with lower tooth shorter than upper; flagellum without fringe of hair beneath; supraorbital foveae distinct (Fig. 1); mesopleural venter sparsely haired; foretarsomere I with two short bristles before apex; mid- and hindtibiae spinose; pygidium narrow apically but sides widening more rapidly than in *chontale*, distal one-half nearly flat (Fig. 2).

Holotype male (U. C. Davis) PATAGONIA, SANTA CRUZ COUNTY, ARIZONA, 30 August 1954 (R. M. Bohart). Paratype female (California Academy of Sciences), Continental, Pima Co., Arizona, 12 August 1957 (G. D. Butler).

This species is distinguished from *chontale* most readily by the conspicuously hairy eyes, dull and fine sculpture, non-ridged upper frons (compare Figs. 1 and 5), narrower supraorbital foveae in the female (Figs. 1 and 5), densely hairy pronotal lobes, and simple male tergite VII (medially concave in *chontale*).

LITERATURE CITED

PATE, V. S. L. 1948. A review of the genus *Moniaecera*. Trans. Amer. Entomol. Soc., 74: 41–60.

A New Brumal *Empis* from the San Francisco Bay Area, California

(Diptera : Empididae)

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The earliest brumal (winter-occuring) *Empis* species, which is currently known from six localities of the San Francisco Bay area, has not been described. It is not a rare species as our sample of over three hundred and fifty specimens indicates. It has apparently seldom been collected by others because of the general lack of collecting during our winter months—its time of flight. It was first discovered at Jasper Ridge in southern San Mateo County by insect net sweeping in 1948. Subsequently it has been collected at Redwood City (insect net collecting in 1951) and in Marin County at Novato (insect net collecting in 1952; flight trap collections in 1963), Alpine Dam (insect net collecting in 1957), Inverness (flight trap collections in 1964) and Mill Valley (insect net collecting in 1966).

[1] The prints of photographs used in figures 1, 2, and 3 were prepared by Mr. Maurice Giles of the California Academy of Sciences, from negatives taken by Arnaud. We would also like to thank Mr. and Mrs. Frank Myer for permission to operate insect flight traps on their property at Inverness, California.

