

# American Museum Novitates

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PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY  
CENTRAL PARK WEST AT 79TH STREET, NEW YORK 24, N.Y.

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NUMBER 2063

DECEMBER 29, 1961

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## The Pseudoscorpion Genus *Kleptochthonius* Chamberlin (Chelonethida, Chthoniidae)

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The present project began as a description of several new cave-inhabiting species of the genus *Kleptochthonius*. As work progressed, however, it became increasingly evident that a revision of the genus and a discussion of all available species were advisable. This paper, therefore, includes an emended generic diagnosis, descriptions of 10 new species, extensions of measurements and geographical range of two species, and a key to the species of the genus available to us.

We are indebted to Dr. W. J. Gertsch of the American Museum of Natural History, Dr. J. F. G. Clarke of the United States National Museum, and Drs. A. S. Pearse, C. Clayton Hoff, and Thomas C. Barr, Jr., for the specimens on which part of this paper is based. The types of the new species described are deposited in the American Museum of Natural History. The catalogue numbers refer to the accession catalogue of the junior author.

Dr. William B. Muchmore of the University of Rochester has informed us (*in litt.*) that he possesses material representing several additional species of *Kleptochthonius* which he will publish independently. He has studied the type material of "*Chthonius*" *packardi* which he also reports pertains to this genus. His studies of this species will be included in his forthcoming publication.

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FAMILY CHTHONIIDAE HANSEN  
SUBFAMILY CHTHONIINAE DADAY  
TRIBE CHTHONINI CHAMBERLIN

GENUS *KLEPTOCHTHONIUS* CHAMBERLIN

*Heterochthonius* CHAMBERLIN, 1929, Canadian Ent., vol. 61, p. 153 (original description, as subgenus of *Apochthonius*). BEIER, 1932, Das Tierreich, vol. 57, p. 42 (as subgenus of *Apochthonius*). HOFF, 1945, Trans. Amer. Micros. Soc., vol. 64, no. 4, pp. 313–314 (revised description, raised to full generic rank).

*Kleptochthonius* CHAMBERLIN, 1949, Amer. Mus. Novitates, no. 1430, p. 4 (proposed to replace *Heterochthonius* Chamberlin, 1929, a homonym of *Heterochthonius* Berlese, 1910). HOFF, 1949, Bull. Illinois Nat. Hist. Surv., vol. 24, art. 4, p. 434 (as full genus).

TYPE SPECIES: *Apochthonius* (*Heterochthonius*) *crosbyi* Chamberlin.

DIAGNOSIS AND DESCRIPTION (EMENDED): Closely related to *Apochthonius* but differing in having marginal teeth of chela well separated. Carapace subquadrate, broadly truncate anteriorly, and provided with 18 to 22 simple and acuminate setae; epigean species with two pairs of well-developed corneate eyes, troglobitic species either with one pair of eyes or completely blind. Chelicera with spinneret vestigial to obsolete and completely non-galeate; palm of chelicera provided with basic four setae (*is*, *sb*, *b*, and *es*) plus a variable number of accessory setae; flagellum of six to nine pinnate blades. Pleural membrane minutely papillate. Sternal and tergal scuta entire; tergite and sternite of segment 11 fused to form circumanal plate; abdominal setae simple and acuminate; tergite of segment 12 membranous (absent?) and non-setose, corresponding sternite (segment 12) bearing two microsetae; variable number of tactile or semitactile setae differentiated on circumanal plate. Maxilla with two apical and two marginal setae and one discal seta; coxa I typically without apical setae, with two or three marginal setae, and usually no (in some cases one or two) discal setae, and with three to 10 acute, seta-like, coxal spines arising from oblique clefts; coxa II typically with two marginal and two discal setae; coxae III and IV each with two marginal and three discal setae. Intercoxal tubercle absent. Fourth leg provided with rather poorly differentiated semitactile setae as follows: tibia with median seta (index,<sup>1</sup> 0.4–0.6) and subdistal seta (index, 0.8–0.9), metatarsus with one subbasal seta (index, 0.2–0.35), and telotarsus with subbasal seta (index, 0.2–0.35) and approximately median seta (index, 0.5–0.7). Marginal teeth of chelal fingers well separated, at least distally; no accessory teeth; seta IB and ISB grouped as a pair and located on dorsum of hand 0.3 to

<sup>1</sup> "Index" is the distance from base to seta divided by the total length of the podomere.

0.4 of hand length from base; IST, ESB, and EB closely clustered on base of fixed finger; seta ET in close proximity to nearly terminal diploid setae; IT and EST closely paired caudad of ET, but slightly to distinctly distad of median; movable finger with seta B subbasal; SB slightly proximad of median and closer to B than ST; T and ST closely paired and located slightly to distinctly distad of median; no venom apparatus in either finger.

We are here considering *Chamberlinochthonius* Vachon as an artificial but convenient subgenus comprising essentially the cavernicolously modified forms of *Kleptochthonius*. In this respect it resembles the polyphyletic subgenus *Blothrus* which is similarly an aggregate of cavernicolously modified species of *Neobisium*.

The subgenera and species that are assigned to this genus can be separated by the following key.

KEY TO THE GENUS *Kleptochthonius* CHAMBERLIN<sup>1</sup>

- 1. Four well-developed eyes; tergites 1 and 2 bordered by four setae at most; usually smaller species, the palpal femur 0.5 to 0.8 mm. long; palps relatively robust, the femur and chela at most 5.5 times as long as broad (generally less); fourth "miofemur" 2.4 to 3.1 times as long as deep; epigean species with range throughout the United States from Atlantic to Pacific . . . . . subgenus *Kleptochthonius*, 2
- Two-eyed or eyeless; tergites 1 to 4 inclusive bordered by four or fewer setae; usually larger species, palpal femur 0.9 to 1.5 mm. long; palps attenuate, femur and chela generally more than six times as long as broad [rarely as little as 5.9 and 5.5 (femur and chela, respectively) times as long as broad]; fourth "miofemur" 3.2 to 4.2 times as long as deep; troglobitic species from caves in eastern United States . . . . . subgenus *Chamberlinochthonius*, 5
- 2(1). Chela homodentate, spaced macrodenticles only; from Pacific coast of the United States . . . . . 3
- Chela heterodentate, smaller microdenticles alternating with spaced macrodenticles; from the United States east of the Rocky Mountains. . . . . 4
- 3(2). Movable finger with seven spaced macrodenticles only; coxal spines three or four in number; lateral guard setae of male genital operculum (segment 3) nine in number; anterior eyes distinctly less than an ocular diameter from the anterior carapacial margin . . . *oregonus*, new species
- Movable finger with six or seven spaced macrodenticles plus 12 to 16 low, rounded, contiguous, basal teeth; coxal spines five to seven in number; lateral guard setae of male genital operculum (segment 3) six or seven in number; anterior eyes at least as far from the anterior carapacial margin as their own diameter . . . . . *geophilus*, new species

<sup>1</sup> The authors are indebted to Dr. William B. Muchmore for helpful criticisms and suggestions in arranging this key.

- 4(2). Femur 3.8 to 4.0 times as long as broad; with three coxal spines on each coxa; small species, palpal femur 0.5 to 0.6 mm. long; chela with 14 to 16 macrodenticles on fixed, and seven to nine on movable, fingers . . . . . *crobyi* (Chamberlin)  
 Femur 4.7 to 5.5 times as long as broad; with three to six (generally five or six) coxal spines on each coxa; larger species, palpal femur 0.65 to 0.8 mm. long; chela with 20 to 26 macrodenticles on fixed, and nine to 15 on movable, fingers . . . . . *multispinosus* (Hoff)
- 5(1). Completely eyeless; carapace bordered posteriorly by six setae (m4m); palm of chelicera with nine setae . . . . . *gertschi*, new species  
 With one pair of weakly to distinctly corneate eyes; carapace bordered posteriorly by two to four setae; palm of chelicera with five to seven setae . . . . . 6
- 6(5). Palps relatively robust, femur of female 5.9, chela 5.5 times as long as broad; small species (female 1.8 mm. long) from Cudjo's Cave, Cumberland Gap, Tennessee . . . . . *lutzi*, new species  
 Palps more slender, femur 6.3 to 8.0, chela 6.2 to 8.1, times as long as broad; larger species, males 1.8–2.0 mm., female 2.0–3.0 mm., long . . . . . 7
- 7(6). Palpal femur 6.2 to 6.9 times as long as broad; microdenticles of movable finger at most nine or 10 (may be completely vestigial) . . . . . 8  
 Palpal femur 7.0 to 8.0± times as long as broad; microdenticles of movable finger small to very small but distinct and numbering 16 to 21 . . . . . 12
- 8(7). Coxal spines relatively numerous, eight to 10 per coxa; microdenticles of fixed chelal finger minute but distinct, relatively numerous (about 15 to 18) . . . . . 9  
 Coxal spines relatively fewer, only occasionally as many as eight; microdenticles of fixed chelal finger obsolescent and few in number (five to nine at most) . . . . . 10
- 9(8). Posterior margin of carapace bordered by four setae; fourth "miofemur" 3.8 times as long as deep; from Saltpeter Cave, Cumberland County, Tennessee<sup>1</sup> . . . . . *infernalis*, new species  
 Posterior margin of carapace bordered by two setae; fourth "miofemur" 3.5 times as long as deep; from Cathcart Cave, Dekalb County, Tennessee<sup>1</sup> . . . . . *myopi*, new species
- 10(8). Macrodenticles of fixed finger 43 to 55 in number, including the more closely spaced and less acute basal teeth; tergite 2 with a single pair of border setae . . . . . 11  
 Macrodenticles of fixed finger total 30 to 35; tergite 2 bordered by four setae; from Thomas Cave, Kentucky . . . . . *microphthalmus*, new species
- 11(10). Chela of male 6.7 to 7.6 times as long as broad; fixed finger of chela with 37 to 43 spaced macrodenticles in addition to three to seven basal, rounded, contiguous teeth; homodontate, no clearly evident intervening microdenticles; from White Cave (near Mammoth Cave), Kentucky . . . . . *cerberus*, new species  
 Chela of male 8.1 times as long as broad; fixed finger of chela with 49

<sup>1</sup> These two caves are said by Thomas C. Barr, Jr. (*in litt.*), to belong to different systems, so genetic communication between the two by way of crevices is impossible.

- macrodenticles (no basally contiguous teeth), plus six or seven vestigial and barely visible microdenticles alternating with the fourth to twelfth macrodenticles; from Blind Snail Cave, Hart County, Kentucky . . . . . *attenuatus*, new species
- 12(7). Microdenticles of fixed finger 15; tergite 5 with four marginal setae; coxal spines four or five only per coxa; from Bunkum Cave, Byrdstown, Tennessee . . . . . *rex*, new species
- Microdenticles of fixed finger 26; tergite 5 with six marginal setae; coxal spines five to eight per coxa; from McClung's Cave and other West Virginia caves . . . . . *henroti* (Vachon)

SUBGENUS *KLEPTOCHTHONIUS* CHAMBERLIN

TYPE SPECIES: *Apochthonius (Heterochthonius) crosbyi* Chamberlin.

The characters that have been found to be significant are given in the foregoing key.

**Kleptochthonius (Kleptochthonius) oregonus**, new species

Figure 1

MATERIAL: Holotype male (JC-1142.02001), sifted from dead leaves in mixed stand of maple and fir along creek bank, 1 mile north of Selma, Josephine County, Oregon, by Joseph C. Chamberlin, April 6, 1937.

DESCRIPTION: Male: Medium-sized epigean species of typical facies.

Carapace about as broad as long, with two pairs of corneate eyes, both of which are directed more or less forward, anterior pair slightly less than their own diameter from anterior carapacial margin and much less than their own diameter (about a third to a half) from posterior pair; epistomal process or denticulations lacking, but anterior carapacial margin laterally very finely and obscurely denticulate at base of chelicerae; derm smooth except quite strongly tessellated laterally; chaetotaxy 8-4 (22).

Abdomen ovate, of usual structure; derm smooth, except lightly tessellated on anterior and laterally on posterior segments; tergal chaetotaxy, 4:5:7:7:8:10:9:9:8:7:1T2T1:0; sternal chaetotaxy,

$$\frac{7}{10}:(4-4):(3)\frac{13-13}{7}(4):(4)8(4); m11m; mm10mm:mm10mm:3S1S2S1S2:3S1S2S4:S2S2S2S:0:mm;$$

chaetotaxy and facies of genital segments typical of group. Coxal area of usual morphology; chaetotaxy, 2-2-1:0-3-0-CS; 2-2:2-3:2-3; apical process of pedal coxa I prominent and distinctly incurved; coxal spines of usual type, numbering three or four on each coxa.

