

TWO NEW SPECIES OF PSEUDOSCORPIONS FROM ILLINOIS

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Since the publication of my monographic account of the pseudoscorpions of Illinois (Hoff, 1949), I have had the opportunity to examine additional collections from the state, among them two undescribed species of the monosphyronid family Cheiridiidae. These two species, one in the genus *Cheiridium* Menge and the other in the genus *Apocheiridium* Chamberlin, are described in the present paper.

The two pseudoscorpion species described here may be keyed to family by the use of keys in my "Pseudoscorpions of Illinois" or by those given by Chamberlin (1931) or by Beier (1932). In using keys in any one of these publications, however, one must keep in mind that a venom apparatus is now known to occur in both chelal fingers in at least some species of Cheiridiidae, and separation of the Cheiridiidae from the Sternophoridae can no longer be made on the basis of a venom apparatus in only the fixed finger of the Cheiridiidae. The two additional genera reported here for Illinois may be separated by the diagnostic summaries given in this paper or by the use of keys given by Chamberlin (1931) and Beier (1932).

Type specimens of the species described here have been deposited in the collections of the Illinois Natural History Survey and in the author's collections.

GENUS *Cheiridium* Menge

Cheiridium Menge, 1855, N. Schr. Naturf. Gesell. Danzig, vol. 5, no. 2, p. 36.

Cheiridium Chamberlin, 1924, Pan-Pac. Ent., vol. 1, p. 37.

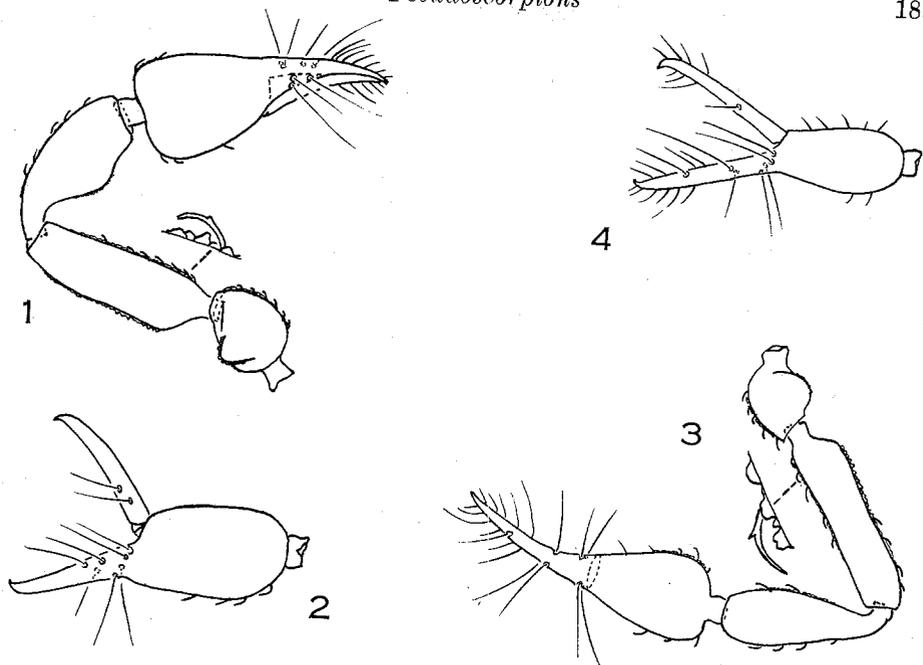
Cheiridium Beier, 1932, Das Tierreich, vol. 58, p. 7.

Species of this genus may be recognized by a combination of the following characters: humeral angle of the carapace pronounced, ten tergites visible in dorsal view, heavy granulations typically dotted-reticulate in nature, and movable chelal finger with two tactile setae. At the present time, the genus contains *C. museorum* (Leach, 1817) from Europe and North Africa, *C. simulacrum* Chamberlin, 1938, from Hawaii, *C. minor* Chamberlin, 1938, from China, and *C. insperatum* Hoff and Clawson, 1952, from Utah. In addition, a fossil form, *C. hartmanni* Menge, is known from Baltic amber.

Genotype: *Chelifera museorum* Leach, 1817.

