

CHASMOCARCINUS ROBERTSI, A NEW CRAB SPECIES
FROM THE MIOCENE OF VIRGINIA, WITH NOTES ON
THE GENUS FALCONOPLAX (CRUSTACEA, DECAPODA, GONEPLACIDAE)

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ABSTRACT

The new species *Chasmocarcinus robertsi* from the upper Miocene Eastover Formation of Virginia is described and compared to other closely allied living and fossil representatives of this genus. The comparative morphology of fossil and living species demonstrates that the fossil genus *Falconoplax* Van Straelen, 1933, is a junior subjective synonym of *Chasmocarcinus* Rathbun, 1898. *Chasmocarcinus robertsi* occurs in, or was derived from, Miocene strata, not "?Paleocene beds" as reported by previous authors. Specimens of *C. robertsi* found near Little Cove Point, Maryland represent the northernmost known occurrence of living or fossil *Chasmocarcinus*.

INTRODUCTION

In 1961 Lauck W. Ward discovered a small fossil crab about 43 km northeast of Richmond along the south bank of the Mattaponi River, in King William County, Virginia. Subsequent field work by Ward in this and other nearby areas along the river produced more specimens which, in 1963, he sent to the National Museum of Natural History in Washington for identification. Henry B. Roberts of the museum examined these crabs and concluded that they represented a new species of the genus *Falconoplax*, which at that time was known only from the type species, *F. kugleri* Van Straelen, 1933, a crab described from and restricted to the Eocene of Falcón, Venezuela. In 1964 we began our field studies of the fauna associated with the crab-bearing lag deposits along the Mattaponi River, and supported Roberts's

studies by providing him with additional crab material until his retirement in 1973. Poor health prevented Roberts from completing a number of his projects including the description of this new species of *Falconoplax*. Upon his retirement Roberts handed over that job to the senior author.

Family GONEPLACIDAE MacLeay, 1838
Subfamily CHASMOCARCININAE
Serène, 1964
Genus CHASMOCARCINUS Rathbun,
1898

Chasmocarcinus RATHBUN, 1898a: 284.

Type species, by indication, *Chasmocarcinus typicus* Rathbun, 1898.

Falconoplax VAN STRAELEN, 1933: 11.

Type species, by monotypy, *Falconoplax kugleri* Van Straelen, 1933.

Definition (Modified from Rathbun, 1898a): Carapace thick, broadest posteriorly, tapering anteriorly, with lateral margins forming a curve continuous with the anterior margin. Front narrow, bilobed. Orbits marginal, oblong. Pterygostomial region with horizontal suture. Antennula with basal joint very large and hemispherical. Epistome nearly perpendicular, projecting below maxillipeds. Maxillipeds widely gaping, parallel, longitudinally placed; merus suboval, palpus articulating at antero-internal angle. Abdomen much narrower at base than sternum; third, fourth, and fifth segments coalesced in male. Sternite 8 with genital groove covered with supplementary accessory plate. Abdominal segments distinct in female. Chelipeds with merus trigonal, carpus quadrate, manus short and broad, fingers long and slender. Ambulatory legs slender, subcylindrical, third pair the longest, second next, fourth the shortest. Dactylus of last pair recurved.

The following characters should be added to Rathbun's (1898a) description of the type species of *Chasmocarcinus*: anterior dorsolateral mar-

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gin with persistent, minute tooth above prominent, V-shaped lateral groove formed by intersecting post-subhepatic and cervical grooves. These two characters are also present on the type species of *Falconoplax*.

Included Recent and fossil species:

Recent species and their type localities – *C. typicus* Rathbun, 1898a:285 (North of Trinidad); *C. obliquus* Rathbun, 1898a:286 (Bahamas, SE of Andros Isl., in Tongue of Ocean); *C. latipes* Rathbun, 1898b:602 (Mexico, Magdalena Bay); *C. cylindricus* Rathbun, 1901:10 (Puerto Rico, Mayaguez Harbor); *C. rathbuni* Bouvier, 1917:391 (Brazil, Rio Grande do Sul); *C. superbus* (Boone, 1927:16), (Belize, Glover Reef); *C. mississippiensis* Rathbun, 1931:72 (Mississippi, Mississippi Sound near Horn Island); *C. longipes* Garth, 1940:90 (Panama, Secas Ids. and Colombia, Port Utria); *C. panamensis* Serène, 1964b:258 (Bay of Panama, Isl. del Rey); *C. chacei* Felder and Rabalais, 1986:548 (northwestern Gulf of Mexico, vicinity of Flower Garden Banks).

Fossil species, their type localities and age – *C. kugleri* (Van Straelen, 1933:11), (Venezuela, central Falcón; Eocene); ?*C. bicarinella* (Collins and Morris, 1976:109), (Barbados, Spa; Eocene), type not examined. The presence of two small blunt spines bordering the cervical notch mentioned by Collins and Morris and the strong diagonal dorsal ridges seen in their figure of the holotype suggest that this species does not belong here; *C. seymourensis* Feldmann and Zinsmeister, 1984:1056 (Seymour Island, Antarctica; Eocene).

