

A REVISION OF THE CULICINE MOSQUITOES  
OF INDIA.

Part XV.

THE INDIAN SPECIES OF THE SUBGENUS *LOPHOCERA-*  
*TOMYIA* (THEO.) EDW., INCLUDING TWO NEW  
SPECIES.

BY

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THE genus *Lophoceratomyia* is here treated as a subgenus of *Culex*, in accordance with the views of Edwards. Although there are, as in the case of *Culiciomyia* certain characters present in the male sex, which serve to distinguish the species included in the subgenus as a group, it does not appear that these characters are of full generic importance, and judging by the structure of the male hypopygium, which is of importance in classification, the subgenus is closely related both to *Culex* and *Culiciomyia*.

GENERAL CHARACTERS OF THE SUBGENUS *Lophoceratomyia*.

Small or medium sized *Culex*-like mosquitoes, brownish black or reddish brown in colour. Specialised tufts of scales and hairs are present on certain segments of the antennae of the males; drawings are reproduced, on one of the accompanying plates, showing the appearance of these in each of the Indian species. In all the species there is a matted tuft on the ninth segment\* ; in *C. minutissimus* there is also a small and rudimentary tuft on the eighth segment, but in the other species there are specialised tufts of scales and hairs on the sixth, seventh, and eighth

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\* NOTE.—The antenna is considered to consist of fourteen segments, of which the basal globose segment, called the torus, is the first. There is a chitinised ring between the torus and the head, but it does not appear to be proved that this is morphologically a segment of the antenna.

segments, and usually a small hair-tuft or scale-tuft on the tenth. The scale-tufts on the seventh and eighth segments are very similar in most species, but that on the sixth shows specific differences. The scaling of the head and body in both sexes is very similar to that of *Culiciomyia* species (*vide* Part XIV of this Revision). Proboscis and palpi dark brown without pale rings. Basal two-thirds of the wings in both sexes usually very scantily scaled. Abdominal tergites, in five out of the eight species at present known from India, entirely dark scaled, in the other three species pale bands are present. Legs brownish black without palerings. Side-piece of the male hypopygium with a subapical lobe bearing appendages as in *Culex*, clasper usually *Culex*-like, but specialised in some species. Phallosome divided into a pair of chitinised ventral cornua, which may be pointed, smooth, and without teeth, or tubercular, with a row of small teeth, and with a large median process. Figures are reproduced showing the salient points of structure in each species.

The females of some of the species are exceedingly difficult to identify, and I have been obliged to base the following synoptic table chiefly upon characters present only in the male sex.

## SYNOPTIC TABLE.

1. Abdomen banded .. .. .	2
Abdomen unbanded .. .. .	4
2. Mesonotal scales brownish black, antenna of the male without specialised tufts of scales on segments 6 and 7, small species ..	<i>minutissimus.</i>
Mesonotal scales light brown or reddish brown, antenna of the male with specialised tufts of scales on segments 6 and 7, larger species .. .. .	3
3. Mesonotal scales reddish brown, basal segment of the antenna of the male without a blunt prominence on the inner side ..	<i>cinctellus.</i>
Mesonotal scales light brown, basal segment of the antenna of the male with a blunt prominence on the inner side ..	<i>plantaginis</i> sp. n.
4. Basal segment of the antenna of the male normal, projecting scales and hairs on the ventral surface of sixth segment of the antenna of the male white, palpus of the male with a minute finger-like process at the base .. .. .	<i>fraudator.</i>
Basal segment of the antenna with a blunt prominence on the inner side, projecting scales or hairs on the sixth segment of the antenna of the male dark brown or yellow, palpus of the male without a finger-like process at the base .. .. .	5
5. Sixth segment of the antenna of the male with a tuft of long hairs, bright yellow in colour .. .. .	<i>flavicornis</i> sp. n.
Sixth segment of the antenna of the male with a tuft of dark brown hairs or scales .. .. .	6
6. Palpi of the male longer than the proboscis by more than the length of the apical segment, the last two segments distinctly hairy .. .. .	<i>uniformis</i>
Palpi of the male longer than the proboscis by less than the length of the apical segment, the last two segments short and with few hairs .. .. .	7
7. Antenna of the male with a large and distinct scale tuft of the sixth segment .. .. .	<i>mammilifer.</i>
Antenna of the male with a smaller and less distinct scale tuft of the sixth segment .. .. .	<i>minor.</i>

**Culex (Lophoceratomyia) minutissimus** Theo.

*Culiciomyia minutissima*, Theobald, 1907, Mon. Cul., Vol. IV, p. 235.

