

OBSERVATIONS ON SCALE-INSECTS (COCCIDAE).—VI.

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(PLATE XVI.)

Glypeococcus, gen. nov.

Female. Dorsum nude and densely chitinised. Marsupium occupying practically the whole of the interior. Venter (sternites) remaining attached to the food-plant. Legs and antennae present. Cephalic margin with a strongly developed clypeus, lying prone over the mentum. Abdominal stigmata present.

Larva of the *Icerya* type, and with several pairs of abdominal stigmata.

Type. *C. hempeli*, Ckll.

Glypeococcus hempeli, Ckll.

Icerya (Crypticerya) hempeli, Ckll., Can. Ent. xxxi, p. 43 (1899).

Crypticerya hempeli, Hemp., Rev. Mus. Paul., iv, p. 376 (1900).

Female adult (Pl. xvi, fig. 1). Sphaeroid and hollow at gestation, the marsupium filling practically the whole of the interior. Integument densely chitinised, faintly ribbed and polished; very dark plum-coloured, with a delicate "bloom-like" secretion, the segmentation of the dorsum indicated by faint blackish interrupted lines. Venter

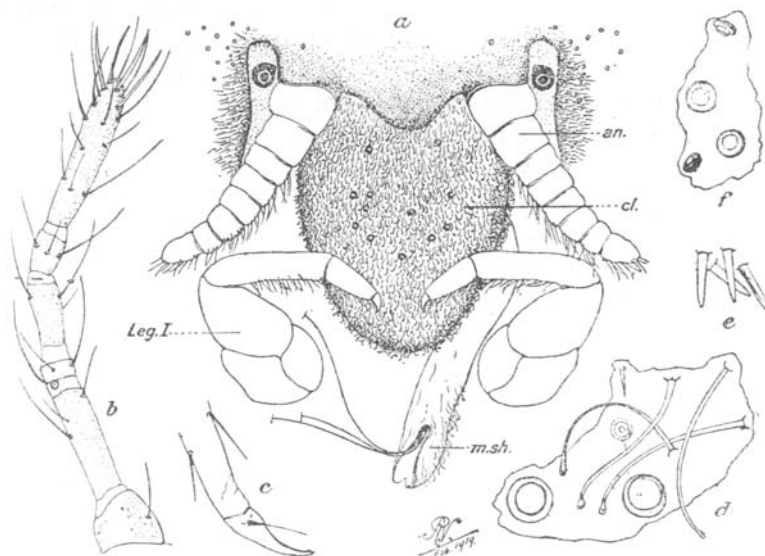


Fig. 1. *Glypeococcus hempeli*, Ckll., ♀; a, the relative position of the various appendages on the anterior portion of the venter: an, antenna; cl, clypeus; m.sh., membranous sheath enclosing the buccal filaments; b, antenna of larva; c, tarsus of larva; d, gland-pores and hairs on venter of ♀; e, dorsal spines of larva; f, gland-pores of larva.

membranous, resting on a thin layer of hard resin-like secretion, segmentation distinct. Mentum biarticulate, the "filaments" enclosed in a membranous sheath (*m.sh.* in (C605)

fig 1, *a*), the latter lying obliquely to one side of the median line in mounted preparations. Clypeus (fig. 1, *a*, *cl.*) strongly produced, densely hairy and *completely overlying the mentum*. Antennae, legs and thoracic stigmata lying in very deep depressions. Ventrally the margins and the whole of the thoracic area, together with the terminal abdominal segment, densely hairy; the hairs (fig. 1, *d*) distinctly knobbed at the tips. Antennae (fig. 1, *a*, *an*) robust, of 8–9 strongly chitinised segments. Legs (fig. 1, *a*) robust, and strongly chitinised; claw simple. Abdominal stigmata small and apparently in six pairs. Thoracic stigmata large; the gland-pores multilocular, the cylindrical ducts long and apparently truncate proximally. Dermal gland-pores (fig. 1, *f*) large and with a deep cylindrical rim; they are irregularly disposed on the venter and for a short distance also beyond the margin; the dorsum rather thickly studded with minute pores surrounded by dark granular bodies. Anus large and roughly circular in the outline formed by the dense chitinous walls of the body; no other exact details observed, but portions of a ruptured membranous cuticle project into the lumen, suggesting that the true structure is wanting. Diameter, 6.5–9mm.; antennae, 0.6 mm. long.

Larva. Form elongate. Antennae (fig. 1, *b*) clavate, of six segments; 2nd, 4th, and 6th longest; 3rd and 5th very short and subequal; all the segments with fine slender hairs, the longer ones less than the length of the terminal segment; terminal segment with several slender spinose hairs at the tip; in the clear membrane which connects the 2nd and 3rd segments is a relatively very large chitinous ring with a granular centre; as no hair or spine has been seen attached to this organ it is suggested that it may be a sensorium or gland-pore; three similar structures also occur on the coxae. Legs long and slender; claw (fig. 1, *c*) with a minute, subapical denticle. Dorsal gland-pores with a broad quoit-like rim and a very short cylindrical duct, the whole structure when seen in profile reminding one of a very short-stemmed agaric or broad-flanged stopper to a glass jar; these are arranged more or less in transverse rows. The terminal segments of the abdomen, more especially in the region of the anus, with a group of large spines, packed very closely together in the median area. Terminal abdominal bristles in five pairs; these are of great length, or slightly longer than the antennae. The chitinised hind gut with its flange-like papillae very distinct. Abdomen with at least six pairs of stigmata; the external opening minute and membranous; the atrium long, gradually narrowed distally, strongly ribbed transversely or irregularly moniliform, and the proximal portion with a deep wide cleft; the connective tube slender, chitinised, and bifurcated, each branch having well-formed taenidia; length of the atrium about twice the diameter of the large quoit-like gland-pores.

BRAZIL: San Paulo; on the spiny branches of an unknown tree or shrub (mimosa?), 1906. (In a small collection of Brazilian Coccidae purchased from Mr. O. E. Janson; no other data).

The determination of the species is based upon an examination of a specimen (ex coll. T. D. A. Cockerell) kindly supplied by Mr. E. E. Green, to whom I express my thanks, as in the absence of his material I should most certainly have given this insect a new specific name.

I have described the morphological characters in some detail as hitherto the true characteristics seem to have been almost entirely overlooked. The presence of a

strongly developed clypeus in this Coccid it is unique, and is probably homologous with that of certain members of the FULGORIDEA belonging to the genus *Cixius* and other allied forms.

***Aspidoproctus gowdeyi*, sp. nov.**

Female adult. Completely covered dorsally with a thick and densely felted layer of dusky white and pale yellow wax; the wax more or less divided into segments corresponding to the segmentation of the body. Venter pale castaneous, slightly mealy and in parts covered with white woolly filaments. Legs pitchy red. Marsupium well developed, the secretory operculum wanting, but apparently broken away.

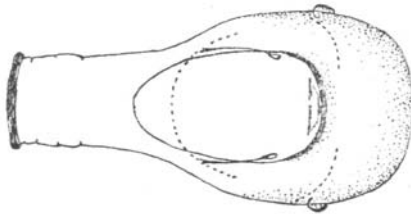


Fig. 2. *Aspidoproctus gowdeyi*, Newst., sp. n., ♂ genital armature.

Male. In dry specimens the body is uniformly black or piceous. Wings very dark smoky brown or blackish; costa black, subcostal vein dull crimson; forked pseudo-vein dull white and very conspicuous. Halteres with 4–5 strongly hooked bristles. Body mealy. On maceration in KOH the softer parts of the integument change to dull crimson; the sclerites and also the legs and antennae, piceous. The single pair of central processes well developed; terminal bristles varying in length and thickness, the longest about four times the length of the process. Genital armature (fig. 2) shaped somewhat like a flask or ampulla in miniature; the proximal portion broadest; near the centre of the dilated proximal portion is a shallow saucer-shaped appendage suspended to the walls of a large, ovate, chitinous ring; distal portion cylindrical and densely chitinised. Intromittent organ not observed.

UGANDA: Kampala, on plumbago and rose, 15.x.1918 (*C. C. Gowdey*).

The males hatched apparently during transit through the post and were rather badly crumpled and otherwise injured.

***Walkeriana digitifrons*, sp. nov.**

Female, adult (Plate xvi, fig. 3). Stationary. Somewhat pyriform, narrowest in front; highly convex and sloping gradually towards the cephalic margin. Dorsum more or less covered with an easily deciduous layer of white or pale buff-white, granular wax; margin with relatively robust, coalescing plates of white wax, which, when perfect, are distinctly laminated transversely; cephalic margin with a short stout, centrally placed, cylindrical process. Integument very hard, dark castaneous or piceous; margin, when denuded, with a series of large blunt tooth-like projections or tubercles, arranged rather widely apart; dorsum with 3–4 bilateral rows of gland pits, in which the granular wax generally remains more or less intact; abdominal

segmentation distinct. Venter hollow, but filled with loose white flocculent material, in which the eggs are laid and the larvae subsequently hatch. Vaginal orifice transversely linear, and without a secretory operculum or an invaginated marsupium. The integument of the dorsum, after long maceration in KOH, becomes pale brown in colour; but partly retains its hard and somewhat brittle nature. Antennae with 10–11 segments; 4th segment the shortest, but its articulation with the 5th is often incomplete, though the constriction between these segments is well marked and relatively deep. Eyes in the form of a truncated cone. Legs rather sparsely hirsute, but normal in shape. Compound gland-pores of the dorsal pits relatively large, rather narrowly ovate, and collectively forming a rather coarse and irregular reticulation. Dorsal gland-pores of the usual multilocular type; they are fairly numerous and more or less evenly distributed; those on the marginal tubercles are surrounded by a radial and somewhat petaloid pattern, due apparently to the thickening of the integument. Ventral gland-pores similar to those of the dorsum, but slightly larger and with an ovate central pore; they are thickly packed together at the margins and also on the marginal tubercles. Anus surrounded by a broad concentric band of dark chitin, which is thickly studded with simple, more or less circular gland-pores. Fine slender hairs are scattered over both sides of the body; marginal hairs also slender, but longer than those on other parts of the body. Length, inclusive of the finger-like process on the cephalic margin, 6–9 mm.

Larva. This is of the usual form. Five of the long hairs on the terminal segment of the antennae equalling the length of the body. Sides of the abdomen with numerous long fine hairs; anal hairs or bristles apparently in three pairs, of which the central pair are much the more slender and shorter; outer pairs (2nd and 3rd) relatively stout and longer than the body.

UGANDA: Damba Isl., Sesse Islands, Lake Victoria; on *Baikea eminii*, 8.x.1912 (C. C. Gowdey).

***Pseudococcus inquilinus*, sp. nov.**

Female, adult. External covering and lateral appendages destroyed by the medium in which the specimens were preserved. Form, when denuded, similar to that of *P. longispinus*, Targ. With 16–17 pairs of cerarii; anal pair with two, the others with from 4 to 7 sharply conical spines. Lateral cerarii (fig. 3, c) with 2–3 auxiliary setae and numerous, obtusely triangular pores rather closely grouped together near the cerarii, but scattered and merging into the body-pores beyond. Anal lobe cerarii (fig. 3, a) surrounded by a small circular chitinised area; ventral surface of each lobe (fig. 3, b) with a broad and somewhat rectangular chitinised area. Anal ring well formed; setae (fig. 3, e) a very little shorter than the anal lobe setae. Dorsal body setae (fig. 3, d) numerous, slenderly spinose, with, in many instances, flagellate tips. Obtusely triangular pores very numerous, intermingled with larger simple pores; and on the last few segments of the abdomen a few multilocular pores; tubular ducts very short and scanty (?) the rims of which are chitinised. Dorsal osteoles large, in two pairs. Legs relatively stout.

The young adult female resembles the old adult, but has the gland-pores more closely packed together.

BRITISH GUIANA: "Cattle Trail Survey," on an unknown plant; "the insects enclosed by ants (*Acromyrmex* sp.) in small paper nests," 1919 (*A. A. Abraham*, per *G. E. Bodkin*).

This species is very near *P. comstocki*, Kuwana, as defined by Ferris (Leland Stanford Jun. Univ. Pub. "The California Species of Mealy Bugs," p. 41) but differs in having a larger number of cerarian spines and in the form of the chitinised area on the ventral surface of the anal lobes.

Taken in association with *Lecanium inquilinum*, Newst., and *L. deformosum*, Newst.

