



Eugene Richardson, curator of fossil invertebrates, lecturing on Mazon Creek. The map is of Pit 11, one of the most productive sites in the area.

MAZON CREEK STUDIES

the first 120 years

BY MATTHEW H. NITECKI

THE STUDY OF MAZON CREEK FOSSILS had its beginning in the mid-1800s, when the area came to the attention of geologists James Dwight Dana, Leo Lesquereux, and Edward Drinker Cope. Local farmers and townspeople, however, were the first to collect the curious, fossil-bearing concretions. Natural exposures along the creek and at mining sites that first appeared near Braidwood (about 1855) and Coal City (about 1858) produced these first specimens. Before long, local collectors, notably Joseph Even, S. S. Strong, and J. C. Carr loaned their concretions to Illinois State Geologist Amos H. Worthen and to Lesquereux.

When Dana published on two fossil insects from Mazon Creek in 1864, the locality immediately drew the interest of other American paleontologists. His brief paper describes an almost complete body and a wing fragment, both belonging to insects of extinct orders. Insects are relatively

rare among Mazon Creek fossils, so it is remarkable that they were the first to be described.

Worthen was among the first to recognize that the Mazon Creek beds were out of the ordinary. Between 1865 and 1890 he and Fielding B. Meek published seven papers that

Matthew Nitecki is curator of fossil invertebrates. He served recently as chairman of the Paleontological Society, north-central section, and was a convener of the Paleontological Society's symposium on Mazon Creek fossils, held May 1 at Ann Arbor, Mich.; 21 papers on Mazon Creek were presented at the symposium, 12 of which were by Field Museum staff or research associates. The papers are to be published shortly by Academic Press, New York.



Leo Lesquereux (1806-89) was the first paleobotanist to make an intensive study of Mazon Creek fossil plants.

described and classified Mazon Creek fossils, these appearing in the volumes of the Geological Survey of Illinois and in the *Proceedings of the Academy of Natural Sciences in Philadelphia*.

Volume II of the State Geological Survey (1866) was devoted in part to the Mazon Creek biota. In it, Joseph S. Newberry and Worthen described a fish, Cope an amphibian, Meek and Worthen several invertebrates, and Lesquereux 11 new species of plants.

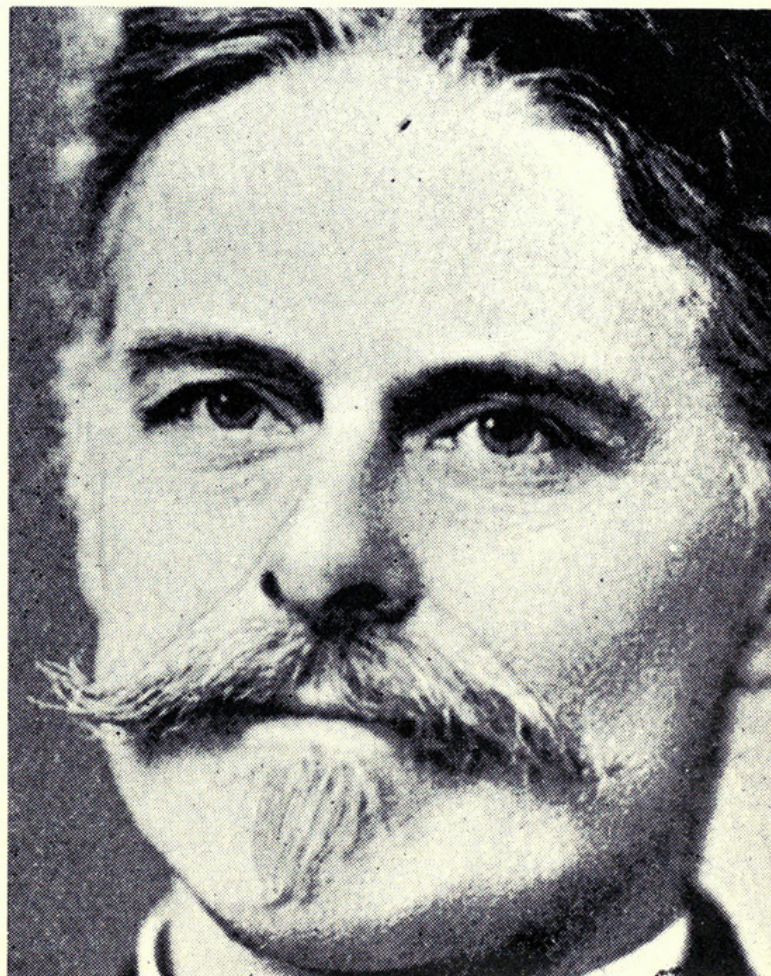
Almost singlehandedly, Lesquereux established the discipline of paleobotany in this country, and by 1880 he had described over 1,300 species of fossil plants, most of which he collected himself. Lesquereux is best known for his studies dealing with floras of the Pennsylvanian, Cretaceous, and Tertiary periods and with mosses and prairies; but his work on the Mazon Creek flora was as rigorous as his other writings. By 1866 Lesquereux had described 71 species of fossil plants from Mazon Creek, represented by 614 specimens. In 1870 the number of species was 180 and the specimens were in the thousands.

