

RECORDS AND DESCRIPTIONS OF NYCTERIBIIDAE AND STREBLIDAE (Diptera)¹

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The present paper represents a partial report on the Nycteribiidae and Streblidae in collections of the B. P. Bishop Museum, American Museum of Natural History (AMNH)², U. S. Navy Medical Research Unit No. 2 (NAMRU), Rijksmuseum van Natuurlijke Historie of Leiden (LDN), Naturhistorischen Museum of Basel (BSL), Canada Department of Agriculture Entomology Research Institute, U. S. National Museum (US) and School of Public Health and Tropical Medicine of Sydney (SHMS). Unless indicated by abbreviations of other institutes, the specimens examined are in the Bishop Museum collection. For the loan of the material, I am much indebted to Drs. J. G. Rozen, Jr., H. M. Van Deusen, R. E. Kuntz, H. Hurlbut, M. A. Lieftinck, F. Keiser, G. P. Holland, A. Stone and B. McMillan. I am obliged to Prof. O. Theodor of Jerusalem, who is undertaking a world revision of the Nycteribiidae, for his information on certain species here discussed.

Genus *Nycteribia* Latreille 1796

This genus, as here understood, contains about 16 known Old World species which fall into 4 groups represented by *pedicularia* Latr., *schmidlii* Schin., *parilis* Wk. and *vexata* Wwd. respectively. The first 4 of the following species belong to the *pedicularia*-group, the last 2, to *parilis*-group, and the new species *alternata* is a member of the *schmidlii*-group.

From the ♂ genitalia and ♀ abdominal plates, *Nycteribia* is apparently the most generalized genus of the Nycteribiidae.

Nycteribia kolenatii Theodor & Moscona 1954

SWITZERLAND: 1♂ (BSL), Bern, 21. IX. 1933, coll. Troxler.

This species is so similar to *N. latreillii* Leach that it has long been confused with the latter. It breeds on *Myotis* spp. and occurs in W. Europe (*latreillii* is more widely spread and extends to NW Africa and Palestine).

Nycteribia allotopa Speiser 1901

TAIWAN (all collected off *Miniopterus schreibersi*): 8♂♂, 11♀♀ (NAMRU #6452,

1. Partial results of the project "South Pacific insects of public health importance," supported at Bishop Museum by the National Institutes of Health, Bethesda, Md., U. S. A.
2. A. E. stands for the field number of the Archbold Expedition, Amer. Mus. Nat. Hist.

6458), Shen-Ou, Taipei hsien, 17-19. VIII. 1959, R. E. Kuntz; 3 ♂♂, 2 ♀♀ (NAMRU #6450), Jui-Fang, Taipei hsien, 14. VIII. 1959, Kuntz; 16 ♂♂, 19 ♀♀ (NAMRU #10052, 10061, 10064), Tao-Yuan city, 14-16. XII. 1959, Kuntz; 4 ♂♂, 10 ♀♀ (NAMRU #169-H), Lung-Sou, Kuei-Shan, Tao-Yuan hsien, 13. XII. 1960, H. Hurlbut.

Originally described from 1 ♂, 1 ♀ collected at Lian Si Paghe, W. Sumatra and recorded from India, Ceylon, Taiwan, Kiangsu, and the Philippines. *Listropodia wui* Hsü (1935: 295, figs. 2, 6, part; 1937: 275, figs. 6-8, ♂ excl. "♀") from Kiangsu is apparently a synonym of this species. **New Synonymy.**

Nycteribia formosana Karaman 1939

TAIWAN: 4 ♂♂, 1 ♀ (NAMRU #6433), Chia-I city, off *Miniopterus schreibersi*, 4. VIII. 1959, R. E. Kuntz.

Originally described from Taiwan, recorded from Kiangsu and Shantung. Besides *Miniopterus*, it has been found on *Rhinolophus* and *Myotis*.

Nycteribia parvula Speiser 1901

TAIWAN (all collected off *Miniopterus schreibersi*): 2 ♀♀ (NAMRU #6453), Shen-Kang, Taipei hsien, 17. VIII. 1959, R. E. Kuntz; 3 ♀♀ (NAMRU #6452, 6458), Shen-Ou, Taipei hsien, 17-19. VIII. 1959, Kuntz; 1 ♀ (NAMRU #6433), Chia-I city, 4. VIII. 1959, Kuntz; 9 ♂♂, 8 ♀♀ (NAMRU #10052, 10061, 10064), Tao-Yuan city, 14-16. XII. 1960, Kuntz; 3 ♂♂, 4 ♀♀ (NAMRU #169-H), Lung-Sou, Kuei-Shan, Tao-Yuan hsien, 13. XII. 1960, H. Hurlbut.

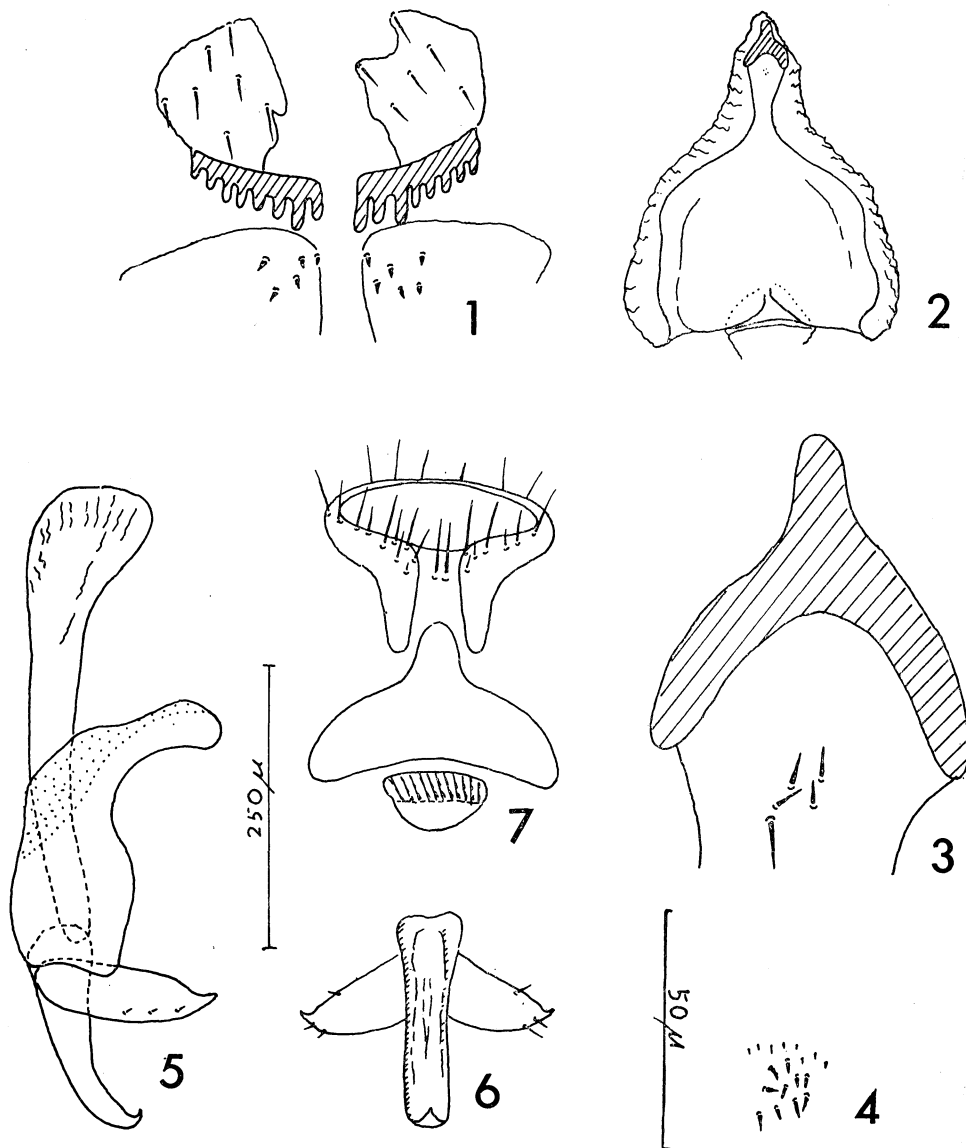
N. parvula was originally described from 2 ♀♀ collected at Lian Si Paghe, W. Sumatra. Its distributional range and host specificity are the same as those of *N. allotopa* and the two species are very often found together. The "♀" (error for ♂) of *Listropodia wui* Hsü (1935: 295, figs. 2, 6, part; 1937: 275, figs. 9-10) is apparently a synonym of this species. **New Synonymy.**

Nycteribia alternata Maa, n. sp. Figs. 8-15.

