EARTH SCIENCES HISTORY

JOURNAL OF THE HISTORY OF THE EARTH SCIENCES SOCIETY

Volume 23, Number 2, 2004



CONGRESO DE GEODESIA

A caricature of participants at the Second Assembly of the International Union for Geodesy and Geophysics in Madrid, Spain, 1924. Courtesy of Carnegie Institution of Washington, Department of Terrestrial Magnetism.

EARTH SCIENCES HISTORY

Journal of the History of the Earth Sciences Society

DEPARTING EDITOR: Gregory A. Good History Department, Woodburn Hall, Room 202A West Virginia University Morgantown WV 26506-6303 USA

Tel: 304-293-2421 Ext. 5247 E-mail: greg.good@mail.wvu.edu

EDITOR-ELECT: Patrick N. Wyse Jackson, effective January 2005 Department of Geology, Trinity College Dublin, 2, Ireland

Tel: 00-353-1-6081477 Email: wysjcknp@tcd.ie

JOURNAL/SOCIETY WEB SITE: www.historyearthscience.org

BOOK REVIEW EDITOR: Vic Baker

Department of Hydrology and Water Resources, The University of Arizona, Tucson AZ 85721 USA; Tel: 520-621-7875

E-mail: baker@hwr.arizona.edu

FOUNDING EDITOR: Gerald M. Friedman, 1982–1993 PAST EDITOR: Mott T. Greene, 1994–1998

ASSOCIATE EDITORS

Mineralogy and Geology, Germany,

Paleontology, Historical Geology Kenneth Carpenter Denver Museum of Natural History 2001 Colorado Boulevard Denver, CO 80205-5798 United States Email: Geophysics, Space Science Ed Cliver Space Vehicles Directorate Air Force Research Laboratory (AFRL/VSBXS) Hanscom AFB, MA 01731-3010 United States Email: Edward.Cliver@HANSCOM.AF.MIL

Geography, Cartography Lesley B. Cormack Department of History and Classics University of Alberta 2-28 Henry Marshall Tory Building Edmonton, AB T6G 2H4 Canada Email: Lesley.Cormack@UALBERTA.CA

Meteorology and Climatology, Military and Geophysics James R. Fleming STS Program Colby College 5881 Mayflower Hill Waterville, ME 04901 United States Email: jrflemin@colby.edu

Antiquity to 19th Century; History, Sociology, and Philosophy of Earth Sciences PD Dr. Bernhard Fritscher Munich Center for the History of Science and Technology Institute for the History of Science Museumsinsel 1 D-80306 Munich Germany Email: B.Fritscher@lrz.uni-muenchen.de Paleontology, Geology in Latin America Maria Margaret Lopes Instituto de Geocijncias Universidade Estadual de Campinas C.P. 6152 13083-970 Campinas, São Paulo, Brazil Email: mmlopes@ige.unicamp.br Oceanography Eric Mills Department of Oceanography Dalhousie University Halifax, Nova Scotia B3H 4J1 Canada Email: E.Mills@DAL.CA 18th- and 19th-Century, American Geology Julie R. Newell SIS Program Southern Polytechnic State University 1100 So. Marietta Parkway Marietta, GA 30060 United States Email: jnewell@spsu.edu

 P. tcd.ie
 Downloaded from https://prime-pdf-waternark.prik.prime-pdf-waternark.prik.prime-pdf-watern

Email: Ezio.Vaccari@lettere.unige.it

Earth Sciences History is published twice per year.

To submit a manuscript or subscribe: Please visit the HESS web site at www.historyearthscience.org. Articles may be submitted to an appropriate Associate Editor or directly to the Editor. Manuscripts are refereed by at least two reviewers.

Change of address: Please send your new address via email to the Treasurer and the Secretary. See the inside back cover for their email addresses.

To join HESS: See the clip-and-mail form at the back of the journal or visit the web site. Remember that HESS now can accept credit cards, especially valuable for individuals outside the U.S.

Copyright 2004 by HESS. All rights reserved.

