BOOK REVIEWS

FULLER'S EARTH: A HISTORY OF CALCIUM MONTMORILLONITE, by Robert H.S. Robertson, 1986, Volturna Press, 421 p., 25, c/o The Resource Use Institute, Ltd., Pitlochry PH16 5ED Scotland, U.K.

Fuller's earth, a calcium-rich bentonitic clay, was used in degreasing and fulling, or felting, wool fibers in making cloth. Although this application has now been taken over by soap, fuller's earth was used for some 7,000 years, right up to the early part of this century. Its history is ably summarized by the author, whose association with the industry dates from 1933 and who is a past chairman of the Clay Minerals Group of the Mineralogical Society.

After a brief introduction on the nature of wool and the fulling process, the author devotes 135 pages to an account of fuller's earth from 5,000 B.C. to the present. Then follow 165 pages of regional accounts -- focusing, naturally enough, on England, which was long a major source. About 45 pages on properties and applications complete the main text. Copious marginal notes and references accompany all topics. There are five appendices, a brief bibliography, and an index.

More than 90 illustrations enhance the text. These range from reproductions of friezes from Greece and Mesopotamia through 16th-century woodcuts to 19th-century maps and diagrams. Rather surprisingly for a book of this type (and price), there are six tipped-in color plates. Three of these, from modern-day advertisements, show "the annual sealed earth ceremony at Lemnos" in Greece; Jesus presenting samples of curative earth to the sick; and a package of Matthew's Fullers Earth Cream as it was once on sale in pharmacies. The other color plates show a fresco from Pompeii in which cupids are fulling cloth; a Flemish miniature of dyers at work, dated 1482; and a painting of St. James the Less, patron saint of dyers, fullers, and druggists.

Among the interesting items of information is the influence of the wool-processing industry on English surnames Fuller, Weaver, Tucker, Walker, Webber, and Dyer are all reminders of clothmaking. (A tucker rolled cloth into a cylindrical form; a walker was a fuller.) Another item is that the apparatus used in 17th-century felting of wool cloth was similar in general principle to the stamp mill once used in western gold fields. Another is that the term fuller's earth has been applied in this country to clays that have had no use in clothmaking, a usage that the author regards with distaste. Indeed, the book abounds in esoterica: why the author uses the singular apostrophe in fuller's earth; why the term montmorillonite is preferable to smectite; geophagy (clay-eating) and folk medicine; and comments on price wars and smuggling. The book closes with two photographs of teasels being readied for drying. (This prickly plant is used in carding, giving wool cloth a soft finish by raising fiber ends or nap.)

Most discussion of individual districts includes notes on local geology, but the book includes no general discussion of the origin or geological distribution of fuller's earth. This work clearly belongs under history of technology, along with such works as Blakey's (1973) on the Florida phosphate industry, Lindsay's (1974) on the slates of Wales, and Multhauf's (1978) on common salt. The price is not given in dollars; at the time of this review, the U.S. price would be about $37.00. The book is a bargain at this figure.

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ORE FIELDS AND CONTINENTAL WEATHERING. Jean-Claude Samama. New York: Van Nostrand Reinhold, 1986. 326 pp. $44.95

Jean-Claude Samama, of the Ecole Nationale Superieure de Geologie Appliquee in Nancy, France, has written a most useful book, Ore Fields and Continental Weathering. This first volume in the Evolution of Ore Fields Series is divided into seven chapters. The first two are introductory, one focusing on continental weathering as an economic factor, the second on the geochemical definition of continental weathering. Chapter 3 treats the general relation between continental weathering and ore fields, and Chapters 4, 5, and 6 explore in detail the effects of such weathering on economic deposits, low-grade occurrences, and source rocks, respectively. The final chapter is an overall summary. Each chapter, except the first and last, has an extensive reference list; most of the references were published after 1970. The text, which draws on worldwide examples, is augmented by many clear, well-conceived line drawings, both author originals and drawings adapted from published references. The author devotes little to the history of the subject, although the subject itself might be considered a history of the formation of ore deposits.

The overwhelming amount of published information in all specialties is a fact of scientific life. Therefore, the need for comprehensive, well-written syntheses of broader fields has never been greater. Dr. Samama is to be commended for fulfilling the need in this topic. This book would serve well as a textbook for advanced courses in ore genesis.

