

A NEW SPECIES AND REDESCRIPTIONS OF COLLEMBOLA FROM ANTARCTICA¹

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Abstract: One new species of Collembola from Antarctica is described, from the subfamily Hypogastrurinae. Redescriptions are given with illustrations of *Friesea grisea* (Schaeffer), 1891 and *Gomphiocephalus hodgsoni* Carpenter, 1908. It has been possible to describe male and female of *Friesea grisea*.

Introduction: The material dealt with in this paper was collected during the summer seasons 1959-60 and 1960-61 in Antarctica by Dr. M. E. Pryor of the University of Tennessee, U. S. A., and members of the Bishop Museum Antarctic Research party (J. L. Gressitt, R. E. Leech, T. S. Leech, C. W. O'Brien, K. A. J. Wise). I am indebted to Dr. Pryor and to Dr. J. L. Gressitt of the Bishop Museum, Honolulu, for the opportunity to study this material.

Hypogastrura antarctica Salmon, n. sp. Figs. 1-13.

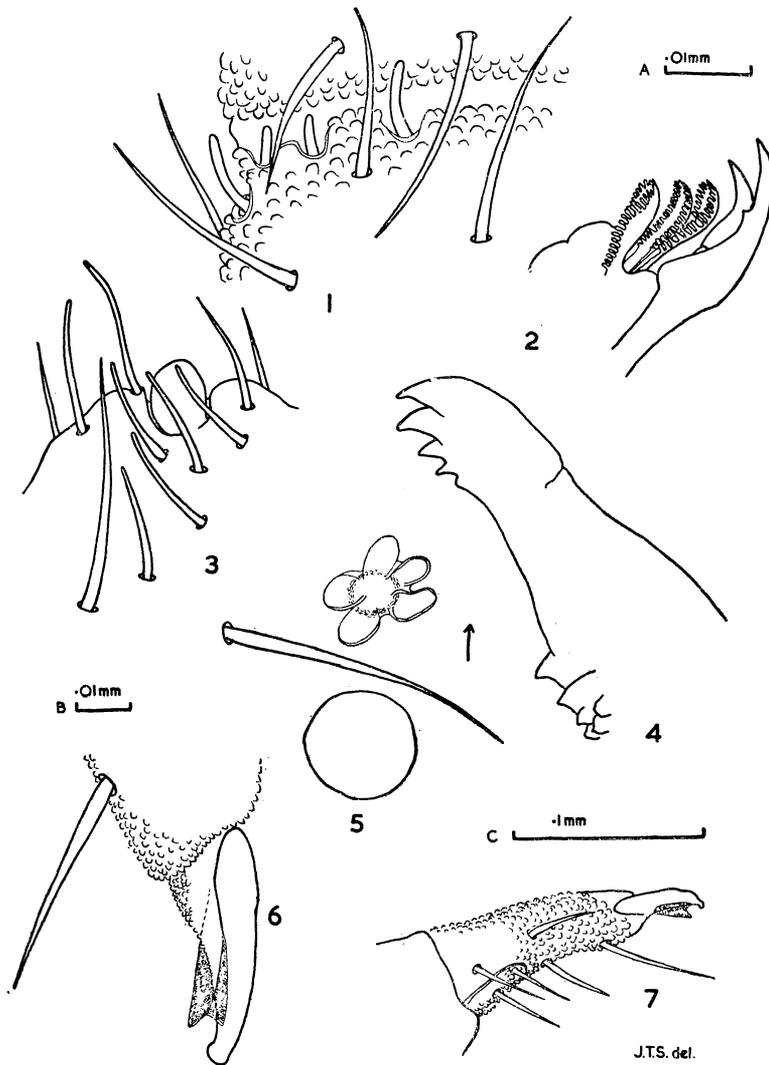
Color: Deep blue-black to black, but paler ventrally and on the appendages in some specimens.

Clothing: Occasional short curved setae and numerous longer, stout, straight, stiff setae, especially posteriorly on the body.