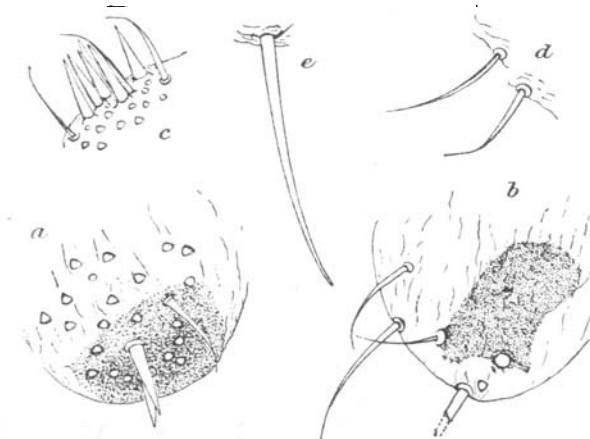


Fig. 3. *Pseudococcus inquilinus*, Newst., sp. n. ♀; *a*, dorsal and, *b*, ventral surface of anal lobes; *c*, lateral abdominal cerarii; *d*, body setae; *e*, hair of anal ring.

***Pseudococcus perniciosus*, Newst. & Willcocks, var.**

Ovisac of female. Arranged in a similar way to those of typical *P. perniciosus*,* but the more or less globular masses are smaller. The examples are so badly weathered, however, that it is not possible to give details of the structure of the individual ovisacs.

Female, adult. Under pressure of the covering glass the form is narrowly ovate. Antennae of seven segments. One pair of cerarii present on the anal lobes (fig. 4, *a*), the spines sharp and somewhat slender, with a few obtusely triangular gland-pores scattered around them. No typical lateral abdominal cerarii present, but their position is indicated by a single, faintly lanceolate spine (fig. 4, *c*), with from 1 to 2 simple supplementary setae at some distance away from it: the spines are traceable in some individuals on the last 3-4 segments, in others on the penultimate segment only. Body spines (fig. 4, *d*) minute, faintly lanceolate, and very scanty indeed; hairs small and also very scanty. Anal lobe setae (fig. 4, *b*) slightly longer than the anal ring setae (fig. 4, *e*). Integument *very thickly set with gland-pores* (fig. 4, *c, c*), more especially so along the margin; these are of three kinds: multilocular, tubular and obtusely triangular; the first-named are arranged in narrow transverse bands on the dorsal surface of some of the abdominal segments, elsewhere they are irregularly disposed on both surfaces. Length of 53 adult ♀♀ varying between 2.1 and 2.7 mm.

* Newstead & Willcocks. Bull. Ent. Res., i, p. 138 (1910).

Larva. Anal lobes with a pair of slightly lanceolate spines; setae longer than those of the anal ring. Dorsal spines minute, similar in shape to those on the anal lobes.

BRITISH EAST AFRICA: Kabete, on coffee, November 1918. "Coffee bush infected in the lab. has been killed by this scale" (*F. W. Dry*, for *T. J. Anderson*).

Typical examples of *P. perniciosus*, N. & W., have from 5-6 pairs of lanceolate cerarian spines on the distal segments of the abdomen, with 2-3 obtusely triangular pores scattered near them; and the body spines, though smaller than the cerarian spines, are relatively much larger, and also much more frequent than are those in the variety from coffee at Kabete. Moreover *P. perniciosus* is much larger, measuring from 3-4 mm.

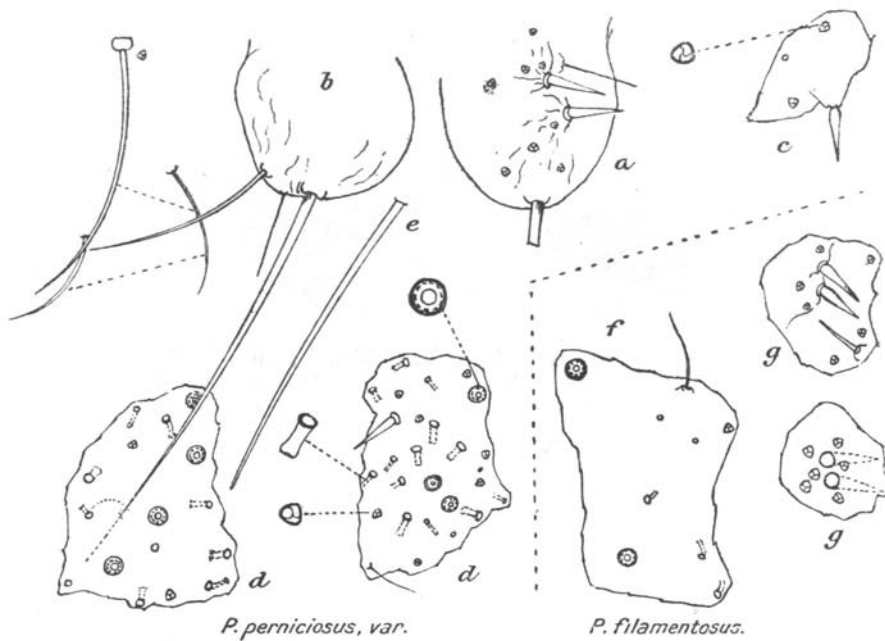


Fig. 4. *Pseudococcus perniciosus*, N. & W., var., ♀; *a*, *b*, dorsal and ventral aspect of the anal lobes; *c*, lateral abdominal cerarii; *dd*, gland-pores; *e*, hair of anal ring. *Pseudococcus filamentosus*, Ckll., ♀; *f*, gland-pores; *gg*, lateral abdominal cerarii.

Brain* has sunk *P. perniciosus* as a synonym of *P. filamentosus*, Ckll., without giving reasons for so doing; this action has led me to re-examine examples of the latter (part of the type lot kindly presented to me by Professor T. D. A. Cockerell in 1892) and I find that it differs to a marked degree from *P. perniciosus* in having very few gland-pores (fig. 4, *f*), relatively shorter anal lobe setae and small groups of obtusely triangular pores round the cerarian spines (fig. 4, *g*, *g*). Some of the tubular ducts of the dorsum are also much shorter and many of them are accompanied by 2-3 obtusely triangular pores. Clearly therefore *P. perniciosus* is specifically distinct from *P. filamentosus*, and the former name must be retained.

* Brain, C. K. Trans. R. Soc. S. Africa, v, pt. 2, p. 99 (1915).

Phenacoccus ballardi, Newst.

The original description* of this rather remarkable insect was given without illustrations. I have thought it desirable, therefore, to give a photomicrograph of both old and young adult females (Pl. xvi, fig. 4) in the hope that it will enable students to determine the species with greater ease.

Pseudophilippia inquilina, sp. nov.

Female, adult. Form short ovate and slightly tumid. Colour in life mauve pink. Dorsum nude; venter protected by a thin vesicular glassy scale, which is firmly attached to the bark of the food-plant. Antennae (fig. 5, *a*) and legs quite rudimentary; the former, which are much shorter than the stigmata, are composed

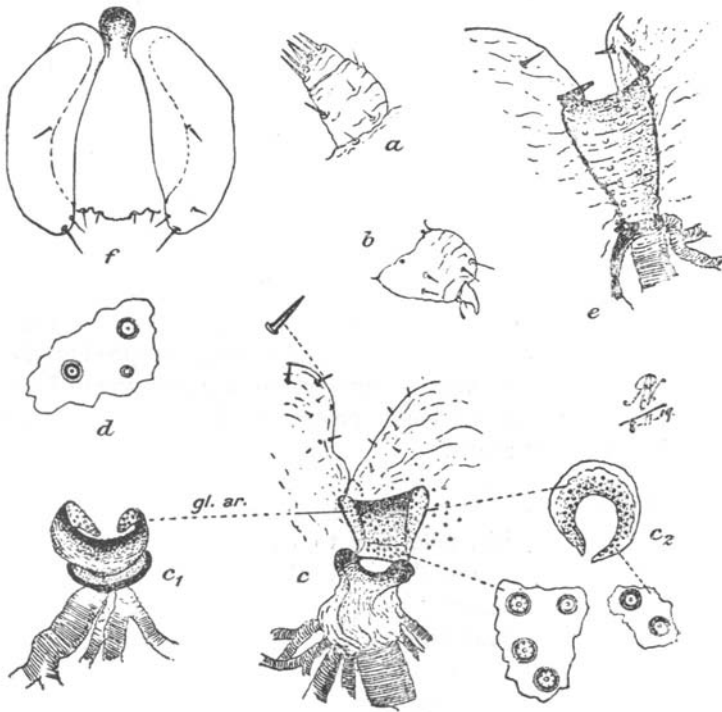


Fig. 5. *Pseudophilippia inquilina*, Newst., sp. n. ♀; *a*, antenna; *b*, leg; *c*, *c*₁, *c*₂, stigmata; *d*, gland-pores. Second stage ♀: *e*, stigmatic cleft; *f*, anal lobes.

apparently of three segments, the apex having several stiff hairs. Legs (fig. 5, *b*) slightly smaller than the antennae, bare, composed of a single tubercular-shaped segment, with a relatively large claw; lower digitules stout and bluntly pointed. Stigmatic clefts (fig. 5, *c*) clearly defined. The stigmata (fig. 5, *c*, *c*₁, *c*₂), which are placed close to the cleft, are protected by a well-defined external arch (fig. 5, *gl. ar.*) shaped somewhat like a horse-shoe in miniature, and closely set internally with thick-rimmed multilocular gland-pores. Anal cleft nearly four times the length of the lobes; the latter surrounded by a distinct chitinous arch. Venter rather

* Newstead, R. Bull. Ent. Research, viii, p. 17 (1917).

thickly studded with circular gland-pores (fig. 5, *d*). Dorsum with numerous spines, especially towards the margin. Rostrum relatively large; the filaments protected by a very long membranous sheath. Length, 4.2–6.8 mm; width, 4.3–5.5 mm.

Female, second stage. Short ovate; dorsum flat. Colour and the structural characters of the antennae and legs as in the adult female. Stigmatic clefts (fig. 5, *e*) relatively deep. Stigmatic spines two, one on either side of the external glandular arch; the latter much more extended towards the margin, and with fewer gland-pores than in the adult; fulcrum to the atrium of the stigmata strongly produced. Anal lobes (fig. 5, *f*) with a tongue-shaped sclerite between them at the base.

Larva. Ovate. Antennae and legs well developed; the former of six segments, of which the 3rd is much the longest and equal in length to the 2nd, 4th and 5th together. Anal lobes large; apical hair very long and stout. One large stigmatic spine in each cleft. Marginal hairs in an irregular double row. Abdominal segments with a transverse series of hairs, slightly smaller than those at the margin. Rostral filaments as long, apparently, as the circumference of the body.

JAMAICA: on the banks of the Great River, near Montpelier; attached to the bark of an unknown tree beneath a large, blackish coloured "paper" nest of *Cremastogaster brevispinosa*, Mayr, var. *tumulifera*, For. The nest in question was attached to the bole of the tree about six feet from the ground; 10.xii.1908 (*R. Newstead*).

I have placed this rather remarkable insect in Cockerell's genus *Pseudophilippia* as it agrees best, in its morphological characters, with Cockerell's diagnosis; but the absence of an ovisac may be thought by other students to preclude its admission here. It seems to me, however, that the presence of a glassy ventral scale beneath the body of the female and the curiously protected stigmata do not in themselves call for the erection of a new genus.

***Antonina waterstoni*, sp. nov.**

Female, adult. Colour, in life, pale buff to dusky buff. Form flat, narrowly ovate to very elongate, broadly rounded in front, widest generally in the region of the proximal segments of the abdomen, narrowing rather suddenly behind; last two segments of abdomen (fig. 6, *a*) strongly constricted. Antennae quite rudimentary and apparently unsegmented; they are placed quite close to the margin. Legs absent. Mentum very small and unsegmented; just below it there are several minute tubercles, each with a short stiff hair. Stigmata large and widely separated; first pair in a line with the rostrum; the small group of parastigmatic glands merging into those at the margin. On the dorsal surface just behind the 2nd pair of stigmata is a large group of minute spines (fig. 6, *b*) occupying the whole width of the 1st proximal segment of the abdomen. Margin, all round, with an almost continuous band of relatively large pores (fig. 6, *c*) and a few minute pointed spines. Anal segment (fig. 6, *a*) markedly distinct; dorsal surface with a pair of forwardly directed bristles; ventrally it is almost covered with pores, which are almost as numerous as those on the preceding segment. Anal lobes quite rudimentary, each bearing a few stiff hairs. Anal ring (fig. 6, *a*₁) placed in a slight depression; hairs six in number, and rather stout. Length of young adult, 3–4.2; width, 2–3.2 mm. Old adults measure: length, 5.7–6 mm; width, 3–3.2 mm.

The dorsum and venter are very thinly protected with white powdery wax, this secretion adheres to the food-plant, but readily comes away from the insect ; beyond the body, especially in the posterior region, the secretion is dense and completely fills the narrow space between the stem and the leaf-sheath. The general of facies the female, together with the secretory matter (ovisac), bears a striking resemblance to *Aclerda berlesei*, Buffa.

