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SOME NEW AUSTRALIAN NYCTERIBIIDÆ (DIPTERA PUPI-
PARA).

BY

A. MUSGRAVE, F.E.S.,
Entomologist, the Australian Museum.
(Plates xxii-xxiii.)

In a recent paper¹ I listed five species of Nycteribiidæ for Australia. In my present contribution I propose to describe five Australian forms which appear to be new, and give a few notes on known species. Some of these Nycteribiids have been secured by members of the staff of the Australian Museum, while others have been kindly loaned by the Directors of other Australian museums. I am indebted to my colleague Mr. E. Le G. Troughton for identifying for me the bats from which parasites were taken. The insects loaned by kindred institutions are unfortunately without the scientific names of their hosts, the word "bat" with which they are labelled, being valueless to describe as host an animal upon which all Nycteribiids occur. Some of these specimens too, were mounted on card, an unsatisfactory method, while others were mounted in Canada balsam and insufficiently cleared. Nycteribiids should be preserved in 70 per cent. alcohol, though much of the material upon which this paper is based has been cleared and mounted in Canada balsam. I would also acknowledge my indebtedness to Miss Joyce K. Allan for the care taken, and great assistance afforded, in the preparation of the illustrations.

Genus NYCTERIBIA Latreille 1796.

Subgenus NYCTERIBIA Latreille 1796.

The species I propose to describe as new are members of the genus *Nycteribia* s. str. and are all similar in general characteristics to *N. falcozi* Musgrave, and *N. brevicauda* Musgrave, the males differing chiefly in size and in the presence or absence of bristles on the discs of the tergites and sternites, while the females, too, resemble one another in possessing a second tergite subchordate in form and with the posterior margin produced into two acuminate processes bearing bristles which vary in size and number in the different species.

The curious shape of the second tergite of the females has its parallel in the abdomens of the females of *Penicillidia fletcheri* Scott, *P. bathybothyra* Speiser (*P. pumila* Scott), *P. peali* Scott, and in *Tripselia amiculata* Speiser (*Nycteribia (Achrocholidia) fryeri* Scott). Through the courtesy of Dr. Scott I have been able to examine a male and female of *Tripselia amiculata*, and though our Australian forms approximate very closely to them they are at once differentiated by the tibial rings

¹Musgrave—*Rec. Austr. Mus.*, xiv, 4, 1925, pp. 289-300, pls. xliv-xlv.

and the slender legs. The tibial rings are wholly absent in the species I have described and those which I regard as new, but on the under surface of the tibia may frequently be seen light areas apparently homologous with those on the tibia of *Tripselia* but which, nevertheless, do not encircle the tibia.

Scott has stated,² "I have received through Dr. Bequaert 1 ♂ and 1 ♀ from Sumatra, belonging to a form which closely resembles *T. fryeri* except in the following particulars: size smaller, legs noticeably shorter, especially femora, and both femora and tibiae stouter; ventral hind margin of thorax in both sexes fringed with long bristles (absent in typical *fryeri*), three on each side of the middle line, with shorter ones between them. Detailed consideration of this form, stated to be from *Pipistrellus sp.* must be deferred." As Dr. Scott has lent me this material from Tarussan Bay, Sumatra, I have been able to compare the male and female with those species I propose to describe, as well as with the male and female of *Tripselia amiculata*. In a letter to me, Dr. Scott writes, "The *Tripselia sp.?* from Sumatra may not be a true *Tripselia* at all. It may be a *Nycteribia* allied to your *N. falcozi*."

My examination of the two species confirms his first statement, and the Sumatran species may therefore be definitely associated with the Australian species of the subgenus *Nycteribia*. I hesitate, however, in deciding whether the Sumatran species may be referable to *N. falcozi* or not. It is smaller than the typical specimens of *falcozi*, and differs in minor structural details, though it is very similar in form and structure to some *Nycteribiids* I have placed below under *falcozi*.

The Australian forms of *Nycteribia* s. str. are quite unlike the European and Asiatic forms, except for the absence of the eyes and the somewhat similar shape of the limbs, the abdominal segmentation being on a very different plan. Our species at first glance would seem to have closer affinities with the genus *Tripselia*, except for the reasons stated by Scott in his remarks on the Sumatran insect.

Key to the Australian species of the genus *Nycteribia* s. str.

Females.

- A. Small species of 1·5 mm. in length.....*halei* n. sp.
- AA. Larger species exceeding 1·5 mm. in length.
 - B. Species with lobes beneath the acuminate processes of tergite 2.
 - C. Lobes rounded and bearing many spines.....*troughtoni* n. sp.
 - CC. Lobes pointed and bearing few spines.....*burrelli* n. sp.
 - BB. Species without lobes beneath the acuminate processes.
 - D. Long bristles on the posterior margin of basal tergite half the length of those on the acuminate processes of tergite 2.....*brevicauda* Musgrave
 - DD. Long bristles on the posterior margin of basal tergite considerably more than half the length of, or as long as those on the acuminate processes of tergite 2.
 - E. Disc of tergite 2 densely clothed with minute bristles...*multispinosa* n. sp.
 - EE. Disc of tergite 2 sparsely clothed with minute bristles.
 - F. Long bristles on posterior margin of basal tergite more than half the length of tergite 2.....*longispinosa* n. sp.

²Scott—Parasitology, ix, 4, 1917, p.608.

FF. Long bristles on the posterior margin of basal tergite less than half the length of tergite 2.....*falcozi* Musgrave

As the males do not present differentiating characters of any value they are not included in the key.

NYCTERIBIA FALCOZI *Musgrave*.

(?) *Nycteribia (Acrocholidia) oceanica* Speiser (not Bigot) Arch. Naturg., lxvii, 1, 1901, p. 41.

Nycteribia (Nycteribia) falcozi Musgrave, Rec. Austr. Mus., xiv, 4, 1925, p. 292, pl. xlv, and pl. xlv, figs. 5-7.

Hab.—Queensland: Cunnamulla, 9 males and 8 females mounted in Canada balsam, and others on card, collected by Mr. H. Hardcastle on a bat.

New South Wales: Wagga, 25.1.1925, 1 ♀ collected by Mr. H. V. Brann from a bat.

