

Fauna Associated With the Pennsylvanian Floral Zones of the 7-11 Mine, Columbiana County, Northeastern Ohio¹

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ABSTRACT. Stratigraphically significant compression floras have been found in lower Conemaugh ironstone beds and lower Conemaugh dark argillaceous shales in the 7-11 Mine, Columbiana County, Ohio. The known fauna associated with the ironstone beds is limited to branchiopods, myriapods, and a single arachnid. The dark argillaceous shales yielded both invertebrate and vertebrate fossils including freshwater sharks, fish, ostracods, branchiopods, myriapods, arachnids, and insects. The absence of any marine fauna supports the contention that both the ironstone beds and the dark argillaceous shales were deposited in a freshwater environment.

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INTRODUCTION

The 7-11 Mine in Columbiana County, Ohio has two distinct floral zones which contain stratigraphically significant fossil plants previously considered indicative of upper Conemaugh and Monongahela sediments of the Appalachian Basin (McComas 1988). The marine shales found above the floral zones have been identified as the Brush Creek based on the presence of the ammonoid *Pennoceras* (McComas et al. 1986). The Brush Creek is the oldest marine zone in the lower Conemaugh, which indicates that the fossiliferous ironstone and shales found below the Brush Creek are lower Conemaugh units.

The known invertebrate fauna associated with the floral zones of the 7-11 Mine is restricted to the phyla Annelida and Arthropoda. The dominance of the phylum Arthropoda is similar to that reported from the Pennsylvanian freshwater deposits found at Montceau-Les-Mines, France (Rolfe et al. 1982) and Linton, Ohio (Hamilla and McComas 1984).

LOCALITY AND STRATIGRAPHY

The 7-11 Mine is a strip mine located north of East Liverpool on Ohio 7, 1.1 km north of the junction of Ohio 7 and Ohio 11. The strip mine is in the S 1/2, NW 1/4, Sec. 13, T. 10 N., R. 2 W., West Point Quadrangle, Madison Township, Columbiana County. The fossiliferous freshwater units are located in the lower third of the 35-m highwall which exposes lower Conemaugh rocks. The units are located between the production coal seam in the bottom of the strip mine and the dark, silty, fossiliferous, Brush Creek marine shales 10 m above the production coal seam. A detailed stratigraphic column of the 7-11 Mine is shown in McComas (1988).

The freshwater units are confined on both lateral margins along the highwall by thick, tabular, cross-bedded sandstones. The conformable relationship between the sandstones and the freshwater units suggests that the paleotopographic low occupied by the freshwater units was an abandoned river channel.

Directly above the production seam, the freshwater units are comprised of finely laminated, light-gray shales

with ironstone interbeds. Above these shales is an underclay and thin coal followed by dark, argillaceous shales. Capping the freshwater units and the lateral sandstones are the Brush Creek marine shales. The flora and associated fauna are restricted to the thicker ironstone interbeds and to the dark argillaceous shales directly underlying the Brush Creek shales.

FAUNA

The fauna of the ironstone beds is restricted in the number of taxa and specimens. Five specimens of the conchostracan branchiopod, *Leaia*, were found as molds in the ironstones; three specimens of the myriapod, *Acantherpestes* (Fig. 1, F), were found in a 3-mm shale parting between two 9-cm ironstone beds. A single arachnid specimen is preserved as the mold and cast of the abdomen of *Eophrynus* (Fig. 1, B).

The fauna of the dark, argillaceous shale, in contrast, is abundant and diverse. The vertebrate fauna of the dark shales includes shark and fish remains. The distinctive tooth of the freshwater shark, *Xenacanthus*, was found as a common fossil throughout the shales. Pyritized skull elements of *Xenacanthus* were found, including a 17-cm lower jaw with teeth. Fish remains include isolated skull elements, isolated scales, and complete specimens of *Elonichthys*. A single tooth of a lungfish was also found.

The invertebrates of the dark shale are restricted to the phyla Annelida and Arthropoda. The coiled polychaete annelid, *Spirorbis*, was found as isolated individuals on a bedding plane and as clusters on large plant fragments. The arthropods are represented by smooth-shelled, podocopinid ostracods (covering some bedding planes); the conchostracan branchiopod, *Leaia*, found throughout the shale; fragments of the large myriapod, *Arthropleura*; insects; and arachnids. The most common insect fossils found were fragments of two species of cockroaches. Complete specimens of the smaller blattoid species show that it attained a length of 4 cm. Isolated wings and head shields of this species were found throughout the dark shale. The second blattoid species is represented by a complete specimen 10 cm in length (Fig. 1, E) and isolated fragments found only in the lower 0.5 m of the shale. The only other type of insect found was a mantis-like orthopterid (Fig. 1, A). Two arachnid specimens have been found in the shale. One specimen is an isolated abdomen of *Hemiphrynus* (Fig. 1, D); the other is a complete specimen of *Trigomartus* including the legs (Fig. 1, C).

