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HINEI (ORTMANN)
(DECAPODA, ASTACIDAE).

GEORGE HENRY PENN,
DEPARTMENT OF ZOOLOGY, TULANE UNIVERSITY
OF LOUISIANA, NEW ORLEANS.

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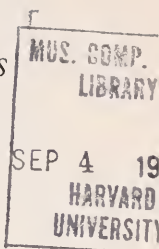
George Henry Penn, *Editor*,
c/o Department of Zoology,
Tulane University of Louisiana,
New Orleans, U. S. A.

A REDESCRIPTION OF THE CRAWFISH *PROCAMBARUS*
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GEORGE HENRY PENN,

Department of Zoology, Tulane University of Louisiana,
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The crawfish which is the subject of this paper was named in honor of the late James Stewart Hine (1866-1930), a distinguished student of the Diptera, who was a summer visitor at the now non-existent Gulf Biologic Station, Cameron, Louisiana. Dr. Hine sent the type specimens to Dr. Arnold E. Ortmann at the Carnegie Museum who described the species in 1905. Until recently this species was known only from Cameron as recorded by Ortmann (1905), Cary (1906) and Cary and Spaulding (1909); the latter two references are merely repetitions of Ortmann's original data. In 1939 under a grant from the New Orleans Academy of Sciences I collected crawfishes in southern Louisiana and found this species in several additional parishes. Later, Hobbs (1945) recorded it from Liberty County, Texas as a co-inhabitant at the type locality of *Cambarellus puer* Hobbs. The distribution and ecology of *Procambarus hinei* will be discussed at length in a subsequent paper on the Louisiana species of the genus *Procambarus*.

Ortmann's original description was inadequate and the figure of the first pleopod of the form I male left much to be desired. Specimens used in drawing up the following redescription were collected in two areas in Cameron Parish, Louisiana, each within fifteen miles of the type locality.

PROCAMBARUS HINEI (ORTMANN)

Synonymy.—*Cambarus* (*Cambarus*) *hinei* Ortmann, 1905, Ohio Nat., 6: 401; *Procambarus hinei* (Ortmann), Hobbs, 1942, Amer. Midl. Nat., 28: 342.

Type locality.—"One quarter mile from Gulf Beach, near Cameron, Cameron Parish, Louisiana"; type unknown (or lost). The types are not in the Carnegie Museum along with the rest of Ortmann's material (Brooks, 1931), nor have they been located in the crawfish collections of any other institution.

Male, form I.—Cephalothorax (figs. 1, 2) subovate. Abdomen narrower than and slightly longer than the cephalothorax. Width of cephalothorax at widest point subequal to height at the same point.

Areola broad, about $3\frac{1}{2}$ times longer than width at its narrowest point (average, 3.47; range, 3.78 to 2.86), with about five very fine punctations in narrowest part (average, 5.5; range, 5 to 7). Cephalic portion of cephalothorax about $2\frac{1}{4}$ times as long as the areola (average, 2.26; range 2.15 to 2.44); length of areola averages 30.6 percent of the total length of the cephalothorax (range, 29.0 to 31.7 percent).

Rostrum without lateral spines, but with margins interrupted in most specimens; less than ten percent of the specimens with very small lateral spines on rostrum. Rostrum widest at base, margins raised, more or less straight and converging; no median carina. Acumen distinct, although its base merges with the remainder of the rostrum.

Postorbital ridges weakly developed, terminating anteriorly in small spines. Branchiostegal spine small, acute. Cervical groove interrupted by a very small lateral spine on each side. In some specimens this spine is absent. Epistome (fig. 3) broader than long, with a small spine on anterior margin.

Cephalic region of the telson with two spines in each caudolateral angle, the more lateral one nearly twice the length of the other.

Antennules of usual form, with a large spine on the distal margin of the ventral surface of the basal segment. Antenna reaching just beyond the telson. Antennal scale (fig. 4) extending well beyond the tip of the rostrum; lateral margin straight, terminating in an acute spine; lamellar portion flat, fringed with long hairs from base to apex; greatest width of scale just proximal to the middle, length about $2\frac{1}{4}$ times greatest width (average, 2.23; range, 2.00 to 2.50).

Chela (fig. 5) subcylindrical, long and slender; non-tuberculate; very finely pubescent; palm inflated. Both fingers terminating in short corneous tips bent toward each other. Opposable margins of fingers flattened and covered with about four (apical) to about ten (basal) rows of small rounded tubercles. Fingers very short; dactyl about 35 percent of the total length of the outer margin of the chela (average, 35.2; range, 32.0 to 37.0). Carpus (fig. 5) subcylindrical, non-tuberculate.

Hooks (figs. 6, 7) on ischiopodite of third and fourth pereopods; those of the fourth about two-thirds as long as those on third pereopods.

Venter of cephalothorax covered with a dense mat of long hairs which are present on the mesial faces of all of the pereopods and maxillipeds. They are especially thick and conspicuous on the mesial faces of the third maxillipeds and the first three pereopods.