EARTH SCIENCES HISTORY

Volume 23, Number 2, 2004

TABLE OF CONTENTS

Editorial: Historians, Scientists, and the History of Earth Science Gregory A. Good	171
Announcement	174
Articles	1/4
Earthquakes, Damage, and Prediction: The Spanish Seismological Service, 1898–1930 Aitor Anduaga	175
The Desert Sandstone of Australia A Late Nineteenth-Century Enigma of Deposition, Fossils, and Weathering David F. Branagan	208
The First Half-Century of the International Association of Sedimentologists (IAS) 1952–2002 Gerald M. Friedman	257
Baer's Law of Stream Deflection Andrew S. Goudie	Note
Ancient References to the Fossils from the Land of Pythagoras Nikos Solounias and Adrienne Mayor	283
Reinventing the Wheel: Recurrent Conception in Geomorphology C. Rowl Twidale	297
SPECIAL SECTION: THE HISTORY OF MATHEMATICAL GEOLO	GY
Introduction: Pioneers in Mathematical Geology Daniel F. Merriam and Richard J. Howarth	314
Georges Matheron: Founder of Spatial Statistics Frederik P. Agterberg	325
John Cedric Griffiths (1912–1992): Geologist, Statistician, Philosopher, and Advocate	
Lawrence J. Drew Not "Just a Petrographer": The Life and Work of Felix Chayes (1916–	335
1993) Richard J. Howarth	343
Richard Arthur Reyment: Father of the International Association for Mathematical Geology	
Daniel F. Merriam William Christian Krumbein: Father of Mathematical Geology Wolfgang Scherer	365 374
A. B. Vistelius: First IAMG President and Visionary Mathematical Geologist	574
	384
Book Reviews	
B. P. Radhakrishna, ed., J. B. Auden: A Centenary Tribute Rasoul Sorkhabi	390

Stephen Jay Gould, The Hedgehog, the Fox, and the Magister's Pox: Mending the Gap between Science and the Humanities	
Victor R. Baker	392
Jack Repcheck, The Man who Found Time: James Hutton and the Discovery of the Earth's Antiquity	
Victor R. Baker	393
Interesting Publications Gerald M. Friedman	395
Journal Guidelines	
Author's Style Sheet and Checklist	407
Citation Guidelines	408
Guidelines for Writing Éloges	410 411
Treasurer's Report for 2004	412
Deset Sandstone of Australia A Late Minetecuti-Century Enignal	
Author Index	413
Key Word Index	428
Historical People Index	433
Books Reviewed Index	442
Book Reviewers Index	456
Notes on Contributors	466

EDITORIAL

HISTORIANS, SCIENTISTS, AND THE HISTORY OF EARTH SCIENCE

GREGORY A. GOOD Departing Editor, EARTH SCIENCES HISTORY West Virginia University Morgantown, WV 26506-6303 Greg.Good@mail.wvu.edu

I, and EARTH SCIENCES HISTORY, transition today toward new paths. Since 1998 I have done my best to maintain the standards of the journal. During my time as editor, EARTH SCIENCES HISTORY has published a wealth of articles and research notes, 73 in all. The articles have ranged so widely it would be tedious to give any sense of their breadth. The journal has not quite become cosmic in its scope, but it has come much closer to being a comprehensive venue for the history of all areas of earth science. Articles in history of geology and paleontology have kept their strong presence, but there have been increasing numbers of articles in the histories of atmospheric and oceanic science and even a little history of geophysics. A gap in our coverage I wished to fill and never did was the history of geography. Perhaps that will happen under the new editor.

One development that has pleased me greatly is the increasingly international character of our authorship. This issue illustrates the point well. This issue has a Spanish author, two Australians, three Britons, a Venezuelan, a Canadian, and five Americans. Several issues in the last years have drawn authors from even broader backgrounds. While this is a good sign that EARTH SCIENCES HISTORY is becoming more global, it also points to a practical problem of fast communication during the publishing process. The editor-to-be, Patrick Wyse Jackson, is considering ways to meet this challenge. Since he will be editing the journal in Dublin, Ireland, and the printer will continue to be Allen Press in Lawrence, Kansas, U.S.A., this will be essential.

During these six years I have incurred many debts. First, my thanks to all of the authors who have allowed me to work with their creations. You have taught me not only much history of earth science, but many of you have interacted with me most cooperatively regarding changes to your manuscripts and various computer problems experienced along the way.

Likewise, numerous articles have been reviewed by a great many referees (well over one hundred!) and by several of the Associate Editors. These two groups, more than the editor, guarantee the observance of a high scholarly standard. I wish to thank several particular Associate Editors—Ken Carpenter, David Oldroyd, Ezio Vaccari, James Fleming, and Irina Podgorny—all of whom helped with the various stages of several articles.

Gerald M. Friedman and Mott Greene, the Founding Editor and second Editor of EARTH SCIENCES HISTORY, have supported and advised me during my term. Gerry in particular has continued to supply the column 'Interesting Publications' and to do so on schedule. Mott's 'war stories' have helped me to keep going when I have occasionally needed encouragement. And I have had the privilege of working with two energetic Book Review Editors: Gretchen Luepke Bynum and Vic Baker. Their contributions to the journal, and to the Editor's sanity, are immeasurable.

