream of valuable source data. As a pioneer player, Fleagle's analysis covers the core history of American meteorological progression. The development of US meteorology departments' curricula through the 1950s and 1960s is traced from synoptic and dynamic meteorology into atmospheric physics/chemistry, numerical modeling, and environmental applications. A major occasion was the expanding international cooperative scene in the wake of the momentous International Geophysical Year (IGY, 1957–58). Fleagle also discusses the growth of populations of students, as well as of members of AMS and AGU (American Geophysical Union); the essentials behind the formation of academic cooperative atmospheric research via NCAR (1958); and the early wedding of national geosciences and environmental concerns in ESSA (1965), which evolved into the growing atmospheric/oceanic partnership of the NOAA (1970).

Fleagle's stint in the presidential Office of Science and Technology (OST, 1962–1964) brings to bear the very different dimension of the scientist fathoming political expediency, as he or she attempts to altruistically influence government science policy. He joined many others from academic and professional science ultimately disenchanted with governmental ability to broker equitable science policy. He witnessed government attempts to subsume a young NCAR and focused personal efforts at stemming further attempts to corral all agencies of atmospheric science under the Department of Commerce. Fleagle prophetically urged NASA to integrate its satellite development program with expanded atmospheric research funding, yet it took a decade of rising concerns over climate warming and stratospheric ozone to initialize this future successful union. With valuable lessons learned he applied these to continued service at the NCAR governing level; joint research programs between UW with NOAA; and inputting change to AMS and

NOAA core policy. He saw the future worth of science-savvy government servants and developed a postgraduate science policy seminar at UW to address this.

Mirroring national growth of the science in knowledge, technology, and the unique integration of geo- and biosciences that grew with the exigencies of environmental answers, was the international-scale awareness of the worldwide potential problems of greenhouse warming and ozone depletion. Fleagle notes these expanded areas of atmospheric science application were driven by large-scale experimental opportunities (such as BOMEX 1969, GATE 1974, Global Weather Experiment 1978–1979, and others), as well as the advanced technical capability (sensors, satellite platforms, etc.) to collect comprehensive databases. The meteorology of Fleagle's youth has come a long way in knowledge and application to stand as the impressively wide-ranging atmospheric sciences of today.

Since such a book is supposed to augment, not just repeat the oral history, I would have welcomed greater detail. But format strictures seem to limit the book to a more general presentation. In regard to basic editorship, I found no typographical errors, but dates could be more comprehensively presented to label periods and specific events. In a few instances Fleagle could not recall a paper given (for instance, p. 52). But remedying that with a footnote should have been the editor's job. In regard to footnotes, a functional criticism seems appropriate. The format provides the author and the date of publication but not the publication title. Used throughout the book, this should be a shortcut used for previously cited sources–not for initial presentation. The inclusion of a worthy footnote is surely equally worthy of proper formatting. A case in point presents itself in the first chapter with an indirect reference to Vilhelm Bjerknes's *Physikalische Hydrodynamic* that sends the reader to the bottom of the page to the footnote (footnote 6, p. 3). There is no title, yet the book is: ". . . the revered but largely unread bible of meteorology." The title is found in the adequate references, but titles would be very usefully served at the point of origin for the reader's convenience; here the title would go a long way in helping the reader understand why it was generally unread: it is in German.

Although I found myself sometimes feeling steered away from more details on central themes of evolving atmospheric science for the sake of personal and extraneous reminiscence, Fleagle's book is a basic topical outline for diverging into deeper analysis of later twentieth-century atmospheric science for historians of science, society, and technology, particularly stressing the development and direction of NCAR, NOAA, and government science policy since the 1960s.

William J. McPeak, Institute for Historical Study (San Francisco); 39 Barbados Drive, Aliso Viejo, California 92656; wjmcpeak@raytheon.com

---

SPECIMEN ACADEMICUM INAUGURALE DE GEOLOGIA PATRIA (ACADEMISCH PROEFSCHRIFT OVER DE GEOLOGIE DES VADERLANDS). W. C. H. Staring, 1833. Christiian Caspars, Latin translator. With introduction in English by Aart Brouvwer. 2001. Nederlandse Geologische Verening, Tilburg. Published as a combined issue of Grondboor en Hamer, v. 55, no. 5a and Staringia 10. 174 p. Softcover, Euro 16.00 (This publication can be ordered from the Nederlandse Geologische Vereniging, W. M. Felder, Oude Trichterweg 26, 6294 AL Vijlen, Netherlands. Postage and handling must be added).

In the Netherlands, Winand Carel Hugo Staring (1808–1877), the "Father of Dutch Geology," is famous for two reasons. He completed the first geological map (scale 1:200,000) of the Netherlands in 1860, and his two-volume magnum

opus *De Bodem van Nederland* (1856–1860) became the first treatise on the geology of the Netherlands. Outside the Netherlands the geologist Staring is largely unknown. This must be due to language barriers. Staring published mainly in Dutch; he had learned Latin, French, and German, but never mastered English. Moreover, Staring published mainly on Dutch geology, in particular the Pleistocene (Diluvium) and Holocene (Alluvium) deposits covering the larger part of the Netherlands. The two existing biographies of Staring (Huberts 1877; and Veldink 1970) are also published only in Dutch.

Specimen academicum . . . , published in 1833 in Latin, was Staring's doctoral thesis at Leiden University. At that time a thesis had to be written in Latin. Now it has been translated into Dutch, with a short introduction and an excellent three-page summary in English prepared by Professor Aart Brouwer. Even with the English summary, however, this work probably will not help to make Staring well known abroad.

From an historical point of view, this thesis is very interesting, as it summarizes the knowledge of Dutch geology up to 1833. The region dealt with includes a section of Belgium that was part of the Netherlands from 1815 to 1831. The boundary of the mapped area follows the northern limits of the Cretaceous rocks in France, Belgium, Germany, and the Netherlands; the Ems River forms the boundary in the Northeast, the North Sea in the North and West. As a result, the Upper Cretaceous deposits of the area around Maastricht—the type locality of the Maastrichtien, with its famous fossils of the Mosasaurus discovered in the eighteenth century and already well known at that time—are not dealt with. In general Staring deals only with the surficial geological deposits. His remarks on Tertiary deposits (Part 1 of the thesis) are mainly based on those that crop out or are quarried in Belgium. Very few Tertiary deposits were known from the Netherlands at that time. The main part of his thesis deals with the Pleistocene ("Diluvium") and Holocene ("Alluvium").

Diluvium and Alluvium deposits cover the main part of the Netherlands; they both consist of deposits less compacted than the Tertiary, and they differ also in fossil content. The Diluvium in general represents the higher parts of the Netherlands, whereas the Alluvium forms the lower part where relief is almost absent. Staring also mentions the higher fertility of the Alluvium, foreshadowing his lifelong interest in agriculture and its relation to geology.

Staring mentions the great variety of stones found in the Diluvium. He enumerates all the hypotheses known at that time to account for stones from igneous, metamorphic, and fossiliferous sedimentary rocks not known to crop out in the vicinity of the Netherlands. He adopts Hausmann's hypothesis that many of these stones originate from Scandinavia (Staring's Northern Diluvium); also some of the stones have a southern origin, Ardennes and the Rhenish Schiefergebirge (Staring's Southern Diluvium). According to theories at the time, these stones were brought here by the sea or by enormous rivers. The glacial origin of these erratics had to wait for the acceptance of the glacial theory around 1840, the year of publication of L. Agassiz's "Études sur les Glaciers."

In dealing with the Alluvium, Staring declares himself a follower of Lyell: geological phenomena can be understood as the result of forces still working today (uniformitarianism). As he was unable to read English, he had only consulted the first part of Lyell's *Principles* in the translation into German by C. Hartmann (1832). He apologizes that he could not read the two other volumes of Lyell's *Principles,* which might have many interesting remarks on the subdivision of the Tertiary and the formation of Alluvium and peat deposits useful for his thesis. The Alluvium covers the largest part of the Netherlands and therefore gets more pages in the thesis than the older Diluvium deposits. Because wind and water transport alluvial sediments, Staring suggests that the flat surface of the Alluvial

deposits indicates that the forces of wind and water during the Alluvium were much weaker than during the Diluvium.

Staring divides the peat deposits into those present above the water table (and usually resting on sandy Diluvium), and those present below the water table (mainly occurring in the western lower part of the Netherlands). Staring does not know the deposits on which these lower peat deposits rest. The peat consists of the remains of plant species still occurring in the Netherlands; human remains and artifacts are also found on occasion. The discussion on the formation of peat and its allochthonous or autochthonous origin is still in debate at that time, but Staring seems to have a preference for its formation *in situ*.

The other chapters of this part deal with fluvial and marine Alluvium deposits and both the inland and coastal dunes. Here again Staring's agricultural interest shows. These moving sands are a nuisance to agriculture and need to be planted with pine trees or marram-grass. In his later life he experimented with afforestation of the coastal dunes; he was one of several who published on this subject.

In his introduction Staring clearly indicates his thesis to be only a compilation of the existing knowledge published in widely diverse papers. The thesis must be seen as a stepping stone to the work Staring hoped to do in the future if he could get the opportunity (position, finances) to devote himself to the publication (in Dutch) of a "Geology of the Netherlands" as well as the production of a geological map. Not until 1852 was Staring able to do this. In that year on the initiative of agricultural societies, the liberal Dutch prime minister Thorbecke appointed a government commission consisting of Van Breda, Miquel, and Staring (as secretary) to survey the geology of the Netherlands. Internal problems in the commission, especially between Van Breda and Staring, led to the dissolution of the commission. In 1857 Staring alone was charged with completion of the geological map. He managed to complete the survey in 1860 with a map consisting of twenty sheets, scale 1:200,000. The printing was not completed until 1867.

The bilingual (Latin and Dutch) publication of this thesis has mainly historical interest. It is a pity no translation into English was made at the same time, making this early publication on Dutch geology readily available to a wider public. Those interested in the history of Dutch geology but not mastering Latin or Dutch will find the excellent introduction and summary of the thesis in English by Aart Brouwer a welcome substitute.

Gerhard C. Cadée, Department of Paleobiology, Netherlands Institute for Sea Research, P.O. Box 59, 1790 AB Den Burg, The Netherlands; cadee@nioz.nl

---

CULTURES AND INSTITUTIONS OF NATURAL HISTORY: ESSAYS IN THE HISTORY AND PHILOSOPHY OF SCIENCE. Michael T. Ghiselin and Alan E. Leviton, editors. 2000. California Academy of Sciences Memoir 25, San Francisco. 363 p. Hardcover, $40.00. (Plus $3 postage and handling; Calif. residents add 8.25% to book price. Order from Office of Scientific Publications, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118).

This volume is one of a series that commemorates the sesquicentennial of the California Academy of Sciences, which will be celebrated next year. It brings together papers from two conferences, one held in Milan in 1996 on the Culture of Natural History and the other, held in San Francisco in 1998, on the Institutions of Natural History. The result is an eclectic volume, whose contents range from Brazil to India, and from the eighteenth-century Sienese Academia dei Fisiocritici to twentieth-century proposals to abolish the Linnaean binomial nomenclature in

favor of an explicitly cladistic alternative (sometimes referred to as the phylocode; see http://www.ohiou.edu/phylocode/).

A full discussion of the book's contents and scope would be almost as long as the book itself. Among the highlights are a group of four articles on the history of the Smithsonian Institution. Pamela Henson describes the Institution's founding and initial aims. Ellis Yochelson discusses paleontology at both the US Geological Survey and the US National Museum. Michele Aldrich and Alan Leviton analyze the relationship between the Smithsonian and its West Coast rival, the California Academy of Sciences. In what will probably be the most surprising, unusual, and informative essay for many readers, Kae Takarabe describes the first official Japanese visitors to the US, in 1860, who were also the first Japanese to experience a Western style museum. Although the political circumstances in Japan made it impossible for their visit to lead to the formation of Japan's first natural history museum, the episode was a fascinating moment in the nineteenth-century transformation of Japanese attitudes towards the West and its technology.

Several of the essays focus on the institutional contexts of individual naturalists. These include Mary Winsor's account of Louis Agassiz's vision for the Harvard Museum of Comparative Zoology; Léo LaPorte's discussion of the museum-based career of George Gaylord Simpson; and Daniel Becquemont's analysis of Herbert Spencer's failure to gain the support of the rising generation of institutionally based naturalists. By contrast, other contributors have focused on naturalist's ideas. Michael Ghiselin discusses the possible influence of alchemy on biological thinking, particularly through the strange but fascinating work of Lorenz Oken. And Alessandro Minelli describes late-twentieth-century attempts to reform the nomenclature of biological systematics, an intriguing, if rather polemical, piece that might have been more at home in a systematics journal rather than a historical one.

It is all but impossible to summarize such a diverse collection. With one or two exceptions, these essays are more descriptive than theoretical. While this leaves them free of impenetrable jargon, one is occasionally left wishing for a little more reflection on the significance of some of the fascinating material that has been assembled here. No doubt the conferences at which these papers were originally given included discussions between the participants, including comparison of their disparate materials and approaches. It would have enhanced the interest of this volume if some of these discussions had been included, perhaps in the form of commentaries or a more detailed introduction. While this book may well contain something for everyone, it is hard to imagine anyone who will find all its contents interesting or useful; this is a book which libraries—rather than individuals—should buy, since it is likely to be consulted by a wide variety of researchers.

Dr. Jim Endersby, Department of History and Philosophy of Science, Cambridge University, Cambridge, U.K.

CRADLE OF LIFE: THE DISCOVERY OF EARTH'S EARLIEST FOSSILS. J. William Schopf. 1999. Princeton University Press, Princeton, New Jersey. 367 p. Hardcover, $45.00; Softcover, $17.95.

Next to dinosaurs and hominids, the Burgess Shale and the Ediacara Fauna have become thriving paleontoliterary industries. Now Professor Schopf draws attention to fossils of the earliest life in this intriguing book. Combining elements of popular science, history, and autobiography the reader is presented with an

overview of the discovery, recognition, life, and relationships of the earliest life on Earth.

And a remarkable story it is. Framed as a response to Darwin's problem of the apparent absence of Precambrian life, the book gives geological, biological, and chemical background, tells of early and more recent finds, discusses the origin of life, and the physiological responses necessary for survival on an Earth very different from our own. It then discusses in more detail stromatolites, cyanobacteria, and the origin of "cells like ours." A couple of supplementary chapters explore other episodes in paleontological history and the possibilities of fossils from Mars. A 20-page glossary, a 7-page reading list, and two indexes complete the contents.

Following the abortive Eozoon controversy in 1865, Burgess shale discoverer Charles Doolittle Walcott took credit for describing the first Precambrian stromatolites in 1883. But in 1931, British botanist Seward dismissed Walcott's claims for Precambrian life, and such was his influence that many potential readers of this book must have learned as students that there was no useful evidence of Precambrian life forms.

The story becomes personal as the author, as an 18-year-old, first-year undergraduate in Ohio, joined the search. Despite advice from his professors to find a more practical area to study, Schopf pursued the will-o'-the wisp of Precambrian life as a graduate student at Harvard. He was a humble assistant when competing papers on Canada's Gunflint chert were published by Barghoorn and Tyler, in a situation that rivals the well known Darwin/Wallace episode. A new research strategy focused on stromatolites then led to discovery of cyanobacteria in Australian material.

Historians of science will find Schopf's text a mixed blessing. He recognizes and explores the importance of personalities and social settings, and gives vivid impressions of important figures as "disheveled teddy bears" and "wiry wonders." But once launched in the story, his own work is only touched on in passing accounts of a visit (with Russian origin of life specialist Oparin) to Salvador Dali, and 1982 work in China. Meanwhile the recent history of the field in which he has played such an important part is dismissed in a paragraph. It is fascinating to learn that biologists knew of modern stromatolites while unaware geologists were arguing about their nature, but we do not learn here who made the discoveries or how the information crossed the subject barrier. Schopf's view of scientific history is sometimes over-simplified (did Darwin only have one dilemma?). And this reader would gladly have swapped the chapter on Scheuchzer and Beringer (interesting, but with little to do with the rest of the book) for more hard information about the author's own life and work.

Equally mixed is the author's use of language. A variety of stylistic approaches include question-and-answer passages, and sometimes a moral ("take home lesson") is pointed as in a Victorian children's story. Terminology is used carelessly—anogygenic photosynthesizers are "clever," microbes "invent," one percent is "abundant," and the terms "zoo," "menagerie," and "ecosystem" apparently have identical meanings. But in view of his complaints about scientists' reputation for "polysyllabic arcana," it is disappointing to find too many unexplained examples in the text. For technical terms are abundant, new ones seem to be coined on the spot, and the text is full of abbreviations such as BIF and CHON.