Remarks: The similarities between *Falconoplax* and *Chasmocarcinus* have, surprisingly, not been noted by previous authors. With the exception of a new species introduced by Collins and Morris in 1976, *Falconoplax* has received little attention on the generic level. However it has received considerable attention on the family level. A brief review of the literature dealing with this genus and its family placement follows.

Van Straelen (1933) erected the genus *Falconoplax* to accommodate his new fossil species *F. kugleri*, from the Eocene of Venezuela, and placed it in the family Goneplacidae without explanation. Glaessner (1969) transferred *Falconoplax* to the fami-

ly Dorippidae, subfamily Tymolinae. His justification for this move was based on, among other characters, the presence of a wide sternal plate “with deep sternal grooves leading medially from 5th pereopod coxae of female.” These grooves are apparently those formed on internal molds by the dissolution of the exoskeleton, and are very misleading. Collins and Morris (1976) followed Glaessner in placing *Falconoplax* in the Tymolidae when they named a second species, *F. bicarinella*, from the Eocene of Barbados. In this paper they mentioned a third “undescribed species from the ?Paleocene of Virginia, U.S.A.” Glaessner (1980), citing the criteria used by Guinot (1977,1978), stated that “it would seem necessary to exclude this genus” (*Falconoplax*) from the Tymolidae. Bailey and Blow (1987), in an abstract and without elaboration, referred to *Falconoplax* as a junior synonym of *Chasmocarcinus*, a genus in the family Goneplacidae. Glaessner and Secretan (1987) discussed and figured the genital groove present on the eighth sternite of *Falconoplax*, and retained this genus in the Tymolidae. Tavares (1992) removed *Falconoplax* from the Cyclodorippidae (= Tymolidae) and, based on the “characteristics of its thoracic sternum,” stated that *Falconoplax* is related to the Goneplacidae. In this paper we repeat and explain our earlier position that *Falconoplax* is a synonym of *Chasmocarcinus* and therefore a member of the Goneplacidae.

The relationship of *Falconoplax* to *Chasmocarcinus* was called to our attention by a specimen label in the U.S. National Museum collections corrected by the late Mary J. Rathbun to read: “*Chasmocarcinus kugleri*, Van Straelen, 1933.”

With Rathbun’s label in mind we examined Van Straelen’s types of *F. kugleri* in 1985 and compared them to the types of *C. typicus*. Both species share generic characteristics and are remarkably similar except for size. *Falconoplax kugleri* is, on the average, considerably larger than *C. typicus* and most other living representatives of *Chasmocarcinus*. However, at least one living species, *C. latipes* Rathbun, 1898, does approach the large size attained by fossil forms. Size, therefore, does not appear to be of generic importance here.

Unfortunately, Van Straelen based his description of *F. kugleri* on about 200 internal molds of carapaces. Even the figured type is completely lacking the exoskeleton. Such internal molds are misleading in the shape and surface features they present. For example, the figured type of *F. kugleri* shows a narrow front with wide orbits. Exterior exoskeleton impressions of these same features on some paratypes show their proportions to be nearly the reverse, or more like those of *Chasmocarcinus*. Similarly the tubercles, diagonal ridges, and other features described by Van Straelen (1933) for *F. kugleri* and used in part by Collins and Morris (1976) to assign *F. bicarinella* to *Falconoplax* appear stronger or more subdued than corresponding features on *Chasmocarcinus*. In summary, these surface features mistakenly led Van Straelen to believe that he had a new genus, which he named *Falconoplax*.

Our examination of the types of *F. kugleri* revealed a number of characters not presented by Van Straelen in his description of *F. kugleri*. In brief, these characters are as follows: carapace subquadrate, broadest posterolaterally. Dorsal surface covered with large punctae. Front narrow, bilobate, equal to about one-third of fronto-orbital width. Orbits marginal, ovate. Anterior dorsolateral junction defined by sharp ridge with single, minute tooth anterior to intersecting cervical groove and above lateral V-shaped groove. Epigastric lobes weak. Mesogastric and cardiac regions well defined by deep grooves. In males, sternite 8 separated from preceding by genital groove covered by supplemental sternal plate. In females, gonopores large, round, found on sternite 6. Abdomen of male broadest at segment 3; segments 3-5 fused. Abdomen of female broadly oval, segments unfused, distinct. Right and left carpus of female chelipeds with long, acute spine.

These *Falconoplax* characters, in combination with those mentioned by Van Straelen, describe a crab which falls well within Rathbun's definition of *Chasmocarcinus*. In conclusion, the number of shared generic characteristics and overall similarities of these two genera compel the present authors to consider *Falconoplax* a junior subjective synonym of *Chasmocarcinus*.

CHASMOCARCINUS ROBERTSI, n. sp.

Plate 1, figures 3-5;

Plate 2, figures 3-12.

