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**COPELATUS GLYPHICUS (SAY) AND
SUPHISELLUS BICOLOR (SAY),
WATER BEETLES NEW TO
CALIFORNIA AND PRESUMABLY
INTRODUCED (COLEOPTERA: DYTISCIDAE
AND NOTERIDAE)**

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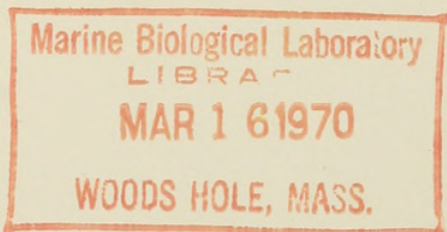
INTRODUCTION

In August, 1963, a living specimen of the small dytiscid *Copelatus glyphicus* (Say) was found in a clear, cold mountain stream at an altitude of 6600 feet in Tuolumne County, California. In October three more were found in a murky pool near sea level in Marin County. These two localities are over a thousand miles west of any published records for the species, and provide very unlike habitats.

In April, 1968, one male was taken in a tributary to Deer Creek, Tulare County, at 4000 feet altitude, and a female in Deer Creek itself some 20 air-line miles away, at 550 feet altitude. In this last spot I collected also a series of the little noterid *Suphisellus bicolor* (Say), type species of the genus, here at least 1200 miles west of its known distribution.

One explanation might be that the two species (and perhaps others not yet found) have been introduced, possibly in aquaria materials. This may be plausible for *S. bicolor* taken in series from one stream, but hardly accounts for *C. glyphicus*, which has been found sparingly in each of four places over a northwest-southeast distance of some 250 miles.

[237]



Family DYTISCIDAE

The species of *Copelatus* of the United States and Canada are small brownish dytiscid beetles, often flattened, which have regular, clearly impressed longitudinal discal striae (not series of punctures) on the elytra, in both sexes (fig. 1). In 1956 I recorded *C. chevrolati renovatus* Guignot from Imperial County, California, and listed *C. impressicollis* Sharp as a possible California species.

Since then F. N. Young has published a revisional study of the Nearctic species in which he tentatively placed *C. impressicollis* as a synonym of *C. distinctus* Aubé, remarking of the latter "I believe that it will eventually prove to form an *Artenkreis* of isolated species." It seems not to have been taken in the United States from much west of a line drawn from Flagstaff to Nogales in south central Arizona, and should be dropped from the California list. On the other hand an unlikely second species, *C. glyphicus* (Say), has been taken here four times in recent years, a thousand miles west of its nearest recorded locality.