Chelicera (fig. 1C) moderately robust, distinctly shorter than carapace (0.7 as long) and 2.0 times as long as broad; derm smooth except sparsely

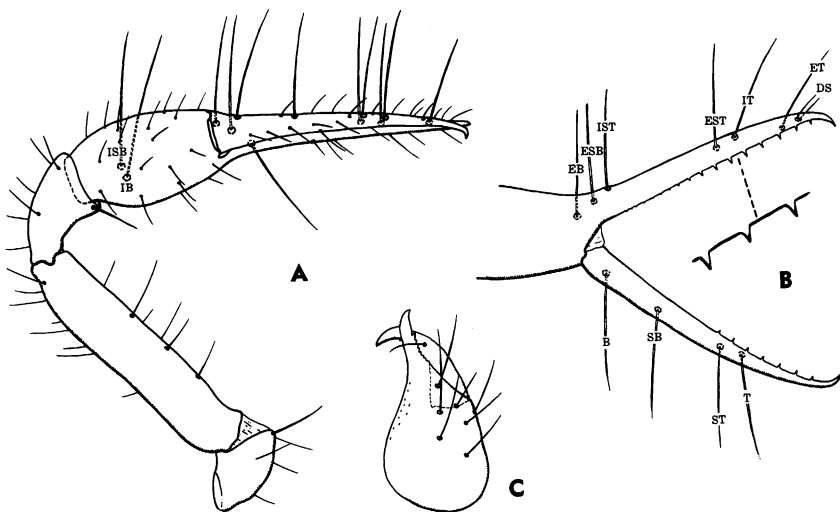


FIG. 1. *Kleptochthonius* (*Kleptochthonius*) *oregonus*, new species, holotype male. A. Ventral aspect of right palp. B. Interior aspect of left chela. C. Exterior aspect of right chelicera.

granulate (probably minutely hispid) on median aspect of hand; galeal tubercle vestigial, scarcely apparent; serrula exterior with about 17 blades; serrula interior typical, but number of blades not ascertainable in type preparation; flagellum comprising biseriate series of about eight unilaterally pinnate setae; movable finger with four or five marginal denticles; fixed finger with about eight denticles which progressively decrease in size basally; palm provided with a total of seven setae (*is*, *sb*, *b*, and *es* plus a series of three accessory setae between *es* and *b-sb*).

Palp moderately robust (fig. 1A); derm smooth; vestitural setae simple and acute; trochanter 1.7 to 1.8, femur 4.8, tibia 1.8, times as long as broad; chela 1.5 times as long as femur and 4.7 times as long as broad; hand 1.7 times as long as broad; fingers 1.7 to 1.8 times as long as hand and shorter than femur; tibia shorter than chelicera.

Chela (fig. 1B) completely homodontate, with well-spaced and relatively few macrodenticles which number 16 on fixed finger and seven on movable finger; rounded, contiguous, vestigial teeth lacking from movable finger.

Legs of usual structure; third and fourth legs with moderately differentiated tactile setae on tibia (two, with indices of 0.44 and 0.81, respectively), metatarsus (one, index 0.24) and telotarsus (two, with indices of 0.19 and 0.48, respectively).

Pedal proportions: leg I: basifemur 4.3, telofemur 2.2, tibia 3.7, and miotarsus 8.0, times as long as deep; leg IV: "miofemur" 2.9, tibia 4.3, metatarsus 2.7, and telotarsus 8.1, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype male: total length, 1.57; abdominal breadth,  $0.57 \pm$ . Carapace,  $0.47 \pm$  long (breadth indeterminable); ocular diameter (anterior and posterior, respectively), 0.05 and 0.05. Chelicera, 0.333 by 0.167. Palp: trochanter, 0.197 by 0.112; femur, 0.549 by 0.114; tibia, 0.239 by 0.134; chela, 0.828 by 0.177 broad (depth indeterminable); hand, 0.303 long; fingers, 0.533 long. Leg I: basifemur, 0.287 by 0.666; telofemur, 0.144 by 0.066; tibia, 0.184 by 0.049; miotarsus, 0.335 by 0.042. Leg IV: "miofemur," 0.514 by 0.176; tibia, 0.350 by 0.081; metatarsus, 0.169 by 0.063; telotarsus, 0.341 by 0.043.

### ***Kleptochthonius (Kleptochthonius) geophilus*, new species**

#### Figure 2

MATERIAL: Holotype male (JC-1954.02001), allotype female (JC-1954.02002), paratype male (JC-1954.02003), and two paratype females (JC-1954.02004 and 1954.03001) on slides, and five males, two females, and four nymphal paratypes in alcohol, all collected in dead leaves of alder, 2 miles south of Denmark, Curry County, Oregon, April 27, 1937, by Joseph C. Chamberlin.

DESCRIPTION: (Both sexes unless otherwise noted). Relatively large, epigean, four-eyed, robustly proportioned species of normal facies; dorsal sclerotic parts pale yellowish brown, fingers of chela somewhat darker.

Carapace subquadrate, scarcely narrowed behind, with four relatively prominent and strongly corneate eyes, the first pair about their own diameter from anterior carapacial margin and about half of their own diameter from second pair; epistomal process obsolete and smoothly rounded; anterolateral carapacial margin finely serrate at base of chelicerae; chaetotaxy 8-4 (22); derm smooth, except strongly tessellated laterally.

Structure of abdomen typical (fig. 2A); derm mostly tessellated; tergal chaetotaxy of male, 3 or 4:4:6:7:8:8 to 10:8 to 10:S2S2S2S:SS1S1S1SS: S1S1S1S:1T2T1:0; tergal chaetotaxy of female, 4:4:6 or 7:8 or 9:8 to 10:9 or 10:9 to 11; 9 to 11:10 to 12:7 or 8:1T2T1:0; sternal chaetotaxy of male,

$\frac{7}{6} : (4-4):(4) \frac{8 \text{ or } 9-7 \text{ to } 9}{6} (3):(4) 7 (4):mmm8mmm:mm8 \text{ or } 9mm:mmm8 \text{ or}$

$9mmm:14:5S2S5:T2T2T2T:0:mm;$

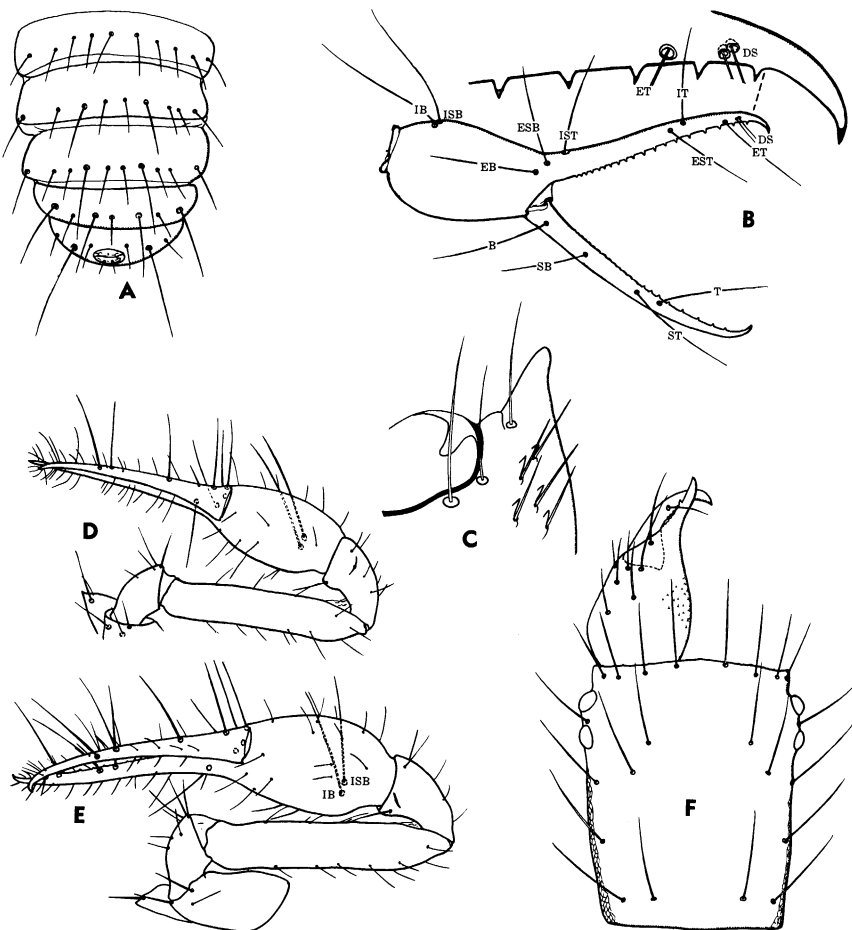


FIG. 2. *Kleptochthonius* (*Kleptochthonius*) *geophilus*, new species. A. Tergites of terminal abdominal segments (female, JC-1954.02004). B. Exterior aspect of right chela (female, JC-1954.02004). C. Apex of coxa I, showing coxal spines (female, JC-1954.03001). D. Ventral aspect of left palp of male (JC-1954.02003). E. Ventral aspect of left palp of female (JC-1954.02004). F. Carapace and left chelicera of male (holotype).

sternal chaetotaxy of female, 9 or 10:(4) 6 (4):(3 or 4) 7 (4 or 5):mm or mmm9mm or mmm:mm 10 or 11mm:14 or 15:14 or 15:14 or 15 (variable arrangement of semitactile setae):T2T2T2T2T:0:mm. Male and female genitalia of usual chthoniine facies. Coxal area of typical facies; chaetotaxy, 2-2-1:0-3-0-CS:2-2:2-3:2-3; anterior process of coxa I distinct,



elongate, slightly incurved, and non-setose; coxal spines (fig. 2C) of usual type, arranged in two irregular rows on coxa I, total number usually six, but in some cases five or seven.

Chelicera (fig. 2F) robust, of usual facies, distinctly shorter than carapace and 2.0 to 2.2 times as long as broad; galeal tubercle obsolescent; base of fixed finger interiorly provided with low, rounded, finely hispid tubercles; serrula exterior with 18 or 19 blades; serrula interior with 16 teeth; flagellum comprising eight unilaterally pinnate setae in biseriate order; fixed finger with eight to 10 protrorse marginal denticles which regularly decrease in size caudally; movable finger with five or six small, protrorse, marginal denticles; palm with three accessory setae in linear order between setae *b-sb* and *es*.

Palp (fig. 2D, E) robust, somewhat dimorphic, being distinctly more slender in male than in female. Palpal proportions of male: trochanter 1.8 to 1.9 times as long as broad; femur slightly shorter than the fingers and 5.1 to 5.2 times as long as broad; tibia much longer than breadth or depth of chela and 1.8 to 1.9 times as long as broad; chela 1.5 to 1.6 times as long as the femur, and 4.5 to 4.7 times as long as broad or deep; hand 1.6 to 1.8 times as long as broad; fingers 1.7 to 1.8 times as long as the hand. Palpal proportions of female: trochanter 1.8 to 2.0 times as long as broad; femur slightly shorter than fingers and 4.8 to 5.2 times as long as broad; tibia scarcely longer than breadth or depth of chela and 1.7 to 1.8 times as long as broad; chela 1.6 to 1.8 times as long as femur, and 3.9 to 4.3 times as long as broad or deep; hand 1.4 to 1.6 times as long as broad; fingers 1.7 to 1.8 times as long as hand.

Chela with dentition and chaetotaxy as illustrated (fig. 2B). Fingers homodentate, with prominent, well-spaced macrodenticles but no visible indications of intervening microdenticles; fixed finger (both sexes) with 18 or 19 spaced macrodenticles; movable finger with six or seven spaced macrodenticles distally and 12 to 16 low, rounded, contiguous, and nearly obsolescent basal teeth.

Legs not significantly differentiated sexually, moderately robust and of typical facies; third and fourth legs with semitactile or tactile setae moderately differentiated, tibia with submedian (index, 0.41 to 0.56) and subdistal (index, 0.81 to 0.83) tactile setae, metatarsus with subbasal tactile seta (index, 0.21 to 0.26), and telotarsus with subbasal (index, 0.21 to 0.24) and median (index, 0.48 to 0.53) tactile setae. Pedal proportions (both sexes): leg I: basifemur 4.8 to 5.1, telofemur 2.5, tibia 3.8 to 4.3, and miotarsus 7.9 to 8.3, times as long as deep; leg IV, "miofemur" 2.7 to 2.9, tibia 4.4 to 4.6, metatarsus 2.7 to 2.9, and telotarsus 8.3 to 8.8, times as long as deep.