Tasmania: near Bicheno, East Coast, 4 ♂ 3 ♀, on *Eptesicus pumilis* Gray, collected by Professor T. T. Flynn of the University of Tasmania.

Note.—I refer all the above specimens to this species as I cannot find characters to separate them from this form. They differ however from the typical *falcozi*, in that they are smaller and the limbs proportionally shorter. The males of the Cunnamulla specimens measure from 1.8 to 2.1 mm. in length, and the females from 1.7 to 2.3 mm. The males of the specimens from near Bicheno measure from 1.7 to 2 mm., and the females from 1.6 to 1.7 mm.

NYCTERIBIA TROUGHTONI, *sp. nov.*³
(Pl. xxii, figs. 1-4.)

Length.—♂ 2.1-2.3 mm., ♀ 2-2.3 mm.

Colour.—Yellow-brown. Specimens mounted in Canada balsam yellowish.

Head bare, except for a few moderately long bristles on the vertex and a few short ones on the anterior margins of the cheeks directed forwards.

Thorax beneath nearly a third broader than long, almost flat, the surface covered with minute bristles. The median longitudinal furrow broadened behind the middle and terminating in a depression. Hind margin bearing a fringe of six long bristles, three on each side of the middle line, and towards the lateral angles, while along the middle and interspersed with these are smaller bristles. On the dorsal surface, the bristles in front of the halteres pits vary in number; thus in the specimens examined by me the bristle formula reads as follows:—

Register No.	Left Side	Right Side	Sex
K. 51801 12	11	♀
K. 51802 13	13	♀

³Named in honour of my friend Mr. E. Le G. Troughton, Mammalogist, Australian Museum.

Legs.—Front coxæ twice as long as broad, provided with short stout bristles towards the anterior margin, those on the posterior margin being longer and few in number.

The femora bear numerous short bristles on their anterior surfaces and are much more closely bespined than in *Nycteribia falcozi*. The posterior dorsal portions are bare, as are also the ventral posterior surfaces.

The femora are nearly three times as long as broad and are much broader than in *falcozi* or *brevicauda*.

♀ *Abdomen* (Dorsal aspect) (Pl. xxii, fig. 1). *Basal tergite* small and not reaching to the sides of the abdomen, its posterior margin widely sinuate and bearing at the posterior angles 6-7 large bristles of equal length. At the sides of the disc are some short, dark, bristles, while the middle is bare. *Tergite 2* long and broad, subchordate in form and divided longitudinally into two halves by a faint irregular line. Each side is somewhat convexly curved anteriorly and concavely sinuate posteriorly, the posterior margin being produced into two acuminate processes. Each acuminate process bears 4-5 long, dark, stout bristles and 4-5 short, dark thorn-bristles. The disc is bare for the most part, but towards the centre of the tergite and on either side of the dividing line occurs a group of scattered short bristles and other groups exist at each anterior angle. A few bristles are present near the lateral margins of the abdomen. Beneath the produced posterior margin, and connected on either side with the connexival membrane, is a pair of rounded lobes carrying on their apices an outer row of 4-5 long stout spines, and an inner row of 1-3 shorter ones. These bristles may vary in size and number in the same specimen. *Anal segment* broader than long, its surface bare. Anteriorly each side is convexly curved, while the hind margin is emarginate. From each posterior angle spring two long stout dark bristles and a group of thorn bristles.

(Ventral aspect) (Pl. xxii, fig. 4). *Basal sternite* twice as broad as long, the middle line furrowed, the surface with 5 irregular rows of short bristles. Ctenidium with 68 spines. *Sternites 2* and *3* are very short, and in the middle are covered by the spines of the ctenidium, the ends of the bristles projecting beyond the ends of the spines. The bristles of these sternites are longer at the sides than towards the centres of the margins. *Sternite 4* short, its surface bare, the bristles on the hind margin resembling those of the preceding sternites but spaced farther apart. *Sternite 5* much longer, and with a row of bristles on the hind margin resembling those of the other sternites and with 2-3 long bristles at the sides. In front of the hind margin occur one or two rows of small bristles. *Subgenital plate* broad, membranous, bare, with a row of short bristles on the posterior end of the disc. Between this row and the margin, at each posterior angle, are situated 2 moderately long suberect bristles. On the rounded hind margin is a group of 14 bristles, consisting of 8 short bristles situated in the middle, on either side of which are 2 pairs of longer ones, while at the outer sides of these again is a single short bristle.

♂ *Abdomen* (Dorsal aspect) (Pl. xxii, fig. 2). *Basal tergite* small, trapezoidal, and bearing a number of small bristles. The tergite is almost

entirely hidden by the flexing of the next tergite, and the suture is not clearly defined. *Tergite 2* bearing one or two rows of minute bristles near the anterior margin and a group of bristles at each anterior angle. The long bristles on posterior margin extend to the border of the next tergite, and alternating with each pair of bristles are one or two minute bristles. *Tergite 3* bare, the long bristles on the posterior margin extend only a little more than half way on to the next tergite, owing to the flexure of the abdomen. Minute bristles alternate with the long ones. *Tergites 4-5* bare, bristles on posterior margin shorter in the middle, those at the sides extend as far as, or beyond, the border of the next tergite. The small bristles which alternate with the long ones are much longer than the corresponding bristles of the preceding tergites. *Tergite 6* bare on the disc. On the posterior margin the long hairs are less numerous than in the other tergites, though some are extremely long and extend more than half the length of the anal segment. *Anal segment* moderately short, bare towards the anterior margin, covered with evenly spaced bristles towards the posterior margin and with two long erect bristles in the apical third. At the lateral margins are erect bristles while 2 long and 2-3 short bristles occur on each posterior angle.

(Ventral aspect) (Pl. xxii, fig. 3). *Basal sternite* with middle line slightly furrowed, the surface with irregular rows of short bristles and a group of bristles near each anterior lateral margin. Ctenidium with 50-60 spines; 54 in allotype. *Sternites 2 and 3* have their posterior margins beset with long bristles, varying somewhat in length, those at the sides being much longer than those in the middle. The discs bare, except for a few bristles towards the lateral margins. *Sternite 4* slightly longer than the two preceding sternites. Posterior margin curved, and bearing in the middle short, stout, thorn-bristles arranged in two rows, one on the margin of 12, the other in front of 13 bristles, though these numbers are subject to variation. Other bristles of different lengths alternate with the thorn-bristles and extend on either side, those towards the lateral margins being much longer than the others. A row of bristles occurs in front of the marginal series. *Anal segment* with a number of erect hairs at the sides. Claspers strong, reaching almost to the anterior margins, their apices directed downwards. On their outer sides are short slender bristles directed outwards, and towards the base are a series of short bristles, their apices directed inwards, and a pair of long erect bristles.