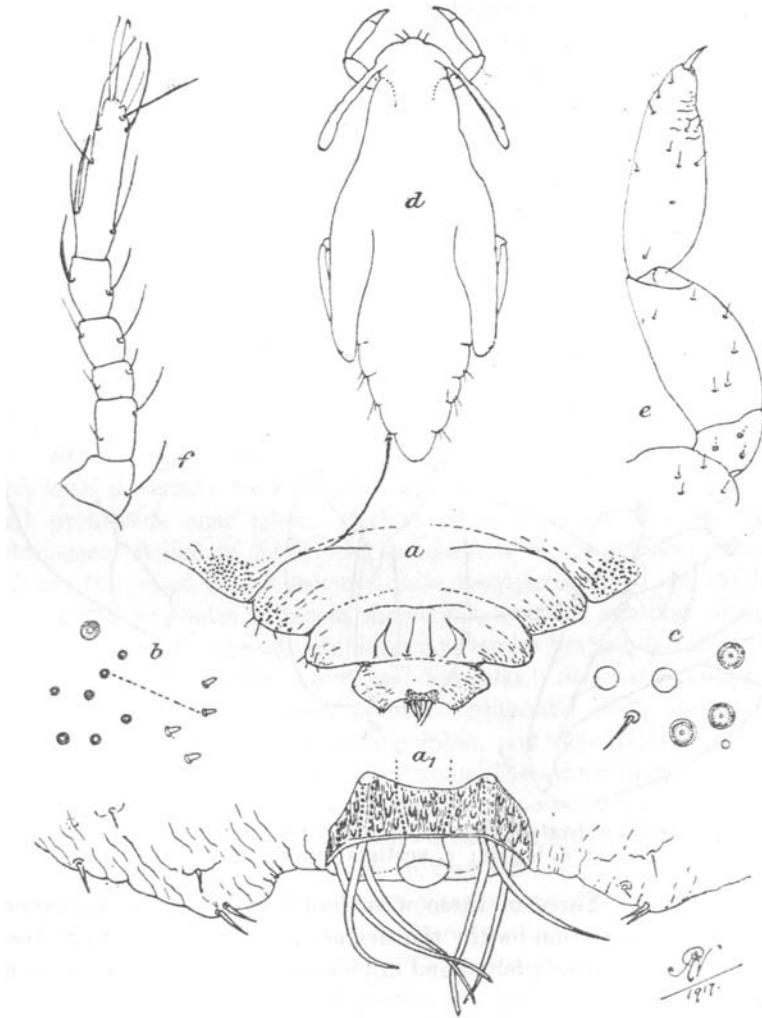


Fig. 6. *Antonina waterstoni*, Newst., sp. n., ♀; a, terminal segments of abdomen; a₁, terminal segment of abdomen with anal ring, etc.; b, gland-pores and body spines; c, marginal gland-pores; d, dorsal aspect of pupa; e, leg i. of pupa; f, antenna of larva.

Male (fig. 7, a). Rather robust. Head almost as broad as the thorax, articulation faint. Eyes well within the margin, and enclosed by two longitudinal curved sclerites; ocelli slightly smaller, placed between the antennae, just within the margin of the frons, ventrally. Antennae (fig. 7, b) of nine segments; 1st and 2nd very robust;

3rd and 4th very slender and markedly narrower than the rest ; 4th much the smallest and less than half the length of the 3rd ; all the segments with the exception of the 4th and 9th with short stout, bluntly pointed spines ; terminal one with several long hairs. Leg i. (fig. 7, c) with the tibia and tarsus more robust and much shorter than the corresponding segments in legs ii. and iii. (fig. 7, d) ; all the tibiae with distal spines, ventrally. Genital sheath short. Caudal bristles long. Wings long, but rather narrow. Length to end of genital sheath, 0·8.

Pupa (fig. 6, d). Robust. Antennal sheaths short and composed, as far as one can ascertain, of nine segments. Leg i. (fig. 6, e) more robust than legs ii. and iii. Claws to tarsi very slender. Length, 0·8 mm.

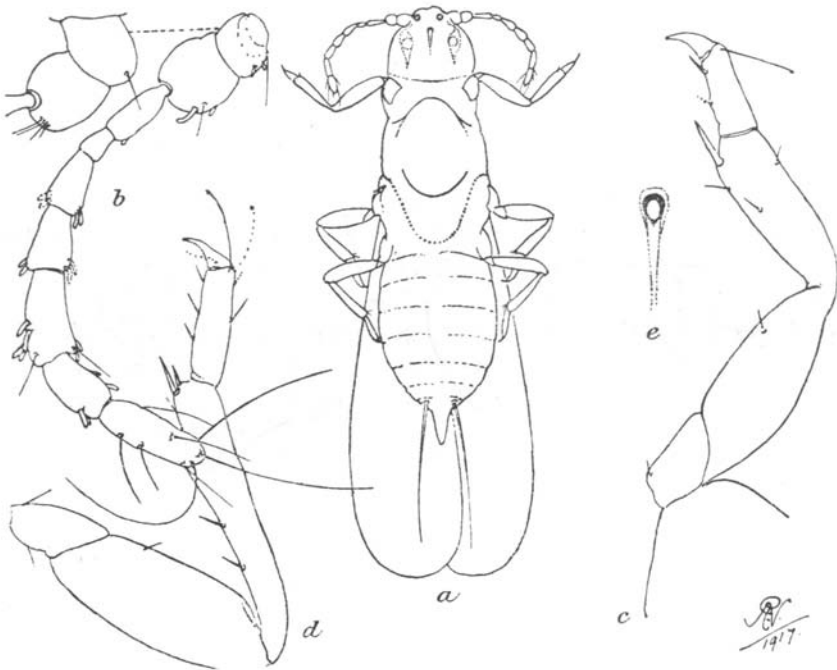


Fig. 7. *Antonina waterstoni*, Newst., sp. n., ♂ ; a, ventral view ; b, antenna ; c, leg i ; d, leg iii ; e, vestigial buccal cavity (?)

Puparium of Male. Three of these were found closely packed together under a leaf-sheath in association with the females. Collectively they formed an irregular mass of white, loosely felted and brittle strands of wax, completely enclosing the pupae.

Larva, adult (? Male). Very elongated, parallel-sided. Antennae (fig. 6, f) of six segments ; 3rd shortest ; 6th longer than the first three together ; all the segments with fine hairs, the 5th and 6th with long slender spinose ones. Anal segment of abdomen with a long stiff bristle indicating the position of the lobes. Anal ring with six long hairs. Rostrum very broad. Eyes small but prominent. Length, 0·55 mm.

MACEDONIA : beneath the leaf-sheaths of *Arundo phragmites*, 1917 (Capt. James Waterston).

It affords me infinite pleasure to dedicate this newly discovered species to our esteemed colleague.

The males were all dead, and more or less imperfect; and although one failed to trace the long caudal filaments, the presence of these structures is indicated by the setae which supports them in life. All the examples were lying beneath the leaf-sheaths and were flattened out as if by pressure of the sheaths.

The male of *Antonina australis*, Green, has been seen by Froggatt (Agricultural Gazette, N.S.W. No. 742, p. 3, 1904), but so far as I can ascertain it has not been described. The discovery therefore of the male of *A. waterstoni* is of interest, as the members of this sex in all the other species hitherto described are unknown.

The female of *A. waterstoni* is nearly related to *A. socialis*, Newstead, but differs in having much smaller antennae, in the presence of a large isolated group of minute spines, and in the character of the anal segment, including also the relative position of the anal ring.

***Pseudokermes marginatus*, sp. nov.**

Female Test. Roughly hemispherical; glassy white, with a median longitudinal suture, which renders the two halves easily separable; dorsal surface with faint traces of small and somewhat rectangular patches of secretion; sides with wavy conchoidal striae; stigmatic ridges more or less distinct; margin wavy.

Female, adult. Shape somewhat like that of a soldier's steel helmet in miniature, with a narrow mediodorsal ridge, a relatively very broad flat margin (rim) and prominent anal lobes. Surface faintly uneven but shining. Colour pale castaneous. Boiled in KOH, the integument of the dorsum changes to pale straw-colour; the broad flange becomes quite transparent, and the extreme margin brownish—the three grades of chitin showing in marked contrast to one another. Antennae represented by exceedingly minute tubercles bearing 4–5 short stout setae. Legs entirely absent. Margin wavy and irregular. Stigmata robust, somewhat cylindrical, and externally obtusely conical. Stigmatic clefts and spines absent. Marginal spines relatively stout, acutely pointed, and very widely separated. Anal cleft deep; lobes somewhat triangular, the proximal and inner margins longer than the outer; apices with several fine hairs. Dorsal gland-pores in the median longitudinal ridge, circular, surrounded by a small pale area, and often divided into two linear groups. The broad flat marginal flange, in very old and heavily stained examples, with numerous cell-like clear areas, the inner series forming an irregular dactyliform pattern; in younger forms these structures are wanting and in their place are seen a large number of narrow tubular ducts. The extreme margin presents, on its inner surface, an irregular crenulated appearance, the depressions occupied by a rather ill-defined duct. Length, 2·1–1·8; width, 2·1–2 mm.

BRITISH GUIANA; Ituni Savannah, on *Nectandra* sp., 28.ii.1919 (*A. A. Abraham* per *G. E. Bodkin*).

The test of the female resembles that of the young forms of *P. nitens*, Ckll., but the fine vertical striae are wanting and the surface is much more uneven. In the female of *P. nitens* the broad margin is wanting; the integument is uniformly membranous after maceration in KOH, and minute vestigial legs are present.

Male puparia not observed.

***Pulvinaria brevicornis*, sp. nov.**

Female, adult. More or less oval in outline and highly convex, or sub-hemispherical; generally with two longitudinal rows of rather deep pits, one on each side of the median line. Colour, in alcohol, varying from pale buff to pale castaneous; some are unicolorous, others with two interrupted longitudinal black lines following the course of the pits, the outer line, in some examples, giving off lateral lines on the abdominal segments. Integument thin. Antennae (fig. 8, *a*) relatively very short and robust, equal in length to the anterior tibio-tarsal segments together; of 6 segments (the articulations somewhat ill-defined in some examples); 5th and 6th each with a rather long slender spine. Legs (fig. 8, *b*) short and very robust. Stigmatic clefts obsolete; spines three (fig. 8, *c*), stout, the central one generally slightly

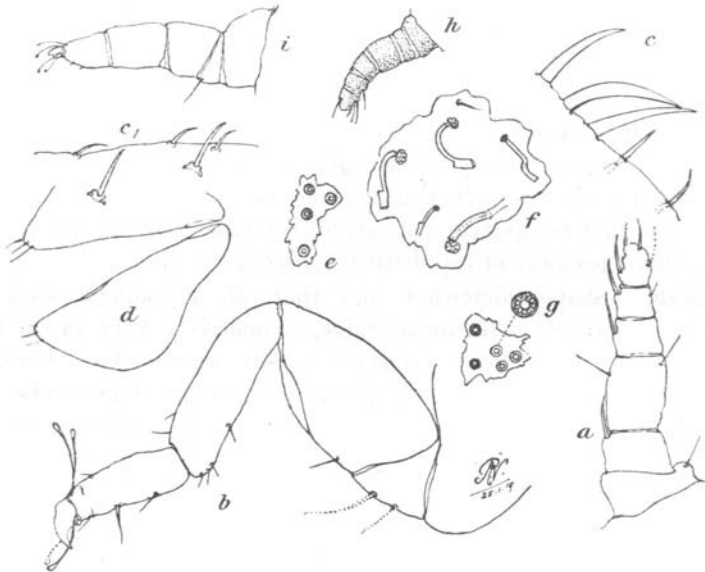


Fig. 8. *Pulvinaria brevicornis*, Newst., sp. n., ♀; *a*, antenna; *b*, leg; *c*, *c*₁, stigmatic and marginal spines; *d*, anal lobes; *e*, preanal gland-pores; *f*, ventral tubular ducts; *g*, stigmatic gland-pores. Male, pronymph: *h*, antenna; *i*, leg.

longer than the laterals, but in some instances it is of the same length as the others. Marginal spines (fig. 8, *c*₁) simple, pointed and rather widely separated. Anal cleft short, or two to three times longer than the lobes. Anal ring of 10 hairs. Anal lobes (fig. 8, *d*) with the proximal margin much longer than the distal margin; apex with several hairs. Dorsum, in heavily stained preparations, with widely separated, broadly oval or subcircular cells. Venter with innumerable circular gland-pores, the tubular connections of which (fig. 8, *f*), are suddenly truncate on one side near the proximal end and furnished with a rosette-like extension. Length, 3–3.75 mm; width, 1.75–3 mm.