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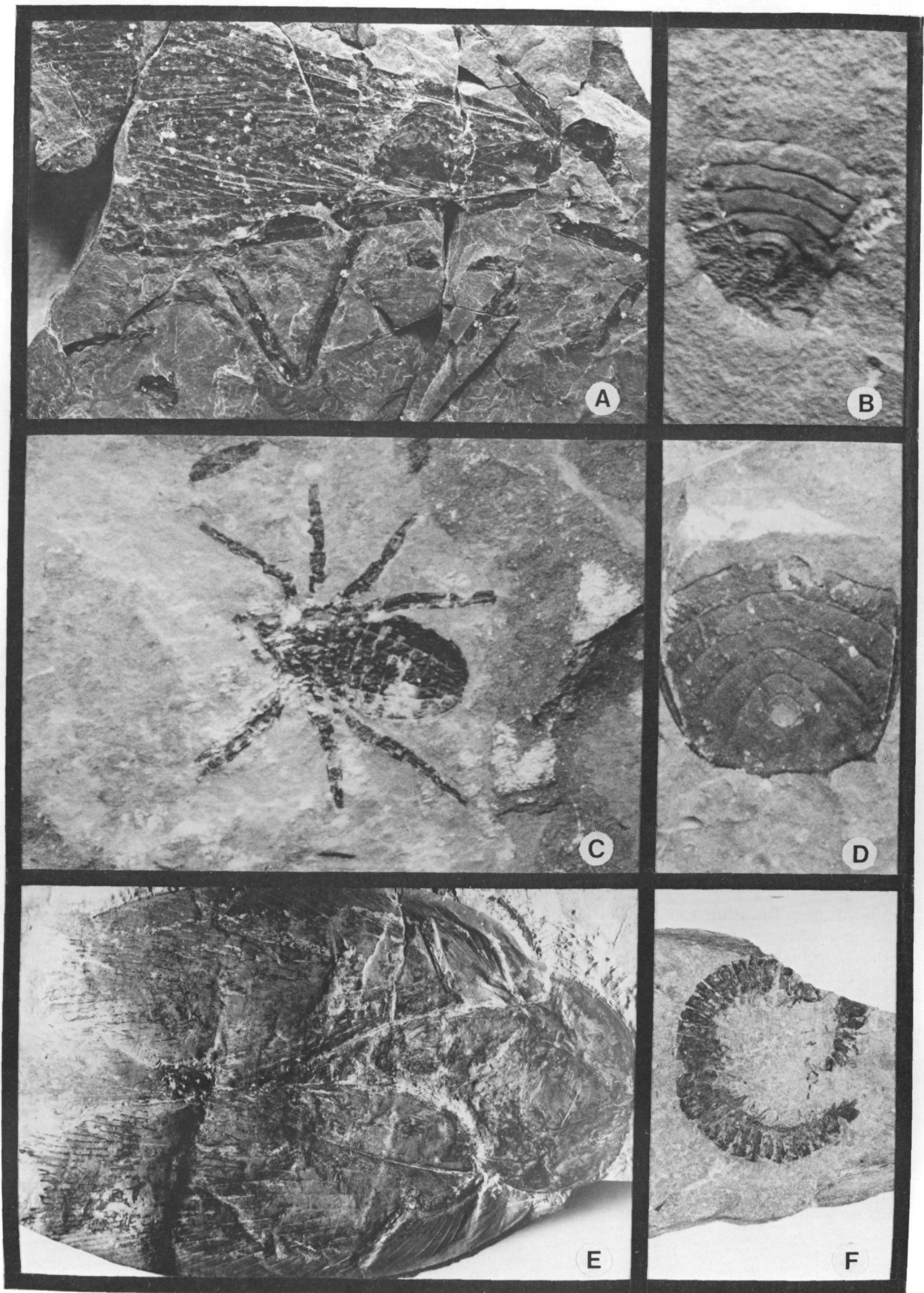


FIGURE 1. Fauna of the 7-11 Mine, Columbiana County, Ohio. A, Orthopterid insect, including legs ($\times 2$); B, *Eopbrynus* abdomen ($\times 4$); C, *Trigomartus* complete specimen ($\times 4$); D, *Hemipbrynus* abdomen ($\times 4$); E, Blattoid insect ($\times 1.25$); F, *Acantherpestes* ($\times 2$).

DISCUSSION

The vertebrate locality of Linton, Ohio has been interpreted recently by R. W. Hook and J. C. Ferm (1985) to represent an abandoned river channel (similar to that of the 7-11 Mine). The invertebrate fauna in the fossiliferous cannel coal at Linton consists exclusively of annelids and arthropods, as does that of the 7-11 Mine (Hamilla and McComas 1984). To date, however, not a single insect fossil has been recovered from the Linton deposit. The invertebrate fauna reported by Rolfe et al. (1982) from Montceau-Les-Mines, France is dominated by the phyla Annelida, Arthropoda, and Mollusca. The prevalence of non-marine bivalves at Montceau-Les-Mines is in direct contrast to Linton and the 7-11 Mine where not a single bivalve has been found. The lack of mollusks from Linton and the 7-11 Mine suggests taphonomic reasons for their exclusion. However, the preservation of the carbonate shell of the polychaete annelid, *Spirorbis*, and the lack of bioturbation at both localities indicates that environmen-

tal conditions in the substrate played a larger role in this exclusion.

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