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ALFRED WEGENER - THE FATHER OF CONTINENTAL DRIFT. Martin Schwarzbach. Madison, Wisconsin: Science Tech, Inc., 198 . 261 pp. $35.00.

I found this biography of Alfred Wegener interesting, comprehensive, informative, well written, and well illustrated. Schwarzbach does an excellent job of bringing out not only Wegener's scientific accomplishments but also the details of his personality. The volume begins with an "Introduction to the English Edition" by Anthony Hallam, who succinctly reviews Wegener's life and comments generally on the volume. Hallam's contribution could easily be published as a review of the book.

In eight chapters, Schwarzbach sets the scientific scene that existed in Germany before the time of Wegener. He then proceeds to document Wegener's personal life and professional career, including his scientific contributions in meteorology and geology, his Greenland expeditions, and the history of the Theory of Continental Drift from its inception to the present time. Wegener emerges as a warm, humble, and gifted meteorologist whose broad grasp of diverse areas of science enabled him to put together one of the major geological theories of this century. It is ironic that as an "outsider" to geology Wegener achieved neither fame nor fortune for his contributions during his lifetime. Even more ironically, his ideas were probably least accepted in his native Germany.

The book's chapters flow smoothly and are accompanied by some 50 illustrations, including 29 photographs, as well as charts, maps, and notes. I found the chapter on "The Expeditions to Greenland" especially interesting and informative. Having led Antarctic expeditions, I felt a new closeness and respect for Wegener. His last expedition, on which he died in 1930, is well detailed. His reticence at leaving loved ones at home, his frustration at delays in getting started due to the weather, his sense of responsibility for his expedition members, and his determination to attain the goals of his expedition are clearly expressed. My own experiences have also made me better able to respect Wegener's physical courage in attempting to resupply his men who were isolated in the middle of the Greenland icecap - a decision that cost him his life.

The next to last chapter, "Memories of Alfred Wegener", was written by his close friend, colleague, and fellow Greenland explorer Johannes Georgi. Georgi, who was a meteorologist on Wegener's last, ill-fated expedition, presents a warm and close picture of him over a twenty-year period, from Wegener's first contact with Georgi as a student, until his death.

A final chapter by I. Bernard Cohen, entitled "Continental Drift and Plate Tectonics: A revolution in Earth Science", efficiently summarizes early ideas on continental drift by predecessors of Wegener, the gradual development of the theory in Wegener's mind, and Wegener's unsuccessful search for a mechanism of continental drift. It also documents the "paper revolution" in the earth sciences following publication of the theory, until the 1960s at which time the theory was incorporated into our present theory of plate tectonics.

Appendices include chapter notes, a listing of Wegener's primary publications, a selected bibliography on Wegener and continental drift, and an index.

It must be apparent that I thoroughly enjoyed Schwarzbach's book. The material from Hallam, Georgi, and Cohen offers additional viewpoints of Wegener from the past and present, and adds greatly to the book. If Schwarzbach is to be faulted for anything, it is that he is overprotective of Wegener. Schwarzbach is not a passive biographer of Wegener, but a strong supporter, and Wegener does not need to be protected. He comes through very strongly as an imaginative individual who synthesized extant information into a major theory and marshalled a wide array of evidence in support of it. That Wegener was not able to devise a mechanism for continental drift does not detract from his accomplishments. Schwarzbach's support is understandable, for it would be hard to study Wegener's life and not like him. I recommend this book to earth scientists, historians, and anyone with an adventuresome interest. At a price of $35 the book is not inexpensive, but I believe it is well worth it.

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INVERTEBRATE PALAEONTOLOGY AND EVOLUTION, 2nd edition. E.N.K. Clarkson. London: Allen & Unwin, 1986, 382 pp. $45.00 cloth cover, $24.95 paper cover

It is difficult to justify reviews of textbooks of any science in a journal devoted to history of the science. However, one can note that, as a large number of the Society's members are in academia, it is a service to let them know of the better texts that are available. Clarkson's book certainly fits that criterion! It is illustrated with meaningful drawings, the language is both crisp and crystal clear, and the details of classification are certainly in step with current thinking in the profession. The book is strong on interpretations of functional morphology and paleoecology; there is a balance in treatment between the importance of the group in the fossil record and the space devoted to it. All references are up to date and most are to papers published in the last ten years.

