

## BOOK REVIEWS

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**OBSERVATIONAL SEISMOLOGY AN ANNIVERSARY SYMPOSIUM ON THE OCCASION OF THE CENTENNIAL OF THE UNIVERSITY OF CALIFORNIA AT BERKELEY SEISMOGRAPHIC STATIONS.** J. J. Litehiser, editor. 1989. *University of California Press, Berkeley [Los Angeles/London]*. 379 p. Hardcover, \$49.95.

This volume contains the proceedings of the symposium held at Berkeley on May 28–30, 1987 to commemorate the establishment of the first seismic stations in the Western Hemisphere at that institution in 1887. These proceedings encompass 22 individual contributions on a wide variety of topics related to the general theme of the development of earthquake monitoring on local, regional and worldwide scales. As is often the case with symposium proceedings, these contributions represent a range of efforts extending from thoughtful, state-of-the-art summaries to brief recapitulations of the speaker's verbal presentations at the meeting. Conspicuous among the former group are excellent articles by B. A. Bolt on the contributions of the Berkeley group to seismology over this 100-year period of continuous station operation, by E. S. Husebye and B. O. Rudd on the role of seismic arrays in global and regional monitoring, and by J. P. Eaton on the seismicity and tectonics of northern California.

The title of the volume is somewhat misleading to the extent that the papers are about equally divided among those relating to the recording and those relating to the interpretation of seismic data. The editor has grouped them according to emphasis into four sections entitled: (I) Addresses, (II) Past and Future Development of the Seismological Observatory, (III) Crustal Tectonics and the Distribution of Earthquake Foci and (IV) Analysis and Interpretation of Observatory Data. The two keynote addresses in Section I include the aforementioned history of the Berkeley station by B. A. Bolt and a brief description of the evolution of global earthquake monitoring from Mallet to the current ISC by R. D. Adams. Bolt's review includes discussions of the early history of the stations (they were initially installed at the request of astronomers who were interested in controlling the positions of their telescopes) and of the pivotal leadership provided by Perry Byerly as Director of the Berkeley Seismographic Stations from 1925–1962, as well as a concise summary of the many contributions of Berkeley staff and students to virtually every area of seismology. This paper, taken together with the review of seismometer deployment at Berke-

ley by R. A. Uhrhammer in Section II, provides a number of interesting insights into both the history of the Berkeley stations and the early days of seismology in California.

Section II consists of six papers which focus on seismological monitoring and includes brief contributions from M. J. Berry on the development of international seismological organizations and data centers, from A. M. Dziewonski on instrumentation advances leading to the IRIS initiative, from W. K. Lee and S. W. Stewart on the characteristics of the U.S.G.S. Central California Microearthquake Network, and from D. W. Simpson and D. H. Johnson on the introduction of distributed processing concepts into the design of regional networks, in addition to the previously referenced papers by Uhrhammer and by Husebye and Rudd. The paper by Husebye and Rudd is notable for its broad scope in that it traces the evolution of seismic arrays from LASA and NORSAR in the late 1960's to the current NORESS regional array deployment in Norway and provides a summary overview of array design concepts and signal processing developments over that period. It is elegantly written and contains an extensive list of references on the subject which should prove to be a valuable resource for anyone interested in entering into this area of research.

Section III also consists of six papers which deal with the relationship between observed seismicity and regional tectonics. These include a paper by E. R. Engdahl and W. A. Rinehart on the development of a seismicity map of North America, papers by D. Denham, J. W. Dewey and A. Eisenberg, D. Comte and M. Pardo on the interpretation of observed seismicity in terms of currently available tectonic models, a paper by H. Kanamori and H. Magistrale on seismic gaps along the San Jacinto fault, as well as the previously referenced paper by J. P. Eaton on the U.S.G.S. earthquake monitoring program in Northern California. In this latter paper, Eaton traces the development of the Northern California network from its inception in the late 1960's to its current deployment of more than 350 stations. In addition, he reviews the observed seismicity in the region for the period 1980–1986 with particular emphasis on the Mendocino and Coast Ranges Seismic Zones and discusses the implications of the observations in the context of plate tectonics. This excellent summary of the current state of understanding of Northern California seismicity provides a valuable benchmark for future studies in this area.