Hab.—New South Wales: Glenroy, Hartley, April, 1923, 2 ♀, on *Chalinolobus gouldi* Gray, collected by Mr. Robert Stein; Smithfield, 27th May, 1925, 2 ♀, on *Chalinolobus gouldi* Gray, collected by Mr. R. Stein; Munni, Williams River, 27th July, 1921, 1 ♂ on *Chalinolobus gouldi* Gray, collected by Mr. N. Cayley. South Australia: Lucindale, 3 ♂ 6 ♀, collected by Mr. F. Secker from an undetermined host.

Types.—Holotype ♀ K 51801, and paratype ♂ and females in the collection of the Australian Museum. Allotype ♂ and paratype male and females in the collection of the S.A. Museum.

Material examined.—The nine specimens from Lucindale, South Australia, forwarded on loan from the South Australian Museum, were mounted on card, and of these two males and a female are badly damaged.

Three females and two males have been cleared and mounted in Canada balsam. I have regarded the males as belonging to the same species as the females, as the card upon which they were mounted says "on bat." A single male collected at Munni, Williams River, N. S. Wales, from the same species of bat as that on which the holotype was secured, appears to be identical with the males from Lucindale, S. Australia. I have therefore associated it with this species. The material collected by Mr. Stein has been cleared and mounted in Canada balsam, with the exception of one female from Smithfield, New South Wales, preserved in alcohol. The holotype ♀ is from Glenroy, Hartley, New South Wales.

Note.—The female is a stout, thick-set insect with the thorax as broad as half the total length. It may be recognised in cleared specimens by the rounded lobes bearing spines, which are situated beneath the produced posterior margin of tergite 2, but in specimens preserved in alcohol, these lobes are hidden and only the ends of the bristles may be seen projecting from the sides. The male has the discs of the tergites devoid of minute bristles.

NYCTERIBIA MULTISPINOSA, *sp. nov.*

(Pl. xxii, figs. 5-10.)

Length ♂ 2.9-3 mm., ♀ 2.6-2.9 mm.

Colour yellow-brown, specimens in Canada balsam yellowish.

Head bare, except for a few bristles on the vertex.

Thorax beneath broader than long. The hind margin bears 8 long bristles, the median pair being shorter than the others and these are interspersed with smaller bristles. On the dorsal surface, the bristles in front of the halteres pits vary in number from 14-18 in different specimens.

Legs.—Front coxæ $1\frac{1}{4}$ times as long as broad, provided with short, stout bristles towards the anterior margin, those on the posterior margin being longer. Front pair of femora bearing numerous short bristles on their anterior surfaces, while the posterior dorsal and ventral surfaces are devoid of them; middle pair with anterior and posterior dorsal surfaces densely covered with bristles, the posterior ventral surfaces bare. Otherwise the legs conform to those of *troughtoni*, *falcozi*, and other Australian species of the genus.

♀ *Abdomen* (Dorsal aspect) (Pl. xxii, fig. 5) *Basal tergite* small, trapezoidal, and not reaching to the sides of the abdomen, the hind margin widely sinuate and bearing on either side of the groove a row of 7-8 long, and 3-5 small bristles. The bristles of this row may vary in number on either side of the sinuation. At the sides of the disc are short, dark bristles, while the middle is bare. *Tergite 2* long, moderately broad, subchordate in form, and divided longitudinally by a faint median line. Anteriorly each side is slightly convex while posteriorly it is concavely sinuate, the posterior margin being produced into two acuminate processes. (In females in which the abdomen is distended these curves are more accentuated.) Each acuminate process bears a row of long bristles which may vary in number on the two processes in the same specimen. (In the holotype there are seven on each process.) In front of the long

bristles are two rows of small thorn-bristles, consisting of 7-8 in each row, while the area in front of this again is bare, or one or two thorn-bristles may be present on the lateral concavity. On either side of the median dividing line, a number of short dark bristles extend from the inner side of the posterior margin towards the basal tergite, and these in conjunction with the light-coloured connexival membrane along the dividing line, give the insect the appearance of having a definite parting in the hair. This whitish furrow is particularly noticeable in specimens preserved in alcohol. The rest of the tergite is covered with irregular transverse rows of similar short bristles, with a group at each anterior angle, as well as a series of 7-8 moderately long bristles on the lateral margins.

Beneath the produced posterior margin is a row of 2-4 moderately long bristles. *Anal segment* short and tapering slightly, its surface bare; at the sides and anterior lateral angles are a number of bristles. Posterior margin emarginate, from the posterior angles are given off two long bristles, while smaller ones occur along the posterior margin, and moderately long ones along the lateral margins.

(Ventral aspect) (Pl. xxii, fig. 6). *Basal sternite* slightly furrowed, the surface with seven irregular rows of short bristles. Ctenidium with 56-66 spines. *Sternite 2* short, and with a row of bristles on the hind margin covered; medially by the ctenidium. (In females in which the abdomen is distended the sternite is equal in length to the two succeeding sternites, and may bear six irregular transverse rows of small bristles.) *Sternite 3* short, its surface bare, the row of bristles on posterior margin resembling those of preceding sternite. *Sternite 4* similar to preceding but longer and bearing long hairs at the sides. A row of short bristles is present in front of these and is situated towards each lateral margin. (In gravid females these bristles extend more towards the middle line.) *Sternite 5* longer, equal to the two preceding sternites together, with a series of long bristles on the hind margin interrupted medially, and carrying in front towards the lateral margins two irregular rows of bristles. *Subgenital plate* broad, bare, carrying on its posterior end on the disc an irregular row of bristles interrupted medially. Two short and 2-3 long bristles occur between this row and the hind margin. Posterior margin rounded with a row of about 14 long bristles and some shorter ones towards the sides.