BRITISH GUIANA: Turkeyn, East Coast, on *Avicennia nitida*, 22.vi.1917 (*G. E. Bodkin*).

The integumental characters of this insect are unusual, and should serve, together with the form of the antennae, the anal lobes and stigmatic spines, to distinguish it from its allies.

***Pulvinaria broadwayi* var. *echinopsidis*, nov.**

Female, adult. Ovate, usually very slightly narrowed in front. Antennae of eight segments; 3rd a little longer than the 2nd; formula 3, 2, 8, 1 (4, 5, 6, 2) or 3, 2, 8, 4 (5, 6, 7). Legs robust and relatively long. Lower digitules strongly incrassate proximally and broadly dilated distally. Stigmatic clefts (fig. 9, *a*) very shallow; spines three, all of them stout, the middle one usually a little more than twice the length of the laterals. Marginal spines (fig. 9, *a*) set rather closely together and of two types—one relatively short and simple, the other longer and slightly divided

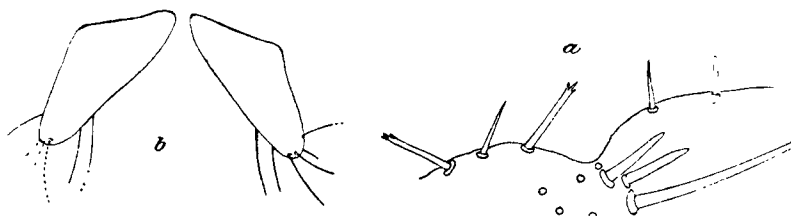


Fig. 9. *Pulvinaria broadwayi* var. *echinopsidis*, Newst., nov., ♀; *a*, stigmatic cleft with marginal and stigmatic spines; *b*, anal lobes.

at the tip. Dorsum without glands or cellular structures; venter crowded with glandular tubes, more especially so in the abdominal region. Anal lobes (fig. 9, *b*) rather narrow and furnished distally with several long hairs. Anal ring of eight hairs, of which one pair is much smaller than the rest. Length, 2–1.5; width, 1–1.3 mm.

Ovisac. More or less rounded and formed of loose and somewhat brittle material, at the side of which the shrivelled body of the female rests. Greatest width, 1.5–3 mm.

BRITISH GUIANA: Botanic Gardens, Georgetown, on *Echinopsis latiflora*, ix.1918 (*G. E. Bodkin* and *H. Morrison*).

***Lecanium subacutum*, sp. nov.**

Female, adult (fig. 10, *a*). Colour of dead examples pale dusky yellow. Flat and very thin; dorsum wrinkled, the wrinkles at the margin radial. Form long and narrow; extremities subacute; the length three times as great as the greatest width; one side of the body is usually more or less straight, the other strongly arched. Antennae (fig. 10, *b*) of six segments, the third very long, and almost equalling the length of the 2nd, 4th, 5th, and 6th together. Legs long and slender. Stigmatic clefts (fig. 10, *c*) shallow; spines three, all of them very stout and bluntly pointed; the central one rather flattened and more than twice the length of the laterals. Marginal spines (fig. 10, *c*) simple, rather stout and strongly curved backwards; they are placed very closely together, so that the tip of each spine almost reaches the strongly curved portion of the spine below it. Anal lobes (fig. 10, *d*) long and narrow; the length equalling that of the 3rd segment of the antennae. Dorsum with numerous large circular gland-pores (fig. 10, *e, e*) having strongly chitinised rims and fine granular centres; they are irregularly scattered over a relatively broad area between the anal lobes and the antennae. Dorsal spines (fig. 10, *e, e*) short, stout, and bluntly pointed. Dermal cells absent. Submarginal tubercles in two

pairs: one anterior, the other posterior. Anal cleft relatively short, and from one-seventh to one-ninth the length of the body. Length, 2.4–3.1 mm.

Young females are relatively narrower than the adults; but do not otherwise differ from them.

Male puparium. Glassy white. Very elongate; outline similar to that of a young female; median plate or "coronet" long and very narrow; stigmatic ridges well defined; margin with one division along the line of the lower pair of stigmata. Length, 1.8–1.9; width, 0.5–0.6 mm.

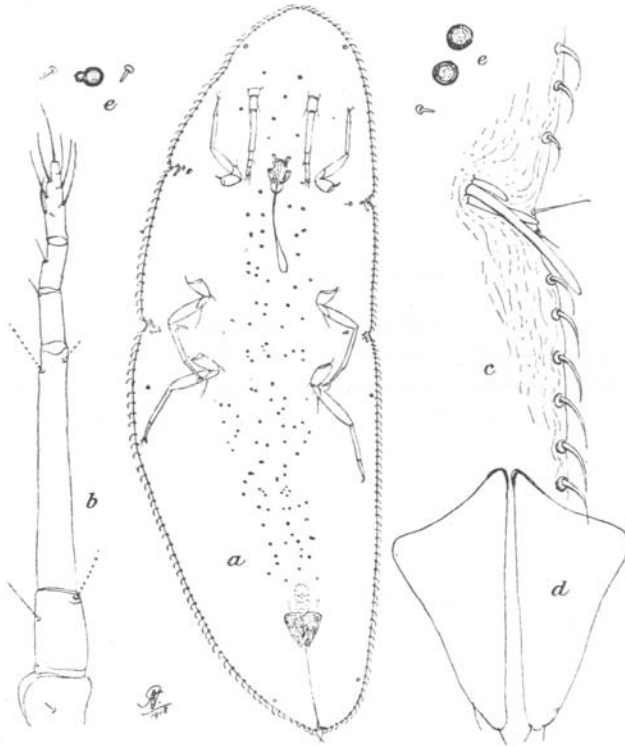


Fig. 10. *Lecanium subacutum*, Newst., sp. n., ♀; a, adult ♀; b, antenna; c, marginal and stigmatic spines; d, anal lobes; e, e, dorsal gland-pores and spines.

UGANDA: Jana Isl., Sesse Islands, Lake Victoria, on *Coffea robusta*, 9.x.1918; Bufumira Isl., Sesse Islands, on the leaves of an unknown plant, 12.x.18 (C. C. Gowdey).

In both instances this species was living in association with *Aspidiotus articulatus* var. *magnospinus*, Newst.

***Lecanium (Eucalymnatus) decemplex*, sp. nov.**

Female, adult. Circular, or more or less so; flat and very thin. Colour translucent amber-yellow, often with a tinge of red or pale castaneous. The whole of the dorsum covered with a thin hard glassy test, the presence of which is extremely difficult to detect and which is equally hard to detach. Boiled in KOH the female

(fig. 11, *a*) presents the following morphological details: Dorsum divided into five bilateral plates—two cephalic, three thoracic, and two abdominal; the sutures separating the cephalic from the first thoracic plates terminating at the stigmata; the other sutures are connected with the mesal one (these sutures in the dried examples appear as well defined narrow ridges). Mesal suture between the anal lobes and the rostrum with large circular gland-pores (fig. 11, *b*). Antennae of six segments; the third almost as long as the 1st, 4th, 5th and 6th together. Legs well developed; lower digitules large and strongly incrassate. Anal lobes (fig. 11, *c*) somewhat triangular; inner margin longest; distal margin shortest; the sclerites beneath (fig. 11, *d, d*) stout and somewhat spine-like. Anal cleft deep, and apparently partly fused but separable. Stigmatic clefts (fig. 11, *e, e*) small, but deeply invaginated; spines three, very robust, and blunt at the tips. Marginal spines (fig. 11 *e, e*) simple, and set rather widely apart. Submarginal gland pores (fig. 11, *f*) very small, numbering from six to eight on either side. Oval cells can be seen, near the margin, in old and well stained examples. Length, 3·4–3·7; width, 3·2–3·7 mm.

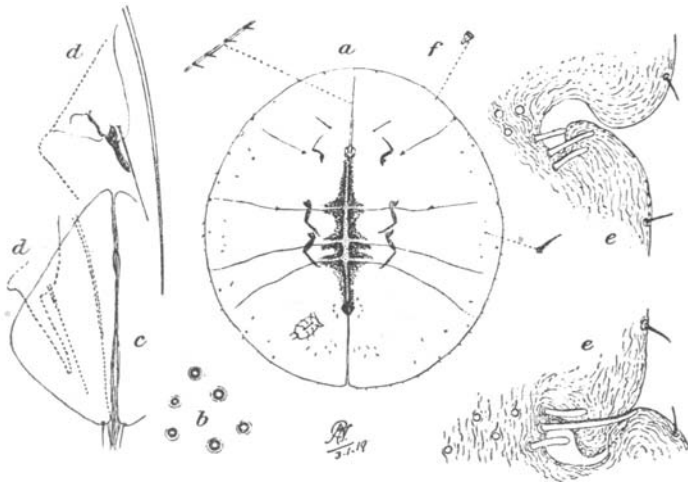


Fig. 11. *Lecanium (Eucalymnatus) decemplex*, Newst., sp. n., ♀; *a*, adult ♀; *b*, mesal gland-pores; *c*, anal lobe; *d, d*, sclerites of anal lobes; *e, e*, stigmatic clefts and spines.

Male Puparium. Broadly ovate; divided into eleven plates: two median, one cephalic, and four bilateral; the lateral plates with partial subdivisions. Length, 1·8; width, 1·4 mm.

BRITISH GUIANA: Ayaria, Thuraka Lake, Ituribisci Creek, Essequibo, on leaves of *Lecythis* sp., 6.x.1918 (*G. E. Bodkin*).

This somewhat remarkable species evidently belongs to the subgenus *Eucalymnatus*, its distinguishing features being the small number of plates into which the dorsum is divided.

***Lecanium inquilinum*, sp., nov.**

Female, adult. Ovate or elongate and highly convex; more or less circular when mounted under pressure. Integument pale brown, but thin and transparent after maceration in KOH. Antennae (fig. 12, *a*) of eight segments. Legs relatively robust

and rather long; digitules normal. Anal cleft free and a little more than twice the length of the lobes; the latter (fig. 12, *b*) rather elongate and obtusely rounded distally. Stigmatic clefts very small; spines three, all robust and blunt, the laterals almost equal in size to the central one. Marginal spines (fig. 12, *c*) long and very acute, the tips in many cases appearing almost flagellate; they are placed very closely together and are continuous along the stigmatic clefts. Stigmata with a large trumpet shaped peritreme, and placed unusually near the margin of the body. There is a large closely packed group of multilocular gland-pores on the inner walls of the anal cleft, close up to the lobes. A few minute gland-pores occur in the densely chitinous patch surrounding the anal lobes. Length, 1.7–2.3; width, 1.4–1.8.

Female, young adult. Similar to the old adult, but the marginal spines are much more bluntly pointed and the chitinous patch surrounding the anal lobes is wanting.

BRITISH GUIANA: "Cattle Trail Survey," the insects enclosed by ants (*Acromyrmex* sp.) in small paper nests 1919 (*A. A. Abraham* per *G. E. Bodkin*).

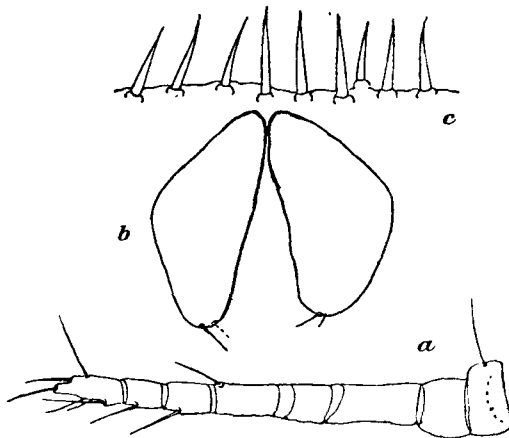


Fig. 12. *Lecanium inquilinum*, Newst., sp. n., ♀; *a*, antenna; *b*, anal lobes; *c*, marginal spines.

The form and arrangement of the marginal spines recall those seen in certain species of *Pulvinaria*; but the species clearly belongs to *Lecanium* and somewhat resembles the hollow hemispherical species. Taken in association with *Lecanium deformosum*, sp. n., and *Pseudococcus inquilinus*, sp. n.

***Lecanium (Eulecanium) deformosum*, sp. nov.**

Female, adult (fig. 13, *a-d*). Dorsum rather flat; sides relatively thick; general form very irregular and distorted, some examples being broader than long and others more or less elongate, but the margins in all cases (12 examples) are asymmetrical and often distorted to a marked degree. Antennae (fig. 13, *e*) of six segments; the 3rd and 6th longest. Legs with the tibio-tarsal segments either distinctly articulated or partly so, rarely completely fused; leg i. (fig. 13, *f*) with the tibia generally strongly curved. Anal lobes (fig. 13, *g*) very broadly dilated distally. Anal cleft faintly fused, but easily separated after maceration in KOH. Stigmatic clefts small, or seated in faint depressions; spines (fig. 13, *h*) three, the laterals normally very short, stout,

and obtusely pointed: in one example (fig. 13, h_1) the lower group on one side has the lateral spines as long and as stout as the central one. Marginal spines (fig. 13, i) simple and hair-like. Dorsal gland-pores minute and widely separated. In well stained specimens the integument of the dorsum is faintly divided into broad plate-like radial areas enclosing numerous irregular pigmented markings. Length, 1.2–1.8; width, 1.1–1.5, mm.