The book is certainly made more vivid by entertaining use of informal language, as rocks are buried at "fossil-frying depths" while life arises in the "primordial consommé" and iron-rich formations are formed by "rusting of the earth," but less happy slang gives us "fubarized"—"fouled up beyond all recognition." Since the author also complains about "mushy soundbites" used by

others, it is disappointing to see many woolly words and images in his own text. It is hard to see cyanobacteria as "monarchs of the primal world," or grasp an "explosive rise" which lasts 200 million years. Many sentences are clumsy, and metaphors are mixed and sometimes misused. It is not clear, for instance, how a group of scientists, some of whom never met each other, can work together like a jazz band, nor why the absence of a death-altered chemistry can be a "smoking gun"? And the proof-reader sometimes napped—we not only have the "new typos" (real but incorrect words that get past spell checking, as in "mother load") but also some real old-fashioned spelling errors, even in scientific names.

Illustrations are largely in black and white, though eight color plates enliven the book. Many are diagrams, with a look of overheads prepared for lectures, and of these the ones dealing with time are oddly designed with the oldest information at the right, so that they read in the opposite way to the text. The hammer in one photograph is somehow expected to provide scale for the adjacent picture.

Despite some reservations about the language, communication of complex and unfamiliar subject matter, and occasional lack of useful detail, this book is an important contribution to a neglected area of science. Schopf has strongly demonstrated his belief that science is indeed "enormously good fun," and opened up a fascinating area hitherto little known to scientists and general readers.

David A. E. Spalding, 1105 Ogden Road, RR#1, Pender Island, British Columbia V0N 2M1 Canada; brandywine@gulfislands.com

---

THE END OF THE DINOSAURS. CHICXULUB CRATER AND MASS EXTINCTIONS. Charles Frankel. 1999. Cambridge University Press. 223 p. Hardcover, US$24.95.

Since the 1980 report of concentrations of iridium in the Cretaceous-Tertiary boundary clay, a simple answer has been available for the problem of the extinction of the dinosaurs. For the last two decades a steady stream of popular science books has offered versions of this answer, discussing the evidence for an asteroid impact, wondering where it struck, and speculating on the devastating effect it must have had on the Earth's surface and the life thereon.

The author of this volume has studied planetary geology, and has written a previous book on *Volcanoes of the Solar System.* This contribution to K-T studies was first published in French in 1996 and now appears in English. In content it updates its predecessors in reporting on the discovery of Chicxulub crater in Mexico and its widespread acceptance as the locus of the K-T asteroid strike. He tells us, though, that "my intent is not to present a definitive historical account of K-T research . . . but to tell as entertaining a story as possible." (p. ix).

The entertaining story starts with a review of great mass extinctions, followed by discussion of the impact hypothesis and some of the reasons why it has not received universal acceptance. Chapters four and five detail the search for a crater marking the K-T event and the discovery of Chicxulub. The nature of the K-T catastrophe is elaborated, and then an interpretation of the wider relationship between impacts and extinctions follows. Lastly, we are warned of the potential danger of a possible future impact to ourselves. A bibliography and index complete the work. Numerous black-and-white illustrations present photographs of people, places, and fossils, accompanied with maps and diagrams.

For the reader interested in the development of the asteroid hypothesis and the discovery of the Chicxulub crater, this is very useful and interesting. However, in naming his book *The End of the Dinosaurs,* the author promises far more than

he delivers. In the introduction we are promised that "the discovery of Chicxulub crater brings a convincing answer to the long-debated mystery of the mass extinction: it also stands as a brilliant example of the scientific method at work." (p. ix). While scientific method is certainly documented in pursuit of the missing crater, surely it also demands that the facts about the mass extinction should also be seriously considered before claiming that the asteroid is responsible. Simple answers are not always useful for complex problems.

The reader seeking clarification of the complexities of the K-T extinction will not find it here. While a convincing case has certainly been made by many authors that an asteroid arrived at the end of the Cretaceous, many paleontologists are not convinced that it caused the demise of all—or even any—of the dinosaurs. The record of late dinosaurs is largely confined to parts of North America, so we have little information about a dinosaurian demise in the rest of the world. Where the record exists, it is clear that numbers of dinosaur genera were substantially reduced well before the end of the Cretaceous, so extinction of non-avian dinosaurs may have been substantially or entirely completed before the asteroid arrived. It is also possible that some non-avian dinosaurs survived into the Tertiary. Moreover, if, as many vertebrate paleontologists now believe, birds are direct descendants of (and thus are) dinosaurs, then dinosaurs are not only not completely extinct, but their most vulnerable representatives are the very ones that survived the supposed universal cataclysm, along with many other groups of vertebrates and other organisms. Readers interested in this fascinating issue can seek more balanced accounts in such books as *Dinosaur Extinction and the End of an Era: What the Fossils Say* (J. David Archibald 1996) and *Extinction* (Steven M. Stanley 1987).

Frankel accepts that "it is hard to remain objective" (p. ix), and much of the text confirms this, as he generally finds it easier to ignore the facts that don't conveniently fit his thesis. If contrary views are mentioned, they are summarily dismissed; the idea that the iridium deposition could represent more than a million years is "absurd" (p. 21), and there is no discussion of condensed deposits. Alternatively, dissenting views are dismissed as "dogma" or "hostility" (p. 52), while their (frequently unnamed) holders merely "claimed" their interpretation (p. 16), or "liked to reason within a terrestrial, closed frame of reference." (p. 37). The 96 percent of members of Society of Vertebrate Paleontologists (SVP) cited as not accepting that "an extraterrestrial object had caused the demise of the dinosaurs" (p. 50) are obviously not considered of the same academic quality as the "scientists" (p. 52) who are ready to accept the impact hypothesis. Senior scientists, we are told, exert control over the views of their fellows (pp. 53–54), but they are not as open minded as the science press (p. 54).

Facts are sometimes vaguely expressed. For instance a "site in Canada" (p. 33) is a bit hard to pinpoint in the absence of a supporting reference. Interpretations can be even more baffling. The peak of Deccan activity is two million years before the K-T boundary, but this is dismissed as a possible explanation of extinction because "it is only at K-T time that the mass extinction took place" (p. 43). The Manicouagan crater is nine million years too late to relate to the end of Triassic extinction (p. 158), so Frankel assumes that the crater is wrongly dated—and indeed the gap has been reduced by a couple of million years by p. 166. If "between a quarter and half of all mass extinctions in the fossil record appear to be connected with impacts" (p. 164), the obvious implication that between half to three quarters of all mass extinctions are not connected with impacts surely requires some other explanation.

Language frequently misrepresents the thought being expressed. This reader is uncertain how a collision scar can be "responsible for the massacre of countless species" (p. ix); does not know what is a "coup de grace to a declining biosphere"

(p. 42); how the Manicouagan astrobleme can be "ubiquitous" except when one is in the middle of it (p. 72); or how the disappearance of twelve species of ammonites can be a "catastrophic mass extinction" (p. 47). Other language is unnecessarily emotive, when for instance plankton species (p. 6) and algae (p. 145) are "massacred."

For the historian of science this volume has some usefulness in its record of the discovery of Chicxulub. And since it produces a "smoking gun" but no body, it also sheds light on the frustration of paleontologists and geologists when (as the author himself suggests, presumably with intended irony) "along came a crew of . . . physicists who pretended to put the whole issue to rest with one wave of their cosmic wand." (p. 37).

In an earlier book related to this topic, physicist Richard Muller (*Nemesis,* 1988) draws for his research the analogy of "an explorer, trying to put together a map of an unknown world, unsure of the value of what he is going to find and how he is going to repay his debts, while suffering from shortage of supplies and attacks by the natives." It seems that some astrophysicists are still carrying out this sort of exploration, and by dismissing the invaluable information possessed by geologists and paleontologists—the "natives" of his unfamiliar terrain—are obscuring the value of what has undoubtedly been found. But then, Earth Science historians are familiar with controversy, overstated cases, neglected discoveries, and passionate attacks on the opposition—and where would we be without them?

David A. E. Spalding, 1105 Ogden Road, RR#1, Pender Island, British Columbia V0N 2M1, Canada; brandywine@gulfislands.com

---

GOLD: FORGOTTEN HISTORIES AND LOST OBJECTS OF AUSTRALIA. Iain McCalman, Alexander Cook, and Andrew Reeves, editors. 2001. Cambridge University Press, Cambridge, New York, Oakleigh (Victoria), Madrid, and Cape Town. 344 p. Hardcover, A$49.95; US$ 65.00.

This finely illustrated book of twenty essays accurately describes itself as "a cultural history of gold and its impact on the history of Australian society." It does not, therefore, say much about the metallurgy of gold or the technical aspects of its mining, and hence may be of peripheral interest to readers of **EARTH SCIENCES HISTORY.** But for those interested in the extraordinary role of gold in human history, Australian political and cultural history, and the phenomenon of gold rushes, it says a great deal.

Apart from anything else, the collection says something about the peculiarities of human nature and culture, in that a material that is of no great intrinsic value or practical use other than that of a medium of exchange or in teeth (!) should so stimulate economic activity. Yet it has done so from time immemorial, and continues to do so even to this day. Wealth could, if one were fortunate or exceptionally hard working or astute, literally be dug from the ground. This strange fact had greater repercussions in Australia than almost anywhere in the world except perhaps California, South America, and South Africa (where it helped prop up apartheid). Essentially, gold gave birth to Victoria, Australia, causing a dramatic rise in population in that southern part of the continent in the 1850s, and leading to a substantial influx of Chinese gold miners. This eventually led to the emergence of the infamous White Australia policy at the beginning of the twentieth century, and even the act of federation itself, not to mention the earlier demise of the convict system. It also saw the first steps towards trade unionism,

and the peculiar Australian mixture of individualism and self-help, camaraderie, and disdain for authority. As many have argued, the diggers and diggings etched themselves on the Australian character and political and social life, as well as matters directly to do with economic development. (Marx is recorded as having written to Engels: "California and Australia are two cases that were not provided for in the Manifesto: creation of great new markets out of nothing"!)

As said, the book is finely illustrated, with numerous pictures, both colored and black-and-white, reproducing drawings, paintings, and contemporary photographs; but regrettably there are not a great many showing technological processes, or photographs of the diggings or the diggers in action. There is only one map (of the Pilbara region in Western Australia), and that is indistinct. On the other hand, the color illustrations are particularly good, and some of the reproduced paintings display goldfield activities most clearly.

What we do have–presented, as the editors emphasize, chiefly by means of narratives rather than theoretical analyses–are discussions of such matters as conditions of daily life on the goldfields and in Melbourne; the temporary shift of the "center of gravity" in Australia from Sydney to Melbourne; the place of women in the scheme of things; the impact of the search for gold on Aboriginal lives and culture; the "aesthetics" of gold (as, for example, in jewelry); and the grievous impact on the environment in the areas where mining and dredging were undertaken. There is some mention of the collaboration of the well-known geologist Richard Daintree with the French photographer Antoine Fauchery (for the goldfields were somewhat cosmopolitan, albeit essentially British), but nothing much is said about Daintree, and the chosen photographs of Fauchery will be disappointing to historians of science and technology. All the contributions are well written and documented.

David Oldroyd, Honorary Visiting Professor, School of Science and Technology Studies, The University of New South Wales, Sydney 2052, Australia

---

UNDERSTANDING SOIL CHANGE: SOIL SUSTAINABILITY OVER MILLENNIA, CENTURIES, AND DECADES. Daniel D. Richter, Jr. and Daniel Markewitz. 2001. Cambridge University Press, Cambridge, U.K. 255 p. Hardcover, $69.95

The central theme of this engaging book is "that despite 10,000 years of soil use we have a relatively elementary understanding about the impact of management through time." (p. 12). Soil scientists seek to understand soil properties and to predict responses to various actions and interventions. However, long-term experiments to measure and analyze the impacts of those actions are seldom established. The few long-term studies at Rothamstead (UK) and the universities of Missouri and Illinois are on fairly fertile soils–soil types which are extensive in some countries, but are hardly representative of vast areas of Earth where people practice agriculture and forestry. The analysis of changes in soil properties presented by the authors was made possible by methodical annual sampling of soils (a soil archive now stored at Duke University) from the Calhoun Experiment Forest, near Union, South Carolina. U.S. Forest Service personnel planted the former cotton fields to pines in 1957. The soils of the experimental forest are classified as Ultisols, which mantle about half of the southern Piedmont. Factors of soil genesis such as high rainfall, warm summers, and moderate winters acting upon acidic rock created a low-fertility, acidic soil dominated by low-activity clays.

The authors examine the Ultisols in three time dimensions: over millennia,

centuries, and decades. They discuss soil genesis before moving on to human uses of the land. Southeastern Indians developed agricultural societies that often farmed the alluvial soils. European migrants and African slaves utilized Ultisols extensively for cotton and corn. Introduction of fertilizer allowed for more continuous planting, without having to revert to shifting cultivation. The agricultural phase left a legacy of soil alteration in erosion and reduction of organic matter. On the plus side of the ledger, the pines planted on the Calhoun forest inhabited a soil environment with greater amount of nitrogen, phosphorous, potassium, and a higher pH than the Europeans had encountered upon settlement.

Further soil-property alterations by four decades of pine growth open up avenues for management recommendations. The thorough analysis of changes in soil chemistry will be left to the reader. To cite one example, however, the authors observe that phosphorus, nitrogen, and lime removed in forest harvesting may need to be replaced. Globally, Ultisols are being converted from forests to pasture and cropland, while other Ultisols are being reforested. The Calhoun studies demonstrate the responses by the soil to reforestation and harvesting and offer guidance on future management requirements.

In discussing Ultisols, the authors educate readers about the processes of creating an acidic, low nutrient soil. Lest the reader be left with the impression that these processes operated equally in all Southern soils, the authors could have explained that there are adjacent Alfisols that have maintained their base richness in lower horizons due to the nature of the clays. Likewise the history of cotton culture and its relationship to technological change is somewhat different on the Alfisols and Vertisols of the South.

The authors make a well-reasoned plea for long-term experiments in the interest of both productivity as well as environmental quality. The case is convincing but will, as the authors acknowledge, require institutional support. Academia does not value selfless collection of data to be used long in the future.

The authors write well. The methodology of placing the data-rich, recent period in the context of historical and geologic time works. The book thereby attracts a broader readership and educates non-soil scientists about soils and their relevance to both agriculture and the maintenance of environmental quality. The general reader who may not understand the implications of chemical analysis can, however, understand the historical explanation. That scientists, policymakers, and land users understand inherent limitations and potentials of soils and the effects of management on both is the stated objective of the authors. They have effectively made their case.

Douglas Helms, Senior Historian, Natural Resource Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20013

VOM WUNDERZEICHEN ZUM NATUROBJEKT: FALLSTUDIE (CHANGES IN THE INTERPRETATION OF THE AURORA OF MARCH 17, 1716). Wilfried Schröder, editor. 2001. Science edition, Potsdam and Bremen. 96 p. Softcover, $20.00.

Vom Wunderzeichen zum Naturobjekt is a small collection of primary sources, some in German and some in Latin, with a brief introduction. The document collection centers on the events of 17 March 1716, when a spectacular aurora dazzled folks throughout northern Germany. The longest and most important of the texts reproduced here is by Christian Wolff, that great academic troublemaker of early eighteenth-century Prussia. Like many of Wolff's writings, this one is shockingly tedious, filled with apparently superfluous geometrical demonstrations,

longwinded accounts of simple things, and wholly unconvincing explanations of more complicated things. The other two texts in the collection are short and—unless you are a real aurora buff—pretty uninteresting.

As the title of the book suggests, Schröder wants to argue that the dramatic display of Northern Lights on that day in 1716 changed forever the way the "common people" thought about celestial phenomena (p. 15). What had been a "sign of wonder" now became a "natural object." There is, of course, at least one obvious problem with the argument: how, that is, can Schröder use the events of a single day to demonstrate significant long-term change? More troublesome still, though, is his claim that the "new thing here is that a scientist held a lecture for the people to explain a natural phenomenon. Here is an interaction between the ordinary man, who is confronting fearfully a phenomenon which he cannot understand, and a scientist willing to give an explanation" (p. 16). Need I say more? Let me just issue a general warning: Schröder has been misled by the term "lectione publica," which he takes to be a "lecture for the people." In fact, it just means that Wolff's lecture was free of charge that day. No doubt, many students came to listen—Wolff was apparently a popular and engaging speaker—but the idea that it was some kind of revolutionary speech, bringing science to the common people, is just silly.