The fourth and final section serves as a catchall and includes eight papers on a wide variety of topics rang-

ing from the role of statistical concepts in seismology (K. Aki; D. R. Brillinger), to source characteristics of explosions (B. W. Stump) and earthquakes (A. Udias; K. D. Smith, J. N. Brune and K. F. Priestly), to earth structure studies (L. Johnson; L. A. Drake; L. Knopoff, P. A. Rydelek and W. Zurn). These papers provide a good flavor of the breadth of current seismological research and its applicability to the analysis and interpretation of observed seismic data.

In summary, this volume contains many contributions which should be of interest to students of earth science history. Taken together, they emphasize once again the relative youth of seismology as a science and the great strides that have been taken in this discipline over the past 100 years. The quality of the book is quite good, although there are a few misplaced pages and minor typographical errors which may cause some momentary confusion. I particularly recommend it to anyone interested in the history of seismology.

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**PRINCIPLES OF GEOLOGY.** *Charles Lyell. Volume 1: A facsimile of the first edition with a new introduction by Martin J. S. Rudwick. 1990. University of Chicago Press. 574 p. Cloth \$39.95; Paper \$17.95.*

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Lyell's **PRINCIPLES** had a profound influence on Nineteenth Century thought and a very special impact on Charles Darwin. Moreover, it has been the cornerstone of geological dogma to the present day though few geologists have, in fact, read Lyell's book. Lyell's main thesis is that former changes in the earth's surface are explainable "by reference to causes now in operation" (often expressed as "the present is the key to the past").

A cursory examination of Lyell's **PRINCIPLES** leaves the impression that it is little more than a catalogue of observations on present-day erosion and deposition and on volcanoes and earthquakes in historic time. The length of the book and the mass of detail tend to obscure Lyell's thesis. Fortunately for the modern reader, Martin Rudwick's introduction provides a guide to the continuous thread of argument that underlies the 1400-odd pages of the first edition (of which nearly 600 constitute the volume here reviewed).

It will come as a surprise to many, perhaps, that Lyell did not accept Darwin's theory of evolution and, in fact, rejected any one-directional change in the composition of the biosphere. Nor did he accept any progressive evolution of the physical world. In this sense Lyell was at odds with most of his contemporaries as well as geologists of the present time.

This reprinting of Lyell's classic work is particularly timely in view of the controversy relating to a presumed collision of a large bolide and the earth at the

end of the Cretaceous—a catastrophe inferred from iridium enrichment at the Cretaceous-Tertiary boundary. It is to this hypothetical event that the mass extinctions including that of the dinosaurs is attributed. To what extent are geologists willing to abandon the uniformitarianism of Lyell? The reprinting of Lyell will reopen this question and lead to a re-examination of the concept—how is it to be defined, what are the assumptions that underly it, and to what extent can it be applied?

Geologists, particularly students of the history of the science, will be grateful for this reprint inasmuch as the original is now difficult to obtain. And they will also appreciate Rudwick's contribution that places the work in its historical context.

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**A HISTORY OF GEOLOGY.** *Gabriel Gohau. 1991. Revised and translated from the French by Albert V. and Marguerite Carozzi. Rutgers University Press, New Brunswick, NJ and London. 259 p. Softcover, \$12.95; Hardcover, \$35.00.*

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Reviewers' reactions to Gabriel Gohau's 1987 **HISTOIRE DE LA GEOLOGIE** were laudatory (Bork, 1988; Taylor, 1988). Thanks to Rutgers University Press, in league with translators Albert and Marguerite Carozzi, it is now easy for an English-speaking audience to profit from Gohau's account of the development of the geosciences. The paperback version is a real bargain in cost-to-content terms and could serve as an excellent text for courses in the history of geology. Because the published reviews of the French edition cover much of the substance of Gohau's text, this discussion will concentrate upon aspects of the English version which differ from the original or which are of particular note to the newly-targeted Anglophone readership.

At the outset, however, it is worth reviewing a few of the basic strengths of the narrative. The coverage is sweeping, carrying the account of geology's evolution from the pre-Socratic Greeks to the fomenters of the plate-tectonics revolution. In order to encompass twenty-five centuries in 250 pages, any author must do some judicious pruning, so the reader must realize that the book is a survey, not a multi-volume treatise. Given the limitations of space, Gohau does a masterful job of providing a coherent overview. He is particularly good at weaving important themes throughout the entire history of geoscience—as one example, how humans perceive continuity or discontinuity in the geologic record, from the time of the Greeks to current debates about the Cretaceous/Tertiary boundary.