TABLE 1  
MEASUREMENTS (IN MILLIMETERS) OF TYPE SPECIMENS OF *Kleptochthonius geophilus*, NEW SPECIES

Morphological Part <sup>a</sup>	Males		Females	
	Holotype	1954.02003	Allotype	1954.03001
Entire body, L×B	1.87 × 0.57	2.18 × 0.70	2.10 × 0.74	2.26 × 0.70
Carapace, L	0.49	0.44	0.52	0.50
Breadth <sup>b</sup>	Indet.	0.40, 0.41	Indet.	0.51, 0.44
Eye diameter	0.044	0.048	0.046	Indet.
Chelicera, L×B	0.384 × 0.187	0.394 × 0.180	0.459 × 0.221	0.443 × 0.213
Pedipalp				
Trochanter, L×B	0.234 × 0.125	0.218 × 0.121	0.266 × 0.138	0.256 × 0.138
Femur, L×B	0.645 × 0.126	0.618 × 0.118	0.722 × 0.151	0.702 × 0.136
Tibia, L×B	0.279 × 0.158	0.276 × 0.147	0.312 × 0.177	0.305 × 0.184
Chela, L×B	1.000 × 0.224	1.000 × 0.212	1.263 × 0.292	1.164 × 0.285
Chela, D	0.217	0.213	0.298	0.292
Hand, L; finger, L	0.361, 0.659	0.371, 0.649	0.459, 0.787	0.435, 0.754
Leg I				
Basifemur, L×D	0.361 × 0.071	0.361 × 0.072	0.395 × 0.081	0.377 × 0.077
Telofemur, L×D	0.177 × 0.070	0.177 × 0.070	0.186 × 0.074	0.184 × 0.074
Tibia, L×D	0.208 × 0.055	0.210 × 0.055	0.233 × 0.059	0.228 × 0.055
Miotarsus, L×D	0.400 × 0.048	0.397 × 0.048	0.413 × 0.052	0.430 × 0.052
Leg IV				
"Miolfemur," L×D	0.587 × 0.212	0.571 × 0.208	0.631 × 0.216	0.610 × 0.213
Tibia, L×D	0.403 × 0.092	0.397 × 0.086	0.443 × 0.096	0.438 × 0.096
Metatarsus, L×D	0.197 × 0.071	0.190 × 0.068	0.221 × 0.077	0.213 × 0.074
Telotarsus, L×D	0.407 × 0.046	0.384 × 0.046	0.443 × 0.052	0.413 × 0.052

<sup>a</sup> Abbreviations: B, breadth; D, depth; L, length.

<sup>b</sup> Anterior and posterior breadth, respectively.

The measurements are summarized in table 1.

*Kleptochthonius (Kleptochthonius) crosbyi* (Chamberlin)

Figure 3

*Apochthonius (Heterochthonius) crosbyi* CHAMBERLIN, 1929, Canadian Ent., vol. 61, pp. 153–154 (original description, type species of *Heterochthonius*); 1931, Stanford Univ. Publ., univ. ser., biol. sci., vol. 7, no. 1, p. 72, fig. 16D (serrula exterior), p. 137, fig. 34G, H (chela and dentition), p. 169, fig. 45A (chaetotaxy of male genital segments), p. 186, fig. 50E (male genitalia). BEIER, 1932, Das Tierreich, vol. 57, p. 42 (listed).

*Heterochthonius crosbyi*, HOFF, 1945, Trans. Amer. Micros. Soc., vol. 64, no. 4, pp. 313, 318 (subgenus *Heterochthonius* raised to generic rank and description emended); 1949, Bull. Illinois Nat. Hist. Surv., vol. 24, art. 4, p. 36 (supplementary measurements of holotype).

*Kleptochthonius crosbyi*, CHAMBERLIN, 1949, Amer. Mus. Novitates, no. 1430, p. 4 (*Heterochthonius* shown to be preoccupied by *Heterochthonius* Berlese, 1910). HOFF, 1958, Amer. Mus. Novitates, no. 1875, p. 7 (listed, general distributional data for North America).

The original description of *Kleptochthonius crosbyi* by Chamberlin in 1929 did not contain detailed measurements, and it is therefore too incomplete to be useful in the separation of it from the several more recently described species of the genus. The emendations presented here supplement the original description of the holotype and include measurements and proportions of two females not at hand in 1929.

MATERIAL: Holotype male (JC-318.01001) collected on summit of Mt. Mitchell, North Carolina, October 22, 1923, (Crosby-Cornell Collection, No. 22). New material as follows: female (JC-1194.01002) collected at Quicksand, Kentucky, June 25, 1925, by C. R. Crosby, with *K. multispinosus* (Hoff); and female (JC-1538.01001) collected on summit of Mt. Mitchell, North Carolina, October 22, 1923, by C. R. Crosby (actually the same collection data as for the holotype; this specimen, herewith designated the allotype of the species, will be deposited in the Cornell University collections).

DESCRIPTION (EMENDED): Both sexes except as noted: Small epigean species of typical facies.

Carapace about as long as its ocular breadth and somewhat constricted behind; two pairs of well-developed corneate eyes, first pair about two-thirds of their own diameter from anterior carapacial margin and from one-third to one-half of their diameter from second pair; anterior carapacial margin smoothly truncate (minutely serrulate laterally at base of chelicerae, at least in females); derm smooth except tessellated and sparsely and lightly papillate laterally; chaetotaxy 8 or 10–4 (22 or 24).

Abdomen typical; derm of females smooth except reticulate or tessellate laterally; tergal chaetotaxy of male, 4:4:7:7:7:9:9:10:?:?:?:?; tergal chaetotaxy of female, ?:?:6:9:9:10:10:9:10:S1S1S1S:1T2T1:0; sternal chaetotaxy of male comprising "about 12 setae on the median sternites"; sternal chaetotaxy of female, 9:(4)9(4):(4)9(4):13:16:14:15:16:11:0:mm;

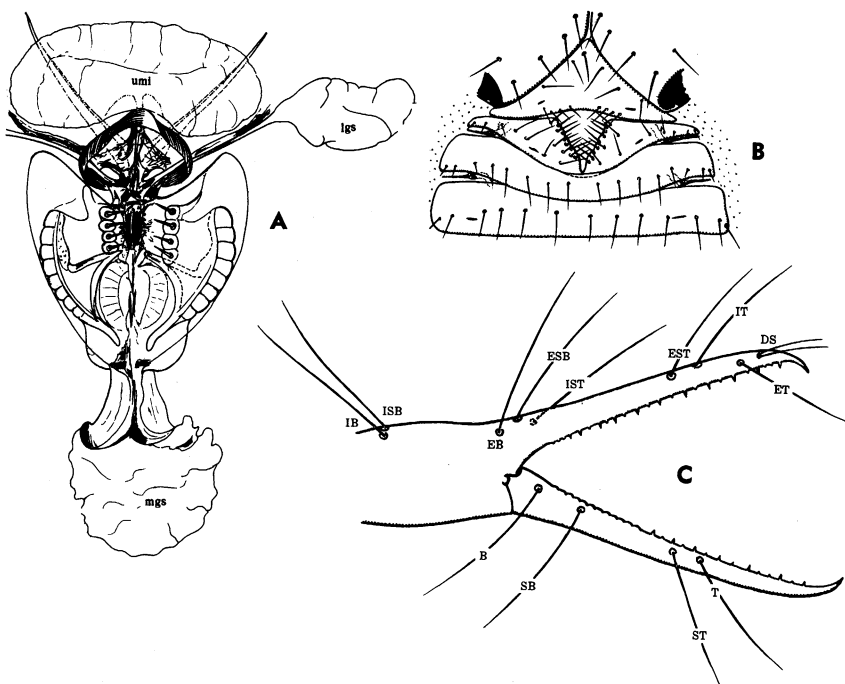


FIG. 3. *Kleptochthonius* (*Kleptochthonius*) *crosbyi* (Chamberlin), holotype male. After Chamberlin (1931). A. Interior structures of male genitalia. B. Chaetotaxy of male genital operculum (drawn to a smaller scale than A). C. Exterior aspect of right chela (redrawn). Abbreviations: lgs, lateral genital sac; mgs, median genital sac; umi, uterus masculinus interior.

male genitalia and genital operculum as illustrated (fig. 3A, B). Coxal area of typical facies; chaetotaxy of coxae typical, coxal spines of usual structure, numbering three on each coxa I of both sexes.

Chelicera of usual facies, much shorter than carapace and 1.8 to 2.0 times as long as broad; galeal tubercle present as distinct rounded crest, at least in females; derm smooth except medial aspect of hand provided with low, scale-like, hispid tubercles; flagellum consisting of six denticulate blades; movable finger of female with about five marginal denticles,

basal ones becoming very short, distal one noticeably set apart from rest of series; fixed finger of female with seven to 10 marginal denticles, basally short, subapical tooth much the largest; palm with three accessory setae posterior to usual complement of *is*, *es*, *b*, and *sb*.

Palp relatively robust (palps of male holotype badly crushed and shrunken, making only partial measurements possible). Palpal proportions of male: femur 3.8 times as long as broad; finger 2.3 times as long as hand and 1.1 times as long as femur; chela 1.4 times as long as finger. Palpal proportions of female: trochanter 1.9 to 2.0, femur 3.8 to 4.0, tibia 1.7, chela 4.8, and hand 1.6, times as long as broad; finger about twice as long as hand and 1.1 times as long as femur.

Chela as illustrated (fig. 3C); fingers distinctly heterodentate. Fixed finger of both sexes with 14 to 16 widely spaced macrodenticles and eight to 12 microdenticles alternating with the distal macrodenticles; movable finger of both sexes with seven to nine large, acute, and widely spaced macrodenticles which merge basally with eight to 11 low, rounded, nearly contiguous teeth, and with seven to 10 microdenticles alternating between the most distal of the macrodenticles.

Legs moderately robust and of typical facies but noticeably more slender in female. Pedal proportions of male: leg I: basifemur 3.8, telofemur 1.75, tibia 3.0, and miotarsus 7.6, times as long as deep; leg IV: "miofemur" indeterminate, tibia 3.3, metatarsus 2.3, and telotarsus 7.3, times as long as deep. Pedal proportions of female: leg I: basifemur 4.4, telofemur 2.2 to 2.3, tibia 3.4 to 3.7, and miotarsus 7.5 to 8.2, times as long as deep; leg IV: "miofemur" 2.4 to 2.6, tibia 4.1 to 4.3, metatarsus 3.1 to 3.2, and telotarsus 8.4 to 8.9, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype male: total length, 1.29. Carapace, 0.45 long; ocular breadth,  $0.45 \pm$ ; posterior breadth,  $0.40 \pm$ . Chelicera, 0.299 by 0.162. Palp: trochanter (indeterminable); femur, 0.513 by 0.135; tibia (indeterminable); chela,  $0.79 \pm$  long, breadth (indeterminable); hand,  $0.238 \pm$  long; fingers, 0.555 long. Leg I: basifemur, 0.299 by 0.079; telofemur, 0.131 by 0.075; tibia, 0.173 by 0.058; miotarsus, 0.355 by 0.047. Leg IV: "miofemur" (indeterminable); tibia, 0.327 by 0.098; metatarsus, 0.173 by 0.075; telotarsus, 0.341 by 0.047.

Females JC-1194.01002 and JC-1538.01001 [latter (allotype) in parentheses]: total length indeterminate (1.45). Carapace 0.43 (0.48) long; ocular breadth, 0.44 (indeterminable); posterior breadth,  $0.36 \pm$  (indeterminable). Chelicera, 0.377 (0.410) by 0.184 (0.221). Palp: trochanter, 0.213 (0.259) by 0.113 (0.131); femur, 0.582 (0.599) by 0.153 (0.151); tibia, indeterminate ( $0.246 \pm$ ) by indeterminate ( $0.148 \pm$ ); chela, 0.927 (0.986) long by 0.193 (indeterminable) broad (depth inde-

terminable in both cases); hand, 0.305 (0.328) long; fingers,  $0.623 \pm (0.645)$  long. Leg I: basifemur, 0.311 (0.335) by 0.070 (0.077); telofemur, 0.148 (0.161) by 0.066 (0.070); tibia, 0.194 (0.185) by 0.052 (0.055); miotarsus, 0.361 (0.358) by 0.044 (0.048). Leg IV: "miofemur," 0.515 (0.517) by 0.195 (0.216); tibia, 0.348 (0.376) by 0.085 (0.088); metatarsus, 0.187 (0.180) by 0.061 (0.057); telotarsus, 0.354 (0.371) by 0.040 (0.044).

*Kleptochthonius (Kleptochthonius) multispinosus* (Hoff)

*Heterochthonius multispinosus* HOFF, 1945, Trans. Amer. Micros. Soc., vol. 64, no. 4, pp. 314–318 (original description), fig. 1 (carapace), fig. 2 (dorsal view of palp), fig. 3 (lateral view of chela), fig. 4 (teeth of fixed chelal finger); 1949, Bull. Illinois Nat. Hist. Surv., vol. 24, art. 4, pp. 434–436 (redescription; Illinois records), fig. 16 (dorsal and lateral view of chela, showing teeth in detail).

*Kleptochthonius multispinosus* HOFF, 1951, Amer. Mus. Novitates, no. 1483, p. 5 (new eastern United States records). HOFF AND BOLSTERLI, 1956, Trans. Amer. Micros. Soc., vol. 75, no. 2, p. 159 (data on palpal variation and new records from central and southern United States). HOFF, 1958, Amer. Mus. Novitates, no. 1875, p. 7 (general distributional data).

