



FIGURE 10—*Cyclus obesus* new species. Reconstruction of the dorsal surface. Scale = 2 mm.

Another fossil species should probably figure into these comparisons, the poorly known taxon *Carcinaspides pustulosus* Schafhäütl, 1863. This species more than likely seems related to *Halicyne*, because it shares with that genus a truncated anterior area and lobate decoration on the anterior and median areas of the carapace. The *Carcinaspides* fossils, however, appear to lack a clearly defined optic notch and a rostral plate. Nevertheless, they display a distinct, dense, and robust array of papillations on the carapace surface and a highly scalloped margin. Although *Carcinaspides pustulosus* should remain a distinct species for now, one might make a convincing argument for placing it within the genus *Halicyne* if the holotype ever becomes available for study.

HALICYNE MAX new species Figures 11–16

Diagnosis.—Carapace shield almost circular in outline, slightly vaulted in cross section, bearing distinct papillose decoration (especially on antero-medial parts), with distinctly thickened submarginal rim bearing thin, scalloped, serrate, shelf-like edge; underside of carapace with lamellae; distinct optic notches antero-laterally with small stalked compound eyes; rostral plate well developed with a distinct ventrally directed anterior-most portion bearing a pair of rounded knobs or bosses; terminal segments of all geniculate limbs long and thin, two sets of maxillipedes, maxillipedal genicula distinctly larger than those of the maxillae.

Description.—The almost completely circular and vaulted carapace appears about as long as wide (see Table 3) and bears a distinctly papillose surface (e.g., PE 13445, Figure 11.2; PE 34772, Figure 11.1; PE 34772, Figure 12.3). The quite complex margin of the carapace folds to form a distinct submarginal rim (PE 15233, Figure 11.3, PE 34772, Figure 11.1) that bears a thin, shelf-like, scalloped, and robustly spinose edge (e.g., PE 22453, Figure 13.1; PE 24954, Figure 13.2; PE 24061, Figures 13.3 and 13.4). The distinct optic notches occupy places at the anterior ends of the submarginal rim and anteriorly bear a laterally directed process (PE 15233, Figures 11.3 and 11.4; PE 34772, Figure 11.1). Stalked compound eyes lie in these notches (PE 34772, Figure 14.1). A wide, papillose rostral plate extends forward from the anterior margin of the carapace shield (PE 34772, Figure 12.3; PE 22453, Figure 13.1). Composed of two portions, the dorsal part of the rostral plate bends ventrally to form a separate “bumper” along the anterior-most facade of the

TABLE 2—Measurements in cm of specimens of *Cyclus obesus*; * indicates holotype.

| Specimen | Carapace | | |
|-----------|----------|-------|----------------|
| | Length | Width | Length : width |
| PE 23041 | 1.22 | 1.70 | 0.72 |
| PE 24975 | 1.32 | 1.70 | 0.78 |
| PE 30630* | 1.20 | 1.44 | 0.83 |
| PE 34834 | 1.05 | 1.45 | 0.72 |
| PE 34880 | 1.33 | 1.67 | 0.80 |
| PE 39056 | 1.35 | 1.74 | 0.78 |
| Average | 1.24 | 1.62 | 0.76 |

head (PE 15233, Figures 11.3, 11.4; PE 22552, Figure 15.1). We cannot determine exactly whether this ventrally directed portion forms a solid part of the rostral plate or movably articulates with the basal portion. This ventrally directed plate bears distinct paired bosses (Figures 11.4, 12.3) and a median raised area that has a finely reticulated, reflective surface similar to that seen on the optic areas of the compound eyes (Figure 14.1).

The underside of the carapace in the region of the thorax has a dense arrangement of subparallel lamellae or rugae (Figure 11.1; PE 25662, Figure 12.1, Figure 15.1; Figures 14.1, 14.2, 14.3). These occur as thin double-walled plates (PE 22552, Figure 14.3). These plates appear to arise as a series of folds or flaps from the underside of the carapace proper rather than growing out from the lateral thoracic body wall. The preservation of these fossils precludes definitive conclusions, but it appears that these plates lie in a U-shaped chamber formed by the body wall and carapace and possibly partially enclosed by a flange from the posterior and postero-lateral sternites and the edge of the carapace (PE 22552, Figure 14.2, 14.3).

None of the specimens we have seen preserve much of the antennules and antennae. We know only the geniculate limbs completely. The maxillae have a short delicate terminal segment (PE 28958, Figure 15.2) and serrations on the medial edge of the moderately long penultimate segment (PE 13445; PE 34772, Figure 12.3). Although well developed and directed distinctly anteriorly, the maxillae appear smaller than the maxillipedes (Figures 15.1–15.3).

The very large first maxillipede has a long and delicate terminal segment, subequal to the single-segmented, somewhat more robust, penultimate segment (PE 25662, Figure 12.2; PE 28958 Figure 15.2). These seem to have a distinct anterior orientation extending out in front of the head. The second maxillipede has a more antero-lateral orientation of its subchelate geniculum (PE 13445, Figure 11.2; PE 11451, Figure 15.3). The second maxillipede appears as somewhat shorter than the first but still longer than the maxillae (PE 34772, Figure 11.1).

The well-developed walking legs extend laterally from the body but are concentrated in the anterior portion of the thorax (PE 34772, Figure 11.1). Furthermore, at least the anterior-most of these have their distal segments directed anteriorly (PE 25662, Figure 12.1). Thus the posterior thoracopods appear to be somewhat geniculate.

We know nothing concerning the abdomen or caudal rami of this species.

Occurrence.—Francis Creek Shale, Desmoinesan, Middle Pennsylvanian.

Material examined.—PE 11451, 13445, 15233, 20613, 21610, 22464, 22552, 22471, 24061, 24954, 25662, 28958, 34764, 34772.

Holotype and locality.—PE 34772 (Figures 11.1, 12.3), Peabody Coal Company Pit 11, Will and Kankakee counties, Illinois.