

OBSERVATIONS ON SCALE-INSECTS (COCCIDAE)—III.

By ROBERT NEWSTEAD, F.R.S.,

The School of Tropical Medicine, The University, Liverpool.

(PLATES VI and VII).

***Platysaissetia carpenteri*, sp. nov.**

Female, adult. More or less circular or faintly pentagonal; low convex; pseudo-margin strongly rounded, giving the insect a markedly "crustiform" (Green) appearance; margin very thin and shallow; anterior stigmatic clefts well defined. Dorsum with a slightly subcentral depression, from which there arise *strong radial striae* extending to the pseudo-margin. Anal cleft fused. Anal lobes in the subcentral depression, so that they appear almost in the middle of the back. Colour of dorsum brownish black, with minute reddish-buff glandular spots. Venter coffee-brown. Detached scurfy particles of a somewhat glassy secretion within the pseudo-margin, and six larger particles of similar material, each resting upon a minute tubercle, arranged in a parallelogram near the central depression. Derm cells closely packed together, very irregular in shape, many being markedly attenuated at one extremity; these are divided into more or less definite radial bands corresponding to the spaces between external striae; in the central area of the dorsum they are almost obscured by the dense chitin, so that only the minute central pores are traceable; in this same area are a number of larger and clearer pores varying considerably in size, the larger ones radiating from the anal lobes.

Length, 101–0.5 mm.

Female test, second stage. Completely covering the whole of the upper parts of the body; opaque, glassy white, and finely vesicular; divided into median, submedian and marginal rows of relatively large, imbricated plates; extreme margin with portions of a fringe of fibrous matter of a similar nature to that which forms the test proper.

Length, 2.2 mm.; width, 1.7 mm.

The above diagnosis was drawn from the *ventral* surface of a single specimen which had fixed itself in one of the large stigmatic clefts of the type female.

Female, second stage. Elongate-ovate; margin faintly wavy. Legs and antennae highly developed; the latter (fig. 1, *a*) of six segments; 3rd very long, equalling the length of the last three together; formula: 3, 2 (4, 6), 1, 5. Legs longer than the antennae; tarsi shorter than the tibiae; femora rather incrassate. Stigmatic clefts obsolete. Stigmatic spines three, laterals with the tips rounded, nearly half the length of the median one; the latter also bluntly pointed. Marginal spines acute, of about the same length as the lateral stigmatic spines, but broader at the base; they are placed rather closely together; those at the angles of the anal cleft about three times the length of the others. Glands of five different types: (1) small, faintly 8-shaped or ovoid, with a faint central bilateral constriction; these occur in advance of the marginal spines and extend over the whole of the venter in large

(C357)

c

numbers; (2) long tubular glands (fig. 1, *b*) thickly disposed over the venter; (3) irregular ovate glands, with minute obscurely 8-shaped pores, collectively forming a faint polygonal reticulation dorsally; (4) relatively large and irregularly lobate glands (fig. 1, *c*) extending from the anal lobes to the rostrum on both sides of the median line; and (5) a regular submarginal series of very large tubular glands (fig. 1, *d*) each with an inner, somewhat flask-shaped tube; of these there are eleven on one side and twelve on the other; in many instances they are placed opposite a faint depression in the margin. A median strip of dark chitin extends from the rostrum to the anus. Anal lobes with the basal and outer margin in one continuous curve, inner edge straight. Anal cleft short, open.

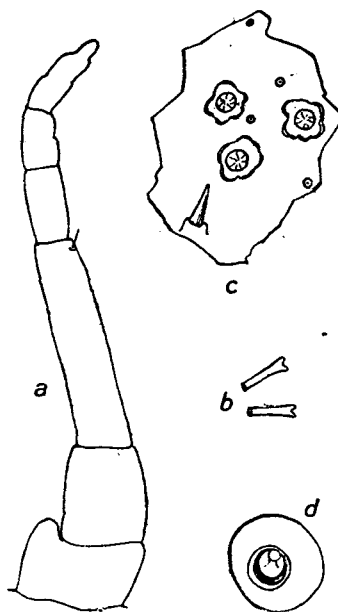


Fig. 1. *Platysaissetia carpenteri*, Newst., sp. n., ♀; *a*, antenna; *b*, *c*, *d*, glands and pores.

Length, 2.1 mm.; width, 1.7 mm.

UGANDA: Ngamba Is., on the trunk of a fig tree, 16.v.14 (*Dr. G. D. H. Carpenter*).

The adult female differs from *P. castilloae* (Ckll.) in having the anal lobes (operculum) placed near the centre of the dorsum, and in the presence of dorsal radial striae. The second stage female differs in the larger number of submarginal glands.

***Platysaissetia ferox*. sp. nov.**

Female, adult. Dorsal area with rather conspicuous, granular, amber-yellow patches of secretion arranged, more or less, in concentric and narrowly ovate rings. Pseudo-margin with a series of toothlike, glassy appendages, varying in colour from amber-yellow to translucent grey; there are 10–12 of these appendages on either side.

Length, 2·8–3·2 mm. ; width, 2·2–2·4 mm.

Female adult (denuded). Short ovate or roughly quadrate ; dorsum generally keeled, the sides sloping sharply downwards ; pseudo-margin strongly crenulated or wavy, each depression corresponding to the position of the toothlike appendages ; derm exceedingly dense and hard, surface polished and faintly uneven ; colour piceous, with here and there traces of the closely packed glands showing as yellowish spots. On the ventral surface *below the crenulated pseudo-margin* is the true margin in the form of a prominent ring of chitin upon which the insect rests, and as this is thickened at both extremities it gives the insect a slightly tilted appearance, and also raises the pseudo-marginal appendages, so that the latter present a semi-detached appearance. At gestation the extremely thin ventral derm shrivels, leaving a central hollow, as in certain species of *Lecanium* and *Ceroplastes*. Antennae partly atrophied, of (?) six segments, the terminal segment with several short stout hairs. Legs of about the same length as the antennae ; tarsus either equal to or very slightly longer than the tibia. Anal cleft very clearly defined, but fused. Anal lobes small, with the base and outer edge in a continuous curve ; inner edge straight ; a single minute hair in advance of the middle line and a similar one at the apex. Derm glands similar to those in *Lecanium* (*Saissetia*) *hemisphaericum*, but so densely packed as to give the derm, by transmitted light, an imbricated appearance ; glands of the fringe-bearing incrassated body-wall, or pseudo-margin, very long and somewhat tubular in shape ; they are very closely packed together and superimposed. Here and there, in the hollows of the undulations, one may trace the large cylindrical gland which forms so conspicuous a feature in the earlier stages. Anterior stigmatic clefts strongly pronounced ; no trace of the second pair.