BRITISH GUIANA: "Cattle Trail Survey," on an unknown plant, the insects enclosed by ants (*Acromyrmex* sp.) in small paper nests, 1919 (A. A. Abraham per G. E. Bodkin).

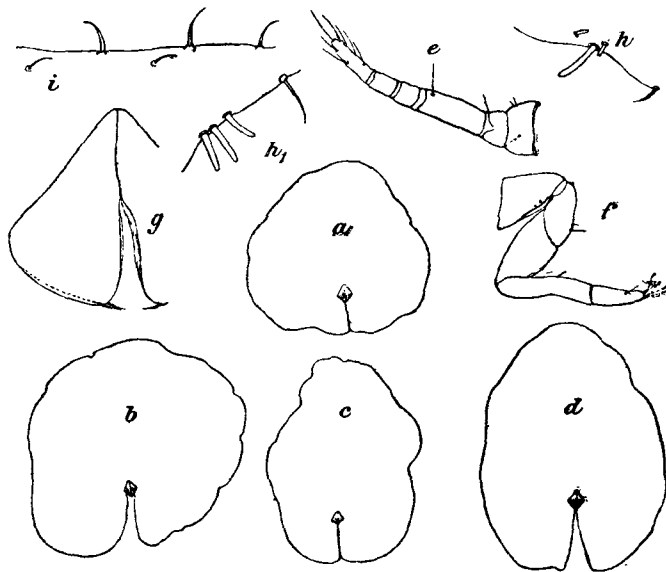


Fig. 13. *Lecanium deformosum*, Newst., sp. n., ♀; a–d, outline of four adults; e, antenna; f, leg; g, anal lobes; h, h_1 , stigmatic spines; i, marginal spines.

A small oviparous species, remarkable for its markedly deformed shape, the presence or absence of the tibio-tarsal articulation, and the apparent variability of the stigmatic spines. Found in association with *Pseudococcus inquilinus*, sp. n., and *Lecanium inquilinum*, sp. n.

***Lecanium* (*Saissetia*) *nigrum* var. *nitidum*, nov.**

Female, adult. Usually more or less hemispherical, but some examples are slightly ovate and narrowed in front; margin markedly flattened, and often with regular rectangular patches of silvery secretion; dorsum smooth and shining; anal lobes usually porrect. Colour varying according to the age of the individual: young forms pale red-brown, old adults rich dark castaneous. Eyes relatively large, black and prominent. Antennae (fig. 14, a) of eight segments; the 3rd scarcely as long as the 4th and 5th together. Legs rather slender. Derm cells forming a closely reticulated pattern as in *Lecanium nigrum*, Niet. Stigmatic clefts very shallow; spines three, the central one about five times the length of the laterals, (fig. 14, b). Marginal

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spines (fig. 14, *c*) short and sub-palmate, the distal portion being broadly flattened and deeply divided. Anal lobes (fig. 14, *d*) short and obtusely rounded; inner margin slightly longer than the proximal; external margin strongly arched. Length, 1.8–2 mm.

Female, young adult. Flat; straw-coloured when dry. Form when mounted under pressure somewhat ovate. Antennae (fig. 14, *a*) with eight segments and similar in form to those of the adult. Legs ii. and iii. much longer than leg i. Stigmatic clefts (fig. 14, *b*) indicated by a very slight indentation of the margin; spines three, the laterals minute and acutely pointed. Marginal spines (fig. 14, *b, c*) as in the adult. Anal cleft free, its length slightly less than twice the length of the lobes; the latter (fig. 14, *d*) as in the old adults.

UGANDA: Bukeke Isl., Sesse Islands, Lake Victoria, on *Luzibarziba*, 9.x.1918 (C. C. Gowdey).

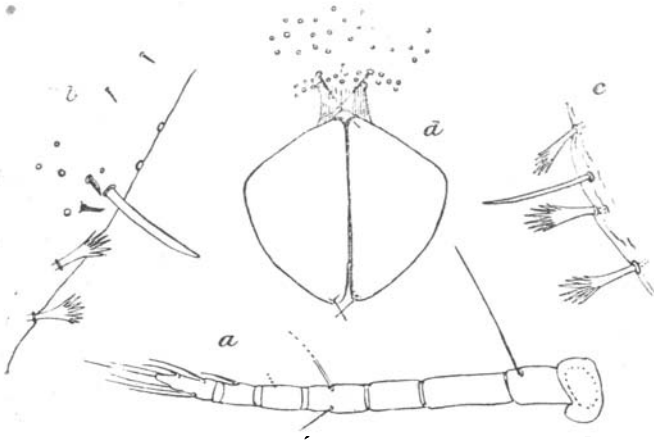


Fig. 14. *Lecanium nigrum* var. *nitidum*, Newst., ♀; *a*, antenna; *b*, stigmatic and marginal spines; *c*, marginal spines; *d*, anal lobes.

Its small size and generally hemispherical form, together with the highly polished integument and the sub-palmate marginal hairs, are the distinctive features of this well-marked variety.

***Platysaissetia montrichardiae*, sp. nov.**

Female, old adult. Blackish or sooty brown. Generally more or less ovate and very slightly narrowed in front; but occasionally the outline is irregular, indented, or markedly asymmetrical; dorsum very low convex or almost flat, scabrous, the minute elevations often carrying small particles of the test of the young female. Vertical sides markedly shallow. Pseudo-margin relatively faintly produced. Tubular glands at the extreme margin. Stigmatic clefts rarely traceable. Venter hollow, but more or less covered with a rather thick pellicle of white wax. Dermal cells (fig. 15, *a*, from an *unstained* preparation) very irregular in outline, each pale area with a distinct pore at the extreme edge; the walls of each cell area thick, dark, and very irregular. Other details as in the young adult. Length 4–5.2; width 2.9–3.9. mm.

Female, young adult. Pale brown to dull castaneous. Dorsum flat and covered with a dirty white, glassy test, consisting of minute plates, which collectively present a faintly imbricated appearance. The test is easily deciduous, and when removed the integument presents a polished appearance. Antennae (fig. 15, *b,b*) of eight segments, of which the 4th, 5th and 8th are the longest; formula: (4, 5, 8) 3, 2, (6, 7) 1 or 5 (4, 8,) 3 (2, 6, 7) 1; terminal hair of great length. Legs relatively slender; tarsus of anterior pair (fig. 15, *c*) with a well defined constriction; coxa and trochanter each with a very long hair. Stigmatic clefts obsolete; spines (fig. 15, *d,d*) three, the central one equal in length to the 4th and 8th segments of the antennae; lateral spines pointed and about one-fourth the length of the central one. Marginal spines (fig. 15, *d*) slightly shorter and stouter than the lateral stigmatic spines; they are

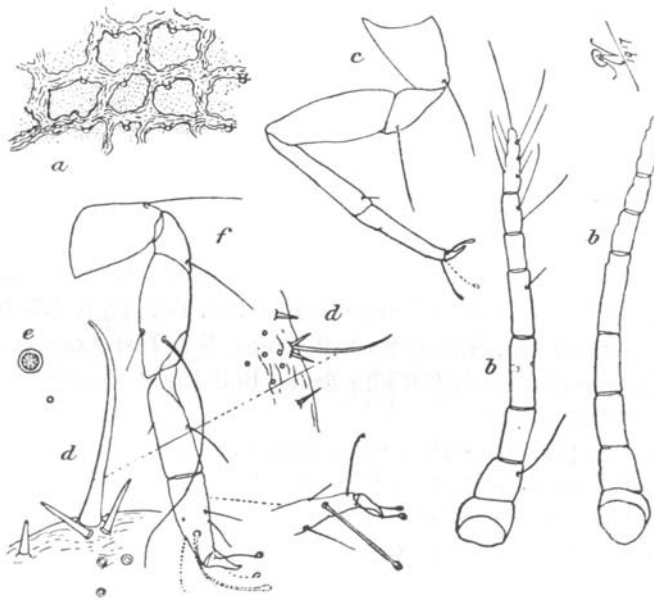


Fig. 15. *Platysaissetia monrichardiae*, Newst., sp. n., ♀; *a*, dermal pores and "cells." Young adult ♀; *b, b*, antennae; *c*, leg; *d, d*, stigmatic spines; *e*, post anal gland-pores; *f*, leg of larva.

separated by a distance equal to three or four times their length. Dermal gland-pores irregularly ovate, large, placed close together, and most conspicuous towards the margin. Anal lobes with the outer margin strongly arched; and surrounded by a narrow wall of dense chitin. Anal cleft fused; from one-fifth to one-sixth the length of the body. Postanal glandular pores (fig. 15, *e*) relatively large and circular, forming a broad scattered group extending as far forward as the mentum. Length, 2.6–3.3 mm.

Female, second stage. Differs from the adult chiefly in the following details: Antennae of six segments, of which the third is much the longest. Postanal gland-pores absent; postanal bristles in three pairs. Length, 0.7–0.8 mm.

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Male Puparium. Oblong, opaque, glassy, white; anal cleft distinct; surface composed of minute rough polygonal plates; the marginal series forming a roughly serrated fringe. Length, 1.5 mm.

Larva. Differs from the second stage female in the following details: Antennae with the 3rd and 6th segment equal and longest. Legs (fig. 15, *f*) with the distal femoral bristle of great length; tarsal digitules markedly unequal in thickness and length respectively, the longer one arising from the tarsus some distance behind the smaller one; digitules to the claw normal. Anal ring with six hairs. Length, exclusive of the caudal bristle, 0.5 mm.

BRITISH GUIANA: Ikruaka Lake, Essequibo, on *Montrichardia aculeata*, 11. iii. 1917 (*G. E. Bodkin*).

A very heavy infestation, so much so that the insects covered a very large proportion of the branches.

A somewhat remarkable species, distinguishable, in the adult female, by the curious character of the derm and the relatively short anal cleft (0.7–0.8 mm.); in the second stage female by the absence of marginal cylindrical ducts to the glands; and in the larva by the unusual character and relative position of the tarsal digitules.

Aspidiotus longispina, Morgan.

Aspidiotus longispina, Morgan, Ent. Mo. Mag. xxv, p. 352, pl. v, fig. 1 (1889).

Morganella maskelli, Cockerell, Bull. 6, T.S., U.S.A. Dept. Agric., p. 22 (1897).

Hemiberlesia longispina (Morg.), Leonardi, Riv. Pat. Veg. vi, p. 120, fig. 4 (1897).

Aspidiotus longispina var. *ornata*, Maskell, Trans. N.Z. Inst., xxx, p. 225 (1897).

Aspidiotus (*Morganella*) *maskelli* (Ckll.) Brain, Bull. Ent. Research, ix, p. 136, pl. vii, fig. 109 (1918).

Female Puparium (fig. 16).—This, when perfect, is narrowed, strongly produced, and slightly involute posteriorly, resembling the long curved toe of an Oriental slipper in miniature. This very remarkable appendage is composed of both dorsal and ventral portions of the capsulate puparium; but it is rarely found intact in examples which have been submitted to even light pressure, as it is very brittle and readily breaks away.



Fig. 16. *Aspidiotus longispina*, Morgan, ♀, puparium.

Male Puparium. Elongate, exuviae terminal or sub-terminal. Colour as in the female puparia.

Male. Not differing in its morphological characters from typical members of the genus.

BRITISH GUIANA: Botanic Gardens, Georgetown, on papaw, 1919 (*G. E. Bodkin*).

The synonymy given above is, I believe, correct, the determination being based upon an examination of material received from both Morgan and Maskell. A co-type ♀ from Morgan in my collection was originally mounted in Canada balsam without staining, so that the true form of the strikingly characteristic squamae on the pygidium of the ♀ could not be detected and was thus overlooked by Morgan in the first instance, and subsequently also by Leonardi, to whom I sent my example for examination, and for the purpose also of figuring it in his memoir (*l.c.*). In 1906 I had occasion to stain the female given to me by Morgan for comparison with examples submitted to me by Kotinsky, on *Ficus* sp., from Honolulu. I then found that the squamae were strikingly different from what they appeared to be when unstained. Subsequently I stained and mounted an example of Maskell's *A. longispina* var. *ornata* and found it to be specifically identical with Morgan's co-type female. Clearly therefore the specific names *maskelli* of Cockerell and *ornata* of Maskell must sink.