MATERIAL: Two males (JC-1194.01001 and JC-1194.01003) and one nymph (JC-1194.01004) collected June 25, 1925, by C. R. Crosby at Quicksand, Kentucky, with *K. crosbyi* (Chamberlin). Female (JC-1275.-01001) collected December 29, 1938, by Jones in Griffith Cave, Marshall County, Alabama. Female (JC-1281.01001) collected October 30, 1940, by A. F. Archer at Uphabee Creek, Tuskegee, Macon County, Alabama. Two males (JC-1507.01001, JC-1507.01002) collected October 27, 1923, by C. R. Crosby at Alberta, Virginia. Female (JC-1532.01001) collected October 15, 1923, by C. R. Crosby at Oteen, North Carolina. Male (JC-1539.01001) collected October 26, 1923, by C. R. Crosby at Walnut Creek, Raleigh, North Carolina. Four males, four females, and one nymph (JC-1544.01001–JC-1544.01009) collected October 19, 1923, by C. R. Crosby at Mt. Pisgah ("Mt. Piggah" on label), North Carolina, at 3000 feet elevation. Five males and one female (JC-1550.01001–JC-1550.-01006) collected October, 1923, by C. R. Crosby at Blowing Rock, North Carolina. Two males (JC-2056.04001, JC-2056.04002; topotypes) collected November 21, 1940, by A. S. Pearse at Duke Forest, Durham, North Carolina. In addition to the states noted above, Hoff (*loc. cit.*) has recorded material from Mississippi, Missouri, Illinois, and Tennessee.

REMARKS: Hoff has published rather extensively on this species, extending the geographical distribution and limits of variability as new material became available for study. We have at hand 15 males, eight females, and three nymphs of this species which have been studied and

compared with Hoff's holotype and paratype. These specimens still further extend the known geographic distribution and require slight extensions in the limits of variation. The following data, particularly on the chaetotaxy, the dentition of the chela, and the palpal and pedal proportions and measurements, supplement Hoff's data.

**MALES:** The carapacial chaetotaxy of 10 males studied in detail varied from 6-4 (20) to 10-4 (24). Similarly, the number of coxal spines on each coxa I ranged from three to five or six. Both fingers of the chela were strongly heterodentate. The dentition of the fixed finger ranged from as few as 19 macrodenticles and 11 microdenticles (minimum total, 32) to as many as 26 macrodenticles and 15 microdenticles (maximum total, 37). The minimum number of teeth on the movable finger of the chela was found to be nine macrodenticles, seven microdenticles, and six low, rounded, basal teeth (total, 27); the maximum number was 15 macrodenticles, 14 microdenticles, and 11 low, rounded, basal teeth (total, 38).

Palpal proportions ranged as follows: trochanter 1.8 to 2.0, femur 4.7 to 5.5, tibia 1.8 to 2.1, chela 4.7 to 5.4, and hand 1.7 to 2.2, times as long as broad; fingers 1.5 to 1.9 times as long as hand and 0.8 to 1.0 times as long as femur; chela 1.5 to 1.7 times as long as fingers.

Proportions of leg I: basifemur 4.9 to 5.3, telofemur 2.4 to 2.8, tibia 3.9 to 4.5, and miotarsus 8.8 to 9.8, times as long as deep. Proportions of leg IV: "miofemur" 2.6 to 2.9, tibia 4.4 to 5.1, metatarsus  $3.1 \pm$  to 3.5, and telotarsus 8.5 to 10.7, times as long as deep.

**FEMALES:** Carapacial chaetotaxy in six females studied in detail ranged from 6-4 (20) to 8-4 (22). The number of spines on each coxa was three to four or five. Dentition of the chela varied as follows: fixed finger: 21 macrodenticles, 10 microdenticles (total, 31) to 25 macrodenticles, 14 microdenticles (total 39); movable finger: nine macrodenticles, five microdenticles, and 10 low, rounded, basal teeth (total 28) to 11 macrodenticles, 10 microdenticles, and 15 low, rounded basal teeth (total, 35).

The palpal proportions varied as follows: trochanter 1.8 to 2.0, femur 5.0 to 5.4, tibia 1.9 to 2.3, chela 4.4 to 4.6, and hand 1.9, times as long as broad; fingers 1.3 to 1.5 times as long as hand and 0.8 to 0.9 times as long as femur; chela 1.7 to 1.8 times as long as finger.

Proportions of leg I: basifemur 4.8 to 5.5, telofemur 2.5 to 2.8, tibia 4.2 to 4.6, miotarsus 8.5 to 9.5, times as long as deep. Proportions of leg IV: "miofemur" 2.4 to 3.1, tibia 4.6 to 5.2, metatarsus 3.3 to 3.5, and telotarsus 9.9 to 10.2, times as long as deep.

**MEASUREMENTS (IN MILLIMETERS; MINIMUMS AND MAXIMUMS):** Male: total length, 1.51-2.10. Carapace, 0.48-0.57 long; ocular breadth,  $0.42 \pm 0.53$ ; posterior breadth, 0.39-0.49. Chelicera, 0.361-0.443 by

0.177–0.240. Palp: trochanter, 0.216–0.269 by 0.155–0.147; femur, 0.640–0.766 by 0.128–0.160; tibia, 0.246–0.328 by 0.131–0.180; chela, 0.938–1.158 by 0.180–0.246; hand, 0.361–0.426 $\pm$  long; fingers, 0.559–0.746 long. Leg I: basifemur, 0.344–0.420 by 0.068–0.082; telofemur, 0.161–0.202 by 0.066–0.077; tibia, 0.200–0.257 by 0.052–0.059; miotarsus, 0.385–0.466 by 0.044–0.049. Leg IV: “miofemur,” 0.556–0.667 by 0.205–0.246; tibia, 0.367–0.472 by 0.081–0.095; metatarsus, 0.202–0.240 by 0.061–0.077; telotarsus, 0.399–0.451 by 0.040–0.053. Female: total length, 1.51–2.32. Carapace, 0.52–0.62 long; ocular breadth, 0.50–0.56; posterior breadth, 0.39 $\pm$ –0.56 $\pm$ . Chelicera, 0.410–0.481 by 0.216–0.246. Palp: trochanter, 0.246–0.262 by 0.133–0.138; femur, 0.705–0.795 by 0.133–0.157; tibia, 0.279–0.328 by 0.144–0.164; chela, 1.055–1.148 by 0.238–0.248; hand, 0.443–0.476 long; fingers, 0.613–0.689 long. Leg I: basifemur, 0.400–0.426 by 0.077–0.086; telofemur, 0.180–0.197 by 0.071–0.079; tibia, 0.230–0.257 by 0.055–0.057; miotarsus, 0.443–0.464 by 0.049–0.052. Leg IV: “miofemur,” 0.648–0.672 by 0.216–0.274; tibia, 0.436–0.459 by 0.085–0.098; metatarsus, 0.239–0.248 by 0.068–0.074; telotarsus, 0.446–0.467 by 0.044–0.047.

*Kleptochthonius* (*Kleptochthonius*) sp. indet.

**MATERIAL EXAMINED:** The following nymphal specimens cannot presently be placed specifically with any degree of safety. All are typically epigean and may belong for the most part to *K. (K.) multispinosus*.

One mutilated tritonymph (JC-1271.01001) from Wonder Cave, Monteagle, Tennessee, collected March 17, 1931, by J. M. Valentine (the American Museum of Natural History). One tritonymph (JC-2372.-01001) from Mill Cave, 3.6 miles northeast of Rickman, Overton County, Tennessee, collected in rotting wood March 16, 1957, by T. C. Barr, Jr. (the American Museum of Natural History). Two tritonymphs (JC-1424.-02001, JC-1424.02002), collected September 1, 1930, by Nathan Banks in New Found Gap, Tennessee, at 5000 feet in elevation (Museum of Comparative Zoölogy). One tritonymph (JC-1276.02001) collected in McFarlen Cave, near Garth, Jackson County, Alabama, February 29, 1940, by Jones and Archer (the American Museum of Natural History). One tritonymph (JC-1523.02003) collected at Quicksand, Kentucky, by C. R. Crosby, June 25, 1925 (Cornell University).

SUBGENUS *CHAMBERLINOCHTHONIUS* VACHON

*Chamberlinochthonius* VACHON, 1952, Notes biospéologiques, vol. 7, pp. 105–106.

**TYPE SPECIES:** *Chamberlinochthonius henroti* Vachon.



Vachon's genus *Chamberlinochthonius* is here considered as a subgenus of *Kleptochthonius*. Although this subgenus is not necessarily natural, it is useful. It is diagnosed in the key to the genus.

***Kleptochthonius* (*Chamberlinochthonius*) *gertschi*, new species**

Figure 4

**MATERIAL:** Holotype female (JC-1262.01001), Gilly's Cave, Pennington Gap, Virginia, August 3, 1931.

**DESCRIPTION:** Female: Relatively large, lightly pigmented species of typical troglobitic facies.

Carapace as long as ocular breadth, only weakly constricted behind; light yellowish in color; completely lacking eyes or eyespots; epistomal process or median serration lacking but anterior carapacial margin laterally minutely serrulate at base of chelicerae; derm smooth except lightly tessellated posterolaterally; chaetotaxy, 6-04m (21); normal chaetotaxy, probably 6-m4m (22).

Abdomen typical; derm smooth; tergal chaetotaxy, 3:4:3:4:4:6:6:7:6:T2T:0; sternal chaetotaxy, 6:(4)6(4):(3)6(3); m8m:m6m:m5m:m7m:10:S1S2S1S;0:mm. Genital area of female typical. Coxal area of usual facies; chaetotaxy, 2-2-1:0-2-1 (or 2)-CS:2-2:2-3:2-3; apical process of coxa I well developed and devoid of microsetae, as indicated in formula; six coxal spines (fig. 4D) of usual type on each coxa (biseriate, anterior row with two, posterior row with four, blades).

Chelicera (fig. 4A) of typical facies, almost as long as the carapace and about 2.2 times as long as broad; medial aspect of hand provided with low, scale-like, finely hispid tubercles; galeal tubercle vestigial; serrula exterior typical, but number of teeth not ascertainable in type preparation; serrula interior partly obscured but consisting of approximately 15 truncate blades; flagellum of typical facies but number of setae not ascertainable; movable finger with nine to 11, fixed finger with 12 or 13, protrorse marginal denticles which are somewhat larger distally; a total of nine macrosetae present on palm, these including five short accessory setae in addition to the usual *sb*, *b*, *is*, and *es*.

Palp (fig. 4C) a uniform light yellowish tan, very slender; derm smooth; vestitural setae simple and acuminate; trochanter 2.0, femur 7.2, and tibia 2.5, times as long as broad; chela 1.4 times as long as femur and 6.9 times as long as broad or deep; hand 2.6 times as long as broad; fingers 1.7 times as long as hand and shorter than femur.

Chela slender, distinctly heterodentate, with chaetotaxy and dentition

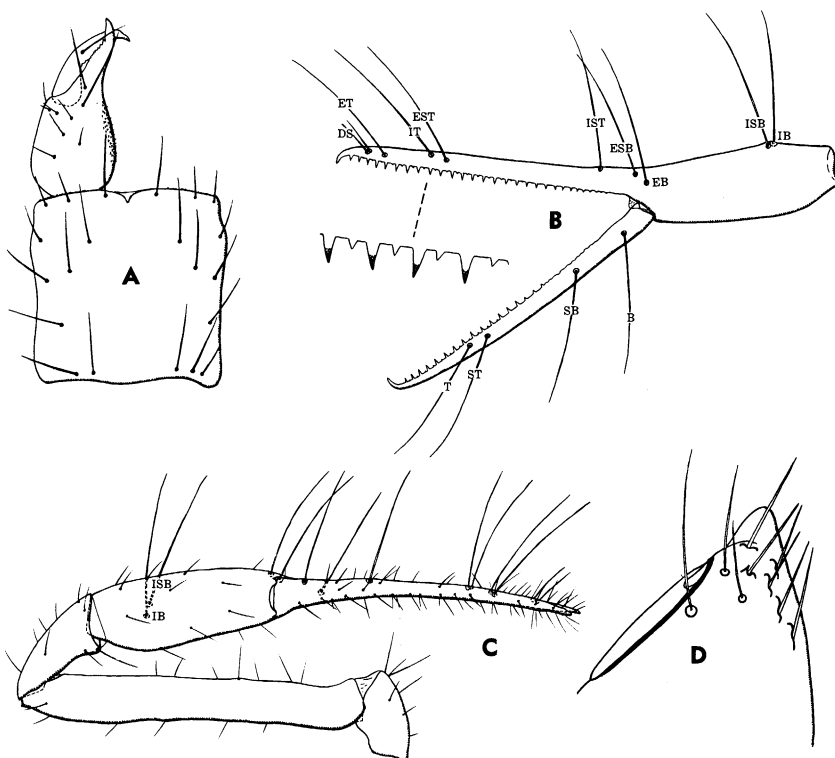


FIG. 4. *Kleptochthonius* (*Chamberlinochthonius*) *gertschi*, new species, holotype female. A. Carapace and left chelicera. B. Exterior aspect of left chela. C. Ventral aspect of right palp. D. Apex of coxa I, showing coxal spines.

as illustrated (fig. 4B); fixed finger with 29 well-spaced, prominent macrodenticles between the anterior and medial of which intervene 17 microdenticles; movable finger with 17 macrodenticles, 11 intervening microdenticles and 13 or 14 low, rounded, contiguous denticles or crenations.