An undescribed species from the ?Paleocene of Virginia, U.S.A. COLLINS and MORRIS, 1976, p. 112; TAVARES, 1992, p. 73.

Diagnosis: Carapace large, thick, subquadrate in dorsal outline; anterior dorsolateral junction with granulated ridge; dorsal and ventral surfaces coarsely punctate; fingers of male major chela very long, slender, greatly deflected, proximal end of propodus with row of five distinct teeth, first and fifth prominent; carpus in both sexes with stout curved spine on inner angle; eighth sternite of male with genital groove covered by accessory plate.

Description: Carapace large, thick, subquadrate in dorsal outline, broadest at posterolateral angle, anterior third of dorsal surface strongly deflexed, level transversely. Anterolateral margins perpendicular. Subhepatic region smooth to sparsely granulate, moderately inflated with broad smooth furrow below; dorsolateral juncture above well defined by granulated ridge. Ridge with single, persistent, minute tooth anterior to intersecting cervical groove. Front narrow, bilobate, projecting beyond anterolateral margin, roughly equal to one third of fronto-orbital width. Lobes rounded, surface densely dentate, borders defined by raised thickened smooth to striate lip. Orbits transverse, in low relief laterally, ovate with broad granulate lower and lateral inner rim; border striate above, coarsely granulate below and laterally; distal orbital rim in contact with weakening dorsolateral ridge. Suborbital margin extending well beyond front. Dorsal surface coarsely punctate and granulate. Punctae developed into deep, transverse furrows near anterior and posterior borders; surface finely granulate anteriorly. Epigastric lobes weak. Cervical groove usually faint dorsally, occasionally strong with intermittent deep depressions, always strong laterally where it terminates to form a prominent V-shaped groove with post-subhepatic groove joining inferior horizontal groove below. Posterior gastric pits very small, slit-like. Mesogastric and cardiac regions well defined by deep grooves, surfaces finely granulate. Diagonal, low, narrow transverse branchial ridge intersects lateral margin medially, separated from incurving terminus of anterior dorsolateral ridge by cervical groove. Branchial regions, greatly expanded, sloping posterolaterally to form broad flange; surface coarsely granulate, rugged, with deep pits and furrows. Finely corrugated, narrow, raised cord along posterolateral border.

Eyestalks visible along their entire length when retracted, slightly incurved, robust, filling orbits at base, tapering distally to (inferred) small cornea, upper surface punctate with few granulations. Antennules prominent; basal arti-

cle very large, hemispherical; second article very long; third article and flagellum not seen. Antennal peduncle seated in orbital gap. Operculum of excretory pore broad, ovate. Epistome with large, anterior, medially placed, badly eroded bilobate prominence. Outline and other features incomplete. Buccal frame broadly rectangular. Third maxillipeds widely gaping; merus broadly suboval, width slightly more than ischium; palpus articulating at antero-internal angle; endopod extending to merus medially. Pterygostomian region broadly triangular, bordered by low, narrow, smooth lip; surface smooth to sparsely punctate, with low pustules.

Sternum greatly arched longitudinally; surface coarsely punctate and granulate. Punctae large, evenly distributed, occasionally drawn into long furrows on sternite 4. Granules fine, evenly distributed over most sternites, coarse and concentrated to form longitudinal ridges adjacent to abdominal depression and along posterior margin of sternites 4-8, occasionally developed into striae adjacent telson in old males, coarsest in mature individuals of both sexes. Sternites 5-8 coarsely beaded along anterior margins. In males, sternite 8 broad, separated from preceding by genital groove covered by

supplemental sternal plate. In females, gonopores large, round, with simple low rim, found on sternite 6 impinging border of sternite 5. Sternite 8 with broad, shallow transverse depression. Abdomen of male narrow, broadest at segment 3, finely granulate, sometimes wrinkled. Segment 1 not seen; segment 2 narrow; segments 3-5 fused, usually depressed medially at sutures; lateral extension of segment 3 covering mesial ends of supplementary sternal plates; segment 4 with or without lateral tubercle. Segment 6 nearly equal in length to telson, with or without two medial transverse slit-like pits, anterolateral margins distinctly elevated. Abdomen of female broadly oval, finely granulate, with longitudinal furrows on segments 3-7. Lateral margins of segments 3-6 coarsely granulate. Segment 4 widest; segment 6 longest, reniform. Telson broadly triangular with weak medial longitudinal ridge.

