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Florence Bascom (1862–1945) in the field, ca. 1920.
Can anyone identify the gesturing man?

EDITORIAL
A DIVERSE ISSUE

GREGORY A. GOOD

This issue of **EARTH SCIENCES HISTORY,** larger than usual, includes a diverse set of historical investigations. The earth sciences involved are all sciences of the solid Earth, but covering different disciplines, times, and places. (This attention to geology will be balanced in vol. 19, no. 1, which will be dedicated to oceanography. Please see the back cover for this forthcoming issue.)

In a letter to the editor, Gerald M. Friedman adds substantively to our previous issue (volume 17, number 2) on the role of meteoritic impacts in geology. Specifically, he discusses the work of W. F. Prouty (1879–1949) and others on this topic.

The six articles address the history of petrology, paleontology, mineralogy, and structural geology. Events examined occurred from 1800 to just a few years ago. While there is a wealth of American topics in this issue, events and figures in France, England, Germany, Russia, and elsewhere also are critically important.

One similarity among the articles is the contextual depth of the stories told. Lois Arnold's investigation of how Florence Bascom (1862–1945) became a geologist is a sensitive account not only of her education at a time when university life was just opening up to women, but also of how her career was affected by family contingencies and by the social and political contexts and by the science practiced around her. Arnold's article provides, too, an interesting account of geology at an important university and of how lab and field work related to each other there. This article is the first in a series by Arnold on the career of Florence Bascom.

William Ausich, George D. Sevastopulo, and Hugh S. Torrens relate the paleontological research of Thomas Austin, Sr. (1794–1881) and his son Thomas (1817-before 1881). Their work on crinoids, published by subscription, provides one glimpse of how precarious science was for the non-professional in Ireland and Bristol in the late nineteenth century. Unpublished drafts of intended publications also demonstrate interest of the Austins in the evolution and ecology of crinoids. The Austins resided somewhere between natural history and biology.

Kennard B. Bork's examination of the correspondence of Parker Cleaveland (1780–1858), Benjamin Silliman, Sr. (1779–1864), and Alexandre Brongniart (1770–1847) shows how interconnected mineralogical research was in the early nineteenth century. The Trans-Atlantic community of researchers exchanged ideas, publications, information, and extensive collections of specimens. Mineralogists, moreover, earned their livings as professors, mining inspectors, and factory managers—a thoroughly synthetic science undertaken for both pedagogical and practical purposes.

Linda VanAller Hernick reveals the life and research of a lesser-known figure, Silas Watson Ford (1848–1895). Ford made his living as a telegraph operator, a bookkeeper, and, it seems, as a debtor of note. His research on Cambrian and Silurian paleontology, however, was taken seriously by Charles D. Walcott and others. While coping with the expense of research, Ford also found himself bound within a class structure and dealing with personal limitations. Hernick draws on a wide array of sources, including Ford's newspaper articles on the Silurian Age, correspondence, and cemetery records. As in the case of the Austins above, city directories also provided clues into an obscure life.

Daniel Merriam and Davis Young take a non-biographical approach to their

topics, respectively, the development of the concept of 'Plains-type Folds' and the elaboration of an important theory in igneous petrology, the theory of differentiation. Merriam's is a story of extensive field work, mostly in the middle of North America, in which theory and technique interacted intensively. Nevertheless, these investigations of compacted sedimentary structures have found application in cratonic areas world-wide. The interest in these structures, magnified by their potential for finding oil, brought together sedimentology and geothermy in the 1920s and 1930s.

Young's article is the second in his series on the history of petrology, the first having appeared in **EARTH SCIENCES HISTORY,** vol. 18, no. 1. This installment leaves behind the period of generalists and examines how igneous petrology began in the 1880s to take on the characteristics of a specialized research area. The increasing importance of physical chemistry and of petrological microscopes demanded extensive training and pointed toward a greater role for the laboratory in petrology. Although a few Americans figure in this article, petrology was still primarily a European science in 1900—something that is clear from the numerous Germans, Scandinavians, French, and British researchers discussed by Young.

Readers will also note that the **Focus Book** section concerns a book of special importance, Naomi Oreskes's *The Rejection of Continental Drift: Theory and Method in American Earth Science* (New York and Oxford: Oxford University Press, 1999). The two essay reviews by Vic Baker and Mott Greene, along with Oreskes's reply, exemplify the give-and-take that this editor wishes to encourage. Such thoughtful interchange can only encourage better scholarship from us all.

