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PENNSYLVANIAN INVERTEBRATES  
OF THE MAZON CREEK AREA, ILLINOIS

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TRILOBITOMORPHA  
ARTHROPLEURIDA

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## Trilobitomorpha, Arthropleurida

The large terrestrial arthropod, *Arthropleura*, has hitherto been reported only from Europe, where fragments are not uncommon in some Westphalian (Middle Pennsylvanian) deposits. Unfortunately, no complete specimens have been found; the head is known from only one partial impression that lacks antennae or other appendages, and the tail is unknown. Thus, the classification is doubtful. Waterlot (1934) defined the subclass Archaeocrustacea to include two orders, the Trilobita and the Arthropleurida, within the class Crustacea, in which Van der Heide (1951) has followed him. Moore, Lalicker, and Fischer (1952) have retained the order Arthropleurida of Waterlot as a class, parallel to the class Trilobita and others within the subphylum Trilobitomorpha.

### Phylum ARTHROPODA

### Subphylum TRILOBITOMORPHA

### Class ARTHROPLEURIDA

### Family ARTHROPLEURIDAE

### Genus *Arthropleura* Jordan

The first specimens of *Arthropleura* that have been reported from North America are described below.<sup>1</sup> Since they consist of portions of the leg and its supposed articulating apparatus, and since species are discriminated on the basis of the ornamentation of the dorsal tegument, these specimens can not be specifically identified. I collected two of the three specimens in 1952; the third and most complete was found by Mrs. John M. McLuckie in 1953. They are from the Middle Pennsylvanian Francis Creek shale of Will County, Illinois, and were discovered in dump heaps of strip mines. The faunal and floral associates and their occurrence have been discussed briefly (this volume, no. 1, pp. 8-10; see map, fig. 3, in that paper, for detailed locality records).

<sup>1</sup> Though Handlirsch (1906, p. 340) is probably correct in attributing a fragmentary "Mylacridae?" of Scudder, from Mazon Creek, Illinois, to *Arthropleura*.

**Arthropleura** sp.

## Figures 38-41

Seven species of *Arthropleura* are known from Westphalian and Stephanian deposits of western Europe. The body is composed of an unknown number of segments (at least 22), consisting, like those of trilobites, of axial and pleural lobes. There is no differentiation into thoracic and abdominal segments, nor any fusion of segments into a pygidium. Ventrally, each segment bears a pair of biramous appendages, the endopodite and exopodite being similar. At the base of each leg is a "rosette organ" composed of triangular bosses arranged like the petals of half a flower; this organ is regarded by Waterlot (1934) as constituting the attachment of the leg to the body. Our specimens consist of one leg with the rosette organ attached, and two isolated rosette organs. The size of the leg implies an animal nearly twice as long as Waterlot's (1934, pl. A; see fig. 38) restoration of *A. armata*, while the size of the larger rosette organ before us implies an animal  $3\frac{1}{4}$  times the size of *armata*; the largest European species, *A. pruvosti* Waterlot, is slightly more than twice as long as the restoration of *A. armata*. The *Arthropleura* of the ancient Mazon Creek coastal plain in Illinois must have been about five feet long—by far the largest animal of this fauna.

The leg consists of ten joints, including the basis; in the specimen, the exopodite covers the endopodite, only part of which can be seen. Each joint of the leg terminates postero-distally in a slightly recurved spine; the last joint is claw-like. Above the basis lies the rosette organ, surrounded on the side opposite the leg by a convex border. Comparing the bosses of the rosette organ with the nomenclature adopted by Waterlot (see fig. 40, *e*), we find his elements C, E, L and L'. The plate I is probably represented on the McLuckie specimen as a protuberance from the basis, marked by several irregular grooves. As in other species of *Arthropleura*, plate C is the most heavily shagreened in texture. The convex border of the rosette organ corresponds to the sternite of Waterlot. The two detached rosette organs have a well-developed plate I and small accessory bosses distad of L. The basis extends beyond the rosette organ on the most complete specimen as a heavily granulated plate that blends posteriorly into a less papillose plate that curves into a plane at right angles to the plane of the leg and represents the K plate (epipodite?).