Legs of usual structure; two short semitactile setae moderately differentiated on fourth tibia, one submedian (index, 0.41) and one subterminal (index, 0.85); a single subbasal semitactile seta on fourth metatarsus (index, 0.23), and two such setae on fourth telotarsus, with indices of 0.31 and 0.69, respectively. Leg I: basifemur 7.2, telofemur 3.3 to 3.4, tibia 5.1, and miotarsus 11.8, times as long as deep. Leg IV: "miofemur" 3.7 to 3.8, tibia 6.1 to 6.2, metatarsus 3.6, and telotarsus 12.7, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype female: total length, 2.16; abdominal breadth,  $0.71 \pm$ . Carapace, 0.61 long, 0.62 broad across the eyes,  $0.59 \pm$  broad posteriorly. Chelicera, 0.589 by 0.264. Palp: trochanter, 0.320 by 0.158; femur, 1.082 by 0.151; tibia, 0.410 by 0.164; chela, 1.550 by 0.226 broad or deep; hand, 0.582 long; fingers, 0.973 long. Leg I: basifemur, 0.613 by 0.085; telofemur, 0.266 by 0.079; tibia, 0.335 by 0.066; miotarsus, 0.694 by 0.059. Leg IV: "miofemur," 0.877 by 0.234; tibia, 0.620 by 0.101; metatarsus, 0.305 by 0.084; telotarsus, 0.738 by 0.058.

***Kleptochthonius* (*Chamberlinochthonius*) *lutzi*, new species**

Figure 5

MATERIAL: Holotype female (JC-2228.01001) collected April, 1948, in Cudjo's Cave, Cumberland Gap, Tennessee, by L. Lutz.

DESCRIPTION: Female: Relatively small, rather slender species of typical facies.

Carapace of usual structure, with a single pair of large, corneate eyes situated nearly twice their own diameter from anterior margin; posterior eyes not visible in cleared type preparation and, if present at all, probably vestigial or mere spots; epistomal process lacking, but anterior carapacial margin minutely serrulate laterally at base of chelicerae; derm smooth except somewhat tessellated posterolaterally; chaetotaxy, 6-3 (19); norm, probably 6-4 (20).

Abdomen of typical structure; derm smooth; tergal chaetotaxy, 3:5:4:4:6:6:6:8:7:7:T2T:0; sternal chaetotaxy, 7:(4)7(4):(3)7(4):mmm5mm:mm5mm:m6m:9:4S1S3:S2S2S2S:0:mm. Genital area of female typical. Coxal area of usual facies; chaetotaxy, 2-2-1:0-2 (or 3)-0 (or 1)-CS:2-2:2-3:2-3; apical process of coxa I typical; coxal spines (fig. 5B) of usual type comprising an irregularly biseriate series of two and four (six in all) setae on each coxa.

Chelicera (fig. 5C) of usual appearance, moderately robust, nearly as long as carapace and about 1.9 times as long as broad; galeal tubercle vestigial; medial aspect of palm slightly scaly, possibly minutely hispidous; serrula exterior comprising about 19 teeth; serrula interior typical but number of teeth not ascertainable from type; flagellum a biseriate series of about eight unilaterally pinnate setae; both movable and fixed fingers with about 10 or 11 marginal denticles which became progressively smaller basally; palm with a total of seven setae (*is*, *sb*, *b*, and *es*, plus three accessory setae).

Palp moderately slender (fig. 5D); derm smooth; vestitural setae slen-

der and acute; trochanter 2.0 to 2.1, femur 5.8 to 5.9, and tibia 1.9, times as long as broad; chela 1.5 times as long as femur, 5.5 times as long as broad and 5.4 times as long as deep; hand 2.0 times as long as broad; fingers 1.7 times as long as hand and shorter than femur.

Chela with chaetotaxy and dentition as illustrated (fig. 5A); fingers distinctly heterodentate, fixed finger with 27 spaced macrodenticles be-

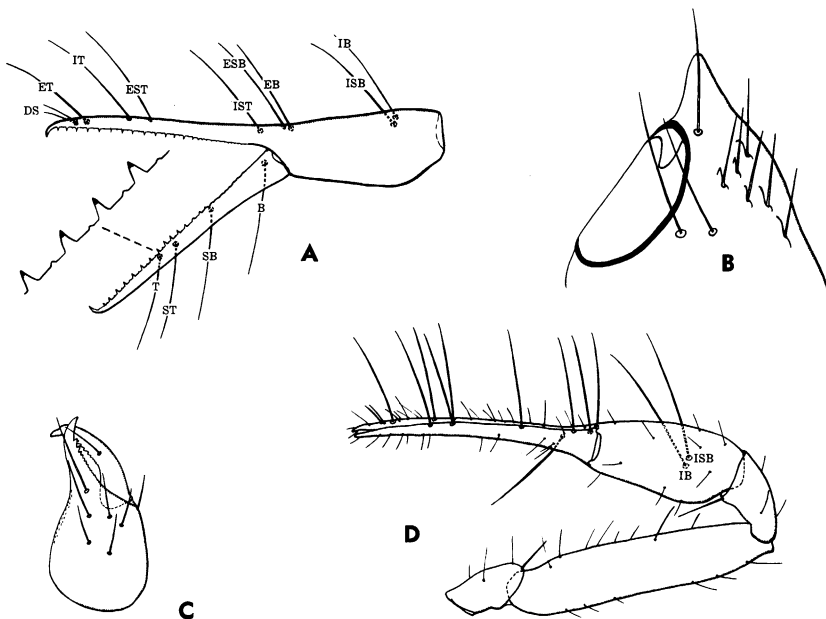


FIG. 5. *Kleptochthonius* (*Chamberlinochthonius*) *lutzi*, new species, holotype female. A. Interior aspect of right chela. B. Apex of coxa I, showing coxal spines. C. Exterior aspect of right chelicera. D. Ventral aspect of left palp.

tween which intervene 13 microdenticles distally; movable finger with 15 spaced macrodenticles and 10 intervening microdenticles, plus a basal series of about seven low, rounded, nearly contiguous vestiges (about 32 in all). It is to be noted that when the chela is closed the basal macrodenticles of the fixed finger, which are quite close-set and small, fit between the rounded basal teeth of the movable finger.

Legs of typical structure, moderately slender; legs III and IV with two tactile or semitactile setae differentiated on tibia (indices, 0.47 and 0.81), metatarsus with a subbasal tactile seta (index, 0.27), and telotarsus with a subbasal tactile seta (index, 0.29), and probably a subdistal one as well,

although the actual seta is lost from the type. Leg I: basifemur 5.2, telofemur 2.8, tibia 4.1 to 4.2, and miotarsus 9.4, times as long as deep. Leg IV: "miofemur" 3.4, tibia 5.3, metatarsus 3.2 to 3.3, and telotarsus 10.6, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype female: total length, 1.75; abdominal breadth indeterminable. Carapace, 0.51 long; breadth indeterminable; ocular diameter, 0.048. Chelicera, 0.476 by 0.246. Palp: trochanter, 0.272 by 0.132; femur, 0.872 by 0.149; tibia, 0.336 by 0.177; chela, 1.279 by 0.234 broad and 0.236 deep; hand, 0.476 long; fingers, 0.804 long. Leg I: basifemur, 0.403 by 0.077; telofemur, 0.210 by 0.074; tibia, 0.262 by 0.063; miotarsus, 0.517 by 0.055. Leg IV: "miofemur," 0.705 by 0.206; tibia, 0.489 by 0.092; metatarsus, 0.241 by 0.074; telotarsus, 0.563 by 0.053.

REMARKS: The holotype of this species was first studied by Dr. C. Clayton Hoff, who tentatively segregated it as new. He has kindly relinquished publication rights in order to permit its inclusion in the present paper. We have followed his desires in dedicating the species to L. Lutz, who collected the only known specimen.

***Kleptochthonius* (Chamberlinochthonius) infernalis, new species**

Figure 6

MATERIAL: Holotype female (JC-1272.01002) and female paratype (JC-1272.01001), both collected in Saltpeter Cave, Grassy Cove, Tennessee, October 7, 1938.

DESCRIPTION: FEMALE: Medium-sized, nearly normally pigmented, but moderately slender species of typical facies.

Carapace somewhat broader than long and slightly broader anteriorly than posteriorly; moderately pigmented; derm smooth except lightly tessellated laterally; with a single pair of relatively large but only weakly corneate eyes which are somewhat less than twice their own diameter from anterior carapacial margin; epistomal process lacking, but entire anterior margin more or less serrulate; chaetotaxy, 6-4 (20).

Abdomen of typical morphology; derm smooth; tergal chaetotaxy, 4:4:4:4:5:5 or 6:6 or 7:6 to 9:8:6 to 8:T2T:0. (Tergite 1 in holotype apparently characterized by an abnormal chaetotaxy, having only two rather than four marginal setae indicated in chaetotaxal formula. The tergite itself appears to be somewhat deformed; hence this conclusion. However, the possibility remains that the chaetotaxy of this segment should be written 2 to 4 rather than 4.) Sternal chaetotaxy, about 7 or 8: (4)7 or 8(4):(3) or (4)8 to 10(3):m8m:mm5 or 6mm:m7m:10 or 11:11 to 13:S3S2S1S:0:mm. Chaetotaxy of genitalic segments and cribriform

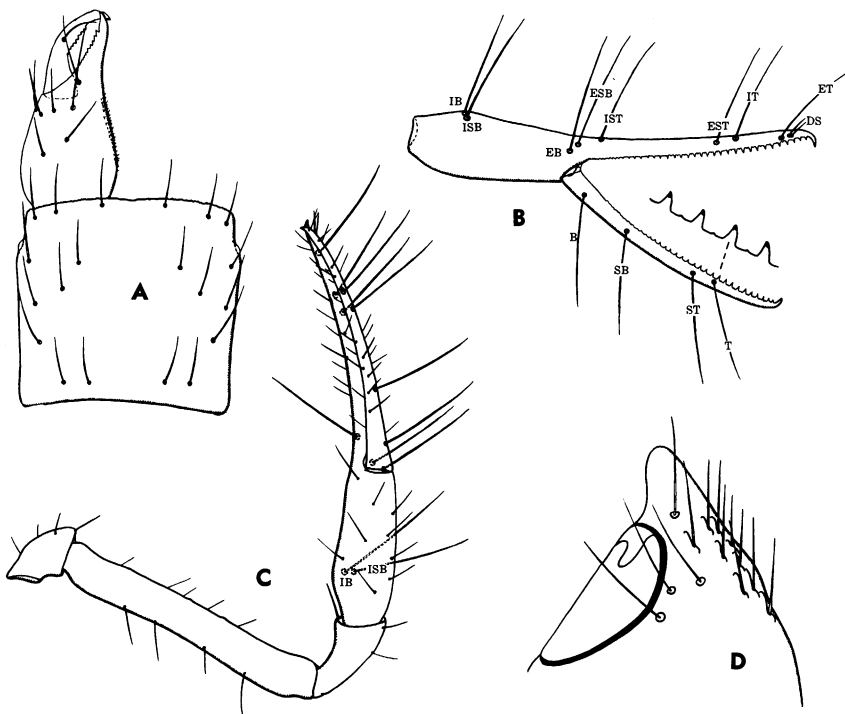


FIG. 6. *Kleptochthonius* (*Chamberlinochthonius*) *infernalis*, new species, holotype female. A. Carapace and left chelicera. B. Exterior aspect of right chela. C. Ventral aspect of left palp. D. Apex of coxa I, with coxal spines.

plates of female genitalia typical. Coxal area of usual facies; chaetotaxy, 2-2-1:1-2-1-CS:2(or 3)-2(or 3):2-3:2-3; apical process of coxa I well developed, with a single basal macroseta; coxal spines of usual type and totaling eight or nine setae arranged in irregular double series on each coxa (fig. 6D).

Chelicera (fig. 6A) as long as or slightly longer than carapace and 2.2 to 2.3 times as long as broad; medial aspect of hand provided with low, scale-like, finely hispid tubercles; galeal tubercle vestigial; serrula exterior with 19 or 20 teeth; serrula interior with at least 13 or 14 teeth; flagellum a double series of eight or nine unilaterally pinnate setae (basal one acute); movable finger with nine nearly uniform marginal denticles; fixed finger with about 11 similar but slightly more protrorse denticles, the basal ones of which are very small; palm with a total of seven setae (*is*, *sb*, *b*, and *es*, plus a series of three accessory setae).

Palp moderately slender, of typical facies (fig. 6C); derm smooth; vestitural setae simple, acuminate; trochanter 1.9 to 2.0, femur 6.5 to 6.7, and tibia 2.2, times as long as broad; chela 1.4 to 1.5 times as long as femur, 6.8 to 6.9 times as long as broad, and 6.4 times as long as deep; hand 2.6 times as long as broad; fingers 1.7 times as long as hand but shorter than femur.