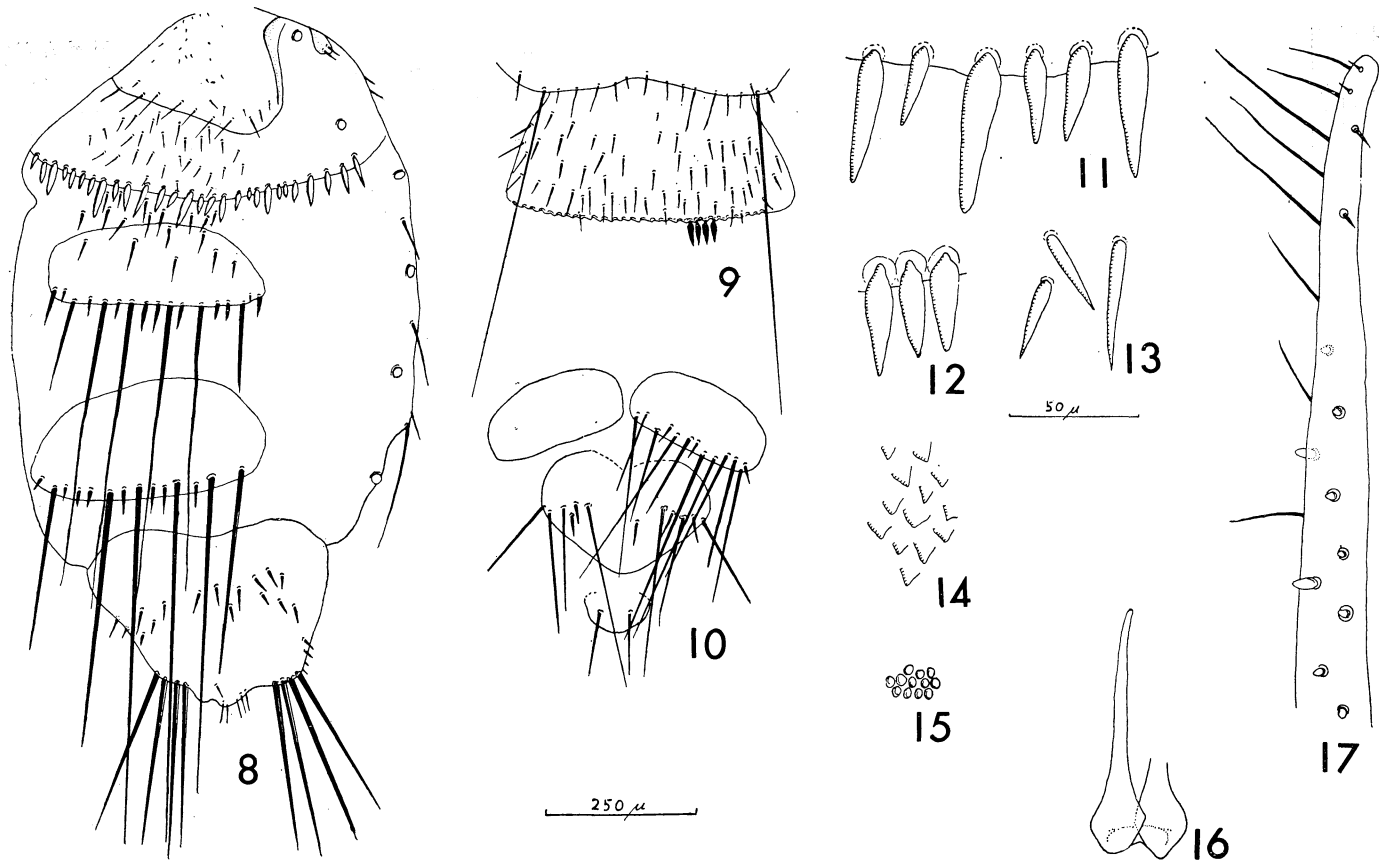
KAMERUN: 1 ♀, Kribi, S. Kamerun, off "*Eidolon helvum* Kerr", 1936, T. Bollinger. Holotype on slide, in Basel Mus.

Female: Length (excl. head and legs) 1.8 mm. Anterior margin of head with a setal row on dorsum and at each side; lower part of gena with 7-8 setae which are about 1/2 as long as those on anterior margin of head. Thorax much wider than long with about 11 notopleural setae; ctenidium with 18-19 long pointed denticles; median sternal suture well marked, slightly widened at intermediate section; oblique sternal sutures forming an angle of about 100°; posterior sternal margin (fig. 9) with about 13 setae, 1 of them near lateral corner more than 2× median length of synsternite 1+2. Legs normal for the genus, relative length of fore tibia, basitarsus and tarsomeres 2+3+4 and greatest width of tibia 30 : 26 : 9 : 12. Abdominal tergite 1 (fig. 8) with a number of microsetae at disc, a row of rather long setae along posterior margin, and a medially interrupted row of much shorter finer setae before posterior margin; tergite 2 with a cluster of rather short fine setae at disc, its posterior margin straight, with a row of somewhat alternately arranged short and long spines (fig. 11), the shorter ones about 1/2 as long as longer ones; area between tergite 2 and tergal plate 1 with several irregularly arranged setae; tergal plate 1 anteri-

only with few scattered setae, its posterior margin also straight, with very long setae and rather short spines which are also somewhat alternately arranged; tarsal plate 2 much larger than 1, discally bare, posteriorly with similar setae and spines as in plate 1; anal



Figs. 1-7. 1, *Cyclopodia (Cyclopodia) bougainvillensis petersi* Maa, allotype ♀, postgenital plate and part of anal sclerite; 2, same, holotype ♂, basal arc of genitalia, outer surface; 3, same, upper part more highly magnified; 4, same, microsetae on inner surface; 5, *Eremoctenia vandeuseni* Maa, paratype ♂, genitalia in side view; 6, same, aedeagus and parameres in ventral view; 7, same, paratype ♀, anal sclerite, postgenital plate and pregenital plate. (All figures except 3 and 4 in same scale.)



Figs. 8-17. 8, *Nycteribia alternata* Maa, holotype ♀, abdominal dorsum; 9, same, posterior margin of thoracic venter and abdominal synsternite 1+2 (ctenidium only partly drawn); 10, same, sternites 6 and 7 and genital plate; 11, same, spines on posterior margin of tergite 2; 12, same, denticles of abdominal ctenidium; 13, same, ordinary setae between tergite 2 and tergal plate 1; 14, same, integumental sculpture of abdominal membranous area; 15, same, integumental sculpture of anal segment; 16, *Eucampsipoda divisum* Maa, holotype ♂, claspers of genitalia; 17, same, apical part more enlarged. (Figs. 8-10 and 16 drawn to same scale; figs. 11-15 and 17, same scale.)

segment with circular scale-like sculpture (fig. 15) and an arcuate series of setae; membranous area between and at sides of tergal plates with triangular scale-like sculpture (fig. 14); ctenidium composed of about 41 rather short denticles (fig. 12); synsternite 1+2 with 4-5 rows of setae of similar length, its anterior area bare at middle; sternites 3 and 4 each with 2 (at middle) or 3 (at side) setal rows, setae of anterior rows on sternite 3 longer than those on sternite 4 and nearly as long as those on synsternite 1+2; sternites 5 and 6 (fig. 10) each very narrowly interrupted at middle and each with only 1 setal row, although there exist 2-3 much shorter setae close to the row; median membranous area of these sternites bare; setae of posterior marginal rows of sternites 3-6 all of similar length; sternite 7 with a row of about 6 setae (3-4 long and 2-3 short) near midway at each side, its median area weakly sclerotized and bare; genital plate large, semicircular, with 2 moderately long setae; anal process short, with about 4 long apical, and few much shorter preapical setae. Male unknown.

This species belongs to the *schmidlii*-group which includes 6 known Palaearctic and Ethiopian species and subspecies. It can be readily distinguished from all of them by the very characteristic abdominal chaetotaxy. The alternately arranged spines on the tergal plate 1 strongly simulate the denticles of its abdominal ctenidium, and this seems to be unusual for the genus. In Theodor's (1957: 461) key to Ethiopian species, *alternata* runs to *capensis* Karam., but besides the chaetotaxy, the shape and arrangement of the sclerotized plates are fairly different.

Nycteribia bakeri Scott 1932

NEW HEBRIDES: 21 ♂♂, 20 ♀♀, Tesmalune, Espiritu Santos, 27-28. IX. 1958, B. Malkin.

Endemic to the New Hebrides, recorded from *Miniopterus australis*.

Nycteribia parilis Walker 1861

TIMOR: 1 ♀ (BSL), Baaguaia, E. Timor, off "*Pteropus griseus* Geoffr.", VIII. 1935, A. Bühler.

The host record given above is probably incorrect, and no *Nycteribia* species have ever been known from Megachiroptera. *N. parilis* was originally described from Batchian and, since then, recorded from other Moluccan islands. Its Australian record needs confirmation.

Genus *Basilis* Mir. Ribeiro 1903

This is the largest genus of the Nycteribiidae and contains about 60 known species found in temperate and tropical countries in both hemispheres. *Tripselia* Scott 1917, formerly considered as a distinct genus, is here degraded to subgenus (NEW STATUS). The latter occurs only in the Palaetropics and is similar to typical *Basilis* in all essential characters, including the ♂ genitalia and the arrangement and chaetotaxy of the ♀ abdominal sclerotized plates. The only difference, viz., the absence of eyes, is by no means a good generic character.

The distributional center of *Tripselia* is probably in New Guinea and Australia. In our collection, there are about 10 undescribed species mainly from New Guinea on *Miniopterus*, *Pipistrellus*, *Nyctophilus* and *Taphozous*.