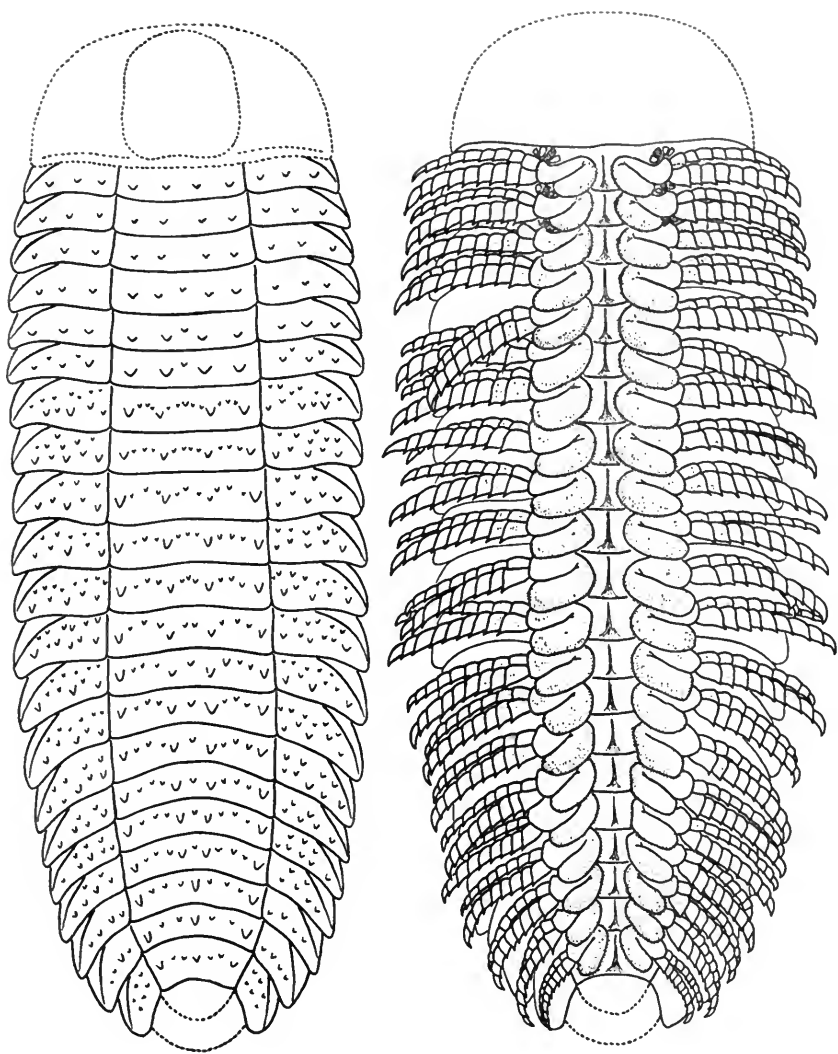


FIG. 38. Restoration of *Arthropleura armata* Jordan 1854, from Waterlot (1934, pl. A). Ruled line = ten centimeters.

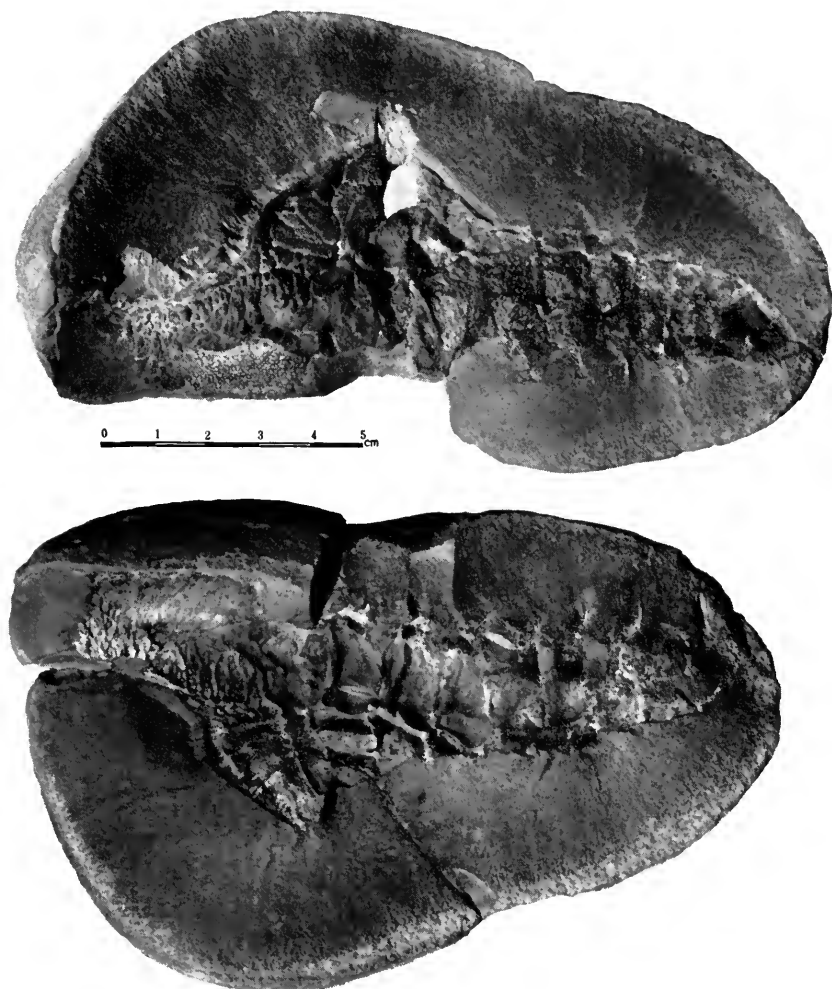


FIG. 39. *Arthropleura* sp., leg and rosette organ preserved as impressions in matching halves of a concretion. McLuckie collection.