Length, slightly smaller than the test.

Female test, young adult. Bright golden-yellow or amber-yellow ; dorsal area somewhat irregularly granulated, some of the larger granules roughly cube-shaped ; tooth-like process forming the fringe as in the adult, but smaller and uniform in colour with the dorsum.

Female, young adult. Colour of dry integument pale castaneous or yellowish brown ; eyes piceous. The pseudo or fringe-bearing margin (fig. 2, *a*) similar to that of the old adult, but not nearly so prominent and the undulations less pronounced ; in each of the hollows of the crenulations is a large cylindrical pore (fig. 2 *a*₁) enclosing a large spinose squama similar to those found in the DIASPINAE ; in addition to these the derm is closely packed with longer and larger glands (fig. 2, *a*₂) roughly tubular in form, arranged transversely two to three deep and overlapping each other ; they are, however, irregular in shape and but faintly indicated. Scattered over the ventral surface are a number of minute circular pores. The true margin is furnished with a regular series of closely set spines (fig. 2, *a*₃) and immediately in advance of them minute circular pores, arranged more or less in line with the spines. Derm cells in the non-chitinised portion of the dorsum, just within the margin proper (fig. 2, *a*), forming an irregular polygonal tessellation. Legs very short, tarsus slightly longer than the tibia. Antennae broken away in the preparations.

Female (?), *second stage*. (No test present in either of the two examples examined). Form broadly ovate. Pseudo-margin absent. Anal cleft well defined, but relatively

short; anal lobes similar to those in the adult. Margin (fig. 2, *b*) continuous. No stigmatic clefts. Stigmatic spines (fig. 2, *b*) three, the laterals short, stout and obtuse, the central one more than twice the length of the former. Marginal spines (fig. 2, *b*) slightly larger than those in the adults. Tubular glands well within the margin; there are eleven of these on either side and one opposite the centre of the cephalic margin with a much smaller gland on either side of it; just within the angles of the anal cleft is a similar small gland. Post-anal pores (fig. 2, *c*) circular, with confused gratings; these are arranged in two scattered groups numbering six and five respectively; on the rest of the mid dorsal area are numerous minute circular pores, and a few rather slender spines. Derm cells in a broad marginal zone, forming a polygonal reticulation in the stained specimens. The legs and antennae had been almost entirely removed by a predaceous larva of some kind, whose frass was found beneath the body of the Coccid.

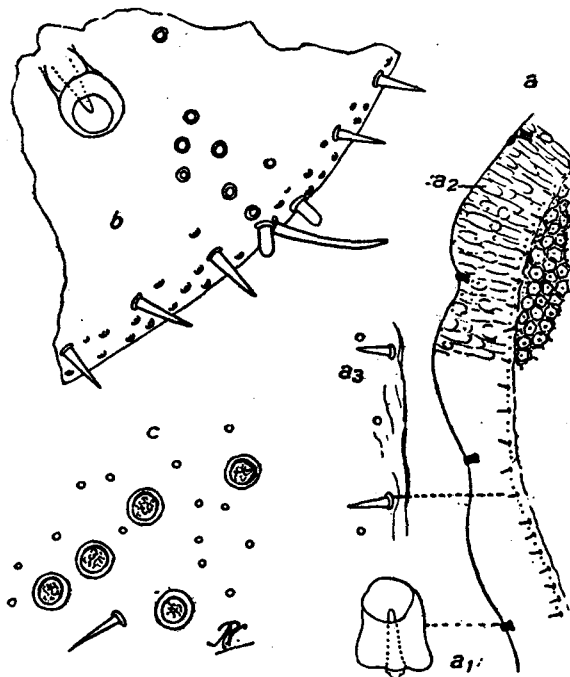


Fig. 2. *Platysaissetia ferox*, Newst.; *a*, margin of young adult ♀; *a1*, gland; *a2*, gland pores; *a3*, inner series of spines; *b*, margin of second stage ♀; *c*, postanal pores of the same.

Length, 1.3 mm.; width, 1.1 mm.

Larva. Anal lobes well within the cleft, the apical hair long; two laterals much shorter; there is also a single minute spine seated on the inner edge in a marked depression. Antennae and legs robust; the former of six segments, the 3rd about twice the length of the 2nd. Marginal hairs extremely small. Stigmatic spines three, the laterals exceedingly minute; the central one very long and equal in length to the third segment of the antennae. No special dorsal or marginal glands traceable.

S. NIGERIA: Calabar Botanical Gardens, on a hard-wooded scrub, 15.iv.08 (*Dr. Slater Jackson*).

This is altogether a very remarkable species, bearing a striking superficial resemblance to an immature example of a Monophleboid of the genus *Lophococcus*. The crenulated pseudo-margin is however suggestive of certain species of *Ctenochiton*; but it is certainly not congeneric with the latter, and is, I feel, correctly placed in *Platysaissetia*.