*Culiciomyia nigerrima*, Theobald, 1910, *ibid*, Vol. V, p. 233.

*Melanoconion juxtapallidiceps*, Theobald, 1910, *ibid*, p. 456.

A small dark species with pale basal transverse bands on the abdomen. The basal segment of the antenna of the male is normal (without a blunt prominence on the inner side), segments six and seven without specialised hair tufts, a very small tuft on the eighth segment, and a rather larger matted tuft on the ninth (fig. 1), palpi of the male only slightly longer than the proboscis, the terminal segments with few hairs, a minute spine at the base of each palpus but no finger-like process. Palpi of the female about one-seventh the length of the proboscis. Mesonotal scales brownish black. Pleurae dark brown, lighter brown in some specimens, one lower mesepimeral bristle. Wing length, male 2 mm., female 3 mm. The structure of the male hypopygium is shown in figs. 11, 22, and 23. The ventral cornu of the lateral plate of the phallosome is without small teeth or tubercles, and there is no large median process, a structure which is present in some of the other species.

*C. minutissimus* has been found in the following localities in India :—

Bombay ; near Bombay Harbour (*Christophers*), Trombay, July 1921, larvae in surface well (*Barraud*).

Bombay Deccan (South) ; Hubli, September 1921 (*Barraud*).

Madras ; Nilgiri Hills, September 1915 (*Khazan Chand*).

Central Provinces ; Nowgong, received 28th July 1914, from the Officer Commanding the Station Hospital.

Type females of *minutissima*, *nigerrima*, and *juxtapallidiceps*, all in the British Museum, from Ceylon (*Green*).

**Culex (Lophoceratomyia) fraudator** Theo.

*Lophoceratomyia fraudatrix*, Theobald, 1905, Ann. Mus. Nat. Hung., Vol. III, p. 94, and Mon. Cul., Vol. IV, p. 474.

*Lophoceratomyia variata*, Leicester, 1908, Cul. Malaya, p. 121.

This is the only Indian species with an unbanded abdomen in which the basal segment of the antenna of the male is normal (without a blunt projection on the inner side).

*Palpi of the male* longer than the proboscis by one and a half times the length of the apical segment, length of proboscis 1.8 mm., of the long segment of the palpus 1.7 mm., length of each of the last two segments 0.3 mm., the terminal segments with numerous outstanding hairs, a minute finger-like process at the base of each palpus, a row of short spines on the under surface of the proboscis at the base. *Antenna of the male* : a tuft of very long scales on the sixth segment, the most ventrally situated of these scales appear white when seen in certain positions, tufts of crumpled scales on the seventh and eighth segments, the usual matted tuft on the ninth, and a tuft of scales and hairs on the tenth (fig. 7). *Thorax* : mesonotal scales reddish brown. *Length of wing* of the male 2.3 to 2.4 mm. Pleurae

brown, lower mesepimeral bristles apparently absent. *Legs* dark brown as in the other species. *Abdomen*: dorsum brownish black, unbanded, venter pale scaled. Figs. 12 and 20 illustrate the structure of the *male hypopygium*.

The Central Malaria Bureau collection, Kasauli, contains two males from the Andaman Islands, Mount Harriet, September 1911 (*Christophers*) and one male from Assam, Dibrugarh, August 1922 (*Barraud*).

Types of *fraudatrix* in the Hungarian Museum, Budapest, from New Guinea, Friedrich Wilhelmshafen, and Stephansoff, Astrolabe Bay (both *Birò*, 1900). Types of *variata* in the British Museum, from Malay Peninsula (*Leicester*).

### **Culex (Lophoceratomyia) cinctellus** Edw.

*Culex (Lophoceratomyia) cinctellus*, Edwards, 1922, nom. n., Ind. Jour. Med. Res., Vol. X, No. 2, p. 473.