One small (or maybe not-so-small) item in closing. The articles for this issue were received before the new citation guidelines for **EARTH SCIENCES HISTORY** were established. Likewise, the articles for the next several issues arrived during the transition. Because of this, I have taken on personally much work that is normally done by an author in preparing a publication for a particular journal. (Remember that I am the full staff for all editing, correspondence, etc.!) Please, dear prospective contributors, follow all the guidelines as closely as possible for future submissions. You will find these guidelines on the web site **www.as.wvu.edu/HESS** and in the back of **EARTH SCIENCES HISTORY,** 1999, vol. 18, no. 1. I don't want to burn out too soon.

LETTER TO THE EDITOR

Impact From Space: A Historical Discussion

The "impact issue" of "rocks from space" recalls comparable controversies on this same subject that excited the geological community fifty years ago. In fact in my beginning geology courses at that time, part of my lecture series related to extraterrestrial impacts. Instead of iridium anomalies the subject addressed the Carolina Bays, a portion of the Atlantic Coastal Plain.

The geologist who promoted the impact concept was W. F. Prouty (1879–1949), head of the Department of Geology of the University of North Carolina. He wrote many important papers on impacts (see references). In his "The Carolina Bays" in 1943, he traced some of the impacts on aerial photographs and explained "the meteorite theory is the only one which logically explains the origin of the bays" (p. 241). Interestingly, not a single reference can be found to the Prouty papers in the entire multi-authored issue of **Earth Sciences History** devoted to the impact problem.

Prouty noted in this same article (p. 236) "within the Atlantic Coastal Plain . . . are to be found tens and probably hundreds of thousands of . . . elliptical shaped, sand rimmed depressions, now generally spoken of as Carolina Bays." He also observed:

> There is also everywhere some variation in the shape of the bays as well as in the size of the bays. In any one area the shape and ellipticity of the bays is strikingly uniform. Variation in direction of elongation is to be expected under the meteoritic theory, due to the fanning out effect of numerous falling bodies rapidly evolving gas and crowding the central area. The time of the formation of the bays seems to be sharply limited . . . (The Carolina Bays, 1943, p. 236)

and

> The sequence of formation of the bays, in general, has no relationship to size, position or direction, although in some places there is a seeming preponderance of later formed bays toward the west or northwest of the earlier formed overlapping depressions. This tendency should be expected if meteorites were the cause of the bays. The turning of the Earth from west to east would cause the rear of a tandem meteorite pair to hit the earth to the west of the first of this pair. If the rear meteorite were not only a little behind but traveling at a slighty lower level, which it is reasonable to expect would be the case, it would also tend to form an elliptical depression to the northwest of its predecessor (The Carolina Bays, 1943, p. 237).

And also

> The fact that the greatest number of meteorites discovered in the United States has come from the area to the northwest of the Carolina Bay country, where they would naturally be better preserved in the clay soil than in the water-soaked and pervious sands of the Coastal Plain, is in the minds of many scientists, supporting evidence of the meteoritic theory. This mode of origin is further supported by the evidence gained through magnetometer surveys of more than 30 bays (The Carolina Bays, 1943, pp. 241–242).

Prouty's classical 1952 paper appeared almost three years after his death in 1949. This article was complete at the time of his death with the exception of the abstract, summary, and conclusions, which his son C. E. Prouty, chairman of the Department of Geology of the University of Pittsburgh, completed. In this paper Prouty reviewed previous theories of impacts by F. A. Melton and William Schriever (1933) and G. R. MacCarthy (1936 and 1937), which were likewise not cited in the **Earth Sciences History** Impact Issue. He explained that the meteoric theory includes the action of air-shock waves. Magnetometer surveys showed pronounced magnetic spot highs, where the meteorites landed. "The me-

teor is assumed to be much smaller than its resulting crater." (Prouty, Carolina Bays and their Origin, 1952, p. 222). "No direct evidence, such as meteoritic masses or fused glass, has been found, nor should such be expected under the conditions" (Prouty, Origin of Elliptical Bays, 1938, p. 1957). The papers did not speculate on the events of extinction.

In 1938, Melton related the time of meteorite impact to near the end of the Cretaceous time. He stated "it will be necessary critically to re-examine the fundamental causes of diastrophism, and possibly to rewrite the geologic history of post-Cretaceous time." He did not specifically mention extinctions, but the vague term diastrophism may include this event.

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