♂ *Abdomen* (Dorsal aspect) (Pl. xxii, fig. 7). *Basal tergite* small, trapezoidal and almost hidden by the arching of the next tergite. *Tergite 2* covered with irregular rows of tiny black bristles, the hind margin bearing a row of long bristles some of which extend to the border of the following tergite. *Tergite 3* covered with rows of tiny bristles and bearing on the posterior margin rows of long bristles interspersed with shorter ones, the long ones extending more than half way on to the next tergite. *Tergite 4* with irregular rows of small bristles, which increase in length as they near the posterior margin, and leave a bare area towards each lateral margin. On the posterior margin the long bristles are interspersed with smaller ones, the longer bristles extending as far as the border of the next tergite. *Tergite 5* provided with rows of bristles similar to those of the last tergite, but the rows are shorter and leave a larger portion of the

sides bare. On the posterior margin the long bristles, which are interspersed with shorter ones, extend well past the border of the next tergite. *Tergite 6* bare. On the posterior margin the longer bristles are less numerous and the centre is occupied by shorter ones, but two of the long bristles extend almost the full length of the anal segment. *Anal segment* long, bare towards anterior margin, otherwise covered with short bristles fairly evenly spaced and with two moderately long erect bristles in the apical third. At the sides are erect bristles, and from each posterior angle springs two long and 3-4 short bristles.

(Ventral aspect) (Pl. xxii, fig. 10). *Basal sternite* with middle line furrowed. Surface with irregular rows of small bristles and a group of bristles near each anterior lateral margin. Ctenidium with 60 spines. *Sternite 2* covered for the most part by the spines of the ctenidium, but with two rows of tiny bristles on the disc and a row of long bristles extending beyond the border of the next sternite. A group of bristles is present at each posterior lateral margin. *Sternite 3* bare but for a few tiny bristles near the posterior margin. The bristles on the posterior margin are short towards the middle but increase in length towards the sides and extend beyond the border of the next sternite. *Sternite 4* longer than the two preceding sternites. Posterior margin curved, and bearing in the middle short, dark thorn-bristles arranged in two rows, one on the margin of 13, the other in front of 10, bristles. Other bristles of varying length occur on either side of these and in front of the marginal series is a row of long semi-erect bristles. *Anal segment* with a number of erect bristles at the sides. Claspers strong and reaching to the anterior margin, provided with the usual series of short and long bristles on the base and sides.

Hab.—New South Wales: Berrima, 3,000 ft., 3 ♂, 7 ♀, on *Scoteinus rüppellii* Peters, collected by Mr. T. V. Sherrin; Barrington River, 4,800 ft., January 26th, 1925, 1 ♂, on *Scoteinus rüppellii* Peters, collected by Mr. T. G. Campbell.

Types.—In the collection of the Australian Museum, holotype ♀, register number K 55122, allotype ♂ register number K 55129, and paratypes.

Material examined.—Three females, one the holotype, and one male of the Berrima series have been cleared and mounted in Canada balsam, and also the male from the Barrington River which appears to belong to this species. The remainder of the material is preserved in alcohol. The abdomen of the holotype female is not distended, but the other females all appear to have distended abdomens.

Note.—The most outstanding character of the female is the dense pubescence on the disc of tergite 2, which, in most specimens preserved in alcohol, has a distinct longitudinal parting through the centre of the tergite due to the whitish connexival membrane on either side of the dividing line showing through. This is particularly noticeable in females in which the abdomen is distended (Pl. xxii, figs. 8, 9, the illustration prepared from a paratype preserved in alcohol). In one specimen, register number K 55127, the minute bristles extend on to the dividing line.

NYCTERIBIA HALEI, *sp. nov.*⁴
(Pl. xxiii, figs. 1-3 and 6.)

Length ♂ 1.6 mm., ♀ 1.5 mm.

Colour.—Specimens mounted in Canada balsam, light-yellowish.

Head bare, a few bristles on the vertex.

Thorax beneath nearly as long as broad, otherwise resembling that of *falcozi*, the bristles on the posterior margin consisting of 6 long bristles interspersed with shorter ones. The bristles in front of the halteres pits on the dorsal surface, number 10-11 on each side.

Legs.—Front coxæ more than twice as long as wide, otherwise nothing noteworthy.

♀ *Abdomen* (Dorsal aspect) (Pl. xxiii, fig. 1). *Dorsal tergite* trapezoidal, the lateral margins darkly-pigmented, the posterior margin sinuate and bearing on either side of the groove 4-5 long bristles and several shorter ones. The disc is bare, but a few bristles are present at the anterior angles. *Tergite 2*, long, subchordate, and divided by a faint median line. Each half is convexly rounded anteriorly and concavely sinuate posteriorly, the posterior margin being acuminately produced. Each acuminate process bears 2 long and 3-4 short spines. On each side of the dividing line are one or two short dark bristles, and a few are situated at the anterior angles, otherwise the disc is bare. Beneath the posterior margin is a series of 3-4 spines, their apices directed outwards. On each side of the tergite on the lateral margins is a series of bristles three in number. *Anal segment* bare, with a few bristles at the lateral margins and posterior angles.

(Ventral aspect) (Pl. xxiii, fig. 6.) *Basal sternite* with 4 irregular rows of bristles. Ctenidium with approximately 60 spines. *Sternite 2* bearing several transverse rows of small bristles on the disc, and a row of long bristles on the posterior margin. *Sternites 3 and 4* bare on the disc, the posterior margin indicated by a row of long spines. The connexival membrane is here indented at the sides. *Sternite 5* bare on the disc, but there is a transverse row of fine bristles in front of the long bristles on the posterior border. *Subgenital plate* broad, membranous, bare; a series of bristles occurs on the posterior end and at the lateral margins.

♂ *Abdomen* (Dorsal aspect) (Pl. xxiii, fig. 3). *Basal tergite* hidden by the arching of the next tergite. *Tergite 2* with a few scattered minute bristles on the disc and at the sides, while the long bristles on the posterior margin are interspersed with minute bristles. *Tergite 3* with a few minute bristles on the centre of the disc and long and minute intercalary bristles on the posterior margin. *Tergites 4 and 5* are similar in appearance, being bare on the disc and with long and minute intercalary bristles on the posterior border. *Tergite 6* similar to preceding, but the median of the long bristles extend well down the anal segment. *Anal segment* long and tapering, bare on anterior half, but with erect bristles on posterior half and lateral margins. Posterior angles each with the usual 2 long and 3 short bristles.

