

**CORRECTIONS IN THE TAXONOMY AND NOMENCLATURE
OF MOSQUITOES
(DIPTERA, CULICIDAE)**

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Recent work on the mosquitoes of the world, particularly in connection with a forthcoming synoptic catalogue of the Culicidae, has revealed the need for certain corrections, and I make them at this time so that they can be incorporated in the catalogue. Much of the information on which this paper is based was obtained during a visit to the British Museum (Natural History), and I am indebted to the authorities of that institution, particularly to P. F. Mattingly, for the many courtesies extended during that visit.

THE FAMILY CULICIDAE

For many years this family included three subfamilies, the Dixinae, Chaoborinae, and Culicinae, but recently there has been a strong tendency to raise the Dixinae to family rank, a procedure with which I have been in full agreement. Some authors have accorded the same treatment to the Chaoborinae, and while this has not been widely accepted, it seems to me to be a logical and useful step and I have adopted it. Certainly there are sufficient characters on which to base the family Chaoboridae, and it is of great practical value since it leaves in the family Culicidae only the true mosquitoes, all of which have an elongate labium and nearly all of which are bloodsucking.

Within the Culicidae, after the exclusion of the Dixidae and the Chaoboridae, we can recognize three subfamilies—the Anophelinae, Culicinae, and Toxorhynchitinae. The Culicinae can in turn be separated into several tribes. These will include the Culicini, Aedini, Culisetini, Uranotaenini, and Sabethini.

Anopheles ludlowae (Theobald)

Myzomyia ludlowii Theobald, 1903, Mon. Cul. 3: 43.

Since the original description of this species states, "Habitat.—Luzon, Philippine Islands (Miss Ludlow)," it is evident that Theobald intended to dedicate the species to Miss S. Ludlow (see also p. 347, accession 141a), and since it is obvious that Theobald was using the genitive case when he proposed the name *ludlowii*, it is necessary to correct the spelling of this name. The International Rules of Zoological Nomenclature demand that a species name based on the modern patronymic of a woman, if in the genitive case, should be formed by adding *ae* to the complete name.

Orthopodomyia albicosta (Lutz)

Bancroftia albicosta Lutz, 1904, in Bourroul, Mosq. Brasil, pp. 40, 59.

Lane (1955, p. 624) considers that this is a *nomen nudem* in Bourroul, but since only a single species is included in the newly named genus on p. 40, and since characters are given for the genus on p. 59, one must consider that these characters apply to the species also, and validate the name. Lane has marked two specimens in the British Museum as types of the species. The male bears the label, "Cochocirinha 22.11.04 Bainha," and the female, "Cantareira 11.4.05." Lane gives Cantareira as the type locality. Since the Cantareira specimen was collected after the publication of the description, and the male was collected late in 1904, it does not seem likely that either of these specimens was before Lutz when he described the species. For this reason the validity of these as syntypes is questionable.

Mansonia arribalzagai (Theobald)

Iaeniorhynchus arribalzagae Theobald, 1903, Mon. Cul. 3: 261.

In accordance with the International Rules of Zoological Nomenclature and supported with a slight modification not affecting this case by the Copenhagen Decisions on Zoological Nomenclature, a specific name based on a modern patronymic of a man is, if in the genitive case, to be formed by adding *i* to the portion of the name used. Since it is certain that this species was named after Felix Lynch Arribálzaga, the name of this species should be emended from *arribalzagae* to *arribalzagai*.

Theobald consistently referred to Dr. Lynch Arribálzaga as Dr. Arribálzaga, an error which has persisted to this day. As is customary in Spanish names, Lynch and Arribálzaga are the family names of his father, Felix F. Lynch, and his mother, Trinidad Arribálzaga. Species described by him should be credited to Lynch Arribálzaga, which might be abbreviated to Lynch, Lynch A., or L. A., but not to Arribálzaga or Arrib. Comparable names are Gil Collado, Osorno Mesa, Diaz Najera, Martinez Palacios, Nunez Tovar, Campos R., etc. It should be noted that Portuguese names do not follow the same plan, so that Costa Lima is alphabetized under Lima, Ayrosa Galvão under Galvão, Oliveira Castro under Castro, etc.