Chela with chaetotaxy and dentition as illustrated (fig. 6B); fingers weakly but unmistakably heterodentate; fixed finger with 37 prominent, well-spaced macrodenticles between the distal ones of which alternate about 17 very small microdenticles; movable finger with 24 or 25 spaced macrodenticles and 10 or 11 very small interspaced microdenticles distally, plus about 10 or 11 low, rounded, nearly contiguous teeth basally.

Legs of usual structure and appearance, moderately slender. Proportions of leg I: basifemur 7.1 to 7.2, telofemur 3.1 to 3.2, tibia 5.1 to 5.2, and miotarsus 10.2, times as long as deep. Proportions of leg IV: "miofemur" 3.8 to 3.9, tibia 6.1, metatarsus 3.7 to 3.8, telotarsus 12.4 to 12.5, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype female: total length, 2.05; abdominal breadth, 0.79. Carapace, 0.66 long, 0.74 broad anteriorly, 0.70 broad posteriorly; diameter of eyes, about 0.052. Chelicera, 0.689 by 0.320. Palp: trochanter, 0.372 by 0.195; femur, 1.204 by 0.182; tibia, 0.471 by 0.215; chela, 1.778 by 0.262 broad and 0.277 deep; hand, 0.681 long; fingers, 1.135 long. Leg I: basifemur, 0.736 by 0.103; telofemur, 0.302 by 0.096; tibia, 0.397 by 0.077; miotarsus, 0.754 by 0.074. Leg IV: "miofemur," 1.066 by 0.277; tibia, 0.735 by 0.120; metatarsus, 0.361 by 0.096; telotarsus,  $0.845 \pm$  by 0.068.

Paratype female: total length, 2.12; abdominal breadth, 0.95. Carapace, 0.66 long, 0.69 broad anteriorly, 0.66 broad posteriorly; diameter of eyes, 0.044. Chelicera, 0.664 by 0.289. Palp: trochanter, 0.344 by 0.173; femur, 1.158 by 0.175; tibia, 0.443 by 0.200; chela, 1.673 by 0.243 broad; hand, 0.623 long; fingers, 1.068 long. Other measurements indeterminate (legs lost).

### ***Kleptochthonius* (Chamberlinochthonius) myopi<sup>us</sup>, new species**

Figure 7

MATERIAL: Holotype male (JC-2256.01001) collected in Cathcart Cave, De Kalb County, Tennessee, October 17, 1948, by Jones and Archer.

DESCRIPTION: Male: Relatively large, moderately pallid, and quite attenuated species.

Carapace about as long as ocular breadth and somewhat constricted behind; rather pallid yellow in color; with one pair of weakly corneate eyes less than twice their own diameter from anterior carapacial margin and with a slightly clear, non-corneate, vestigial eyespot posterior to eyes; anterior carapacial margin broadly truncate and lacking an epistomal process or serrulations; derm smooth except tessellated on extreme lateral aspects; chaetotaxy, 6-2 (18).

Abdomen of typical facies; derm smooth; tergal chaetotaxy, 4:4:4:4:6:6:6:6:7:7:1TTTT1:0; sternal chaetotaxy,

$$\frac{4}{9}:(4-4):(3)\frac{8-9}{8}(3):(3)8(3):10:10:10:11:11:TTT2TTTT:0:\text{mm.}$$

Genital area typical. Coxal area of usual morphology; chaetotaxy, 2-2-1:0-3-1 (or 0)-CS:2-2:2-3:2-3; apical process of first pedal coxa devoid of microsetae; coxal spines of usual type, consisting of nine or 10 such spines on each coxa (fig. 7A).

Chelicera (fig. 7D) of typical facies, shorter than carapace and 1.9 times as long as broad; derm smooth, except medial aspect of hand provided with very low, scale-like tubercles, no hispidulations observable; galeal tubercle vestigial to completely lacking; serrula exterior comprising 17 basally acute but terminally, broadly truncate blades; details of serrula interior not observable; flagellum of seven generally unilaterally pinnate blades; movable finger with seven denticles which become very low basally; fixed finger with six to nine irregular denticles, the terminal one of which is unusually large; usual setae present (*sb*, *b*, *is*, and *es*), in addition to three accessory setae which form a triangle caudad of *b* and *sb*.

Palp (fig. 7B) light tan in color and quite attenuated; derm smooth; vestitural setae simple, acuminate; trochanter 1.8, femur 6.8, and tibia 2.4, times as long as broad; chela 6.8 times as long as broad and 6.5 times as long as deep; hand 2.4 times as long as broad; fingers 1.8 times as long as hand and slightly shorter than the femur.

Chela slender and distinctly heterodontate (fig. 7C); fixed finger with 35 macrodenticles which become lower and less acute basally and 17 microdenticles interspaced between distal macrodenticles; movable finger with 21 macrodenticles which merge into about 13 low, rounded teeth basally, and with nine microdenticles interspaced between distal macrodenticles.

Legs of usual facies; tibia of leg IV provided with a submedian (index, 0.37) and possibly a distal (index, 0.87) semitactile seta, metatarsus with a subbasal semitactile seta (index, 0.21), and telotarsus with a subbasal



semitactile seta (index, 0.28) but with no median or distal telotarsal seta evident in the holotype. Leg I: basifemur 7.1, telofemur 3.0, tibia 5.0, and miotarsus 11.2, times as long as deep. Leg IV: "miofemur" 3.5, tibia 6.1, metatarsus 3.6, and telotarsus 13.1, times as long as deep.

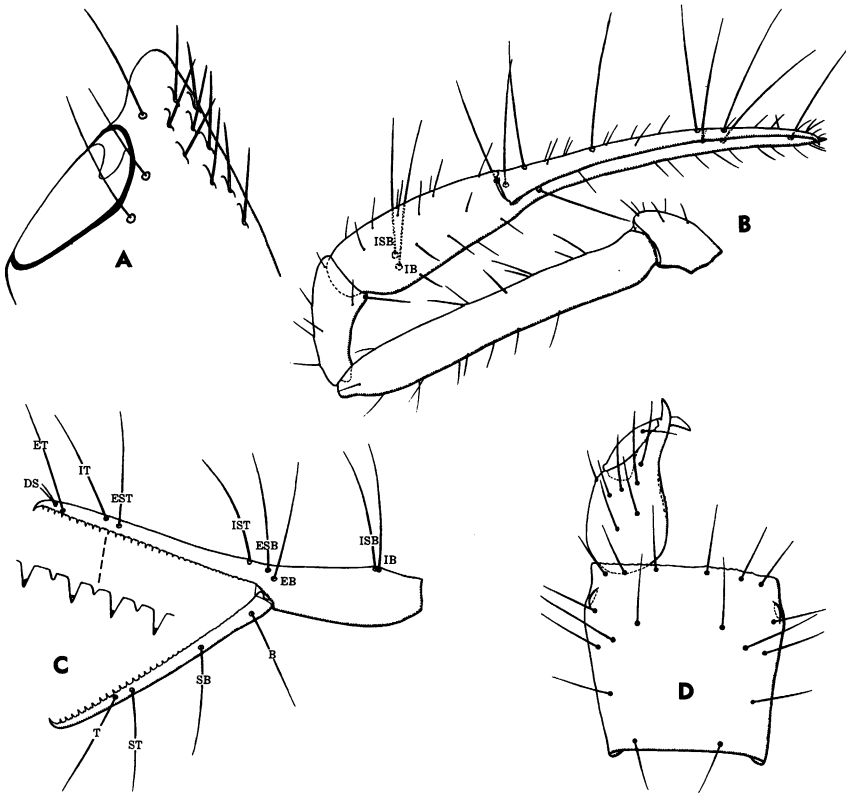


FIG. 7. *Kleptochthonius* (*Chamberlinochthonius*) *myopioides*, new species, holotype male. A. Apex of coxa I, showing coxal spines. B. Ventral aspect of right palp. C. Exterior aspect of left chela. D. Carapace and left chelicera.

MEASUREMENTS (IN MILLIMETERS): Holotype male: total length, 1.97; abdominal breadth, 0.97. Carapace, 0.61 long, 0.65 broad across the eyes, and 0.55 broad posteriorly; ocular diameter, 0.059. Chelicera, 0.518 by 0.268. Palp: trochanter, 0.315 by 0.178; femur, 1.132 by 0.166; tibia, 0.428 by 0.179; chela, 1.691 by 0.248 broad and 0.261 deep; hand, 0.607 long; fingers, 1.083 long. Leg I: basifemur, 0.600 by 0.085; telofemur,

0.262 by 0.088; tibia, 0.345 by 0.069; miotarsus, 0.716 by 0.064. Leg IV: "miofemur," 0.962 by 0.272; tibia, 0.660 by 0.109; metatarsus, 0.323 by 0.091; telotarsus, 0.810 by 0.062.

**Kleptochthonius (Chamberlinochthonius) microphthalmus**, new species

Figure 8

**MATERIAL:** Holotype female (JC-2373.02001) and three female paratypes (JC-2373.02002–JC-2373.02004) collected "from raccoon dung in Thomas Cave, 2 miles N. E. of Hadley, Warren County, Kentucky," by Thomas C. Barr, Jr., January 1, 1957.

**DESCRIPTION:** Female: moderately large, lightly pigmented species, with one pair of weakly developed eyes.

Carapace subquadrate, slightly narrowed behind; one pair of weakly to very weakly corneate eyes located somewhat more than twice their own diameter from anterior carapacial margin; a posterior pair of vestigial eyespots may or may not be present; epistomal process not developed, anterior margin of carapace broad, truncate, and usually smooth except for minute serrulations laterally at bases of chelicerae; derm smooth except tessellated laterally; chaetotaxy, 6–4 (20).

Abdomen of typical facies; derm smooth except both sternites and tergites tessellated laterally; tergal chaetotaxy, 2 to 4:4:4:4:6:6 to 7:7:7:7:5 to 6:S2S:0; sternal chaetotaxy, 8 or 9:(3) 8 to 10(2 or 3):(3)8 to 11(3):10 or 11:7 to 10:9:10:8 to 10:S1S1(or S)S(or 1)1S:0:mm. Female genital area typical. Coxal area of typical facies; chaetotaxy, 2–2–1:0 (or 1)–2(to 4)–0(to 1)–CS:2(or 3)–2:2–3:2–3; coxal spines of usual type, numbering four to five on each coxa (fig. 8B).

Chelicera of usual facies (fig. 8C), shorter than carapace and from 2.0 to 2.2 times as long as broad; derm smooth, except medial aspect of palm provided with low, scale-like, and finely hispid tubercles; galeal tubercle vestigial; serrulae typical, serrula exterior comprising 17 to 18 blades and serrula interior comprising about 14 blades; flagellum comprising five to seven pinnate blades; movable finger with five to seven marginal denticles typically becoming very low and indistinct basally and usually including a low, rounded, subapical crenation or tooth; fixed finger with six to eight marginal denticles becoming lower and more rounded basally; palm provided with three accessory setae in addition to usual complement of *is*, *sb*, *b*, and *es*.

Palp moderately slender (fig. 8D); derm smooth, vestitural setae simple; trochanter 1.8 to 2.0, femur 6.1 to 6.3, tibia 1.8 to 2.2, times as long as broad; chela 5.8 to 6.3 times as long as broad and 5.7 to 6.1 times as long as deep; fingers 1.5 to 1.6 times as long as hand.

Chela (fig. 8A) almost homodentate, only very obscurely and minutely heterodentate; fixed finger with 30 to 35 acute and well-spaced macrodenticles, the more distal ones of which alternate with six to nine vestigial and scarcely perceptible microdenticles; movable finger with 18 or 19 spaced macrodenticles which are continuous with 13 or 14 low, rounded, and more or less contiguous basal crenations, microdenticles not observable.

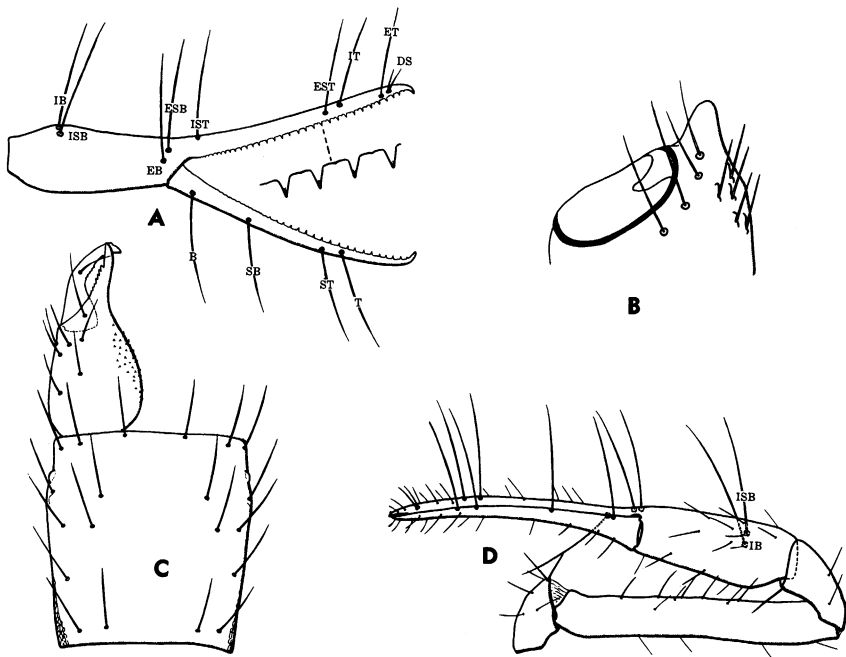


FIG. 8. *Kleptochthonius* (*Chamberlinochthonius*) *microphthalmus*, new species. A. Exterior aspect of right chela, holotype female. B. Apex of coxa I showing coxal spines (female, JC-2373.02002). C. Carapace and left chelicera (female, JC-2373.02004). D. Ventral aspect of left palp, holotype female.

