

EARTH SCIENCES HISTORY

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EDWARD HITCHCOCK'S POEM, THE SANDSTONE BIRD (1836)
JORDAN D. MARCHB II
North Museum, Franklin & Marshall College, Lancaster, PA 17604
ABSTRACT

Edward Hitchcock's 1836 poetic description of the animals believed responsible for the large, three-toed Lower Jurassic *Eubrontes giganteus* fossil footprints was obscurely published in 1836. Due to the literary, rather than scientific, nature of the journal (*The Knickerbocker*) and Hitchcock's incomplete bibliographic reference to its source, the poem has been completely overlooked by today's geological historians. It offers a unique (and ironic) glimpse of the early sciences of geology and paleontology in the era just before Agassiz's glacial hypothesis was introduced. The work is still laced with many lingering notions about Diluvial processes and a persistent belief in the Earth's degenerate, mined condition. This remarkable poem is offered for republication here (with critical comments). -

THE TRILOBITE AFFAIR OF JAMES HALL AND
JAMES DWIGHT DANA (1837-1847)
ROLF LUDVIGSEN
Denman Institute for Research on Trilobites
4062 Wren Road, Denman Island, British Columbia, Canada V0R 1T0
and
Centre for Earth and Ocean Research, University of Victoria
Victoria, British Columbia, Canada V8W 2Y2
ABSTRACT

James Hall's 1838 paper on two species of the trilobite *Paradoxides* in the *American Journal of Science*, the first paper Hall published in a scientific journal and the first to deal with fossils, was conceived and written by James Dwight Dana. The sequence of events was uncovered by M. L. Prendergast (1978) in an unpublished thesis. The Trilobite Affair, as it was dubbed by Dana, created problems for both participants and it may have been a source of discord 20 years later as Hall and Dana clashed over theories of mountain building. John Clarke and Rudolf Ruedemann, Hall's successors, attempted to exonerate their mentor by shifting the entire blame for the affair to Dana.

RED EARTH AND BONES: THE HISTORY OF CAVE
SEDIMENT STUDIES IN NEW SOUTH WALES, AUSTRALIA
R. A. L. OSBORNE
ABSTRACT

Red earth and bones are an enduring theme in the history of cave sediment studies in New South Wales. Scientific studies of cave sediments began with the discovery of fossil bones in red cave earth at Wellington Caves in the 1830's.

Three distinct phases in the study of cave sediments in New South Wales can be recognised. In the first, Classical, phase, from 1830 to 1900, leading naturalists and geologists visited caves and reported the presence of sediments. Red earth was sought as an indicator of vertebrate fossils, however, neither the sediment itself, nor its stratigraphy was studied to any extent.

In the second, Low Activity, phase, from 1900 till 1966, there was little scientific interest in cave sediments. Some work was done on phosphorites, and mention was made of both palaeokarst and possible correlation of sequences between different cave areas.

The third, Modern, phase began in 1966 with the work of R. M. Frank, who for the first time examined both the composition and stratigraphy of cave sediments in New South Wales. Following Frank, cave sediment studies became specialised with a variety of sedimentological, chemical and stratigraphic approaches being taken.

WHIGGISM AND ITS SOURCES IN ALLÉGRE'S
THE BEHAVIOR OF THE EARTH
DAVID J. LEVESON
Department of Geology
Brooklyn College, CUNY
Brooklyn, NY 11210
ABSTRACT

Claude Allégre's recent book on the development and subsequent modification of plate tectonic theory is written from the perspective that history is a tale of progress. Analysis of the text reveals that this point of view originates from (1) a deep emotional attachment to the earth, explanatory theories of the earth, and the earth sciences; and (2) a firm conviction both that nature exists independently of those who seek to know her and that nature is knowable. Such attitudes facilitate research in science but hinder understanding of science.

JED HOTCHKISS AND THE GEOLOGICAL MAP OF VIRGINIA
PETER W. ROPER
Green Acres, Thelda Avenue
Keyworth, Nottingham, England NG 12-5HU
ABSTRACT

William Barton Rogers' pioneering geological survey was terminated in 1842 with none of its three principal aims accomplished. In particular no funds were made available for the preparation of a geological map, even supposing that a suitable base map existed for the purpose. Thirty-four years were to elapse before Jedediah Hotchkiss, appointed by Virginia's Board of Immigration to write a wide-ranging geographical and political description of Virginia, produced a topographical map at a scale of 24 miles to one inch on which Rogers was able to delineate the results of the survey. Later, Hotchkiss publicized Rogers' work in the mining and scientific journal, *The Virginian*, which he founded in 1880. In the June issue of that year he included a version of this geological map. Later, Rogers and Hotchkiss planned to produce a new map at a scale of 8 miles to one inch. Following the death of Rogers in 1882, Hotchkiss collaborated with Emma Rogers in preparing a reprint of Rogers' survey reports and other papers relating to the geology of Virginia; this was to be accompanied by the larger scale map. In the event, Hotchkiss was only able to provide a revision of the 1880 map. However, he did edit and supervise the printing of the 96 sections produced by Rogers. These were exhibited at the New Orleans Exposition 1884/5 along with the new edition of the 24 miles to one inch map. He also displayed wall maps of Virginia at a scale of 3.5 miles to one inch, including one showing Rogers' geology.