*Lophoceratomyia taeniata*, Leicester, 1908, Cul. Malaya, p. 127.

This is one of the three Indian species in which there are pale transverse basal bands on the dorsum of the abdomen. From *C. minutissimus* it may be distinguished by its larger size, reddish brown mesonotum, and by the presence of specialised tufts of scales and hairs on segments six to ten of the antenna of the male. From *C. plantaginis* sp.n. it may also be distinguished by the reddish colour of the mesonotum, and the male differs from that sex of *plantaginis* in the absence of a blunt prominence on the basal segment of the antenna, in the presence of numerous outstanding hairs on the terminal segments of the palpi, in the form of the tufts of scales and hairs on the antenna (compare figs. 6 and 3), and in the structure of the hypopygium (compare figs. 14 and 15).

*Palpi of the male* longer than the proboscis by a little less than the length of the apical segment, length of the proboscis 1.8 mm., of the long segment of the palpus 1.4 mm., of penultimate segment 0.34 mm., of apical segment 0.35 mm., numerous outstanding hairs on the last two segments, some very small spines on the under surface of the proboscis at the base; palpi of the female from one-seventh to one-sixth the length of the proboscis. *Antenna of the male*: two or three long pointed scales on the sixth and tenth segments, the appearance of these and of the scale tufts on segments 7, 8, and 9, is shown in fig. 6. *Thorax*: mesonotum deep reddish brown, pleurae pale brown, one lower mesepimeral bristle. *Wing length*, male 2.7 mm., female 3 mm. *Legs* deep brown, femora paler ventrally. *Abdomen*: tergites brownish black with basal transverse ochreous bands. *Male hypopygium* (fig. 15): a collection of straight hairs on the outer side of the side-piece near the dorsal border, not forming a definite line as in most other species, clasper broader on the apical half than on the basal.

The Central Malaria Bureau collection, Kasauli, contains a few specimens from the Malabar Coast, October 1915 (*Khazan Chand*).

Leicester's type specimens of *taeniata* are, I believe, in the British Museum, from the Malay Peninsula.

**Culex (Lophoceratomyia) uniformis** Theo.

*Lophoceratomyia*\* *uniformis*, Theobald, 1905, Jour. Bomb. Nat. His. Soc., Vol. XVI, No. 2, p. 245. Mon. Cul., Vol. IV, p. 473. *Ibid*, Vol. V, p. 412.

Male and female. *Head*: the flat scales are bluish white, narrow scales creamy, upright scales and bristles dark brown, proboscis, palpi, and antennae brownish black. *Antennae of the male* (fig. 5): basal segment with a blunt prominence on the inner side, matted hair tufts and scale tufts on segments six to nine, some long scales on the sixth of different lengths, thick twisted tufts on the seventh and eighth, and the usual long matted tuft on the ninth, I have not been able to make out even a rudimentary tuft on the tenth segment. *Palpi of the male* longer than the proboscis by rather more than the length of the apical segment, the last two segments distinctly hairy and rather longer than the corresponding segments in *C. mammilifer* and *C. minor*; length of proboscis 1.7 mm., of long segment of palpus 1.5 mm., of penultimate segment 0.31 mm., of apical segment 0.34 mm.; palpi of the female longer than in some other species and about one-quarter the length of the proboscis. *Thorax*: mesonotum covered with narrow brownish black scales, pleurae dark green or dark brown without any conspicuous spots or scales, three or four proepimeral bristles, one lower mesepimeral bristle usually present. *Wing length*, male 2.4 mm., female 3.2 mm. *Legs* deep brown, femora paler ventrally as usual. *Abdomen*: tergites entirely covered with brownish black scales without any pale bands or spots, venter somewhat paler. Male hypopygium (figs. 10 and 17): three rod-like processes on the subapical lobe of the side-piece, two long with hooked tips, one shorter and pointed, a leaf-like plate, and several bristles, usually only four long hairs on the dorsal border towards the base; clasper slightly enlarged about the middle tapering from this point to the tip; phallosome divided into a pair of ventral cornua bearing very small teeth, and a pair of pointed median processes.