(Ventral aspect) (Pl. xxiii, fig. 2.) *Basal sternite* with three irregular rows of minute bristles on the posterior part of the disc, anterior portion

⁴Named in honour of the collector, Mr. H. M. Hale.

bare. A group of bristles is present on each anterior lateral angle. Ctenidium with approximately 60 spines. *Sternite* 2 bare on the disc, except for a few minute bristles. On the posterior margin the bristles are of varying length. *Sternite* 3 longer than the preceding sternite, bare on the disc, and with bristles of varying length on posterior margin, those towards the sides being the longest. *Sternite* 4 equal in length to the two preceding sternites, bare on the disc, the posterior margin convexly curved and bearing medially two transverse rows of small black thorn-bristles, one lying on the margin the other slightly in front of it. In each row are eight bristles. In front of the thorn-bristles is a row of fine bristles extending the length of the sternite, while bristles of varying length occur on either side of the thorn-bristles. *Anal segment* with a number of erect bristles at the sides and the anterior lateral angles. Claspers strong, their apices apparently not reaching the anterior margin; a long bristle springs from the base of each clasper.

Host.—*Chalinolobus morio* Gray.

Hab.—South Australia: Cave at Arkaba, 2,000 ft., September, 1924, 2 ♀ 1 ♂, collected by Mr. H. M. Hale.

Types.—Holotype ♀, register number K 51821, allotype ♂, register number K 51819, and paratype ♀ in collection of Australian Museum.

Note.—This is the smallest example of the subgenus I have seen.

NYCTERIBIA BURRELLI, *sp. nov.*⁵

(Pl. xxiii, figs. 4, 5, 9, 12.)

Length ♂ 2.1 mm., ♀ 2.3 mm.

Colour.—Specimens mounted in Canada balsam light-yellowish. Male abdomen more darkly pigmented than that of female.

Head bare, except for a few hairs on the vertex.

Thorax beneath, broader than long, the surface covered with minute bristles, otherwise the thorax is similar to that of other species of the genus. The bristles on the dorsal surface in front of each halteres pit are approximately 12 in number.

Legs.—Front coxæ twice as long as wide, otherwise there appears to be nothing noteworthy about them.

♀ *Abdomen*.—(Dorsal aspect) (Pl. xxiii, fig. 9.) *Basal tergite* trapezoidal, small, its posterior margin widely sinuate, and bearing on either side of the sinuation two moderately long black spines and some small bristles. The long bristles are proportionately much shorter than the corresponding bristles of any species I have seen. *Tergite* 2 long, subchordate, and divided longitudinally by a faint median line. Each side is convexly curved anteriorly, and concavely sinuate posteriorly, the posterior margin of the tergite being produced into two acuminate processes. Upon each acuminate process are borne two long, stout bristles and six small thorn-bristles. On either side of the dividing line are a number of minute bristles, which produce an effect similar to that of tergite 2 of *multispinosa*, viz., that of a parting down the centre of the tergite. On the anterior angles are some fine bristles, while the usual

⁵Named in honour of the collector, Mr. H. Burrell.

series of moderately long bristles occurs on the lateral margins towards the posterior end, and vary in number from 6-8. Beneath the acuminate processes, and anterior to the anal segment, are two slender pointed tubercles projecting laterally, each of which bears at its distal extremity two black thorn-bristles, while a third bristle may be present on the tubercle anteriorly. *Anal segment* short, broad, its surface bare. The posterior margin is emarginate, and from each posterior angle is given off 4 long and some smaller bristles, while two small bristles may occur on the lateral margins.

(Ventral aspect) (Pl. xxiii, fig. 12.) *Basal sternite* with middle line slightly furrowed, and the surface with about seven irregular transverse rows of short bristles. Ctenidium with approximately 64 spines. *Sternites* 2, 3 and 4 short, and bearing on their posterior margins a row of bristles. *Sternite* 2 is almost entirely hidden by the spines of the ctenidium, owing to the twisting of the abdomen. *Sternite* 5 longer than the three preceding sternites. The posterior margin bears a row of bristles resembling those of the other sternites, but spaced further apart, while a second row of fine bristles is situated on the disc in front of the marginal series. *Subgenital plate* broad, membranous bare. On the disc towards the posterior margin, is an irregular transverse row of bristles, while several sub-erect bristles occur between the row and the margin. On the posterior margin itself is a row of 13 bristles, those in the middle being short and arranged in a group of six, while a pair of long bristles occur on either side of these, and shorter ones on the outer sides of these again. Two long bristles, and some short ones are present on the lateral margins.

♂ *Abdomen*.—(Dorsal aspect) (Pl. xxiii, fig. 5.) *Basal tergite* hidden by the arching of the next tergite. *Tergite* 2 bears on the posterior margin a row of long bristles interspersed with one or two minute bristles. A row of minute bristles occurs in front of the marginal row, and a few bristles at the anterior angles, otherwise the disc is bare. *Tergite* 3 with a posterior marginal series similar to the preceding tergite, and a central transverse row of minute bristles, otherwise bare. *Tergite* 4 bare. The long bristles on the posterior margin are interspersed with small bristles which are longer than the corresponding ones of the preceding tergites. *Tergite* 5 similar to preceding, but some of the long bristles are much longer than any of the previous tergites, and extend well down on to the anal segment. *Tergite* 6 bare on the disc. The long bristles are fewer in number, and the intercalary bristles are darker and more in evidence. The median long bristles are extremely long and appear to be equal in length to the anal segment. *Anal segment* bare on the disc anteriorly, but posteriorly covered with short erect bristles, while the usual two long and three small bristles occur at each posterior angle.

(Ventral aspect) (Pl. xxiii, fig. 4.) *Basal sternite* with middle line slightly furrowed, the surface with irregular rows of minute bristles. Ctenidium with approximately 60 spines. *Sternite* 2 hidden almost entirely by the spines of the ctenidium, only the ends of the long bristles borne on the posterior margin being visible. *Sternite* 3 with a posterior marginal series of long bristles, in front of which is a transverse row of minute bristles; otherwise the disc is bare. *Sternite* 4 longer than the two preced-

ing together. Posterior margin curved, and bearing in the middle stout thorn-bristles arranged in two rows, one on the margin of 11, the other in front, of about 8. On either side of these extend bristles, and in front of the thorn-bristles is the usual row of fine bristles. *Anal segment* appears to present little of noteworthy value. The claspers would appear to reach to the anterior margin, and there is the usual row of lateral bristles, and the bristles of the claspers are similar to those of other species.