Cheiridium firmum, new species
(Figs. 1 and 2)

Female: Description based on the female holotype and ten female paratypes; measurements given for the holotype are followed in many instances in parentheses by the ranges of measurements for all eleven females. Body robust; virtually all parts of the animal a golden



FIGS. 1 and 2.—*Cheiridium firmum*, new species, female holotype. FIG. 1.—Dorsal view of palp. FIG. 2.—Lateral view of chela. FIGS. 3 and 4.—*Apocheiridium stannardi*, new species, female holotype. FIG. 3.—Dorsal view of palp. FIG. 4.—Lateral view of chela.

yellow; surface sculpturing strongly marked, especially on the carapace, the tergites, and the palpi; body length 0.86 (0.86-0.98) mm. Carapace similar to that of other species of the genus, triangular in general outline and widest across the posterior margin; one pair of eyes; setae of carapace sparse and arcuate, each with a small spinule on the outer margin; about eight setae along the posterior carapacic margin; sculpturing of the dotted-reticulate type, with some granules extending posterior to the margin and giving the general impression of marginal teeth; carapace 0.27 (0.25-0.295) mm. long, 0.35 (0.35-0.39) mm. wide, width of carapace at level of eyes varying from 0.15 to 0.17 mm. Abdomen with tergal halves

very sclerotic and well separated, strong dotted-reticulate granulations with many granules extending posterior to the edge of the sclerotic plate and appearing as rounded marginal teeth; setae arcuate, relatively fine, and apparently with a single spinule on the outer surface of each; each tergal half of the central portion of abdomen with eight to ten setae, chiefly arranged along the posterior margin. Sternites with half-sternites well separated, less sclerotic than the tergal halves, and with sculpturing that approaches a reticulate pattern; setae varying from acuminate to weakly arcuate, the arcuate setae apparently with a minute spinule; about eight setae along the margin of each sternal half. Abdomen 0.59 (0.59-0.69) mm.

long, 0.56 (0.54-0.60) mm. wide.

Chelicera small; light in color; flagellum of three setae, of which the most distally placed one is bladelike; serrula exterior of ten ligulate plates; subapical lobe of movable finger very small to obsolete; four or five very small denticles appear along the distal portion of the inner margin of the fixed finger; galea well developed, narrowing gently toward the distal end and terminally trifid; chelicera of holotype 0.089 mm. long, movable finger 0.058 mm. in length.

Palpus relatively stout, rich golden color; strongly granulate except the distal half of the chela and the chelal fingers; setae well developed, arcuate, and with a small spinule on the outer surface except that setae are acuminate on the distal half of the chelal hand and on the fingers; measurements given are overall and include the surface granulations. Trochanter with nearly square pedicel well separated from the rest of the podomere; flexor margin of trochanter with a basal-lateral and a medial-subdorsal bulge or protuberance; length of trochanter 0.14 (0.132-0.148) mm., width 0.085 (0.085-0.096) mm., length 1.65 (1.41 to 1.73) times the width. Femur stout, subcylindrical except for the well-developed and nearly square pedicel; flexor margin nearly straight or a very little convex; extensor margin weakly concave in the central half; greatest width just distal to the pedicel; length 0.245 (0.237-0.265) mm., width 0.070 (0.070-0.078) mm., length 3.5 (3.24 to 3.52) times the width. Tibia stout; pedicel nearly square; extensor margin usually evenly and markedly convex, flexor margin decidedly

bulging in the center and a little concave beyond; length 0.202 (0.195-0.213) mm., width 0.089 (0.089-0.097) mm., length 2.27 (2.13 to 2.32) times the width. Chela from the dorsad stout, hand subtriangular, pedicel a little displaced towards the extensor surface, both extensor and flexor margins of hand weakly convex; chela without pedicel 0.331 (0.331-0.358) mm. long, 0.125 (0.121-0.136) mm. wide, length 2.65 (2.54 to 2.78) times the width. From the side, chelal hand fairly robust, oval in general outline; basal margin rounded and with the pedicel near the center of the margin; dorsal margin nearly straight, ventral margin weakly and evenly convex; fixed finger nearly straight and with a sinuation on the outer surface near the finger base; movable finger slightly curved; each finger with usually 12 to 15 marginal teeth along the distal half of the inner finger margin, these teeth retroconical and acute at the distal end of the row but becoming obsolete and flattened near the center of the finger margin; both fingers with venom apparatus; tactile setae as shown in the figures; chelal hand 0.161 (0.159-0.173) mm. long, 0.109 (0.106-0.117) mm. deep; movable finger 0.175 (0.175-0.195) mm. long.

