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Some Notes On Pennsylvanian Crustaceans In the Illinois Basin

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The malacostracan faunas of the Mazon Creek assemblages have been dealt with in a series of publications (Schram, 1969, 1970, 1973, 1974a, b). This note in the sequence takes up those forms which were not dealt with in those earlier papers and offers a few general comments on the Crustacea of the Mazon Creek assemblages. All specimens referred to are deposited in Field Museum of Natural History.

SYNCARIDS

Two palaeocaridacean syncarids, *Acanthotelson stimpsoni* and *Palaeocaris typus*, Meek and Worthen, 1865, occur in the Pennsylvanian Illinois Basin. Both of these species were originally described from the Braidwood Fauna of the Mazon Creek area, Francis Creek Shale, Carbondale Formation (Westphalian C) (Richardson and Johnson, 1970). In 1885, Packard recognized the distinct nature of these eumalacostracans by erecting the superorder Syncarida to accommodate them, seven years before the first extant form, *Anaspides tasmaniae*, Thompson, 1893, was discovered in Australia.

Information has come to light to reveal that these syncarids, *A. stimpsoni* and *P. typus*, have a wide distribution around the Illinois basin (fig. 1). They are the most common crustaceans in the Mazon Creek Braidwood Fauna, constituting about 93 per cent of the crustacean forms. But both species are relatively rare elements in the Mazon Creek Essex Fauna, together making up only 5 per cent of the crustaceans. A specimen of *A. stimpsoni* was discovered in a well core by the Illinois Geolog-

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ical Survey. The specimen, PE 13945, was taken in Wabash County, NW¼, SW¼, SE¼, sec. 25, T.2 S., R.14 W., at 816 ft. in core T-4, in the Dykersburg Shale, Carbondale Formation above the #5 (Springfield) Coal below the St. David Limestone. Another specimen of *A. stimpsoni*, PE 13961, was found in a gray shale concretion above the #6 (Herrin) Coal in the Brereton cyclothem, one-half mile west of Carterville in Williamson County, sec. 4, T.9 S., R.1 E. *A. stimpsoni* (P 32083, P 32084) and *P. typus* (P 32082), are the only crustaceans found to date in the abandoned Chieftain Mine, 7 miles south of Terre Haute, Indiana, east of U.S. Highway 41. This area has been open to amateur collectors for some years and is now largely overgrown with vegetation. The Chieftain locality is in the Lower Shelburn Formation, equivalent to the lowermost Modesto Formation of Illinois, i.e., Pennsylvanian in age but higher in the stratigraphic column than the localities in the Illinois Carbondale Formation.