Body: Length up to 2.25 mm. Antennae shorter than the head with the four segments related as 10 : 14 : 14/16 : 20/22. Ant. IV with apical exsertile knob associated with several slender fairly straight sense rods on one surface (fig. 3) while on the opposite surface there are several longer, slender curved sense rods and some long setae. Sensory organ of Ant. III situated on the apical border of the segment and composed of two short, straight sense rods behind a low granulated integumentary fold, flanked on either side by a longer curved sense rod; the whole protected by five guard setae, three of which arise from Ant. III and two from Ant. IV (fig. 1). Ocelli eight to each side subequal. Postantennal organ rosette-shaped equal to an ocellus in size and formed of five peripheral lobes arranged round a central boss (fig. 5). Mandible with elongate, projecting head bearing five apical teeth, the anterior two the largest, the posterior one rudimentary (fig. 4). Maxilla head with two sickle-shaped teeth and three comb-like lamellae (fig. 2). Abd. III to Abd. IV as 28 : 35. Rami of tenaculum each with three barbs. Abd. VI with two anal spines, about half the length of the hind claw with slight or without distinct papillate bases (figs. 10 & 11). Genital aperture of male with setae as in fig. 13.

Legs: Claw granulated basally, with distinct sub-apical outer tooth and inner tooth

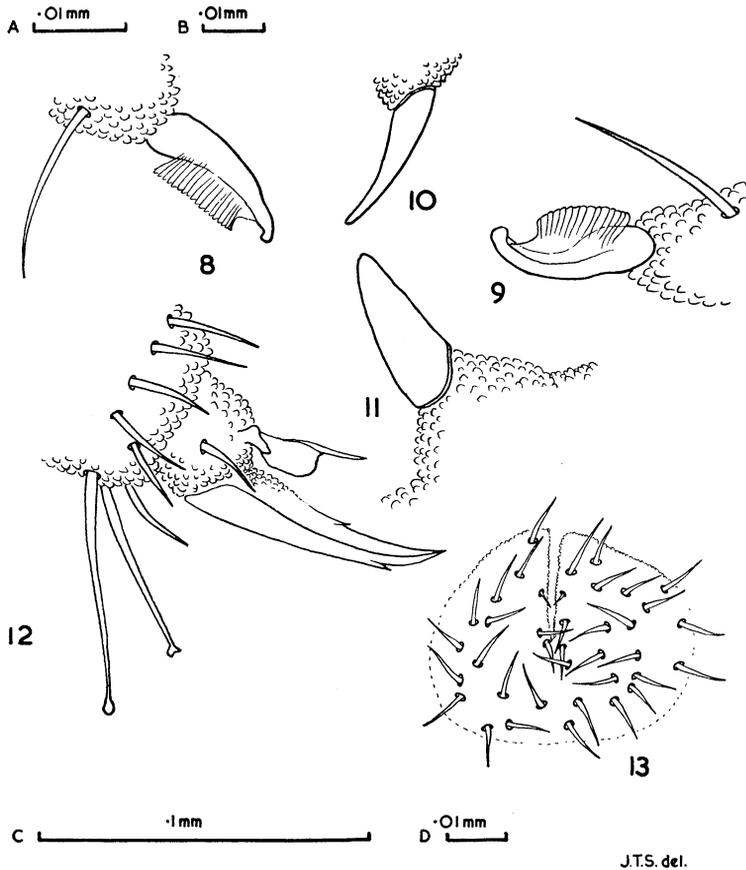
1. Partial results of field work on grants from the United States Antarctic Research Program, National Science Foundation.



Figs. 1-7. *Hypogastrura antarctica* n. sp.: 1, sense organ on Ant. III; 2, head of maxilla; 3, apex of Ant. IV; 4, head of mandible; 5, postantennal organ and adjacent ocellus; 6, mucro; 7, dens and mucro. (A=scale of figs. 1, 2, 3, 4 & 5. B=scale of fig. 6. C=scale of fig. 7.)

at three-fifths down; unguiculus about half as long as claw, needle-like with very broad semicircular inner lamella. A medium length basal seta to each side of claw and two clavate tenent hairs, about as long as claw, to each foot.