Chelipeds long, unequal in both sexes, surfaces punctate, for the most part smooth. Merus short, heavy, with fine granules along inferior edge; carpus subrectangular with stout, curved, granulated spine on inner angle. Inner carpal border finely granulate. In males palm of major chela short, inferior surface broadly triangulate,

PLATE 1

Figures

- 1-2. *Chasmocarcinus typicus* Rathbun
North of Trinidad; Recent.
 - 1a. Male syntype, in dorsal view, cl 7.7 mm, cw 10.4 mm (USNM 6901). Scale = 1 mm.
 - 1b. Male syntype above, in ventral view to show genital groove and covering plate on left thoracic sternite 8. Scale = 1 mm.
2. Male syntype, left frontal lobe and orbit in anterior view, cl 8.0 mm, cw 10.4 mm (USNM 6901). Scale = 0.5 mm.
- 3-5. *Chasmocarcinus robertsi* Blow and Bailey, n. sp.
King William Co., Virginia; Miocene.
 3. Female holotype, in dorsal view, cl 17.9 mm, cw 24.5 mm (USNM 468599). Locality: USGS 26619. Arrow points to minute tooth on anterior dorsolateral ridge. Scale = 3 mm.
 4. Female paratype, right frontal lobe and orbit in anterior view (image reversed), cl 16.7 mm, cw (approximate; carapace broken) 23.2 mm (USNM 468600). Locality: USGS 26620. Scale = 1 mm.
 5. Male paratype, in ventral view to show genital groove and covering plate on left thoracic sternite 8. Apparent opening on ventral surface between plate cover and sternite 8, abnormal. Dorsal aspect of carapace concealed by matrix. Width of sternum 21.5 mm (USNM 468601). Locality: USGS 26623. Scale = 1 mm.
- 6-8. *Chasmocarcinus kugleri* (Van Straelen)
Falcón, Venezuela; Eocene.
 - 6a. Female holotype internal mold, in dorsal view, cl 18.8 mm, cw 23.3 mm (NHMB F 1290). Scale = 3 mm.
 - 6b. Female holotype above, left frontal lobe and orbit in anterior view. Scale = 1 mm.
 7. Male paratype internal mold, in ventral view to show genital groove and covering plate on left thoracic sternite 8, cl (approximate) 14.3 mm, cw 18.3 mm (NHMB F 1435). Scale = 1 mm.