Mansonia bonneae Edwards

(Figures 1 and 2)

Mansonia bonneae Edwards, 1930, Bul. Ent. Res. 21: 542.

When Edwards described this species, he considered it to be the taxon that Bonne-Wepster (1930, p. 209) described as *Taeniorhynchus annulipes* var. A. An examination of the terminalia of the holotype male of *bonneae* in the British Museum shows certain differences from Bonne-Wepster's figure. The dististyle (Fig. 1) is somewhat similar to the upper figure of Bonne-Wepster, but there is no evidence of the hairs along the concave margin of the dististyle, as shown in the whole

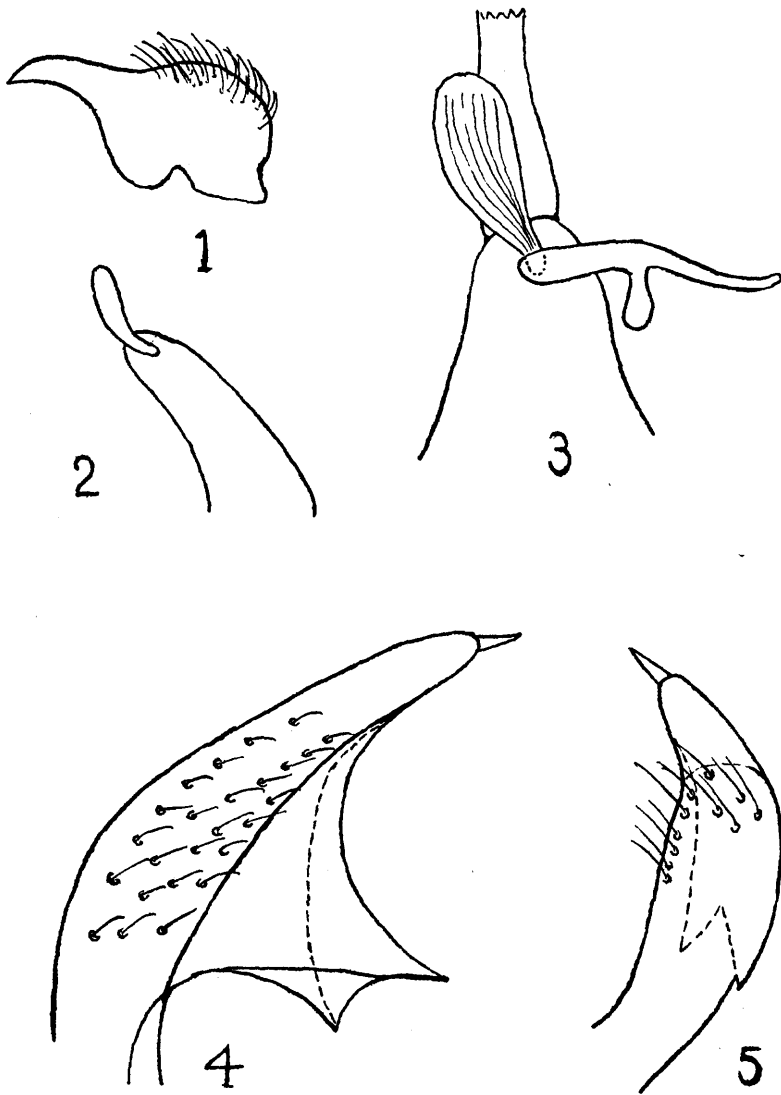


Fig. 1: *Mansonia bonnea* Edwards, dististyle of male; fig. 2: *Mansonia bonnea* Edwards, claspette of male; fig. 3: *Culex alticola* Martini, end of basistyle and base of dististyle of male, showing leaflet and subapical process; figs. 4 and 5: *Psorophora pallescens* Edwards, tip of dististyle of male.

figure of the terminalia. The claspette shows only one blunt appendage at the tip (Fig. 2) rather than two acutely pointed ones as in the figure. There are also many more, longer, heavier, spines on the inner margin of the basistyle than shown in the figure. These differences seem to make the identity of *bonneae* with *annulipes* var. A very doubtful.