Furcula: Manubrium and dens subequal, the dens longer than the mucro as 25 : 10. Mucro somewhat variable, upturned and swollen apically with one or two pleated lamellae (figs. 6, 8, 9); mucro sometimes granulated basally as in fig. 6. Dens ventrally with one long apical seta, two short median setae and three short basal setae; no dorsal setae.

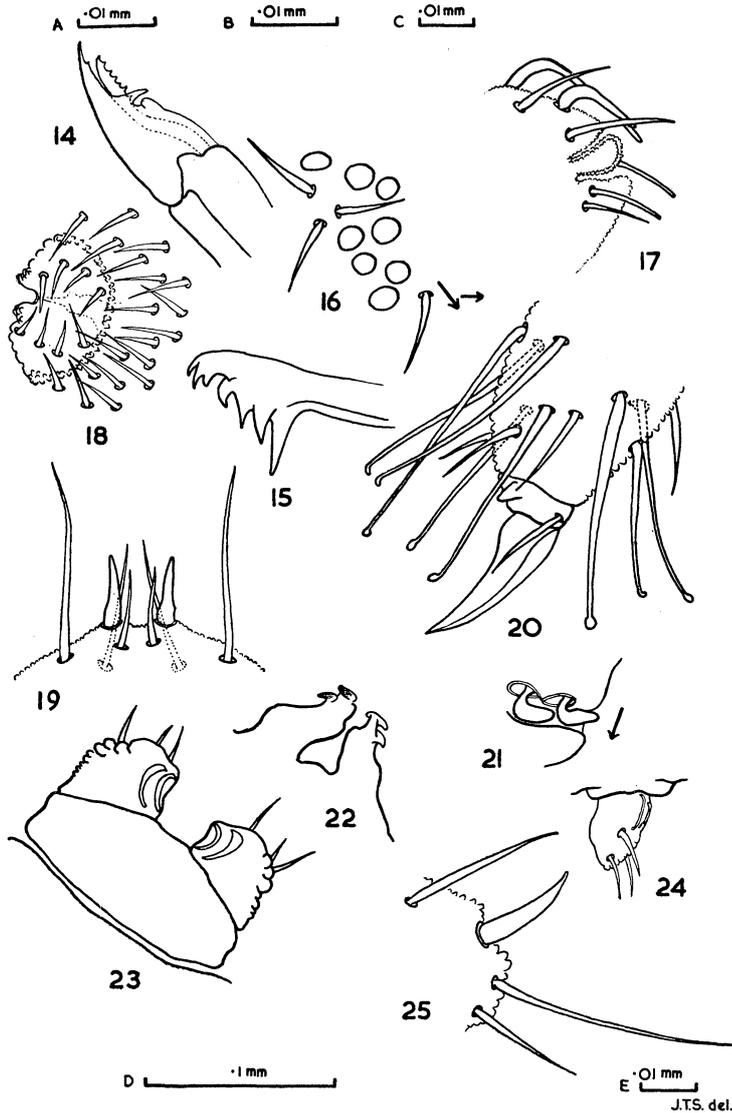


Figs. 8-13. *Hypogastrura antarctica* n. sp.: 8, mucro of another specimen; 9, mucro of a further specimen; 10, anal spine; 11, anal spine of another specimen; 12, hind foot; 13, genital aperture of ♂. (A=scale of figs. 10 & 11. B=scale of figs. 8 & 9. C=scale of fig. 12. D=scale of fig. 13.)

Type data: Holotype, Bishop Mus. (3360), Honolulu. Paratypes: Author's Coll.; Dominion Mus., Wellington, New Zealand; U. S. Nat. Mus., Washington D. C., U. S. A.; Brit. Mus. Nat. Hist., London; Mus. Comparative Zool., Cambridge, U. S. A.

Localities: Deception Island, S. Shetland Is., 63° 60' S, 35° W, on coast of Whale Bay, collected by R. E. Leech, 10. III. 1960; Base P. M. Cerda, R. E. & T. S. Leech, 18. I. 1961; West side entrance to Deception Island, S. Shetlands, R. E. & T. S. Leech, 20. I. 1961.