I recommend this work without reservation to all paleontologists to adopt as a teaching text. Indeed, if some non-paleontologist must obtain general information in a hurry, or wants to learn

more about this field of the earth sciences, I cannot think of a better source. Nevertheless, I hope that in the third edition the author will devote just a tiny bit of space to the history of the science. Oppel receives half a sentence, Lamarck, half a paragraph, and Darwin, less than half a page. Surely a bit more history would not hurt the students.

To cite one example of how good this text is, Clarkson takes the step of indicating that the arthropods alive today should be interpreted as three separate phyla and that the trilobites should be treated as an extinct phylum, rather than as a class. I think this is excellent. However, this change would carry much more emphasis if the author had explained the significance of the discovery of limbs 110 years ago which convinced paleontologists that trilobitres were arthropods. From there he could move to the steps that led to their acceptance as a class and finally a bit more discussion on the debate about whether there were any extinct phyla. This would put his notion of the placement of the trilobites in perspective and show students that classification evolves through time with increase in information.

When an author has done a superb job, as Clarkson indeed has, one should not dwell on that which has been excluded. However, as more people slowly but steadily become interested in the history of the earth sciences, we can hope that one day this interest will be reflected in the textbooks.

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DOWN TO EARTH: ONE HUNDRED AND FIFTY YEARS OF THE BRITISH GEOLOGICAL SURVEY. H.E. Wilson. Edinburgh: Scottish Academic Press, 1985. 189 pp., paper cover.

Self-described as a "sort of mutineer", H.E. Wilson presents a witty, irreverent history of the British Geological Survey (BGS). The focus is on the years since World War II, but the whole 150-year history of the BGS is traced. The account is rich in anecdotes and comments on the idiosyncracies of BGS leaders, particularly directors, which will surely delight those familiar with the personalities portrayed. The many moves from place to place and the development of various scientific fields are documented.

The trials of Hercules are recounted. A copy of the Roman statue, but of Portland Stone rather than Italian marble, Hercules was installed in the BGS museum in 1851. At the age of 32, because they were regarded as "offensively obtrusive", his genitalia were removed in favor of a fig leaf (removed, not covered!). Curators for the next 90 years passed along a velvet-lined mahogany box containing the removed parts, until Hercules was put together again at the new BGS site in Keyworth.

Although Hercules had his virility restored midway through his second century, BGS virility at the same phase of its existence is in doubt. In fact, the factors that have combined to jeopardize the BGS provide the most interesting reading for those not familiar with the inner workings of BGR.

The current difficulties began in 1965 when the Department of Scientific and Industrial Research was dissolved and the BGS was assigned to a new entity called the Natural Environment Research Council (NERC). The BGS staff ceased to be civil servants, but were still subject to certain civil service rules. Under NERC the BGS was expected to find part of its financial support from government agencies for "commissioned research". For a few years, BGS did this so effectively that commissioned research rose from less than 18 percent of the budget in 1972-73 to over 80 percent in 1978-79. More staff were hired to carry out this expanded workload. Then, as the government agencies suffered budget cuts, funds for commissioned research declined and BGS was left overstaffed, underfunded, and oriented toward short term, commercial research.

Moreover, the situation of the BGS Director reporting to a committee turned out to be a form of exile from the ordinary workings of government. This organizational exile coupled with geographical exile to Keyworth, four hours from London, are viewed as important factors contributing to the critical situation in which the BGS finds itself.

To an outsider sympathetic to the purposes of a government Geological Survey, the BGS situation is lamentable. It appears that somehow the role for the BGS got mixed up with the role usually played by private consulting organizations. Without an independent base of funds and a well defined governmental mission, a Geological Survey cannot provide the unbiased, factual data base that is so essential for policymaking. Here's hoping that the next update on BGS history can view the NERC episode as a not-so-amusing interlude, and that there is no need for an update on Hercules.

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BONES FOR BARNUM BROWN. ADVENTURES OF A DINOSAUR HUNTER. Roland T. Bird. Fort Worth: Texas Christian University Press, 1985, 225 pp., $14.95 paper, $29.95 hard cover.