The 1987 focus upon French and Continental contributors was applauded by reviewers, who felt that

such a perspective was helpful in balancing the sometimes Anglocentric view of geology's development, as presented by Lyell, Geikie, and others. In this English-language version the Gallic vision appears even more striking. Some British and American students may wonder what happened to William Smith, when they read (p. 129) that "the decisive moment of the establishment of this last stage (using fossils to date rock) was the publication of a famous memoir by Georges Cuvier and Alexandre Brongniart." Other examples of a Continental emphasis exist, but they may serve as valuable antidotes to the brand of Whiggism which sees all advances in geology as an orthogenetic sequence of steps taken by Hutton or Lyell.

This 1991 edition is more than just a translation of the 1987 text. New features include a complete set of notes, a few new illustrations, an expanded glossary, a slightly altered index, and minor revisions of the narrative. The Carozzis have translated Gohau's lively prose with great fidelity, yet in idiomatic and clear English. Having detailed reference notes is a valuable aid for readers interested in pursuing a specific topic. A perusal of the two index listings indicates that few additions or deletions of major figures have occurred, but new names range from Alvarez to Xanthus of Lydia; fans of French literature will be sad to see that Rabelais has been deleted. Also cut is the "Chronological Summary" of the first edition, tied so closely to French history that most American students would have been hard put to make significant connections ("Who was that François I guy, anyway?"). Each chapter profits from small "boxed" items which typically present first-person quotations from relevant historical figures. It is apparent that the author, translators, and editors gave considerable thought to creating a revision which retains the strengths of the original but incorporates meaningful adjustments.

Quibbling about minor miscues is an unpleasant aspect of reviewing, but it does tell the reader to be on guard, it indicates that a reviewer actually read the book, and it puts publishers on notice that proofreading is still a noble endeavor. It is worth reiterating that the basic attributes of "A History of Geology" far outweigh any litany of mini-blemishes. On p. 32 we are told that Leonardo da Vinci claimed that "water constitutes the vital human (sic) of this arid earth," when one suspects that he meant "humor." And on p. 79 we are amazed to read that Lehmann lived from 1619 to 1767. The term "toise" is introduced without definition on p. 71, and then is defined, differently each time, on pages 77, 91, and 119. (The 9-million-foot-high Alps produced by following the p. 91 definition are caused more by someone not changing a French comma into a decimal point than by truly unusual tectonics.) As long-lasting as Brongniart's contributions may be, it is not likely that he coined the word "Jurassic" in 1929 (p. 159). American readers may wonder why the "Bretonian Orogeny" is listed (p. 219) in a book targeted for their use, when "Acadian" is so much more familiar as a term for discussing Late De-

vonian tectonic events in North America. Other mini-suggestions could be made, but there is little reason to snipe at minor points that are the likely result of overly-rapid production rather than substantive mistakes.

On the more fundamental issue of whether the book informs and provokes thought, most readers will respond strongly in the affirmative. Not only does a rich cast of characters pass in review; Gohau also offers valuable insights which help the reader understand past developments and future implications of specific ideas. His constant concern with philosophical issues and recurring questions assures that individuals and historical movements are set in a larger context. In discussing plate tectonics, for example, the reader is reminded (p. 206) that "the value of a scientific theory lies as much in its retroactive explanation of facts that had remained enigmas as in its prediction of new facts," and then Gohau provides specific cases in point. Active reading of the text is fostered by the author's occasional role as provocateur, as when he states (p. 144) that "in Deluc's day, the late 1790s, the concept of uniformitarianism was considered to be an old method . . . based merely on common sense. How did Lyell turn it into a novelty?" There may be moments when one wishes for more explication, but the point of the book is to be concise and it succeeds in presenting an impressive wealth of factual data and thematic analyses.

Who should read "A History of Geology"? Anyone interested in a general introduction to geoscience history will find the material rewarding and approachable. Students, at various levels, could use it as a point of departure in a course on the history of geology. Even those geologists and historians already attuned to many of the topics covered may find Gohau's commentary refreshing and informative. Rutgers University Press is to be commended for pursuing the project and for offering the book at such an affordable price.

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**AN INTRODUCTION TO SEISMOLOGICAL RESEARCH: HISTORY AND DEVELOPMENT.** Benjamin F. Howell. 1990. *Cambridge University Press, New York*. 193 p. Hardcover, \$39.50.