Legs moderately slender and of normal facies; leg IV with tactile or semitactile setae differentiated on tibia (two, indices of 0.42–0.45 and 0.84–0.86), metatarsus (one, index, 0.26–0.29), and telotarsus (two, indices of 0.21–0.30 and 0.66–0.70). Leg I: basifemur 6.7 to 7.5, telofemur 3.1 to 3.4, tibia 5.0 to 5.5, and miotarsus 10.6 to 11.1, times as long as deep. Leg IV: “miofemur” 3.3 to 3.5, tibia 5.6 to 6.0, metatarsus 3.7 to 4.0, and telotarsus 11.6 to 12.9, times as long as deep.

TABLE 2  
MEASUREMENTS (IN MILLIMETERS) OF TYPE SPECIMENS OF  
*Kleptochthonius microphthalmus*, NEW SPECIES (ALL FEMALES)

Morphological Part <sup>a</sup>	Holotype	2373.02002	2373.02003	2373.02004
Entire body, L	2.15±	2.21±	Indet.	2.15±
Carapace, L	0.66	0.57	0.65	0.59
Breadth <sup>b</sup>	0.64, 0.54±	0.62, 0.54	0.66, 0.64	0.58, 0.52
Eye diameter	Indet.	0.037	0.040	0.033±
Chelicera, L×B	0.613 × 0.285	0.566 × 0.279	0.582 × 0.295	0.574 × 0.267
Pedipalp				
Trochanter, L×B	0.307 × 0.169	0.325 × 0.179	0.336 × 0.190	0.336 × 0.167
Femur, L×B	1.082 × 0.164	1.066 × 0.169	1.148 × 0.174	1.000 × 0.164
Tibia, L×B	0.380 × 0.205	0.402 × 0.213	0.443 × 0.203	0.402 × 0.197
Chela, L×B	1.591 × 0.256	1.550 × 0.246	1.689 × 0.279	1.492 × 0.256
Chela, D	0.262	0.254	0.279	0.262
Hand, L; finger, L	0.640, 0.959	0.607, 0.943	0.649, 1.058	0.590, 0.910
Leg I				
Basifemur, L×D	0.656 × 0.088	0.626 × 0.088	0.679 × 0.093	0.590 × 0.088
Telofemur, L×D	0.271 × 0.085	0.279 × 0.082	0.295 × 0.090	0.262 × 0.085
Tibia, L×D	0.344 × 0.066	0.344 × 0.066	0.361 × 0.066	0.318 × 0.063
Miotarsus, L×D	0.672 × 0.063	0.672 × 0.063	0.712 × 0.064	0.623 × 0.059
Leg IV				
“Miofemur,”				
L×D	0.918 × 0.262	0.886 × 0.266	0.982 × 0.287	0.853 × 0.262
Tibia, L×D	0.645 × 0.110	0.623 × 0.112	0.679 × 0.114	0.607 × 0.108
Metatarsus, L×D	0.325 × 0.082	0.325 × 0.085	0.346 × 0.088	0.310 × 0.084
Telotarsus, L×D	0.741 × 0.059	0.705 × 0.055	0.745 × 0.059	0.684 × 0.059

<sup>a</sup> Abbreviations: B, breadth; D, depth; L, length.

<sup>b</sup> Anterior and posterior breadths, respectively.

The measurements are summarized in table 2.

REMARKS: The holotype shows an interesting abnormality in having a single microseta dorsally on the anal operculum. In this genus dorsal, opercular microsetae are normally absent.

***Kleptochthonius* (*Chamberlinochthonius*) *cerberus*, new species**

Figure 9

MATERIAL: Holotype male (JC-2374.01001) collected from flowstone in White Cave, 0.5 mile west of “historic” entrance to Mammoth Cave, Mammoth Cave National Park, Kentucky, by Thomas C. Barr, Jr., March 30, 1957. Paratypes, two males, (JC-2379.01001, JC-2379.01002) collected from “Whites Cave, near Mammoth Cave, Kentucky,” August

19, 1929, by L. Giovannoli (United States National Museum).

**DESCRIPTION:** Male: Relatively large, two-eyed species of rather slender proportions.

Carapace somewhat longer than broad and slightly narrowed behind (fig. 9D); one pair of small but corneate eyes located approximately one and a half to two times their own diameter from anterior carapacial margin; median epistomal process completely lacking, but anterior carapacial

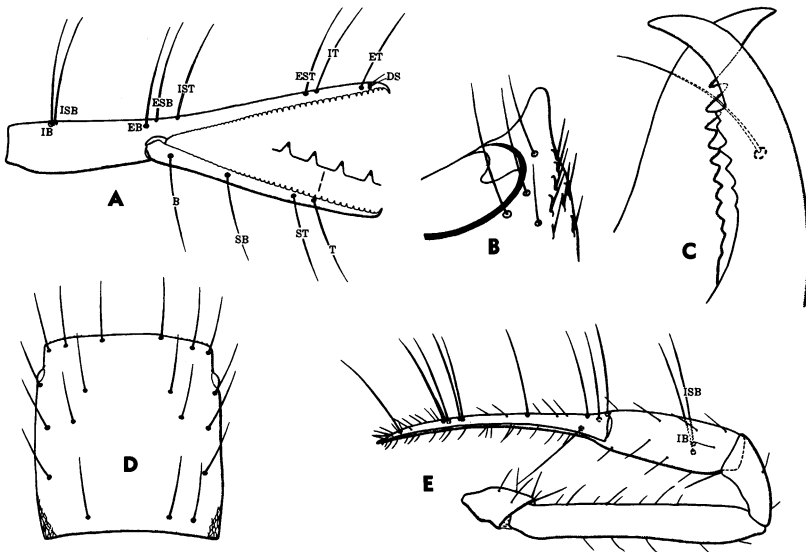


FIG. 9. *Kleptochthonius* (*Chamberlinochthonius*) *cerberus*, new species. A. Exterior aspect of right chela (male, JC-2379.01002). B. Apex of coxa I, with coxal spines (male, JC-2379.01002). C. Tip of cheliceral fingers, showing dentition, holotype male. D. Carapace, holotype male. E. Ventral aspect of left palp, holotype male.

margin very weakly and obscurely serrulate laterally; derm smooth except lightly tessellated posterolaterally; chaetotaxy typically 6-4 (20). (One specimen studied bears only three setae on posterior margin, but it is clear that one seta is unpaired where its complement failed to develop.)

Abdomen of usual form; derm smooth, except tessellated laterally on both tergites and sternites; tergal chaetotaxy, 2 or 3:2:2 to 4:2 to 3:4:4: 6:6 or 7:6 to 8:5 to 7:?:0; sternal chaetotaxy,

$$\frac{2}{10 \text{ or } 11} : (3-3) : (3) \frac{10 \text{ or } 11-9 \text{ or } 10}{6 \text{ to } 8} (3) : (3) 8 \text{ or } 9 (3 \text{ or } 4) : 8 \text{ or } 9 : 8 \text{ or } 9 : 8 \text{ or } 9 : 10 \text{ or } 11 : 10 \text{ or } 11 : T_1 T T_2 T T_1 T (\text{or } 10) : \text{indet.} : \text{mm};$$

structure and chaetotaxy of genital segments typical. Coxal area of usual facies; chaetotaxy, 2-2-1:0-3-1-CS:2-3:2-3:2-3; coxal spines of usual type and numbering six to eight on each coxa (fig. 9B).

Chelicera shorter than carapace and about twice as long as broad; derm smooth, except median aspect of palm provided with low, scale-like tubercles; galeal tubercle completely absent, tips of fingers smoothly rounded (fig. 9C); serrula exterior with about 15 to 18 blades, serrula interior with about 12 blades; movable finger with six to nine marginal denticles which become lower and less acute basally, isolated subdistal tooth vestigial or completely absent; fixed finger with nine to 12 marginal denticles becoming very low and less distinct basally; flagellum comprising approximately seven bipinnate blades; palm provided with a total of seven setae (*is*, *sb*, *b*, and *es*, plus a series of three accessory setae).

Palp as illustrated (fig. 9E), derm smooth, with simple acuminate vestitural setae; trochanter 1.8 to 1.9, femur 6.6 to 6.9, tibia 1.9 to 2.3, times as long as broad, chela 6.7 to 7.6 times as long as broad and 7.0 to 7.6 times as long as deep; fingers 1.6 to 1.7 times as long as hand.

Chela (fig. 9A) homodontate, microdenticles on both fingers vestigial to completely absent; fixed finger with 37 to 43 well-spaced and acute macrodenticles which are continuous with three to seven basal teeth which are lower, rounded, and more nearly contiguous; movable finger with 22 to 27 acute and well-spaced macrodenticles which merge with nine to 14 low, rounded, basal teeth which become little more than mere crenations.

Legs moderately slender and of typical facies; leg IV with relatively well-differentiated tactile setae on tibia (two, with indices of 0.38 to 0.40 and 0.82 to 0.83), metatarsus (one, index, 0.24), and telotarsus (two, indices of 0.24 to 0.31 and 0.66 to 0.69). Leg I: basifemur 7.0 to 7.9, telofemur 2.7 to 3.3, tibia 4.4 to 4.7, and miotarsus 10.1 to 11.0, times as long as deep. Leg IV: "miofemur" 3.3 to 4.0, tibia 4.8 to 5.6, metatarsus 3.8, and telotarsus 12.0 to 14.0, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype male: total length,  $1.94 \pm$ ; abdominal breadth indeterminable. Carapace, 0.60 long, ocular breadth, 0.54, posterior breadth, 0.54. Chelicera, 0.528 by 0.231. Palp: trochanter, 0.287 by 0.155; femur, 0.989 by 0.151; tibia, 0.377 by 0.180; chela, 1.428 by 0.210 broad and 0.205 deep; hand, 0.530 long; fingers, 0.918 long. Leg I: basifemur, 0.599 by 0.085; telofemur, 0.262 by 0.085; tibia, 0.307 by 0.066; miotarsus, 0.645 by 0.059. Leg IV: "miofemur," 0.848 by 0.213; tibia, 0.566 by 0.118; metatarsus, 0.312 by 0.082; telotarsus, 0.705 by 0.059.

Paratype males (JC-2379.01001 and 2379.01002, latter in paren-

theses): total length, 2.07 (1.82±); abdominal breadth, 0.72± (0.73±). Carapace, 0.61 (0.60) long, ocular breadth, 0.52 (0.58), posterior breadth, 0.43 (indeterminate). Chelicera, 0.490 (0.469) by 0.262 (0.262). Palp: trochanter, 0.317 (0.311) by 0.171 (0.166); femur, 1.049 (1.049) by 0.156 (0.152); tibia, 0.355 (0.385) by 0.186 (0.166); chela, 1.463 (1.514) by 0.210 (0.200) broad and 0.210 (0.199) deep; hand, 0.566 (0.552) long; fingers, 0.897 (0.962) long. Leg I: basifemur, 0.622 (0.636) by 0.083 (0.081); telofemur, 0.276 (0.221) by 0.083 (0.083); tibia, 0.305 (0.304) by 0.069 (0.069); miotarsus, 0.656 (0.669) by 0.065 (0.061.) Leg IV: "miofemur," 0.903 (0.925) by 0.270 (0.283); tibia, 0.617 (0.620) by 0.110 (0.117); metatarsus, 0.316 (0.317) by 0.083 (0.083); telotarsus, 0.738 (0.773) by 0.061 (0.055).

***Kleptochthonius* (*Chamberlinochthonius*) *attenuatus*, new species**

Figure 10

**MATERIAL:** Holotype male (JC-2375.01001) collected from "Blind Snail Cave, 7 miles ENE of Munfordville, Hart County, Kentucky," by Thomas C. Barr, Jr., December 29, 1956.

**DESCRIPTION:** Male: relatively large, rather attenuated, two-eyed species.

Carapace slightly longer than broad and somewhat narrowed behind; one pair of corneate eyes located about twice their own diameter from anterior carapacial margin; epistomal process or serrulations lacking from anterior carapacial margin which, however, is very weakly denticulate laterally; derm smooth except tessellated laterally; chaetotaxy, 6-3 (20). Chaetotaxal norm doubtless 6-4 (20), as it was quite clear that one seta had not developed.