KEY TO THE CALIFORNIA SPECIES OF *Copelatus*

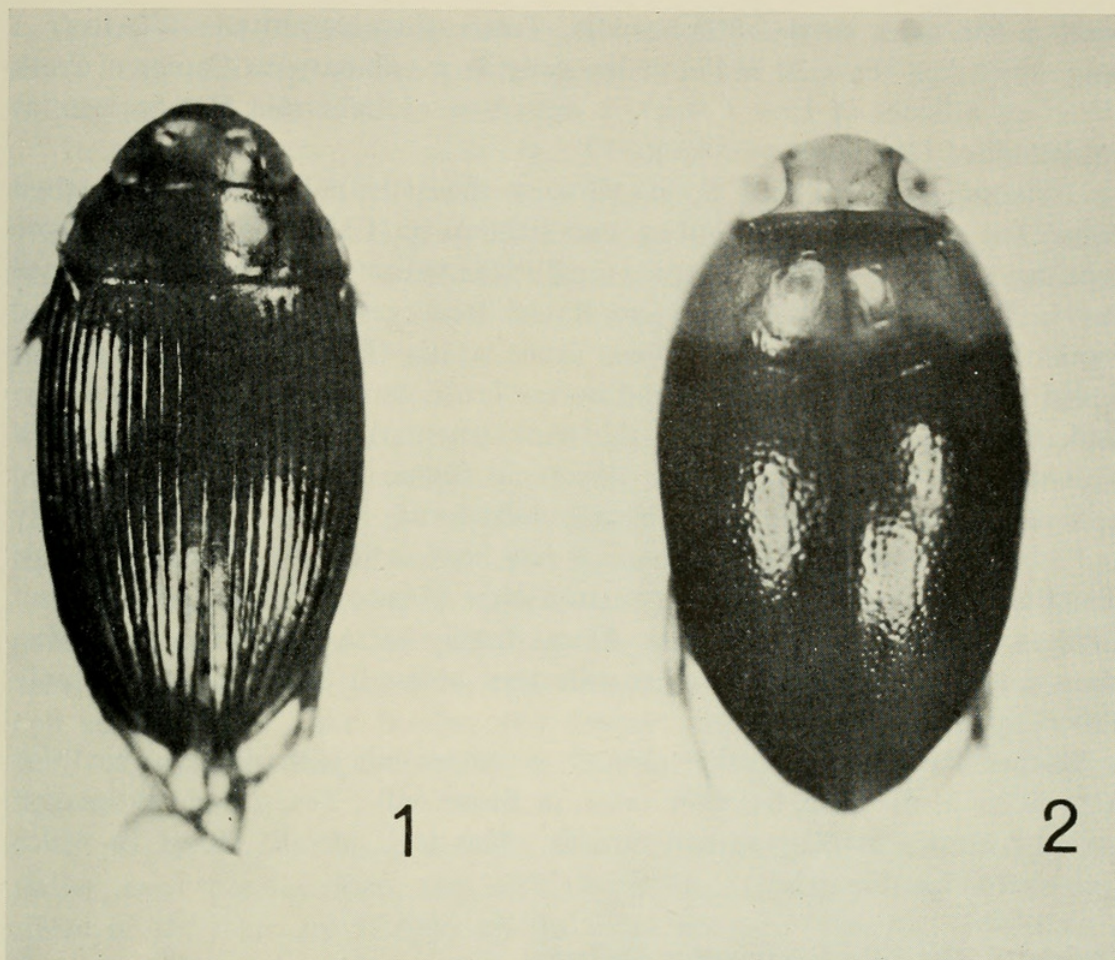
1. Each elytron with 10 discal striae, and a submarginal stria in posterior half (fig. 1). Prosternal process slightly evenly inflated, not keeled. Inner margin of front tibia of male narrowed and weakly notched in basal third (fig. 3), that of female slightly sinuate in same region. Smaller, flattened species, 4.0 to 4.75 mm. long *C. glyphicus* (Say), 1823.
- Each elytron with 8 discal striae, and a submarginal in posterior half. Prosternal process strongly but not sharply keeled. Inner margin of front tibia of male straight (fig. 5), as in female. Larger, more convex species, 5.25–6.50 mm. long *C. chevrolati renovatus* Guignot, 1952.

***Copelatus glyphicus* (Say).**

Colymbetes glyphicus SAY, 1823, Trans. Amer. Philos. Soc., new ser., vol. 2, no. 1, p. 99. Say in LeConte, 1859 [Complete writings of Thomas Say], vol. 2, p. 512.

Copelatus glyphicus Say, SHARP, 1882, Sci. Trans. Royal Dublin Soc., (2) vol. 2, p. 589. SCHAEFFER, 1908, Jour. New York Ent. Soc., vol. 16, no. 1, p. 17. BLATCHLEY, 1910, Coleoptera . . . Indiana, p. 223. YOUNG, 1954, Univ. Florida Studies, Biol. Sci. Ser., vol. 5, no. 1, p. 106. YOUNG, 1963, Quarterly Jour. Florida Acad. Sci. vol. 26, no. 1, p. 60 (key), 62 (text).