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Heretofore the history of seismology could in general only be fragmentally found in prefatory sections, papers, and chapters of larger technical works, and in a very few history-oriented journal papers and several collected EÖS (American Geophysical Union) publi-



cations. Howell, emeritus professor of geophysics and dean at Pennsylvania State University, has written an important and accessible contribution to the technical history of geophysics that is neither a traditional topical history nor textbook, but a valuable hybrid with historical and technical features.

The book largely focuses on the technical development and dissemination of geoscientific theories and technology rather than on individual biography. A geoscientist's history predominantly for geoscientists, *An Introduction to Seismological Research* successfully seeks to acquaint the nonspecialists with the main facts and methods in the largely 20th-century history of seismic geophysics.

Howell divides the history of seismology and seismometry into four historical eras: the classical period from antiquity to the 1755 Lisbon earthquake; the predominantly direct-observation period through 1900; an empirical period, which simultaneously saw the growth of geophysics as a whole, lasting till about 1960; and the post-1960 era of computer models and data processing in both pure and applied seismology. After a synoptic introduction, eight topical chapters in turn discuss the cause (Chapter 2) and prediction (Chapter 3) of earthquakes; seismometers (Chapter 4), seismic structure of the earth (Chapter 5), earthquake magnitude/size relations (Chapter 6), seismic attenuation (Chapter 7), microseisms (Chapter 8), and tsunamis (Chapter 9). The book repeatedly examines the seismological impact and role of continental drift and plate tectonics with details which complement the broader historical treatments by historians/philosophers of science such as Le Grand, Stewart, Giere, Laudan, and Fraenkel.

This book's thematic focus is not surprisingly focused largely on earthquake seismology; the author is a noted researcher in within-earth attenuation and earthquake hazard regionalization. Thus Chapters 2–6 aptly summarize and explain the key concepts and methods in the development of earthquake models and forecasting methods. Chapter 3 considers the foundations and development of empirical cataloging, model verification, and seismicity zoning by Mallet, Milne, Gerland and Wiechert, Macelwane and the Jesuit seismological network, as well as the US Coast and Geodetic Survey, National Oceanographic and Atmospheric Administration, and the US Geological Survey. Specific topics covered include macro vs micro scales, shallow vs deep hypocenters, inter- vs intra-plate location, and near- vs far-field sources, and more generally the connections between rock fracture and earthquake faulting, from Reid's elastic-rebound theory to contemporary wet-dilatancy theories of Brace and Scholz. Accurately but somewhat too briefly, the important developments in seismic propagation computer models are introduced as numerical tools for theoretical experiments on earthquake source type, depth, and range behaviors.

Chapter 4 on seismic instrumentation goes considerably beyond Dewey and Byerly's classic 1969 paper

in the *Bulletin of the Seismological Society of America*. Considerations include discussions of the mutual reciprocal influence of earthquake research requirements and available technometry, particularly in the evolution of modern portable and strong-motion seismometers from *fin du siècle* direct-recording seismographs. As noted in Stewart's recent discussions (*Drifting Continents and Colliding Paradigms*) of the role of scientific graphics as crucial "iconic images" in scientific theory development and acceptance, each chapter includes an ancillary history of some of the first critical diagrams, maps, and figures which the author feels played key roles in driving home and disseminating basic concepts and methods in 20th-century seismology. These iconic graphics include Lamb's problem of seismic-acoustic waveguide trapping, Nakano's first motions for different source geometries, Jeffrey's travel-time curves for surface foci, Gutenberg and Richter's global maps of seismic activity belts, and several generations of plots of earth moduli variation vs crust, mantle, and core depth. An appendix offers a chronology of seismic developments and discoveries, underscoring several high-activity clusters in the 1930's and 1960's.

Some overly brief generalizations and omissions are discernible in the above discussions but are almost inevitable in writing a short monograph. What it covers is clearly and well summarized and detailed, with over 730 bibliographic citations referencing key works by contemporaries Aki, Anderson, Bath, Benioff, Birch, Brace, Bullen, Byerly, Ewing, Jeffreys, Knopoff, and more historical personages such as Gutenberg, Mallet, Milne, Oldham, Richter, Stoneley, and Wiechert. An acknowledged but still unfortunate gap in any such study is the neglect of Meissner and Karcher's work in the early 1920's on seismic refraction and reflection prospecting. Also acknowledged absent is the story of the "Vela Uniform" project's contributions to seismometry and seismic array design, seismic signal processing, and seismic wave propagation modeling.