Localities in India:—

Bombay; Elephanta, July 1921, larvae from tree-holes (*Barraud*).

Bombay Deccan; Belgaum and Nagargali, August 1921, larvae from tree-holes and bamboo stumps (*Barraud*).

North Kanara; Kadra, September 1921, larvae in water in fallen tree (*Barraud*).

Malabar; Pudupadi, October 1915, larvae from tree-holes (*Khazan Chand*).

Madras; Nilgiri Hills, September 1915 (*Khazan Chand*), Madras (*Patton*).

Andaman Islands; Mount Harriet, September 1911 (*Christophers*). Ceylon (*James*).

Types of *uniformis* in the British Museum, from Paradeniya, Ceylon (*Green*).

**Culex (Lophoceratomyia) mammilifer** Leic.

*Lophoceratomyia mammilifer*, Leicester, 1908, Cul. Malaya, p. 128.

*Lophoceratomyia bicornuta*, Theobald, 1910, Rec. Ind. Mus., Vol. IV, No. 1, p. 25, and Mon. Cul., Vol. V, p. 412.

\* NOTE.—The spelling of this name in the original reference is *Lophoceraomyia*, but this was altered later by Theobald, in his Monograph, to *Lophoceratomyia*.

This species resembles *C. uniformis* and *C. minor* in size, in the general dark coloration and unbanded abdomen, and in the structure of the basal segment of the antenna of the male. In the male sex it may be distinguished from *C. uniformis* by the length of the palpi, which resemble those of the male of *C. minor*, and are only very slightly longer than the proboscis, the terminal segments short and with few hairs; from *C. minor* it may be distinguished by the larger scale tuft on the sixth segment of the antenna of the male. There are differences in the male hypopygia between the three species, shown in one of the accompanying plates, which appear to be constant. *Antenna of the male* (fig. 4): the scale and hair tufts on segments six to nine closely resemble those on the corresponding segments on the antenna of the male *uniformis*, but there is a rudimentary tuft on the tenth segment (the second tuft on segment eight in fig. 4 is hidden). *Palpi of the male*: longer than the proboscis by a little less than the length of the apical segment, the last two segments short, of about equal length, and with few outstanding hairs, a row of small spines at the base of each palpus; length of proboscis 1.8 mm., of long segment of the palpus 1.5 mm., of penultimate segment 0.22 mm., of apical segment 0.20 mm. *Hypopygium of the male* (figs. 16 and 19): the chief points of difference between this and allied species will be seen by referring to the figures given.

The Central Malaria Bureau collection, Kasauli, contains specimens from:—  
Malabar Coast, October 1915 (*Khazan Chand*).

Andaman Islands, Mount Harriet, September 1911 (*Christophers*).

The types of *mammilifer* are in the British Museum, from Raub, near Kuala Lumpur, Malay Peninsula (*Leicester*); type male of *bicornuta* in the Indian Museum, from base of Dawna Hills, near Kawkaech, Lower Burma, 4th March, 1908. (*Annandale*).

#### **Culex (Lophoceratomyia) minor** Leic.

*Lophoceratomyia minor*, Leicester, 1908, Cul. Malaya, p. 126.

This species closely resembles *C. uniformis* and *C. mammilifer*, but differs in the details given below. As Edwards has pointed out (Bull. Ent. Res., Vol. VII, part 3, 1917, p. 227) the original description does not agree in some particulars with specimens of apparently this species in Leicester's collection, now in the British Museum. In the male sex this species differs from *uniformis* in the shorter palpi and in the smaller scale tuft on the sixth segment of the antenna (fig. 2), the size of this scale tuft also serves to distinguish this species from *mammilifer*. *Palpi of the male* longer than the proboscis by only one-quarter or one-half the length of the apical segment, the terminal segments with very few hairs; length of proboscis 1.6 mm., of long segment of palpus 1.3 mm., that of the penultimate and apical segments each about 0.29 mm.; the length of the last two segments appears to vary and in some specimens the palpi are only very slightly longer than the proboscis; palpi of the female about one-fifth the length of the proboscis. *Wing length*, male 2.5 mm., female 3.2 mm.