***Akermes andersoni*, sp. nov.**

Female, adult. Completely covered with a rather dense, dusky-white, mealy secretion, which also spreads over the surrounding portions of the food-plant, giving the infested leaves an almost uniform mealy appearance. Colour, on the removal of the secretion, rich dark piceous or very dark castaneous, shining; younger examples varying from reddish brown to dusky buff. Form irregularly oval, asymmetrical, and more or less narrowed in front; sometimes broadly ovate or subcircular. Flat or very low convex with a faint median keel in the abdominal region; sides well within the margin, with a series of widely separated *truncate tubercles*; these structures vary in number and are often also asymmetrical. Derm densely chitinated, more especially so towards the margins, where innumerable minute, translucent, poreless "cells" are present.

Female, young adult. (fig. 3, *a*). In this stage all the structural details are clearly demonstrated; they do not differ from those of the older examples. Antennae (fig. 3, *b*) rudimentary; articulations somewhat irregular and not very clearly defined, five segments being traceable in some individuals; 1st segment with a few minute hairs; the terminal one with five to six stout spinose hairs; length, inclusive of hairs, about equal to the length of the anal lobes. Front pair of legs (fig. 3, *c*) represented by extremely minute tubercular projections, each furnished with a minute spine—the rudiments of a claw; these structures measure about one-third the total length of the stigmata. Anal cleft short but well defined. Anal lobes roughly triangular, inner edge longest, straight; base shortest; beneath each is a well defined sclerite. Anal ring with eight hairs. Derm immediately above the anal orifice with a series of circular pores and usually four minute spines. Stigmatic clefts (fig. 3, *d*) generally quite minute, but occasionally there is a great indentation of the margin in this region (? due to arrested development by prominent bodies of the food-plant); stigmatic spines (fig. 3, *d*) three, all very small, the central one the longest. Margin with a complete fringe of very long and relatively stout hairs, and just within them is a widely separated series of minute hairs. The "truncate tubercles," as seen on the dorsum of the dried specimens, when examined in optical section, show that the ends are composed of numerous circular or ovate pores. In addition to the large compound pores (fig. 3, *e*) there are also a few much smaller ones, but their number and arrangement varies in different individuals and they are moreover asymmetrical. Stigmata (fig. 3, *f*) somewhat trumpet-shaped in some individuals, in others, especially when seen in profile, with a trifoliate flange and a central spheroid process.

Length, 2.5–3 mm.; width, 2–2.2 mm.

Female, second stage. Elongate ovate. Antennae similar to those of the adult but shorter. Cribriform plates in two examples arranged as follows $\frac{1}{3-3} \frac{0}{3-3}$; they are all approximately of the same size as the smallest in the adult. Marginal spines like those of the adult, but much more widely separated. Anal lobes elongate, apex with one very long hair and two to three much shorter ones. Anal ring of (?) eight hairs. No trace of rudimentary legs.

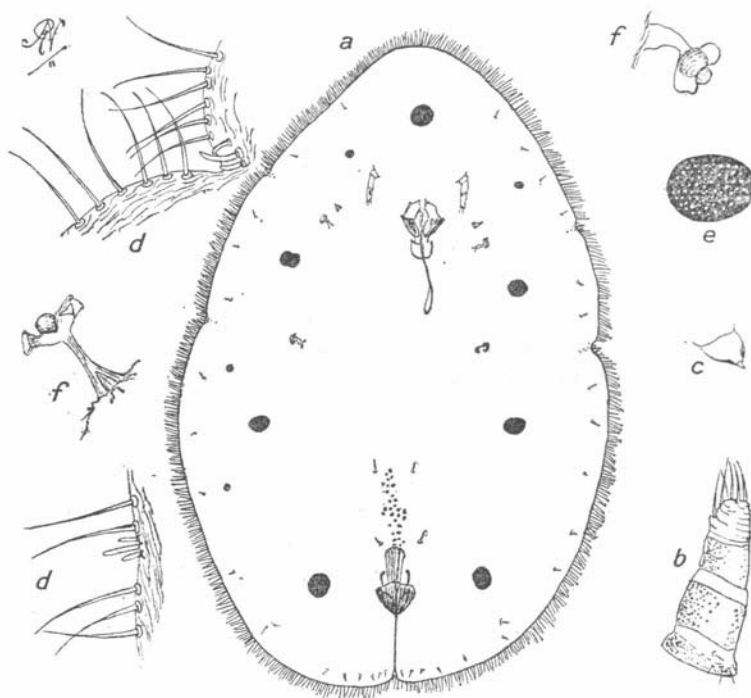


Fig. 3. *Akermes andersoni*, Newst., sp. n., ♀; a, adult ♀; b, antenna; c, rudimentary leg; d, stigmatic and marginal spines; e, compound pore; f, stigmata.

Larva. Antennae of six segments; 3rd the longest. Margin of body with long equidistant hairs. Stigmatic spines three, the central one of great length, the laterals minute. Anal lobes conspicuous, each with an immense seta, and one or two small ones. Anal ring with six hairs. Cribriform plates absent.

BRITISH EAST AFRICA: Kabete, on orange leaves (heavy infestation), i.1914 (*T. J. Anderson*).

One has experienced no little difficulty in assigning this remarkable Coccid to its proper generic position; but as it fits best into Cockerell's genus *Akermes** I have placed it there provisionally. In some respects it agrees with *Hemilecanium*, Newst.,† but in this the anal cleft is obsolete and the compound pores are present in all stages.

* *Canad. Ent. XXXV*, pp. 89-90 (1902).

† *Jour. Econ. Biol.* III, p. 39, pl. iv (1908).