This volume notably complements recent works on historical seismicity and the historiography of seismicity by N. N. Ambraseys and others. The content and treatment, although in many places clearly obvious as "one man's view" of specific topics, are always objective and balanced. This unfortunately too-abbreviated discussion is well conceived, thorough, and well written. Although it may at times be hard reading for geoscientists and historians who do not have some training in mathematics and geophysics, it will not fail to give valuable information and insights to any persistent readers. The time is more than right for such historically-structured interdisciplinary monographs that can effectively bridge the gaps between nontechnical surveys/tutorials and specialist literature. Professors, researchers, and graduate students will find Howell's work a valuable resource and example.

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**SAND, WIND, AND WAR: MEMOIRS OF A DESERT EXPLORER.** Ralph A. Bagnold. 1990. *The University of Arizona Press, Tucson.* 209 p. Hardcover, \$29.95.

Few earth scientists could recount a life story as interesting as the one recounted by Ralph A. Bagnold in *Sand, Wind, and War: Memoirs of a Desert Explorer*. As Luna Leopold, Paul Komar, and Vance Haynes, three scientists who knew Bagnold, state in a foreword, we are fortunate that Bagnold completed his autobiography shortly before he died in May, 1990. Although this book has neither the philosophical depth of Antoine de Saint Exupéry's similarly titled classic of desert experience, *Wind, Sand and Stars*, nor the scientific detail of Bagnold's own 1941 classic, *The Physics of Blown Sand and Desert Dunes*, it will be of keen interest to earth scientists concerned with the history of their science and to science historians concerned with the life of a great scientist.

In this memoir Bagnold tells the story of his life, beginning with his birth in England in 1896, continuing through his army career and desert experiences before and during World War II, and ending with his distinguished scientific career following World War II. Although no period of his life is short-changed, he properly gives prominence to his explorations and research in the North African desert.

One of the things we learn from this book is how truly intrepid Bagnold was. His desert explorations, beginning in 1927 while he was stationed with the British army in Egypt, were undertaken not as part of a farsighted and well funded military research program but on leave time and with only the private vehicles that he and a few friends could muster. While on duty for a few years in India, he even drove back across the Middle East to take part in another Egyptian desert exploration that he had organized.

Bagnold was not trained as a scientist, but his engineering education at Cambridge seems to have been well suited to his research needs. His scientific concern with sand and wind arose gradually from his painfully acquired knowledge of desert travel by motor vehicle. One of the high points of the book is his description of a sand storm that left one of his vehicles stranded in an eight-foot-deep scour pit. Bagnold's wind-tunnel experiments on sand transport were undertaken while he was convalescing in England from a tropical ail-

ment. These laboratory experiments preceded his field experiments, which he performed during a last scientific trip to the Egyptian desert in 1938.

Bagnold's service in the British army during the North African campaigns of World War II has long been legendary among aeolian sedimentologists. What a surprise it was to learn how accidentally this service came about! Bagnold, who had retired in 1939, had been recalled and posted to East Africa, not to Egypt, where any perceptive military organization would have sent him. The ship on which he sailed was damaged in the Mediterranean and limped into Port Said, whereupon Bagnold managed to remain in Egypt and eventually talked his way into organizing and commanding the Long Range Desert Group, a small reconnaissance and raiding group that operated throughout the Egyptian and Libyan deserts. He slyly notes that his group was contrasted in jest to the Short Range Shepherds Group, named for the Cairo hotel bar where British staff officers congregated. Bagnold's wartime service earned him the title of Brigadier, but he says that he put greater value on being elected Fellow of the Royal Society.

The reasons why Bagnold became such an important scientist are, as one might expect, more implicit than explicit in this book. His physical and mental energy and the resulting sheer enthusiasm for discovery come through strongly, and these factors must have been critical to his success. What I personally have found most valuable in Bagnold's work is the boldness and clarity of his thought experiments, best exemplified in his 1941 classic. Even when they have turned out to be wrong, these chains of reasoning have proven immensely stimulating, both as approaches to specific problems and as examples of how a courageous scientist pushes the power of reason to its limits.

To appreciate Bagnold's scientific thought, one must go to his scientific papers and his 1941 book. To understand something of the person and of how the scientific ideas were generated, however, this memoir is a good place to start. Besides its interest to scientists and historians, the book will appeal to anyone who enjoys the story of an interesting life. The book is handsomely produced. There are 17 photographs, most of them illustrating his desert travels. Four page-sized maps show the routes of his desert explorations and of his military operations in World War II.