*Hypopygium of the male* (figs. 13 and 18): a row of rather long hairs, usually seven in number, along the dorsal border of the side-piece near the base, three long

processes arising from the subapical lobe, one with a long sinuous tip; clasper tapering; a few small teeth and a moderately large median process on the lateral plate of the phallosome.

Localities :—

- Bombay Deccan; Tavargatti, August 1921, larvae from tree-holes (*Barraud*).  
 North Kanara; Kadra, 1st October, 1921, larvae in small rock pool, and Karwar, September 1921, larvae tree-holes (*Barraud*).  
 North Bengal; Sukna, September and October 1922, larvae from tree-holes (*Barraud*).  
 Assam; Shillong, June and August 1922, Nongpoh, July 1922, and Haflong, August 1922, larvae from tree-holes and bamboo stumps (*Barraud*).  
 Eastern Himalayas; Kurseong, September 1922, larvae from tree-holes (*Barraud*).  
 Ceylon; Suduganga, 5th April 1919, 24th June 1919, 21st December 1919, larvae from pools (*R. Senior-White*).

**Culex (Lophoceratomyia) flavicornis** sp.n.

A rather large species compared with others in the subgenus, mesonotum and abdomen dark brown, the latter unbanded, the sixth segment of the antenna of the male bears a tuft of long hairs, bright yellow in colour. The palpi of the male are longer than the proboscis by nearly the length of the rather long apical segment, in this respect the species differs from Leicester's description of the male of *Lophoceratomyia eminentia*, from the Malay Peninsula, in which the scale tuft on the sixth segment of the antenna is yellow, and the palpi are shorter than the proboscis.

Description of male and female. *Head*: both the narrow and flat scales on the vertex and sides are creamy white, the upright scales and bristles dark. Proboscis and palpi very dark brown. *Palpi of the male* longer than the proboscis by a little less than the length of the rather long apical segment. The approximate measurements of the proboscis and segments of the palpus are:—proboscis 2.4 mm., long segment of palpus 2.0 mm., penultimate segment 0.27 mm., apical segment 0.62 mm. The long segment bears numerous hairs of moderate length along the ventral surface for the whole length, and there are a number of short hairs on the last two segments. Palpi of the female between one-fifth and one-quarter the length of the proboscis. *Antenna of the male* (fig. 8): basal segment with a prominence on the inner side, a tuft of long yellow hairs on the ventral surface of the sixth segment, tufts of bent and twisted hairs and scales on the seventh, eighth, and ninth segments, very similar to allied species, a small tuft of straight hairs on the tenth segment. *Thorax* mesonotal scales dark chestnut brown, scutellar scales very narrow and lighter brown, mesonotal and scutellar bristles dark. Pleurae dark brown, without scales, four proepimeral bristles, no lower mesepimeral bristle. *Wing length*, male 3.4 mm., female 4.3 mm. *Legs* deep brown, femora paler ventrally as usual. *Abdomen*: dorsum dark brown, venter ochreous. The *male hypopygium* (fig. 9) is remarkably

distinct in the form of the clasper and of the appendages of the subapical lobe of the side-piece.

Type male and female and one other male, in the Central Malaria Bureau collection, Kasauli, from the Nilgiri Hills, October 1915 (*Khazan Chand*).

**Culex (Lophoceratomyia) plantaginis** sp.n.

This is one of the three species in which there are pale bands on the dorsum of the abdomen. From the other two species it may be distinguished in the male sex by the presence of a blunt prominence on the inner side of the basal segment of the antenna. From *C. minutissimus* it may be distinguished by its larger size and lighter colour, and from *C. cinctellus* by the light brown, rather than reddish brown, colour of the mesonotum.