For me, Christian Wolff is interesting, not as some herald of modern science, but rather for his systematic, relentless, tedious style of explication. Schröder wants to know how Wolff brought science to the people. I want to know why anyone listened. But that is a question for another book. Is there any reason to buy this one? Unlikely. Wolff's "Gedanken über das ungewöhnliche Phoenomenon," though relatively obscure, is available in the United States. The other two pieces in the collection are probably not worth the effort. And Schröder's interpretation you can do without.

Andre Wakefield, NEH Research Fellow, Dibner Institute, Dibner Building, MIT E56-100, 38 Memorial Drive, Cambridge, Massachusetts 02139

ORIGINS: THE EVOLUTION OF CONTINENTS, OCEANS AND LIFE. Ron Redfern. 2001. University of Oklahoma Press, Norman. 360 p. Hardcover, $49.95

This beautiful large-format book is not about the history of earth sciences, but it may well turn out to be an historic work. The book begins, not with an introduction as is usual, but with a section entitled "About the Photography." This is proper because this book is primarily "about the photography." Science writer Ron Redfern traveled on a series of expeditions all over the world for three years, making over seven hundred photographs that are the heart of this volume. The extent of this major undertaking is further documented with the Acknowledgments and Dedication (which covers three pages) as well as the impressive glossary, bibliography, and index.

According to the press release, the book has a unique structure, offering the chance to follow two distinct but parallel narratives in one volume. The first is a series of individual photo-essay spreads. The second is formed by an authoritative running text illustrated with clearly numbered icons. The book can therefore be either browsed through or read in chronological order.

Origins is comparable to what Redfern did so well in *The Making of a Continent* (1983). After the Introduction, twelve chapters plus an epilogue of breathtaking photography and lucid narrative follow. In these chapters, Redfern doesn't just talk about geology. He has also incorporated the history of the development

of the earth sciences, not in great depth, but in enough detail to make readers realize that there is a history to the science as well as to the Earth.

This book should be in every geology library. As John S. Shelton's *Geology Illustrated* (1966) is recognized as a classic of the twentieth century, I predict that *Origins,* published in September 2001, will become a classic of the twenty-first.

Gretchen Luepke Bynum, U.S. Geological Survey (retired), 650 Alamo Court #6, Mountain View, Calif. 94043; gluepke@aol.com

ESSAY REVIEW

DRAGON HUNTER. ROY CHAPMAN ANDREWS AND THE CENTRAL ASIATIC EXPEDITIONS. Charles Gallenkamp. 2001. Viking, New York. 344 p. Hardcover, US$29.95

Before the nineteenth century, the world was a very parochial place. Most folk either resided throughout their lives in the community where they were born or, if they traveled, did so for specific purposes, along prescribed routes, to just a few other not-very-distant places. Seamen mostly sailed on vessels that stayed close to home shores; only a few ships traveled greater distances or sailed boldly into the unknown. Colonists, after being planted in distant places, were soon restricting their horizons in the same way as their European progenitors. Even in the eighteenth century, tourism was barely beginning; it was a wholly aristocratic pursuit and usually confined to the Grand Tour in Europe. In the few early newspapers and journals, events in other countries were sometimes reported, but only those affecting one's own village or district were read with real interest—and there were still few who could read, anyway.

The nineteenth century changed all that. Means for rapid transport were developed that revolutionized concepts of distance. As costs of traveling declined, tourism became an available pursuit to more and more folk. Educational opportunities were fast developing and the ability to read became much commoner, with journals and newspapers expanding to keep pace with a growing public appetite. Before that century, there had been little enthusiasm for exploration of distant lands, except as a means for expanding trade or getting rid of surplus population. During it, exploration for altruistic reasons—religious or scientific—came to be applauded and those who performed such daring exploits were properly regarded as heroes.

This attitude surely influenced the boy born on 26th January 1884 to a very ordinary family of business folk in Beloit, Wisconsin. Roy Chapman Andrews set it forth himself:

> I was born to be an explorer. There never was any decision to make. I couldn't do anything else and be happy . . . . The desire to see new places, to discover new facts—the curiosity of life always has been a restless driving force in me." (Andrews, 1935, p. xv).

The opportunities were there for a determined person. Though much of the world map had been filled in before the twentieth century began, there were still blank white places on the maps available to westerners, still much to be learned about the natural world and geological past in areas of those maps already coloured in. Never again will there be such opportunities, for there are no blank spots now and, though many aspects of the natural environment remain to be properly studied, their study requires persons of a very different temperament from Andrews's.

Roy Chapman Andrews, then, was the right person at just the right time. His combination of an ability to formulate clear objectives with an immense drive, plus the capacity to charm audiences or individuals and an unexpected patience in coping with the convolutions of Oriental politics and officialdom, were the qualities needed for success in his chosen field; the fact that he was handsome was a valuable bonus. From the outset, he had a genuine love of nature and wild places; he was to acquire a particular love for the Orient and especially for Peking, the Chinese city nowadays named Beijing. He was a first-class hunter and had great physical hardihood. However, as Gallenkamp points out (p. 57):

> Andrews [was not] an intellectual in the true sense—something he freely admitted. He was attracted to the *idea* of science and the opening of hitherto unknown scientific horizons, but his interest in the deeper implications of his discoveries was often superficial. As Douglas Preston observed in his history of the American Museum, *Dinosaurs in the Attic,* most great explorers were "indifferent scientists." Andrews was no exception. He thrived on blazing pathways into unknown places, but he was usually content to leave the interpretation of whatever scientific bounty his journeys yielded to specialists equipped with the training and patience he lacked.

He was delighted to make new paleontological or zoological discoveries: a plethora of animal and fossil taxa bear his name. However, once a fossil was found

> . . . the time-consuming procedures required to extricate them were incompatible with his restless temperament. "I was inclined to employ [a] pickax," he confessed, "where Granger would have used a camel's hair brush and pointed instruments not much larger than needles." . . . For years, it was axiomatic in the American Museum's palaeontology department that any time an improperly collected or damaged fossil reached the laboratory, it was said to have been "RCA'd"—an allusion to Andrew's heavy-handed approach to collecting. (p. 152)

Andrews wrote a great deal—not only a long series of articles and books about the expeditions he led and his own travels (e.g., 1921, 1926, 1929, 1935) but also two autobiographical works (1943, 1949). He was a good writer and speaker, able to convey his own excitement to his readers or his listeners. That was a key factor in the raising of money for those expensive expeditions into central Asia. His achievements properly gain mention in most histories of paleontology and are treated at length in some (e.g., Colbert 1968, 1984; Spalding 1993), while at least three biographies of him for junior readers have been published (Green, 1939; Archer, 1968, 1976; Pond, 1972). However, perhaps because Andrews wrote so copiously himself, never till now has there been a full-length biographical study; this work, therefore, breaks new ground. It draws upon much unpublished material, in the archives of the Department of Paleontology of the American Museum of Natural History and elsewhere, and upon conversations or correspondence with Andrews's elder son and many other persons who knew him.

As its title indicates, the biography concentrates on Andrews's greatest achievements—the immensely successful expeditions to Inner and Outer Mongolia, as they were then called, which he led in the years 1922 to 1930. It is shown how these were made possible by Andrews's increasingly close friendship with the Museum's wealthy and autocratic Director, Henry Fairfield Osborn—Andrews came to regard him as a second father—and how successful Andrews was in wheedling support, initially from the other very rich Americans of his time and subsequently, as dramatic discoveries came to be announced, from the general U.S. public.

However, the problems of financing the expeditions were minuscule compared with those Andrews encountered in securing permission from Chinese and Mongolian officials to travel to these lands in and about the Gobi Desert—and, having gone there and collected, in contriving to get the trouvaille of biological and paleontological specimens out of those countries and back to New York. In the 1920s, both China and Mongolia were in a state of economic and political collapse

that approached utter anarchy—warlords and rival administrations in strife-torn China, and, in Mongolia, an antiquated governing apparatus being suborned and taken over by Russian-inspired, America-hating Communists, with bandits roaming both countries and the giving of a bribe (a "squeeze," it was called) obligatory before any transaction could proceed or district traversed.

The curious image is presented of a wealthy social group of foreigners placidly continuing their artificial life of parties, races, and other alien amusements in Peking throughout that decade, in the midst of a disintegrating social fabric and despite witnessing, almost daily, acts of stomach-turning violence among the Chinese of that city. Paradoxically perhaps, Andrews loved the city and reveled in such luxurious living. In the hinterland of China, corruption and violence were everywhere; but Andrews, though often embroiled in minor disturbances, was tough enough, astute enough and, yes, lucky enough to prevent them from escalating into major troubles.

Author Charles Gallenhamp is an archaeologist, not a paleontologist. In consequence, he makes a number of minor mistakes that should be eliminated from future editions. The distinguished Russian palaeontologist and explorer Vladimir Obruchev is consistently miscalled "Obrechev" (p. 143 and elsewhere). The economic geologist and explorer Raphael Pumpelly is wrongly included in a group "primarily archaeologists" (p.143). *Stegodon* is not "a distant relative of the elephants" (p. 114) but their direct ancestor. The "duckbilled iguanodonts" of p. 246 are later and more properly called hadrosaurs (p. 312). And the statement that the multituberculate mammals did not survive into the Cenozoic (p. 201) is quite wrong—they flourished at least until the Oligocene. The status of the three giant Oligocene mammal genera mentioned on p. 153 is not so clear-cut as the author states; *Indricotherium* and *Baluchitherium* may indeed be synonyms, but *Paraceratherium* is a very different creature. The statement that: "It would . . . be impossible to confirm whether [*Protoceratops* was] the earliest of the ceratopsians, as first suspected by Osborn and his colleagues" (p. 172) is puzzling: it is nowadays universally accepted to have been their progenitor.

The text has been proofread with creditable care; I noted only a single misspelling ("pregant," p.179). Its great charm is its readability. The author recognized that he was telling what is truly an adventure story; he does so with an admirable combination of historical accuracy and brio.

Perhaps some of Roy Chapman Andrews's attitudes might jar with modern social sensibilities. Perhaps, though lamenting their methods, one might understand the motivations of the Chinese "Society for the Preservation of Cultural Objects" more than he did. No doubt Andrews was always egocentric and became more so with the years. (One sympathizes with his neglected parents, who gain small mention; during their son's long sojourns abroad, was he even writing regularly to them?). Perhaps Andrews was not the right person to succeed Osborn as Director of the American Museum of Natural History and perhaps, during those financially-stressed years of the "Dirty Thirties," he did make injudicious monetary allocations for ill-timed and expensive exhibits. In the final analysis these things do not matter. Roy Chapman Andrews was one of the last great explorers (scientific and geographic). He was truly a hero; this excellent biography is a proper tribute to him and his achievements.

William A. S. Sarjeant (deceased), Department of Geological Sciences, University of Saskatchewan, 114 Science Place, Saskatoon, Saskatchewan, Canada S7N 5E2

REFERENCES

Andrews, Roy C., *Across Mongolian plains. A naturalist's account of China's "Great Northwest"* (New York: Blue Ribbon Books, 1921), xxiv + 274p.

Andrews, Roy C., *On the trail of ancient man. A narrative of the fieldwork of the Central Asian expeditions* (New York and London: Putnam's Sons, 1926), xxiv + 375p.
Andrews, Roy C., *Ends of the Earth* (New York and London: Putnam's Sons, 1929), ix + 354p.
Andrews, Roy C., *This business of exploring* (New York and London: Putnam's Sons, 1935), xix + 288p.
Andrews, Roy C., *Under a lucky star. A lifetime of adventure* (New York: Viking Press, 1943), 300p.
Andrews, Roy C., *An explorer comes home* (Garden City, NY: Doubleday, 1947), 276p.
Archer, Jules, *Science explorer Roy Chapman Andrews* (New York: Messner, 1968), 192p. Republished as *From whales to dinosaurs: the story of Roy Chapman Andrews* New York: St. Martin's Press,1976).
Colbert, Edwin C., *Men and dinosaurs. The search in field and laboratory* (New York: Dutton, 1968), xviii + 283p. Republished as *The great dinosaur hunters and their discoveries* (New York: Dover Publications, 1984).
Green, Fitzhugh, *Roy Chapman Andrews, dragon hunter* (London and New York: Putnam's Sons, 1939), ix + 173p.
Pond, Alonzo W., *Andrews: Gobi explorer* (New York: Norton/Grosset and Dunlap, 1972), x + 212p.
Spalding, David A. E., *Dinosaur hunters* (Toronto: Key Porter Books, 1993), ix + 310p.

INTERESTING PUBLICATIONS

Gerald M. Friedman, CONTRIBUTING EDITOR

Since the start of this journal, Founding Editor Gerald M. Friedman has prepared this column. Contributors wishing to list recent books and papers of interest to our membership are requested to send them to Professor Gerald M. Friedman, Brooklyn College and Graduate Center of the City University of New York c/o Northeastern Science Foundation, Rensselaer Center of Applied Geology, P.O. Box 746, Troy, NY 12181-0746 U.S.A.; FAX: 518-273-3249; *gmfriedman@juno.com*

ABBRI, FERDINANDO, 1999, Giovanni Arduino e la mineralogia chimica svedese del Settecento *in* Ettore Curi (ed.) Scienza, tecnica e "pubblico bene" nell'opera di Giovanni Arduino (1714–1795), Verona, Accademia di Agricoltura, Scienze e Lettere, p. 37–45.

ALLEN, D.E., 2001, Naturalists and society: the culture of natural history in Britian, 1700–1900. Variorum collected studies series CS724. Ashgate, Burltington, VT, 189 p.

ALLEY, RICHARD B., 2000, The two-mile time machine: ice cores, abrupt climate change, and our future. Princeton University Press, Princeton/Oxford, 229 p.

AMADOR, FILOMENA and CONTENÁAS, P., 2001, Abductive reasoning and representation of megafauna in the history of geology: INHIGEO Meeting Portugal 2001, Lisboa and Aveiro, abstracts.

AMADOR, FILOMENA and CONTENÁAS, P., 2001, A História da Biologia e da Geologia, Universidade Aberta, Lisboa (a book in Portuguese, half of which is devoted to the history of geology).

ANONYMOUS, 2002, Odessa, Ector County, Texas, Friday October 11, 1929: Penn is big oil producer: *West Texas Geological Society Bulletin,* v. 41, no. 6, p. 4.

ANONYMOUS, 2002, Odessa, Ector County, Texas, Friday April 1, 1932: *West Texas Geological Society Bulletin,* v. 41, no. 6, p. 5.

ANONYMOUS, 2002, From the archives: Charles Jules Edme Brogniart (1859–1899): *Geoscientist,* v. 12, no. 3, p. 11.

ANONYMOUS, 2002, From the archives: Gustave Emile Haug 1861–1927: *Geoscientist,* v. 12, p. 10.

ANONYMOUS, 2002, From the archives: Joachim Barrande (1799–1833): *Geoscientist,* v. 12, no. 5, p. 12.

ANONYMOUS, 2002, Odessa, Texas, Friday September 16, 1927: Magnolia raises prices on crude: general oil increase coming soon, operators here believe; field activity remains great: *West Texas Geological Society Bulletin,* v. 41, no. 6, p. 4.

ANONYMOUS, 2001, Sociedad España para la Defensa del Patromonio Geológico y Minero: *Bolitín SEDPGYM,* no. 16, April.

ARAGONÉS I VALLS, ENRIC, 1998, El mapa geològic i topographic de la provincia de Barcelona: de l'escala 1:100,000 a la 1: 40,000 (1884–1891): *Treballs del Museo Geològico de Barcelona,* v. 7, p. 129–174.

AREIAS, MARIA D., 2001, Rocks'n roll: the contributions to African geology of the Portuguese travellers Malheiro and Andrade: INHIGEO meeting Portugal 2001, Lisboa and Aveiro, abstracts volume.

AREIAS, MARIA D., 2001, Expeditions in the African colonies during the 19th century: geological contributions from Portuguese travellers: *Comunicacões do Instituto Geológico e Mineiro,* v. 88, p. 347–354.