This common eastern species has not been reported from further west than eastern New Mexico (Sublette and Sublette, 1967, p. 369). Knowing its general distribution, I simply couldn't believe my eyes when I took my first example in northern California. A female was collected in a little stream a hundred yards from its confluence with Niagara Creek, at an altitude of 6600 feet on the western slope of the Sierra Nevada. This was at the Niagara Creek Forest Campground adjacent to Highway 108 in Tuolumne County, on 11 August 1963. On 21 September my wife and I returned to the same spot, but



FIGURES 1-2. Aquatic beetles new to California. FIGURE 1. *Copelatus glyphicus* (Say) from Deer Creek at the Porterville - Fountain Springs road, Tulare County, California. $\times 16.5$. FIGURE 2. *Suphisellus bicolor* (Say), same data. $\times 26.5$. Photographs by David G. Kissinger.

failed to get any more. We did vow never again to go into the mountains on the first day of deer shooting season, for our collecting site had become the campground for a swarm of hunters. With their teen-age progeny many were busy "sighting in" their guns, and it was no place for entomologists to be stooped over at the edge of a stream.

On 6 October 1963, I found two males and a female of *C. glyphicus* in a pool filled with dead grass in a ditch just to the south side of the old railroad grade which went under Highway 101 at Forbes Overhead, San Rafael, Marin County, only 8 feet above sea level. This marshy area, tributary to Gallinas Creek, has since been "improved" with rock fill.

The third and fourth localities are some 250 airline miles southeast of San Francisco, at the eastern edge of the San Joaquin Valley. One female was collected on 9 April 1968, in Deer Creek at the Porterville-Fountain Springs

road, a few miles south of Porterville, Tulare County, altitude 550 feet; a male was taken some 20 airline miles away in a tributary to Capinero Creek (itself an affluent of Deer Creek), 2 miles east of California Hot Springs, at an altitude of 4000 feet, on 10 April.

It is surprising to find *C. glyphicus* a thousand miles west of its cited range, but the known distribution and habitats in California are even more puzzling. Niagara Creek is a rapid, small, clear stream in a boulder and gravel bed in the forested sierra; the San Rafael locality was a pool full of dead organic matter near sea level; Deer Creek at the Fountain Springs road is turbid with silt, shallow, and spread over a broad sandy bed in open meadowland, with a good current along the bank where the beetle was found; its seasonal affluent at 4000 feet is a tiny rapid stream over a sand and silt bed in a gully. If the species was originally introduced, it has spread remarkably and is surely here to stay. Perhaps it has been actively spreading westward recently, and is still so scarce in western New Mexico, Arizona, and adjacent areas as to have escaped collectors. It can hardly be so widespread in California and yet be unreported by other collectors, unless it has been here for only a short time.

Another little species, smaller than *C. glyphicus* but with similarly modified front tibiae in the male, has been taken in Brownsville, Texas, and on the west coast of Mexico in Nayarit and Sinaloa. This is *C. debilis* Sharp, in which each elytron has five striae.

***Copelatus chevrolati renovatus* Guignot.**

Copelatus chevrolati var. *australis* SCHAEFFER, 1908, Jour. New York Ent. Soc., vol. 16, no. 1, p. 17 (not *C. australis* (Clark), 1863, p. 14). LEECH, 1948, Proc. Calif. Acad. Sci., 4th ser., vol. 24, no. 11, p. 406.

Copelatus chevrolati ssp. *schaefferi* GUIGNOT, 1952, Rev. franç. Ent., vol. 19, no. 1, p. 23 (not *C. schaefferi* Young, 1942, p. 92.)

Copelatus chevrolati ssp. *renovatus* GUIGNOT, 1952, Rev. franç. Ent., vol. 19, no. 3, p. 170.

Copelatus chevrolati renovatus Guignot, LEECH, 1956, in Usinger, Aquatic insects of Calif. . . . , p. 321. YOUNG, 1963, Quarterly Jour. Florida Acad. Sci., vol. 26, no. 1, p. 74.

Young gives the distribution of the typical subspecies as the Atlantic and Gulf coastal plain area and the Bahamas. He mentions having seen specimens of *C. chevrolati renovatus* from "Arizona, Arkansas, California, Kansas, Louisiana, New Mexico, Oklahoma, Texas, Sonora, Baja California, Sinaloa, Tamaulipas, and Nuevo Leon."