Description of male. *Head*: a patch of creamy flat scales at each side, the flat scales continued as a border to the eyes in front, vertex covered with pale narrow curved scales with scattered upright forked scales of a darker colour, bristles dark; proboscis, palpi, and antennae dark brown. *Palpi* longer than the proboscis by a little more than the length of the apical segment, length of proboscis 1.87 mm., of long segment of the palpus 1.6 mm., of penultimate segment 0.31 mm., of apical segment 0.32 mm., the last two segments with a few outstanding hairs which are more numerous on the penultimate than on the apical. *Antennae* (fig. 3) with specialised hair tufts of a dark colour on segments six to ten inclusive, those on the sixth and tenth segments very small and consisting of a few hairs or needle-like scales, those on the seventh, eighth, and ninth formed of matted and crumpled hairs and scales very similar to *C. uniformis*. *Thorax*: mesonotum and scutellum clothed with brown scales which are lighter in colour than in *C. uniformis* and allied species, pleurae dark brown, coxae lighter, two proepimeral bristles, apparently no lower mesepimeral bristle, but the specimen is pinned through this area. *Wings*: veins very thinly clothed with dark scales, length 2.6 mm., base of anterior fork cell very slightly nearer the base of the wing than that of the posterior. *Legs* dark brown, lighter when viewed from behind, femora paler ventrally as usual. *Abdomen*: tergites clothed with very dark brown scales except for narrow basal ochreous bands, the sternites appear to be entirely dark.

*The male hypopygium* (figs. 14 and 21) is very similar to that of *C. minor*.

Type male, unique, in the Central Malaria Bureau collection, Kasauli, from Koti, near Kasauli, Western Himalayas, larva from pool, August 1923 (*Barraud*).

### EXPLANATION OF PLATE VII.

Drawings illustrating the specialised tufts of scales and hairs on the antennae of the males of Indian species of *Lophoceratomyia*. The numbers indicate the segments of the antenna. All the figures are drawn to the same scale, and show a ventral view of part of one antenna in each case. The normal verticillate hairs on each segment have been omitted.

- |         |  |
|---------|--|
| Fig. 1. | <i>Culex (Lophoceratomyia) minutissimus.</i> |
| „ 2.    | „ „ <i>minor.</i>                            |
| „ 3.    | „ „ <i>plantaginis</i> sp.n.                 |
| „ 4.    | „ „ <i>mammilifer.</i>                       |
| „ 5.    | „ „ <i>uniformis.</i>                        |
| „ 6.    | „ „ <i>cinctellus.</i>                       |
| „ 7.    | „ „ <i>fraudator.</i>                        |
| „ 8.    | „ „ <i>flavicornis</i> sp.n.                 |

EXPLANATION OF PLATE VIII.

Drawings illustrating the structure of the male hypopygia of Indian species of the subgenus *Lophoceratomyia*. All the figures are drawn to the same scale.

- Fig. 9. *Culex (Lophoceratomyia) flavicornis* sp.n. Apex of side-piece and clasper seen from the inner side.
- „ 10. „ „ *uniformis*. Ditto.
- „ 11. „ „ *minutissimus*. Ditto.
- „ 12. „ „ *fraudator*. Ditto.
- „ 13. „ „ *minor*. Ditto.
- „ 14. „ „ *plantaginis* sp.n. Ditto.
- „ 15. „ „ *cinctellus*. Ditto seen from the outer side.
- „ 16. „ „ *mammilifer*. Ditto seen from the inner side.
- „ 17. „ „ *uniformis* Side view of one side of the hypopygium (ninth segment and side-piece omitted);  
lp. lateral plate of phallosome.  
mp. median process of lateral plate of phallosome.  
pp. parameral plate.  
ba. basal apodeme.  
as. plates of the anal segment.
- „ 18. *Culex (Lophoceratomyia) minor*. Lateral plate of the phallosome seen from the inside.
- „ 19. „ „ *mammilifer*. Ditto.
- „ 20. „ „ *fraudator*. Ditto.
- „ 21. „ „ *plantaginis* sp.n. Ventral view of the phallosome and anal segment, the latter shaded.
- „ 22. „ „ *minutissimus*. Ditto.
- „ 23. „ „ „ Lateral plate of the phallosome, side view.

PLATE VII.

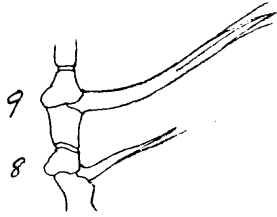


Fig. 1.