***Akermes quinquepori*, sp. nov.**

Female, adult. Flattened and shrivelled on the dorsum; sides somewhat rounded and thickened; integument presenting a dull, oily appearance; colour, when dry, dull red-brown, sometimes paler on the dorsum and often with obscure blackish and indefinite markings. Antennae (fig. 4, *a*) and legs (fig. 4, *b*) vestigial; the former with several short spinose hairs at the tip; basal segment relatively very large; length less than half the width of the stigmata. Legs (fig. 4, *b*) about the same size as the antennae; coxal sclerite relatively large, claw well defined; above the latter a slender hair, and there are several additional hairs traceable in some of the

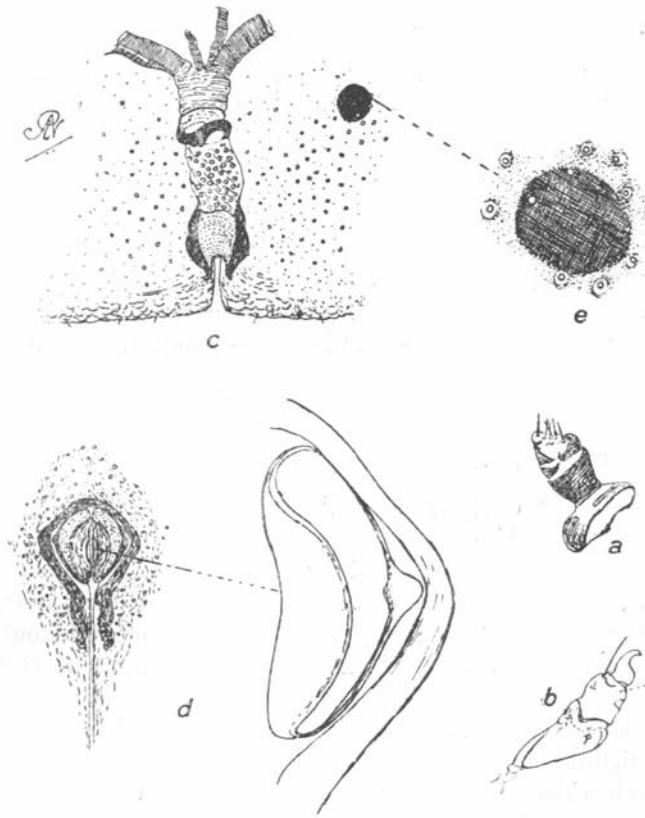


Fig. 4. *Akermes quinquepori*, Newst., sp. n., ♀; *a*, rudimentary antenna; *b*, rudimentary leg; *c*, stigmatic area; *d*, anal lobes; *e*, large compound pore.

specimens. Stigmatic clefts (fig. 4, *c*) deep; at the base a strongly chitinised sclerite which forms a semicylindrical tube; from this structure to the stigmata is a thin glandular tube; the whole of this respiratory organ is unusually large. Margins thickened and finely but irregularly crenulated; spines exceedingly minute and irregularly arranged. Anal cleft short, about one-sixth the entire length of the insect. Anal lobes (fig. 4, *d*) surrounded by a thickened wall of chitin and beyond it a concentric zone of thinner chitin beset with rather small and somewhat circular

pores ; lobes very thick, basal outline somewhat horn-shaped and at the angle formed by the juncture of the base and outer edge is a well defined tubercular projection. Submarginal compound pores (fig. 4, *e*) very large and presenting an exceedingly minute reticulated surface ; these are arranged as follows : one, the largest, about midway between the base of the rostrum and the margin ; one in front of, and another between each of the spiracles, making five in all ; these structures are possibly analagous to the "cribriiform plates," but have much finer gratings. Derm of both dorsum and venter thickly set with minute ovate glands, each with a circular opening having a well defined chitinous ring.

Length, 3·8–5 mm.

Larva with well developed legs and antennae.

BRITISH GUIANA : Georgetown, on *Microlobium acaciaefolium*, 28.xii.13 (*G. E. Bodkin*).

Mr. Bodkin also adds the following details : " This Coccid was discovered beneath the bark of a tree growing in the Botanic Gardens. It was attended by a small black ant which occurs commonly, especially under the bark of trees. The bark could be easily removed with a knife. The Coccids were observed to occur in small colonies of two to three or three to five together. They were apparently entirely hidden from the light. The colour of the adult females, when alive, is dull pink. The young larvae are bright pink in colour and extremely active. Ova are produced by the female." (*In litt.* 3.i.14).

***Lecanium hirsutum*, sp. nov.**

Female, adult. Short ovate, rarely sub-circular ; integument thin ; colour in alcohol dusky yellowish-white to ochraceous buff, margin usually distinctly darker. Integument of the dorsum clothed with long spinose hairs and thickly studded with glands (fig. 5, *a*), the central orifice of the latter surrounded by several somewhat irregular lobate processes. Antennae (fig. 5, *b*) rather short and stout, of seven or eight segments, usually eight, of which the third is the longest. Legs stout ; tarsus (fig. 5, *c*) much shorter than the tibia ; claws short and very broad proximally ; upper digitules long and rather stout, distal extremity distinctly dilated and flattened ; lower digitules unusually *broad and flat*. Stigmatic cleft (fig. 5, *d*) well defined and much wider proximally than distally ; spines short, seven to nine in number, three or more being much stouter than the rest, but not all arranged in the same plane. Marginal hairs numerous and similar to those on the dorsum, into which they merge imperceptibly ; close up to the bases of many of these are two distinct pores (fig. 5, *a*). In the young adult females the margin (fig. 5, *f*) is also *thickly set with short stout spines*, but these organs are so easily deciduous in the old adults that they are rarely present. Anal lobes (fig. 5, *e*) with the base as long as the outer edge ; apex with an unusually long hair. Hairs of the anal ring extremely short, being scarcely as long as the lobes.

Length, 3–4 mm.

EAST AFRICA ; food-plant not stated. (Ex coll. Berlin Zoological Museum, 1912).

This insect resembles *Lecanium (Eulecanium) pubescens*, Ehrhorn,* in having the dorsum clothed with hairs, but in all other respects it is markedly distinct, the salient characters in *L. hirsutum* being the strongly invaginated stigmatic clefts, the curious and unusual shape of the digitules of the tarsi and the innumerable small spines and hairs at the margin.