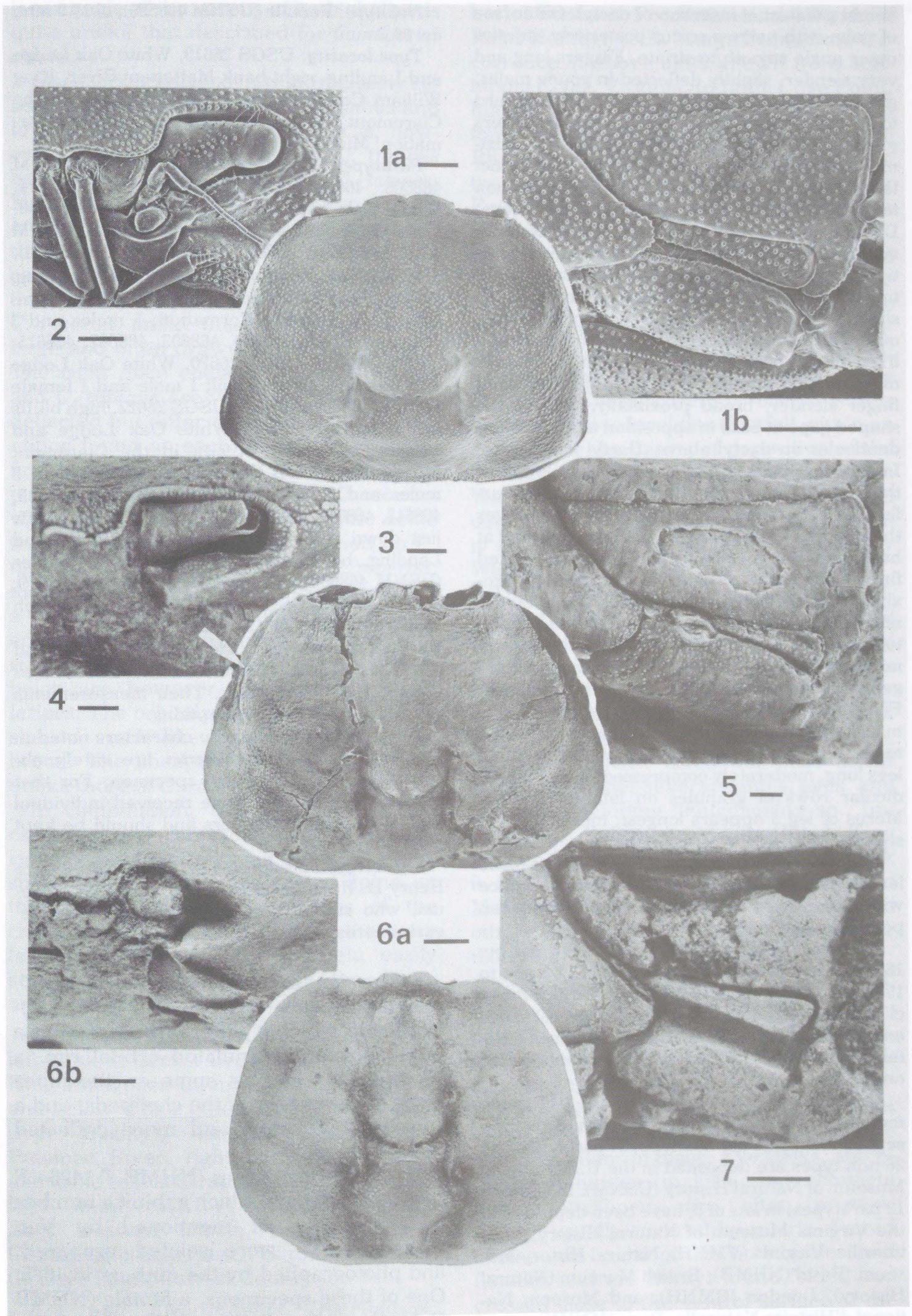


PLATE 1

height greatest at insertion of dactyl. Outer face of palm with narrow sulcus posteriorly, inferior outer angle smooth to striate. Fingers long and very slender, slightly deflected in young males, greatly deflected downward and curved inward to fit arch of sternum in gerontic males; fingers extending to posterior border of sternum. Proximal end of fixed finger with row of five distinct teeth, first and fifth prominent, set in opposition to small blunt denticules on dactylus above. Dactyl shorter than fixed finger, broad at base, superior surface weakly granulate. Distal portions of both fingers with minute acute teeth, tips of each bent inward. Palm of minor chela slightly smaller than major, of similar shape, outer surface without posterior sulcus; palm and fixed finger nearly equal in length, opposable margins with minute acute teeth distally; fixed finger slender, broad proximally, with scythe shaped gape at base in opposition to small, blunt denticules on dactyl above. Dactyl incomplete. In females, palm of major chela slightly larger than minor, shape like that of male, outer surface with posterior sulcus; fingers slightly longer than palm, of equal length. Dactyl very broad at base, superior surface weakly granulate. Fixed finger with series of blunt denticules along proximal third, in opposition to series of smaller denticules on dactyl above. Dactyl with strong tooth at base. Distal portions of both fingers with minute acute teeth. Minor chela incomplete, fingers more slender than those of major chela. Fixed finger with scythe shaped gape at base, margins of opposition of both fingers with fine teeth. Walking legs incomplete. Meri of walking legs long, moderately compressed, with perpendicular rows of granules on lateral surfaces. Merus of leg 3 appears longest; merus of leg 4 shortest.

Measurements in millimeters: cl = carapace length, measured along midline; cw = carapace width, measured at maximum distance between posterolateral borders.

Size: Female range: cl 14.6 mm to 20.5 mm, cw 18.2 mm to 28.5 mm. Male range: cl 14.3 mm to 19.5 mm, cw 18.0 mm to 26.9 mm. Largest male: cl 29.1 mm, estimate, cw not available, carapace enclosed in matrix. Largest specimen (sex indeterminate): cw 31.6 mm. Measurements based on 113 specimens.

Material and Repositories: Of the 317 specimens of *C. robertsi* examined in private and museum collections, the holotype, 34 paratypes and 26 non-types are deposited in the U.S. National Museum of Natural History (USNM). In addition 12 paratypes, in lots of 3, have been deposited in the Virginia Museum of Natural History, Martinsville, Virginia (VMNH); Natural History Museum, Basel (NHMB); British Museum (Natural History), London (BMNH); and Muséum National d'Histoire Naturelle, Paris (MNHN).

Holotype: Female (USNM 468599), cl 17.9 mm, cw 24.3 mm.

Type locality: USGS 26619, White Oak Lodge and Landing, right bank Mattaponi River, King William Co., Virginia. Collected *in situ* in the Claremont Manor Member of the Eastover Formation; Miocene.

Paratypes: 4 males and 1 female (USNM 468606, 468611, 468620-468622), USGS 25274, White Oak Lodge and Landing, beach spoil, Ward Collection; 4 males and 3 females (USNM 468602, 468604, 468616, 468617, 468623-468625), USGS 26619, White Oak Lodge and Landing, collected *in situ* in the Claremont Manor Member of the Eastover Formation; 5 males and 3 females (USNM 468600, 468603, 468607, 468615, 468626-468629), USGS 26620, White Oak Lodge and Landing, beach spoil; 1 male and 1 female (USNM 468609, 468630), USGS 26622, high bluffs just down river from White Oak Lodge and Landing, collected *in situ* in the Claremont Manor Member of the Eastover Formation; 3 males and 2 females (USNM 468601, 468605, 468613, 468618, 468631) USGS 26623, high bluffs just down river from White Oak Lodge and Landing, beach spoil; 4 males and 3 females (USNM 468608, 468610, 468612, 468614, 468619, 468632, 468633) USGS 26625, a mixture of beach spoil from USGS 26619-26623.

Of the 34 paratypes listed above, 7 males and 6 females (USNM 468600-468612) are measured and figured in this paper. Their measurements are as listed on the plate captions.