First pleopod (figs. 8, 9, 10) extending to caudal side of the coxopodite of the third pereopods when the abdomen is flexed. Apical third of pleopod bent caudad at about a 60° angle to the shaft. Pleopod terminating in three very small parts. The apical elements are somewhat twisted counterclockwise so that the mesial and cephalic processes are shifted to a more posterior position than is normal; hence, they are most clearly seen when the caudal surface of the pleopod is examined. Mesial process non-corneous, spiculi-form and extending laterodistad; cephalic process corneous, lying near to and mesiocaudad of the mesial process, truncate near apex, and extending laterodistad; central projection corneous, acute and somewhat compressed along its longitudinal axis, with fusion line of



Figures 1-15. *Procambarus hinei* (Ortmann): 1, 2, cephalothorax of form I male; 3, epistome of form I male; 4, antennal scale of form I male; 5, chela and carpus of form I male; 6, 7, hooks on ischiopodites of third and fourth pereopods of form I male; 8, 9, 10, mesial, caudal and lateral views of the first pleopod of form I male; 11, 12, 13, mesial, caudal and lateral views of the first pleopod of form II male; 14, chela and carpus of female; 15, annulus ventralis of female. Pubescence removed from all structures illustrated.

its component elements clearly visible. Caudal process not developed. A shoulder-like hump is present on the cephalomesial part of the apex of the pleopod. Apical half of mesial surface of pleopod with a heavy clothing of long hairs.

Male, form II.—Very similar to form I in general appearance. Chelae reduced but with the ratio of length of fingers to length of chela as in the form I male. Hooks on ischiopodites of third and fourth pereopods greatly reduced. Venter of cephalothorax only sparsely clothed with long hairs. First pair of pleopods (figs. 11, 12, 13) reaching to posterior part of coxopodites of third pereopods when abdomen is flexed; apical processes reduced and non-corneous.

Female.—Similar to form I male in shape and structure of the cephalothorax, but differing strikingly in the proportions of the chelae (fig. 14) in which the palm is only slightly longer than the fingers. Annulus ventralis (fig. 15) immovable, roughly pyramidal in shape with the apex of the base directed anteriorly; width nearly twice as great as length. Anterior face with a deep furrow from the base to the summit of the pyramid along the anterior edge. Sinus originates at the summit of this furrow and runs posterodextrad and gently curves back posterosinistrad nearly to the base of the posterior face of the pyramid.

Measurements.—Following are measurements in millimeters for the largest and smallest of the form I males, and the largest female in the collections examined.

	♂ ₁ (largest)	♂ ₁ (smallest)	♀ (largest)
Cephalothorax:			
Length	20.0	14.5	22.0
Height (greatest)	9.9	7.1	11.0
Width (greatest)	9.8	7.6	11.0
Areola:			
Length	6.0	4.3	7.5
Width (narrowest)	1.7	1.5	2.0
Rostrum:			
Length	5.5	4.5	5.6
Width at base	3.1	2.2	4.2
Antennal scale:			
Length (lateral margin)	5.2	4.3	5.5
Width (greatest)	2.5	1.9	2.7
Abdomen:			
Length (to tip of telson)	27.0	18.5	27.0
Chela:			
Length of outer margin	18.0	10.5	9.0
Length of inner margin of palm	11.5	5.8	3.8
Width of palm (greatest)	4.5	2.4	3.5
Thickness of palm (greatest)	3.5	2.0	2.4
Length of dactyl	5.9	3.9	4.5

Color pattern.—Although all of my specimens are faded so that the exact color cannot be recognized, the following notes made some

years ago will at least indicate the color pattern. Dorsally with a pair of conspicuous dark, broad, parallel, longitudinal stripes which originate just below the postorbital ridges and run posteriorly along either side of the areola and onto the abdomen. On the abdomen these stripes converge slightly, become narrower and terminate on the base of the telson. At their termination the stripes are about half as wide as at their points of origin. The sides of the abdominal tergites each have a thin longitudinal, darker stripe. Chelae without dark markings.

Specimens examined.—The specimens used in this study were collected from two localities in Cameron Parish, Louisiana as follows:

5 ♂♂_I, 8 ♂♂ juveniles, 3 ♀♀, and 7 ♀♀ juveniles, from a shallow pond on the coastal chenier at Creole, April 22, 1940, P. Viosca, Jr. and G. H. Penn (TU P-553). Included in the same collection were a few each of *Procambarus blandingii acutus* (Girard) and *P. clarkii* (Girard).

32 ♂♂_I, 9 ♂♂_{II}, and 14 ♂♂ juveniles, from a shallow pond at Hackberry, July 28, 1940, G. H. Penn (TU P-557). Included in the same collection were a few each of *Cambarellus puer* Hobbs and *Procambarus clarkii* (Girard).

Relationships.—Ortmann (1905: 403) placed *P. hinei* in the *Blandingii* Section on the basis of the hooks on its third and fourth pereopods and the subcylindrical chelae, and in the *Alleni* Group because of the shape of its rostrum and width of its areola. He did state, however, that "within the latter group it stands rather isolated with regard to the male organs, which show a rather primitive conformation, with exception of the distinct backward curve of the distal part." However, Hobbs (1942: 70-71) pointed out that *P. allenii* (Faxon) itself is a very disjunct species, and he thus considers the *Alleni* group to be monotypic and probably belonging in the *Barbatus* Section. In view of the peculiarities of the structure of the first pleopod of the form I male, *Procambarus hinei* cannot be placed in the same group with *P. allenii*, nor even in the same section; neither can it be placed logically in any of the other sections of the genus as currently described. Accordingly, I am designating a separate section, the *Hinei* Section, to accommodate this disjunct species.

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