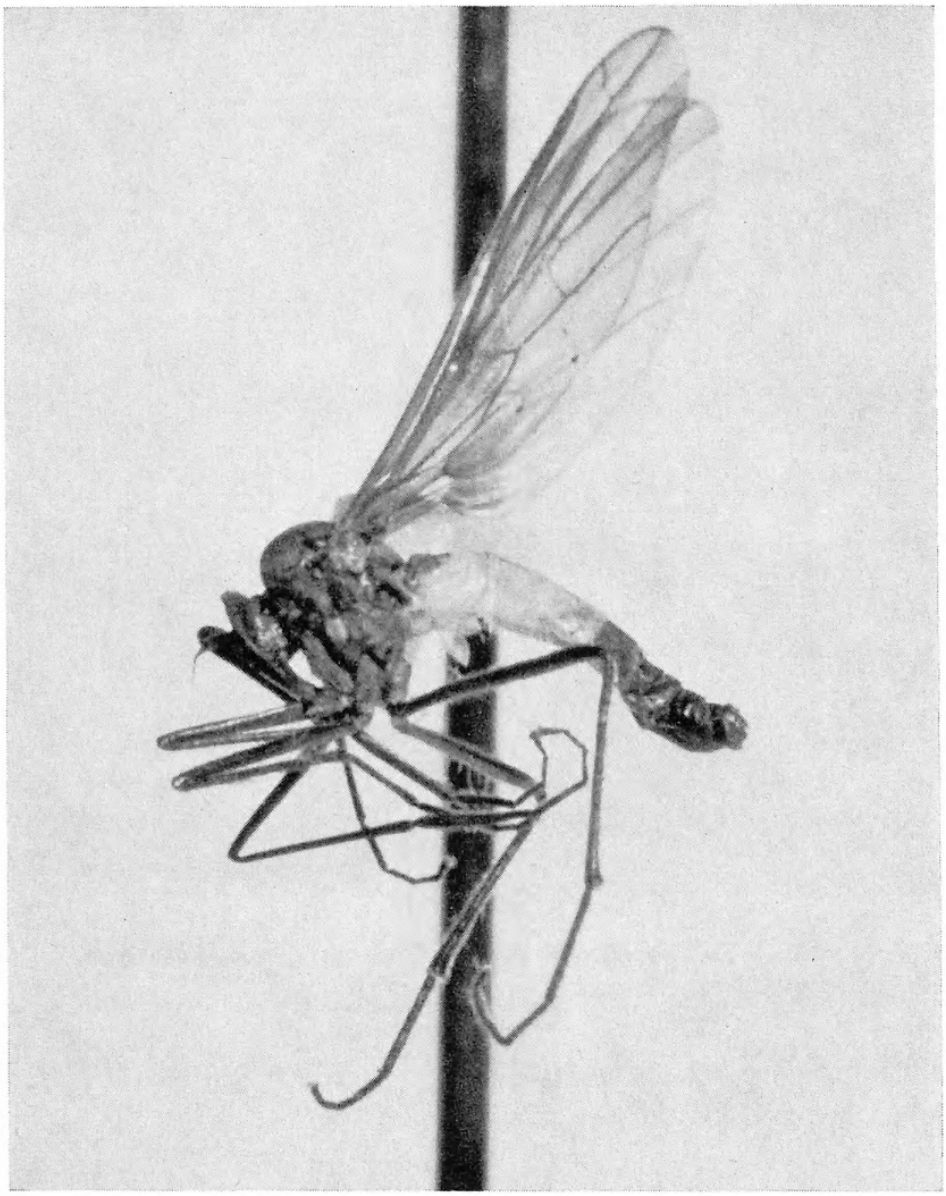
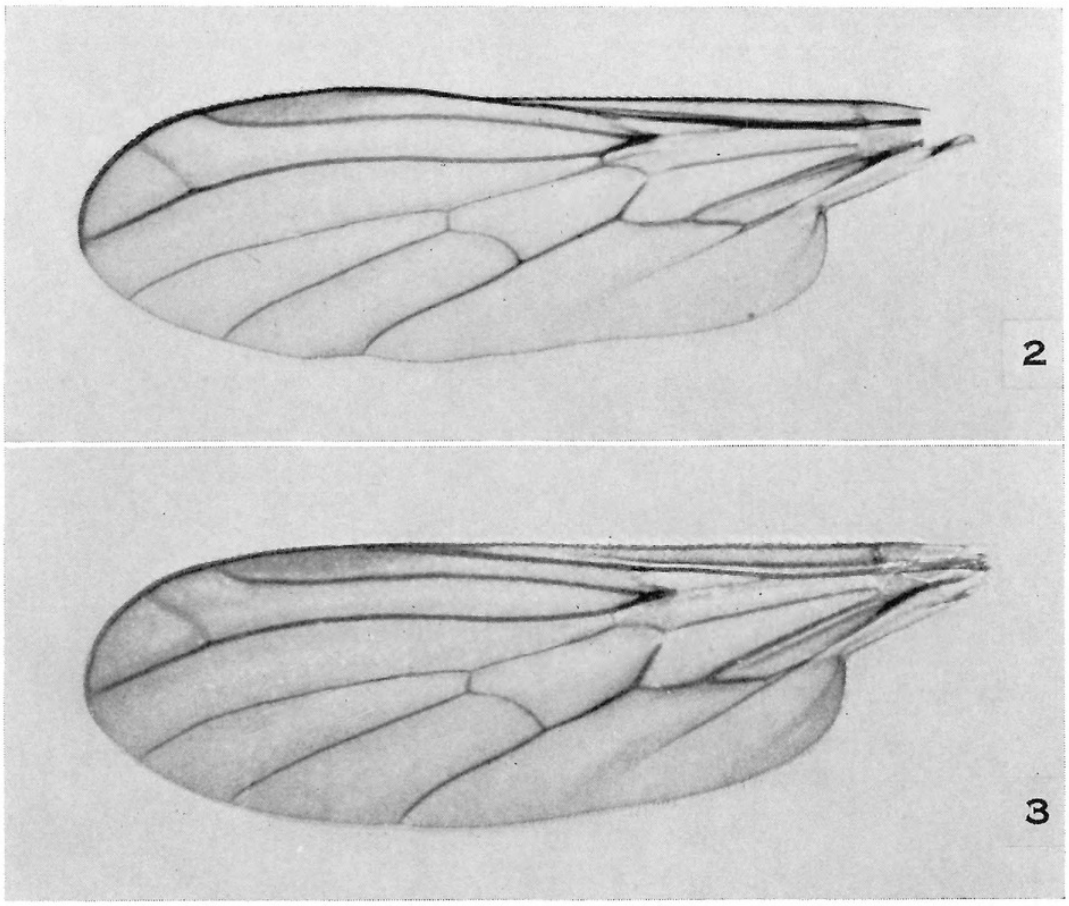


Fig. 1. *Empis melanderi*, new species, left lateral view, male (paratype).