ARRIGHI, SIMONE, PRINCIPE, CLAUDIA, and ROSI, MAURO, 2001, Violent strombolian and subplinian eruptions at Vesuvius during post-1631 activity: *Bulletin of Volcanology,* v. 63, p. 126–150.

AVNI, Y., BARTOV, Y., GARFUNKEL, Z., and GINAT, H., 2000, Evolution of the Paran drainage basin and its relation to the Plio-Pleistocene history of the Arava Rift western margin, Israel: *Israel Journal of Earth Sciences,* v. 49, p. 215–238.

AYALA-CARCEDO, F.J., 2001, Noah's flood and science: a short review and analysis: *INHIGEO Newsletter,* no. 33, p. 27–30.

AYALA-CARCEDO, F.J., 1998, Historia de las obras hidraúlicas y la Política del Aqua, *in* Ayala-Cardedo, F.J., ed., Historia de la Tecnología en España, p. 183–194.

BACHL-HOFMANN, Ch., 1999, Die geologische Reichsanstalt von 1849 bis zum Ende des Ersten Weltkriegs, *in*: Bachl-Hofmann, Ch., Cernajsek, T., Hofmann, Th., and Schedl, A., eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österreichs (1849–1999), Wien, p. 55–77.

BACHL-HOFMANN, CHRISTINA, CERNAJSEK, TILFRIED, HOFMANN, THOMAS, and SCHEDL, ALBERT, eds, 1999, Die Geschichte Bundesanstalt in Wien: 150 Jahre Geologie in Dienste Osterreiche (1849–1999), Geologische Bundesanstalt/Böhlau Verlag, Vienna.

BACHL-HOFMANN, CH., CERNAJSEK, T., and GSTÖTTNER, M., 1999, Der wissenschaftliche Wert von Nachlässen von Geologen für die Erforschung der Geschichte der Geologie, in Cultural Heritage in Geology, Mining, and Metallurgy. Libraries-Archives-Museums. World Mining Education Traditions. 4th International Symposium. 7–11 Sept, 1997, Banska Stiavnica, Papers Volume, Banska Stiavnica, p. 29–30.

BACON, CAROL, ET AL., 2000, The Petroleum potential of onshore Tasmania: a review. mineral resources Tasmania, Rosny Park (Hobart), historical section, p. 9–30.

BACON, C.A., CALVER, C.R., BOREHAM, C.J., LEAMAN, D.E., MORRISON, K.C., REVILL, A.T., and VOLKMAN, J.K., 2000, The petroleum potential of onshore Tasmania: a review. Geological Survey Bulletin 71, Mineral Resources Tasmania.

BALDWIN, STUART, 2002, Henry Clifton Sorby FRS (1826–1908): *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 17.

BALLA, ZOLTÁN, 1998, On the first Mongolian-Hungarian geological expedition (1966–1999): *Földtani Közlöny* [Geological Research], v. 127, p. 32–36. (in Hungarian)

BALLARD, ROBERT D. and HIVELY, WILL, 2000, The eternal darkness: a personal history of deep-sea exploration. Princeton University Press, Princeton, 388 p.

BEHRENDT, J.C., 1999, Innocents on the ice. A memoir of Antarctic exploration, 1957. University of Chicago Press, Boulder, 428 p.

BESTERMAN, T.P., 2001, Frontiers to science: free trade and museum ethics: *The Geological Curator,* v. 7, no. 6, p. 199–209.

BLACK, BRIAN, 2000, Petrolia: the landscape of America's first oil boom. The Johns Hopkins University Press, Baltimore, 236 p.

BLEWETT, R.S., HUSTON, D.L., and CHAMPION, D.C., 2001, North Pilbra national geoscience mapping accord project (1995–2001): Scientific highlights: *AGSO Research Newsletter,* no. 34, p. 25–28.

BRICE, WILLIAM R. and FIGUEIRÔA, SILVIA FERNANDA DE M., 2001, Charles Hartt, Louis Agassiz, and the controversy about Pleistocene glaciation in Brazil: *History of Science,* v. 39, p. 161–184.

BRUCE, VICTORIA, 2001, No apparent danger: the true story of volcanic disaster at Galeras and Nevado Del Ruz. HarperCollins, New York, 239 p.

BRÜCKNER, EDUARD, 2000, The sources and consequences of climate change and climate variability in historical times. Edited by Nico Stehr and Hans von Storch. Translated by Barbara Stehr and Gordon Gamlin. Kluwer Academic Publishers, Dordrecht/Boston/London, 338 p.

BURNETT, D. GRAHAM, 1999, The history of cartography and the history of science: *Isis,* v. 90, p. 775–780.

BUTCHER, NORMAN E., 2002, Finding out about James Hutton: *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 16–17.

BUTCHER, NORMAN, 2002, The Hutton memorial garden at St. John's Hill, Edinburgh: *Magazine of the Geologists' Association,* v. 1, no. 1, p. 18–19.

BUTTLER, C.J., WYSE JACKSON, P.N., and SHARPE, T.S., 2001, George Robert Vine (1825–1893): Stay Maker, bryozoologist and fossil dealer. Abstracts International Bryozoology Association and Society for the History of Natural History meeting, From John Ellis to Bryostatins: The history of study of fossil and living bryozoans, Trinity College, Dublin, Ireland, July 21st, p. 5.

CADBURY, DEBORAH, 2002, The dinosaur hunters. Fourth Estate, London, 374 p.

CARDOSO, JOÃO L., 2001, L'utilisation de Roches Dures dans le Chalcolithique de l'Extremadura Portugaise: le Cas de Leceia (Oeiras), INHIGEO Meeting Portugal 2001, Lisboa and Aveiro, Abstracts.

CARDOSO, JOÃO L. and MELO ANA A., 2001, Commented Correspondence between Carlos Ribeiro and Nery Delgado: a contribution to the history of Portugese Archaeology: *Comunicacões do Instiuto Geológico e Mineiro,* v. 88, p. 309–346.

CARNEIRO, ANA, 2001, The travels of Nery Delgado (1835–1908) in the context of the Portuguese Geological Survey: *Comunicáes do Instituto Geológico e Mineiro,* v. 88, p. 277–292.

CAROZZI, ALBERT V., 2001, Saussure et la controverse sur le basalte, *in* René Sigrist, ed., H.-B. de Saussure (1740–1799) un regard sur la terrre, Bibliothèque d'Histoire des Sciences, Georg, p. 175–195.

CAROZZI, ALBERT V., 2001, Du dogme neptuniste au concept de refoulements horizontaux: les étapes d'une réflexion géologique, *in* René Sigrist, ed., H.-B. de Saussure (1740–1799) un regard sur la terre, Bibliothèque d'Histoire des Sciences, Georg, p. 83–108.

CATALDI, RAFFAELE, HODGSON, SUSAN F., and LUND, JOHN W., eds., 1999, Stories from a heated earth: our geothermal heritage, geothermal resources council, International Geothermal Association.

CERNAJSEK, T., 1999, Die geowissenschaftliche Forschung in Österreich in der ersten Hälfte des 19. Jahrhunderts, *in*: Bachl-Hofmann, Ch., Cernajsek, T., Hofmann, Th., and Schedl, A., eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österreichs (1849–1999), Wien, p. 41–54.

CERNAJSEK, TILLFRIED, 2000, A synthesis of the history of geology in Germany: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 43–44.

CERNAJSEK, T., 1999, Vom Wiederaufbau bis zur Reorganisation, *in*: Bachl-Hofmann, Ch., Cernajsek, T., Hofmann, Th., and Schedl, A., eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österreichs (1849–1999), Wien, p. 162–168.

CERNAJSEK, T., SEIDL, J., and ROHRHOFER, A., 2000, Geowissenschaften und Biographik: *Auf den Spuren österreichischer Sammler (1748–2000), Österreichisches Biographisches Lexikon, Schriftenreihe, Wien,* v. 6, 24 p.

CERNAJSEK, T. and GSTÖTTNER, M., 2000, Ein Briefwechsel Wilhelm Haidingers mit Eduard Sueß und dem Inneminister Alexander von Bach: *Mitteilungen der Österreichischen Gesellschaft für Wissenschaftsgeschichte,* v. 19, p. 123–140.

CIPRIANI, CURZIO, 2001, L'evoluzione della mineralogia negli ultimi due secoli [the development of mineralogy in the last two centuries], *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 58–64.

COOPER, J.A., 2000, Reflections on 25 years of curation: *The Geological Curator,* v. 7, no. 3, p. 101–107.

CZARMOECKI, S., 1999, An unknown report of Rudolf Zuber on geological fieldwork in Argentina: *Wiek Nafty,* v. 4, p. 4–20.

D'ARGENIO, BRUNO, 2001, Le scienze della Terra a Napoli e la nascita della geologia modern [the earth sciences in Naples and the birth of modern geology] *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 47–57.

DABER, R., 1998, Warum erst 1848?—why 1848 and not before?: *Z. geol. Wiss.*, v. 26, p. 359–368.

DAL PIAZ, GIORGIO V., 2001, History of tectonic interpretations of the Alps: *Journal of Geodynamics,* v. 32, p. 99–114.

DARRAGH, THOMAS A., 2002 (for 2001), This beautiful work of art: Skene and Slight's continental Australia [on one of the most beautiful geological maps ever produced in Australia]: *The La Trobe Journal,* no. 68, p. 31–38.

DARRAGH, THOMAS A., 2001, Frederick McCoy: the Irish years: *The Victorian Naturalist,* v. 118, p. 160–164.

DARRAGH, THOMAS A., 2001, Ferdinand Hochstetter's notes of a visit to Australia and a tour of the Australian goldfields: *Historical Records of Australian Science,* v. 13, p. 383–437.

DAVIS, M., 2001, Phoney stones: *The Geological Curator,* v. 7, no. 6, p. 229–230.

DEAN, DENNIS R., 1999, Gideon Mantell and the discovery of the dinosaurs. Cambridge University Press, Cambridge, New York/Melbourne.

DEFFEYES, KENNETH S., 2001, Hubbert's Peak: the impending world oil shortage. Princeton University Press, 41 William St., Princeton, NJ, 204 p.

DENYER, P. and SOTO BONILLA, G.J., 1999, Contribución pionera de William M. Gabb a la Geología y Cartografía de Costa Rica: *Anuario de Estudios Centroamericanos, Universidad de Costa Rica,* v. 25, p. 103–138.

DOEL, RONALD E., 1996, Solar system astronomy in America: communities, patronage, and interdisciplinary research. Cambridge University Press.

DOEL, RONALD E., 2000, Polar melting when the cold war was hot. San Francisco Examiner oped page contribution, October 3, p. A15.

DOEL, RONALD E., 1997, The earth sciences and geophysics, p. 361–388 *in* John Krige and Dominique Pestre, eds., Science in the twentieth century. Harwood Academic Publishers, London.

DONATI, VITALIANO, 2001, Viaggio minalogico nelle Alpi Occidentali. Valle di Susa, Maurienne, Trentaise, Valle d'Aosta e Faucigny, nell'estate 1751 [Mineralogical travel in the Western Alps, during the summer of 1751]. Edited by G. Scalva, INRM/Editrice Compositori, Bologna.

DOTT, R.H., Jr., 1999, The Wisconsin school of geology: early intellectual exports: *Wisconsin Academy Review,* Summer, p. 29–36.

DUDICH, E., 1999, Ein Leben für Tirol: Raimund Wilhelm Werner von Klebelsberg zu Thumburg (1886–1967) Professor für Geologie und Paläontologie der Universität Innsbruck, *in* Lobitzer, H. und Grecula, P., eds., Geologie ohne Grenzen: Festschrift 150 Jahre Geologische Bundesanstalt, Abhandlungen, der Geologischen Bundesanstalt, v. 56, p. 153–158.

DUDICH, ENDRE, ed., 2001, The chronicles of the Association of European Geological Societies (1975–2000). Polish Geological Insistute, Warsaw.

DUDICH, E., 1999, Die Beziehungen zwischen der k.k. Geologischen Reichsanstalt in Wien und der Ungarischen Geologie von 1867 bis 1918, *in* Lobitzer, H. und Grecula, P., eds., Geologie ohne Grenzen: Festschrift 150 Jahre Geologische Bundesanstalt, Abhandlungen, der Geologischen Bundesanstalt, v. 56, p. 61–68.

FARLOW, JAMES and BRETT-SURMAN, M.K., eds., 1997, The complete dinosaur. Indiana University Press, Bloomington and Indianapolis.

FERREIRA, MARTIM P., 2001, A contribution to the history of metallurgy in Portugal: metallurgiae elementa of M.J. Barjona (1798): INHIGEO Meeting Portugal 2001, Lisboa and Aveiro, Abstracts.

FETTWEIS, G.B.L., 1999, Über Zusammenhänge zwischen Montanhistorie und Geschichte der Erdwissenschaften: *Res montanarum,* v. 20, p. 6–8.

FETTWEIS, G.B.L., 2000, Über Bergbau und Bergbaukunde im Raum des heutigen Österreich [About Mining and Mining Engineering in the Area of Today's Austria Since 1849]: *Berg und Hüttenmännische Monatshefte,* v. 145, p. 127–142.

FIGUEIRÔA, SILVIA and DA SILVA, CLARETE, 2001, Enlightened mineralogists: mining knowledge in Brazil, 1750–1825: *Osiris,* v. 15, p. 174–189.

FIGUEIRÔA, SILVIA FERNANDA DE M., 2001, 500 years of mining in Brazil: a brief review: *Resources Policy,* v. 27, p. 9–24.

FIGUEIRÔA, SILVIA FERNANDA DE M., 2001, The writings of Orville Adelbert Derby (1851–1915) and its meaning to the history of geological sciences: *Cadernos IG/UNICAMP,* v. 9, p. 94–102.

FIGUEIRÔA, SILVIA FERNANDA DE M., 2001, Guilherme Schäch de Capanema and technical culture in 19th century Brazil: *Proceedings of the XXI international Congress of History of Science, Mexico City,* v. 1, p. 59–59.

FRANKEL, CHARLES, 1999, The end of the dinosaurs: chicxulub crater and mass extinctions. Cambridge University Press, Cambridge, England, 223 p. (originally published in French as La mort des dinosaures (1996)).

FREITAS, MARCUS VINICIUS DE, 2001, Charles Frederick Hartt um naturalista do Império de D. Pedro II, Belo Horizonte (Minas Gerais): Editora da Universidade Federal de Minas Gerais.

FRIEDMAN, GERALD M., 2001, Birthplace of the Geological Society of America: New York State and the Erie Canal: *Geoscientist,* v. 11, p. 8–9, 11.

FRIEDMAN, GERALD M., 2000, Founders of American geology: meeting: history of geologic pioneers, Troy, New York, USA; 3–5th August, 2000: *Endeavour,* v. 24, p. 145–146.

FRIEDMAN, GERALD M., 2001, Conference on the history of geologic pioneers, August 2–5, 2000: *GSA Today,* January, p. 28–29.

FRITSCHER, B., 2001, Entwicklung in der Geologie bei Lorenz Oken. Offenburg, Von Freiheit und Verantwortung in der Forschung: Symposium on the 150th anniversary of Lorenz Oken (19.-20. 10. 2001).

FRITSCHER, BERNHARD, 1999, Bemerkungen zu einer historischen Epistemologie der romantisch-idealistischen Erdwissenschaft am Beispiel der 'Geosophie" Lorenz Okens: *Zeitschrift fuer geologische Wissenschaften,* v. 29, p. 61–69.

GEE, HENRY, 1999, In search of deep time: beyond the fossil record to a new history of life. The Free Press, New York/London, 267 p.

GIACOMONI, PAOLA, 2001, Il laboratorio della natura. Paesaggio montano e sublime naturale in età moderna [The laboratory of nature: mountain landscape and natural sublime in the modern age], Franco Angeli, Milano.

GODARD, G., 2001, Eclogites and their geodynamic interpretation: a history: *Journal of Geodynamics,* v. 32, p. 165–203.

GOTTE, WOLFGANG, 2001, Wie in Preussen unter König Friedrich Wilhelm II. Kupfer in Silber verwandelt werden sollte: *Geohistorische Blätter,* v. 4, no. 1, p. 21–32.

GOZALO, RUDOLFO, 2000, Propuesta de peridización para la geología y paleontología españos: *Actes de les V Trobades d'Història de la Ciència i de la Tècnica,* p. 71–75.

GOZALO, RUDOLFO, 1993, Homenaje a Juan Vilanova y Piera: València, 25–27 de Novembre de 1993, Department of Geology, University of València, València.