***Mansonia dives* (Schiner)**

Culex annulipes Walker, 1857, Jour. Proc. Linn. Soc. London 1: 6 (not Meigen, 1830).

Culex dives Schiner, 1868, Reise der Novara, Diptera, p. 31.

Culex longipalpis van der Wulp, 1881, Bijd. Faun.-Midden-Sumatra, Dipt., p. 9.

The name *Culex dives* was completely overlooked by Edwards (1932), although Giles referred to it in both editions of his "Handbook of Gnats or Mosquitoes." Schiner proposed this name as a substitute for the preoccupied *Culex annulipes* Walker. It is possible that Schiner misidentified Walker's species, but nomenclatorially *dives* is a substitute name for *annulipes* Walker and must be applied to Walker's species, which is accepted as being the same as *Culex longipalpis* Wulp. Paragraph 142, p. 75, of the Copenhagen Decisions on Zoological Nomenclature (Hemming 1953) is very clear on this nomenclatorial principle. For this reason the name *dives* Schiner replaces the currently used *longipalpis* Wulp.

***Psorophora (Grabhamia) cingulata* (Fabricius)**

Culex cingulatus Fabricius, 1805, Syst. Antliat., p. 36.

Aedes (Lanesia) garciai Levi-Castillo, 1953, Rev. Ecuat. de Ent. and Parasit. 1(3): 102 (New synonymy).

The description and figures of the single male of *Aedes (Lanesia) garciai* Levi-Castillo, type of the subgenus *Lanesia*, are quite evidently of a *Psorophora* of the subgenus *Grabhamia*. Dr. Levi-Castillo wrote to me that the type specimen was destroyed by, "time, humidity and fungi" but the terminalia were preserved on a slide which he very kindly loaned to me for examination. The terminalia are dissected and agree well with the original figures except that both dististyles are cut or broken off a short distance beyond the base, at the same level, and the distal two-thirds of these structures are missing from the slide. These terminalia are certainly of a *Psorophora (Grabhamia)* and the figure of the adult agrees well with *cingulata*. Levi-Castillo describes the wing as, "Recubiertas de escamitas negras y algunas más claras." In *cingulata* the scales are usually all dark, as figured for *garciai*, but a few paler scales may be present. I consider *garciai* to be a synonym of *cingulata* and *Aedes (Lanesia) Levi-Castillo*, 1953, to be a synonym of *Psorophora (Grabhamia) Theobald*, 1903.

Psorophora (Janthinosoma) albipes (Theobald)

Janthinosoma albipes Theobald, 1907, Mon. Cul. 4: 157.

This name was proposed for the species that Theobald (1903, p. 126) had determined as *Janthinosoma discruciens* (Walker). In 1903 Theobald gave as localities "South America (Walker): Trinidad, at Agua Santa (F. W. Ulrich)." In 1907 Theobald gave the additional locality "Fort Logan H. Roots, Arkansas (Miss Ludlow)." The locality, "South America (Walker)" would be that of the true *discruciens* and would not be eligible for lectotype selection for *albipes*. The other two localities are therefore the only ones available, and since *albipes*, as now recognized, does not occur in the United States it seems best to restrict the name to the Trinidad locality. There are two specimens in the British Museum labeled "Agua Santa, Trinidad," and I have labeled the one bearing the date 22.XII.1900 as lectotype and the one dated 25.XII.1900 as paralectotype.

Lane and Cerqueira (in Lane, 1955, p. 758) give the type locality as U. S. A. and the type in the British Museum. No U. S. A. type was found there, but there is a specimen from Red Hills, Kingston, Jamaica, on which Lane put a type label. Since this is not an original locality and the lectotype designation was not published, it has no standing as a lectotype.