***Aspidiotus (Chrysomphalus) apicatus*, sp. nov.**

Female Puparium. More or less circular, convex and very thick; covered with a relatively thick epidermal layer of the bark; colour, when denuded, opaque black, larval exuviae nude, shining black, forming a well defined nipple; second exuviae black; ventral surface shining black. Ventral pellicle rather stout; white or dusky white, with a dark brown or blackish periphery. Diameter, 1.6-1.9 mm.

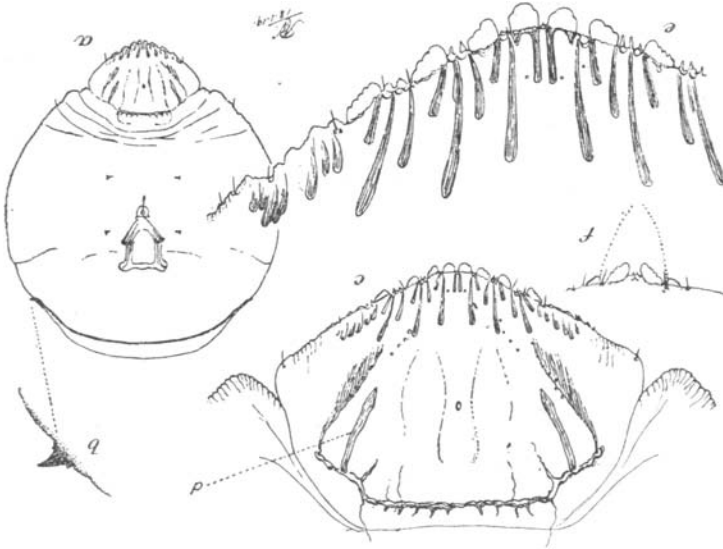


Fig. 17. *Aspidiotus (Chrysomphalus) apicatus*, Newst., sp. n., ♀; *a*, adult; *b*, thoracic spine; *c*, pygidium; *d*, paraphyses of do.; *e*, fringe of do.; *f*, anal plates, etc., of larva.

Female, adult (fig. 17, *a*). Broadly ovate, with a well marked and rather highly chitinised, cephalic projection, and immediately below it a minute spiny process (fig. 17, *b*). Margin of body more or less strongly and finely crenulated. No parastigmatic glands. Pygidium (fig. 17, *c*) broadly rounded, with a well marked callosity extending along it proximally, from which there arises on either side a somewhat

lanceolate sclerite (fig. 17, *d*). Margin (fig. 17, *e*) with nine pairs of well defined paraphyses and a few rather indistinct ones beyond them; those arising from the distal lateral portions of the lobes with the sides almost parallel and the ends more or less suddenly truncate. Lobes in four pairs; the 2nd, 3rd and 4th pairs dentate. Length, 1-1.1 mm.

Male Puparium. Broadly ovate, with the ends equally rounded; colour dark brown or blackish, but covered with the epidermal layer of the bark; larval exuviae black and more or less exposed; under surface dark brown or piceous, the central area partly covered with a white mealy secretion. Length, 0.5-0.3 mm.

Larva. Broadly ovate. Antennae of five segments, of which the 5th is much the longest and distinctly ringed. Pygidium (fig. 17, *f*) with two pairs of finely dentate lobes; the median pair much the larger and converging towards the middle line.

BRITISH GUIANA: Enmore Forest, East Coast, Demerara, on *Avicennia nitida*, ix.1918 (*G. E. Bodkin* and *H. Harrison*).

***Aspidiotus (Chrysomphalus) umboniferus*, sp. nov.**

Female Puparium. More or less circular to broadly pyriform; flat, thin, and somewhat transparent; pale reddish-brown to pale chocolate-brown. Exuviae

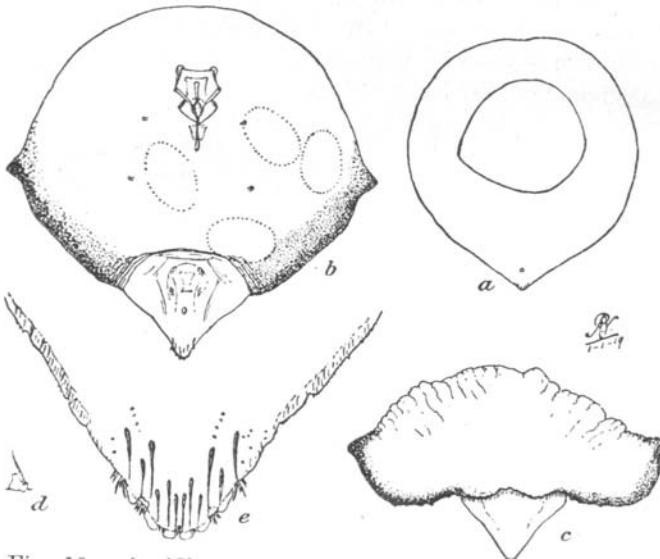


Fig. 18. *Aspidiotus (Chrysomphalus) umboniferus*, Newst., sp. n., *a*, larval and nymphal pellicles; *b*, adult ♀ after treatment in KOH; *c*, unrestored ♀; *d*, antenna of ♀; *e*, pygidium of ♀.

central or subcentral; the first nipple-like and black when denuded; the second, sooty brown. Ventral pellicle very delicate and composed generally of concentric rings. Diameter, 1.6-2 mm.

Male Puparium. Elongate ovate, slightly narrowed posteriorly. Colour similar to that of the female. Length, 1 mm.

Female (fig. 18, *b*, *c*). Very broadly pyriform; width of cephalothorax slightly greater than the entire length of the body; metathorax with a relatively large, blunt, marginal tubercle, which, together with the margin below it, is strongly

chitinised. Pygidium (fig. 18, *e*) unusually narrow and bluntly pointed. Circumgenital glands in four groups, the posterior lateral groups placed in a line with the vaginal orifice; formulae of four individuals:—

| | | | |
|-----|-----|-----|-----|
| 8-6 | 6-6 | 7-8 | 6-6 |
| 6-6 | 6-6 | 5-6 | 6-6 |

Lobes in three pairs; median pair somewhat quadrate, broader than long; 2nd and 3rd pairs slightly shorter than the first and more than twice as broad as long. Squamae between the median and 2nd lobes, very short; the second of the proximal pair, immediately beyond the third lobe, trifid. Paraphyses in six pairs, all rather narrow but clearly defined. Dorsal gland-pores small and few in number, with the tubular ducts filiform.

BRITISH GUIANA: Ayaria Creek, Essequibo, on *Lecythis* sp., 6.x.1918 (*G. E. Bodkin*).

In the structural details of the margin of the pygidium this species very closely resembles *A. perseae*, Comst., but it has a much more strongly pointed pygidium, fewer circumgenital glands, and an extra pair of paraphyses; these characters, taken in conjunction with the large metathoracic tubercles and the strongly chitinised margin below them, form the salient features of this Coccid. *Aspidiotus* (*Chrysomphalus*) *paullistus*, Hempel, also possesses very distinct cephalo-thoracic tubercles; but in this species there are only two pairs of paraphyses and the pygidium is relatively shorter and much more rounded distally.

***Aspidiotus* (*Selenaspis*) *articulatus* var. *magnospinus*, nov.**

This variety (fig. 19, *a*) differs from typical *Aspidiotus articulatus*, Morgan, in the following details: Cephalothoracic margin finely but distinctly serrated. Thoracic

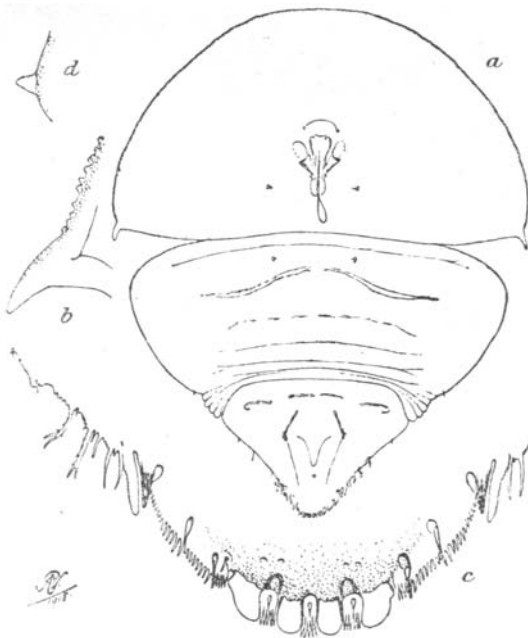


Fig. 19. *Aspidiotus articulatus* var. *magnospinus*, Newst., ♀; *a*, adult; *b*, thoracic spine; *c*, fringe of pygidium; *d*, thoracic tubercle of typical ♀ *articulatus* for comparison.

spine (fig. 19, *b*) relatively very large, curved and rather acutely pointed, the contour gradually merging into the cephalo-thoracic margin, and considerably longer than its greatest width. In *articulatus*, the thoracic spine (fig. 19, *d*), drawn to the same scale as in fig. *b*, is suddenly produced, short, and bluntly pointed, and its length about equal to its greatest width.

UGANDA: Bufumira Isl., Sesse Islands, Lake Victoria, on the leaves of an unknown plant, 12.ix.1918 (*C. C. Gowdey*).

Aspidiotus (Selenaspis) kamerunicus, Lind., has a similar thoracic spine and a serrated margin, but in this species the broad palmate squamae, between the second pair of lobes and the spiny process, are replaced by squamae of a much narrower type.

***Aspidiotus (Odonaspis) rhizophilus*, sp. nov.**

Female Puparium. Dense, hard and capsulate, but the two halves slightly separated posteriorly. Form irregular, but old examples are slightly narrowed and produced posteriorly; convex above and flat beneath. Larval exuviae generally

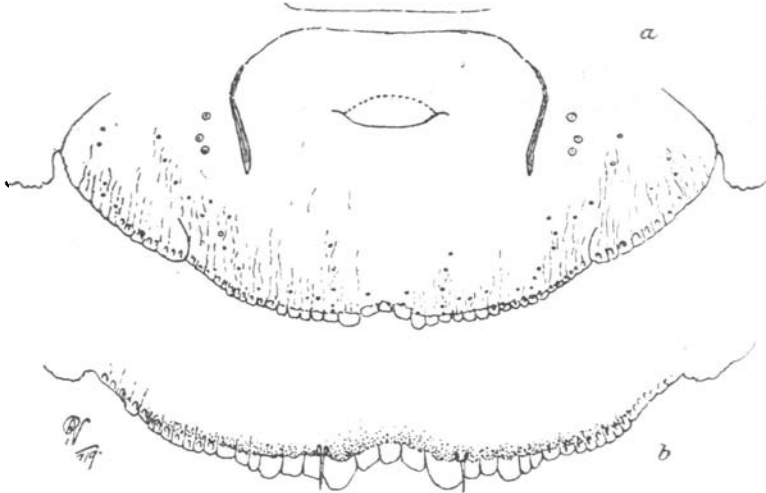


Fig. 20. *Aspidiotus (Odonaspis) rhizophilus*, Newst., sp. n. ♀; *a*, pygidium; *b*, fringe of pygidium.

towards the anterior margin, greyish in colour and sometimes fissured. Ventral pellicle with a greyish patch towards the anterior margin. Texture rather rough; colour dull black or brownish black. Length, 1.3–1.5 mm.

Female, adult. More or less circular, or peg-top-shaped. Rudimentary antennae with, apparently, only one stout bristle. Stigmata surrounded by intricate folds of the integument; no gland-pores. Pygidium (fig. 20, *a*) very short and broadly rounded distally; circumgenital glands absent. Dorsal gland-pores small and few in number, the tubular ducts relatively long and slender. Ventral gland-pores similar to those on the dorsal surface, but more numerous. Vaginal orifice nearly opposite the anal orifice. Margin (fig. 20, *b*) with a series of irregular, closely adjacent, squamate plates, of which the larger pair are evidently homologous with the median lobes in typical members of the genus *Aspidiotus*.

BRITISH EAST AFRICA: Kabete, on roots of *Chloris incompleta*, 7.x.1918
(*R. H. Deakin*, per *F. W. Dry*).

***Aspidiotus fiorineides*, sp. nov.**

Female Puparium (fig. 21, *a*). Attached to the edge of the leaf, with equal portions on both sides. Very elongate; sides compressed; middle line of dorsum rather sharply keeled. Exuviae central, bright orange-yellow or pale castaneous. Secretionary portion very broad, thin, semi-opaque, dusky white. Length, 2–2.2 mm.

Male Puparium. Similar to that of the female, but much smaller. Larval exuviae central, and orange-yellow in colour.