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## 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 are requested to send them to the editor.

Due to financial constraints, the previous list of Interesting Publications (Volume 11, Number 1, 1992) was cut short. The following is a continuation of that list.

- Krebs, Bernhard, 1989, 25 Jahre Lehrstuhl/Institut für Paläontologie der Freien Universität Berlin (25 years—Department of Paleontology of the Free University of Berlin): *Berliner Geowissenschaftliche Abh und lungen*, v. 106, series A, p. 5–7.
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## ANNOUNCEMENTS

XIXth International Congress of History of Science  
August 22–29 1993  
Zaragoza, Spain

The scheduled program includes: Lectures, Scientific sections, Symposia, Exhibitions, Poster Presentations, Business and General Meetings, and Tours, Excursions, Get Together Meetings, and Receptions.

For further information contact:

XIX International Congress of History of Science  
Facultad de Ciencias  
(Matemáticas)  
Ciudad Universitaria  
50009 Zaragoza (Spain)

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Work has begun on *History of the Geosciences: An Encyclopedia*, to be published by Garland Publishing. Scheduled to appear in 1994, the book is intended to provide an overview of current scholarship and new directions in its field, will encompass a broad cultural and chronological range, and will include entries on a wide range of subjects in the history of geosciences, including but not restricted to geophysics, geology, oceanography, meteorology, and near space science. Inquiries should be addressed to the editor, Gregory A. Good, Department of History, West Virginia University, Morgantown, WV 26506.

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A symposium to mark the 75th anniversary of the foundation of the Oil Technology Course was held at the Royal School of Mines, Imperial College of Science, Technology and Medicine, University of London, on July 12, 1988.

This symposium was published in 1990 as *Seventy-Five Years of Progress in Oil Field Science and Technology*, 1990 by Balkema, Rotterdam, ISBN 90 6191 1087.

Table of Contents: Introductory remarks, M. Ala; Opening address, G. H. Chipperfield; Keynote address: Change and future opportunities, Sir Peter Baxendell; The history of the oil technology course and its offshoots, G. D. Hobson; Some technological challenges for the upstream oil industry in the 1990's; B. A. Lavers; The UK offshore oil industry—Its history and the challenge for the future, D. W. Pickup; The economics of marginal field development, P. D. Gaffney; World oilfields—Past, present, future, E. N. Tiratsoo; Development of the petroleum exploration scene in the UK onshore area, A struggle over the last 75 years, W. E. Evans; The Middle East basin: A summary overview, R. Stoneley; Seventy-five years of petroleum exploration and production in the Zagros basin of Southwest Iran, M. Ala; Ras Fanar field, F. Sultan, H. Anton and I. Saleh; Clay mineral diagenesis at unconformities, M. B.-Gailani and M. Ala; Porosity evolution of truncated sandstone reservoirs, R. C. Selley; Fluid inclusions associated with oil and ore in sediments, A. H. Rankin; Migration: An analysis of some of the problems, G. D. Hobson; The seismic geologist, M. B. Gowers; Velocities for depth conversion, B. K. Davis; Seismic interpretation: An egg in search of a chicken, I. Wil-



liamson; Wave theoretical topographic imaging of crosshole seismic data, M. H. Worthington and R. G. Pratt; Heterogeneity of permeability in oil reservoirs, J. S. Archer; Reservoir physics at the pore scale, R. A. Dawe; Identification of changes in the productive capacity of a well producing from a solution-gas drive reservoir, T. E. W. Nind; Measurement while drilling, J. W. G. Honeybourne.

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A symposium was held on the history of the geosciences in the German countries on September 17 through the 20th in Freiberg (Saxony) Germany.

### *The Oxford Dictionary of Scientific Quotations*

#### *Request for Geological Quotations*

A new sourcebook of memorable quotations by scientists is in preparation, with W. F. Bynum and R. S. Porter as general editors. The volume will be published by Oxford University Press. Particular sciences are being dealt with by separate members of the editorial board, and David Oldroyd of the University of New South Wales is responsible for the geological material.

Dr. Oldroyd will be pleased to receive suggestions for inclusion in the *Dictionary* from readers of *Earth Sciences History*. Naturally, one will look to quotations from more famous authors, but little-known scientists should certainly not be excluded. Contributions from languages other than English will be particularly welcome.