Roland Bird died in 1978 leaving an unpublished manuscript of 700 pages detailing his years as a dinosaur collector. The work was edited by Bird's lifelong friend, V. Theodore Schreiber, who wrote the prologue and epilogue. It is undoubtedly this personal friendship that allowed Bird's personality to persist in the book. Edwin H. Colbert has written a short, informative and entertaining foreword that highlights some of Bird's nature. The introduction and annotations are provided by James O. Farlow. The introduction covers the following topics, all of which are pertinent to the subject of the book: a biographical sketch of the author, a history of the collection of dinosaur trackways, stratigraphic principles, and geologic time. These subjects receive adequate, well written coverage so that one with little or no background in geology or paleontology will be better able to appreciate the science in the pages that follow, while not boring those with a knowledge of these topics. The annotations (Notes) at the end provide further references, where required, to subjects covered in the various chapters, as well as scientific discussions of current controversies both scientific and religious. The annotations fill out the story and provide further insight into Bird by way of quotations from letters to co-workers. Numerous photographs of localities and specimens as well as current drawings of dinosaurs in non-static, non-lumbering poses are found throughout the book. Finally, the book is fully indexed.

The body of the book deals solely with the work that Bird accomplished in the field of paleontology and the people he encountered. The story starts in the early 1930s with Bird's first fossil find, made while riding his motorcycle across Arizona, and ends during World War II with Bird leaving the American Museum to hunt vanadium and uranium for the U.S. Government. He became ill during this time and was never able to return to collecting dinosaurs. His last work on dinosaurs was undertaken several years later under the direction of E.H. Colbert who requested that he return to the museum to piece together the Paluxy River tracks for display behind the brontosaur.

The romantic style of writing makes the reader wish he had had the opportunity to collect fossils with this energetic and dedicated individual. The book contains important information on collecting techniques, how fossils are found, how they are removed from the ground to the museum and, once there, how they are mounted for exhibit. Dinosaurs do not just walk into the museum and stand there for our edification! These subjects are treated very dryly in any number of books on paleontology. This book, however, relates to the reader not only what was intended to happen but what actually took place in getting the specimens out of the rock (it ain't all roses). Portions of this book brought to mind the informative and enjoyable account of the Princeton University fossil collecting expeditions to Patagonia led by John Bell Hatcher in the 1890s. The Patagonian accounts are contained in a book entitled Bone Hunters in Patagonia by J.B. Hatcher (1903), recently reprinted by the Ox Bow Press (1985).

This historical documentation of the collection and preparation of the material from Howe Quarry, the Paluxy River, and the States Mine is important in providing to the reader, and to the possible future viewer of some of this material on exhibit, a better understanding of the specimens' scientific significance as well as an appreciation for the people behind the exhibited specimens. After reading this book one could not possibly look upon the brontosaur at the American Museum or the trackway behind it without thinking of Bird's reminiscences about them. Seldom does one obtain an account of fossil collecting so rich in information yet enjoyable to read. This is one.

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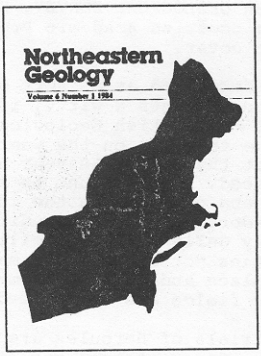

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MISCELLANEA

From time to time, items of historical interest turn up. They are not announcements, nor are they articles, but stray facts to be tucked away for the future. That is the rationale for this column. perhaps it will never appear again, but possibly members will continue to send me miscellaneous items of general interest. All contributions are welcome.

A New Museum

Drumheller, Alberta, is 1 1/2 hours' drive from Calgary and 3 hours from Edmonton. September 25, 1985, marked the dedication of a new museum in the town. This is the Tyrrell Museum of Palaeontology. The museum concentrates scientifically on the magnificent Late Cretaceous dinosaurs of Alberta, but the exhibits explore life and its evolution from the beginning. The museum is named in honor of Joseph Burr Tyrrell, who who, as a 24-year-old member of the Geological Survey of Canada, first found fossil bones along the Red Deer River. In spite of formidable difficulties, he got a wagonload of bones to Fort Calgary and eventually to Ottawa. Tyrrell is best known for his explorations of northern Manitoba and the Yukon. He remained with the GSC until 1899, before leaving for the Kondike gold field, and died in 1957.