I reserve my greatest thanks, though, for the other officers of the History of

EDITORIAL

the Earth Sciences Society, who have alternately fed me new ideas or reacted constructively to my own. Ken Taylor first discussed the editorship with me at the close of his term as President in 1998. I have since served with Presidents Kennard Bork, Silvia F. de M. Figueirôa, and Bill Brice, with two treasurers, Dorothy Sack and Ed Rogers, and with numerous councilors, all of whom have interacted extensively with me via email and telephone. Without their gentle goading and collaboration, I could not have had nearly as much fun as I've had and the journal would not have been so strong.

I've heard that an organization is not mature until it has moved to its fourth CEO, and now **EARTH SCIENCES HISTORY** makes that move. From Gerald M. Friedman, to Mott Greene, to myself, and now to Patrick Wyse Jackson. With each step the journal has grown, and each succeeding editor has benefited from the experience of his predecessors. I thank Gerry and Mott for their advice and empathy. I'm confident that Patrick, too, will do well for the journal and the society.

HESS and this journal are unique in history of science, in that here historians and scientists act together as equal partners. Different motivations drive our respective historical interests, but this is healthy. While some journals in history of science seem to be progressively more pre-occupied with arcane issues of historiography, and while some scientific outlets seem not to expect historical research to meet the same standards that are applied to scientific research, EARTH SCIENCES HISTORY has tried to occupy a middle ground. Although this journal has published articles based on historical problems, some controversial, it has also published articles simply because they told a good story well. And standards of argument and documentation have been enforced. I hope our readers have found this balance acceptable. I have tried as Editor to keep alive the spirit of collaboration among scientists and historians that I trace back (in my career) to the 'Insiders-Outsiders' Penrose Conference of 1994.

* * *

This 'bonus issue' of the journal is almost two issues in one. The first section includes six 'over-the-transom' contributions: on the history of Spanish seismology in social and political context, on the development and fate of the concept of 'Desert Sandstone' in Australia, on the International Association of Sedimentology at fifty years, on Baer's law of stream deflection, on ancient references to fossils on Samos, and on the tendency for ideas to resurface over time in geomorphological thought.

The second section was brought to me by Daniel F. Merriam, who participated in a session at the 35th meeting of the International Association for Mathematical Geology (IAMG), in Portsmouth, England, in 2003. These seven articles do not merely celebrate the people who established this new geological specialization in the twentieth century; they explore the diversity of personality and ability that made this new field possible. These articles display for our readers a side of geology that many of them likely know very little about. The pre-occupation for years has been with 'classic' geology, especially with geological field work and with dramatic theoretical orientations like catastrophism and actualism or plate tectonics. Many other aspects of earth science yet remain to be treated historically.

A last word of thanks: West Virginia University has generously supported EARTH SCIENCES HISTORY since 1998 through a small subsidy. This subsidy has allowed me to attend conferences of both the History of Science Society and the Geological Society of America each year. This way I was able to stay in touch with HESS members and recruit possible authors and referees. Equally valuable, however, this subsidy has employed a series of student assistants who have helped in many ways. Their most visible products are the five Cumulative Indexes at the

EDITORIAL

end of this volume. These indexes provide a comprehensive guide to volumes 1 to 22 of **EARTH SCIENCES HISTORY.** The assistants have also scanned all twenty-three volumes of the journal and produced a PDF version of it that will be made available for purchase in 2005. My thanks go out to Tom Tucker, Stephen R. Orr IV, Jeremy Robinson, Isaac Emerick, and Jason Ruehl. The Dean of the Eberly College of Arts and Sciences at WVU who saw the value in editorial activity was Duane Nellis. Duane was President of the Association of American Geographers while I was editor. Many of you will appreciate that few academic administrators see editing a journal as an advisable alternative to research!

A new phase in my life is beginning. Thank you all for this wonderful opportunity I had to edit EARTH SCIENCES HISTORY.

ANNOUNCEMENT

Founding Editor and Honorary Life Member of the History of the Earth Sciences Society, Distinguished Professor Gerald M. Friedman will celebrate his retirement on September 11–14, 2005 from the City University of New York. The conference will celebrate Professor Friedman's career in geology, education, and history of science. Retirement from active teaching and administration will provide additional opportunity for research and writing. The party will be celebrated at the Northeastern Science Foundation in the beautiful setting of Troy, New York, in the foothills of the Catskill and Adirondack Mountains. The program will include a field trip by boat on the Hudson River to experience the ambience of upstate New York and history of geology field trips to the sites of founders of American geology. We extend invitations to both members and nonmembers to submit abstracts for oral and poster presentations.

Join us to celebrate Professor Friedman's career. Registration forms will be sent later. Please send abstract to: Friedman 2005, NSF/RCAG 15 Third Street/PO Box 746, Troy, NY 12181