Psorophora (P.) pallescens Edwards

(Figures 4 and 5)

Psorophora (P.) pallescens Edwards, 1922, Bul. Ent. Res. 13: 76.

This distinctive species is based on a pair of syntypes in the British Museum and presumably others in Budapest. An examination of the terminalia of the male syntype in the British Museum shows certain structures to be somewhat different than as figured by Lane and Cerqueira (in Lane, 1955, p. 737). One difference is in the hairs at the tip of the claspette, these being considerably longer and bent. A more striking difference is in the shape of the tip of the dististyle. On the slide one of these is in the lateral view, and the other with the convex surface toward the observer. These two aspects are shown in figures 4 and 5, respectively.

Psorophora perterrens (Walker)

Culex perterrens Walker, 1856, Insecta Saundersiana, Dipt. 1: 431.

A specimen in the British Museum bears the following labels: "Saunders 68-4/Type/perterrens Wlk/identified as type by E. A. Waterhouse ♀ perterrens Walk. N. Amer." This specimen belongs to the subgenus *Janthinosoma* and, although it lacks all legs, the head and thoracic coloration show it to be, with little doubt, *Psorophora ferox* (Humb.). If this specimen is considered as the type of *perterrens*, then the name should be transferred from synonymy under *P.*

ciliata (F.) to synonymy under *P. ferox*. There are, however, serious objections to accepting this specimen as the type. The original description of *perterrens* gives the locality as South America, whereas this specimen is labeled "North America"; the dimensions given, "Length of body 4 lines; of the wings 6 lines," are considerably greater than in this "type" specimen; the abdominal coloration as described is "purplish with a testaceous band on the fore border of each segment," while in *ferox* the testaceous bands are on the hind borders of the segments, if present. For these reasons I do not think that this specimen can be considered the type, and since no other type was found, the original specimen is presumably lost.

The synonymizing of *perterrens* with *P. ciliata* (F.), as done by Theobald and accepted ever since, is also open to question. While the size is in agreement, one would hardly expect Walker to overlook the banding of the tarsi, and the described abdominal coloration agrees no better with *ciliata* than it does with *ferox*. For this reason we must consider *perterrens* as an unknown species of mosquito, presumably of the genus *Psorophora*, with no type in existence.

Aedes, subgenus Neomelaniconion Newstead

Neomelaniconion Newstead, 1907 (Feb. 1), in Newstead, Dutton and Todd, Ann. Trop. Med. and Parasit. 1: 31.

Banksinella Theobald, 1907 (Feb. 23), Mon. Cul. 4: 469.

It has apparently been overlooked that the name *Neomelaniconion*, based upon the single included species, *palpale* Newstead, antedates both *Banksinella* Theobald and the differently spelled *Neomelanoconion* Theobald, published 22 days later. Since *Culex luteolateralis* Theobald, the type of *Banksinella*, and *N. palpale* belong to the same subgenus of *Aedes*, as has long been recognized, it is evident that *Neomelaniconion* must replace *Banksinella*.

Aedes (Finlaya) mjobergi (Edwards)

Armigeres mjobergi Edwards, 1926, Sarawak Mus. Jour. 3: 248.

The British Museum collection contains three rather badly rubbed female syntypes of this species. An examination shows them to belong to the genus *Aedes*, subgenus *Finlaya*, of the *geniculatus* group and *niveus* subgroup. The specimens are not in good enough condition for identification as any species previously placed in the subgroup, and it is probable that they represent a valid species. Discovery of the male would be most helpful in settling the relationship of the species. The best of the syntypes has been labeled and is here designated as lectotype of the species.

***Aedes (Ochlerotatus) vigilax ludlowae* (Blanchard)**

Culex annulifera Ludlow, 1903, N. Y. Ent. Soc. Jour. 11: 141 (not Blanchard, 1852).

Culex ludlowi Blanchard, 1906, Les Moustiques, p. 630.

Since this was a new name for *Culex annuliferus* Ludlow, not Blanchard, it is obvious that it was named for Miss Ludlow and should therefore take the feminine ending.