Remarks: This species is closest related morphologically to *H. caduceator* Carp. from Nyassaland and to *H. similis* (Nic.) from Europe. All these species have two tenent hairs to each foot but *H. antarctica* differs from the former species in the structures of the post-antennal organ and of the claw which in *caduceator* has two external teeth and no inner teeth. In *H. similis* the unguiculus has a long terminal bristle and the mucro is of different form from that of *H. antarctica*.



Figs. 14-25. *Friesea grisea* Schaeffer: 14, head of maxilla; 15, head of mandible; 16, left ocellar group; 17, apex of Ant. IV of ♀; 18, genital aperture of ♂; 19, anal spines of ♂ from above; 20, middle foot; 21, sensory organ of Ant. III; 22, rami of tenaculum; 23, furcula-dorsal surface; 24, furcula from side; 25, anal spines from side. (A=scale of figs. 14, 15, 20, 22, 23 & 24. B=scale of figs. 17, 18 & 21. C=scale of fig. 16. D=scale of fig. 19. E=scale of fig. 25.)

SUBFAMILY BRACHYSTOMELLINAE

Friesea grisea (Schaeffer), 1891 Figs. 14-29.

Color: Varying from dark to light blue, usually paler ventrally and on the legs and furcula.

Clothing: Sparse of short simple setae with a few longer ones posteriorly.

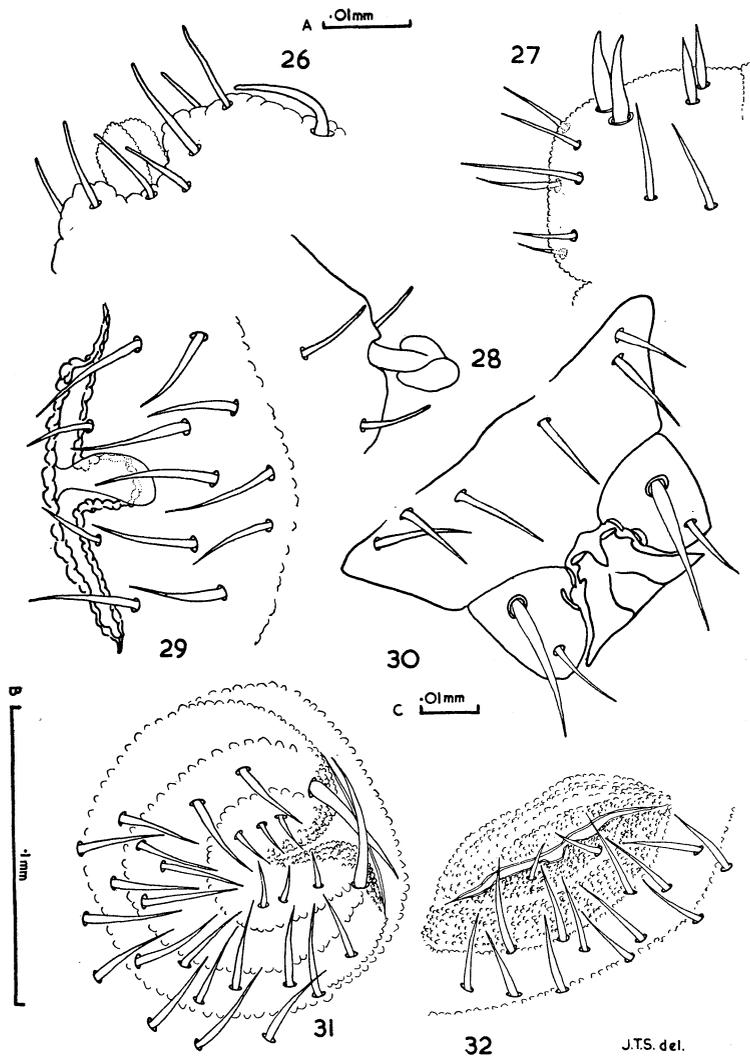
Body: Length up to 1 mm. Cuticle coarsely granulated. Antennae shorter than the head, the segments broad and stout with segments III and IV partially fused. Ants. I : II : III & IV as 12 : 12 : 21 or the four segments related as 12 : 12 : 12 : 9. Apex of Ant. IV in male with a double exsertile knob and numerous straight tapering slender sense rods (figs. 26 and 28). Ant. IV in female with single apical exsertile knob and several long, stout, sharply bent sense rods (fig. 17). Sensory organ of Ant. III small, and consisting of two short, stout, sharply bent sense rods each in its own cuticular pocket but arising close together (fig. 21). Ocelli eight to each side, subequal, arranged with their associated setae as in fig. 16. Postantennal organ absent. Mandible protruding with seven apical teeth as in fig. 15. Maxilla elongated with saw toothed apical lobes as in fig. 14. Tenuaculum (fig. 22) without setae but with two stout barbs to each ramus. Abd. III to Abd. IV as 15 : 16. Abd. VI in male with two long, slender, erect, apical anal spines without papillae (figs. 19 and 25). Abd. VI in female with two pairs of long, slender, erect spines without papillae; one pair slightly anterior to the other and somewhat smaller (fig. 27). Genital aperture in male with two groups of four short setae and a group of 19 irregularly spaced setae (fig. 18). In female with two short setae and 13-14 longer setae arranged as in fig. 29.