Host.—*Chalinolobus morio* Gray.

Hab.—New South Wales: Caermarthen, Manilla, November, 1923, 1 ♂ 1 ♀, collected by Mr. H. Burrell.

Types.—The holotype ♀ register number, K 51823, and the allotype ♂ register number, K 51822, are in the Australian Museum.

Note.—The female of this species presents characters which readily separate it from any other known species of the genus *Nycteribia*, viz., the relatively shorter spines on the basal tergite, and the two slender tubercles beneath the produced posterior margin of tergite 2. The male like others of the genus appears to be devoid of distinguishing characters.

NYCTERIBIA LONGISPINOSA, *sp. nov.*

(Pl. xxiii, figs. 7, 8, 10, 11.)

Length ♂ 2·7 mm., ♀ 2·3-2·4 mm.

Colour of specimens mounted in Canada balsam yellowish, the chitin in places darkly pigmented.

Head bare, except for a few moderately long bristles on the vertex.

Thorax broader than long, almost flat, the surface covered with minute bristles. Median furrow broadened behind the middle and ending in a depression. Hind margin with typical fringe of bristles consisting of 6-8 long bristles interspersed with shorter ones. On the dorsal surface the bristles in front of the halteres pits vary in number from 13-16.

Legs.—Front coxæ slightly more than twice as long as broad, lightly beset with bristles, otherwise the legs resemble those of *multispinosa*.

♀ *Abdomen*.—(Dorsal aspect) (Pl. xxiii, fig. 11.) *Basal tergite* large, trapezoidal, and bearing on the disc a number of short bristles, the posterior margin darkly pigmented, widely sinuate, and bearing on either side of the groove a row of 9 long and 4 small bristles of which the median are the longest. The number is subject to variation. The long bristles extend half the length of the next tergite, and provide one of the chief differentiating features of the species. *Tergite 2* long, subchordate, divided longitudinally by a faint irregular line. Each side is convexly curved anteriorly, and concavely sinuate posteriorly, its posterior margin being produced into an acuminate process with the apex directed outwards. Each acuminate process bears 4-6 long stout bristles, equal in length to the longest of the preceding tergite, and in front are 6 small stout thorn-bristles, though the numbers are not always constant. On each side of the dividing line occur a few short bristles, while a group of small bristles are present at each anterior angle, and some scattered ones on the disc near the lateral margins and extending from the anterior margin to the lateral concavity. A series of 4-5 moderately long bristles is borne on the lateral margins. Below the acuminate processes is a chitinous area carrying on its rounded posterior margin 5-6 sub-erect

bristles situated towards the lateral angles. *Anal segment* broader than long, its surface bare. Anteriorly each side is convexly curved while the hind margin is emarginate. Three or four bristles occur on the lateral margins, and 2 long and 3 short bristles are present on each posterior angle.

(Ventral aspect) (Pl. xxiii, fig. 10.) *Basal sternite* with middle line clearly furrowed, the surface with irregular rows of short bristles. *Ctenidium* with approximately 70 spines.

The abdomen is deeply indented at the sides in the holotype, owing to the collapse of the connexival membrane between the third and fourth sternites.

Sternite 2 short, and in the holotype almost entirely hidden by the spines of the ctenidium and a fold of the connexival membrane. *Sternite 3* short, bare, its posterior margin indicated by a row of bristles. *Sternite 4* similar to preceding, but the bristles on the posterior margin are longer, particularly towards the sides. A few bristles are present at the sides in front of the posterior marginal row. *Sternite 5* longer than the preceding sternites, and bearing two rows of bristles, a posterior marginal row of long bristles, and an inner row of small bristles. *Subgenital plate* broad, membranous, bare, though at the posterior end, on the disc, occurs a row of short bristles. Between this row and the posterior margin are situated two pairs of long sub-erect bristles. Posterior margin rounded, and bearing a row of 14 long and a few short bristles.

♂ *Abdomen*.—(Dorsal aspect) (Pl. xxiii, fig. 8.) *Basal tergite* small, trapezoidal, fore-shortened, and bearing a number of short bristles. *Tergite 2* bearing irregular rows of curved small bristles on the disc, and a posterior marginal row of long bristles interspersed with small ones. Lateral margins strongly pubescent. *Tergites 3* and *4* with irregular rows of small bristles on the disc, and a posterior marginal row resembling that of the preceding tergite. *Tergite 5* resembles tergite 3-4, but the bristles on the disc are fewer in number and the tergite is chiefly bare. *Tergite 6* similar to preceding, but some of the median long bristles extend more than half-way down the next tergite. A row of small bristles occurs in front of the posterior marginal row. *Anal segment* moderately long and blunt, bare towards the anterior margin, otherwise covered with short bristles and with two long erect bristles in the apical third. At the sides are a number of bristles, while two long and three short bristles spring from each posterior angle.

(Ventral aspect) (Pl. xxiii, fig. 7.) *Basal sternite* resembles that of the female, but the small bristles on the disc are closer together. *Ctenidium* with approximately 60 spines. *Sternite 2* with three rows of small bristles on the disc their length increasing towards the lateral margins. Posterior margins with long bristles, many of which reach to the border of the next sternite. *Sternite 3* bare in the middle, but a few small bristles are present towards the lateral margins. On the posterior margin is a series of long bristles, and an inner widely spaced row of small bristles. *Sternite 4* as long as the two preceding sternites. Posterior margin curved, bearing in the middle short, stout, thorn-bristles arranged in two rows, one on the margin of 14, the other in front, of 13 bristles. On the posterior margin also occurs a number of bristles, those at the posterior angles

being the longest. In front of the marginal series is a row of slender bristles. Disc bare, except for a few short bristles towards the lateral margins. *Anal segment* with a number of bristles at the sides towards the basal end. Claspers strong, black-pigmented, extending to the anterior margin. On the outer side of each clasper are a series of 7 slender bristles with their apices directed outwards, and towards the base are some short bristles, and a single long bristle directed downwards.