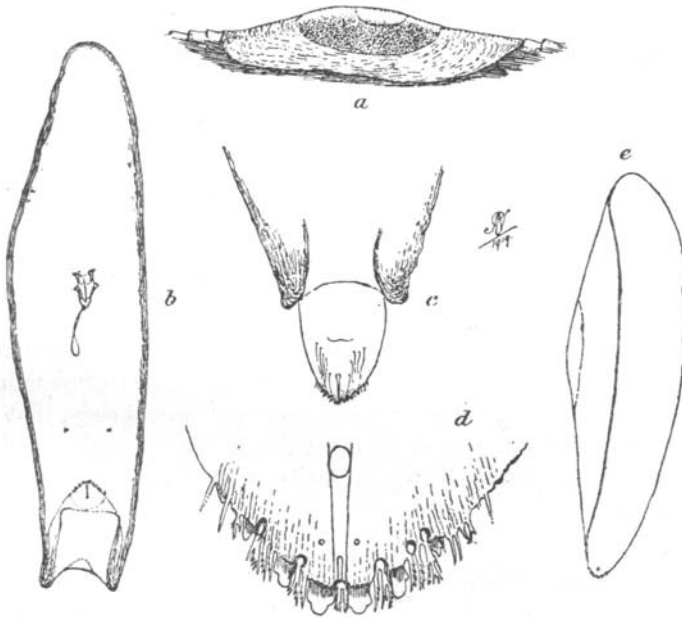


Fig. 21. *Aspidiotus fiorineides*, Newst., sp. n.; *a*, lateral view of ♀ puparium on edge of leaf; *b*, adult ♀; *c*, terminal portion of body with pygidium; *d*, pygidium of ♀; *e*, exuviae ("pellicle") of second stage ♀.

Female, adult (fig. 21, *b*). Narrowly elongate; the length four times as great as the width; extremities narrowed. Dorsum strongly convex; venter flat. Rostrum subcentral. Body, with the exception of the pygidium, densely chitinised; the chitin at the junction with the pygidium appearing deeply divided. The integument of the pygidium membranous, and in several specimens turned backwards, looking as if it were completely invaginated; but when extended (fig. 21, *c*) it is very long, narrowly rounded, and has no circumgenital glands. Margin of pygidium (fig. 21, *d*) with three pairs of well developed lobes; median pair largest and notched on both sides; second pair notched on one or both sides; third pair much the smallest. Squamae between the lobes branched; there is also a branched squama just beyond the third lobe and near it two or three simple ones. Anal orifice large, and placed

well forward. Vaginal orifice just below the centre. Parasitised females are sometimes much shorter and broader than what are apparently typical examples; they may also be markedly contorted. Length, 1–1.5 mm.

Female, second stage. The exuviae of this stage (fig. 21, e) are very strongly arched transversely. Owing to this great convexity it is difficult to determine the exact structural details of the pygidium; the margin of the latter appears however to possess appendages similar to those in the adult; but the three pairs of lobes and the squamae are all relatively much smaller. Length 0.9–1.1 mm.

UGANDA: Jana Isl., Sesse Islands, Lake Victoria, on *Coffea robusta*, 9.x.1918, in association with *Aspidiotus (Selenaspis) articulatus* var. and *Lecanium subacutum*. Newst. (C. C. Gowdey).

The adult female of this very singular species, in its general facies, bears such a strong resemblance to the second stage females of certain members of the genus *Fiorinia* that I had provisionally placed it in this genus; subsequently embryo larvae were detected within the body of the parent and this at once removed all doubts as to its true generic position. It might also be mistaken for a *Cryptaspidotus*, but clearly it has no close affinity with this genus. I have found it exceedingly difficult to orientate the females so that the pygidium lies in its normal position; in the majority of cases it either breaks away or lies turned backwards upon the chitinous integument of the abdomen. In the latter case it is exceedingly difficult to detect, and the structural details are rendered almost obscure by the dark chitin of the body wall. Whether the curious, laterally compressed puparium is due altogether to the exigencies of its position on the edge of the leaf remains to be seen. No examples were found on the flat surface; so that it would seem that the creature had, for some unaccountable reason, acquired the remarkable habit of sitting astride the edge in a way which seems to be peculiarly its own, at any rate among the members of the DIASPINAE.

Chionaspis madiunensis*, Zehntner.

Female Puparium. White, with a fine smooth texture (5 examples), or dusky white and slightly roughened owing to the admixture of the epidermis of the food-plant (1 example). Form moderately convex, circular, broadly ovate, or broadly pyriform. Larval exuviae projecting beyond the margin; translucent white or pale straw-colour. Second exuviae either terminating at the margin or projecting very slightly beyond it; colour pale straw-yellow or brownish-yellow; secretory covering white. Ventral pellicle very thin, white, and attached to the plant. Diameter of large circular form, 3 mm; length of other forms 2.6; width, 2 mm.

Female, adult (fig. 22, a). Slightly elongate, the length of the body being from two to two and a half times the width of the first free abdominal segment. Mesothorax markedly dilated at the margin proximally; eye placed on a distinct tubercular extension of the margin. Dorsal surface with a number of relatively large chitinised patches or tuberosities. Antennae (fig. 22, b) placed closely together immediately above the rostrum; each consisting of a rather long terminal tubercle and a stout outstanding bristle. Mouth-parts placed well forward. All the stigmata (fig. 22, c)

*Meded. Proef. Suiker. Java. (3), No. 6, p. 1 (1898).

with a large group of parastigmatic glands; the first pair placed close up to the mentum; the second pair on the metathoracic segment. The first abdominal segment of the same width as the metathorax; the second much more strongly produced and considerably wider than the two others; third merging into the pygidium. Vaginal orifice a little below the centre of the group of circumgenital glands; anal orifice opposite. Dorsal pores arranged in three well defined but interrupted series. Margin of pygidium (fig. 22, *d*) with four pairs of lobes, all of them very similar in form, but the median pair larger than the rest; second to third pair, inclusive, duplex; the division between each duplex lobe being complete to the base. Squamae simple: there is a short one between each of the lobes, several on the margin

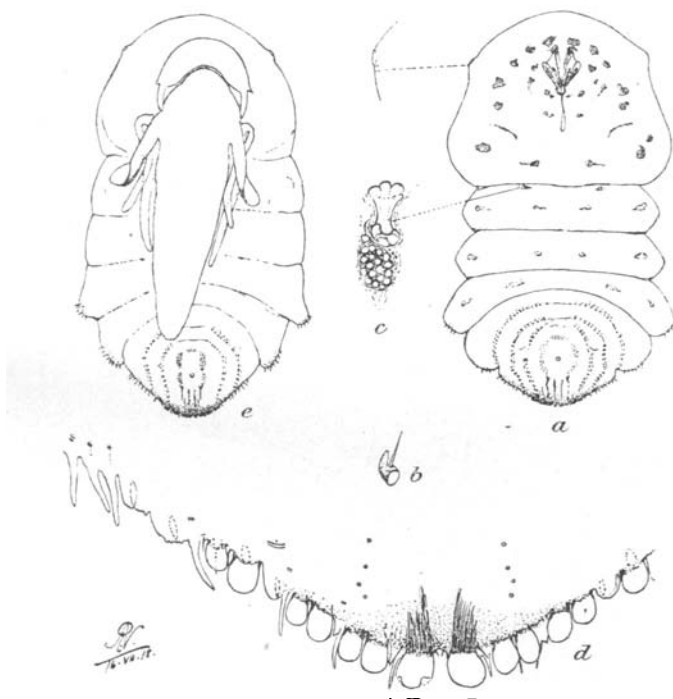


Fig. 22. *Chionaspis madiunensis*, Zehnt., ♀; *a*, adult; *b*, antenna; *c*, stigma; *d*, margin of pygidium; *e*, parasitised ♀.

beyond and also on the two succeeding abdominal segments. The spines are few and not very conspicuous; there are two minute ones between the median lobes, and a slightly longer one at the base of each lobe on the outer margin; a very long one on the dorsal surface in the middle of the first duplex lobe and a smaller one just beyond the fourth lobe. Three conspicuous marginal pores; one between the third and fourth duplex lobes and two beyond the fourth; similar but less conspicuous pairs can be traced on the dorsal surface *over* some of the lobes, especially the fourth pair. In parasitised examples (fig. 22, *e*) the mesothoracic region is not produced laterally, and the free abdominal segments are more pointed.

UGANDA: Kampala, on sugar-cane, 11.ii.1918. (*C. C. Gowdey*).

The deeply divided duplex lobes give the margin of the pygidium a strikingly characteristic appearance. In its general facies the female resembles that of *Chionaspis herbae*, Green;* but the latter has only three pairs of lobes, whereas *C. madiunensis* has four. There are also other slight differences, notably the large number of chitinised patches on the thorax.

I tender my sincere thanks to Mr. E. Ernest Green for the determination of this species, and also for comparing it with examples of his *C. herbae*. The latter I had not seen.

***Chionaspis tenuidisculus*, sp. nov.**

Female Puparium. Form somewhat oblong, sides almost parallel; highly convex, the convexity commencing abruptly near the middle region of the second exuviae. Larval exuviae nude, orange-yellow to golden yellow. Second exuviae bright orange-yellow; secretory covering thin, semitranslucent, white. Secretory portion pure white, slightly polished and very strongly laminate. Length, 1·4–1·7.

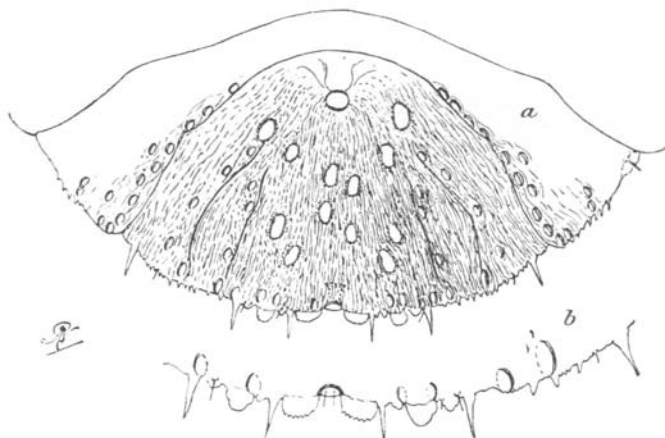


Fig. 23. *Chionaspis tenuidisculus*, Newst., sp. n., ♀; a, pygidium; b, margin of do.

Female, adult. Dead examples dull yellow to red-brown; cuticle rather strongly chitinised; general form fairly well preserved; segmentation distinct; margin folded inwards towards the venter, traces of these folds also visible in the specimens after maceration in KOH. Form elongate, much narrowed and produced anteriorly. Rudimentary antennae rather widely separated; tubercle with one blunt spiny process, and a long and unusually stout spine. Anterior stigmata in a deep horn-shaped cavity; with from one to three gland-pores. Pygidium (fig. 23, a) broadly rounded; median area with several large clear and more or less oval spaces or vacuoles, somewhat irregularly disposed. Anal orifice near the articulation of the abdominal segment. Gland-pores large and rather heavily chitinised. Margin (fig. 23, b) with two pairs of lobes; median pair relatively broad and serrated; second pair duplex, the upper lobule very small and generally notched on both sides. Squamae simple and somewhat slender. Spines minute. Integument rather strongly but finely reticulated.

*Coccidae of Ceylon, p. 132.

UGANDA: Bukassa Isl., Sesse Islands, Lake Victoria, "on creepers with large fleshy leaf in forest," 10.x.1918 (C. C. Gowdey).

The curious cuticular characters should serve at once to distinguish this species from its allies. The large vacuoles of the pygidium remind one of similar structures found in certain numbers of the genus *Lecanium*; but there are no gland-pores associated with the structures in *Chionaspis tenuidisculus*.

Chionaspis praelonga, sp. nov.

Female Puparium (fig. 24, a). Very elongate; the length may be nine to ten times as great as the width; more or less straight or markedly contorted; sides parallel. Colour pure white; texture smooth and slightly polished. Exuviae pale yellowish-brown, ventral pellicle complete. Length, 3-3.7 mm.

Male Puparium. Pure white and very faintly tricarinate.