Abdomen of typical facies; derm smooth except tessellated laterally; tergal chaetotaxy, 2:2:3:4:4:6:6:8:7:6:6:0; sternal chaetotaxy,

$$\frac{2}{10(?)} : (3-3) : (3) \text{ indet. } (3) : (3) 10(3) : 9 : 10 : 12 : 12 : 11 : 10 : 0 : \text{mm};$$

structure and chaetotaxy of genital segments typical of group. Coxal area of usual structure; coxal chaetotaxy, 2-2-1:0-3-1-CS:2-3 or 4:2-3:2-3; apical process of coxa I prominent and rounded; coxal spines of usual type, numbering six to eight on each coxa (fig. 10C).

Chelicera shorter than carapace; derm smooth, except medial aspect of palm provided with minute, finely hispid, scale-like tubercles; galeal tubercle absent, tip of fingers smoothly rounded (fig. 10A); serrula exterior with about 18 blades and serrula interior with about 14 or 15 blades; flagellum comprised of an indeterminable number of pinnate

blades; movable finger with six to seven marginal denticles and fixed finger with nine to 10 denticles, including a large subapical tooth; palm provided with three accessory setae in addition to customary *is*, *sb*, *b*, and *es*.

Palp moderately slender (fig. 10B); derm smooth, with simple vestigial setae; trochanter 2.2, femur 6.8, and tibia 2.0, times as long as

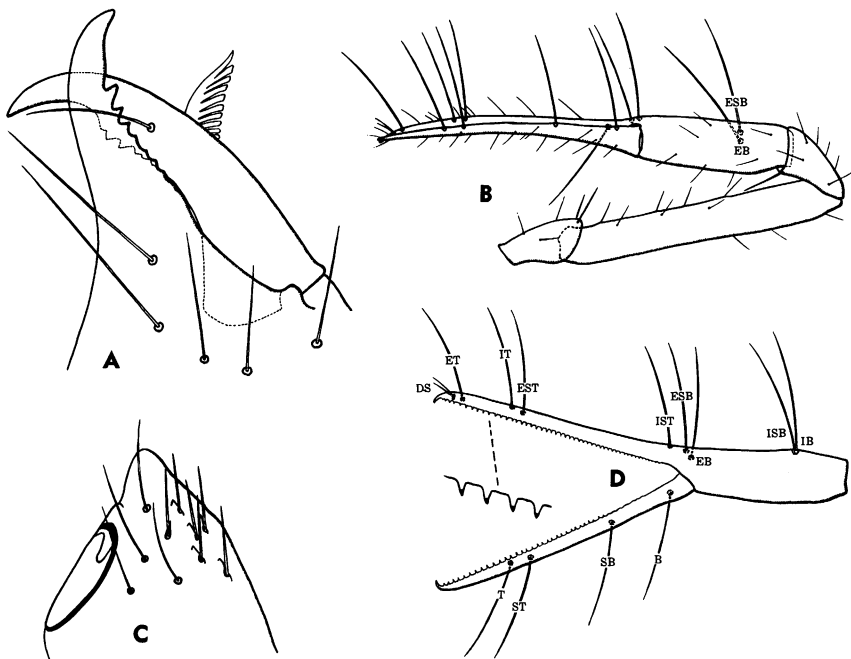


FIG. 10. *Kleptochthonius* (*Chamberlinochthonius*) *attenuatus*, new species, holotype male. A. Tip of left chelicera, showing dentition and chaetotaxy. B. Ventral aspect of left palp. C. Apex of coxa I, with coxal spines. D. Interior aspect of right chela.

broad; chela 1.4 to 1.5 times as long as femur, 8.1 times as long as broad and 7.8 times as long as deep; fingers 1.7 times as long as hand.

Chela (fig. 10D) vestigially heterodentate; fixed finger with 49 well-spaced, acute macrodenticles which are closer together and smaller basally (never contiguous) plus five or six vestigial to obsolete microdenticles between the fourth to twelfth macrodenticles; movable finger with 32 macrodenticles which are very low and rounded basally where they merge with seven spaced, completely rounded, basal crenations, no microdenticles present.



Legs moderately slender and of typical facies; leg IV with moderately well-differentiated tactile setae on tibia (two, with indices of 0.37 and 0.83, respectively), metatarsus (one, index, 0.24) and telotarsus (two, with indices of 0.30 and 0.65, respectively). Leg I: basifemur 7.5 to 7.6, telofemur, 3.2, tibia 4.9, and miotarsus 11.3, times as long as deep. Leg IV: "miofemur" 3.4, tibia 5.0, metatarsus 3.7, and telotarsus 13.0, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype male: total length,  $2.02 \pm$ ; abdominal breadth indeterminable. Carapace, 0.625 long; ocular breadth, 0.566; posterior breadth, 0.530; ocular diameter, 0.045. Chelicera 0.544 long, width indeterminable. Palp: trochanter, 0.343 by 0.156; femur, 1.092 by 0.160; tibia, 0.358 by 0.180; chela, 1.578 long by 0.195 broad and 0.203 deep; fingers, 1.020 long. Leg I: basifemur, 0.695 by 0.092; telofemur, 0.279 by 0.088; tibia, 0.353 by 0.072; miotarsus, 0.722 by 0.064. Leg IV: "miofemur," 1.017 by 0.303; tibia, 0.656 by 0.131; metatarsus, 0.328 by 0.088; and telotarsus, 0.820 by 0.063.

### ***Kleptochthonius* (Chamberlinochthonius) *rex*, new species**

Figure 11

MATERIAL: Holotype female (JC-1270.01001), from Bunkum Cave, Byrdstown, Tennessee, collected April 6, 1935, by Valentine and Beakley.

DESCRIPTION: Female: Large, lightly pigmented, slender, troglolithic species.

Carapace (fig. 11C) pallid, yellowish; as long as ocular breadth and not strongly constricted behind; with one pair of distinctly corneate but very small eyes which are more than their own diameter from anterior margin; epistomal process or median denticulations lacking, but with a few minute serrulations laterally; derm smooth except moderately tessellated laterally and especially posterolaterally; chaetotaxy, 6-2 (18).

Abdomen ovate, lightly pigmented, yellowish; derm mostly smooth but very weakly tessellated on parts of some tergites; tergal chaetotaxy, 4:4:4:4:4:5:5:6:6:4:T2T:0; sternal chaetotaxy, 8:(4)6(4):(3)6(3):m4mm:m5m:m5m:m6m:S3S1S3S:S1S2S1S:0:mm; female genital area typical. Coxal area of typical facies; chaetotaxy, 2-2-1:1-2-0(or 1)-CS:2-2-2-3:2-3; apical process of coxa I, as indicated in the formula, with a single basal macroseta but no marginal microsetae; coxal spines of usual type, four on each coxa (fig. 11A).

Chelicera (fig. 11C) large, light yellowish brown, moderately slender, as long as carapace, and between 2.2 and 2.3 times as long as broad; galeal tubercle vestigial; medial aspect of hand provided with low, scale-

like, finely hispid tubercles; serrulae typical, but numbers of blades not visible in type preparation; flagellum comprising seven unilaterally pinnate setae; movable finger with about 10 slightly protrorse but nearly uniform marginal denticles; fixed finger with about 14 denticles which become lower basally; chaetotaxy of palm comprising seven setae in all

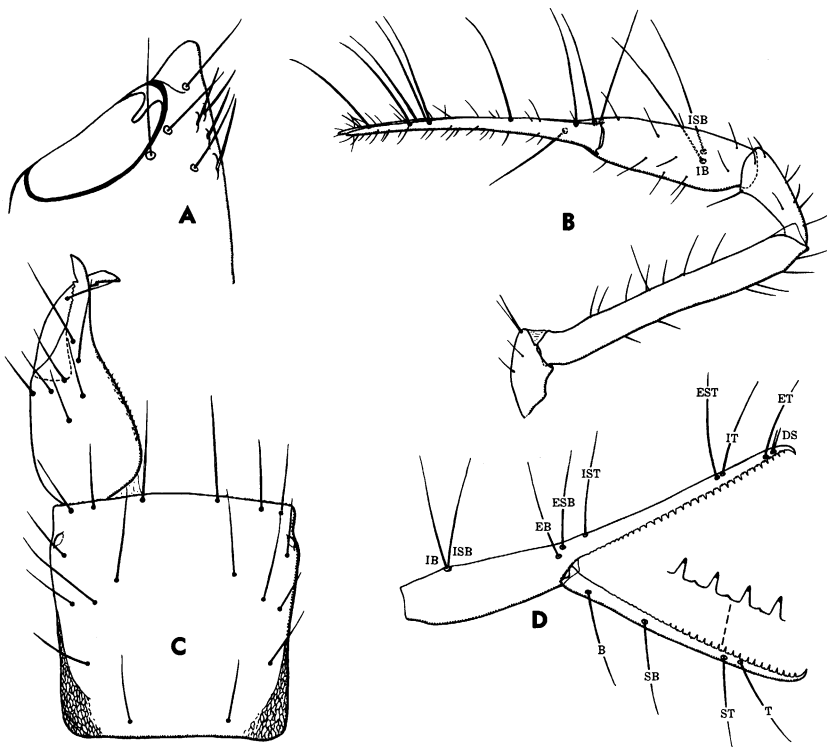


FIG. 11. *Kleptochthonius* (*Chamberlinochthonius*) *rex*, new species, holotype female. A. Apex of coxa I, with coxal spines. B. Ventral aspect of left palp. C. Carapace and left chelicera. D. Exterior aspect of right chela.

(*is*, *sb*, *b*, and *es*, plus three accessory setae of moderate length grouped between *es* and caudad of *b-sb* and *es*).

Palp a uniform, light yellowish tan, of slender facies (fig. 11B); derm smooth; vestitural setae simple and acuminate; trochanter 2.0, femur 8.0, tibia 2.6, times as long as broad; chela 1.5 times as long as femur, 7.6 times as long as broad, and 7.5 times as long as deep; hand 2.7 to 2.8 times as long as broad; fingers 1.7 times as long as hand and shorter than femur.

Chela elongate, with chaetotaxy and dentition as illustrated (fig. 11D); weakly heterodentate but more distinctly so subterminally on fixed finger; fixed finger with 33 prominent macrodenticles and 15 very small microdenticles, of which distal six or seven only are distinct; movable finger with 21 spaced macrodenticles, 16 very small intervening microdenticles, and 13 low, rounded, contiguous, basal teeth.

Legs of typical facies but very slender; fourth legs with weakly differentiated tactile setae on tibia (index, 0.41), metatarsus (index, 0.35), and telotarsus (index, 0.35). Leg I: basifemur 8.1, telofemur 3.6 to 3.7, tibia 5.4, and miotarsus 13.1, times as long as deep. Leg IV: "miofemur" 4.1 to 4.3, tibia 6.7 to 6.8, metatarsus 4.3 to 4.4, and telotarsus 15.0, times as long as deep.

MEASUREMENTS (IN MILLIMETERS): Holotype female: total length, 2.82; abdominal breadth, 1.15. Carapace, 0.80 long, 0.80 broad across eyes, and 0.75 broad posteriorly; diameter of eyes, 0.037 to 0.044. Chelicera, 0.787 by 0.348. Palp: trochanter, 0.449 by 0.223; femur, 1.471 by 0.184; tibia, 0.566 by 0.220; chela, 2.173 by 0.287 broad and 0.290 deep; hand, 0.809 long; fingers, 1.361 long. Leg I: basifemur, 0.892 by 0.110; telofemur, 0.394 by 0.108; tibia, 0.464 by 0.086; miotarsus, 0.968 by 0.074. Leg IV: "miofemur," 1.279 by 0.312; tibia, 0.872 by 0.129; metatarsus, 0.467 by 0.107; telotarsus, 1.107 by 0.074.

*Kleptochthonius (Chamberlinochthonius) henroti* (Vachon)

*Chamberlinochthonius henroti* VACHON, 1952, Notes biospéologiques, vol. 7, pp. 107–111 (original description), fig. 1 (carapace), fig. 2 (male genital area), fig. 3 (palp), fig. 4 (chela), fig. 5 (tip of chelal fingers), fig. 6 (leg IV), fig. 7 (chelicera), fig. 8 (coxal area), figs. 9 and 10 (coxal spines in detail), fig. 11 (palp of tritonymph), fig. 12 (chela of tritonymph), fig. 13 (leg IV of tritonymph). HOFF, 1958, Amer. Mus. Novitates, no. 1875, p. 7 (listed with general distributional data for North America).

REMARKS: The authors have not seen material of this species which was originally described from MacClung's (McClung's?) Cave in West Virginia. Vachon's original description may be relied upon for its recognition.

The chela is strongly heterodentate. Vachon does not specifically describe the microdenticles of the chela. However, his illustration clearly shows at least 26 microdenticles alternating with 35 macrodenticles on the fixed finger. The movable finger is recorded as possessing 25 macrodenticles; his illustration further indicates the presence of about 21 alternating microdenticles.