Many of the morphologic characters noted in the description of *C. robertsi* are rarely observed on more than one specimen. For that reason the paratypes have received individual USNM catalogue numbers and should be kept together.

Etymology: This species is named for the late Henry B. Roberts, of the U. S. National Museum, who stimulated and guided the authors' early interest in fossil decapods.

Discussion: In terms of size and shape *C. robertsi* appears closely allied to *C. kugleri*, from which it differs in possessing a broader, more granulated orbital rim, a shorter, more robust spine on the inner angle of the carpus of the chelipeds, and a considerably larger and more deflected male chela.

A series of paratypes (NHMB F 1426 - F 1436) of *C. kugleri*, which exhibit a number of characters not mentioned by Van Straelen (1933), were isolated, prepared, and photographed by the authors in 1985. One of these specimens, a female (NHMB F 1434) shows a long acute spine on the

inner angle of the carpus of both chelipeds quite unlike that described for *C. robertsi* above.

Chasmocarcinus robertsi most closely resembles the Recent species *C. typicus* and to a lesser degree, *C. latipes*. It is, however, considerably larger than *C. typicus* but not that much larger than *C. latipes*. Measurements given for the type of *C. latipes*, cl 12.5 mm, cw 17.8 mm, approach the size range stated for *C. robertsi*. The carapace of *C. robertsi* is far more punctate than that of *C. typicus*, and the punctae of *C. robertsi*, unlike those of *C. typicus*, are large and often drawn into deep furrows. The right male chela of both *C. robertsi* and *C. typicus* are very large and greatly deflected but differ dramatically in the dentition found on each. Five distinct teeth, first and fifth prominent, are found at the proximal end of the propodus of *C. robertsi* while, in contrast, a crest of minute acute teeth is found at this same position on *C. typicus*. Like the carapace of *C. robertsi*, that of *C. latipes* is very punctate, and has a distinct, granulated, anterior dorsolateral ridge. A minute tooth found along this ridge and the V-shaped lateral groove below are, however, much weaker on *C. latipes*. The orbital rim of *C. latipes* though shaped much like *C. robertsi*, is not as broad. The chelipeds of male *C. latipes*, unlike those of *C. robertsi*, are equal.

In combination, the large size of the carapace, its anterolateral granulated ridge, raised ovate broad rimmed orbits, short, stout, curved granulated spine on the inner angle of the carpus of the chelipeds in both sexes, and the very large, curved male major chela easily separate *C. robertsi* from all other living and fossil species of *Chasmocarcinus*.

Localities: VIRGINIA: Mattaponi River, left bank at Locust Grove and Rickahock, King and Queen County, and right bank at and below White Oak Lodge and Landing (type locality), King William County. Potomac River, right bank, beach spoil above old mill at Stratford Hall, Westmoreland County. MARYLAND: Chesapeake Bay, western shore, beach spoil at Chesapeake Bay Ranch Club south of Little Cove Point, Calvert County.

Age and Stratigraphic Distribution: Upper Miocene: Claremont Manor Mem-

ber of Eastover Formation and ?Windmill Point Member of St. Marys Formation. Occurrence in above units known from Mattaponi River, Virginia, to Little Cove Point, Maryland. *In situ* specimens have been found only at localities along the Mattaponi River where 97% occur in the basal unit of the Claremont Manor Mbr. of the Eastover Fm. Shapes, borings, and surface textures of Eastover crab nodules containing *C. robertsi* suggest that most were derived from discontinuous underlying beds of the Windmill Point Mbr., St. Marys Fm. Two unworked specimens were found at Locust Grove on the Mattaponi River *in situ* in beds below the Eastover thought to be St. Marys. *Chasmocarcinus robertsi* is thus far restricted to localities that fall within an area where the basins of deposition of the St. Marys and Eastover Fms. overlap (see Ward and Powers, 1989). A section and discussion of stratigraphy at the type locality at White Oak Landing is presented by Ward (1992).

The ?Paleocene age suggested by Collins and Wright (1976, p. 112) and repeated by Tavares (1992, p. 74) is unsubstantiated and incorrect. It also should be noted that specimens of *C. robertsi* from the type locality have been offered for sale since at least 1966 by Malick's Fossils of Baltimore, Maryland. Malick listed this crab in his catalogues under several names, ages, and localities, including "*Falconoplax* sp., undescribed, Paleocene, Aquia [Fm.], King William County, Va." Decades of fieldwork in the Coastal Plain strata of Virginia and Maryland by the authors, L.W. Ward, and others have yielded specimens of *C. robertsi* only from Miocene beds.