Hab.—New South Wales: Sans Souci, Botany Bay, Sydney, 20th September, 1923, 4 ♀ 2 ♂, on *Scoteinus ruppellii* Peters, collected by Mr. J. H. Wright; Ropes Creek, 1 ♀, on *Scotophilus* (?) *sp.*

Types.—Holotype ♀, register number K 51807, allotype ♂, register number K 51805, and remaining five paratypes are mounted in Canada balsam and are in the Australian Museum collection.

Material examined.—Two of the females, one from Botany Bay (holotype) the other from Ropes Creek, have their abdomens distended; two have them normal, while the remaining female is badly damaged. One of the males is immature. The males approximate closely to those of *multispinosa*, but the females are readily distinguishable from any other species by the presence of the long spines on the posterior margins of the basal tergite and tergite 2.

Subgenus LISTROPODA Kolenati 1857.

NYCTERIBIA (LISTROPODA) PARILIS Walker.

Nycteribia parilis Walker, Journ. Linn. Soc. Lond., v, 1861, p. 300.

Nycteribia (Listropodia) parilis Scott, Ann. Mag. Nat. Hist., (8), xiv, 1914, p. 231, pl. xii, figs. 20-23 ♂ ♀.

Nycteribia (Listropoda) parilis Musgrave, Rec. Austr. Mus., xiv, 4, 1925, p. 298.

Note.—This form hitherto has been unrepresented in the collection of the Australian Museum as I have pointed out in my paper *supra*, but as the result of a recent exchange with Dr. Scott we now possess 3 ♂ 3 ♀ of this species from Amboyna, collected by Mr. F. Muir on *Miniopterus schreibersi*, and identified by Dr. Scott. While on a collecting trip to Prospect Reservoir near Sydney, on July 16th, 1925, a party led by Dr C. Anderson secured a bat, *Miniopterus schreibersi* Natterer, from which they obtained 2 ♂ 1 ♀ *Listropoda*. I associate them with this species, but they are much larger than the specimens of *Nycteribia (Listropodia) parilis* which I have before me identified by Scott, and they measure 2.5 mm. in length, the specimens from Amboyna measuring only 1.5 mm. One of the specimens was forwarded for identification to Scott who states, "I don't see any very satisfactory characters separating your species from *parilis*, except the great difference in size."

NYCTERIBIA (LISTROPODA) SARASINI Falcoz.

Nycteribia (Listropodia) sarasini Falcoz, Nova Caledonia, Zool., iii, 1923, p. 89, figs. 9-12.

Nycteribia (Listropoda) sarasini Musgrave, Rec. Austr. Mus., xiv, 4, 1925, p. 299.

Note.—In my paper *supra* I stated that this species was unrepresented in the Australian Museum collection. We have since acquired by exchange with Dr. Scott, 2 ♂ 2 ♀ from Mossman, Queensland, collected by Mr. F. Muir on *Miniopterus schreibersi*, and identified by L. Falcoz.

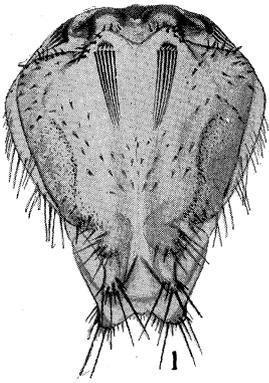
EXPLANATION OF PLATE XXII.

Nycteribia (Nycteribia)roughtoni, sp. nov.

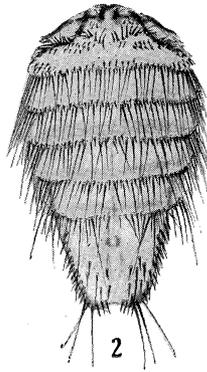
- Fig. 1. Female holotype, dorsal view of abdomen.
,, 4. ,, ,, ventral view of thorax and abdomen.
,, 2, 3. Male allotype, dorsal and ventral views of abdomen.

Nycteribia (Nycteribia) multispinosa, sp. nov.

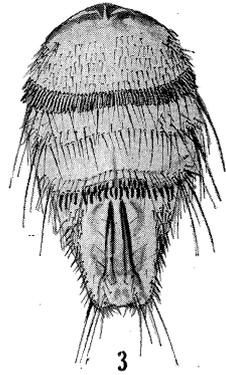
- ,, 5. Female holotype, dorsal view of abdomen.
,, 6. ,, ,, ventral view of thorax and abdomen.
,, 8, 9. Female paratype, dorsal and ventral views of abdomen,
showing distention.
,, 7, 10. Male allotype, dorsal and ventral views of abdomen.



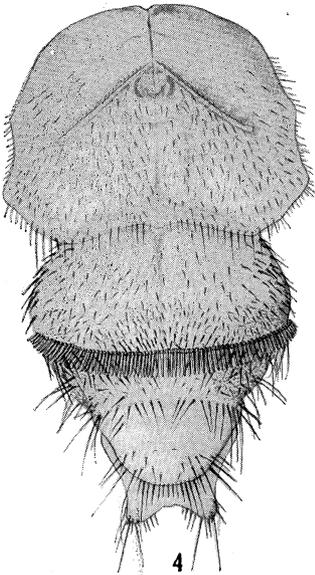
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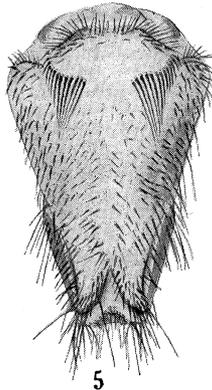
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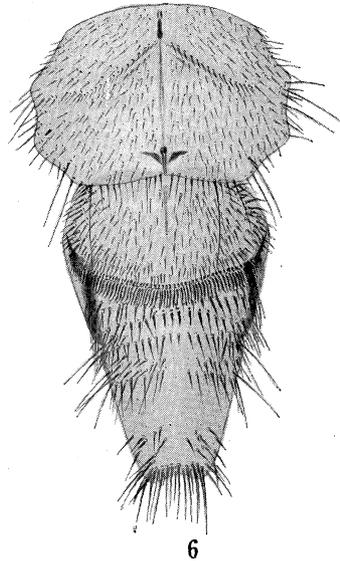
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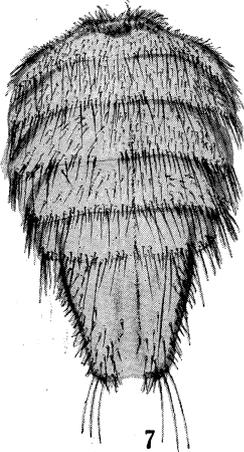
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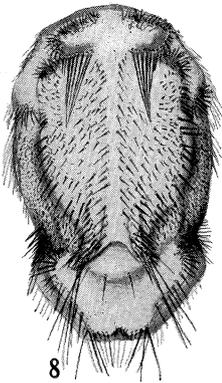
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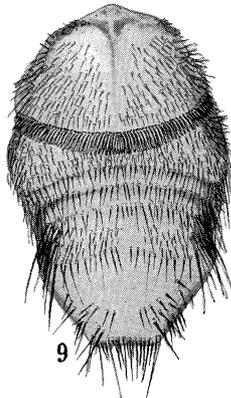
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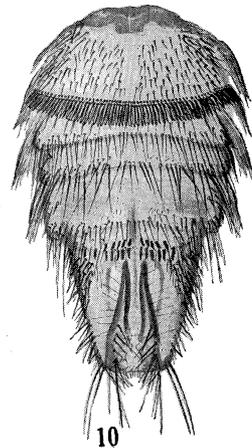
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8