GOZALO, RUDOLFO, 1999, Historia del conocimiento paleontológico del yacimiento de concud (teruel) durante el siglo XVIII, *in* Gámez, J.A. and Liñán, eds., 25 años de Paleontología Argaonesa. Homenaje al Profesor Leandro Sequeiros, Institución "Fernando el Católico" (CSIC), Zaragoza, p. 45–57.

GRUBIC, ALEXANDER, 2001, Andrija Mohorovicic's investigation of the earthquake of 8.10.1909: *Episodes,* v. 24, p. 37–40.

GUIMARAES, P., 1999, As minas portuguesas do Antigo Regime ao Liberalismo: *Revista de Arqueologia e Industria,* v. 2, no. 2, p. 53–80.

GÜNTHER, W. and PAAR, W.H., eds., 2000, Schatzkammer Hohe Tauern: 2000 Jahre Goldbergbau Salzburg, Pustet, München.

HAMBLIN, JACOB DARWIN, 2000, Science in isolation: American marine geophysics research, 1950–1968: *Phys. Perspect.*, v. 2, p. 293–312.

HAMILTON, BERYL M., 2001, Charles Lapworth's "The Moffat Series", 1878: *Episodes,* v. 24, p. 194–200.

HAMILTON, BERYL AMBROSE, 2000, Virtual reality in Edinburgh: the 'Dynamic Earth' exhibition: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 45–46.

HAMMERL, CH., LENHARDT, W., STEINACKER, R., and STEINHAUSER, P., eds., 2001, Die Zentralanstalt für Meteorologie und Geodynamik 1851–2001: 150 Jahre Meteorologie und Geophysik in Österreich. Leykam, Graz, 2 CD-roms.

HÄUSLER, W., 1999, Bunte Steine Bildungs- und sozialgeschichteliche Aspekte der österreichischen Erdwissenschaften im Zeitalter der bürgerlichen Revolution, *in*: Bachl-Hofmann, Ch., Cernajsek, T., Hofmann, Th., and Schedl, A., eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österreichs (1849–1999), Wien, p. 19–40.

HÄUSLER, W., 2001, Goethe-Zeit: Zur Entwicklung der Erdwissenschaften im Bildungsprozeß des österreichischen Bürgertums: *Berichte der Geologischen Bundesanstalt,* v. 53, p. 17–30.

HERBERT, SANDRA and ROBERS, MICHAEL B., 2002, Charles Darwin's Notes on his 1831 geological map of Shrewsbury: *Archives of Natural History,* v. 29, no. 1, p. 27–30.

HERNANDO DE LUNA, R., 1999, Antonio Carbonell y Trillo-Feguerоa: *Asociación Cordobesa de Mineralogia y Paleontologia,* v. 37, p. 20–21.

HERRIES DAVIES, G.L., 2001, A history of Irish geology, in Holland, C.H., ed., The geology of Ireland. Dunedin Academic Press, Edinburgh, p. 493–504.

HESTMARK, GEIR, 2000, Temptations of the tree: a perennial image of life, history, and enlightenment: *Nature,* v. 408, p. 911.

HESTMARK, GEIR, 2000, Oeconomia Naturalae L.: The ecology of Linnaeus was stoic, baroque, and surprisingly modern: *Nature,* v. 405, p. 19.

HOPPE, GÜNTER, 2001, Eine Berliner Preisfrage zum Basaltproblem vom Anfang des 19. Jahrhunderts: *Geohistorische Blätter,* v. 4, no. 1, p. 1–10.

HORNY, RADVAN, 2001, Otomar Pravoslav Novák (1851–1892): Czech palaeontologist, Barrande's disciple and continuator, Národní Museum, Prague (in Czech and English).

HOWARTH, RICHARD J., 2002, The secret life of Frederick Hatch: *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 5.

HOWARTH, RICHARD, 2000, Measurement, portrayal, and analysis of orientation data and the origins of early modern structural geology (1670–1967): corrections and additions: *Proceedings of the Geologist's Association,* v. 112, p. 187–190.

HOWARTH, RICHARD J. and LEAKE, BERNARD E., eds., 2002, The life of Frank Coles Phillips

(1902–1982) and the structural geology of the Moine petrofabric controversy. Geological Society Memoir 23, 104 p.

HUBMANN, B., 1999, Paläontologische Dünnschliff-Untersuchungen in Österreich-Ungarn vor 1860 durch C.F. Peters & F. Unger, *in* Geologie ohne Grenzen: Festschrift 150 Jahre Geologische Bundesanstalt, Abhandlungen der Geologischen Bundesanstalt, v. 56, p. 171–176.

HUBMANN, B. and SCHEDL, A., 1999, Ein Brief von Carl Ferdinand Peters an Bernhard von Cotta und seine Bedeutung für fachübergreifende geologische Vorlesungen: *Geohistorische Blätter,* v. 2, p. 1–6.

HUBMANN, B., 2001, Carl Ferdinand Peters (1825–1881): Beitrag zu seiner Biographie: *Berichte der Geologischen Bundesanstalt,* v. 53, p. 31–48.

HUBMANN, B., ed., 2001, Geschichte der Erwissenschaften in Österreich. (2.Tagung, 17.-18.November 2000 in Peggau/Stmk) Berichte der Geologischen Bundesanstalt, v. 53.

HUBMANN, B., ed., 2000, Geschichte der Erdwissenschaften in Österreich: 2. Symposium Carl Ferdinand Peters (1825–1881) 17.-18.November 2000 Peggau/Steiermark, Abstracts, Berichte des Institutes für Geologie und Paläontologie der Karl-Franzens-Universität Graz/Austria, v. 1.

HUBMANN, B., ed., 2000, Geschichte der Erdwissenschaften in Österreich (Tagung, 22.Februar 1999 in Graz): *Berichte der Geologischen Bundesanstalt,* v. 51.

HUBMANN, B., 1999, Kleiner Leifaden zur Geschichte der Erdwissenschaften in Graz: Erstes Symposium Geschichte der Erdwissenschaften in Österreich Graz, 22. Februar 1999, Graz.

JAMES, K.W., 2001, A mineral collection in the Ulster museum matched with a lecture syllabus of Sir Charles Giesecke (1761–1833): *The Geological Curator,* v. 7, p. 167–173.

JARZEMBOWSKI, ED, 2002, Historic manuscript unearthed: *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 14.

KERNBAUER, A., 2000, Geologie und Österreichs Geologen während der NS-Zeit: Streiflichter auf das Verhältnis von Wissenschaft und Politik: *Berichte der Geologischen Bundesanstalt,* v. 51, p. 83–87.

KERTZ, WALTER, 1999, Geschichte der Geophysik. Zur Geschichte der Wissenschaften. Eine Reihe der TU Braunschweig, v. 3, Ruth Kertz and Karl-Heinz Glaßmeier, eds., Georg Olms Verlag, Hildesheim, Zürich/New York.

KHAIN, VICTOR E. and RYABUKHIN, ANATOLY G., 2001, Geology of the 20th Century: Main features of progress. Part 1: *Bulletin of the Moscow State University,* no. 5, p. 3–8 (in Russian).

KLEIN, WOLF PETER, 1999, Die Geschichte der meteorologischen Kommunikation in Deutschland: Eine historische Fall Studie zur Entwicklung von Wissenschaftssprachen. (Texte und Studien zur Wissenschaftsgeschichte, v. 2). Goerg Olms Verlag, Hildesheim, Germany, 432 p.

KLEMUN, M., 2000, Internationale Kontakte und Funktionen des Mineraliensammelns am Beispiel von Siegmund Zois (1747–1819): *Berichte der Geologischen Bundesanstalt,* v. 51, p. 13–20.

KOELBL-EBERT, MARTINA, 2001, Inge Lehmann's paper: "P"(1936): *Episodes,* v. 24, p. 262–267.

KÖLBL-EBERT, M., 2001, On the origin of women geologists by means of social selection—German and British comparison: *Episodes,* v. 24, p. 182–193.

KÖLBL-EBERT, M., 2001, Abraham Gottlob Werner's conflicting images: thoughts inspired by special exhibitions for his 250th anniversary: *Neues Jahrbuch für Geologie und Paläontologie,* p. 277–297.

KÖLBL-EBERT, M., 2001, Augenzeugin der Gebirgsbildung: Das chilenische Erdbeben von 1822 als wissenschaftshisorischer Kriminalfall: *Münchner Fossilienfreunde* (14.2.2001).

KOZÁK, JAN and SPICÁK, ALES, 2001, Pictorial series of the manifestations of the dynamics of the earth: regular exhibition at the geophysical institute of the academy of sciences of the Czech Republic, Prague, v. 1. Historical images of world earthquakes: *Studia Geophysica et Geodaetica,* v. 45, p. 93–101.

KOZÁK, JAN and SPICÁK, ALES, 2001, Pictorial series of the manifestations of the dynamics of the earth: regular exhibition at the geophysical institute of the academy of sciences of the Czech Republic, Prague, v. 2. Historical images of world volcanoes: *Studia Geophysica et Geodaetica,* v. 45, p. 445–456.

KOZÁK, JAN, 2001, 100-year Anniversary of the first international seismological conference: *Studia Geophysica et Geodaetica,* v. 45, p. 200–209.

KROLL, GARY, 2000, Roy Chapman Andrews and the business of exploring: cetology and conservation in progressive America: *Endeavour,* v. 24, p. 79–84.

KUNKEL, A., KÖLBL-EBERT, M., and JOBE, E., 2001, Sven Hedins Steine: *Aviso,* no. 3, p. 8–9.

LAURENT, GOULVEN, 2001, La naissance du transformisme: Lamark entre Linné et Darwin, Vuibert/Adapt Éditions, Paris.

LEGRAND, HOMER, 2000, Why did American geologists reject drift theory for so long?: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 44–45.

LEITÃO, VANDA, 2001, The travels of geologist Carlos Ribeiro (1813–1882) in Europe in 1858: *Comunicaces do Instituto Geológico e Mineiro,* v. 88, p. 301–308.

LEITÃO, VANDA, 2001, Bringing rocks into state bureaucracy: the Portuguese geological survey: INHIGEO Meeting Portugal 2001, Lisboa and Avero, Abstracts.

LEUTNER, M., 1999, Wissenschaftstheoretische Fallstudien zur Entwicklung der erdwissenschaftlichen Forschung in Österreich: Wilhelm Haidinger-Franz von Hauer-Otto Ampferer: *Abhandlungen der Geologischen Bundesanstalt,* v. 55, p. 92.

LEUTNER, M. and GRECULA, P., eds., 1999, Geologie ohne Grenzen: *Festschrift 150 Jahre Geologische Bundesanstalt,* v. 56.

LEUTNER, M. and KADLETZ, K., 1999, Forschung in außereuropäischen Ländern, *in* Ch. Bachl-Hofmann, T. Cernajsek, and A. Schedl, eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österreichs (1849–1999), Wien, p. 349–374.

LEWIS, C.L.E. and KNELL, S.J., eds., 2001, The age of the earth: from 4004 BC to AD 2002. Geological Society Special Publication no. 190, 304 p.

LOBITZER, HARALD and GRECULA, PAVEL, eds., 1999, Geologie ohne Grenzen Festschrifft 150 Jahre Geologische Bundesanhalt. Abhandlungen der Geologischen Bundesanstalt, v. 56, no. 1, (56 papers in either German or English, some purely geological, but with the majority being historical. 49 papers on the history of the Austrian Survey, plus epilogue).

LÖHNERT, ECKEHARD P., 2001, Konrad Keilhack (1858–1944)—seine Mitgliedschaft in der "Leopoldina": *Geohistor. Blätter,* v. 4, no. 1, p. 117–123.

LOMBORG, BJØRN, 2001, The skeptical environmentalist: measuring the real state of the world. Cambridge University Press, 515 p.

LOPES, MARIA MARGARET, 2000, Minerais e museus na primeira metade do século XIX, na América Latina: *Calernos IG/UNICAMP,* v. 8, p. 36–50.

LUCAS, PETER, 2002, "A most glorious country": Charles Darwin and North Wales, especially his 1831 geological tour: *Archives of Natural History,* v. 29, no. 1, p. 1–16.

LÜDECKE, C., 2001, Studie über den Tod Alfred Wegeners (1880–1930) auf dem Grönländischen Inlandeis. Dresden, Town Hall, Exhibition's opening (26.3.2001).

LÜDECKE, C., 2001, Die Bedeutung der Deutschen Universität Dorpat (1918) am Beispiel des Meteorologen Alfred Wegener, München, Haus des Deutschen Ostens (8.2.2001).

LÜDECKE, C., 2001, Universitas Antarctica: centennial of the first German Antarctic expedition (1901–03): *Terra Nostra: Schriften der Alfred-Wegener-Stiftung,* no. 1, p. 38–39.

LÜDECKE, C., 2001, The German South Polar Expedition of 1901–03, Cambridge, Scott Polar Reasearch Institute, public lectures (10.11.2001). Lüdecke, C., Semper vivum- Beginn der instrumentellen Meteorologie zu Otto von Guerickes Zeit, Magdeburg, 20th International Guericke-Meeting "Vakuum und Mensch" (1.12.2001).

LÜDECKE, C., 2001, Die meteorologischne Untersuchungen des praktischen Arztes und Astronomen Wilhelm Olbers in Bremen zu Beginn des 19. Jahrhunderts, *in* G. Biegel, G. Oestmann, K. Reich, eds., Neue Welten: Wilhelm Olbers und die Naturwissenschaften um 1800 (Disquisitiones Historiae Scientiarum, Braunschweigische Beitäge zur Wissenschaftsgeschichte, 1), Braunschweigeisches Landesmuseum, Braunschweig, p. 134–141.

LÜDECKE, CORNELIA, 2001, Wetterstationen der deutschen Kriegsmarine auf Spitzbergen (1941–1945)—Ein Besuch im Sommer 2000: *Geohistor. Blätter,* v. 4, no. 2, p. 127–133.

LUONGO, GIUSEPPE, 2001, Il Vesuvio e la nascita della vulvanologia [Vesuvius and the birth of volcanology], *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 147–151.

MALKHASSIAN, EDUARD G., 2000, Natural-scientific views and knowledge of the earth in mediaeval Armenia, with special reference to the work of Anania Shirakatsi: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 26–27.

MARVIN, URSULA B., 2001, Oral histories in metoritics and planetary science: II. Robert N. Clayton: *Meteorics & Platetary Science,* v. 35, p. A269-A274.

MARVIN, URSULA B., 1999, Impacts from space: the implications for uniformitarian geology, *in* Craig, G.Y. and Hull, J.H., eds., James Hutton—Present and future, Geological Society of London, Special Publications, v. 150, p. 89–117.

MARVIN, URSULA B., 2001, Oral histories in metoritics and planetary science: IV. James R. Arnold: *Meteorics & Platetary Science,* v. 35, p. A285–292.

MATEUS, ISABEL, MATEUS, HORÁCIO, TELLES ANTUNES, MIGUEL, MATEUS, OCTÁVIO, TAQUET, PHILIPPE, RUBEIRO, VASCO, and MANUPPELLA, GUISEPPE, 1997, Couvée, oeufs et embryones d'un Donosaure Théropode du Jurassique supérieur de Lourinhã (Portugal), Compte Rendu de l'Académie des Sciences, Paris: *Sciences de la Terre et des Planêtes,* v. 325, p. 71–78.

MATOS, ANA C., 2001, Adding value to the history of mining and to the mining heritage: the case of the Lousal Mine (Portugal), INHIGEO Meeting Portugal 2001, Lisboa and Averio, Abstracts.

MAYOR, A., 2000, The first fossil hunters: paleontology in Greek and Roman times. Princeton University Press, Princeton, NJ, 361 p.

MEHRA, JAGDISH and MILTON, KIMBALL A., 2000, Climbing the mountain: the scientific biography of Julian Schwinger. Oxford University Press, New York, 677 p.

MILANOVSKY, EVGENI E., 2001, My first geological journey along the rivers in the north of European Russia: Vestnik [Herald] of the geological Institute, Komi Scientific Centre of the Russian Academy of Sciences, October, p. 26–31 (in Russian).

MILANOVSKY, EVGENI E., 2000, The Plio-Pleistocene glaciation in eastern europe, Siberia, and the Caucasus: evolution of thoughts: *Eclogae Geologicae Helvetiae,* v. 93, p. 379–394.

MILLER, HUGH, 2001, The testimony of the rocks: or, geology in its bearings on the two theologies, natural and revealed. Introduction by Michael A. Taylor, St. Matthew Publishing Ltd., Cambridge, (first edition, 1857).