As *C. chevrolatii*, *C. chevrolati*, or var. *australis*, *C. chevrolati renovatus* has been recorded from California but never with actual localities, by Crotch, 1873, p. 413; Sharp, 1882, p. 584; Woodworth, 1913, p. 184; Sherman (*in* Leng), 1920, p. 80; and Leech, 1948, p. 406.

There are 64 California specimens at hand, all but one from the extreme south in the drainage or flood plain of the Colorado River. The following localities are given from south to north.

IMPERIAL COUNTY: Calexico, 24. VIII. 1937 (light trap); El Centro, 4.XII.1927 (F. E. Blaisdell), and some dated only 1937; Holtville, 15.VI.1934 (E. C. Van Dyke), 15.VII.1934 (M. Cazier), VI.1936 (E. S. Ross), 7.V.1940 (R. P. Allen), 23.VII.1946 (E. C. Van Dyke), 5.IV.1949 (P. D. Hurd. Collected at light); Meloland, 25.VII.1949 (Ray F. Smith); Imperial, 3.IV.1924; Imperial Valley, 28.V.1925 and .V.1926; Brawley, 23.X.1936 (A. T. McClay), 18.III.1939 and 9.V.1940 (R. P. Allen); Calipatria 1.VI.1959 (at argon light). RIVERSIDE COUNTY: Coachella, 24.V.1928 (E. C. Van Dyke); Coachella Valley, 25.V.1928 (E. C. Van Dyke); Indio, 24.IV.1952 (O. Bryant), IV.1952 (N. Lewis). TULARE COUNTY: Deer Creek at Porterville—Fountain Springs Road, 9.IV.1968 (H. B. Leech). Also one example labeled only "S. Cal."

The Deer Creek locality is more than 200 miles northwest of the others, north of the Tehachapi Mountains, and in the "landlocked" Tulare drainage basin. But in the spring of 1969, as occasionally in other years of excessive rain and snow, Tulare Lake flooded and drained northward. Some people went from there to San Francisco by boat, via the San Joaquin River in mid-June (Zane, 1969, p. 5).

Copelatus distinctus is of the same size as *C. chevrolati renovatus* but darker, flatter, more parallel-sided, and each elytron has 10 discal striae. The front tibiae of the male are straight on the inner margin. *Copelatus distinctus* is known as far northwest as central southern Arizona, as mentioned at the beginning of this paper.