Legs golden yellow; sculpturing ranging from fairly strong granulations in the proximal podomeres to a virtual absence of granulations on the distal podomeres; setae ranging from arcuate with a minute spinule on the femur to acuminate on the flexor surface of the tarsus; no indication of a subdivision of the femora; measurements are for the holotype only. First leg with extensor margin of femur irregular

and weakly convex, flexor margin nearly straight; femur 0.159 mm. long, 0.048 mm. deep; tibia with extensor margin convex in the basal half but nearly straight beyond, flexor margin strongly convex and bulging beyond the pedicel, length 0.113 mm., depth 0.041 mm.; tarsus subtriangular and slender, length 0.128 mm., depth 0.030 mm. Fourth leg with podomeres similar in outline to those of the first leg except that the tibia is less stout and has a much less convex flexor margin; femur 0.218 mm. long, 0.058 mm. deep; tibia 0.156 mm. long, 0.043 mm. deep; tarsus 0.152 mm. long, 0.031 mm. deep.

Genital complex simple; 12 or less acuminate setae in a row along the posterior margin of the posterior operculum (third sternite) and a few setae on the surface of the operculum; cribriform plates somewhat oval (hemispherical in side view) in outline, median one appearing larger than the lateral ones.

Male: In all respects essentially like the female, although the chelicerae have been lost and consequently are not available for study. Only one male, the allotype, known. Body about 0.85 mm. long; carapace 0.27 mm. long, 0.34 mm. wide; abdomen 0.57 mm. long, 0.54 mm. wide. Palpus with trochanter 0.140 mm. long, 0.083 mm. wide; femur 0.237 mm. long, 0.066 mm. wide; tibia 0.195 mm. long, 0.086 mm. wide; chela about 0.335 mm. long, width 0.124 mm.; chelal hand 0.163 mm. long, 0.105 mm. deep; movable chelal finger about 0.17 mm. long. First leg with femur 0.152 mm. long, 0.047 mm. deep; tibia 0.109 mm. long, 0.039 mm. deep; tarsus 0.122 mm.

long, 0.029 mm. deep. Fourth leg with femur 0.21 mm. long, 0.058 mm. deep; tibia 0.155 mm. long, 0.040 mm. deep; tarsus 0.152 mm. long, 0.032 mm. deep. Genital complex with 12 acuminate setae along the posterior edge of the posterior operculum; anterior operculum with 12 very fine setae along the medial portion of the posterior margin and a few longer setae on the face of the operculum.

Tritonymph: Description based on two paratypes; measurements so agree in the two that all measurements are given as the average of the measurements for the two individuals. General appearance like that of the adult except smaller in body size and lighter in color. Body 0.82 mm. long; carapace 0.24 mm. long, 0.30 mm. wide. Chelicera with nine plates in the serrula exterior; galea much as in the female. Palpus much like that of the adult except podomeres with less attenuated outline; no more than a very weak sinuation on fixed finger near base of outer margin; chelal fingers with tactile setae much as in the adult, with seven on the fixed and two on the movable finger; palpal trochanter 0.118 mm. long, 0.078 mm. wide; femur 0.199 mm. long, 0.066 mm. wide; tibia 0.174 mm. long, 0.079 mm. wide; chela 0.309 mm. long, 0.105 mm. wide; chelal hand 0.156 mm. long, about 0.094 mm. deep; movable chelal finger 0.163 mm. in length.

Deutonymph: Description based on one paratype. Body and appendages light in color, much less sclerotic than in the adult; body length 0.57 mm.; carapace 0.21 mm. long, 0.28 mm. wide. Chelicera with eight

plates in the serrula exterior; galea like that described for the adult. Palpal podomeres with granules weaker than in the adult; setae like those of the adult but fewer in number; femur subcylindrical in outline, pedicel wide; pedicel of tibia almost obsolete, flexor margin evenly convex; chelal hand much less triangular than in the adult; fixed finger with three interior and three exterior tactile setae, movable finger with one; palpal trochanter 0.101 mm. long, 0.058 mm. wide; femur 0.167 mm. long, 0.056 mm. wide; tibia 0.136 mm. long, 0.062 mm. wide; chela 0.264 mm. long, 0.085 mm. wide; chelal hand 0.140 mm. long, 0.078 mm. deep; movable finger 0.128 mm. long.

Protonymph: Description based on two protonymphs, with measurements given as the average for the two. Much like the deutonymph except smaller and palpal femur with weakly convex flexor and extensor margins. Body length 0.56 mm. Palpal trochanter 0.084 mm. long, 0.056 mm. wide; femur 0.128 mm. long, 0.048 mm. wide; tibia 0.117 mm. long, 0.057 mm. wide; chela 0.240 mm. long, 0.078 mm. wide; chelal hand 0.113 mm. long, 0.074 mm. deep; movable chelal finger 0.125 mm. long; fixed chelal finger with two exterior and one interior tactile setae; movable finger with one tactile seta.