Basilina (Tripselia) blainvillii blainvillii (Leach) 1817

IVORY COAST: 4♂♂ (BSL), Daloa, off *Taphozous mauritanus* Geoffr., 20. II. 1931, P. A. Chappuis.

Widely distributed in Ethiopia, Madagascar and Mauritius (the last place is the type locality). *T. mauritanus* is its preferred host.

Basilina (Tripselia) hirsuta Theodor 1956

NETH. NEW GUINEA: 1♀, Hollandia, on beach, off *Pipistrellus* sp. (#TMP 28), 14. VI. 1959, T. C. Maa; 1♀ (AMNH #152689), Hollandia, off *Aselliscus tricuspoidatus*.

NE NEW GUINEA: 97♂♂, 145♀♀, 3 newly born larvae, Suanimbu nr. Maprik, off *Pipistrellus* sp. (#TMP 1676-1780), 14-15. I. 1960, T. C. Maa; 3♂♂, 10♀♀ (AMNH), Oomsis Creek Camp, off *P. papuanus* (#A. E. 15068, 15071, 15190), IV-V. 1959, H. M. Van Deusen; 1♂ (AMNH), Markham R. Valley, Water Rice, off *P. papuanus* (#A. E. 17103-05), 12. XI. 1959, Van Deusen; 4♂♂, 6♀♀ (SHMS), Gali, sea level, Saidor Subdistrict, Madang Distr., off *P. papuanus*, X. 1961, B. McMillan.

PAPUA: 2♀♀ (AMNH #104777), Dogwa, off *Hipposideros cervinus*.

Originally described from 4♂♂, 9♀♀, collected at Kamali, (10°02'S., 147°45'E.), Papua, off *Nycticeius* and *Pipistrellus*. Bats of the latter genus are probably the preferred hosts. The material before me fits very well with the description by Theodor and is found to be identical with type, although the 1st sternite in his figures appears to have been too short and broad in proportion.

Genus Penicillidia Kolenati 1863

This genus contains about 10 known species and spreads almost all over the Old World. The most preferred hosts are bats of the genera *Rhinolophus*, *Hipposideros*, *Myotis*, and *Miniopterus*. In addition to those listed below, there are 2 undescribed species from New Guinea, Java and Borneo. The Bornean one lacks any trace of an abdominal ctenidium, and its synsternite 1+2 is adorned only by ordinary setae.

Penicillidia dufourii tainani Karaman 1939

TAIWAN: 1♂ (NAMRU #6433), Chia-I city, off *Miniopterus schreibersi*, 4. VIII. 1959, R. E. Kuntz; 1♂ (NAMRU #6450), Jui-Fang, Taipei hsien, off *M. schreibersi*, 14. VIII. 1959, Kuntz.

This is probably the rarest form of the Nycteribiidae of Taiwan.

Penicillidia jenynsii (Westwood) 1834

TAIWAN (all collected off *Miniopterus schreibersi*): 2♂♂, 2♀♀ (NAMRU #6453), Shen-Kang, Taipei hsien, 17. VIII. 1959, R. E. Kuntz; 5♂♂, 11♀♀ (NAMRU #6433, 6458), Shen-Ou, Taipei hsien, 17-19. VIII. 1959, Kuntz; 14♂♂, 8♀♀ (NAMRU #6450), Jui-Fang, Taipei hsien, 14. VIII. 1959, Kuntz; 1♂, 5♀♀ (NAMRU #6433), Chia-I city, 4. VIII. 1959, Kuntz; 6♂♂, 3♀♀, 1 newly born larva (NAMRU #10052, 10061, 10064), Tao-Yuan city, 14-16. XII. 1960, Kuntz; 3♂♂, 1♀ (NAMRU #169-H), Lung-Sou, Kuei-Shan, Tao-Yuan hsien, 13. XII. 1960, H. Hurlbut.

This species was originally described from China (no further details). From description, *P. soochowensis* Hsü 1936: 277, figs. 1-5, ♂♀ (= *Listropodia wui* Hsü 1935: 295, figs.

1, 3, 4, "♀", error for ♂) is certainly a synonym of *jenynsii*. **New Synonymy.**

It may be mentioned that the nycteribiids in Taiwan have all been found on the same species of bat, *Miniopterus schreibersi* (nycteribiids of other Taiwan bats are still unknown). On several occasions, one individual bat may harbor 3 or 4 species together. From Scott's (1914) records and the material at hand, the relative abundance of the 5 species may be compared as follows:

	Scott 1914		Present material		Percentage
<i>Nycteribia allotopa</i>	183 ♂♂	192 ♀♀	31 ♂♂	42 ♀♀	42.7%
<i>Nycteribia parvula</i>	100	83	18	21	20.7
<i>Nycteribia formosana</i>	24	20	4	1	4.7
<i>Penicillidia dufourii tainani</i>	9	7	2	—	1.6
<i>Penicillidia jenynsii</i>	114	142	31	30	30.3

Penicillidia oceanica (Bigot) 1885

NEW CALEDONIA: 1 ♀ (BSL), Nova Caledonia (no further details), coll. Däniker.

Endemic to New Caledonia. The only known host is *Miniopterus australis* Tomes. Scott (1932: 21) recorded the species from Queensland off *M. schreibersi* Natt. but his determination has to be verified; Speiser (1901: 31) wrongly assigned *oceanica* to *Nycteribia* (*Acrocholidia*) and recorded a single ♂ from New South Wales off *Chalinolobus gouldi* Gray. From his description, that ♂ specimen is most probably referable to *Basilia* (*Tripselia*).

The unique specimen before me is rather poorly preserved. It differs from Falcoz's (1923: 86) redescription in the following points: Posterior margin of tergite 1 with only 8 bristles which are finer than and about 2/3 as long (apical part of these bristles very pale and visible only under high magnification or after staining) as longest bristles on tergite 2; posterior margin of tergite 2 with 12 very long stout bristles at middle which are about 2× as long as those at sides; disc of tergite 2 with about 18 short pale bristles; posterior margin of tergite 3 with similar bristles as on tergite 2; sternite 6 posteriorly weakly emarginated, not truncated.

Penicillidia buxtoni Scott 1932

NEW HEBRIDES: 1 ♂, Tesmalune, Espiritu Santo, 27–28. IX. 1958, B. Malkin.

Endemic to the New Hebrides. *Miniopterus australis* Tomes is its known host.

Genus Eremoctenia Scott 1917

Hitherto known from the type species, *progressa* (Muir) from Amboina off *Miniopterus*. A second species is added below.

Eremoctenia vandeuseni Maa, n. sp. Figs. 5–7.

NETH. NEW GUINEA: 2 ♂♂, 2 ♀♀, Danowaria, ca. 50 m, nr. Fakfak, Onion Penin., off *Miniopterus* sp., 2. VI. 1959, J. L. Gressitt & T. C. Maa.

NE NEW GUINEA (all except Gatop in E. Highlands District): 14 ♂♂, 11 ♀♀ (AMNH), Okapa, off *Miniopterus* sp. (#A. E. 16672–16708), 29. IX. 1959, H. M. Van Deusen; 4 ♂♂, 2 ♀♀, probably same data, but picked up from a bag once used for keeping bats,

18. X. 1959, T. C. Maa; 2 ♂♂ (AMNH), Ilafo nr. Okapa, off *Min.* sp. (#A. E. 16732-74), IX. 1959, Van Deusen; 1 ♂, 1 ♀ (AMNH), Gurakor, off *Min.* sp. (#A. E. 15194), 5. V. 1959, Van Deusen; 5 ♂♂, 2 ♀♀, Kassam, off *Min.* sp. (#A. E. 16987-89, 17030-33), 30. X. & 2. XI. 1959, H. M. Van Deusen & T. C. Maa; 8 ♂♂, 5 ♀♀, Sinofi nr. Kainantu, off *Min.* sp. (#TMP 781-817), 30. IX. 1959, Maa; 1 ♂ (AMNH), Arau, Kratke Mts., off *Min.* sp. (#A. E. 16942-43), 22. X. 1959, Van Deusen; 2 ♀♀ (SHMS), Gatop, 600 m, Finschhafen Subdistrict, Morobe Distr., off *Min. schreibersi*, X. 1961, B. McMillan.

Holo- and allotypes, selected from the Okapa series, in Bishop Museum (#3230); paratypes in the Amer. Mus. Nat. Hist., US Nat. Mus., Brit. Mus. (Nat. Hist.) and School Publ. Hlth. Trop. Medic. Sydney.