Family NOTERIDAE

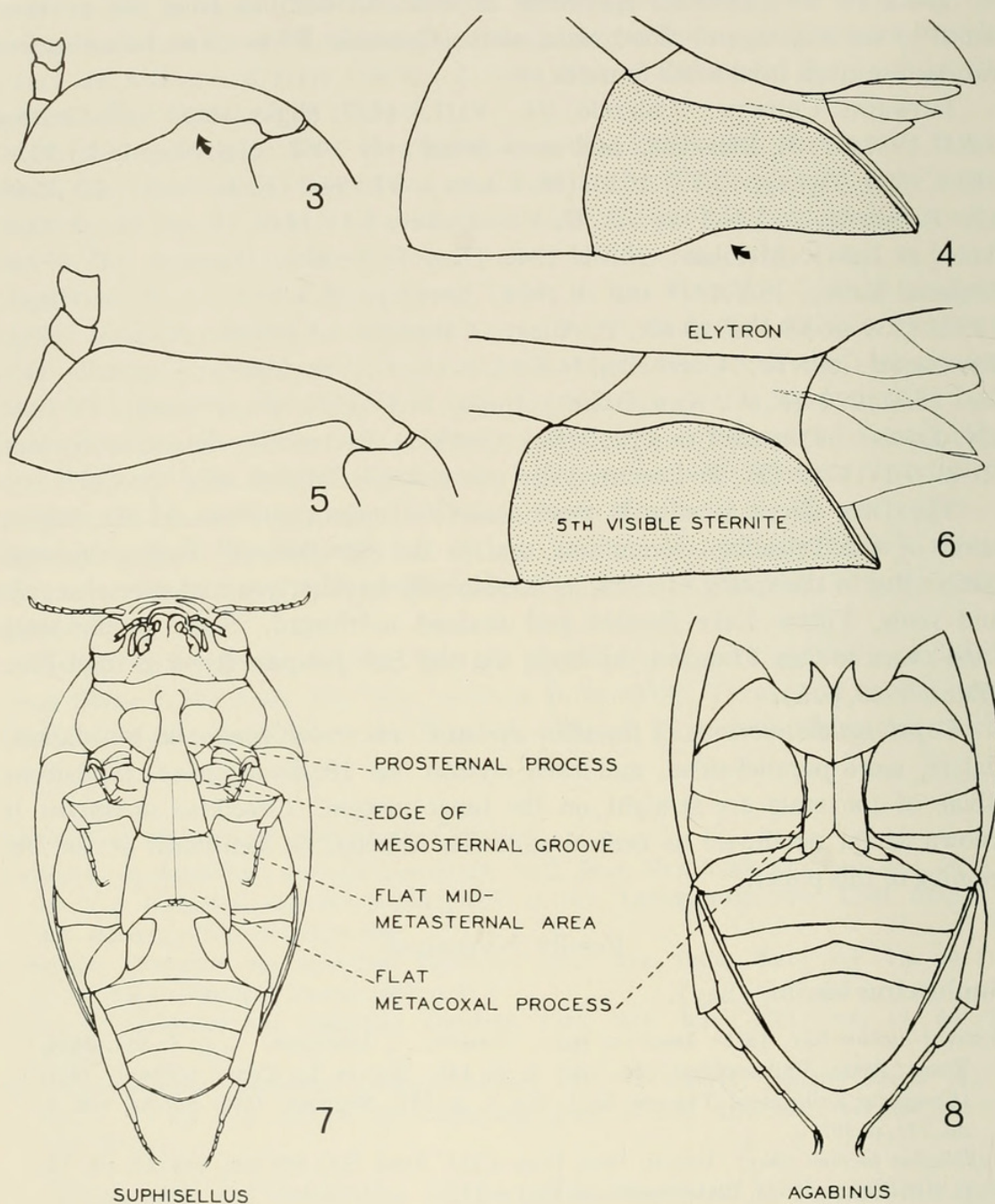
Suphisellus bicolor (Say).

Noterus bicolor SAY, 1831¹, Descr. n. spp. . . insects. . ., Louisiana. . ., p. 5. SAY, 1834, Trans. Amer. Philosophical Soc., vol. 4, p. 446. SAY in Le Conte (editor), 1859, [Complete writings of Thomas Say], vol. 2, p. 561. SCUDDER, 1899, Psyche, vol. 8, no. 273, p. 307.

Suphisellus bicolor (Say), LEECH, 1948, Proc. Calif. Acad. Sci., 4th ser., vol. 24, no. 11, p. 403. YOUNG, 1954, Water beetles of Fla., p. 131.

In 1948 I designated *Noterus bicolor* Say, 1831, p. 5, as the type of *Suphisellus* Crotch, 1873, p. 397, so a present-day identification of the species is of some interest. Zimmermann had overlooked Crotch's obscure proposal

¹ This March, 1831, paper by Say, published at New Harmony, Indiana, is not included in LeConte's 2-volume edition of Say's writings; see terminal bibliography for further comment. There is a copy of Say's 1831 paper in the library of the U. S. Department of Agriculture, Washington, D.C.; I have a photographic copy of the title page and pages 5 to 7 before me. The description in Say's 1834 paper is usually cited as the original; it is word for word the same, but differs in 9 instances of punctuation, and it has the added line, "For this species I am indebted to Mr. Barabino," which was of course covered by the title of the 1831 paper.