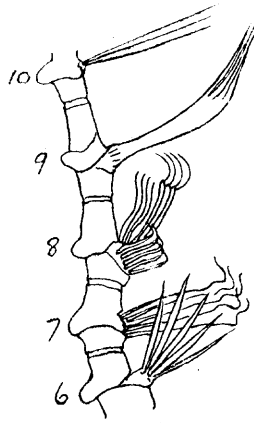


Fig. 2.

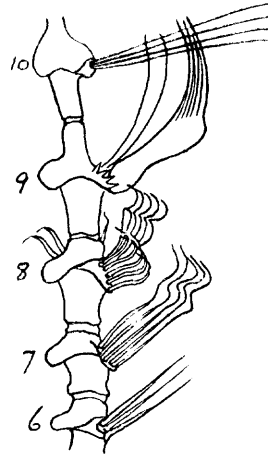


Fig. 3.

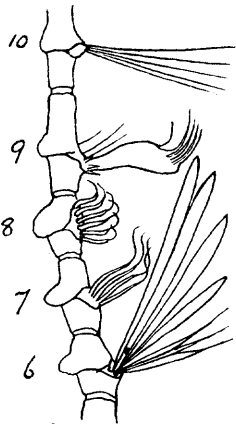


Fig. 4.

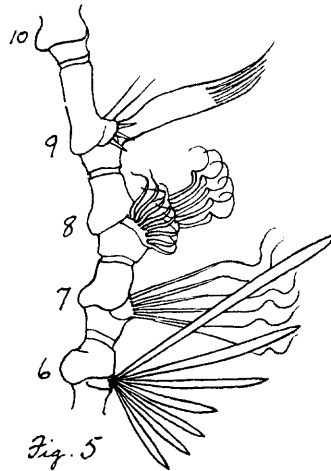


Fig. 5.

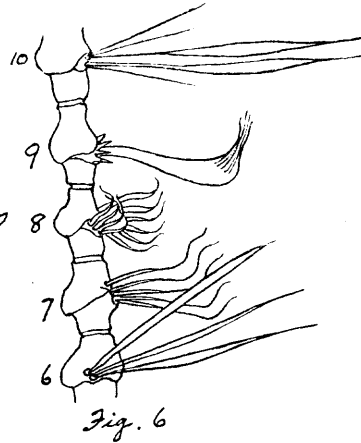


Fig. 6.

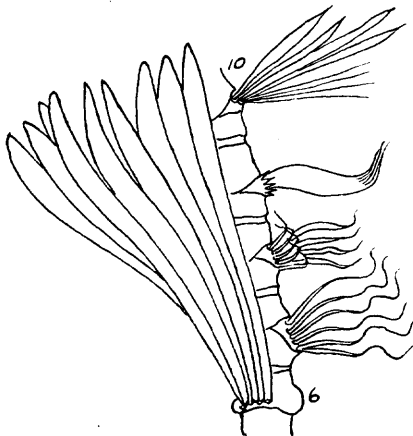


Fig. 7.

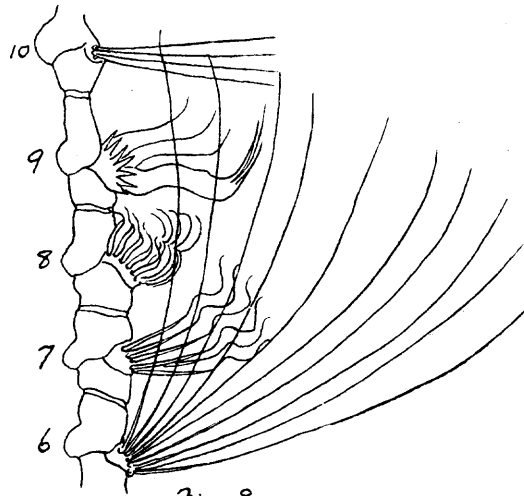


Fig. 8.

0.1. mm.

PLATE VIII.