Kudos

On June 20, 1986, the University of Heidelberg, Germany, conferred an Honorary Doctor's Degree (Doctor Honoris Causa) on Earth Sciences History's Editor, Gerald M. Friedman. This Honorary Doctor Rerum Naturalium degree was granted in recognition of Dr. Friedman's contributions to sedimentology.

Since 1886, on the occasion of its 500th Anniversary, the University of Heidelberg has awarded this degree every 50 years. In 1886 the recipients were John Wesley Powell of the U.S. Geological Survey, and the vertebrate paleontologists Cope and Marsh. In 1936 the degree was conferred on R.A. Daly of Harvard University. Dr. Friedman received his degree on the University's 600th Anniversary. The next degree wil be awarded in 2036.

Historical Markers

Road signs mentioning historic events seem to be a particularly American phenomenon. Oklahoma has been noteworthy for monuments erected to events in the oil industry, but recently Pennsylvania has acknowledged two economic developments. On Grandview Avenue, atop Mount Washington, overlooking downtown Pittsburgh, a new marker documents the first mining of the Pittsburgh Coal, "...the most valuable individual mineral deposit in the U.S."

Also in Pennsylvania, just east of the Ohio boundary, at the intersection of routes 198 and 308, is a new marker dedicated to a brine well drilled in 1815 which produced oil One of the founding members of the American Association of Petroleum Geologists was on hand for the ceremony. What is particularly satisfying about this marker is that it comes as a result of work published by S.T. Pees in this journal. We can all take a bit of pride, and perhaps some inspiration, from that.

Finally, in 1986, the 150th anniversary of the First Geological Survey of Pennsylvania was commemorated by a plaque at "pulpit rocks" near Huntingdon. It here that the geologists recognized that there was more than one major sandstone in the Appalachian sequence and were thus able to lay the foundations of modern stratigraphy.

If some volunteer (definitely not me!) wanted to compile a short list of prominent historical markers in the United States, it might be a nice item to give to geologists who come to America for the 1989 International Geological Congress. Maybe in that way the spread of historical markers could be encouraged.

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REPORT OF THE TREASURER FOR 1985

Since the middle of 1985, when I took over the Treasurer's duties from Ellis Yochelson, I have had good reason to marvel at the fact that Ellis was able to carry out the work of both Secretary and Treasurer for a few years. I thank him for his patience with me while I have gotten acquainted with the job.

The Society's total cash on hand diminished, during the period 31 December 1984 to 31 December 1985, from $7,037.47 to $4,626.66. I suppose this does not look like a promising beginning for the new Treasurer. However, the society's revenue appears to be reasonably steady. The financial picture will be brightened, of course, if members interest their friends and colleagues in Society membership, and if members take the trouble to suggest that their institutional libraries subscribe to Earth Sciences History.

It is a pleasure to record with gratitude that the following persons made generous contributions to the Society in 1985:

1985 Contributions to HESS

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Peter H. Whelan
Frank C. Whitmore, Jr.

My apologies if I have omitted any other names that belong with these.

Respectfully submitted,

Kenneth L. Taylor

CALENDAR

1987

Feb. 9-11 - Sinkholes & the environmental impacts of karst, mtg. & field trip, Orlando, FL, by the Florida Sinkhole Research Institute. Topics: Geology & engineering of karst areas with emphasis on sinkholes & practical aspects. Hydrogeology & environmental problems. Intl examples of applied karst geology & hydrology. Engineering considerations. Contact: Barry F. Beck, University of Central Florida, Orlando, FL 32816.

Mar. 16-20 - Lunar & Planetary Science Conference, Houston; by the Lunar & Planetary Institute, Johnson Space Center, American Geophysical Union, Division for Planetary Sciences of the American Astronomical Society, Geological Society of America, Intl Union of Geological Sciences, and Meteoritical Society. Contact: Pamela Jones, Projects Office, LPI, 3303 NASA Road 1, Houston, TX 77058. Phone: 713-/486-2150.

Apr. 8 - Classification in geology, mtg., London. Contact: R. J. Howarth, Stratigraphy Branch, Building 180, BP Research Centre, Sunbury on Thames, Middlesex, TW16 7LN, U.K.