Foot: Claw without any teeth; unguiculus vestigial. A long basal seta to each side of claw. In its perfect condition there are eight clavate tenent hairs, all longer than the claw, to each foot arranged with three externally, two lateral and three internal (fig. 20). Some of these tenent hairs are often absent, probably lost by abrasion, so that feet may sometimes have as few as four or five.

Furcula: Vestigial, minute, not completely differentiated and showing only a very broad, short manubrium and two stumpy, coarsely granulated dentes, each bearing three short apical setae; mucrones absent (figs. 23 & 24).

Localities: South Shetland Is.: F. I. D. S. Base, Admiralty Bay, King George I., 17. III. 1961, T. S. & R. E. Leech; Livingstone I., 62° 43' S, 60° 26' W, 22. I. 1961, R. E. & T. S. Leech; Livingstone I., at False Bay, Elephant Point, 22. I. 1961, R. E. & T. S. Leech; Isle de la Fuente, Greenwich I., 26. XII. 1960, R. E. Leech; Base Arturo Prat, Greenwich I., 26. XII. 1960, T. S. Leech; West of entrance to Deception I., 63° S, 60° 35' W, 45 m, 9. III. 1960, R. E. Leech; West of entrance to Deception I., 20. I. 1961, T. S. & R. E. Leech; Torre I., near Greenwich I., near chinstrap penguins, 27. XII. 1960, R. E. Leech; Penguin I., 62° 6' S, 57° 56' W under stones and grass roots, 11. III. 1960, R. E. Leech; Gonsalez I., Greenwich I., 26. XII. 1960, R. E. Leech. Antarctica: Gonsales Videla Base, 2. I. 1961, R. E. Leech; and 4. I. 1961, R. E. & T. S. Leech at 150 m alt.; Gonsales Videla Base, 64° 47' S, 62° 49' W, 5. I. 1961, T. Leech; Palmer Peninsula, XII. 1960, R. E. Leech; Victoria Land, III. 1960, M. E. Pryor; Hallett Sound, 6. I. 1959, Pryor; Hallett Station, under stones in skua rookery, 14. XI. 1960, K. A. J. Wise and under stones on scree slopes, 5. XI. 1960, Wise.

Remarks: The large numbers of specimens made available through these collections establish *F. grisea* (Schaeffer) as a good species exhibiting very little variation apart from the sexual dimorphism shown by the anal spines, genital apertures and sensory structures at the apex of Ant. IV; the tenent hairs of the feet are variable, not genetically but accidentally, and the full compliment of tenent hairs shown in fig. 20 is often reduced, sometimes to nil, but in such cases the zones of attachment of the hairs can usually be seen



Figs. 26-29. *Friesea grisea* Schaeffer: 26, apex of Ant. IV of ♂; 27, anal spines of ♀; 28, sense organ at apex Ant. IV everted in ♂; 29, genital aperture of ♀. Figs. 30-32. *Gomphiocephalus hodgsoni* Carp.: 30, furcula and tenaculum in resting position; 31, ♂ genital opening; 32, ♀ genital opening. (A=scale of figs. 26, 28, 29 & 31. B=scale of fig. 27. C=scale of figs. 30 & 32.)

in a good preparation.