***Aedes (Aedimorphus) stenoscutus* (Edwards)**

Stenoscutus africanus Theobald, 1910, Mon. Cul. 5: 263 (not *Duttonia africana* Newstead, 1907).

Ochlerotatus minutus var. *stenoscutus* Edwards, 1912, Bul. Ent. Res. 3: 22.

Edwards proposed the name *stenoscutus* to replace *africanus* of *Stenoscutus africanus* Theobald 1910, which was preoccupied by *Duttonia africana* Newstead 1907, when Edwards placed both in the genus *Ochlerotatus*. Since these two and *Stegomyia africana* Theobald 1901 are all in the genus *Aedes* as now understood the substitute name is necessary. The fact that Edwards sank Theobald's 1910 taxon to varietal status in proposing the name does not alter the fact that one name replaces the other. Therefore, if *Stenoscutus africanus* Theobald is a synonym of *Aedes congolensis* Edwards 1927, as suggested by Edwards (1941, p. 178), then *stenoscutus* must replace *congolensis* as the valid name for the species. It is to be hoped that males will be found in the Gold Coast that will fix the identity of *stenoscutus*.

***Aedes (A.) seculatus* Menon**

Aedes (A.) seculatus Menon, 1950, Roy. Ent. Soc. London, Proc. (B.) 19: 139.

Aedes (A.) carteri Wijesundara, 1951, Ceylon Jour. Sci. (B) Zool. 24: 176. (not *Aedes palpatis carteri* Edwards, 1936; New synonymy.)

The pinned specimens of *Aedes carteri* were destroyed in transit to the British Museum, but there are slides of the terminalia of a male labeled as type and of a female labeled as paratype in the collection. A comparison of the male terminalia with those of the type male of *seculatus* shows very close agreement, and I have no doubt that the two are synonymous. This is fortunate, since it avoids the necessity of proposing a new name for *Aedes carteri* Wijesundara, preoccupied by *A. (Banksinella) palpatis* var. *carteri* Edwards 1936, which was treated as a subspecies by Edwards in 1941.

***Haemagogus anastasionis* Dyar**

Haemagogus anastasionis Dyar, 1921, Ins. Insc. Mens. 9: 155.

Haemagogus uriartei var. *obscurescens* Martini, 1931, Rev. Ent., Sao Paulo 1: 212. (New synonymy.)

Mattingly (1955, p. 28) selected a female from Peru as holotype of *H. uriartei* var. *obscurescens*. An examination of this specimen in

the British Museum shows the fore and mid-tarsi toothed and the sternopleuron without setae. I am unable to discover any reason why this should not be synonymized with *anastasionis*, nor why it should be considered a variety of *uriartei*. The other specimen in the British Museum, from Bolivia, was labeled as paratype by Mattingly. This has two sternopleural setae and I consider this to be *spagazzinii* Brethes.

***Culex (C.) alticola* Martini**

(Figure 3)

Culex alticola Martini, 1931, Rev. Ent., Sao Paulo 1: 216.

The lectotype male in the British Museum shows terminalia so different from those figured by Lane (1955, p. 342) for *Culex apicinus* Philippi, and from the syntype males of *Culex debilis* (Dyar and Knab) in the U. S. National Museum, that the synonymizing of *alticola* with these two species appears unwarranted. Lane's figure does not show the large leaflet with serrate margin that arises between the base of the subapical process and the base of the dististyle in *apicinus*, as it is represented by its generally accepted synonym *debilis*. It also does not show the distinct, acute, somewhat retrorse process at the apex of the dististyle opposite the dististyle claw. In other respects Lane's figure agrees rather well with the terminalia of *debilis*. The principal differences between *apicinus* (= *debilis*) and *alticola* is in the subapical appendages of the basistyle. In *alticola* (Fig. 3) the leaflet is not as large and curved and no serrations are visible on its margin, and the subapical process has a slender distal process beyond an inwardly directed lobe. The basal lobe of the basistyle and the two spine-like setae between the basal and subapical lobes are exactly as in *apicinus*. Because of the differences pointed out, it seems necessary to resurrect *alticola* as a valid species.