MILNE, ANTONY, 2000, Doomsday: the science of catastrophic events. Praeger, Westport, Connecticut, 194 p.

MONES, ALVARO, 1998, Orígenes de la paleontología de vertebrados en América del Sur: *Ciência & Ambiente,* v. 16, p. 15–28.

MONES, ALVARO, 1996, La Historia de la Expedición Malaspina en el contexto científico de la época. Fauna y flora de Uruguay: *Public. Extra Museo Nacional de Historia Natural, Uruguay,* v. 44, p. 1–26.

MORELLO, NICOLETTA, 2001, Nel corpo della Terra. Il geocosmo di Athanasius Kircher [Inside the body of the earth. Athanasius Kircher's geocosm], *in* Athanasus Kircher. Il museo del Mondo, edited by Eugenio Lo Sardo, Roma, DeLuca, p. 179–196.

MOTTANA, ANNIBALE, 2001, Arcangelo Scacchi: massimo scopritore di minerali al Vesuvio [Archangelo Scacchi as great discoverer of Vesuvian minerals], *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 160–167.

NELSON, CLIFFORD M., 2000, Review of: James G. Cassidy, Ferdinand V. Hayden: entrepreneur of science, University of Nebraska Press, Lincoln, in *The Western Historical Quarterly,* v. 32, p. 383–384.

NELSON, CLIFFORD M., 2001, King, Clarence Rivers (1842–1901), *in* M. Rothenberg, ed., The history of the United States: an encyclopedia. Garland, New York/London, p. 300–301.

NELSON, CLIFFORD M., 2001, Geological survey, United States, *in* M. Rothenberg, ed., The history of the United States: an encyclopedia. Garland, New York/London, p. 234–236.

NELSON, CLIFFORD M., 2001, Surveys, federal geological and natural history, *in* M. Rothenberg, ed., The history of the United States: an encyclopedia. Garland, New York/London, p. 548–550.

NELSON, CLIFFORD M., 2001, Review of: Donald Worster, A river running west: The life of John Wesley Powell. Oxford University Press, Oxford, in *Geotimes,* November. See <http://www.geotimes.org/current/geomedia.html>.

NIELD, TED, 2002, Without honour in his own land in honour of Dieudonné Wafula: *Geoscientist,* v. 12, no. 3, p. 14–15.

NIELD, TED, 2002, 2001—Year of geological heritage: *Geoscientist,* v. 12, p. 12–13.

NORDLUND, CHRISTER, 2001, Det upphöjda landet: Vetenskapen, landhöjningsfrågan och kartläggningen av Sveriges förflutna, 1860–1930 [The Elevated Land: Science, Land Elevation and the Formulation of a Swedish Past, 1860–1930]. Royal Skytte Society, Umeå, 425 p.

NORDLUND, CHRISTER and SALZMAN, KATARINA, 2001, Ett högt och ett stort: Om Sveriges två nya världsarv [One high and one big: on the new world heritages in Sweden]: *Area: Tidskrift om landskapsarkitektur [Area: Journal for Landscape Architecture],* v. 4, p. 24–28.

NORDLUND, CHRISTER, 2001, Bildens betydelse: Om vetenskapliga visualiseringar av det postglaciala landskapets utvecklingshistoria [The meaning of the picture: on visualising the development of the post glacial landscape]: *VEST: Tidskrift för vetenskaps—och teknikstudier [VEST: Journal for Science and Technology Studies],* v. 14, p. 7–26.

NORDLUND, CHRISTER, 2001, On going up in the world: nation, region, and the land elevation debate in Sweden: *Annals of Science,* v. 58, p. 17–50.

OBERG, JAMES, 2002, Star-crossed orbits: inside the U.S.-Russian Space Alliance. McGraw-Hill, 355 p.

OELKE, ECKHARD, 2001, On the history of the saline traits in Middle Germany: *Hallesches Jahrbuch Geowissenschaften,* v. 23, p. 111–121.

OFFICER, CHARLES and PAGE, JAKE, 2000, Earth and you: tales of the environment. Peter E. Randall Publisher, Portsmouth, N.H., 254 p.

OLDROYD, DAVID, 1998, Sciences of the earth: studies in the history of mineralogy and geology (variorum collected studies series), Ashgate, Brookfield, VT, 340 p.

OLDROYD, DAVID, 2000, The cause of Noah's flood, scientifically explained, with some thoughts on creation science: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 41–42.

ORESKES, NAOMI and FLEMING, JAMES R., eds., 2000, Why Geophysics?: *Stud. Hist. Phil. Mod. Phys.*, v. 31B, p. 253–428.

ORESKES, NAOMI and LE GRAND, HOMER, eds., 2001, Plate tectonics: an insider's history of the modern theory of the earth. Seventeen original essays by the scientists who made earth history. Westview, Cambridge, MA.

OSTROM, J.H. and MCINTOSH, J.S., 2000, Marsh's dinosaurs. The collections from Como Bluff. Reprint with new foreword by Peter Dodson and a historical update by Clifford A. Miles and David W. Hamblin; first published in 1966, Yale University Press, New Haven, London, 388 p.

PADIAN, KEVIN and GISHLICK, ALAN D., 2002, The talented Mr. Wells: *The Quarterly Review of Biology,* v. 77, no. 1, p. 33–37.

PARODI, GIAN CARLO, 2001, Due secoli di scambi culturali tra il Real Museo Mineralogico di Napoli e il Musèum d'Histoire Naturelle a Parigi [Two centuries of cultural exchanges between the Royal Mineralogical Museum of Naples and the Museum of Natural History of Paris], *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 168–170.

PARSONS, VIC, 2002, James Hutton 1726–1797: *Magazine of the Geologists' Association,* v. 1, no. 1, p. 17–18.

PATACA, ERMELINDA MOUTINHO and PINHEIRO, RACHEL, 2001, Ver à distância: as instruçies da Viagem Filosófica de Alexandre Rodrigues Ferreira (1783–1793) e da Comissão Científica de Exploração (1858): *Proceedings of XXI Simpósio Nacional de História,* p. 465.

PINTO, MANUEL S., 2001, D. Vandeli and the inventory of the Brazilian Mineral Resources, in Actas do i Congresso Luso-Brasileiro de História da Ciéncia e da Técnica, Universidade Évora and Universidade Aveiro, Évora, p. 214–225.

PINTO, LUIS T., 2001, Paul Choffat's (1849–1919) early contributions to Portuguese geology, INHIGEO meeting Portugal 2001, Lisboa and Aveiro, Abstracts.

PINTO, LUIS T., 2001, Paul Choffat's first stay with the Portuguese geological survey (1878–1880): *Comunicacoes do Instituto Geológico e Mineiro,* v. 88, p. 301–308.

PÓVOAS, LILIANA and LOPES, CÉSAR, 2001, Dinosaures au Museum National d'Histoire Naturelle (Lisboa). Histoire d'un processus de communication, INHIGEO Meeting Portugal 2001, Lisboa and Aveiro, Abstracts.

REIMOLD, UWE, 2001, The Vredefort Saga—a scientific controversy around the world's largest gold source: *Geotimes,* v. 46, no. 3, p. 20–23.

RIBEIRO, RENATO P.M., 2001, The growing interest in mining in Portugal by the end of the eighteenth century, INHIGEO meeting Portugal 2001, Lisboa and Aveiro, Abstracts.

RICKARDS, R.B., 2000, Conservation of important geological sites: *The Geological Curator,* v. 7, no. 3, p. 109–110.

RICQLÈS, ARMAND DE, MATEUS, OCTÁVIO TELLES ANTUNES, MAGUEL, and TAQUET, PHILIPPE, 2001, Histomorphogenesis of Embryis of upper Jurassic thoropods from Louringh (Portugal): *Compte Rendu de l'Académie de Sciences, Paris, Sciences de la Terre et des Planêtes,* v. 332, p. 647–656.

ROBILANT, SPIRITO BENEDETTO NICOLIS, 2001, Viaggi mineralogici [Mineralogical travels], edited by V. Garuzzo, Olschki, Firenze.

RODGERS, JOHN, 2001, The company I kept: the autobiography of a geologist. The Connecticut Academy of Arts and Sciences, New Haven, CN, 224 p.

ROMAN, CONSTANTIN, 2000, Continental drift: colliding continents, converging cultures. Foreword by John F. Dewey. Institute of Physics Publishing, Bristol/Philadelphia, 211 p.

RÖSLER, HANS JÜRGEN, 2001, Aus dem Werdegang eines ostdeutschen Mineralogen: Teil 3: Vom Bergmann zum Mineralogen—Studium an der Bergakademie Frieberg/Sachsen in den Jahren 1947 bis 1949 und 1950 bis 1951: *Geohistorische Blätter,* v. 4, no. 1, p. 65–74.

RÓZSA, PÉTER, ed., 1999, Robert Townson's travels in Hungary: Proceedings of the "Townson Symposium" held in Debrecen, 26th September 1997, Kossuth Egetemi Kiadó, Debrecen.

RYABUKHIN, A.G. and NAYMARC, A.A., 1999, Geocatastrophies in the context of ideas on nonlinear dynamics. Ivth International Conference on New Ideas in Earth Sciences, Moscow. Abstracts, Section S-XXVII, p. 111.

SANTANA, JOSÉ CARLOS BARRETO DE, 2001, Teodoro Sampaio: *Proceedings of IV Congresso de História da Bahia, Salvador (Bahia),* v. 2, p. 951–966.

SANTANA, JOSÉ CARLOS BARRETO DE, 2001, Geologia e metáforas geológicas em Os SertQes, Taíra, Université Stendhal-Grenoble 3, v. 11, p. 241–255.

SARJEANT, WILLIAM A.S., 2000, Can the decline of the Latin name be halted?: *Journal of Geoscience Education,* v. 48, p. 121–126.

SAUSSURE, HORACE-BÉNÉDICT DE, 2000, Viaggi nelle Alpi. Passo del Gries e Monte Rosa [Travels in the Alps. Gries Pass and Mt. Rosa], edited by E. Rizzi et al. Fondazione Monti, Anzola d'Ossola.

ŠERBAKOVA, ELENA and LEVANOVA, TATJANA, 2001, Das Ilmengebirge: Aus der Vergangenheit in die Zukunft: *Geohistor. Blätter,* v. 4, no. 1, p. 125–126.

SCHEDL, A., 1999, Der Wiederaufbau nach 1945, *in* Ch. Bachl-Hofmann, T. Cernajsek, Th. Hofmann, and A. Schedl, eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österriches (1849–1999), Wien, p. 152–161.

SCHEDL, A. and PIRKL, H., 1999, Vom Anschulss 1938 bis zum Ende des 2. Weltkrieges, *in* Ch. Bachl-Hofmann, T. Cernajsek, Th. Hofmann, and A. Schedl, eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österriches (1849–1999), Wien, p. 139–151.

SCHEDL, A., 1999, Die Geologische Bundesanstalt in der 1. Republik (1918–1938), *in* Ch. Bachl-Hofmann, T. Cernajsek, Th. Hofmann, and A. Schedl, eds., Die Geologische Bundesanstalt in Wien: 150 Jahre Geologie im Dienste Österriches (1849–1999), Wien, p. 130–138.

SCHRÖDER, W., 2001, Das Polarlicht in Vergangenheit und Gegenwart: *Astronomie + Raumfahrt im Unterricht,* v. 38, p. 8–11.

SCHRÖDER, WILFRIED, 2000, The aurora in time. Translation of Das Phanomen des Polarlichts. Science Edition, Geophysics, Bremen-Roennebeck, 156 p.

SCHROEDER, J.H., 2001, Potsdam und Umgebung. 2. erw. Auflage—Führer zur Geologie von Berlin und Brandenburg (Selbstverlag Geowisenschafler in Berlin und Brandenburg) Nr. 4, 277 p.

SCHUBERTH, KONRAD, 2001, Paul Assmann (1881–1967)—Erforscher der Geologie Oberschlesiens: *Geohistorische Blätter,* v. 4, no. 1, p. 35–46.

SCHWAB, FRED, 2002, Of meteorites, dinosaurs and evolution: *Geotimes,* v. 47, no. 4, p. 52.

SEABORG, G.T., 2001, Adventures in the atomic age: from Watts to Washington. Farrar, Straus, and Giroux, New York, 312 p.

SEIBOLD, EUGEN and SEIBOLD, ILSE, 2002, Sedimentology: from single grains to recent and past environments: some trends in sedimentology in the twentieth century, p. 241–250 *in* D.R. Oldroyd, ed., The earth inside and out: some major contributions to geology in the twentieth century. Geological Society of London Special Publications, v. 192.

SEIBOLD, EUGEN and SEIBOLD, ILSE, 2001, Antonio Vallisnieri—Ein moderner Geologe vor 300 Jahren: Max Pfannenstiel zum Gedächtnis (1902–1976): *International Journal of Earth Sciences (Geologische Rundshau),* v. 90, p. 903–910.

SEIDL, JOHANNES, 2001, Einige Inedita zur Frühgeschichte der Paläontologie an der Universität Wien: Die Bewerbung von Eduard Sueß um die Venia legendi für Paläontologie (1857): *Berichte der Geologischen Bundesanstalt,* v. 53, p. 61–67.

SEMONIN, PAUL, 2000, American monster: How the nation's first prehistoric creature became a symbol of national identity. New York University Press, New York/London, 482 p.

SENGÖR, A.M.C., 2000, Die Bedeutung von Eduard Suess (1831–1914) für die Geschichte der Tektronik: *Berichte der Geologischen Bundesanstalt,* v. 51, p. 57–72.

SENGÖR, A.M.C., 1998, Die Tethys: vor hundert Jahren und heute; Ein Festvortrag gehalten am 18. November 1993 im Kleinen Festsaal des Hauptgebäudes der Universität Wien = The Tethys: one hundred years ago and today: *Mitteilungen der Geologischen Gesellschaft in Wien,* v. 89, p. 5–177.

SEQUEIROS, L., 2000, 2001: año de Athanasius Kircher (1601–1680): *Boletín de la Comisión de Historia de la Geología de España,* p. 14–16.

SEQUEIROS, L., 2001, De José de Acosta (1540–1600) a Athanasius Kircher (1601–1680): dos momentos en los albores de la biogrografía, *in* Los Fósiles y la Paleogeografía, Actas XVII Jornadas de Paleontología, SEPAL, v. 5, p. 3–27.

SEQUEIROS, L., 2000, El Geocosmos teológico del jesuita Athanasius Kircher (1601–1680): *Proyección,* v. 199, p. 281–300.

SEQUEIROS, L., 2000, Charles Robert Darwin y el Origen de las Especies, <www.cienciadigital.net>, July, n110.

SEQUEIROS, L., 2001, Los fósiles "hablan": Qué aporta la paleontología al conocimiento del planeta tierra?, *in*: J.A. Gámez and E. Liñan, eds, La Era Paleozoica. Jornadas de Paleontología de Ricla, p. 27–59.

SILVA, CLARETE PARANHOS DA and FIGUEIRÔA, SILVIA FERNANDA DE M., 2001, A Academia Real das Lisboa e as Ciências Naturais no Brasil Colonial: uma análise da Mineralogia: *Proceedings of the XXI Simpósio Nacional de História, Niterói (Rio de Janeiro),* v. 1, p. 465–465..

SILVA, CLARETE PARANHOS DA, 2001, Com o ouro tudo compram: Memórias de Mineralogia sobre o Brasil em finais do século XVIII: *Proceedings of Seminário Nacional de História da Ciência e da Tecnologia (Sociedade Brasileira de História da Ciência), Rio de Janeiro,* p. 22–23.

SINYUKOV, VALERII V., 2000, Alexander Vasilievich Koltchak as Arctic Explorer, Nauka [Nature] Publishing House, Moscow (in Russian).

SMITH, ALAN, ed., 2001, The rock men: pioneers of Lakeland geology. Cumberland Geological Society, Keswick.

SOKOLOV, RAYMOND, 2002, The spice of life: mining history for the source of an essential mineral: *Natural History,* v. 111, no. 2, p. 98–99.

SOTO, GERARDO, 2001, Contribución Pionera de William M. Gabb sobre Costa Rica, a la Geología y Cartigrafía de Costa Rica: *Anuario de EstudiosCentroamericanosm Universidad de Costa Rica,* v. 25, p. 103–138.