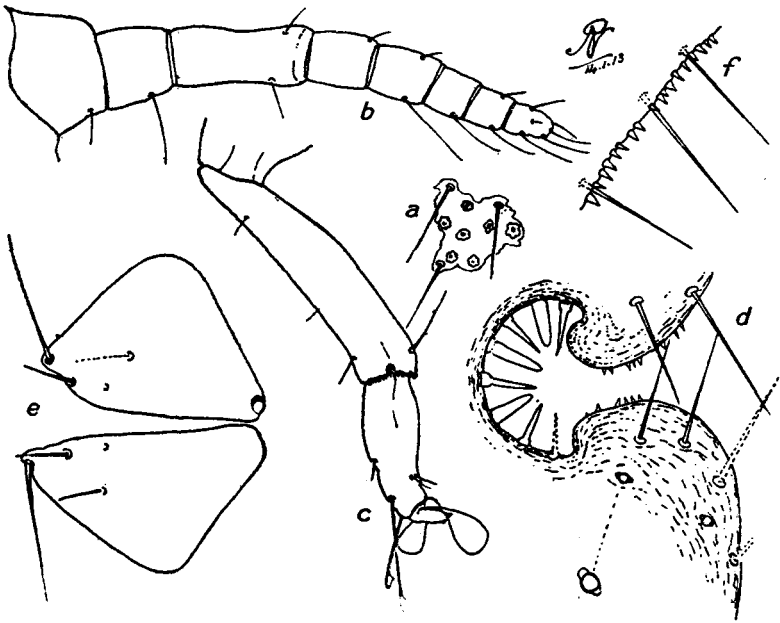


Fig. 5. *Lecanium hirsutum*, Newst., sp. n., ♀; a, portion of integument of dorsum; b, antenna; c, leg; d, stigmatic cleft and spines; e, anal lobes; f, marginal spines of young adult.

***Lecanium pseudotessellatum*, sp. nov.**

Female, adult. Very broadly ovate or sub-circular; margin broadly flattened; dorsum low convex. Median and sub-median carinae interrupted by lateral, radial carinae; the last-named very clearly defined and equidistant at the margins. The somewhat rectangular spaces enclosed by the carinae, in old examples, with a relatively deep and large depression, giving the dorsum a more or less tessellated appearance. Small detached patches of glassy secretion in the hollows of the dorsum and margin. Colour variable: pale castaneous, with a clearly defined darker margin and irregular blackish markings in the centre of the dorsum, or dull castaneous with a darker margin; young adults are much paler. Antennae (fig. 6, a) robust, of seven segments; the 3rd very slightly longer than the 2nd; 6th with a rather stout spine; formula: 3, 2, (5,6), (4,7), 1: Legs unusually large; tibia and tarsus (fig. 6, b) together equalling the length of the antennae; tarsus slightly thicker than the tibia; lower digitules very robust. Anal cleft slightly less than one-fifth the length of the body. Anal lobes (fig. 6, c) somewhat diamond-shaped; base

* Canad. Ent. XXX, p. 244 (1898).

relatively straight and longer than the outer edge; a series of submarginal hairs, usually five, on the inner edge; tips with two or three similar hairs; ventral sclerites conspicuous. Anal ring with six very stout hairs, and on either side a single, very long hair. Dorsal glands with circular pores extending in a relatively broad band between the anal lobes and the rostrum, and continuous along the outer edge of the lobes. Stigmatic clefts (fig. 6, *d*) invaginated and asymmetrical, the three spines pushed to the lower side of the enclosed space. Derm glands at the margin irregularly ovate, and arranged more or less in radial bands. *Venter with a broad,*

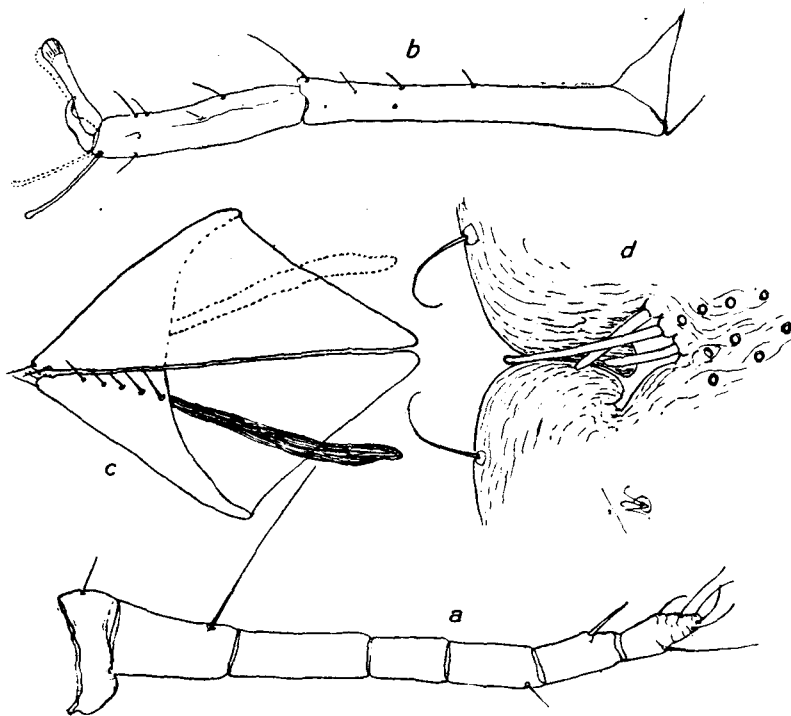


Fig. 6. *Lecanium pseudotessellatum*, Newst., sp. n. ♀; *a*, antenna; *b*, leg ii.; *c*, anal lobes; *d*, stigmatic cleft.

continuous, submarginal zone of tubular glands. Marginal hairs very long and generally markedly curved somewhat like a fish-hook. Old examples completely covered with a dense soot-like fungus.

Length, averaging, 3.7 mm.

Male. Head, thoracic sclerites and costa of wings, pale castaneous; apodeme piceous; abdomen and legs pale brick-red.