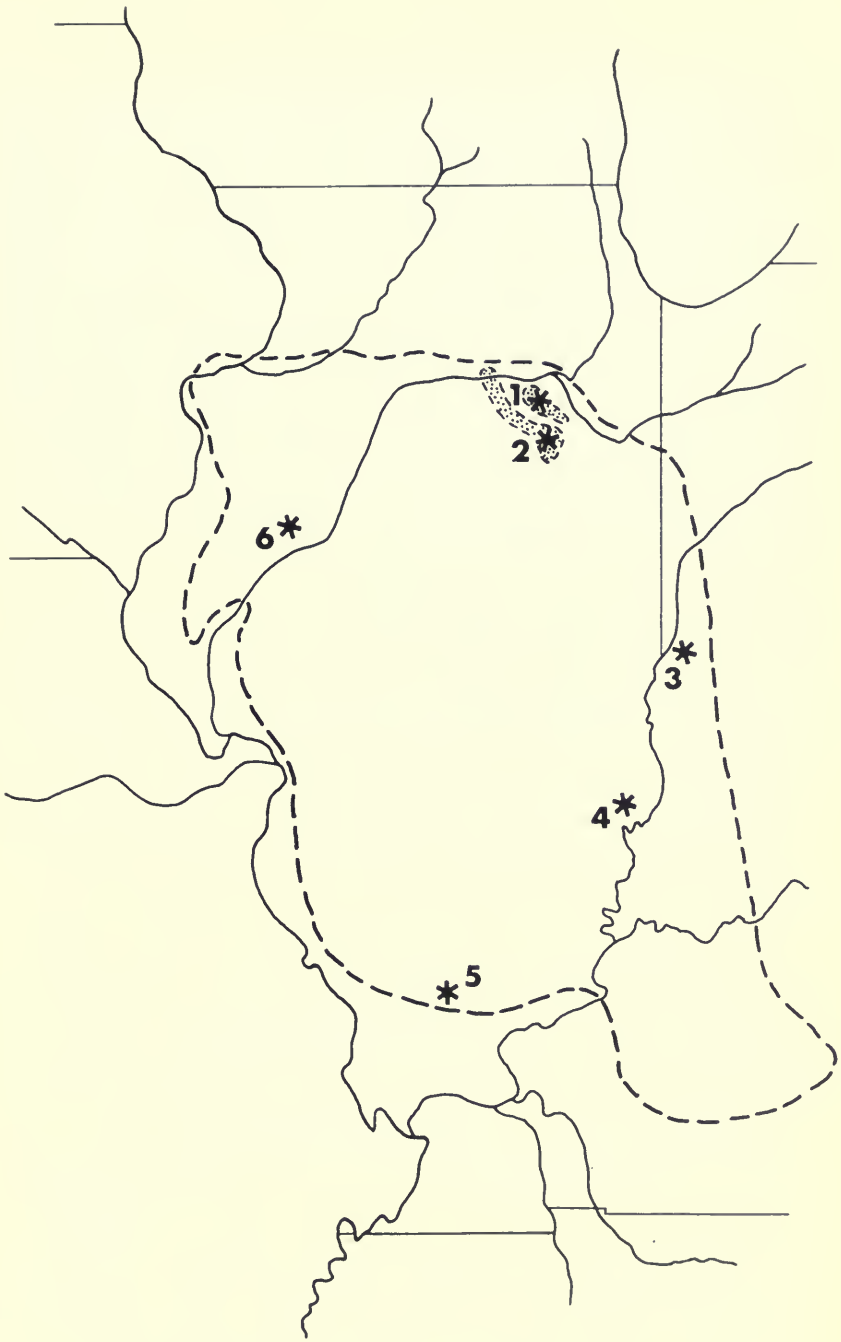
There are some physical differences between syncarids found in the Braidwood Fauna and those of the Essex Fauna. Brooks (1962) reported a mean body length of 267 specimens of *P. typus* (Braidwood specimens) of 2.2 cm., and a mean body length of 176 *A. stimpsoni* of 2.8 cm. In addition, Braidwood specimens are generally characterized by being rather robust and well preserved. I have found that for 35 specimens of *P. typus* from the Essex fauna for which I could measure body length, the average was 1.9 cm., and for 40 specimens of *A. stimpsoni* the body length was 2.6 cm. In addition, Essex syncarids are generally poorly preserved. It would thus appear that the more fresh-water ecology represented by the Braidwood assemblage (Richardson and Johnson, 1970) was apparently more conducive to syncarid biology and subsequent preservation.

EOCARIDA

After the publication of my (Schram, 1974a) paper on Mazon Creek caridoids, Mr. Corliss Ingels of Lafayette, Illinois brought a specimen to my attention which has proven to be a new species of the genus *Anthracophausia* (Peach 1908).

Opposite:

FIG. 1. Fossil malacostracan localities of the Pennsylvanian basin (broken line) of Indiana and Illinois. **1**, Braidwood fauna of the Mazon Creek area (balloon indicates extent of the localities); **2**, Essex fauna of the Mazon Creek area (balloon indicates geographical extent of the localities); **3**, Chieftain Mine south of Terre Haute, Vigo Co., Indiana; **4**, Illinois Geological Survey well core T-4 in Wabash Co.; **5**, abandoned strip mine talus west of Carterville, Williamson, Co.; **6**, Sunspot Mine, north of Astoria, Fulton, Co.


1
2
3
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Superorder Eocarida Brooks 1962
Order Eocaridacea Brooks 1962
Family Anthracophausiidae Brooks 1962
Genus **Anthracophausia** Peach 1908

Anthracophausia ingelsorum n. sp.

Diagnosis.—Abdominal pleura rounded; telson with a single median ridge; uropods lobate.

Description.—The holotype and only well-known specimen of *A. ingelsorum* is 2.25 cm. long from the optic notch of the carapace to the base of the telson. The carapace is 0.82 cm. from optic notch to posterior margin. The rostrum has the marked falciform shape characteristic of the genus and is about 0.26 cm. in length. There is a very slight doublure on the ventral margin of the carapace. Little can be told about the antennae and antennules except that they were moderately developed and the antennules had a slight optic groove. No eyes or appendages have been preserved on any of the material at hand.

The first five pleomeres are subequal and have rounded pleura. The sixth pleomere is somewhat longer than any of the other abdominal segments.

The telson is elongate and triangular and has a slight, yet wide median ridge along its dorsal length. It is not clear whether there are caudal furcae. The uropods have a simple protopod and thin lobate exopods and endopods.

A reconstruction of *Anthracophausia ingelsorum* is offered in Figure 2.

Horizon.—Middle Pennsylvanian, Carbondale Formation, Francis Creek Shale.