SOTO, GERARDO, 2001 (for 2000), Análisis de los trabajos geológicos de William M. Gabb sobre Costa Rica, a la luz del paradigma geológico del Siglo XIX: *Revista Geológica de América Central,* v. 23, p. 97–118.

SPALDING, DAVID, 2000, In the skin of Professor Challenger: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 39.

STALLINGS, ROBERT A., 1995, Promoting risk: constructing the earthquake threat (social problems and social issues). Aldine de Gruyter, New York, 248 p.

STEPHENS, SHIRLEY, 2002, James Hutton's unconformity—Jedburgh: *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 15.

Stories from the Collection: The Lamont-Doherty Earth Observatory. Two-CD set, Columbia University Oral History Research Office.

SZAKALL, SANDOR, 2001, The Rudabanya Iron Ore deposits in the early literature (1880–1939). Rudabanya (in Hungarian).

TANDY, PETER and WOOLEY, ALAN, 2001, The British Museum's Collections of rocks and minerals from Vesuvius made by William Hamilton and Teodoro Monticelli (1759–1846), and Hamilton's observations on Vesuvius between 1764 and 1800, *in* Atti del Bicentenario del Real Museo Mineralogico 1801–2001, edited by M.R. Ghiara and C. Petti, Medias, Napoli, p. 171–180.

THACKRAY, J.C., 2000, Confessions of a geological book-collector: *Archives of Natural History,* v. 27, p. 17–22.

TINKLER, KEITH, 2000, Challenging cold authority: geomorphology in trouble at Yosemite?: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 40–41.

TORRENS, H.S., 1999, Coal hunting at Bexhill 1805–1811: How the new science of stratigraphy was ignored: *Sussex Archaeological Collections,* v. 136, p. 177–191.

TÓTH, ALMOS, ed., 2001, Old geological news. Hungarian museum of the aluminum industry, Szekesfehervar (in Hungarian).

TRÜMPY, RUDOLF, 2000, What happened to Tethys??: *International Commision on the History of Geological Sciences (INHIGEO) Newsletter,* no. 32 for 1999, p. 38–39.

TRÜMPY, R., 2001, Why plate tectonics was not invented in the Alps: *International Journal of Earth Sciences (Geologische Rundschau),* v. 90, p. 477–483.

TURNER, N.S., 2000, A catalogue of the type, figured, and cited fossils in the Nottingham Natural

History Museum, Wollaton Hall, Nottingham, U.K.: *The Geological Curator,* v. 7, no. 3, p. 111–121.

VACCARI, EZIO, 2001, La geologia, in Per una storia del Consiglio Nazionale delle Ricerche [Toward a history of the National Research Council], edited by R. Simili and G. Paoloni, Laterza, Bari—Roma, v. I, p. 152–159.

VACCARI, EZIO, 2001, Les Voyages dans les Alpes et la gèologe italienne [The voyages dans les Alpes and Italian geology], *in* H.-B. De Saussure (1740–1799), Un regard sur la Terre, edited by R. Sigrist, Georg/ Bibliothèque d'Histoire des Sciences, Genève, p. 197–213.

VACCARI, EZIO, 1999, La 'classificazione' delle montagne nel Settecento e la teoria litostratigrafica di Giovanni Arduino *in* Ettore Curi (ed.) Scienza, tecnica e "pubblico bene" nell'opera di Giovanni Arduino (1714–1795), Verona, Accademia di Agricoltura, Scienze e Lettere, p. 47–80.

VACCARI, EZIO, 2001, Geology and mining in 18th century Italy: Giovanni Arduino and Spirito Nicolis di Robilant, in: J.E. Fell, P.D., Nicolaou, and G.D. Xydous, eds., 5th International Mining History Congress. Book of Proceedings, Milos Conference Centre—George Eliopoulos, Milos, p. 346–354.

VACCARI, EZIO, 2001, European views on terrestrial chronology from Descartes to the mid-18th century, *in* C.L. Lewis and S.J. Knell, eds., The age of the earth: from 4004 BC to AD 2002. Geological Society of London Special No. 190, p. 25–37.

VACCARI, E., 1999, Austro-Italian scientific relationships in the field of the earth sciences: The Geologische Reichsanstalt and the geologists of the Lombardo-Venetian Kingdom (1850–1866), *in* H. Lobitzer and P. Grecula, eds., Geologie ohne Grenzen: Festschrift 150 Jahre Geologische Bundesanstalt, Abhandlungen der Geologischen Bundesanstalt, v. 56, p. 95–114.

VAN VEEN, FREDERIK R., 1996, Willem van Waterschoot van der Gracht 1873–1943: Een biografie. Delft University Press, Delft.

VARELA, ALEX GONÇALVES, 2001, Adquirindo modernas técnicas de mineraçío: a viagem científica de José Bonifácio de Andrada e Silva pela Europa Central e Norte (1790–1800): *Proceedings of do CCI Simpósio Nacional de História, Niterói (Rio de Janeiro).*

VARELA, ALEX GONÇALVES and LOPES, MARIA MARGARET, 2001, José Bonifácio de Andrada e Silva e os estudos sobre a virtude febrífuga das quinas no início do século XIX em Portugal: *Proceedings of Congresso Brasileiro de História da Medicina, Barbacena (Minas Gerais),* v. 1, p. 59–59.

VICZIÁN, ISTVÁN and NAGY, A. DEÉ, 1997, Domokos Teleki, der erste Präsident der Societät die Gesamte Mineralogie zu Jena (1773–1798): *Acta Mineralogie—Petrographica, Szeged,* v. 38, p. 165–173.

VICZIÁN, ISTVÁN, 2000, History of mineralogical investigations of the Füzérradvaány "Illite", near Sárospatak, Hungary: *Acta Geologica Hungarica,* v. 43, p. 493–500.

VICZIÁN, ISTVÁN, 1996, Domokos Teleki, an 18th century traveller and mineral collector: *Acta Mineralogica-Petrographica, Szeged, Supplementum,* v. 37, p. 127.

VICZIÁN, ISTVÁN, 1997, Hungarian investigations on the "Zempleni" illite: *Clays and Clay Minerals,* v. 45, p 114.

WANG HONGZHEN, ET AL., eds., 1999, Fifty years of geological sciences in China. Geological University Publishing House, Beijing, (in Chinese).

WANNER, G., 2000, Die Anfänge der Geowissenschaften in Vorarlberg: *Jahrbuch Vorarlberger Landesmuseumverein Freunde der Landeskunde Bregenz,* v. 144, p. 67–80.

WEILI QIU, 1999, The history of research on physiography: stages in China: *China Historical Materials of Science and Technology,* v. 20, p. 95–106.

WEISS, MALCOLM, P., 2000, Frederick William Sardeson, Geologist 1866–1958. Bulletin 48, Minnesota Geological Survey, University of Minnesota, St. Paul, MN, 203 p.

WELLS, JONATHAN, 2000, Icons of evolution: science or myth? Why much of what we teach about evolution is wrong. Illustrated by Jody F. Sjogren. Regnery Publishing, Washington D.C., distributed by National Book Network, Lanham, MD, 338 p.

WILSON, LEONARD G., 2002, A scientific libel: John Lubbock's attack upon Sir Charles Lyell: *Archives of Natural History,* v. 29, no. 1, p. 73–87.

WITHALM, G., 2000, Gregor Graf Rasumofsky (1759–1837) und seine erdwissenschaftlichen Forschungen in Baden bei Wien: *Berichte der Geologischen Bundesanstalt,* v. 51, p. 21–36.

WOODWARD, LUCIA, 2002, The Geikie Collection: *GA magazine of the Geologists' Association Issue 2,* v. 1, p. 15.

WYSE JACKSON, P.N., 2000, Silver pages: 25 years of the newsletter of the Geological Curator's Group and The Geological Curator: *The Geological Curator,* v. 7, no. 3, p. 95–99.

WYSE JACKSON, P.N., 2001, Seven ages of geological investigation: a biostratigraphical study of the geological society of Dublin and its successor the Royal Geological Society of Ireland 1831–1894: Geological Society of America Abstracts with Programs, v. 33, p. 59.

WYSE JACKSON, P.N., 2001, Chronological listing of books published on the geology of Ireland from 1699 to 1999: *Irish Naturalists' Journal,* v. 26, p. 293–313.

WYSE JACKSON, P.N., 2002, John Joly (1857–1933) and his determinations of the age of the earth, *in* Lewis, C.L.E. and Knell, S.J., eds., The age of the earth: from 4004 BC to AD 2002, Geological Society Special Publication No. 190, London, p. 107–119.

WYSE JACKSON, P.N. and SPENCER JONES, M.E., 2001, From Rondelet to Bryostatins: chronology of 100 important events and publications in the history of bryozoological research: Abstracts International Bryozoology Association and Society for the History of Natural History meeting—from John Ellis to Bryostatins: The history of study of fossils and living bryozoans, Trinity College, Dublin, Ireland, July 21, 2001, p. 20.

YAJIMA, MICHIKO, 1998, Hilgendorf predated Morse in bringing Charles Darwin's theory of evolution to Japan: *Historia Scientiarum,* v. 8, p. 133–140.

YAMADA, TOSHIHIRO, 2002, Steno and Spinoza: history and nature of scripture: *Spinozana,* v. 3, p. 47–68 (in Japanese).

YANSHIN, A.L., ed. in chief, 2000, Vernadsky—Pro et Contra. An anthology of literature about V.I. Vernadsky during the hundred years (1898–1998). 114 papers, compiler A.V. Lapo, Russian Christian Institute Press, St. Petersburg, 872 p.

YOCHELSON, ELLIS and LEWIS, CHERRY L.E., 2002, The age of the earth in the United States (1891–1931): from the geological viewpoint, *in* C.L.E. Lewis and S.J. Knell, eds., The age of the earth: from 4004 BC to AD 2002, The Geological Society of London Special Publication no. 190, p. 139–155.

YUSHKIN, NIKOLAI P., 1999, Hydrocarbon crystallization of life: *Earth Science Frontiers* (China Unvirsity of Geosciences, Beijing), v. 6, p. 71–78.

ZANZI, LUIGI, 2000, La scienza sulle Alpi: Horace-Bénédict de Saussure [The science of the Alps], *in* H.-B. de Saussure, Viaggi nelle Alpi. Passo del Gries e Monte Rosa, edited by E. Rizzi et al. Fondazione Monti, Anzola d'Ossola, p. 9–39.

ZIOMKOWSKI, ROBERT MARIAN, 2000, Science, theology, and myth in medieval creationism: cosmogony in the twelfth century: *Diss. Abstr. Int.*, v. 61, p. 4553-A.

ZORN, I., 1999, A history of the research on ostracodes from the Paleogene and Neogene of Austria (1839–1999), in H. Lobitzer and P. Grecula, eds., Geologie ohne Grenzen: *Festschrift 150 Jahre Geologische Bundesanstalt, Abhandlungen der Geologischen Bundesanstalt,* v. 56, p. 185–198.

TREASURER'S REPORT FOR 2002
(As of October 1, 2002)

BALANCE FORWARDED FROM 2001	$35,103.47
Less payment to ALLEN PRESS for 19/2, 20/1, and 20/2	−20,715.39
Less other Operating Expenses including website and postage	−1,183.91
INCOME TO HESS INCLUDING INTEREST	+$17,295.59
BALANCE AS OF OCTOBER 1, 2002	$30,499.76

EXPLANATION

Three issues of **Earth Sciences History** have been published in the year 2002 up to October 1. [Editor's note: issue 21/1 appeared in November.] Those three issues brought us current to January 1, 2002. Volume 21, number 2 is going to the printers in November, 2002. That will bring us to schedule for the publication of **Earth Sciences History.** I anticipate the cost for those two issues to be approximately $15,000. This may be high but I would rather be conservative. That will still leave us in a financially sound position for 2003.

This could not have happened without the efforts of our editor, Greg Good, and our associate editors. I feel certain when I say Greg is happy to see 2002 drawing to a close. We all owe Greg and the associate editors a sincere thank you.

Expenses include: $215 for Ed Roger's participation at a Geological Society of America Affiliated Society meeting in Boulder, $133 for the poster exhibited at our HESS booth during GSA and its shipping charges and the cost of our reception room, $90 for our website and a technician's help on same, and $200 for printing our dues notices for 2002. The balance was postage for mailing our notices, reminders, and reimbursements to our associate editors.

I am grateful to HESS assistant treasurers: Stuart A. Baldwin (U.K.), Rosa Domènech (Spain), Keith Tinkler (Canada), and Barry J. Cooper (Australia) for their assistance with overseas members. We also accepted the resignation (for health reasons) of Stuart Baldwin as our U.K. assistant treasurer. After some consideration, I feel it is to our benefit to retain the services of our assistant treasurers. Members can still pay an overseas treasurer by check and that treasurer can then use a personal credit card to remit payment to the treasurer.

We now can accept credit card payments for all our members, including institutions. This service also applies to the purchase of single issues and runs of **Earth Sciences History.** Credit card service includes Visa, Master Card, Discover, and American Express.

On behalf of our society, a sincere thank you is given to all those members who provided donations to HESS and provided page charges to **Earth Sciences History** in 2002. Thanks to all of our members for your continued support of the society and the journal.

I am especially thankful to the HESS membership for giving me the opportunity to serve as your treasurer.

Respectfully submitted,
Edward Rogers
HESS Treasurer

AUTHOR'S STYLE SHEET AND CHECKLIST

EARTH SCIENCES HISTORY

Please check each item as you verify that your manuscript adheres to it:

1. Manuscripts must be typewritten or processed on a letter quality printer and **double-spaced throughout,** including quotations, notes, and references, on paper of standard size and weight. Margins should be wider than usual to allow space for instructions to the typesetter. All text should be flush left, with the right hand margin left ragged (unjustified) to maintain even spacing and readability. Important note: minimize use of fancy formatting codes such as hanging indents. Underlining and italicizing are acceptable for book and journal titles, as are mathematical and foreign character sets.
2. Revised manuscripts should be submitted in doubled-spaced hard copy, and, whenever possible, on 3.5" disks identifying both the platform (Mac or PC) and the word-processing program used (WordPerfect 7, Word, etc.). Zip disks and CDs are also accepted. Electronic submission is encouraged.
3. Figures are welcome in illustrating articles. Line drawings should be directly reproducible; glossy prints must be furnished for all half-tone illustrations. Digital submission is encouraged, either on 3.5" disks, or on CDs, Zip, or Jaz disks. Files in the TIFF format are best. Files in JPEG or GIF formats are **unacceptable.**
4. Tables should be in files separate from the main text. Note your name on each disk, as well as the platform, software used, and the contents. The typesetter will design the table for your review and revision.
5. **EARTH SCIENCES HISTORY uses a dual citation system of footnotes plus sections on Archives and References.** Although inconvenient for the author, it is easier for readers. Authors may submit articles with either endnotes of footnotes; the publisher can convert endnotes to footnotes electronically. Notes should be **double-** or even **triple-spaced,** numbered consecutively throughout the article, and keyed to superscript reference numbers in the text. You may use the standard command for footnotes or endnotes found in your word-processing software. Your article should be followed by sections titled **Archives** and **References,** also **double-** or **triple-spaced.** Follow the models given in **Citation Guidelines—EARTH SCIENCES HISTORY,** available below and on the HESS web site (**www.historyearthscience.org**).
6. Titles and quotations in languages other than English: Titles should be in the original language, but may be followed by an abbreviated English translation if this will help the reader. Titles in non-Roman script may require special treatment. Short, well-known, non-English phrases or technical terms may be kept in the original language, especially if interpretation might change or cloud the meaning. Longer quotations should be translated into English in the text, with the original language in an attached footnote. Non-English words generally are not italicized in the journal. The author will be responsible for both the translation and the accuracy of the non-English text, although the editor reserves the right of verification.
7. Standard metric units or historically appropriate units should be used. If readers in other fields might not be familiar with the units used, please provide some explanation or equivalents.
8. The names of historical figures should be given in complete form on first appearance (not initials), with birth and death dates specified from a reliable

source. This may not be possible for obscure figures, but your efforts will make your work more interesting and more useful to other scholars.