Length (excl. head and legs) ♂ about 1.6-1.8 mm, ♀ 1.9-2.2 mm. Head broadly rounded, longer than wide and widest behind middle in dorsal view, largely bare, with a setal row along anterior margin dorsally and laterally, and with 10-14 setae between eyes; all setae including those on anterior margin similar in length and robustness; eye 1-faceted, unpigmented; palpus strongly flattened, rather evenly narrow, with short setae along both sides, 3-4 longer ones (slightly longer than those on anterior margin of head-capsule) near apex, apical seta almost 2× as long as dorsum of head capsule; theca nearly circular, 1.5× as long as labella. Thorax much shorter than wide; mesonotum much longer than wide; area behind ends of notopleural sutures very broadly rounded; notopleural sutures practically straight and parallel; notopleural plate rhomboid, distinctly longer than wide, its outer margin curved in S-shape; 7-12 notopleural setae, usually arranged in 2, occasionally 3 (never 1), oblique series, rarely in irregular order, anterior setae more or less shorter, posterior ones as long as or slightly shorter than those on head. Venter of thorax weakly convex, with coarse shallow punctures and fine soft short hairs; anterior margin weakly sinuate and deflexed dorsad at middle, there with 6-8 short erect setae which are visible only in dorsal or cephalic view; median suture narrow; oblique sutures not recognizable even in very matured specimens; posterior margin shallowly, broadly sinuate, with a row of about 5-7 short setae at each side, and 1-3 long ones situated near posterolateral corner. Legs quite long and slender; femora thickest near basal ring, dorsum largely bare particularly in 3rd pair; anterior surface of femora 1 and 2 rather evenly setose, setae at apical 1/3 much longer and stouter; venter of femur 3 rather evenly setose, with 2 long setae near base and 1 on anteroventral margin near apex; venter of all tibiae with 6 setal rows, and basad to 1st row with some scattered shorter setae; 1st row less clearly defined and its setae shorter than in other rows; setae of 2nd to 5th rows successively longer and stouter; setae of 6th row very stout and about 2× as long as those of 5th row; dorsum of all tibiae heavily setose, with 1 long seta each near base, midpoint and apex respectively. Relative lengths (♂) of femora 1-3, 38: 47: 47; of tibiae, 34: 39: 39.

Male Abdomen: Tergite 1 with several minute setae; tergites 2-4 with short dense setae, posteriorly each with a row of very long stout setae; tergites 5-6 bare, except the posterior setal row and 1-3 short submarginal setae; anal segment largely bare, with only a posterior submarginal row of about 8 rather short setae, a very long one at each posterolateral corner, about 10 short ones on dorsolateral margin near apex, and very short fine ones around anus; synsternite 1+2 with sparse short setae, posterior margin with about 25-35 slightly or much longer and stouter setae; sternites 3 and 4 subequal in length, each posteriorly with a submarginal row of very short setae, and a marginal row similar

to that of synsternite 1+2; sternite 5 much longer, similarly setose as sternite 3 or 4, but posterior margin at middle produced caudad and with a cluster of about 18–24 denticles; clasper of genitalia gently curved, apically sharp, black, basally with a strong seta which is about as long as clasper itself, other setae much shorter and irregularly arranged; aedeagus evenly narrow in ventral view, apically curved ventrad; paramere narrowed apicad in profile, with few minute setae; apodeme and phallobase narrow.

Female Abdomen: Tergal plate 1 with scarcely visible minute setae at disc and 2–3, rarely 4, moderately long setae on posterior margin at middle; tergal plate 2 with a cluster of minute setae at disc, posterior margin with 5–10 short setae at each side and 4 long ones at middle; tergal plate 3 small, anteriorly ill defined, posterior margin gently arcuate, with about 17–22 setae of varying lengths, 2 of them longest and stoutest, about 1.5× as long as longest seta on 2nd plate; anal segment with very sparse, rather evenly distributed setae of similar length but 2 near each side of anus about 2× as long as others; anus surrounded by a ring of fine soft hairs; synsternite 1+2 sparsely covered with fine short setae, anterolateral corner near 1st abdominal spiracle with 4–6 stout short setae, posterior margin with about 13–16 moderately long stout setae; sternites 3 and 4 only definable by distribution of setae; sternite 3 with about 3 setal rows, 1st row largely of short setae, with a few long ones; 2nd row, rather irregularly arranged, almost entirely of short setae; 3rd row with long and short setae nearly of equal number and generally arranged alternately; sternite 4 with 2 setal rows, 1st row of short, 2nd row of long setae; sternite 5 divided into 2 transversely oval lateral plates, each bearing about 10 moderately long setae, mostly near anterior and on posterior margin; sternite 6 continuous, not interrupted at middle, with 2 more or less definable setal rows; sternite 7 anteriorly bare, posteriorly setose and produced into 2 lobes each shorter than wide at base; in addition to the setae described above, sternites 3–7 each with a very long seta at each side; lateral surface of abdomen with a cluster of very short setae at level of sternites 3 and 4, elsewhere bare; pregenital plate small, bare, strongly sclerotized and bent dorsad; postgenital plate weakly sclerotized, bare, posteriorly produced at middle.

I take much pleasure in naming this notable species after a notable mammalogist Mr. H. M. Van Deusen of the American Museum for his courtesies and cooperation toward my studies in bat ectoparasites. It is closely related to but smaller than *E. progressa* (Muir), as evidenced by the description and illustrations by Scott (1917). The male of *progressa* appears to differ in having the posterior margin of 5th abdominal sternite (anal segment of Scott) more strongly produced and with less denticles. The female differs in having as many as 14 setae on posterior margin of 1st tergal plate, longer and more numerous setae on posterior margin of 2nd plate, and 3rd plate almost 2× as wide as 1st plate and posteriorly angulately curved. The chaetotaxy of the abdominal venter and legs is also somewhat dissimilar. Upon my request, Prof. Theodor kindly compared 2 of my specimens (♂ ♀) with *progressa* and found they were different in both ♀ chaetotaxy and ♂ genitalia.

Genus *Archinycteribia* Speiser 1901

Hitherto known from the type species which is recorded below. A second species in our collection from Malaya on *Megaderma* bats differs in having 4-faceted eyes and distinctive chaetotaxy.

In Speiser's (1901) systematic arrangement of the Nycteribiid genera, *Archinycteribia* and *Eucampsipoda* were placed at the beginning and end respectively. But both in structural details (including ♂ genitalia) and in the host specificity, the 2 genera have rather close affinities.

Archinycteribia actena Speiser 1901

AMBOINA: 5 ♂♂, 3 ♀♀ (LDN), Ambon, off "Klein-Fledermäusen," coll. Ropstein.

NETH. NEW GUINEA: 2 ♀♀, Kota Nica nr. Hollandia, off *Dobsonia moluccensis magna*, 27. VIII. 1961, C. Terpstra.

NE NEW GUINEA (E. Highlands): 1 ♀ (AMNH), Arau, Kratke Mts., off *D. moluccensis* (#A. E. 16918-19), 20. X. 1959, H. M. Van Deusen; 1 ♂, Kassam, off *D. moluccensis* (#A. E. 16995), 31. X. 1959, H. M. Van Deusen & T. C. Maa.

SOLOMON IS.: 21 ♂♂, 27 ♀♀, Sia Cave, Buka I., off *D. sp.* (#TMP 1501-20 & 1561-77), 8. XII. 1959, T. C. Maa.

The original description was based upon 4 ♂♂ from New Britain found together with *Cyclopodia macrura* Speis. and the Streblid *Nycteribosca gigantea* Speis. on "*Dobsonia peronii* Geoffr." Since then nothing has been published regarding this interesting species. My 8 specimens from Amboina and 2 from New Guinea were found together with *macrura* too, but the long series from Buka I. was only associated with *gigantea* Speis.

Genus **Eucampsipoda** Kolenati 1857

Ranges of distribution and host-specificity of *Eucampsipoda* and *Cyclopodia* are somewhat similar but the former genus includes much fewer species. In his recent revision, Theodor (1955) recognized only 7 species.

Eucampsipoda sundaicum Theodor 1955

MALAYA: 32 ♂♂, 30 ♀♀, Batu Caves, cavern A, Selangor, III. 1960, H. E. McClure; 3 ♀♀ (USNM), Batu Caves, off *Eonycteris spelaea*, 16. VI. 1959, R. Traub; 29 ♂♂, 29 ♀♀, Gua 'che Manan, cave No. 2, Pahang, off 13 *Cynopterus lucasi* bats, 16. XII. 1958, J. L. Gressitt, J. R. Hendrickson & T. C. Maa.

Originally described from Tenasserim, Madras, Sumatra, Malaya, Palawan and Mindanao. *Eonycteris spelaea* is probably the preferred host.

Eucampsipoda inermis Theodor 1955

SULU IS.: 42 ♂♂, 38 ♀♀, Jolo, Jolo I., off bat in cave 3 km outside city, 10-20 m below surface, 24. VIII. 1958, H. E. Milliron.

SUMBA; 1 ♂, 4 ♀♀ (BSL), Praijawang, Mata Wai Kenor, E. Sumba, off *Rousettus amplexicaudatus amplexicaudatus* Geoffr., 13. VI. 1949, A. Bühler & Sutter.

NE NEW GUINEA: 1 ♀ (AMNH), Arau, Kratke Mts., E. Highlands, off *R. amplexicaudatus* (#A. E. 16958), 25. X. 1959, H. M. Van Deusen.

Originally described (original spelling: *inermis*) from Samar, Mindanao, Negros and Java, found on *Rousettus* and *Eonycteris*. Specimens from Sumba and NE New Guinea differ slightly in chaetotaxy and in relative measurements. It is not impossible that they represent geographical races of this rather widely distributed species.

Eucampsipoda divisum Maa, n. sp. Figs. 16-17.