FIGURES 3-8. Structures of *Copelatus*, *Suphisellus*, and *Agabinus* species. FIGURE 3. Front tibia of male of *Copelatus glyphicus*, spines and setae omitted, with arrow pointing to notch. FIGURE 4. Lateral view of apparent 5th abdominal sternite of male of *Suphisellus gibbulus* (Aubé) (stippled), with arrow indicating the position of a transverse impression. FIGURE 5. Front tibia of male of *Copelatus chevrolati renovatus*. FIGURE 6. Lateral view of apparent 5th abdominal sternite of male of *Suphisellus bicolor*, showing the non-impressed median line (though the sides may have impressions). FIGURE 7. Ventral view of *Suphisellus bicolor* to show the conjoined median metasternal area and hind coxal plates; spines and setae omitted. FIGURE 8. Part of undersurface of *Agabinus glabrellus* to show the plate-like hind coxal processes; spines and setae omitted.

of the generic name, and in 1921, p. 187 coined the same name for what is in fact the same generic concept. Though he was at the time writing about and specifically named only South American species, he stated that his new generic name applied to all American (in the broad sense) species which he had formerly listed in *Canthydrus* in Junk's *Coleopterorum Catalogus* (1920), (except for *C. buqueti* (Laporte) and the two species *C. octoguttatus* and *C. uniformis* he was about to describe, all from South America and all three true species of the otherwise Old-World genus *Canthydrus*). Since he did not actually list *S. bicolor* by name when proposing his generic name *Suphisellus*, his name and Crotch's are objectively different taxa, and *Suphisellus* Zimmermann, 1921, is a junior homonym, as well as a junior synonym, of *Suphisellus* Crotch, 1873. Guignot (1946, p. 116) designated *S. varicollis* Zimmermann, 1921, as the type species of *Suphisellus* Zimmermann.

Say described *S. bicolor* as from "Louisiana," collected by Joseph Barabino, a resident of New Orleans who was Say's agent there for shipments received (Weiss and Ziegler, 1931, p. 176; according to the same authors, p. 110, Say also had collected in Louisiana; see their map on p. 189, taken from Barber, 1928, p. 16. Barber, p. 19, presumed a landing at New Orleans for Say). It seems reasonable to designate New Orleans as the restricted type locality for *S. bicolor*, and I hereby do so.

Of the various references to this species in our literature (usually as *Suphis* or *Canthydrus bicolor*), probably most do not apply to the true *S. bicolor* at all. Their cited distributions alone will disqualify those of Crotch, 1873, p. 397; Sharp, 1882, p. 271; Blatchley, 1910, p. 208. The taxonomy of the Nearctic species of *Suphisellus* is difficult and in need of further study. Young (1954, p. 131) did not recognize *S. bicolor* amongst more than 2700 specimens of the genus from Florida. He remarked that *S. gibbulus* (Aubé) is closely allied and possibly only a geographic variant or race, but also said that his concept of *S. gibbulus* might include several forms and perhaps species. I have not seen *S. bicolor* from further east than Mobile, Alabama; it is interesting that Young gives Mobile County, Alabama, for his furthest west example of *S. gibbulus*, and Löding (1945, p. 27) lists both for the county. It appears that adequate collections from southern Alabama should clarify the status of *S. gibbulus* Aubé, though in a recent letter F. N. Young mentions having taken both fairly typical *S. bicolor* and the unicolorous *S. gibbulus*-like form in southern Indiana and in Illinois.