9. Standard information to include at the beginning of an article:
   a. Title of article
   b. Name(s) of author(s)
   c. Affiliation(s) of author(s), with street address(es) and e-mail address(es)
   d. Abstract of approximately 150 words
10. Sections that often follow the main body of the text are:
   a. Acknowledgements
   b. Archives
   c. References (mandatory)
   d. Appendices
   e. Notes on Contributors (mandatory; printed at end of each issue): A sentence or two identifying the author(s), relevant career information, recent research areas, and work in progress.
11. Standard files on disk that must be separated:
   a. Text of article (including footnotes) and References
   b. Figures
   c. Tables
12. **EARTH SCIENCES HISTORY** requests voluntary page contributions from authors in the amount of $15 US per page, but acceptance of manuscripts and publication are not contingent on payment of page charges. A voluntary figure contribution of $15 per figure is similarly requested but not required.

CITATION GUIDELINES

EARTH SCIENCES HISTORY

With each article, **EARTH SCIENCES HISTORY** prints footnotes and—at the end of the article—an **Archives** section and an alphabetical **References** section. This system provides a convenient service to readers.

Footnotes use a superscript numeral in the text. The footnote citation format is a simplified version of that found in the *Chicago Manual of Style,* 14th edition. Although complete information should be in the footnotes, it is often useful to the reader if a short hint is given in the text to indicate which work is being cited. For example: "As Lyell wrote in 1833 in his *Principles of Geology* . . . ." Succeeding citations in footnotes should use a short-title with the author's last name, year of publication, and page(s): e.g., Oldroyd, Archaean, 1991, 446. The use of author and short-title replaces *Ibid.* and *Op. cit.,* which sometimes inconvenience readers. For more complicated situations, see *The Chicago Manual of Style,* 14th ed. (Chicago: University of Chicago Press, 1993), chapter 15, or contact the editor. Authors may include short discussions in footnotes.

The titles of the sections at the end of your manuscript should be **Archives** and **References.** The Archives section may either list the collections of manuscripts consulted and cited or, if it would allow greater clarity, an author might write a paragraph discussing these collections. Of course, this section should be omitted if no archives have been cited in the article.

The References section follows the Archives section, or if this is omitted, it follows the main text of the article. The Reference section lists *published* materials cited. The main difference between footnotes and items in References is structural. While authors' names appear as Roberta Smith in footnotes, they appear in References with the family name first: Smith, Roberta. Otherwise, citations follow the models below in both footnotes and References. A second difference is that footnotes cite specific locations in a work, while items in the References section list works-as-a-whole. For multiple authors, see the examples below.

Citations should be as specific as the instance requires. That is, a citation to a work-as-a-whole is acceptable only if the reference is actually to the work as a whole. If the reference concerns a particular chapter or page range, these must be specified. All quotations require specific pages. Short comments and original (foreign) language quotations may also be found in the footnotes.

How Citations appear in Footnotes:

Book:

Eduard Suess, *The Face of the Earth,* 5 vols. (Oxford: Clarendon Press, 1904), 1:17.

Arthur H. Robinson, *Early Thematic Mapping in the History of Cartography* (Chicago: University of Chicago Press, 1982), 37–43.

K. E. Bullen and Bruce A. Bolt, *Introduction to the Theory of Seismology,* 4th ed. (Cambridge: Cambridge University Press, 1985), 103–107.

Article in journal:

David R. Oldroyd, The Archaean Controversy in Britain: Part I—The Rocks of St. David's, *Annals of Science,* 1991, 48:407–452, on 434.

Eric L. Mills, The Historian of Science and Oceanography after Twenty Years, *Earth Sciences History,* 1993, 12:5–18.

Article or chapter in book:

Stephen J. Pyne, Certain Allied Problems in Mechanics: Grove Karl Gilbert at the Henry Mountains, in *Two Hundred Years of Geology in America,* ed. Cecil J. Schneer (Hanover, NH: University Press of New England, 1979), 225–238.

Karl Hufbauer, Solar Physics' Evolution into a Subdiscipline (1945–1975), in *New Trends in the History of Science,* eds. R. P. W. Visser, et al. (Amsterdam: Rodopi, 1989), 73–91.

Unpublished thesis or dissertation:

John A. Wolter, The Emerging Discipline of Cartography, Ph.D. Diss., University of Minnesota, 1975, 37–38.

Citing manuscript or archival material and oral history interviews in footnotes:

William Thomson to J. D. Forbes, 30 July 1847, incoming 1847/42, James David Forbes Papers, St. Andrews University Library. (This will vary according to the system at each archive. Subsequent citations may use abbreviations.)

Walter M. Elsasser, Oral History Interview conducted by J. T. Kiehl, 12 March 1986. 1 session, 1 cassette; preliminary transcript. Part of American Institute of Physics/ American Meteorological Society project. (Subsequent citations may use abbreviations.)

Archives: Two Alternatives
List format:

Forbes, James David. Papers. St. Andrews University Library. (This will vary according to the system at each archive.)

Elsasser, Walter M. Oral History Interview conducted by J. T. Kiehl, 12 March 1986. 1 session, 1 cassette; preliminary transcript. Part of American Institute of Physics/ American Meteorological Society project.

Paragraph format:

This article is based on research in the James David Forbes Papers, at St. Andrews University Library, in St. Andrew's, United Kingdom. It has also drawn on the Oral History Interview of Walter M Elsasser, conducted by J. T. Kiehl on 12 March 1986. This interview and a preliminary transcript are part of the American Institute of Physics/American Meteorological Society project and may be consulted at the American Institute of Physics, College Park, MD, USA.

How Citations appear in the References Section:
Book:

Suess, Eduard, *The Face of the Earth,* 5 vols. (Oxford: Clarendon Press, 1904).

Robinson, Arthur H., *Early Thematic Mapping in the History of Cartography* (Chicago: University of Chicago Press, 1982).

Bullen, K. E., and Bruce A. Bolt, *Introduction to the Theory of Seismology,* 4th ed. (Cambridge: Cambridge University Press, 1985).

Article in journal:

Oldroyd, David R., The Archaean Controversy in Britain: Part I—The Rocks of St. David's, *Annals of Science,* 1991, 48:407–452.

Mills, Eric L., The Historian of Science and Oceanography after Twenty Years, *Earth Sciences History,* 1993, 12:5–18.

Article or chapter in book:

Pyne, Stephen J., Certain Allied Problems in Mechanics: Grove Karl Gilbert at the Henry Mountains, in *Two Hundred Years of Geology in America,* ed. Cecil J. Schneer (Hanover, NH: University Press of New England, 1979), 225–238.

Hufbauer, Karl, Solar Physics' Evolution into a Subdiscipline (1945–1975), in *New Trends in the History of Science,* eds. R. P. W. Visser, et al. (Amsterdam: Rodopi, 1989), 73–91.

Unpublished thesis or dissertation:

Wolter, John A., The Emerging Discipline of Cartography, Ph.D. Diss., University of Minnesota, 1975.

MANUSCRIPT REVIEW GUIDELINES

EARTH SCIENCES HISTORY

In reviewing a manuscript for **EARTH SCIENCES HISTORY** please comment in as much detail as your time permits upon the following matters (and of course anything else that comes to mind.) Please inform the editor whether you wish your review to be anonymous.

1. Would you have read this through if you had simply come across it already published in **EARTH SCIENCES HISTORY**? If your answer is "No", what might the author(s) do to increase the interest of the piece for you?
2. Is the argument sound, and is its factual basis sufficient and accurate?
3. Are the references to both primary and secondary literatures sufficient, complete, and accurate? Is recent relevant scholarship acknowledged and/or discussed? Can you suggest further materials the author(s) might consult during revision?
4. Is the manuscript clearly written? How might it be reworked for greater clarity?
5. Is the manuscript well organized? What improvements might be made in this area?
6. What is the historical problem the author addresses within the confines of his/her topic? That is to say, if this subject/idea/person is "the answer", what is the "question"?
7. Are the illustrations (if any) pertinent? Sufficient? Of good quality?
8. If this article is revised according to your suggestions, will it be suitable for publication in **EARTH SCIENCES HISTORY**?
9. Other comments and suggestions?
10. Make your comments and suggestions constructive! Because articles for the journal typically pass through at least one cycle of revision before being accepted, it will help greatly if you phrase your comments in a manner which can aid the author(s) in the task of revising the manuscript.
11. If you judge that the manuscript ***cannot*** be brought to a publishable standard in anything like its present form, please say so.

Many thanks for this service to **EARTH SCIENCES HISTORY** and The History of the Earth Sciences Society. Our referees' reviews and commentary are the primary foundation and guarantee of scholarly standards. Please return your comments to me in a timely manner. **In no circumstances take longer than 30 days.**

GUIDELINES FOR WRITING ÉLOGES

EARTH SCIENCES HISTORY

Fields of academic endeavor often memorialize the passing of their practitioners through the publishing of obituaries, memorials, or éloges. The History of the Earth Sciences Society has established a committee (composed of the Past President and three other HESS members) to arrange for the writing of such biographical notices. These éloges will be published in **EARTH SCIENCES HISTORY** at the first opportunity. The committee and the authors of éloges will follow these guidelines:

1. Individuals who contributed significantly to the history of the earth sciences will be appropriate for an éloge, for their contributions including the writing of articles or books in the field, for their efforts as editors, or generally in the support of history of the earth sciences, and to HESS particularly. Eligibility will extend to non-members as well as to members of the History of the Earth Sciences Society.
2. The committee shall normally solicit authors for particular éloges. Proposals for unsolicited éloges will be considered by the committee, but prospective authors of such unsolicited éloges are strongly advised to contact the Past President before beginning. Do not contact the Editor of **EARTH SCIENCES HISTORY** concerning éloges.
3. The primary focus of the essay should be the contribution of the individual to the history of the earth sciences, not contributions to science or to other areas of scholarship, except insofar as those other efforts affected the individual's historical work. While the text should focus on the person's activity in history of earth science, it should also paint a vivid picture of the person. The person's publications will always be evident and available; the personality will not.
4. Length: Essays will be between 1,000 and 2,000 words, as determined by the committee. One photograph may be included.
5. Bibliography: Only partial bibliographies can be published. Authors should refer mainly to publications relating to history of the earth sciences. Authors are encouraged to refer to more complete bibliographies published in other venues and to published memorials that summarize the person's entire career.

NOTES ON CONTRIBUTORS

Günter Buntebarth was born in Germany in1942. He studied geophysics at the Technical University of Clausthal-Zellerfeld, Germany and the ETH Zurich, Switzerland. His Ph.D. and M.Sci. were achieved at the Technical University of Clausthal-Zellerfeld, where he was researcher and lecturer until 1991. Since 1992, he has been a consultant for geophysics with special concentration on geothermics and petrophysics. He led the German working group on geothermics from 1983 to 1992 and the German working group of history on geophysics from 1987 to 1993. He published a German textbook on geothermics, which was translated to Chinese, English, and Spanish. He has edited two other monographs and published approximately eighty papers on geothermics, petrophysics, history of geophysics, and entomology.

Si Frazier owns Frazier Minerals. He is a long-time member of HESS and has interests in mineralogy, geology of quartz, morphological crystallography, history of mineralogy, gemstones, history of European lapidary industries, historical literature of mineralogy and crystallography, and historical literature of gemology.

Elizabeth Hines is a cultural geographer who has maintained an interest in the Carolina gold rush for more than twenty years after meeting a Cabarrus County family panning for gold near Little Meadow Creek. Her interest is in the diffusion of technological innovations in mining, especially the contributions of the Cornish. She is an associate professor of geography at the University of North Carolina at Wilmington.

Eduardo G. Ottone is an assistant professor of paleontology in the Department of Geological Sciences at the Buenos Aires University. His research ineterests have been directed towards Paleozoic and Mesozoic palynology and paleobotany, and the history of paleontology in Argentina during the nineteenth century.

Wilfried Schröder has published numerous articles and books on the history of geophysics.

Michael S. Smith's interests range from the origin of Proterozoic supracrustal rocks in west Greenland to the study of prehistoric archaeological ceramics in the southeastern United States and the Caribbean islands. His research interests in the history of science have concentrated on the interaction of geology and technological development and information exchange. He is an associate professor of geology at the University of North Carolina at Wilmington.

C. Rowl Twidale and Jennie A. Bourne have retired from the Department of Geology and Geophysics in the University of Adelaide, but maintain an office and facilities there. They still enjoy field work and research, and continue to publish. **Twidale** holds doctorates from Bristol and McGill as well as an honorary degree from the Universidad Complutense de Madrid, awarded for his contributions to the study of granite forms, deserts, weathering, and old land surfaces. He has long been interested in the history of geomorphological ideas. **Bourne** holds Honours, M.A., and Ph.D. degrees from Adelaide and is a former student and long-time collaborator of Twidale's. She has worked both in granite and fold mountain terrains and most recently has investigated piedmont plains, with particular reference to fans and pediments. Both Twidale and Bourne are currently engaged in the dating of Australian desert dunes. They are also involved in ecotourist projects, e.g., the well-known Wave Rock at Hyden, Western Australia. Between them **Twidale** and **Bourne** have produced more than a dozen books and monographs and more than three hundred refereed articles and chapters.

HISTORY OF EARTH SCIENCES SOCIETY OFFICERS (2001 TO 2002)

President: Silvia F. de M. Figueirôa (Term 2001 and 2002), Instituto de Geociências, Univ. Estadual de Campinas, C.P. 6152, Campinas, SP 13081-970, Brazil. E-mail: figueroa@ige.unicamp.br.

President-Elect: William R. Brice (Term 2003 and 2004), Geology Department, University of Pittsburgh at Johnstown, Johnstown, PA 15904, USA. E-mail: wbrice@pitt.edu.

Past President: Kennard B. Bork, Department of Geology and Geography, Denison University, Granville, OH 43023, USA. E-mail: bork@denison.edu.

Secretary: David I. Spanagel (Term 2000, 2001, 2002), 101 Grove Street, Shrewsbury, MA 01545 USA. E-mail: dspanagel@townisp.com.

Treasurer: Ed Rogers (Term 2001, 2002, and 2003), P.O. Box 455, Poncha Springs, CO 81242, USA. E-mail: erogers@geology-books.com.

Assistant Treasurers: For Spain: Rosa Domènech, Departament d'Estratigrafia i Paleontologia, Facultat de Geologia, Universitat de Barcelona, c/ Martí i Franquès s/n, 08028 Barcelona, Spain. E-mail: domenech@natura.geo.ub.es. For Canada: Keith Tinkler, Dept. of Geography, Brock University, St. Catharines, Ont. L2S 3A1, Canada. E-mail: ktinkler@brocku.ca. For Australia: Barry J. Cooper, Primary Industries and Resources South Australia, GPO Box 1671, Adelaide, SA 5001, Australia. E-mail: cooper.barry@saugov.sa.gov.au.

Program Officer: James R. Fleming (Term 2000, 2001, and 2002), Science, Technology, and Society Program, Colby College, Waterville, ME 04901, USA. E-mail: jrflemin@colby.edu.

Councilors: Patrick Wyse Jackson (Term 2001 and 2002), Curator and Librarian, Department of Geology, Trinity College, Dublin 2, Ireland. E-mail: wysjcknp@tcd.ie. Cyril Galvin (Term 2001 and 2002), Box 623, Springfield, VA 22150, USA. E-mail: galvincoastal@juno.com. Julie Newell (Term 2002 and 2003), Southern Polytechnic State University, 1100 So. Marietta Parkway, Marietta, GA 30060, USA. E-mail: jnewell@spsu.edu. Rodolfo Gozalo (Term 2002 and 2003), Univ. de Valencia, Dept. de Geologia, c/ Dr. Moliner 50, Burjasot, Valencia E-46100, Spain. E-mail: rodolfo.gozalo@uv.es.

Nominating Committee: Ezio Vaccari (Term 2000, 2001, 2002), E-mail: ezio.vaccari@uninsubria.it. Martina Kölbl-Ebert (Term 2001, 2002, 2003), E-mail: martina.koelbl@iaag.geo.uni-muenchen.de. Ken Taylor (Term 2002, 2003, 2004), E-mail: ktaylor@ou.edu.

HONORARY LIFETIME MEMBERS OF HESS

Gerald M. Friedman, Elected 2001
Ellis L. Yochelson, Elected 2001

FORTHCOMING ARTICLES AND RESEARCH NOTES

Kennard B. Bork
New Frontiers:
The Evolution of William G. Tight (1865–1910) from
Geomorphologist to University President

John A. Breyer and William Butcher
Nothing New under the Earth:
The Geology of Jules Verne's *Journey*

Fae L. Korsmo and Michael P. Sfraga
From Interwar to Cold War:
Selling Field Science in the United States,
1920's through 1950's

Alexander McBirney and Volker Lorenz
Karl Sapper: Pioneer of Middle American Geology