***Culex flavipes*, var. *biocellatus* Theobald**

Culex flavipes var. *biocellatus* Theobald, 1903, Mon. Cul. 3: 224.

This is a name that the catalogues of Edwards (1932) and Lane (1939) failed to include. The type is a female in the British Museum collected by C. H. Hewitt in Trinidad. It stands in the collection as *Culex nigripalpus* Theobald, and is probably that species although this is not certain. The specimen was stated "probably" to form a distinct variety, and described as a "colour variation" of what Theobald determined as *Culex flavipes* Macquart. The name was based upon a single female from among other Trinidad specimens. It seems rather evident that Theobald considered this as no more than a variant in the Trinidad population of what he called *flavipes* Macquart, and I feel that the name can be treated as "infra-subspecific" as defined by the Copenhagen Decisions on Zoological Nomenclature (Hemming 1955,

p. 84, par. 165). By treating it in this manner one avoids the necessity for proposing a new name for the well-established *Aedes* (*Finlaya*) *biocellatus* (Taylor), originally described in the genus *Culex*.

***Culex tarsalis* Coquillett**

Culex tarsalis Coquillett, 1896, Canad. Ent. 28: 43.

Culex kelloggii Theobald, 1903, Canad. Ent. 35: 211.

Eight syntypes of *C. kelloggii* were found in the collection of the British Museum, a female and a male being marked as type. All of these are conspecific with *Culex tarsalis* Coq., except the female "type," which is a specimen of *C. stigmatosoma* Dyar. In order to forestall a possible name change, I here designate the male "Stanford Univ. Cal., Oct. 8, 1901" as lectotype.

***Culex* (C.) *nigripalpus* Theobald**

Culex nigripalpus Theobald, 1901, Mon. Cul. 2: 322.

Culex nigripalpus was "Described from a single ♂ in perfect condition," collected at St. Lucia by Dr. Low. A thorough search of the British Museum collection failed to reveal this specimen, although Lane (1955, p. 351) said, "Type in B.M." All the Low material under the name *nigripalpus* came from St. Vincent and Barbados, and none from St. Lucia. The only old specimen bearing the name *nigripalpus* is one without a type label and with the name written on the under side of the circular cardboard mount. It is from St. Vincent with no date. A slide that probably came from this is labeled by Edwards in ink "*Culex similis* Theo.," and in pencil "(factor D. & K.) = *nigripalpus*." Another from Barbados bearing a type label has no name label. The type of *nigripalpus* is probably lost. However, since it is a well established name for a common and well-known species, there is no reason for not maintaining the present usage.

***Culex* (C.) *virgultus* Theobald**

Culex virgultus Theobald, 1901, Mon. Cul. 2: 123.

Lane studied what he considered to be the type of this species and found it to be same as *C. declarator* Dyar and Knab. *Culex virgultus* was described from two males from Rio de Janeiro, but I found only one in the British Museum and this is presumably the one examined by Lane. The terminalia mounted on a piece of celluloid attached below the specimen are, however, not those of *C. declarator*, but they agree well with those of *C. nigripalpus*. The mount was not particularly good, but I was convinced of this determination. Mr. Mattingly remounted the terminalia and an examination after this remounting confirmed my opinion.

There are several possible explanations of this confusion. One is that Lane examined the other male, which I was unable to find.

Another is that by mistake the wrong terminalia were returned to this specimen of *virgultus*, following examination. One of the disadvantages of this method of preparing mosquito terminalia for study and preservation is that in order to examine the preparation under high enough magnification to see essential details it must be removed from the pin. If one is very careful he can do this without snapping the drop of hardened mountant off the celluloid. Once removed from the pin one must make sure that the mount gets back to the right pin again, since there is no label on the celluloid mount associating it with the specimen from which it came. One should not, of course, remove more than one mount at a time, although there is a temptation to do so when comparing closely related species. Since Rio de Janeiro is out of the expected range of *nigripalpus*, there is some reason for believing that a misassociation of parts has occurred here, but it would be difficult to prove. It seems best, under the circumstances, to consider *virgultus* as an unrecognized species and resurrect the name *declarator* for *virgultus* Theobald of Lane.