The idea is to collect together memorable statements from the geological literature, perhaps aphoristic in style, such as might be found in any dictionary of quotations. They may be up to about one hundred words in length.

Contributors are requested to supply full bibliographical details for each quotation. Items should be written on index cards. The Editors will publish the names of all persons who have supplied quotations that are used. So names of contributors should also be written on the cards.

A *deluge* of suggestions will be exceedingly welcome, and should be directed to:

David R. Oldroyd  
School of Science & Technology Studies  
University of New South Wales  
Kensington, N. S. W., 2033  
Australia

### MEETING ON THE HISTORY OF GEOLOGY

Troy, New York; 29 July–1 Aug. 1992  
History of the Earth Sciences Society/  
Northeastern Science Foundation, Inc.

The History of the Earth Sciences Society, founded in 1982, held its first formal meeting in Troy, New York, from 29 July through 1 August 1992. Dr. Gerald M. Friedman, of Brooklyn College and the City Univ. of New York, organized and hosted the gathering. The Rensselaer Center for Applied Geology, created and run by Dr. Friedman, was the site of the meetings. Support was provided by the Northeastern Science Foundation, Inc. Participants heard approximately 25 professional papers concerning the development of the geosciences in Canada, the United States, Europe, and Brazil. On Friday, 31 July, the group took a field trip in and around Troy to see sites made famous by geologists and industrialists in the region, considered to be a center of the Industrial Revolution in the United States and a "home of geologic pioneers," such as Amos Eaton, Ebenezer Emmons, James Hall, and others.

### KUDOS

*HESS* Editor GERALD M. FRIEDMAN was conferred honorary membership in the Geological Society of Israel. The award, the first given since 1988, has never previously been conferred on a scientist from outside Israel.

### OMISSION

The following is a list of references omitted from "The Turin Papyrus Map" by David McMahon, in *Earth Sciences History*, v. 11, no. 1, 1992.

- LUCAS, A. & ROWE, A. 1938. The ancient Egyptian "Bekhen stone": Annales du service des antiquités de l'Égypte, v. 38, p. 127–156.
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- MURRAY, G. W. 1942a. The gold mine of the Turin papyrus: Bulletin de l'Institut d'Égypte, v. 24, p. 81–86.
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- POSNER, G. 1965. Sur l'orientation et l'ordre des points cardinaux chez les Égyptiens: Nachrichten der Akademie der Wissenschaften in Göttingen, v. 1, p. 69–78.

## EARTH SCIENCES HISTORY CALENDAR

### 1993

**Feb. 8-11**—Geological Remote Sensing Meeting, Pasadena, Calif. Nancy J. Wallman, Environmental Research Institute of Michigan, Box 134001, Ann Arbor, Mich. 48113-4001. Phone: (313) 994-1200, ext., 3234. Fax: (313) 994-5123.

**Feb. 11-16**—American Association for the Advancement of Science, Annual Meeting, Boston. American Association for the Advancement of Science. 1333 H. St., N.W., Washington, D.C. 20005. Phone: (202) 326-6400.

**Feb. 15-17**—Society for Mining, Metallurgy, and Exploration, Annual Meeting, Reno Nev. SME Meetings Department, Box 625002, Littleton, Colo. 80162-5002. Phone: (303) 973-9550. Fax: (303) 979-3461.

**Feb. 25-27**—Geologische Vereinigung, Annual Meeting, Berlin. P. Giese, Freie Universität Berlin, Fachbereich Geowissenschaften, Institut für Geophysikalische Wissenschaften Fachrichtung Geophysik, Rheinbabenallee 49, 100 Berlin, 33 Germany.

**March 14-17**—Venezuelan Society of Geologists/American Association of Petroleum Geologists, International Meeting, Caracas, Venezuela. AAPG Convention Department, Box 979, Tulsa, Okla. 74101-0979. Phone: (918) 584-2555. Fax: (918) 584-2274.

**March 15-16**—South Central Section, Geological Society of America, Meeting, Fort Worth, Texas. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**March 15-19**—Lunar and Planetary Sciences, Annual Meeting, Houston. Pamela Jones, Lunar and Planetary Institute, Program Series Department, 3600 Bay Area Blvd., Houston, Texas 77058-1113. Phone: (713) 486-2150.