Taphonomy and Paleocology: Specimens of *C. robertsi* are found as compacted, articulated individuals in reworked, bored, carbonate-apatite nodules. In general, these crabs are remarkably complete with most exhibiting intact dorsal and ventral aspects of the carapace with abdomens in place. Eye stalks, antennae, antennules, maxilla, and complete outer maxillipeds are often present, though usually covered by matrix. Paired chelae are common in both males and females and are always found folded and crossed close to the ventral surface of the carapace. Incomplete meri of walking legs

are often present. The completeness of these crabs, their subcylindrical shape, and the folded nature of their fragile chelae suggest that they were probably buried alive in burrows. This fossil species seems to have preferred a muddy bottom habitat, as do most of the 10 known Recent

species. A sparse assemblage of decapods is found with *C. robertsi*. Of the 307 fossil decapods found in Miocene strata along the Mattaponi River since 1964 by the authors and others (excluding Ward), only 27 specimens represent species other than *C. robertsi*. Specimens of *C. robertsi* and

PLATE 2

Figures

1. *Chasmocarcinus typicus* Rathbun
Male syntype, anterior outline in dorsal view, cl 8.0 mm, cw 10.4 mm (USNM 6901).
Locality: North of Trinidad; Recent. Scale = 1 mm.
2. *Chasmocarcinus kugleri* (Van Straelen)
Paratype, sex indeterminate, anterior outline of exoskeleton impression in dorsal view, cl 17.3 mm, cw 21.7 mm (NHMB F 1426)
Locality: Falcón, Venezuela; Eocene. Scale = 2 mm.
- 3-12. *Chasmocarcinus robertsi* Blow and Bailey, n. sp.
King William Co., Virginia; Miocene.
3. Male paratype, anterior outline in dorsal view, cl 18.1 mm, cw 23.3 mm (USNM 468602).
Locality: USGS 26619. Scale = 2 mm.
4. Male and female paratypes, composite drawing, to show left third maxilliped. Male carapace incomplete, width of sternum 19.5 mm (USNM 468603)
Locality: USGS 26620.
Female, cl 19.6 mm, cw 25.0 mm (USNM 468604).
Locality: USGS 26619. Scale = 1 mm.
5. Female paratype, sternum flattened to show complete outline and large female opening on sternite 6, cl 18.1 mm, cw 23.4 mm (USNM 468605).
Locality: USGS 26623. Scale = 2 mm.
6. Female holotype (USNM 468599) and paratype, composite drawing, abdomen flattened to show complete outline. Paratype, cl 15.6 mm, cw 21.0 mm (estimate) (USNM 468606).
Locality: USGS 25274. Scale = 2 mm.
7. Male paratype, sternum flattened to show complete outline and genital covering plate on sternite 8, cl 17.0 mm, cw 22.9 mm (USNM 468607).
Locality: USGS 26620. Scale = 2 mm.
8. Male paratype, abdomen flattened to show complete outline. Dorsal aspect of carapace concealed by matrix. Width of sternum 21.5 mm (USNM 468601).
Locality: USGS 26623. Scale = 1 mm.
9. Female paratypes, composite drawing, right carpus and chela in external view:
(1) cl 18.5 mm, cw 27.5 mm (USNM 468608).
Locality: USGS 26625.
(2) cl 18.5 mm, cw 22.2 mm (USNM 468609).
Locality: USGS 26622. Scale = 2 mm.
10. Male paratype, left chela in external view, cl (approximate) 17.0 mm, cw 23.0 mm (USNM 468610).
Locality: USGS 26625. Scale = 2 mm.
11. Male paratype, right chela of young male in external view, cl 14.5 mm, cw 20.4 mm (USNM 468611).
Locality: USGS 25274. Scale = 2 mm
12. Male paratype, (a) right chela of gerontic male in external view. Carapace concealed by matrix. (b) right cheliped of gerontic male, carpus and chela in dorsal view (USNM 468612).
Locality: USGS 26625. Scale = 2 mm.