From 1865 to 1895 Samuel H. Scudder, of Harvard University, published 32 taxonomic papers on Mazon Creek fossils, largely under the imprint of the Boston Society of Natural History. From 1908 to 1916 Roy Moodie, in a series

of papers, described 10 species of amphibians, including a history of their discovery. Seemingly carried away by his enthusiasm, Moodie described more species than actually exist, since he confused differences of preservation with anatomical differences. From 1906 to 1920 Anton Handlirsch, of Vienna's Royal Imperial Museum, described 77 species of insects from the Mazon Creek area, assigning some of them to five new extinct orders. Other important papers published since 1902 on taxonomy, systematics, anatomy, evolution, and phylogeny of Mazon Creek animals are by Alexander Petrunkevitch (arachnids—spiders and their allies), Frank M. Carpenter (insects), Charles R. Eastman and T. S. Westoll (fishes), D. M. S. Watson (amphibians), and Harold K. Brooks (crustaceans).

Later study of fossil plants from Mazon Creek has followed the path of Lesquereux. Adolph Noé, of the University of Chicago, published a popular paper (1925) and Raymond Janssen popularized the Mazon Creek leaves and stems in a handbook (1939); in 1940 he revised some of Lesquereux's work. George Langford, influenced by Noé and Janssen, and relying heavily on the work of early European investigators, also published two popular volumes for the general public. Finally William Darrah, of Gettysburg College, presented a

Edward Drinker Cope (1840-97), distinguished American paleontologist, early recognized the wealth of fossil treasures at Mazon Creek.







George Langford (1876-1964), paleobotanist and Field Museum staff member 1947-62.

history of the Mazon Creek floristic studies and collections which included the number of species present, correlation with other Coal Age floras, a discussion of the environment and microenvironment, and a discussion of anatomy, with a description of megaspores and gametophytes (1969). The work continues today with Hermann Pfefferkorn of the University of Pennsylvania and with Tom Phillips and Russell Peppers of the Illinois Geological Survey.

Field Museum has the finest collection of Mazon Creek fossils in existence. It first became important through the work of Langford, who joined the Museum staff in 1947 and who collected and studied the fossil plants until his retirement in 1962 at the age of 86. (For further discussion of Langford's work see "George Langford, 1876-1964," by Eugene Richardson, in the February, 1976, *Bulletin*.) Noé's collection of Mazon Creek plants, deposited at the Museum by the University of Chicago, added to this already large floral collection. At that time the Museum's collection of the Mazon Creek biota was about 95 percent plants, which reflected the proportions preserved in collecting areas around Mazon Creek and the strip mines.

◀ Scanning electron photomicrograph of sea cucumber sclerites. Enlarged about 1,500 times. Specimen from Pit 11.

Richardson, who joined the Museum's curatorial staff in 1946, almost immediately altered the character of the Mazon Creek collections. He began publishing on the Mazon Creek fauna in 1956, with a study of insects. The discovery of a new collecting site, Pit 11 (operated from 1945 to 1974 by the Peabody Coal Company near Essex), led to a quantum advance in the Mazon Creek studies. Here, and in the adjoining MacElvane Pit, fossil animals were as numerous as plants. It is this site which led Richardson to the significant observation that the biota could be assigned to three distinct groups: the Mazon Creek flora, the nonmarine (freshwater) Braidwood fauna, and the new marine Essex fauna.

Pit 11 has become as illustrious as the Mazon Creek locality itself, yielding a most unusual and extensive marine fauna. The remarkable preservation at the former differs from all previous Mazon Creek collections in that it includes soft-bodied animals not otherwise represented in the fossil record. The most celebrated is the "Tully monster" (*Tullimonstrum gregarium*), named for its discoverer, Francis J. Tully, and formally described by Richardson in 1966. (For more on this subject see "The Tully Monster," by Eugene Richardson, in the July, 1966, *Bulletin*.)

The research effort of Richardson and his colleagues



Herdina mirificus, Mazon Creek fossil insect discovered by (and named for) Jerry Herdina (1905-1974). Shortly before his death, Herdina gave Field Museum his collection of more than 14,000 fossil specimens, nearly all from Mazon Creek.

has been threefold: a description of the Mazon Creek fauna, a determination of their phylogenetic and paleoecological significance, and an investigation of the complex processes by which concretions are formed. The contributions of the late Ralph G. Johnson, of the University of Chicago, and of Frederick G. Schram, of San Diego Museum of Natural History, have also been important in the study of this fauna. Johnson's main work was on ecological community structure and paleoecology; Schram has contributed numerous detailed descriptions of crustaceans and other invertebrates.

Richardson invited the cooperation of specialists in various invertebrate and vertebrate groups and with Johnson assigned the study of some of the fauna to graduate students at the University of Chicago. As a result, more than 50 papers have appeared in about 20 journals; about half of these papers have been published in *Fieldiana: Geology* as part of a contin-

uing study of the Mazon Creek fauna coordinated by Field Museum.

Another significant aspect of Richardson's work has been the development of a working relationship with a large number of amateur collectors, thereby giving the Museum access to thousands of specimens, including many rare and unique forms not represented in any public collection. Thus, more than 80 species have been described by Field Museum scientists and research associates. Additional forms currently awaiting formal description include cartilaginous fishes, insects, polychaetes, pelecypods, and coprolites.

Today, thanks in large part to the work of Richardson and his associates, Mazon Creek has become one of the most important fossil regions on the face of the earth. It is entirely fitting that Field Museum scientists have been the leading force in studies of the region. □



Nitecki, Matthew H. 1978. "Mazon Creek Studies." *Field Museum of Natural History bulletin* 49(8), 22–26.

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