Following are the locality records for the 34 examples of *S. bicolor* at hand. LOUISIANA: New Orleans, 4 collected by Bock², but without date, and 3 taken

² The collector, "Bock," was presumably Dr. George W. Bock of St. Louis, Missouri. In a short obituary notice E. P. Meiners wrote, "He was at one time a very enthusiastic beetle collector and carried on a rather extensive correspondence with many of the older collectors." See *Entomological News*, vol. 52, no. 4, p. 119, issue for April, 1941.

in May but without a collector's name, all from the A. Fenyes collection; 2, Port Sulphur, 4 April 1944, D. E. Beck coll. no. 301 (H. P. Chandler collection). ALABAMA: 2, Carrie's Lake, Mobile, 17 September, 1945, Mike Wright collector (H. B. Leech collection). ARKANSAS: 1, Hope, 28 June 1932, Louise Knobel collector (H. B. Leech collection). TEXAS: 8, Fish Lake, Brazos County, 9 December 1964, and several dates in March and April, 1965, F. S. Conte collector. CALIFORNIA: 5, Deer Creek at Porterville-Fountain Springs Road a few miles south of Porterville, Tulare County, 9 April 1968, H. B. Leech collector; 9, same data, 12 April. Through the kindness of Mr. Conte I have also seen an additional large series from his Fish Lake locality.

All specimens are conspecific with those from New Orleans, and represent the only Nearctic species known to me which agrees with Say's description of *S. bicolor*. The yellow to reddish yellow head and pronotum, the rich black elytra with contrasting brownish yellow apices, faintly aeneous surface reflections and relatively coarse punctation, define it well (fig. 2). The eyes may be all black, as described by Say, or partially or completely white, depending on methods of preservation. The pronotum is usually more reddish than the head, and may be tinged with piceous discally at the front and back margins; the elytra may be narrowly reddish at and behind the humeral angles; the under-surface varies in color, the raised plate-like metasternal keel and adjoining laminate inner processes of the hind coxae being darkest. Only one specimen, that from Hope, Arkansas, has the elytra appreciably reddish near the suture.

These color characters readily separate *S. bicolor* from even the darkest examples of *S. gibbulus* I have seen. In addition there is a structural difference commented on by Young: in *S. gibbulus* the last abdominal sternite is shallowly but distinctly transversely impressed at or just before the middle (fig. 4); in *S. bicolor* the sternite may or may not be impressed on each side of the median line, but the median area is on a plane from front to back, not impressed (fig. 6).

Suphisellus bicolor and species of the genus *Hydrocanthus* may be easily separated from all other aquatic beetles known from California. In these two genera the prosternal process and the median area of the meso- and metasternum form a continuous raised flat plate, triangular in shape (fig. 7). In *Suphisellus* the apex of the prosternal process is at least twice as wide as its width between the front coxae, but not broader than long; in *Hydrocanthus*³ it is at least two and one-half to three times its width between the coxae, and broader than long.

³ As mentioned in *Aquatic Insects of California*, p. 326, Zimmermann in 1928 cited "Californien" for one of his specimens of *Hydrocanthus similator* Zimmermann, but no other California examples of the genus are known and its occurrence here is in doubt. The species resemble those of *Suphisellus* but are larger, over 4.0 mm. as against usually less than 3.0 mm. for the latter. In addition there are complete lateral marginal lines on the pronotum in *Hydrocanthus*, while they occur only in the basal half in *Suphisellus*.

The only genus in the western United States having a structure with any resemblance to this is the dytiscid *Agabinus*; it contains two black species, 6 to 8 mm. in length but here only the metacoxal processes are differentiated and flattened (fig. 8).

ADDENDUM

After the above was set in type, Mr. Joe Schuh of Klamath Falls, Oregon, happened to mention that he had a specimen of *Suphisellus* from Porterville, California. It agrees exactly with the preceding description and figure of *S. bicolor* and is labelled "Porterville, Calif., Tulare County, April 16, 1961. Ed Ball, coll." So the species has been resident in that area for some years, but how it reached there remains unexplained.

ACKNOWLEDGMENTS

F. N. Young was so kind as to verify the identification of two California specimens of *Copelatus glyphicus*; F. S. Conte allowed me to cite a Texas locality where he took *Suphisellus bicolor* in numbers; W. I. Follett was consulted on a point of synonymy; J. A. Powell and N. Bell loaned specimens from the California Insect Survey collection, Berkeley; and B. A. Waldron, District Ranger of the Forest Service, gave local information on the California Hot Springs area; their help is much appreciated.

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