**March 22-24**—Northeastern Section, Geological Society of America, Meeting, Burlington, Vermont. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**March 29-30**—North Central Section, Geological Society of America, Meeting, Rolla, MO. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**April 1-2**—Southeastern Section, Geological Society of America, Meeting, Tallahassee, Florida. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**April 1-4**—National Science Teachers Association, Annual Meeting, Kansas City, MO. NSTA, 1742 Connecticut Avenue, N.W., Washington, D.C. 20009-1171. Phone: (202) 328-5800. Fax (202) 328-0974.

**April 15-16**—Science and Technology Policy, Meeting, Washington, D.C. American Association for the Advancement of Science. 1333 H. St., N.W., Washington, D.C. 20005. Phone: (202) 326-6400.

**April 17-20**—Exploration and Discovery Meeting, Denver, Society of Economic Geologists, Society of Exploration Geophysicists, and others. J. Alan Coope, SEG Conference '93, Box 571, Golden, Colo. 80402. Phone: (303) 837-5819. Fax (303) 837-5851.

**April 25-28**—American Association of Petroleum Geologists, Annual Meeting, New Orleans. AAPG, Box 979, Tulsa, Okla. 74101-0979. Phone: (918) 584-2555. Fax (918) 584-0469.

**May 16-20**—Environmental Hydrology and Hydrogeology, Meeting, Washington, D.C. Secretariat, American Institute of Hydrology, Second USA/USSR Conference, 3416 University Avenue, S.E. Minneapolis, Minn. 55414-3328. Phone: (612) 379-1030. Fax: (612) 379-0169.

**May 17-19**—Geological Association of Canada and Mineralogical Association of Canada, Annual Meeting, Edmonton, Alberta. J. W. Kramers, Alberta Geological Survey, Box 8330, Station F, Edmonton, T5H 5X2, Canada. Phone: (403) 438-7644. Fax: (403) 438-3354.

**May 19-21**—Cordilleran/Rocky Mountain Sections, Geological Society of America, Meeting, Reno, Nev. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**May 31-June 2**—Applied Mineralogy, International Meeting, Perth, Western Australia. Jim Graham, ICAM '93, Private Bag, P.O. Wembley, 6014, Australia. Phone: (619) 387-0371.

**June 1-5**—Geotechnical Engineering, International Meeting, St. Louis. Norma R. Fleming, 119 M E An-

nex, University of Missouri, Rolla MO 65401-0249. Phone: (800) 752-5057; (314) 341-6061. Fax: (314) 341-4992.

**June 21-25**—15th International Conference on the History of Cartography, Chicago. James R. Akerman, Newberry Library, 60 West Walton St., Chicago IL 60610-3380.

**July 7-14**—5th International Congress for the History of Oceanography (ICHO V), Scripps Institution of Oceanography, La Jolla, California. Deborah Day, Archivist, Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA 92093-0175.

**Aug. 23-29**—Coastal Sedimentology Meeting, Hamilton, Ontario. William F. Tanner, Department of Geology, B-160, Florida State University, Tallahassee, Florida 32306. Phone: (904) 644-3208.

**Sept. 25-Oct. 1**—International Association of Volcanology and Chemistry of the Earth's Interior, Meeting, Canberra, Australia. (AVCE) ACTS, GPO Box 2200, Canberra ACT 2601, Australia. Phone: 61/6/257-3299. Fax: 61/6257-3256.

**Oct. 18-20**—National Ground Water Association, Meeting, Kansas City, MO. National Ground Water

Association, 6375 Riverside Drive, Dublin, Ohio. Phone: (614) 761-1171. Fax: (614) 761-3446.

**Oct. 25-28**—Geological Society of America, and Affiliated Societies, Annual Meeting, Boston. Vanessa George, GSA, Box 9140, 3300 Penrose Place, Boulder, Colo. 80301. Phone: (303) 447-2020.

**Nov. 11-14**—History of Science Society, Meeting, Santa Fe, New Mexico. Paul Farber, Department of History, Oregon State University, Corvallis, OR 97331. Phone: (503) 737-4151. Fax: (503) 737-2434.

## 1994

**Feb. 18-23**—American Association for the Advancement of Science, Annual Meeting, San Francisco, Calif. American Association for the Advancement of Science, 1333 H. St., N.W., Washington, D.C. 20005. Phone: (202) 326-6400.

**June 19-24**—American Nuclear Society, Annual Meeting, New Orleans. Meetings Department, American Nuclear Society, 555 N. Kensington Avenue, LaGrange Park, Illinois 60525. Phone: (312) 352-6611.