This new species interestingly displays dimorphism in abdominal coloration. This feature distinguishes it from all other Nearctic species. The male has a bicolored abdomen, a contrasting white and black (in life), while the female has a unicolored black abdomen. Dr. A. L. Melander, who first distinguished this *Empis* as new, determined the males as *Empis* n. sp. and the females as *Acallomyia* n. sp. (a subgenus of *Empis*). Because of the need for a new subgeneric classification of *Empis* and allied genera, and the difficulty of assignment of this new species to an existing subgenus, this assignment is not attempted at this time. It is our pleasure to dedicate this new *Empis* to the late Dr. Axel Leonard Melander (1878–1962), a pioneer worker on the



Figs. 2, 3. *Empis melanderi*, new species, left wings, dorsal surfaces. 2. Male (paratype). 3. Female (allotype).

world Empididae, and whose friendship the first author (PHA) was privileged to have shared.

Empis melanderi Arnaud and Birchim, new species

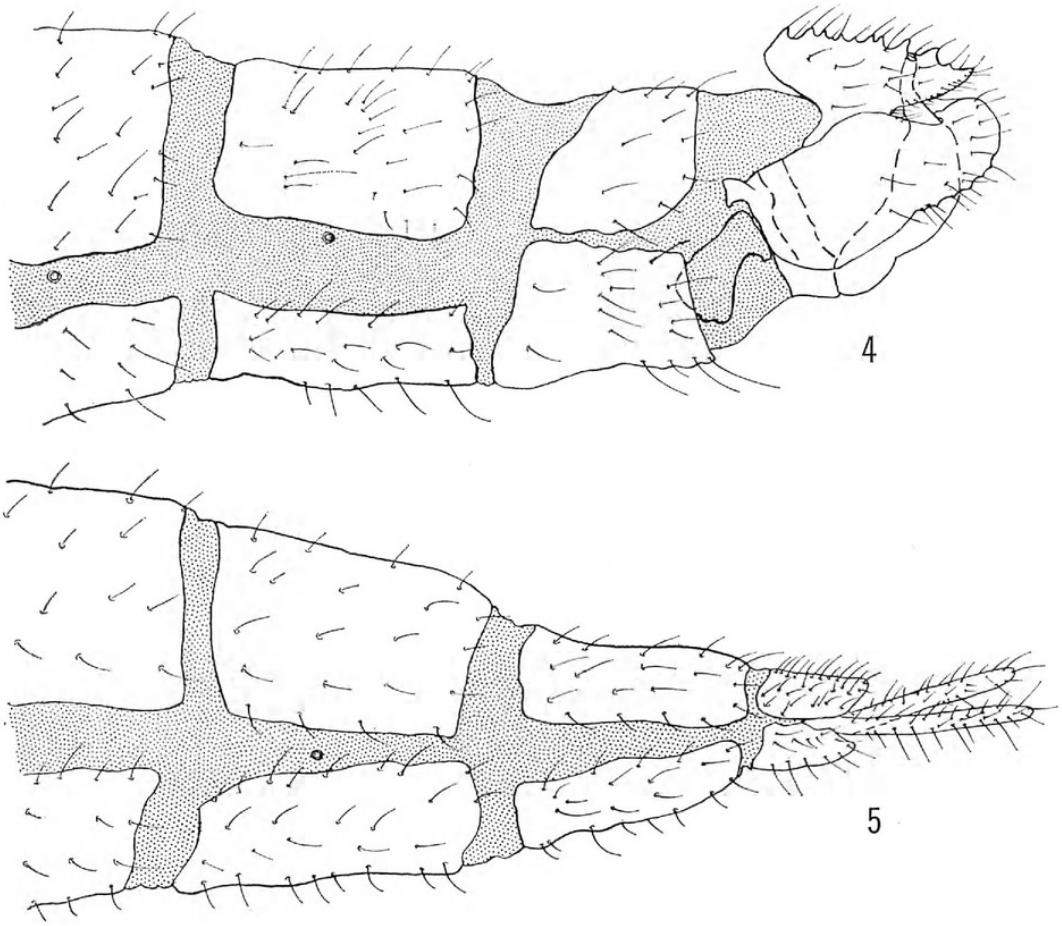
(Figs. 1–5)

DIAGNOSIS.—Elongate, moderately small (under 5 mm), blackish species; thorax with yellowish-brown pollinosity; halteres pale colored in male, partly infumated in female; legs slender and elongate; dimorphic in abdominal coloration with female abdomen black, male abdomen bicolored with portions above of second, third, and fourth mostly pale yellowish white (white when alive).