Male puparium. Glassy; relatively very broadly ovate; divided into three bilateral, one cephalic and two median plates, the *inner* edges of the ridge dividing the median from the lateral plates finely but distinctly crenulated.

Length, 2.2–2.3 mm; width, 1.5–1.6 mm.

TRINIDAD: Aripo Savana, on *Chrysobalanus pellocarpus*, Mey., ii. 1915 (W. A. Freeman, per F. W. Urich).

***Lecanium wardi*, sp. nov.**

Female, adult. Irregularly ovate, somewhat pyriform or more or less deltoid; flat and thin or very low convex. Dorsum wrinkled; sides coarsely punctate, and with fine, widely separated, radial ridges. Derm with radial bands of pigment, most pronounced in the abdominal region. Gland pores relatively large, ovate or circular, and so arranged that they form collectively a large polygonal reticulated pattern; they are most conspicuous in the dorsum, but can also be traced, chiefly between the pigment bands, almost to the margin. Marginal spines (fig. 7, *a*) placed

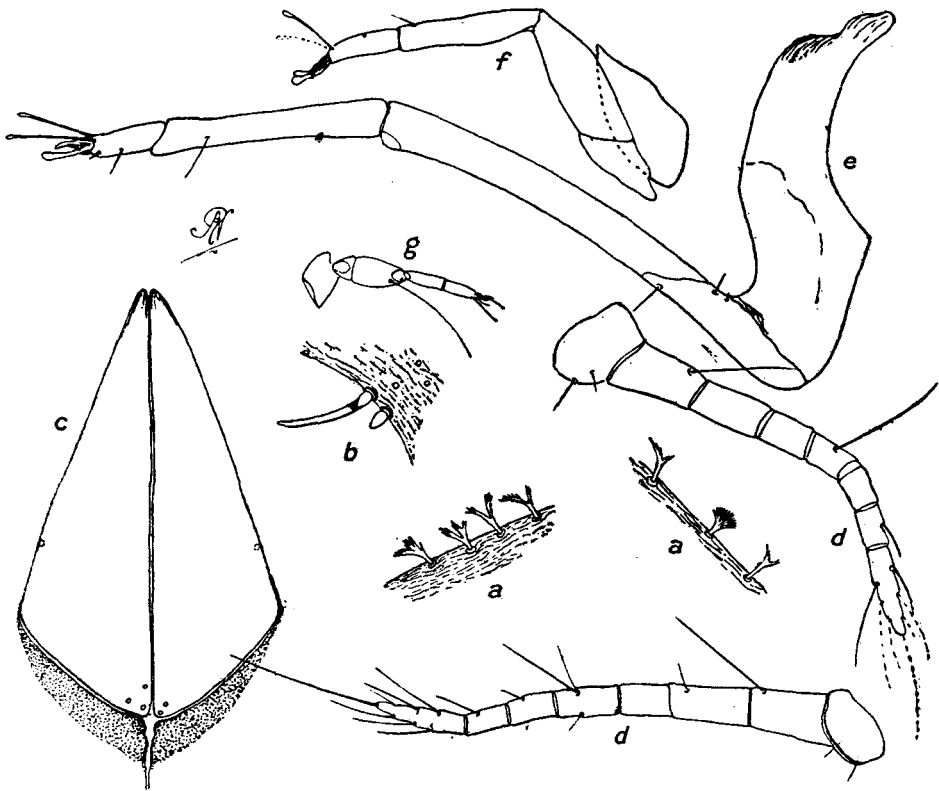


Fig. 7. *Lecanium wardi*, Newst., sp. n., ♀; *a*, marginal spines; *b*, stigmatic spines; *c*, anal lobes; *d*, antennae of second stage ♀; *e*, leg iii.; *f*, leg i.; *g*, leg iii. of larva.

closely together, short, deeply divided and frayed; palmate forms also occur at rare intervals. Stigmatic spines (fig. 7, *b*) three, the laterals small and conical, as in certain species of *Ceroplastes*. Anal lobes (fig. 7, *c*) strongly attenuated along the proximal edge. Anal ring of six hairs. Anal cleft about one-third the length of the body. Antennae (fig. 7, *d*) of eight segments; 2nd, 5th and 8th each with a very long hair; the formula varies slightly, but the 2nd, 3rd and 8th are much the longest. Legs well developed.

Length, 3–3.6 mm; width, 2–2.8 mm; length of anal cleft in large specimens, 1.3 mm.

Female, second stage. Exceedingly thin and paper-like. Colour dusky white or pale greyish-buff. Form generally ovate. Antennae of six segments, 3rd and 6th much the longest. Legs robust. Marginal spines as in adult.

Male, second stage. Ovate. Antennae relatively longer than those of the preceding stage, of six segments; 3rd much the longest, and decidedly longer than the 6th. Marginal spines and anal lobes similar to those of the female. Second and third pairs of legs (fig. 7, *e*) more than twice the length of the first pair (fig. 7, *f*).

Larva. Marginal hairs stout and curved, the tips almost reaching the bases of the succeeding hairs; 2nd and 3rd pairs of legs (fig. 7, *g*) with an exceedingly long hair towards the tip of the femora, being slightly longer than the tibio-tarsal segments together.

BRITISH GUIANA: Botanic Gardens, Georgetown, on leaves of Malacca Apple, 28.vii.15 (*R. Ward*).

A very large percentage of the Coccids were infested by a fungus.