Waterlot's interpretation of the significance of the various plates of the rosette organ was based on a study of a great many specimens and should perhaps not be challenged on the basis of three. He concluded that the heavily shagreened C was a precoxa, joined to the base of the leg, and that I and E, embracing it, were swellings of the sternite surrounding the precoxa, by means of which the leg was flexibly locked to the body. The drawing that embodies his

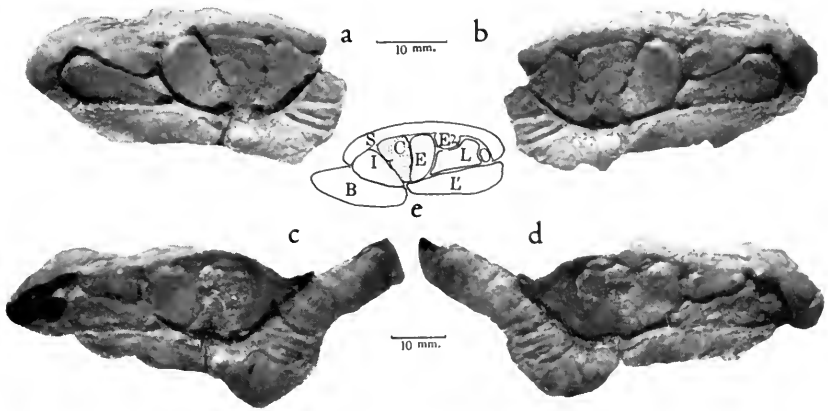


FIG. 40. *Arthropleura* sp., rosette organs. *a, b*, CNHM no. PE154, paired impressions; *c, d*, CNHM no. PE153, paired impressions; *e*, sketch of rosette organ, showing nomenclature of elements as employed by Waterlot and others. B, basis; C, precoxa; E, swelling of sternite, external to C; E2, swelling accessory to E; I, swelling of sternite, internal to C; L, accessory linguiform swelling of sternite; L', accessory linguiform swelling of sternite; S, sternite.

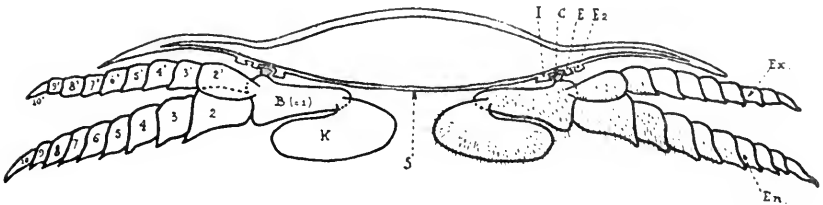


FIG. 41. *Arthropleura*, morphotype; section across body showing relation of leg to body, as proposed by Waterlot (1934, fig. 27). Symbols as employed in figure 40, plus En, endopodite; Ex, exopodite; K, K-plate (epipodite? or gnathobase?).

conclusions (see our fig. 41) shows a leg wholly outside the body, set off from the body cavity by an entire sternum, with no provision for leg muscles. It seems possible that the sternite, or ventral membrane, covered only the space between the bases of right and left legs, and that the bases themselves communicated with the body cavity.

Whatever may be the function of the rosette organ, it evidently forms some sort of a unit in itself, since it may occur apart from the leg or any other part of the animal. Besides the two specimens illustrated here, there is one figured by Pruvost (1919, fig. 20), one figured by Waterlot (1934, pl. 13, fig. 4), and two figured by Van

der Heide (1951, pl. 1, fig. 18; pl. 2, fig. 7). An understanding of the form and function of this organ must await further discoveries of specimens.

If more specimens of *Arthropleura* are found in suitable deposits in North America, they may be among the best guide fossils of the Pennsylvanian non-marine sequence. Waterlot (1934, pp. 104, 282) remarks that any species of *Arthropleura* is confined to one, or at the most to two, zones of the Westphalian in Europe, though Van der Heide (1951) has since extended the range of *A. armata* to three zones.

*Specimens*.—CNHM nos. PE153 and PE154, detached rosette organs, each consisting of paired impressions in concretions (coordinates F8.7, d8.2 on map, fig. 3, this volume, no. 1); collected in 1952 by E. S. Richardson, Jr., and George Langford. Specimen of leg with attached rosette organ in collection of Mr. and Mrs. John M. McLuckie, Coal City, Illinois (approximate coordinates H2, f2); collected in 1953 by Mrs. McLuckie. I am grateful to Mr. and Mrs. McLuckie for permission to study their specimen at the Museum.

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