Holotype male.—Deposited in the California Academy of Sciences, San Francisco; Entomology Type No. 9166.

TYPE DATA.—CALIFORNIA: MARIN COUNTY, INVERNESS, 14–29 December 1963, (P. H. Arnaud, Jr.) collected in flight trap.

DESCRIPTION OF TYPE.—Length 3.5 mm, wing length 3.5 mm. *Head* black, lightly pollinose behind, with elongate black bristles; eyes large, elongate, occupying most of head, separated below antennal bases by slightly over width of one



Figs. 4, 5. *Empis melanderi*, new species, terminal segments of abdomens and genitalia, left lateral views (cleared in KOH). 4. Male (paratype). 5. Female (paratype). Drawings by J. D. Birchim.

facet, above antennal bases widening to large ocellar triangle. Mouth parts brownish-black, about one-fifth shorter than head height; palpi brownish-black, haired, about two-thirds length of mouth parts. Antennae black, elongate; first segment about twice length of second, latter broader; third segment narrow, not wider than second segment, about twice lengh of basal segment, finely pale haired; style about length of basal segment. *Thorax* black, yellowish-brown pollinose, with faint pair of black vittae on middle third, fusing into broad anterior vitta, scutum flattened. Acrosticals absent; 5 dorsocentrals, elongate; 2 humerals, posterior strong; 3 notopleurals, anterior weak; 2 scutellars. *Wing* length 3.5 mm, width 1 mm; venation as illustrated (Fig. 2, paratype); membrane light brownish; veins dark brown; first radial cell darker apically. Squamae off-white. Halteres pale colored. *Legs* black, elongate, mostly black haired; front and middle legs with elongate pale hairs; hind leg with first tarsal segment slightly more than half length of tibia. *Abdomen* bicolored, base above and apical segments black, portions above of second, third, and fourth segments mostly pale yellowish-white, with venter infumated; mostly pale haired, but dark hairs predominating apically. *Hypopygium* (Fig. 4, paratype) simple, black, small; upper lamellae with upper edge dentate and haired; side lamellae curved inwardly apically; penis stout and short.

Allotype female.—Deposited in the California Academy of Sciences, San Francisco; Entomology Type No. 9166.

ALLOTYPE DATA.—Same collection data as holotype.

DESCRIPTION OF ALLOTYPE.—Length 4 mm, similar to holotype, but with sexual dimorphism, in part as follows: abdomen wholly black, wing (Fig. 3) 3.9 mm in length, 1.25 mm in width, with venation as illustrated; knobs of halteres infumated, abdomen (Fig. 5, paratype) with cerci elongate.

PARATYPES.—363 specimens: 216 males and 147 females, from the following California localities: Marin County: Alpine Dam, 7 December 1957 (D. C. Rentz), two males; Inverness, 14–29 December 1963 (P. H. Arnaud, Jr.), collected in insect flight trap, one-hundred and sixteen males and seventy-two females; Mill Valley, 13 February 1966 (P. H. Arnaud, Jr.), collected by insect net sweeping along intermittent brook, four males and nine females; Novato, 12–13 January 1963, twenty-nine males and ten females, 14–16 January 1963, twenty-eight males and thirty-two females, 17–20 January 1963, thirty-three males and thirteen females, all collected in insect flight traps (E. L. Kessel and P. H. Arnaud, Jr.); Novato, Umdhlelannyoni, 7 December 1952 (E. L. Kessel), one male. San Mateo County: Jasper Ridge, 18 January 1948 (P. H. Arnaud, Jr.), nine females; Redwood City (area now known as Stulsaft Park), 13 December 1951, one male and one female, 26 December 1951, two males and one female (P. H. Arnaud, Jr.). Paratypes deposited in collection of the California Academy of Sciences and collections of the authors. Paratypes are to be widely distributed to American entomological collections.

The paratypes vary in size, with some female specimens having wing lengths attaining 4.5 mm, with corresponding body size. One female from Novato collected 12–13 January 1963 has the fork of the third vein incompletely developed; only the basal half of the upper branch is developed.

DISCUSSION: The dimorphism in abdominal coloration provokes the following question. Could the white abdominal coloration found in the male serve as a species recognition symbol and mating stimulus for the female as does the balloon without prey in the final stage (Kessel, 1955) of the evolutionary sequence of the balloon making flies, which also belong to the family Empididae?

LITERATURE CITED

KESSEL, E. L. 1955. The mating activities of balloon flies. Syst. Zool., 4 (3): 97–104, figs. 1–3.