Type locality: Pinkstaff, Lawrence Co., Ill. The type lot consists of the female holotype, the male allotype, ten female paratypes, two tritonymph paratypes, one deutonymph paratype, and two protonymph paratypes taken by H. Tiffan from a "tree hole" on July 25,

1950. The collection was submitted by Orlando Park of Northwestern University. This is the second instance of a species of *Cheiridium* recorded from North America, the previous record being of *C. insperatum* Hoff and Clawson, 1952, from Utah.

Remarks: *Cheiridium firmum* differs from most other species of the genus in absolute size of palpal podomeres and differs from all other species of the genus in the much smaller length: width ratios of the palpal podomeres. In absolute size, the new species most nearly approaches *C. minor* Chamberlin, 1938, from China, but *C. firmum* may be separated from *C. minor* by the stouter and differently shaped palpal podomeres.

GENUS *Apocheiridium* Chamberlin

Apocheiridium Chamberlin, 1924, Pan-Pac. Ent., vol. 1, p. 34.

Apocheiridium Beier, 1932, Das Tierreich, vol. 58, p. 10.

Members of this genus may be recognized by the following combination of characters: 11 abdominal tergites visible from above, posterior margin of carapace and tergites without posteriorly projecting tooth-like spurs or serrations, the movable finger of the chela with a single tactile seta, granulations squamose-stellate in nature, and investing setae of the palps and body non-clavate. The genus is virtually cosmopolitan, with at least one species in every one of Wallace's regions except the Australian. In the United States, three species have been recorded from the Rocky Mountain and Pacific regions.

Genotype: *Apocheiridium ferumoides* Chamberlin, 1924.

Apocheiridium stannardi, new species

(Figs. 3 and 4)

Female: The description of the female is based on the female holotype and two female paratypes. Measurements given are for the holotype except that in some instances the measurement of the holotype is followed in parentheses by the range for all three females. In general appearance much like the genotype, *A. ferumoides*, as pictured by Chamberlin (1931, fig. 66). Body and legs light yellow in color, anterior portion of carapace darker; palpi light yellowish brown. Body robust; legs and palpi slender in comparison with body; body 1.21 (1.21-1.32) mm. long. Entire animal strongly granulate except the sternites; granulations of carapace stellate in appearance. Setae of tergites acuminate, virtually all others arcuate with a strong submedial spine on the outside margin of each. Carapace with usually 18 to 20 setae along the posterior margin; one pair of eyes; carapace 0.40 (0.40-0.41) mm. long, 0.415 (0.415-0.44) mm. in greatest width across the posterior margin; width of carapace measured at the level of the eyes 0.23 mm. for the holotype. Tergites strongly granulate; tergites 1 to 9 divided; each tergal half of center of abdomen with as many as 15 to 18 setae, most of which form a marginal row but as many as six may be grouped transversely across the lateral end of the tergal half. Sternites with almost smooth surface and with weak indications of division into halves in the central part of the abdomen; central tergal halves with as many as 12 or 13 marginal setae. Abdomen for all specimens

between 0.65 and 0.70 mm. in width.

Chelicera light yellow in color; fixed finger with four or five marginal teeth; subapical lobe of movable finger well developed; flagellum of three setae; serrula exterior apparently composed of nine ligulate plates; movable finger with three nearly terminal and simple galeae (often broken and difficult to observe). Chelicera of holotype 0.089 mm. long, base 0.050 mm. wide, movable finger 0.066 mm. long.

Palp relatively slender, investing setae strongly arcuate, each with a submedial spine on the outside surface; surface of podomeres except the distal portion of the chelal hand and fingers very granulate, the granules nodular and extending well above the surface of the podomeres. Measurements of the palpal podomeres are overall measurements and include the granules. Trochanter with pedicel well separated from the rest of the podomere; flexor margin evenly convex, extensor margin with a central protuberance; length of trochanter 0.159 (0.159-0.175) mm., width 0.098 (0.098-0.106) mm., length about 1.65 times the width. Femur subcylindrical but widened and bulging on the extensor margin just distal to the well-separated pedicel; both extensor margin and flexor margin a little concave; pedicel about as wide as long; length of femur 0.311 (0.311-0.331) mm., width greatest just distal to the pedicel and equal to 0.077 (0.077-0.082) mm., length 4.05 (4.0 to 4.05) times the width. Tibia with central portion of the extensor margin weakly concave but weakly convex near each end; flexor margin in general moderately convex; length 0.260 (0.260-