SOLOMON IS.: 1 ♂, Guadalcanal I., off *Rousettus* "*brachyotis* Dobs.," 1928, E. Paravicini. Holotype in Basel Mus., in alcohol, claspers on slide.

Male: Length (excl. head and legs) 2 mm. Eye absent; vertex not darkened; basal 1/2 of palpus hairless; gena with only 1-2 longer and 3-4 shorter setae at lower margin. Notopleural sutures anteriorly almost parallel, posteriorly distinctly curved outward (in *inerme*, straight for the full length and divergent caudad); 1 notopleural seta; venter of thorax distinctly more convex than in *inerme*. Legs slightly shorter in proportion. Chaetotaxy of abdominal dorsum similar to that in *inerme*, but setae comparatively shorter; ctenidium with 34 denticles; sternite 4 interrupted at middle and divided into 2 transverse oval plates each bearing 2 setal rows; sternite 5 also with 2 setal rows; setae of 1st rows of sternites 4 and 5 similar in length and arrangement. Clasper of genitalia about 0.36 mm long, narrow, basally with a rather short stout seta, apically with several fine setae, intermediate part with 6-7 peg-like spines on venter (aedeagus and paramere not examined). Other characters similar to *inerme*. Female unknown.

This elegant species stands close to *Eu. inerme*. The absence of the eyes and the shape and chaetotaxy of the claspers are so different from its congeners that I have no hesitation in recognizing it as new. In Theodor's key (♂), it runs near *inerme* and *sundaicum*. For the inclusion of *divisum*, a new couplet may be inserted between his couplets 4 and 5:

- 4a. Eyes absent; vertex not darkened; sternite 4 interrupted at middle; clasper strongly tapering apicad, its basal bristle rather short, peg-like spines only at intermediate part..... **divisum**
 Eyes present; vertex distinctly darkened; sternite 4 not interrupted at middle; clasper not as above 5

According to Laurie and Hill (1954), the only *Rousettus* found in the Solomons is *R. amplexicaudatus hedigeri* Pohle, whereas *R. amplexicaudatus brachyotis* occurs in the Moluccas, New Guinea and Bismarck Archipelago. Hence, *hedigeri* is probably the actual host of *Eu. divisum*. It may be mentioned that *R. amplexicaudatus amplexicaudatus* Geoffr. is the host of *Eu. inerme* in the Philippines, Sumba and probably Java, and that the genus *Eucampsipoda* is not yet found from the Molucca and Bismarck Arch. Since *inerme* and *divisum* are so distinctive, further investigations on their host and distributional ranges are quite worthwhile.

Eucampsipoda africanum Theodor 1955

KAMERUN: 1 ♂ (BSL), Kribi, S. Kamerun, off *Eidolon helvum*, 1936, T. Bollinger.

A widely distributed Ethiopian species. In addition to *Ei. helvum*, it has been also found on *Rousettus leachi* and *R. aegyptiacus*.

Genus **Cyclopodia** Kolenati 1863

This genus includes several of the largest species of the Nycteribiidae and is exclusively found on Megachiroptera or fruit-bats. Records of their occurrence on Microchiroptera are to be considered either stragglers or due to postmortem contamination. Almost all species of the genus show a certain degree of host specificity. Some are widely spread,

probably having been dispersed by their hosts, but most are rather localized in distribution. In certain instances they appear to be replaced by the related genus, *Eucampsipoda*. In a recent revision of the genus, Theodor (1959) recognized 26 species and subspecies and pointed out that nearly half of this number occur along the arc stretching from New Guinea to the Solomons via the Bismarck Archipelago. In addition to the 13 species enumerated below, 3 others from Celebes, New Guinea and New Britain are left unnamed.

The genus may be divided into 2 subgenera, *Cyclopodia*, s. s. and *Leptocyclopodia* Theodor 1959. The latter is only found in the Oriental Region. From details of the ♂ genitalia and the sclerotization of the ♀ abdomen, *Cyclopodia* is apparently the most highly specialized genus of the Nycteribiidae.

Cyclopodia (Cyclopodia) greeffi greeffi Karsch 1884

KAMERUN: 1 ♂, 1 ♀ (BSL), Kribi, S. Kamerun, off *Eidolon helvum* Kerr, 1936, T. Bollinger.

A common Ethiopian species. *Ei. helvum* is the preferred host (*Ei. sabaeum* is the only known host of *C. (C.) greeffi arabica* Theod.). Only on a few occasions, it was found on *Rousettus angolensis* and *Epomophorus* sp.

Cyclopodia (Cyclopodia) sykesii (Westwood) 1834

INDIA: 2 ♂♂ (LDN), "British India" (no further details), off *Pteropus giganteus*, coll. Blosler.

CEYLON: 2 ♂♂, 2 ♀♀ (BSL), Kandy, C. P., 12. IX. 1953, F. Keiser.

Known from India, Ceylon and Maldive Is., off *Pteropus giganteus*.

Cyclopodia (Cyclopodia) horsfieldi de Meijere 1899

SINGAPORE: 1 ♂, 18. VI. 1958, J. R. Hendrickson; 2 ♂♂, 1 ♀, 20. IX. 1958, Hendrickson.

JAVA: 3 ♂♂, 4 ♀♀, Bogor, 250 m, W. Java, 1. VI. 1961, S. Kadarsan

SUMBA: 1 ♀ (BSL), Rua, W. Sumba, off *Pteropus alecto morio* Anders., 1. IX. 1949, A. Bühler; 1 ♀ (BSL), Waimangura, W. Sumba, off same host, 17. VIII. 1949, A. Bühler.

CELEBES: 1 ♂ (BSL), Tomohon, off "*Myotis (Selysius) mystacinus ater* Peters," 4. IX. 1894, P. & F. Sarasin. The host record is probably wrong.

TIMOR: 2 ♂♂, 3 ♀♀ (BSL), Niki-Niki, VI. 1935, A. Bühler; 1 ♀ (BSL), Koepang, W. Timor, off *Pteropus vampyrus edulis* Geoffr., VI. 1935, A. Bühler.

BABAR I. (?): 5 ♂♂, 6 ♀♀ (LDN), Babber, 1898, S. Schädler. I could not find "Babber" on available maps; perhaps this is an old name for Babar I. in the Banda Sea, or for Babaoe in Timor.

Known from the Malaysian Subregion, including S. Thailand (nr. Bangkok) and Bone-rate I. nr. Lombok, spreading eastward to the Philippines and Celebes, Timor is a new record. Found on *Pteropus vampyrus*, *Pt. alecto*, *Pt. hypomelanus*, *Pt. philippinensis* and *Pt. speciosus*.

Cyclopodia (Cyclopodia) albertisi (Rondani) 1878

NEW GUINEA: 4 ♂♂, 4 ♀♀ (AMNH), Markham R. Valley, Water Rice, NE New

Guinea, off *Pteropus macrotis epularius* (#A. E. 17102), 12. XI. 1959, H. M. Van Deusen; 4 ♂♂ (LDN), Sekroë, Vogelkop Penin., Neth. New Guinea, VII. 1897, S. Schädler.

AUSTRALIA: 2 ♂♂, 1 ♀ (det. M. Bezzi as *C. similis* Speis.), Cairns, N. Queensland, off fruit bat (#18 & 20), J. F. Illingworth.

Originally described from Goram (an islet lying between Ceram and New Guinea), since then recorded from Salawati, Kei and Palau islands, NE Queensland and N. S. Wales, found on several species of the genus *Pteropus* (*gouldi*, *conspicillatus*, *poliocephalus* and *pelewensis*). When ample material from various localities is available, this widely spread species can probably be divided into subspecies.

Cyclopodia (Cyclopodia) australis Theodor 1959

AUSTRALIA: 7 ♂♂, 3 ♀♀ (det. M. Bezzi as *C. similis* Speis.), Cairns, N. Queensland, off fruit bat (#19, 20), J. F. Illingworth.

This species was heretofore known from 4 ♂♂, 1 ♀ from Townsville in Queensland and Darwin in Northern Territory, found together with *C. (C.) albertisi* Rndn. off *Pteropus gouldi*. Six of the 10 specimens at hand were also collected together with *albertisi*, all of them bear the field number 20. The relative abundance, host-preference and intraspecific variability of the two species are to be investigated. In 2 of the specimens examined, there is a short notopleural seta on the right-hand side.

Cyclopodia (Cyclopodia) oxycephala (Bigot) 1860

NEW HEBRIDES: 1 ♂, 3 ♀♀ (AMNH), Malekula, off *Pteropus geddiei* (#79984). 1 ♀ (AMNH), from bottom of bottle containing *Emballonura nigriscens solomonis* (#79910, 79993-80000), Whitney S. Sea Exped.

Originally described from Lifu, Loyalty Is. since then recorded from New Caledonia and New Hebrides, found on *Pteropus ornatus*, *Pt. geddiei* and *Pt. eotinus*.

Cyclopodia (Cyclopodia) inclita Falcoz 1927

SAMOA: 1 ♂, Tutuila, Tafuna, 5. VIII. 1957, W. R. Kellen; 8 ♂♂, 4 ♀♀, Pago Pago, American Samoa, off *Pteropus*, 17. XI. 1959, J. Herring.