9



10

EXPLANATION OF PLATE XXIII.

Nycteribia (Nycteribia) halei, sp. nov.

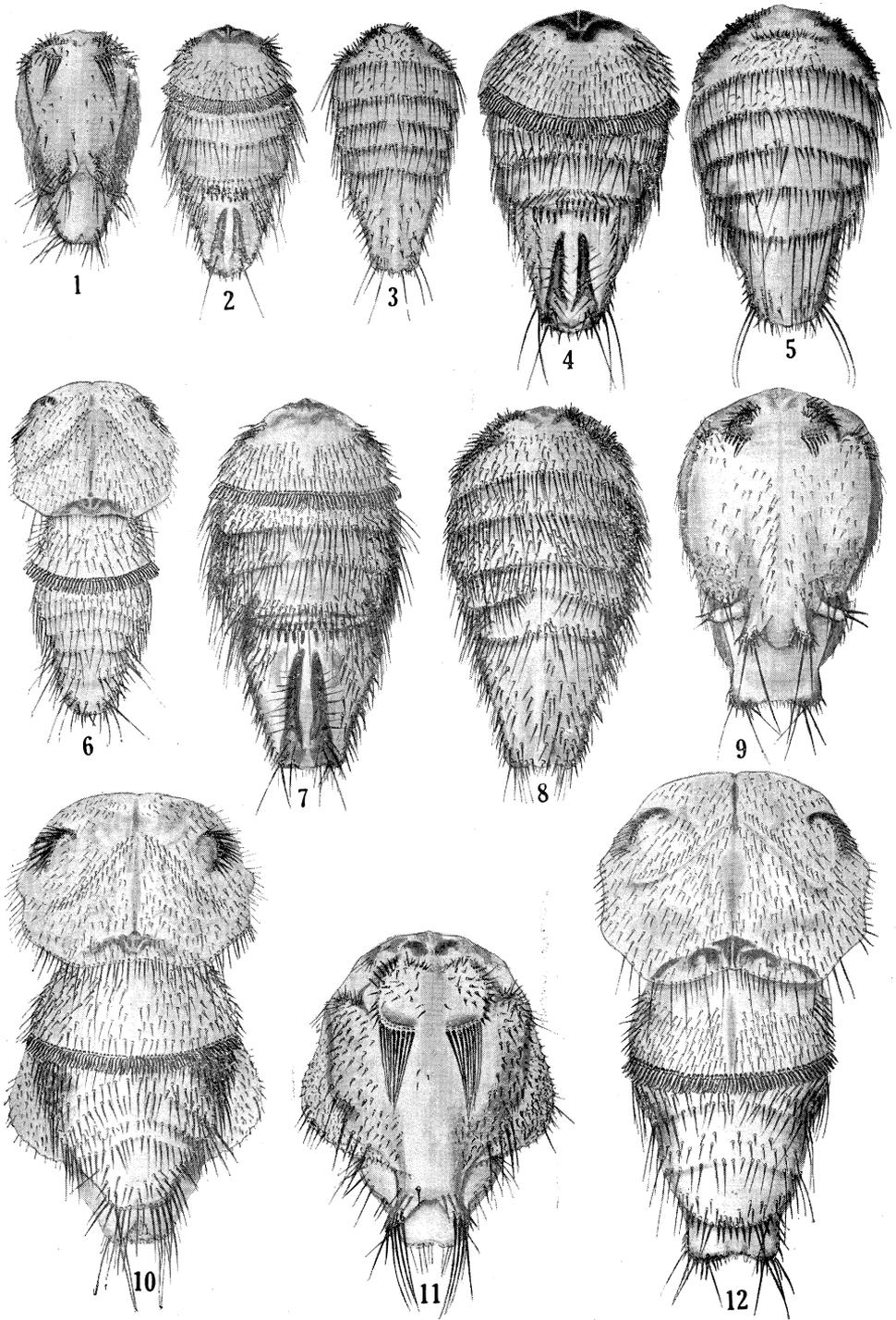
- Fig. 1. Female holotype, dorsal view of abdomen.
,, 6. ,, ,, ventral view of thorax and abdomen.
,, 2, 3. Male allotype, ventral and dorsal views of abdomen.

Nycteribia (Nycteribia) burrelli, sp. nov.

- Fig. 9. Female holotype, dorsal view of abdomen.
,, 12. ,, ,, ventral view of thorax and abdomen.
,, 4, 5. Male allotype, ventral and dorsal views of abdomen.

Nycteribia (Nycteribia) longispinosa, sp. nov.

- Fig. 10. Female holotype, ventral view of thorax and abdomen.
,, 11. ,, ,, dorsal view of abdomen.
,, 7, 8. Male allotype, ventral and dorsal views of abdomen.



JOYCE K. ALLAN, del.