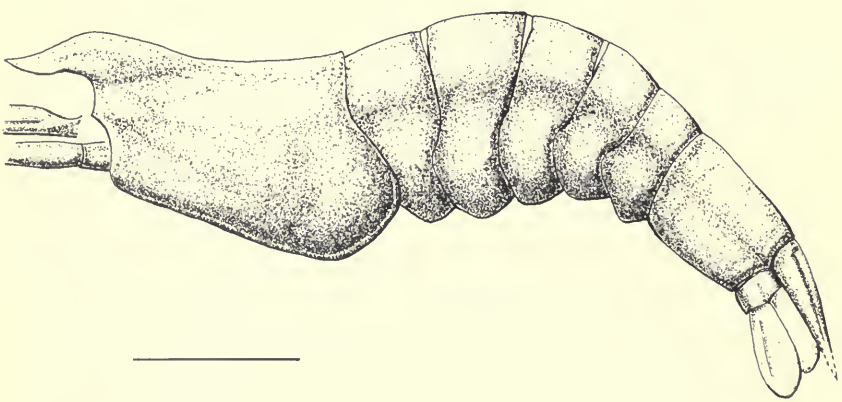

FIG. 2. Reconstruction of *Anthracophausia ingelsorum,* scale is 5 mm.

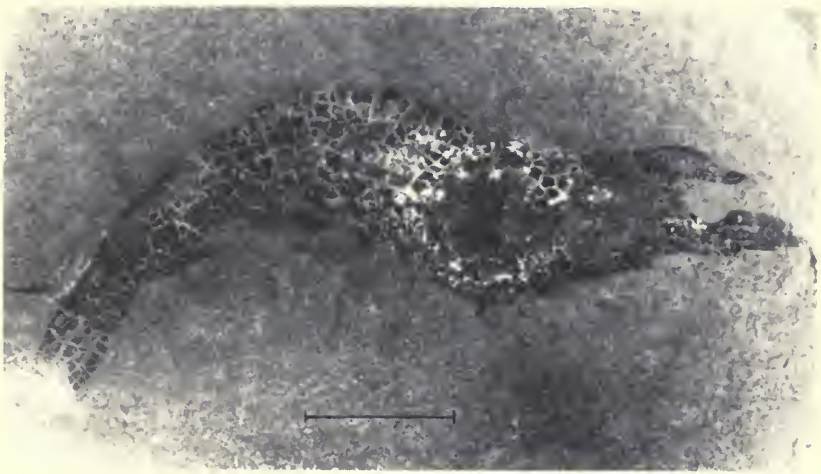

FIG. 3. CEI 41130, holotype of *Anthracophausia ingelsorum,* scale is 5 mm.

Locality.—The holotype was collected in the Sunspot Mine just north of Astoria in Fulton County, Illinois (fig. 1), and was found in an ironstone concretion of the Francis Creek Shale, Carbondale Formation. More poorly preserved specimens have been collected in Peabody Coal Co. Pit 11 in Will and Kankakee counties, Illinois, the principal locality of the Mazon Creek Essex Fauna (fig. 1). The Astoria locality has been known for several years to contain fossils characteristic of the Essex assemblage, though the fauna collected at Astoria is not quite as diverse as that at Pit 11.

Remarks.—Anthracophausia ingelsorum differs from the British Carboniferous *A. dunsiana* in that the latter is somewhat larger (with an average carapace length of 1.1 cm. from optic notch to posterior margin). *A. dunsiana* has two longitudinal lobe-like ridges on the dorsal surface of the telson, with blade-like uropodal rami; the inner margin of the endopod bears setae.

Holotype.—CEI 41130, Cooper Museum of Marine Invertebrates, 5012 Pfeiffer Road, Peoria, Ill. (to be deposited in Field Museum of Natural History as P 32085).

Etymology.—Named in honor of Corliss and Elva Ingels and their son Eric, Lafayette, Illinois, who found the holotype and are among the many ardent amateur collectors of the Essex Assemblage, in the Peoria area, who have assisted my work through the years.

GENERAL COMMENTS

A general assemblage list of the malacostracans found in the Braidwood and Essex faunas is herein presented with approximate relative percentages of each species ("t" means trace or only a few specimens known).