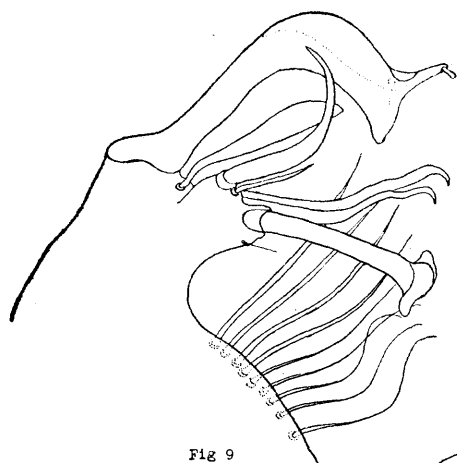


Fig 9

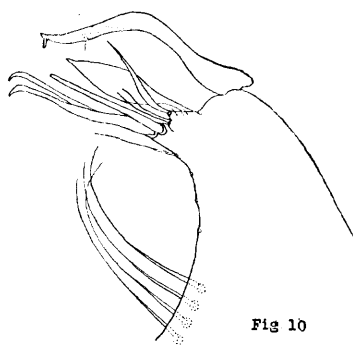


Fig 10

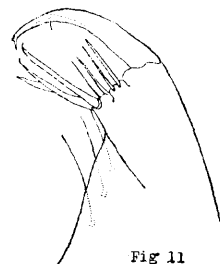


Fig 11

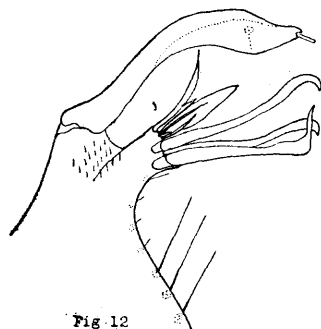


Fig 12

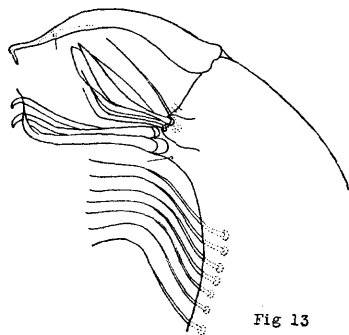


Fig 13

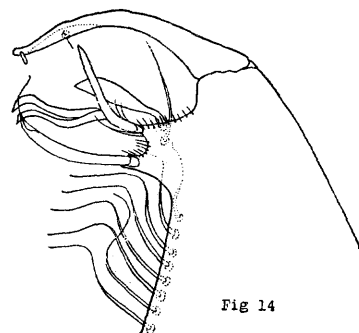


Fig 14

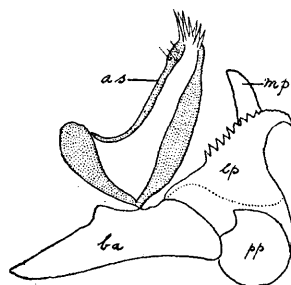


Fig 17



Fig 18

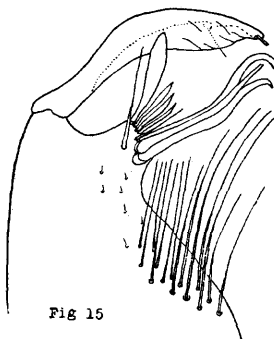


Fig 15

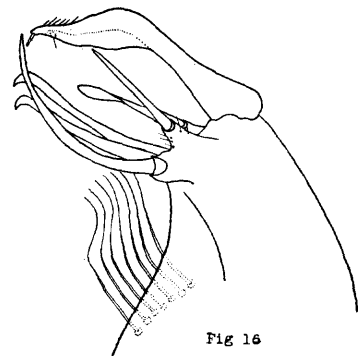


Fig 16

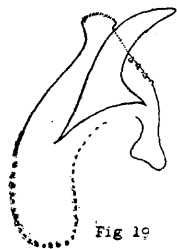


Fig 19

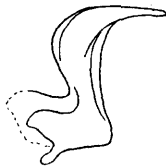


Fig 20

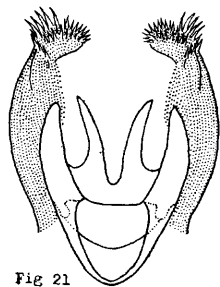


Fig 21

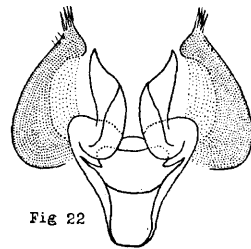


Fig 22



Fig 23