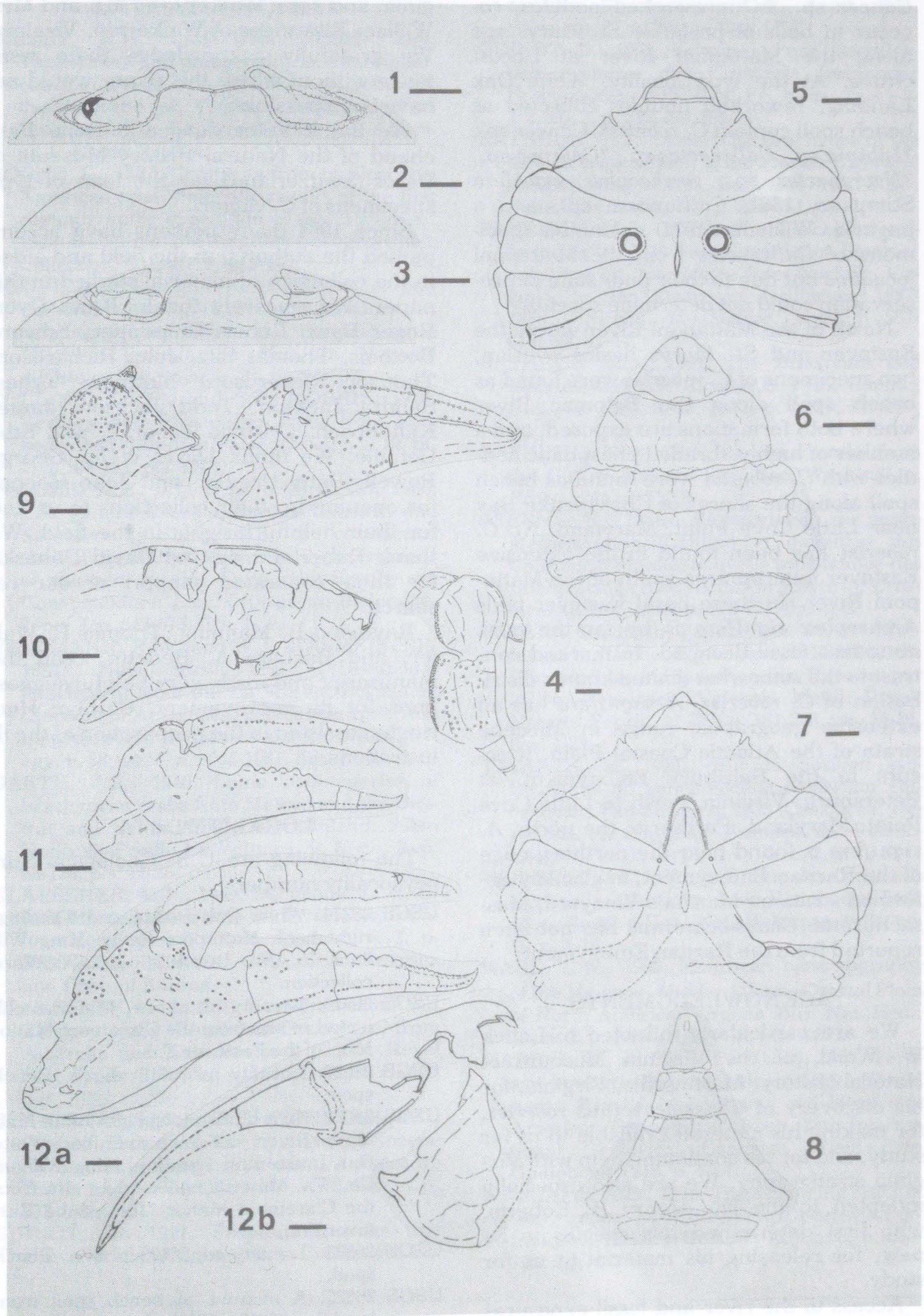


PLATE 2

Cancer sp., in unworked nodules, co-occur in beds of probable St. Marys age along the Mattaponi River at Locust Grove. At the type locality, White Oak Landing, reworked nodules collected as beach spoil contain *C. robertsi*, *Cancer* sp., ?*Libinia* sp., *Callinectes* sp., ?*Calappa* sp., ?*Necronectes* sp., *Archeoplax signifera* Stimpson, 1861, *Callianassa* sp., and a pagurid. Williams (1974) examined specimens of *Callinectes* from the Mattaponi localities but due to their poor state of preservation could not determine species.

North of the Mattaponi River where the Eastover and St. Marys basins overlap, two specimens of *C. robertsi* were found as beach spoil along the Potomac River where both formations are exposed, and a number of highly abraded phosphatic nodules with *C. robertsi* were found as beach spoil along the shores of Chesapeake Bay near Little Cove Point, Maryland. No *C. robertsi* has been found in the extensive Eastover outcrop area south of the Mattaponi River. In these basal Eastover beds *Archeoplax signifera* is by far the most abundant fossil decapod. In marked contrast to the somewhat limited known distribution of *C. robertsi*, *A. signifera* has an extensive geographic range in Miocene strata of the Atlantic Coastal Plain. It occurs in the Salisbury Embayment, at Petersburg, Virginia, north to Little Cove Point, Maryland. Farther to the north, *A. signifera* is found near the northern edge of the Raritan Embayment, in glacially deformed strata on Martha's Vineyard, Massachusetts. *Chasmocarcinus* has not been reported from the Raritan Embayment.

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LOCALITY DATA

The following are U.S. Geological Survey locality numbers:

- USGS 25274: White Oak Lodge and Landing, right bank Mattaponi River, King William Co., Va. Beach spoil. L.W. Ward collection.
- USGS 26619: Locality as above. Material collected *in situ* from the Claremont Manor Mbr. of the Eastover Fm.
- USGS 26620: Locality as 26619 above. Beach spoil.
- USGS 26622: High bluffs along right bank Mattaponi River, just down river from White Oak Lodge and Landing, King William Co., Va. Material collected *in situ* from the Claremont Manor Mbr. of the Eastover Fm.
- USGS 26623: Locality as 26622 above. Beach spoil.
- USGS 26625: A mixture of beach spoil from localities 26619 - 26623 above, and possibly the beaches below the community of Rickahock on the left bank Mattaponi River, King and Queen, Co., Va.

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