Braidwood Fauna

Subclass: Eumalacostraca
Superorder: Syncarida
Order: Palaeocaridacea
Palaeocaris typus Meek and Worthen, 1865 ..... 34.2%
Acanthotelson stimpsoni Meek and Worthen, 1865..... 62.3
Superorder: Eocarida
Order: Eocaridacea
Belotelson magister Packard, 1886..... t
Superorder: Peracarida
Order: Mysidacea
Anthracaris gracilis Meek and Worthen, 1865..... 3.5

Essex Fauna

Subclass: Phyllocarida
Order: Archaeostraca
Ceratiocaris sp..... .26
Dithyrocaris sp. ..... .22
Order: Hoplostraca
Kellibrooksia macrogaster Schram, 1973 ..... 2.4
Subclass: Hoplocarida
Order: Aeschronectida
Kallidecthes richardsoni Schram, 1969 ..... 12.0
Order: Stomatopoda
Tyrannophontes theridion Schram, 1969 ..... 1.5
Subclass: Eumalacostraca
Superorder: Syncarida
Palaeocaris typus Meek and Worthen, 1865 ..... 2.5
Acanthotelson stimpsoni Meek and Worthen, 1865..... 4.4
Superorder: Eocarida
Order: Eocaridacea
Belotelson magister Packard, 1885 ..... 65.5
Peachocaris strongi (Brooks) 1962..... 7.3
Anthracophausia ingelsorum ..... .04
Essoidea epiceron Schram, 1974a 2.0
Superorder: Peracarida
Order: Mysidacea
Anthracaris gracilis (Meek and Worthen) 1865..... t
Mamayocaris jaskowskii Schram, 1974a..... 1.0
Order: Tanaidacea
Cryptocaris hootchi Schram, 1974b 3
Order: Isopoda
Hesslerella shermani Schram, 1970..... .5

The percentages represent a census of crustaceans taken by me over the years in various museums and private collections. The figures should be construed to represent approximate estimates subject to various biases, e.g., the percentage of *Belotelson magister* may be a little high since this figure also includes some counts of *Belotelson* exuviae (see Schram, 1974a). The *Anthracophausia* and *Peachocaris* are inaccurate since many specimens which were not identifiable as to species probably belonged here and were not counted at all. But the percentages express ratios of specimens that can be tagged with a definite species name.

Two things can be observed, especially with regard to Carboniferous faunas as a whole. First, the Braidwood fauna has a restricted crustacean assemblage of a pygocephalomorph associated with syncarids. The correspondence is very striking to what is found in the British Coal Measures where *Pygocephalus cooperi* (same family as *A. gracilis*) is associated with *Palaeocaris retractata, Pleurocaris annulatus* (structurally similar to *A. stimpsoni),* and sometimes *Praeanaspides praecursor* (no apparent counterpart in the Braidwood fauna). We have here the expression of what might be termed a Coal Measure chronofauna consisting of crustaceans which were relatively stable throughout Westphalian time, and which are found in disparate geographic provinces in fresh-water habitats. Associated elements of the faunas include fish, tetrapods, insects, arachnids, merostomes, fresh-water clams, in addition to abundant plant remains.

Second, the Essex fauna crustaceans are more diverse. They seem to be faunistically continuous and related as a whole (Schram, ms. in preparation) to a separate and distinct near-shore marine chronofauna of crustaceans known to extend from Visean through Westphalian time in Europe and North America. The associated fauna of this near-shore marine assemblage includes fish; various soft-bodied invertebrate groups, such as "worms" and coelenterates; various marine molluscs, such as cephalopods; and echinoderms. Plant fossils are relatively rare.

There is some overlap between the two Mazon Creek faunas. *Belotelson magister,* the most important shrimp in the Essex fauna, has been found on rare occasion at Braidwood localities. *Anthracaris gracilis* has a few poorly preserved specimens in Essex localities. Both *A. stimpsoni* and *P. typus* comprise a small percentage of Essex crustaceans, and their size and general preservation may indicate that they were attempting to live in conditions marginal for their existence.

In summary, it should be noted that although the Mazon Creek Crustacea form a spectacular assemblage in their own right, their true importance and significance must await the full description and analysis

of other Late Paleozoic crustaceans which have come to light since this project started eight years ago.

ACKNOWLEDGEMENTS

I wish to thank the many fossil collectors of the Mazon Creek faunas who have helped me through the years. This includes members of the Earth Science Club of Northern Illinois (ESCONI), the Chicago Rocks and Minerals Society, and the fossil study group of Peoria Academy of Sciences. Special thanks must be extended to Dr. E. S. Richardson, Jr., of Field Museum who was a constant source of enthusiasm and encouragement. Dr. Tibor Perenyi consulted on illustration techniques in the later papers in this series. My research assistants over the years have offered yeoman service in the cause of Pennsylvanian science; James K. Gilliam, Paul Wilson, Carl Baird, and Linda Catalana. Dr. Murray Copeland and colleagues of the Geological Survey of Canada were of great help in examining material of Paleozoic malacostracans from the Canadian Maritime Provinces. Much of this work has been funded by N.S.F. grant GB-35484 and grants from the Eastern Illinois University Council on Faculty Research.

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