SUBFAMILY HYPOGASTRURINAE

Gomphiocephalus hodgsoni Carpenter, 1908 Figs. 30-41.

Described originally from South Victoria Land in 1908 and since recorded from Antarctica by McNamara in 1919, Carpenter again in 1921 and Gressitt & Weber in 1959,

this species was present in very large numbers in collections from the vicinity of McMurdo, Ross I. and Victoria Land, Antarctica, as follows:

Marble Point, Victoria Land, 12. XI. 1959, C. W. O'Brien, under damp stones; 29. XII. 1959, J. L. Gressitt, under rocks; 16. XII. 1959, R. E. Leech. Kukri Hills, Victoria Land, 23. XII. 1959, Leech, 900 m, base of glacier, north facing slope. Flat Iron (Finger Point), Granite Harbor, Victoria Land, 27. XI. 1959, R. E. Leech, under flat stones; 23. XII. 1960, K. A. J. Wise, under stones all over Flat Iron. Mt. Suess, Mackay Glacier, Granite Harbor, Victoria Land, 23-26. XII. 1960, J. Mulligan & E. Zeller. Inner Harbor, Granite Harbor, Victoria Land, 24. XII. 1960, Wise, from east shore, near New glacier. Devil's Punchbowl, Granite Harbor, Victoria Land, 25. XII. 1960, Wise, beside tarn, 90 m on south ridge; 26. XII. 1960, Wise, from south ridge. Cape Royds, Ross I., 20. XII. 1959, Gressitt; 29. I. 1960, Gressitt, under rocks also on lichens, also on slope, 10 m; 31. I. 1960, Gressitt, under rocks; 31. I. 1960, Gressitt, under rocks. Horseshoe Bay, Cape Royds, Ross I., 14. XII. 1959, O'Brien, under stones. Cape Barne, Ross I., 30. I. 1960, Gressitt, under rock with lichen; 13. XII. 1959, O'Brien, 8 km north of Deep Lake. Cape Crozier, Ross I., 20. XII. 1959, O'Brien, under a stone; 17. XII. 1961, Wise, under stones near west end of Adelie Penguin rookery ca. 130 m also ca. 160 m; 9. X. 1959, R. Leech, under stones; 9. XII. 1959, Leech, under damp stones; 10. XII. 1959, Leech, under damp stone. Ricky Glacier, Koettlitz Glacier area, (?) XII. 1960, I. A. G. Willis, Camp I., under large stones.