***Lecanium aequale*, sp. nov.**

Female, adult. Dull olivaceous brown, brownish-black, or piceous; surface shining, as if coated with partly absorbed varnish. Form ovate, slightly elongate-ovate, or subpyriform. Dorsum with a median interrupted keel and somewhat

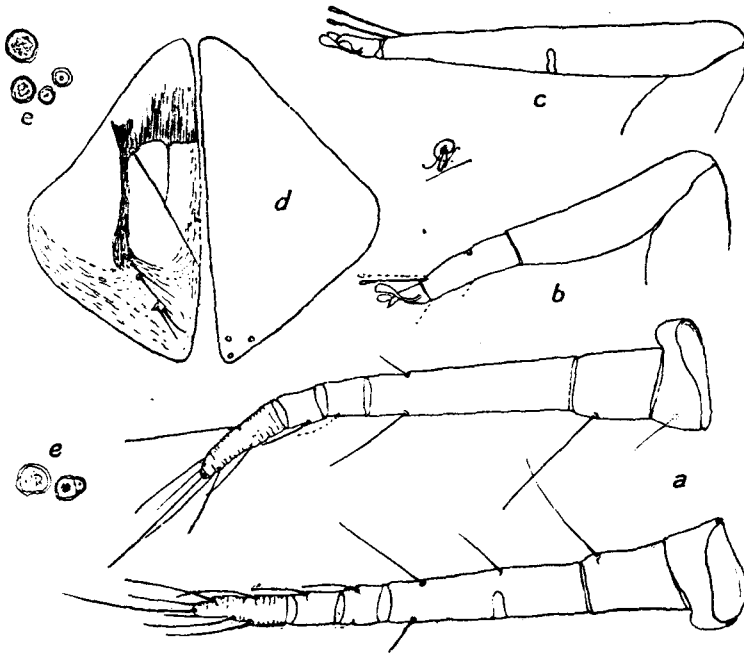


Fig. 8. *Lecanium aequale*, Newst., sp. n., ♀; *a*, antennae; *b*, leg i.; *c*, leg ii.; *d*, anal lobes; *e*, pores.

irregular, faint, transverse ridges. Antenna (fig. 8, *a*) of six segments, the 3rd often with an imperfect central division, as long as or slightly longer than the three succeeding ones. First pair of legs (fig. 8, *b*) with the tibio-tarsal articulation

apparently complete, but usually faintly indicated; tarsi with a marked indentation 2nd and 3rd pair of legs; (fig. 8, *c*) with the tibio-tarsal articulation imperfect, and usually indicated by a thinning of the chitin on the lower half only. Anal lobes relatively large (fig. 8, *d*), with the basal edge much longer than the outer; the tips, externally, show three spine attachments; ventral sclerite with one proximal and two distal, long, spinose hairs. Anal ring of six hairs. Anal cleft fused, excepting a small portion towards the margin; length a little less than one-fourth the length of the body. Derm cells with minute clear pores, very thinly scattered over the whole of the dorsum. There are two long post-anal hairs, and immediately in advance of them, a very scattered group of pores (fig. 8, *e*); but these entirely disappear in very old examples. Marginal spines simple, slender, and curved. Stigmatic spines three, central one much the longest. Stigmatic clefts faintly indicated.

Length, 1.7–2 mm.

Female, second stage. Ovate. Antennae resembling those of the adult; but the 4th and 6th segments are sometimes fused, so that in such instances only five segments exist; one example possesses both forms of antennae. Tibio-tarsal articulation in legs ii. and iii. usually a little more pronounced than in the adult. Anal ring with eight hairs, two smaller than the rest. Post-anal pores (fig. 8, *e*) extending midway between the anal lobes and the rostrum; there are from 18–20 of these, varying in shape and size and some of them coalescing. A few short spinose hairs scattered thinly over the whole of the dorsum. Stigmatic spines three, the median one of great length. Stigmatic clefts faintly indicated. Anal cleft apparently fused.

Male puparium. Glassy in texture, relatively broad, divided into nine plates: one cephalic, three bilateral, two dorsal.

Length 1.2–1.3 mm.; width, 0.75 mm.; thus, compared with the size of the adult females, the puparia are, relatively speaking, exceptionally large.

BRITISH GUIANA: Sea shore, East Coast, on “Coupida” (*Aricennia nitida*), 30.v.15 (*G. E. Bodkin*).

This is apparently a viviparous species, as embryo larvae were found in two of the examples. Distinguished by its unusually small size, and the fusing of the tibio-tarsal segments in legs ii. and iii.; the number of segments to the antennae (six) is also somewhat unusual. It is clearly distinct from Cockerell's *Lecanium* (*Coccus*) *nanum*, and *L. rubellum*. My colleague, Mr. E. E. Green, to whom examples were sent in the first instance, has asked me to describe this species. I have pleasure in doing so and have adopted the MS. name which he gave it.

***Lecanium acaciae*, sp. nov.**

Female, adult. Elongate, highly convex on small twigs; low convex on the larger branches and sometimes irregularly keeled along the median line; often shrivelling considerably after death. Colour bright ochraceous, reddish buff, or dull castaneous, rarely with a faint pigmented reticulation; eyes black. Antennae (fig. 9, *a*) usually of eight segments; immediately below the articulation of the 4th and 5th segments is an extremely long outstanding bristle; a rather long slender spine arising from

each of the 6th, 7th and 8th segments; 8th with several long stiff bristles; formula: (3,4), (8,2), 1, (6,7), 5; examples with seven segments (fig. 9, *b*) are exceptional, and in such instances there is a partial articulation in the region of the outstanding bristle on the fourth segment. Legs: tarsi usually with a well defined, dorsal constriction towards the distal extremity, from which arises a minute hair; tarsal digitules very long, stout, and slightly dilated; those of the claw stout and strongly dilated; claw short and stout. Stigmatic clefts (fig. 9, *c*) faintly indicated; spines three, the central one a little more than twice the length of the laterals, stout, pointed, and strongly curved. Marginal spines (fig. 9, *c*) comparatively stout, curved and divided or frayed distally. Anal lobes (fig. 9, *d*) approximately triangular, inner edge longest, apices bluntly pointed; a well developed chitinous paraphysis