Apr. 13-16 - European Union of Geosciences, biennial mtg., Strasbourg, France. Contact: William Lowrie, Institut fur Geophysik, HPP P 5, ETH Honggerberg, CH-8093 Zurich.

May 9 - Evolutionary ideas of progress, ann. symposium, Chicago. Contact: Matthew H. Nitecki, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, 60605-2496. Phone: 312/922-9410.

Aug. - During IUGG General Assembly, Vancouver, Canada, the Interdivisional Commission on History of the International Association of Geomagnetism and Aeronomy (IAGA) will present two Sessions: "Past, Present and Future Trends in Research in Aeronomy and Geomagnetism" (topics of history) and "The Use of Historical Data in Geosciences" (special attention to discussion in solar-terrestrial physics and the MAUNDER-Minimum). Abstracts due for each before 28 February to Prof. Dr. M. Gadsden, Dept. Natural Philosophy, University of Aberdeen, Aberdeen AB9 2UE, UK. For information, contact W. Schroder, Hechelstrasse 8, D-2820 Bremen-Ronnebeck, Federal Republic of Germany.

Aug. 31-Sept. 4 - Intl Congress of Carboniferous Stratigraphy & Geology, Beijing; by the China Association for Science & Technology, Palaeontological Society of China, Geological Society of China, and Permanent Committee of the Intl Congress of Carboniferous Stratigraphy & Geology. Contact: Yang Jing-zhi, Nanjing Institute of Geology & Paleontology, Chi-Ming-Ssu, Nanjing, People's Republic of China.

Sept. 23-29 - History of Oceanography, Congress, Hamburg, West Germany. Contact: ICHO IV, Deutsche Gesellschaft fur Meeresforschung, Bundesstr. 55, D-2000 Hamburg 13, FGR.

Sept. 23-Oct. 1 - Rocks, fossils & history, symposium, Pisa, Italy, by Intl Commission on the History of Geological Sciences. Excursions: La Spezia, Carrara and surrounding areas in the Apuane Alps; Apuane massif from the Tyrrhenian coast to the Serchio Valley; Serchio Valley and surrounding areas; Padanian margin of Apennines; Venetian Prealps. Contact: Nicoletta Morello, Istituto di Storia Moderna e Contemporanea, Via Balbi 6, 16126 Genoa, Italy.

Oct. 26-29 - Geological Society of America, ann. mtg., Phoenix, with associated societies. Contact: Jean Kinney, GSA, Box 9140, Boulder, CO 80301. Phone: 303/447-2020.

Oct. 29-Nov. 1 - History of Science Society, ann. mtg., Raleigh, North Carolina. Proposals for papers and suggestions for sessions due Feb. 1, 1987 to Michael M. Sokal, Dept. of Humanities, Worcester Polytechnic Institute, Worcester, MA 01609 or John W. Servos, Dept. of History, Box 1783, Amherst College, Amherst, MA 01002.

1988

Sept. 12-16 - Intl Symposium on "Engineering Geology as related to the Study, Preservation and Protection of Ancient Works, Monuments and Historical Sites" sponsored by the Greek Committee of Engineering Geologists, the official group for Greece of the Intl Association of Engineering Geologists (IAEG), Athens, Greece. mtg., field trip and post-symposium excursions to historical sites and archaeological monuments with Engineering Geology interest through continental Greece, Crete and the islands (Peloponnese, Knossos, Athos, etc.) Official languages of the Symposium - English, French & Greek. Papers should be presented in English or French. Contact: Prof. P. Marinos, Univ. of Thrace, Geotechnical Dept., 67100, Xanthi, Greece.

INTERESTING PUBLICATIONS

Since the start of this journal, Editor Gerald M. Friedman has prepared this column. Contributors wishing to list recent books and papers of interest to our membership please send them to the Editor.

Anonymous, 1986, History of Scandinavian geology: Uppsala Newsletter, No. 6, p. 1-2.

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Nowlan, G.S., 1986, Paleoscene Introduction. Paleontology: moden and ancient: Geoscience Canada, V. 13, p. 67-72.

Price, David, 1986, Mary Anning specimens in the Sedgwick Museum, Cambridge: Geological Curator, v.4, p.319-324.

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