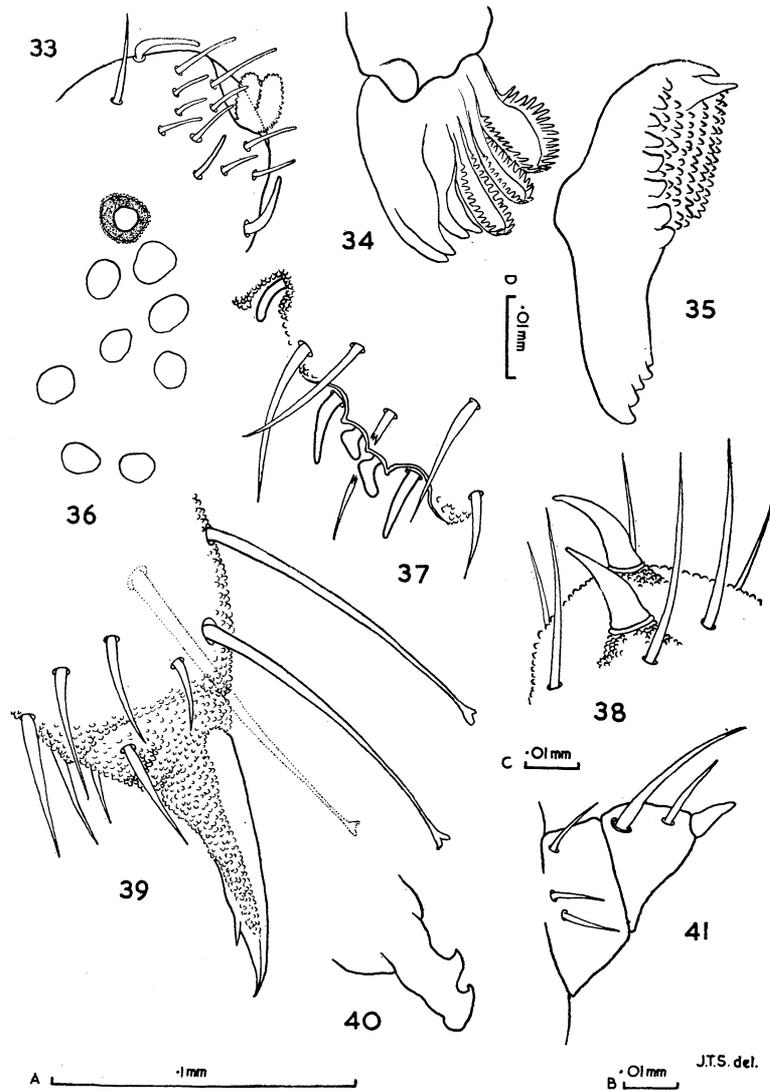
From the large amount of material available to me it appears that this species is remarkably constant with very little morphological variation apart from variations in size. The following description of the species is more detailed than the original of Carpenter particularly with reference to the mouth parts and sensory organs.

Color: Given by Carpenter as "deep blue-black" varies in my specimens from black through to deep blue-black to deep reddish-black or brownish red. Young specimens are often a bright reddish brown.

Clothing: Moderately heavy of medium to long setae, the latter more especially posteriorly.

Body: Length varies from 0.5 mm to 1.6 mm. Antennae shorter than head with the four segments related on large specimens as 8 : 12 : 17 : 20 and on small specimens 4 : 8 : 9 : 9 with infinite variations in between. Ant. IV apically with a double exsertile knob, two short sharply bent sense rods and numerous short, straight, slender sense rods (fig. 33). Sensory organ of Ant. III relatively large with two small central bent sense clubs and two straight, stout, sense rods all behind an integumentary fold and a single exposed curved sense rod to one end of the integumentary folds, the whole provided with five guard seta and arranged as shown in fig. 37. Ocelli eight to each side, subequal, with a postantennal organ of circular form and granulated (fig. 36). Maxilla head with two double apical teeth and three comb-like lamellae (fig. 34). I can find no trace whatever of the teeth forming a molar-like area on the maxilla as mentioned by Carpenter. Mandible with apical teeth and strong molar area as shown in fig. 35. Abd. IV is longer than Abd. III as 43 : 33. Abd. VI with a pair of anal spines on papillae which may or may not be contiguous. Male and female genital apertures armed with setae as shown in figs. 31 & 32.

Legs: Claw with a strong inner tooth at about four-fifths down, no outer teeth. Unguiculus absent. Claw granular as shown in fig. 39. Front feet with two long, clavate tenent hairs longer than claw, arising at different levels; other feet with three tenent hairs



Figs. 33-41. *Gomphiocephalus hodgsoni* Carp.: 33, apex of Ant. IV; 34, head of maxilla; 35, mandible; 36, ocelli and postantennal organ; 37, sensory organ of Ant. II; 38, anal spines; 39, front foot with position of third tenent hair of other feet indicated by dotting; 40, ramus of tenaculum; 41, furcula from side. (A=scale of fig. 39. B=scale of figs. 40 & 41. C=scale of figs. 33, 35, 36 & 38. D=scale of figs. 34 & 37.)

arranged as a pair arising furthest from the claw base and single median one arising nearer the claw base.

Furcula: Very much reduced (figs. 30 & 41). Each dens with a short apical and a long, stout basal seta. The manubrium with three short setae on each side (fig. 30). Manubrial hooks well-developed. Tenaculum small, the rami each with two barbs.