FIJI: 1 ♂ (AMNH), Taruini I., off *Pteropus nawiensis* (#69568); 3 ♂♂, Korovou, Tailevu, off flying fox, 28. VII. 1937.

Endemic to Samoa (type locality: Upolu, Apia) and Fiji islands; the type hosts are *Pteropus tonganus* and *Pt. samoensis*.

Cyclopodia (Cyclopodia) bougainvillensis bougainvillensis Theodor 1959

SOLOMON IS.: 5 ♂♂, Kolombangara I., New Georgia Group, 1-12 m, off flying fox, 9. VII. 1959, J. L. Gressitt.

Endemic to the Solomon Is., originally described from 8 ♂♂, 10 ♀♀, from Bougainville and Guadalcanal islands, found on *Pteropus rayneri grandis*, *Pt. rayneri rubianus*, *Pt. mahaganus*, and *Pteralopex atrata anceps*.

Cyclopodia (Cyclopodia) bougainvillensis petersi Maa, n. subsp. Figs. 1-4.

FERGUSSON IS.: 1 ♂ (Holotype), 1 ♀ (Allotype), 1 ♀ (Paratype), Mapamoia,

off flying fox, VI. 1959, W. Peters. Whole type series on slides, in Bishop Museum (#3231).

Head dorsally with 2-3 long and 2-3 short setae on anterior margin, and about 19-22 short setae behind margin between eyes. Thorax with 3-4 notopleural setae.

Male Abdomen: Tergite 1 with about 11 very short setae (13-19 in typical *bougainvillensis* from Kolombangara); claspers comparatively longer and more slender. Basal arc of genitalia with a very distinct neck region and with lower part much wider than high.

Female Abdomen: Tergite 2 posteriorly scarcely emarginated; dorsum with a group of about 29-30 long stout setae (11-15 setae in typical subspecies) near middle between level of 5th and 6th pairs of spiracles, but no short heavy setae at disc of dorsum; lateral sclerites of genital plate somewhat L-shaped, suddenly narrowed before posterior row of spines. Other characters similar to typical *bougainvillensis*.

This subspecies may eventually prove to be a distinct species when more material is available. No nycteribiids have ever been known from the Fergusson Is., the fauna of which is fairly different from that of the Solomon Is.

Cyclopodia (Cyclopodia) pembrotoni Scott 1932

FIJI: 1 ♂, 1 ♀, Wailotua Cave, 13. VII. 1937, J. M. Valentine.

Endemic to the Fiji Is. The earlier record of *Notopteris macdonaldii* as its host is probably incorrect.

Cyclopodia (Cyclopodia) inflatipes Speiser sensu Theodor 1959

NE NEW GUINEA: 2 ♂♂, 2 ♀♀, Nondugl, W. Highlands, off *Syconycteris* sp. (#TMP 345, 349), 15. IX. 1959, T. C. Maa; 1 ♀, Minj, W. Highlands, off *S. crassa* (#TMP 69, 216), 10-16. IX. 1959, Maa; 1 ♂, 2 ♀♀, Kassam, E. Highlands, off *S. crassa* (#A. E. 17057, 17058, 17065), 6. XI. 1959, H. M. Van Deusen & T. C. Maa; 1 ♂, 3 ♀♀ (AMNH), Mt. Wilhelm, E. slope, off *S. crassa* (#A. E. 16066-68), 25. VII. 1959, H. M. Van Deusen; 1 ♀ (AMNH), same data, but off *Nyctophilus* sp. (#A. E. 16205-06), 30. VI. 1959; 2 ♂♂, 3 ♀♀ (AMNH), Mt. Otto, Collins' Sawmill, off *Syconycteris* sp. (#A. E. 16311), 16. VIII. 1959, Van Deusen; 3 ♂♂, 5 ♀♀ (AMNH), Purosa nr. Okapa, E. Highlands, off *S. crassa* (#A. E. 16507, 16508, 16517, 16519), 21-22. IX. 1959, Van Deusen; 2 ♂♂, 1 ♀ (AMNH), Mt. Michael, NE slope, off *S. crassa* (#A. E. 16463), 10. IX. 1959, Van Deusen; 1 ♂ (AMNH), Oomsis Creek, off *S. crassa* (#A. E. 15131), 27. IV. 1959, Van Deusen; 2 ♀♀ (AMNH), Umir, Markham R. Valley, of *S. crassa* (#A. E. 17111), 14. XI. 1959, Van Deusen; 1 ♀ (AMNH), same data, but off *Macroglossus lagochilus* (#A. E. 17122), date 17. XI. 1959; 1 ♂, 1 ♀, Wantoat, Huon Penin., ca. 1800 m, off "*Miniopterus* and other bats," 9. IX. 1957, G. P. Holland.

This species was originally described from NW New Guinea (no further details), found on "*Kiodotus minimus* Geoffr." which is now known as *Macroglossus minimus*. According to Laurie & Hill (1954), the only form of the genus occurring in New Guinea is *M. lagochilus nanus* Matschie. The unique ♀ type specimen of *inflatipes* has never been re-examined by later authors and is apparently lost. I am reluctantly following the interpretation by Theodor (1959) who described both sexes from Mt. Dayman, Maneau Range, Papua. As far as the legs and pregenital plate are concerned, the original description does not seem to fit the material at hand.

From the collecting data, this appears to be a rain-forest dweller and its preferred hosts appear to be *Syconycteris*, to which the genus *Macroglossus* is closely related.

The notopleural setae in this species were described by Theodor as 3 in number. Two of my specimens each have 3 setae at one side and 2 at another; the ♀ off *Macroglossus* has 1 at each side; all others have 2 at each side. The 2 setae on the anterodorsal margin of the head are sometimes absent. In one of the specimens from Kassam, the body is rather heavily parasitized by Laboulbeniales-fungus.

Cyclopodia (Leptocyclopodia) ferrarii ferrarii (Rondani) 1878

VIETNAM (all collected by C. M. Yoshimoto & B. Feinstein off *Cynopterus* sp.): 1 ♀, Blao, 600 m, 23. X. 1960; 1 ♂, Dak Sut, 700 m, 24. I. 1961; 1 ♀, Lao Blao, 24. I. 1961; 3 ♂♂, 2 ♀♀, Nhaho, 50 m, XI. 1960; Ninh-ma, 100 m, 29. XI. 1960; 1 ♀, Phu Xuong, 100 m, 21. XI. 1960; 1 ♂, 1 ♀, Xuan Phu, 50 m, 25. XI. 1960.

CAMBODIA: 6 ♂♂, Kampot, IV. 1961, N. Spencer & B. Feinstein.

THAILAND: 1 ♂, Pangmakampon (Pankampawng) nr. Fang, Chiangmai Prov., off small fruit bat, 16. XI. 1957, J. L. Gressitt.

MALAYA: 1 ♂, 1 ♀, Rantau Panjang nr. Klang, Selangor, off *Cynopterus brachyotis*, 22. VI. & 8. XI. 1961, H. E. McClure.

JAVA: 1 ♂ (LDN), Java (no further details), H. W. v. d. Weele.

N. BORNEO (all collected by R. E. Kuntz off *Cynopterus brachyotis*): 4 ♂♂, 5 ♀♀ (NAMRU #9165), Jesselton, IX. 1960; 12 ♂♂, 4 ♀♀ (NAMRU #8707, 8723, 8740, 8900-02, 8936), Kasiqui, VIII-IX. 1960; 3 ♂♂, 4 ♀♀ (NAMRU #9231, 9600), Ranau, IX. 1960.

New to Vietnam and Cambodia; previously known from India, Ceylon, Burma, Thailand, Malaya, Sumatra, Simalur Is., Billiton Is., Java (type locality: Batavia), and Borneo. *Cynopterus* bats particularly *C. brachyotis*, are probably its preferred hosts. In a colony of *C. brachyotis* in the Pahang Caves, Malaya, however, *ferrarii* appears to be entirely replaced by *Eucampsipoda sundaicum* Theod.

Cyclopodia (Leptocyclopodia) macrura Speiser 1901

AMBOINA: 2 ♂♂ (LDN), Ambon, off "Klein-Fledermäusen," IX. 1922, coll. Ropstein.

NE NEW GUINEA: 2 ♂♂, Lae, off *Dobsonia* sp., 24. VIII. 1957, G. P. Holland; 2 ♂♂, 1 ♀, Nondugl, W. Highlands, off *D. moluccensis* (#TMP 531), 17. IX. 1959, T. C. Maa; 1 ♀, Kassam, 1350 m, E. Highlands, off *D. moluccensis* (#A. E. 16995), 31. X. 1959, H. M. Van Deusen & T. C. Maa; 5 ♂♂, 2 ♀♀ (AMNH), Arau, Kratke Mts., off *D. moluccensis* (#A. E. 16802, 16918-19), X. 1959, H. M. Van Deusen; 2 ♀♀ (AMNH), Gurakor, off *D. moluccensis* (#A. E. 15231), 9. V. 1959, Van Deusen.