HOW MISCONCEPTIONS ON HEAT FLOW MAY HAVE
DELAYED DISCOVERY OF PLATE TECTONICS
B. F. HOWELL, JR.
Department of Geosciences
406 Deike Bldg., Pennsylvania State Univ.
University Park, PA 16802
ABSTRACT

Since 1906 it has been known that sialic rocks are richer in heat-generating radioactive elements than somatic rocks. This led to the assumption that convection in the mantle must rise under the sialic continents and descend under the simatic ocean floors. So persistent was this view that convective flow in the opposite direction was evaluated seriously only after Hess and Dietz proposed it in the 1960's.

PEALE'S 1799 THEORY OF THE EARTH
Ellis L. Yochelson
U.S. Geological Survey (retired) & Research Associate
National Museum of Natural History
Washington DC 20560
ABSTRACT

In 1799, as an outgrowth of his museum in Philadelphia and in conjunction with his interest in public education, C. W. Peale gave a series of lectures. Most were on animals, particularly birds, but the first part of his first lecture included a theory of the earth, hitherto unpublished. Peale suggested that attraction and repulsion by electricity generated by the sun resulted in a varying orbit and speed of rotation for the earth. This electric charge was responsible for the Deluge of Noah. The subsequent changes in the Earth's orbit explained the seemingly long life spans of the early generations mentioned in the bible.

GEORGE CATLIN'S GEOLOGY
JOEL J. LLOYD
4131 Leland Street
Chevy Chase, MD 20815
ABSTRACT

George Catlin, the noted Nineteenth Century painter of American Indians had a deep interest in geology which, in the late years of his life, was to lead him far astray. He wrote a strange little book, entitled *The Lifted and Subsided Rocks of America*, that was published by Trubner & Co. of London in 1870. In that work Catlin hypothesized that under the great mountain chains of North and South America there existed subterranean vaults, through which tumultuous rivers ran, debauched in the Gulf of Mexico, and intermingled to become the Gulf Stream. The fury of this torrent flung American Indians, clinging to driftwood and rafts, as far as the coasts of Europe.

THE RICHMOND BOULDER TRAINS: V'ERAE CAUSAE IN
19TH-CENTURY AMERICAN GEOLOGY
ROBERT H. SILLIMAN
Department of History
Emory University
Atlanta, GA 30322
ABSTRACT

In the 1840's and 1850's some of the leading geologists of the day, including Edward Hitchcock, Henry D. and William B. Rogers, Charles Lyell, and Louis Agassiz, investigated long, distinct trains of erratic boulders discovered in 1842 in western Massachusetts. It was hoped that study of the boulder trains would help solve the vexing problem of the origin of the drift. The theories tested by application to the erratics were various in content but remarkably similar in justification. They all appealed to the Newtonian principle of *vera causa*. This methodological principle appears to have been more fundamental in treating the boulder trains than conceptions drawn from catastrophism and uniformitarianism. Use of the method did not, however, dispel the mystery of the boulders. A clarification of their origins came only with the general adoption of the glacier theory around 1870.

ELIE BERTRAND (1713- 1797) SEES GOD'S ORDER IN
NATURE'S RECORD: THE 1766 RECUEIL DE
DIVERS TRAITES SUR L'HISTOIRE NATURELLE
KENNARD B. BORK
Department of Geology and Geography
Denison University
Granville, OH 43023
ABSTRACT

Elie Bertrand (1713-1797) was a Swiss pastor/naturalist whose geological writings are illustrative of the growth of eighteenth-century natural history. Describing, cataloguing, and classifying formed the core of his work, but he also proposed theoretical analyses based on observations in the field. Bertrand's intellectual roots included Cartesian rationalism, British natural theology, and the Linnaean system of classification. Trained as a theologian, Bertrand viewed the physical world as a proving ground for showing God's Wise Design in nature. He was also committed to empiricism, and repeatedly called for expanding the base of geological knowledge.

Several of the published products of Bertrand's attempts to understand the natural world were brought together in the 1766 *Recueil de divers traités sur l'histoire naturelle*. By briefly considering each of the incorporated papers, it is possible to recognize the topics which interested eighteenth-century naturalists and to develop insight into the methodologies they used. In the *Recueil* we see Bertrand's eclectic epistemology attempt to deal with such topics as the interior of the earth, earthquakes, fossils, and the origin and Providential use of mountains.

Celebrated in his day, Bertrand was a correspondent of Voltaire, a counselor to the Polish court, and a member of numerous learned societies. He published articles in the French *Encyclopédie*, and his 1763 *Dictionnaire universel des fossiles* was among the most-read scientific books of the century. The obscurity which enveloped Elie Bertrand seems related in large part to the fact that he was an accumulator of data and a commentator about past theories, rather than an innovator of new concepts. As the natural theology that undergirded his writing became obsolete, the cogency of his arguments diminished. In the context of his time, however, Bertrand is an instructive example of how geoscience matured during what has been termed a sterile period in the

development of natural history.