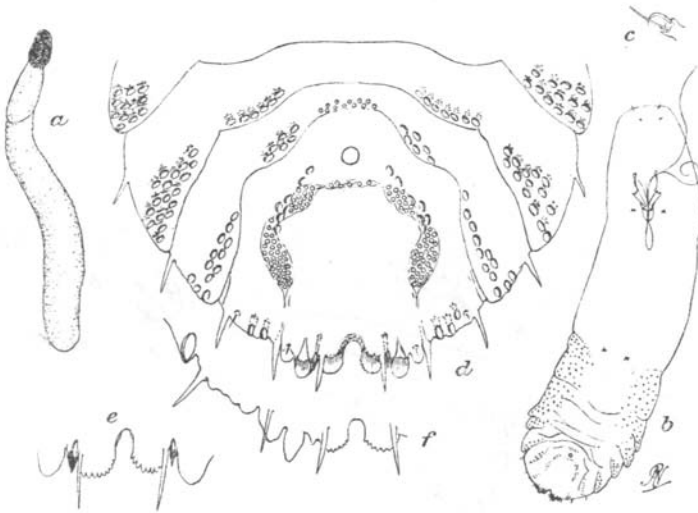


Fig. 24. *Chionaspis praelonga*, Newst., sp. n., ♀; a, puparium; b, ♀; c, antenna; d, pygidium; e, f, portions of margin of pygidium of second stage ♀.

Female, adult (fig. 24, b). Very elongate; length about four times as great as the width; cephalic margin slightly narrower than the pygidium. Rudimentary antennae (fig. 24, c) with two long slender spines, one of which is sometimes strongly curved. Parastigmatic glands 4-5, present at the front pair of stigmata only; 2nd pair of stigmata considerably below the middle distance. Pygidium (fig. 24, d) broadly rounded. Median lobes very slightly recessed, edges serrated; second pair of lobes duplex, the inner lobule much the largest, evenly rounded distally, and much more prominent than the median pair. Squamae slender and spine-like, five on either side of the median lobes. Circumgenital glands in five groups; formula of two examples:

| | | | |
|----|----|----|----|
| | 5 | | 4 |
| 9 | 8 | 10 | 8 |
| 29 | 30 | 29 | 23 |

Immediately above the anal orifice, at the junction of the pygidium with the free abdominal segment, is a transverse linear group of 14–15 circular gland-pores of a similar form to those surrounding the genital orifice. The large glandular pores of the dorsum extending as far as the region of the mesothoracic stigmata.

Female, second stage. A little more than one-third the length of the adult female; narrowly elongate, sides parallel; cephalic margin slightly narrower than the pygidium. The last-named (fig. 24, *e, f*) with the marginal appendages similar to those in the adult; but the serrations of the median lobes more strongly defined, and the second lobe relatively narrower and longer.

UGANDA: Bufumira Isl., Sesse Islands, Lake Victoria, on an unknown tree, 12.x.1918 (C. C. Gowley).

***Chionaspis auratilis*, sp. nov.**

Female Puparium. Moderately elongate; sides generally parallel behind the exuviae; strongly convex, the convexity commencing abruptly in the middle region of the second exuviae. Sides of secretory portion narrowly vertical. Colour pure glistening white, and very finely laminated. Larval exuviae rich dark orange-yellow. Second exuviae dark orange-brown, with the distal portion (pygidium) much paler; secretory covering exceedingly thin, translucent, and present on the anterior half only. Ventral surface open. Length, 1.7–1.8; width, 2.4 mm.

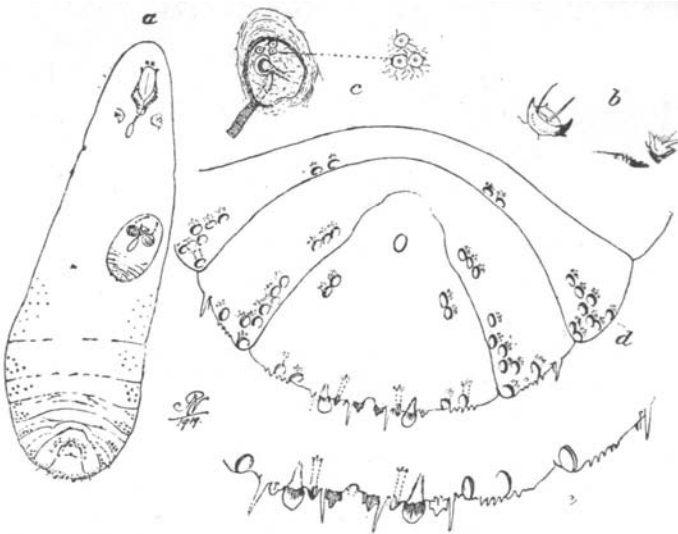


Fig. 25. *Chionaspis auratilis*, Newst., sp. n., ♀; *a*, ♀; *b*, antennae; *c*, anterior stigmata; *d*, pygidium; *e*, margin of pygidium.

Male Puparium. Strongly tricarinate. Larval exuviae rich dark orange-yellow, secretory portion of a dull gold colour.

Female, adult (fig. 25, *a*). Ovoviviparous. Elongate, gradually narrowed anteriorly; length a little more than three times the greatest width. Rudimentary antennae (fig. 25, *b*) placed very closely together immediately in advance of the rostrum, and furnished with remarkably long spiny processes two of which are

strongly chitinised and longer than the others; and a pair of long slender spines. Anterior stigmata (fig. 25, *c*) with three gland-pores, and surrounded by an exceptionally large peritreme, which latter takes the form of a deep irregular pit, and is surrounded by a well-defined chitinous thickening of the body wall. Pygidium (fig. 25, *d*) broadly rounded. No circumgenital glands. Dorsal gland-pores relatively few in number. Fringe of pygidium (fig. 25, *e*) with two pairs of lobes: median pair much the smaller and strongly tricuspid; second pair somewhat spathuliform, and rather narrowly rounded distally. Margin beyond with several minute pointed tubercles. Squamae simple, three on either side. Spines extremely minute.

UGANDA: Jana Isl., Sesse Islands, Lake Victoria, on an unknown plant, 9.x.1918 (C. C. Gowdey).

This species possesses two strikingly characteristic features: the bright golden colour of the male puparia, and the exceptionally large peritreme or depression to the anterior stigmata. The remarkable form of the antennae of this species bears a close resemblance to that of *Chionaspis coronifera*, Green, but these two species are otherwise easily separable.

***Chionaspis dura*, sp. nov.**

Female Puparium. Pure white; exuviae nude, and of a dull orange colour. Form elongate; convexity not greater behind the second exuviae than elsewhere; distal portion more or less slightly flattened. Ventral pellicle present at the sides only. Length, 1.7–2.3 mm.

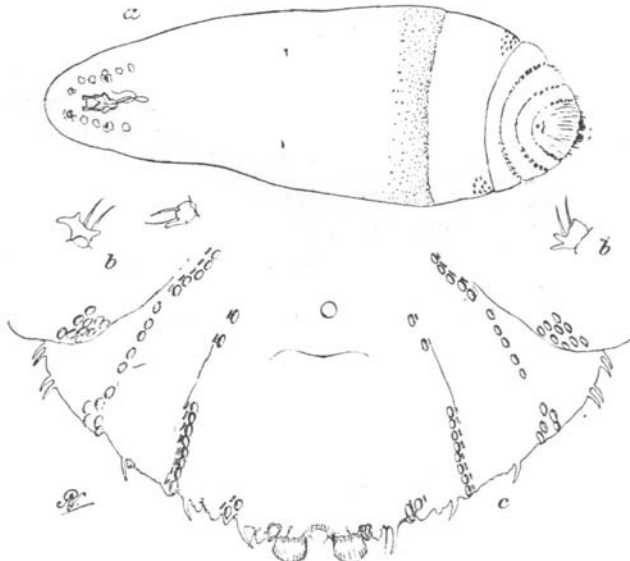


Fig. 26. *Chionaspis dura*, Newst., sp. n., ♀; *a*, ♀; *b, b*, antennae; *c*, pygidium.

Female, adult (fig. 26, *a*). Colour of dead examples dusky yellow to dull orange. Form very elongate; about two and two-thirds as long as the greatest width; cephalo-thorax, in a line with the proximal portion of the rostrum, about one-half

the width of the first free abdominal segment. A little more than two-thirds of the upper portion of the body more highly chitinised than the rest, this character disappearing after long maceration in KOH. Rudimentary antennae (fig. 26, *b,b*) relatively robust, with two or three blunt spiny processes and a pair of long stout hairs; they are placed midway between the margin and the rostrum. Parastigmatic glands (3-4) present at the anterior spiracles only. Pygidium (fig. 26, *c*) broadly rounded; anal orifice placed well forward and just in advance of the vaginal orifice; margin with a very large pair of slightly divergent median lobes, with the outer edges finely crenulated and longitudinally striate; squamae simple and few in number. Spines minute. No circumgenital glands.

UGANDA: Bufumira Isl., Sessc Islands, Lake Victoria, on an unknown tree 12.x.1918 (*C. C. Gowdey*).

The large divergent lobes, the peculiar form of the antennae and the semi-chitinised upper portion of the body are the distinguishing features of this insect.

Chionaspis laniger, sp. nov.

Female puparium (Plate XVI, fig. 2). Somewhat mytiliform, but very highly convex; composed, externally, of white felted woolly material, which when perfect is very strongly and coarsely laminated transversely; beneath the woolly exterior the puparium is hard and shell-like in texture. Ventral scale more or less complete. Exuviae completely covered dorsally with dense loose woolly filaments. Larval exuviae dull yellow; second exuviae dull yellow to pale straw colour. Length, taken from the ventral surface. 2-2.3 mm.

Female, adult. Somewhat ovate or more or less deltoid; cephalo-thorax narrowed anteriorly. Rudimentary antennae (fig. 27, *a,a*) with a unilateral spiny projection and two long stout spines, one or both of which may be curved. Parastigmatic glands to both pairs of stigmata: the anterior pair with about ten; the posterior pair with four or five. Dorsal gland-pores on all the segments below the lower pair of stigmata. Pygidium (fig. 27, *b*) gradually rounded. Anal orifice opposite the anterior group of circumgenital glands. Vaginal orifice opposite the space between the two lateral groups of circumgenital glands. The last-named in five groups; the anterior group consisting of about 15; the anterior-laterals of about 30; the lower-laterals of about 60. Margin of pygidium with six or seven dentate lobes on either side; the third and fourth and the fifth and sixth are adjacent and separable only by a narrow line. Squamae simple and very short. Spines small and slender. Length, 1.5-1.9 mm.

Female, second stage. Margin of the pygidium with similar dentate lobes to those of the adult, but generally narrower and with the dentations more acute.

Larva. Antennae (fig. 27, *c*) of five segments. Just below the cephalic margin, on the dorsal surface, is a pair of relatively large glandular pores (fig. 27, *c*) with very strongly curved cylindrical ducts; the integument surrounding these faintly convoluted. These structures have been observed in the exuviae taken from the puparia.

UGANDA: Kampala, on *Loranthus entebbiensis*, 15.xii.1918 (*C. C. Gowdey*).

This species is remarkable for the unique character of the puparia, which, together with the structural details of the pygidium, should serve as a ready means of determining it.

All the puparia submitted for examination are arranged transversely upon the slender branches of the food-plant; and in one instance there is a double row of them with the cephalic portions (exuviae) of both rows, respectively, meeting together in the middle line.

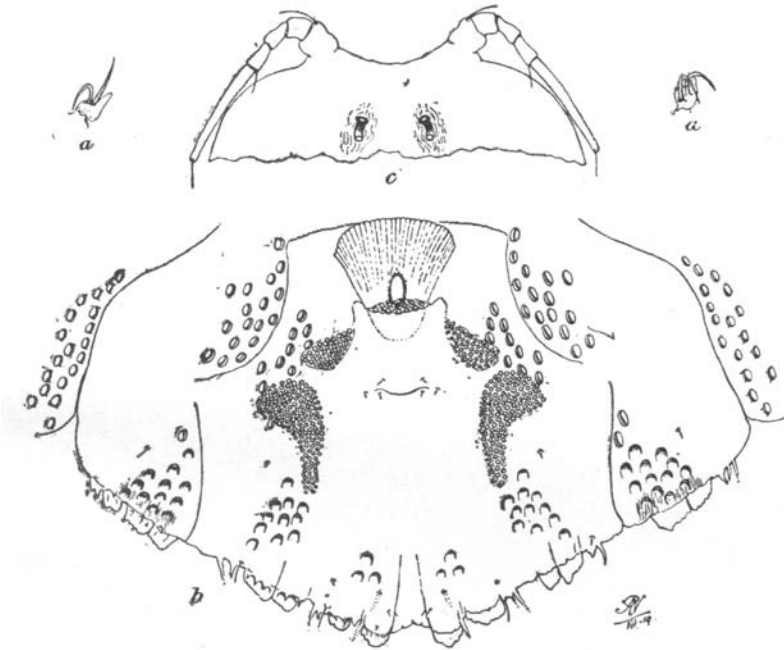


Fig. 27. *Chionaspis laniger*, Newst., sp. n. ; a, a, antennae of ♀; b, pygidium of ♀; c, anterior portion of larval exuviae showing antennae and paired tubular glands.

We tender our congratulations to Mr. Gowdey on his discovery of this extremely interesting addition to the Coccid fauna of Africa.