Both *C. macrura* Speis. and *Archinycteribia actena* Speis. were originally based upon material collected by F. Dahl at Ralum, New Britain off *Dobsonia peroni* Geoffr. There seems to be some doubt about the correctness of the data. According to Laurie & Hill (1954), *D. peronii* occurs only in the island-chain from Lombok to Timor. And, in 1957 and 1959 respectively, Dr. Holland and I spent some time at Keravat (nr. Ralum) and sampled a number of *Dobsonia* bats but failed to discover *macrura* and *actena*. On the

other hand, these 2 nycteribiids were found together on several occasions in the NE New Guinea and Amboina material before me. The 2 ♀♀ from New Britain off *Dobsonia* sp. collected by me are related to *macrura* but apparently represent an undescribed species. The lateral setae near the abdominal apex are much shorter and not curved apically, and the abdominal plates are different in shape and chaetotaxy from those of *macrura*.

From Theodor's (1959) description and illustrations, my specimens of *macrura* listed above differ in certain points: the apex of the ♂ clasper is adorned along its outer margin with about 10 spiniform setae which are similar in length and arranged like a comb, not radiating from the margin; the inner margin is straight, not curved inward; and the ventral surface between inner and outer margins is naked and has no scattered submarginal setae; sternite 6 of the ♀ abdomen is composed of 2 roundish (not triangular) submedian plates each bearing 2 rows (not 1) of setae.

Genus *Nycteribosca* Speiser 1900

Nycteribosca is one of the largest genera of the Streblidae and is known from nearly 30 species in the Palaetropics. A few of them extend to the temperate countries. The separation of the species is not always easy and a number of their earlier records should be accepted with much caution. And as in other parasites, the correct host data are of great importance to the systematics of the genus.

The genus may be conveniently divided into 3 species-groups, represented by *africana* Wk. (type species of the genus), *gigantea* Speis. and *amboinensis* Rndn. respectively. Most of the Oriental species belong to the last group. The *gigantea* group is probably restricted to the Megachiroptera. Its thoracic dorsum is nearly naked, the body size much larger and the vertex unusually darkened. Perhaps it deserves to be raised to a subgenus.

Nycteribosca gigantea Speiser 1900

NETH. NEW GUINEA: 1 ♂, 1 ♀, Hollandia, 500 m, off *Dobsonia moluccensis magna* Thomas, 27. VIII. 1961, C. Terpstra.

NE NEW GUINEA: 2 ♂♂, 1 ♀, Lae, off *Dobs.* sp., 24. VIII. 1957, G. P. Holland; 1 ♂ (AMNH), Arau, Kratke Mts., off *D. moluccensis* (♯A. E. 16918-19), 20. X. 1959, H. M. Van Deusen.

SOLOMON IS.: 12 ♂♂, 6 ♀♀, Sia Caves, Buka I., off *Dobs.* sp. (♯TMP 1501-1520 & 1561-1577), 8. XII. 1959, T. C. Maa.

FERGUSON IS.: 1 ♀, Mapamoiva, off flying fox, VI. 1959, W. Peters.

As suggested by its name, *gigantea* is one of the largest species of the genus. It can be distinguished from its relatives by the following combination of characters: labella as long as or slightly longer than theca; distal part of 1st basal cell distinctly widened, more than 2× as wide as narrowest part of the cell near base; posterior 1/2 of mesoscutum with about 10 setae at each side; femora 1 and 2 much more robust than 3 in side view.

This species has been recorded from New Britain to India, off *Dobsonia*, *Eonycteris*, *Cynopterus*, *Rousettus*, *Hipposideros* and *Miniopterus*. The original description was based upon 3 ♂♂ collected at Ralum (a small village few km S. of Rabaul), New Britain, off *Dobsonia* "*peronii* Geoffr." and these must be considered as the type locality and type host

respectively. Records from other countries and other hosts were mostly if not entirely derived from determinations without checking with topotypes and were thus confused with *parvior* and possibly even still another species. From the material at hand, *gigantea* is probably restricted to bats of the genus *Dobsonia*.

Nycteribosca parvior Maa, n. sp.

SUMBA: 4 ♂♂ (BSL), Praijawang, Mata Wai Kenor, E. Sumba, off *Rousettus amplexicaudatus* Geoffr., 13. VI. 1949, A. Bühler & Sutter.

MALAYA: 10 ♂♂, 7 ♀♀ (USNM), Selangor, off *Hipposideros* sp., 27. XI. 1952; 21 ♂♂, 26 ♀♀, Batu Caves, Selangor, probably off *Eonycteris spelaea* Dobs., VI. 1959, H. E. McClure. Holo- (♂) and allotype (♀), selected from the Batu Caves series, in Bishop Museum (#3232).

Because of superficial similarities, this species has long been confused with *N. gigantea* Speis. It can be immediately distinguished from the latter species in having only 2-3 setae at each side on posterior part of mesoscutum and having fore and mid femora in side view scarcely more robust than hind one. The ♀ pregenital plate (=7th sternite) is lanceolate, more than 2× as long as wide, with no distinct median hairless area (in *gigantea*, hardly longer than wide, medially broadly naked); anterior part of venter of ♀ proctiger with about 14-18 fine setae before the 2 long discal setae (in *gigantea*, with about only 8 fine setae). Further details of these 2 species will be published in a forthcoming revision of the *gigantea*-group.

Ferris' (1924: 73, figs. 1-2) and Hiregaudar and Bal's (1956: 68, figs. 95-98) descriptions and illustrations of "*gigantea*" from Luzon and India are most probably referable to *parvior*.

Nycteribosca nigriceps Jobling 1934

MALAYA: 15 ♂♂, 18 ♀♀, Gua 'che Manan, cave #2, Pahang, off a mixture of *Cynopterus lucasi* Dobs. and *Megaderma spasma medium* Anders., 16. XII. 1958, J. R. Hendrickson, J. L. Gressitt & T. C. Maa.

Originally described from a unique ♂ off an undetermined bat at Borneo (Bidi caves). *Megaderma* is probably the preferred, if not sole, host of *nigriceps*. A number of *Cynopterus* bats from Vietnam and Borneo were sampled but they failed to yield any Streblidae.

Nycteribosca cucullata Jobling 1934

MALAYA: 3 ♂♂, Pulau Tikus nr. Penang, off *Taphozous m. melanopogon* Temm., 24. XII. 1958, T. C. Maa; 2 ♂♂, same data, but 9. VIII. 1960, H. T. Pagden & B. L. Lim.

The original description was based upon a single ♂ off *T. m. melanopogon* Temm. collected at Ceylon, and since then it was recorded from Mindanao, off *T. m. philippinensis* Waterh. and *Cynopterus brachyotis luzoniense* Peters. Very probably *Taphozous* is the preferred host, on which *cucullata* was often found together with *hoogstraali* Jobl. and *macrops* Jobl. The last-named species is known from the Philippines.

Nycteribosca hoogstraali Jobling 1951

MALAYA: 1♂, 3♀♀, Palau Tikus nr. Penang, off *Taphozous m. melanopogon* Temm., 24. XII. 1958, T. C. Maa; 1♀, same data, but 9. VIII. 1960, H. T. Pagden & B. L. Lim.

New to Malaya. Originally described from 2 ♀♀ off *T. m. philippinensis* Waterh. and *Cynopterus brachyotis luzoniense* Peters from Mindanao. In one of the ♀♀ examined, the posterior scutellar margin is distinctly rounded not "pointed" at middle.

Nycteribosca buxtoni Falcoz 1927

SAMOA IS.: 4 ♂♂, 7 ♀♀, Salailua, Savaii, 20. V. 1924, E. H. Bryan Jr.

Endemic to Samoa (type locality: Malololelei, Upolu) and Fiji Is. The type host is *Emballonura semicaudata* Peale.

Nycteribosca amboinensis (Rondani) 1878

AMBOINA: 2 ♂♂, 2 ♀♀ (USNM), Amboina, F. Muir.

NETH. NEW GUINEA: 21 ♂♂, 21 ♀♀, Danowaria caves nr. Fakfak, Onion Penin., off *Miniopterus* sp., 2. VI. 1959, J. L. Gressitt & T. C. Maa: 1 ♀ (BSL), Mist Camp, 1800 m, Neth. Ind.-Amer. New Guinea Exped. (3rd Archbold Exped.), 13. I. 1939, L. J. Toxopeus.