Culex quinquefasciatus Say

Culex quinquefasciatus Say, 1823, Jour. Acad. Nat. Sci. Philadelphia 3: 10.

Culex fatigans Wiedemann, 1828, Aussereuropaische zweifflugeligen Insekten 1: 10.

For many years these two names have been used for the same taxon, and it seems imperative that some agreement should be reached to bring about the rejection of one of the names and the uniform acceptance of the other. It is my belief that the name *quinquefasciatus* should be used for this taxon, and support this view as follows:

1. Reasons for rejecting *Culex fatigans* Wiedemann except as a synonym of *Culex quinquefasciatus* Say:

a. The name *fatigans* has almost universally been considered to apply to the same taxon as that to which the name *quinquefasciatus* has been applied, and it was proposed five years after *quinquefasciatus*, so that by the rules of priority it must fall if the synonymy is accepted. The two names have been synonymized for forty years without serious challenge.

b. Edwards (1932, p. 208) and (1941, p. 316) questioned the identity of *fatigans* but accepted the name. If both names are questionable, then either both should be rejected or the senior one accepted.

c. The original description of *fatigans* gives no biological information, and Wiedemann's description is not adequate for specific recognition among "Ostindien" species. Wiedemann's statement, "Untergeschicht schneeweiss" hardly seems to fit *fatigans* as currently understood.

d. The type of *fatigans* is lost, as is that of *quinquefasciatus*, so that one cannot go to original specimens to settle the problem.

2. Reasons for accepting *Culex quinquefasciatus* Say as the valid name for the taxon:

a. Specimens determined by Say as *Culex quinquefasciatus* were sent to Wiedemann, who described them as *Anopheles ferruginosus*. Howard examined Wiedemann's specimens of *ferruginosus* in Vienna and said that they belonged to the genus *Culex*. Wiedemann also noted that the legs of *ferruginosus* were shorter than those of *Anopheles crucians*.

b. Say gives certain characters in his description that seem to definitely rule out its identity with any North American species of *Anopheles*. One is the statement that the legs are, "much shorter" than in *Anopheles punctipennis*. The second is the statement that the abdomen is banded, the character to which the specific name *quinquefasciatus* refers. He also mentioned the dehiscence of the hairs [scales] and the dark integumental pattern that shows in denuded specimens. This seems to me to be more characteristic of *Culex* than *Anopheles*, the latter not altering much in appearance by a moderate amount of rubbing.

c. It has been suggested that the biological data given by Say for *quinquefasciatus* do not agree with the biology of the species referred to in parts of the world as *fatigans*. These data are: "This is an extremely numerous and troublesome species. We found them in great numbers in the Mississippi in May and June." I can see nothing in this statement to rule out the southern house mosquito. One would expect a boat tied up at any of the towns along the lower Mississippi in the early 19th century to be invaded by swarms of locally breeding *Culex quinquefasciatus* (= *fatigans* of authors and perhaps Wiedemann). It is true that May is somewhat early for great numbers of *quinquefasciatus* except in the Far South, and it is possible that more than one species was involved in Say's biological observations, but this did not prevent him from basing his description on what we call *quinquefasciatus*, which would undoubtedly have been present.

d. The name *quinquefasciatus* has not been applied to any species other than the one that has also gone under the name of *fatigans*, so that in accepting the name *quinquefasciatus* no change in the concept of the name is involved.

Since this problem is zoological rather than nomenclatorial depending upon the interpretation of the descriptions of Say and Wiedemann, it cannot be referred to the International Commission of Zoological Nomenclature for a decision. It is hoped that an agreement can be reached on the proper name for this extremely important species or subspecies of mosquito.

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