0.272) mm., width 0.082 (0.082-0.089) mm., length 3.17 (2.95 to 3.17) times the width. Chela proximally stout, hand much narrowed towards the finger bases; flexor margin of hand basally rounded, extensor margin gently convex, basal margin somewhat rounded and merging gently with the flexor and extensor margins; fingers slender and gently curved; chela without pedicel 0.393 (0.393-0.420) mm. long; 0.122 (0.122-0.130) mm. wide, length 3.22 (3.1 to 3.35) times the width. From the side, chelal hand fairly stout, fingers slender and nearly straight; chelal hand with ventral margin gently convex, dorsal margin often a little more convex and somewhat swollen in the proximal half, basal margin rounded with pedicel displaced slightly towards the ventral side; hand without pedicel 0.178 (0.178-0.191) mm. long, 0.097 (0.097-0.105) mm. deep; movable finger 0.217 (0.217-0.233) mm. long. Both fixed and movable fingers with as many as 12 retroconical marginal teeth, these becoming progressively reduced until they are vestigial at a point well proximad to the midpoint of the finger; tactile setae placed as indicated in the figures.

The legs in general appearance and in shape of the podomeres are essentially like the legs of *A. feruroides* as pictured by Chamberlin (1931, figs. 44-H, I). Measurements of the KOH-treated first leg of the holotype include: femur 0.160 mm. long, 0.060 mm. deep; tibia 0.105 mm. long, 0.043 mm. deep; tarsus 0.101 mm. long, 0.031 mm. deep. The fourth leg was not treated with KOH and measurements for the holotype include: trochanter 0.085

mm. long, 0.058 mm. deep; femur 0.214 mm. long, 0.062 mm. deep; tibia 0.147 mm. long, 0.042 mm. deep; tarsus 0.130 mm. long, 0.031 mm. deep.

Genitalia with 12 to 14 marginal setae on the posterior margin of the posterior operculum or third sternite and a few other setae on the surface of the operculum; lateral cribriform plates very long and slender, median cribriform plate much smaller and nearly circular in outline.

Male: Description based on the male allotype. Male very similar to the female, except that at least in our single specimen the body and legs are a darker yellow; body length 1.12 mm.; carapace 0.37 mm. long, 0.41 mm. in greatest width across the posterior margin; abdomen 0.60 mm. in greatest width. Chelicerae lost from the specimen. Palpus as in the female; trochanter 0.171 mm. long, 0.105 mm. wide; femur 0.315 mm. long, 0.082 mm. wide; tibia 0.264 mm. long, 0.090 mm. wide; chela without pedicel 0.412 mm. long, 0.133 mm. wide; chelal hand without pedicel 0.185 mm. long; movable chelal finger 0.232 mm. in length. Legs essentially as in the female. Posterior operculum with 15 marginal setae and with about ten setae in a group just posterior to the genital opening; anterior operculum with two submedially placed setae.

Nymph: Accompanying the adults is a single nymph, probably a protonymph. Since a series of nymphs is not available, it appears advisable to omit description of the nymph at this time.

Type locality: Herod, Ill. The female holotype, the male allotype,

two female paratypes, and one nymphal paratype taken from beneath the bark of an oak tree by Burks and Stannard on April 4, 1948. This is the first record of a species of the genus *Apocheiridium* east of the Rocky Mountain Region in North America. Known only from the type collection.

Remarks: The present species is the tenth described for the genus. Of the five previously described Palearctic species, our new species appears to have considerable affinity with three: *A. ferum* (Simon, 1879) from southern Europe, *A. ferumoides* Chamberlin, 1924, from California, and *A. inexpectum* Chamberlin, 1932, from California. *Apocheiridium stannardi* differs from *A. ferum* (as described by Beier, 1932) by having a stouter chela and by having a movable chelal finger much longer than the length of the chelal hand without the pedicel. In addition, the flexor margin of the tibia in the new species is more conspicuously convex than in the species *A.*

ferum as shown in drawings by Chamberlin (1931, fig. 29-N) and Beier (1932, fig. 7). From *A. ferumoides*, the new species may be separated by the difference in relative position of the external and internal basal setae of the fixed chelal finger, the difference being easily seen when our specimens are compared with the figure of *A. ferumoides* given by Chamberlin (1931, fig. 38-E). Also the palpal podomeres of *A. stannardi* are conspicuously smaller than those of *A. ferumoides*. From *A. inexpectum*, the new species is differentiated by a stouter chela and by having more conspicuous investing granules on the palpal podomeres. The tactile setae of the fixed chelal finger of *A. stannardi* approach in position those of *A. mormon* Chamberlin, 1924, as indicated by a comparison of our specimens with the figure given by Chamberlin (1924, fig. J) but *stannardi* and *mormon* may be separated without difficulty by the much more slender palpus of the latter.

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