NE NEW GUINEA: 3 ♂♂, 2 ♀♀, Wantoat, Huon Penin., off bats mostly of *Miniopterus*, 9. IX. 1957, G. P. Holland; 3 ♂♂, 2 ♀♀, Okapa nr. Kainantu, off *Min.* sp., 28. X. 1959, T. C. Maa; 4 ♂♂, 3 ♀♀, Kassam, Kratke Mts., off *Min.* sp. (#TMP 1136, 1138-40, 1185-88), H. M. Van Deusen & T. C. Maa; 3 ♂♂, 6 ♀♀, Sinofi nr. Kainantu, off *Min.* sp. (#TMP 775-80), 30. IX. 1959, T. C. Maa; 1 ♀, same data, but off another *Min.* sp. (#TMP 781-817); 2 ♂♂ (AMNH), Kaindi, 2100 m, off *Min.* sp. (#A. E. 15354), 27. V. 1959, H. M. Van Deusen; 1 ♂, 2 ♀♀ (AMNH), Oomsis Creek, off *Min.* sp. (#A. E. 15126), 27. IV. 1959, Van Deusen; 6 ♂♂, 3 ♀♀ (AMNH), Arau, Kratke Mts., off *Min.* sp. (#A. E. 16942-43, 16952), 22. X. 1959, Van Deusen; 3 ♂♂, 6 ♀♀ (AMNH), Okapa area, off *Min.* sp. (#A. E. 16672-16708), 29. IX. 1959, Van Deusen; 2 ♂♂, 1 ♀ (AMNH), Gurakor, off *Min.* sp. (#A. E. 15194), 5. V. 1959, Van Deusen; 1 ♂, 4 ♀♀ (AMNH), Okapa, off *Min.* sp. (#A. E. 16732-34), 29. IX. 1959, Van Deusen; 1 ♂, 2 ♀♀ (SHMS), Gatop, 600 m, Finschhafen Subdistr., Morobe Distr., off *Min. schreibersi*, X. 1961, B. McMillan.

SOLOMON IS.: 3 ♀♀ (BSL), Guadalcanal I., 1928, E. Paravicini.

AUSTRALIA: 2 ♂♂, Cairns, N. Queensland, J. F. Illingworth.

According to previous records, *amboinensis* ranges from India to Ryukyu Is., New Caledonia and New South Wales and occurs chiefly on *Miniopterus*. Its records from *Eonycteris*, *Rousettus*, *Rhinolophus* and *Hipposideros* are to be verified. My determination of this rather variable species is based upon partly the topotypes from Amboina and partly Jobling's redescription and notes (1934, 1951).

Nycteribosca pretiosa Falcoz 1924

NEW HEBRIDES: 28 ♂♂, 50 ♀♀, Tesmalune, Espiritu Santo, 27-28. IX. 1958, B. Malkin.

Endemic to the New Hebrides. *Miniopterus australis* Tomes is the only recorded host. The apices of the 3rd and 4th longitudinal veins, in several specimens, are scarcely divergent, but the shape and chaetotaxy of the ♀ pregenital plate and the comparatively sparsely setose legs serve as convenient characters to distinguish it from *amboinensis*.

Nycteribosca wernerii Jobling 1951

MINDANAO: 7 ♂♂, 6 ♀♀, Kibawe, 4 km S., Bukidnon, 8. XII. 1959, L. W. Quate.

Mindanao is the type locality of *weneri*, and *Hipposideros diadema griseus* Meyer the only reliable known host.

Nycteribosca minuta Jobling 1934

NETH. NEW GUINEA: 1 ♂, 1 ♀ (USNM), Hollandia, off *Hipposideros galeritus cervinus* Gould, 19. XI. 1944, C. Mohr.

NE NEW GUINEA: 8 ♂♂, 3 ♀♀ (AMNH), Oomsis Creek Camp, off *Rhinolophus euryotis* (A. E. 15070), 16. IV. 1959, H. M. Van Deusen.

NEW BRITAIN: 6 ♂♂, 6 ♀♀, 1 damaged ex., Keravat, 6. IX. 1957, G. P. Holland; 18 ♂♂, 19 ♀♀, Keravat, XI. 1959, T. C. Maa.

As suggested by the name, *minuta* is one of the smallest species of the genus. It can be readily recognized by the body size (wing 1.5–1.7 mm long), the curved stout dark spine-like setae just before the ♀ pregenital plate (7th sternite) and the rather sparse setae on the legs. In the original description, which was based on 1 ♀ and 2 ♂♂, those spine-like setae were drawn as horizontally, zigzaggedly curved, and the pregenital plate as with only 4 long setae. These are not true in my specimens. The spine-like setae are straight in ventral view and curved dorsad at the apex; and there are 2 slightly shorter setae in front of the 4 long ones.

The type locality of *minuta* is Russel I., Solomon Is. The record from Queensland, however, needs confirmation. The known hosts are *Hipposideros* and *Rhinolophus*, but probably the former genus is preferred. A closely related species from Buka I. and New Guinea off *Emballonura* and other bats is similar to *minuta* in size and superficial appearance. But the legs are much more densely haired, the spine-like setae near the ♀ abdominal apex are shorter and indistinct, etc.

Genus **Raymondia** Frauenfeld 1855

Nearly 20 species, chiefly Ethiopian, have been assigned to this genus. Of the 5 known species of the Orient, *joblingi* Hiregaudar & Bal 1956 is perhaps merely a synonym of *pseudopagodarum* Jobl.

Members of the genus clearly fall into 2 subgenera which are briefly defined as follows:

Subgenus **Raymondia** Frfld., s.s.

Type species: *R. huberi* Frfld., indirectly designated by Speiser (1900) who assigned 1 of the 2 originally included species to *Nycteribosca*.

Head narrower than interdistance between the 2 anteriormost major humeral setae; labial theca roundish, about as long as broad. Transverse suture of mesonotum complete. Wing relatively shorter and broader than in *Brachyotheca*.

Raymondia (Raymondia) pseudopagodarum Jobling 1951

VIETNAM: 2 ♂♂, Caryu Danar, 21–24. II. 1960, N. Spencer & B. Feinstein.

BORNEO: 1 ♂, Gomantong Caves, N. Borneo, off *Hipposideros* sp., 23. XI. 1958, T. C. Maa & L. W. Quate.

PHILIPPINE IS.: 2 ♂♂, 3 ♀♀, Basay, Negros Or., 15. XII. 1959, L. W. Quate.

TIMOR: 1 ♀ (BSL), Niki-Niki, VI. 1935, A. Bühler.

Heretofore known from W. China (Szechuan), Upper Burma, Peninsular Thailand, Mindanao and Palawan, off *Hipposideros*, *Rhinolophus* and *Miniopterus*. The record from either *Rousettus* or *Eonycteris* is to be confirmed. In several cases, *pseudopagodarum* and *pagodarum* were found in the same cave. But their relative population density and relative preference to the host are unknown. From our present knowledge, *pseudopagodarum* appears to be less widely distributed and to extend further north than *pagodarum*. There is a slight possibility that the unique Timor specimen before me has been mixed up (because of the tiny size of the insect) and wrongly labelled.

Raymondia (Raymondia) pagodarum Speiser 1900

MALAYA: 1 ♂, 1 ♀ (USNM), Kedah, off *Hipposideros* sp., 4. VI. 1952; 1 ♂, 3 ♀ ♀, Gua 'che Yatim, cave #2, Pahang, off *Rhinolophus* sp., 16. XII. 1958, J. R. Hendrickson, J. L. Gressitt & T. C. Maa; 1 ♂, same data, but Gua 'che Manan, cave #2.

BORNEO: 1 ♂, 1 ♀, Gomantong Caves, N. Borneo, off *Hipposideros* sp., 23. XI. 1958, T. C. Maa & L. W. Quate.

NETH. NEW GUINEA: 1 ♂ (USNM), Hollandia, off *Hipposideros galeritus cervinus* Gould, 5. XI. 1945, C. Mohr.

NE NEW GUINEA: 1 ♂ (SHMS), Roinji, sea level, Finschhafen Subdistrict, Morobe Distr., off *Hipposideridae*, X. 1961, B. McMillan.

NEW BRITAIN: 4 ♂♂, 4 ♀♀, Keravat, 6. IX. 1957, G. P. Holland; 123 ♂♂, 124 ♀♀, Keravat, off 24 *Hipposideros* bats (#TMP 1237-38, 1248-63, 1280-81, 1301-02), 21-23. XI. 1959, T. C. Maa.

SOLOMON IS.: 2 ♂♂, 5 ♀♀, Agric. Exp. Sta., Buka I., off 11 *Hipposideros* bats (#TMP 1471-81), 5. XII. 1959, T. C. Maa.

The 24 *Hipposideros* bats examined by me from Keravat were composed of 6 lots. Two of the lots (4 bats), collected from dry tunnels dug by the Japanese soldiers during the World War II, yielded as many as 155 examples of *R. pagodarum* (i.e., 36 *Raymondia* per bat in average), along with 7 examples of *Nycteribosca minuta* Jobl. The other 20 bats were from moderately to very humid tunnels and yielded only 91 *Raymondia*, 32 *Nycteribosca* and 20 ♀ *Ascodipteron*. The last mentioned genus was found only in 1 lot (16 bats). Furthermore, both in Buka I. and Keravat, the *Hipposideros* bats sampled did not yield any other ectoparasites except very few mites. Presumably there is a certain degree of competition of the Streblidae (particularly *Raymondia*) against other ectoparasites in that area, and the drier habitat of the host favors the build-up of the *Raymondia* population.

R. pagodarum was originally described from Rock Temple of Seven Pagodas in Madras, India and since then recorded from Peninsular Thailand, Upper Burma and New Guinea. *Hipposideros* and *Rhinolophus* are its hosts.

Subgenus **Brachyotheca** Maa, n. subgen.

Type species: *Raymondia lobulata* Speis., by original designation.

Head as broad as interdistance between the 2 anteriormost major humeral setae; labial theca distinctly transverse, about 2× as broad as long. Transverse suture of mesonotum incomplete at middle. Wing relatively longer and narrower than in *Raymondia* s.s.