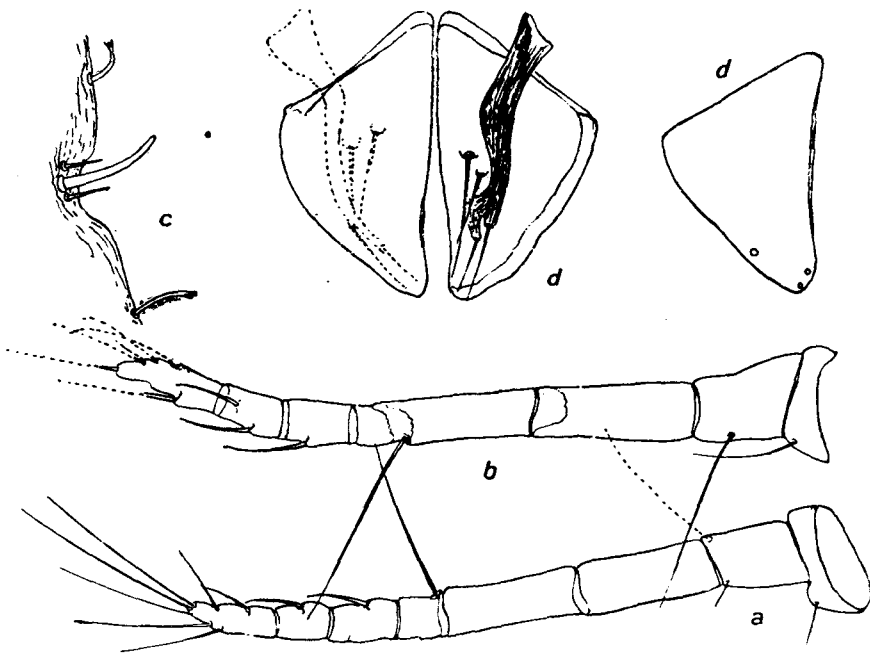


Fig. 9. *Lecanium acaciae*, Newst., sp. n., ♀; *a*, *b*, antennae; *c*, stigmatic and marginal spines; *d*, anal lobes.

or sclerite beneath each lobe furnished with two stout bristles; ventral eversile sac with four stout hairs; anal ring with six hairs. Derm with thinly scattered, small, oval, and also a few large translucent cells.

Length of dried examples, 3.5–5.2 mm.

Male puparium. Glassy, normal in form; but the number of plates into which it is divided not ascertainable from the rather poor material at hand.

BRITISH EAST AFRICA: Nairobi, on *Acacia melanoxylon* and *Albizia moluccana*, i. 1914 (*T. J. Anderson*).

This Coccid had been preyed upon by the larvae of a Lepidopterous insect, whose compound cocoon was covered with dead females.

***Lecanium adersi*, sp. nov.**

Female, adult. Very flat, irregularly ovate, and narrowed in front. Colour varying from chocolate-brown to brownish buff. Antennae (fig. 10, *a*) of six or seven segments; in the latter the 4th is much the longest; in some examples the articulation of the 3rd with the 4th is very faintly indicated or entirely absent. Legs long and slender, especially the middle and hind pairs. Stigmatic clefts (fig. 10, *b*) invaginated; stigmatic spines stout, bluntly pointed and of varying lengths; there are from twenty to twenty-two of these organs. Marginal spines (fig. 10, *c*) falciform and finely serrated on one side. Anal lobes (fig. 10, *d*) with the base exceedingly

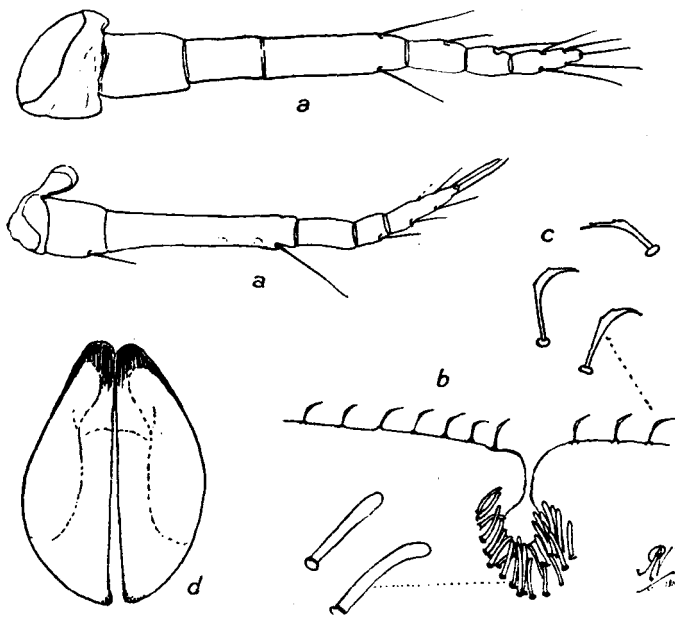


Fig. 10. *Lecanium adersi*, Newst., sp. n., ♀; *a*, antennae; *b*, stigmatic cleft; *c*, marginal spines; *d*, anal lobes.

short, and the outer edge very long and strongly curved or arched. Anal cleft about one-fifth the length of the body. Derm cells minute and very widely separated; there are, however, several of these or similar organs grouped together just in front of the anal orifice.

Length 4.75–5.50 mm.

ZANZIBAR: Marahubi, on mango leaves, 24.iv.13. (*Dr. W. M. Aders*).

Closely allied to *Lecanium bicruciatum*, Green,* from which it differs chiefly in the multiplication of the stigmatic spines.

***Lecanium africanum*, Newstead.**

Lecanium viride var. *africanum*, Newstead, Ent. Mo. Mag. (2) ix, p. 95 (1898).

Lecanium viride (Green), Newstead, Bull. Ent. Res. i, p. 187 (1910).

Female, adult. Colour of dried specimens often yellowish green; others are bright ochraceous, straw-coloured or pale reddish-brown; eyes black. Dorsum,

* Cocc. Ceyl. iii, p. 214, 1. LXXVI.

especially in the younger forms, with a series of black markings, often forming a narrow loop-like pattern; these markings are however rarely present in very old examples. Form oblong oval, but the outline is often irregular; narrowed in front and moderately convex, but the margins broadly flattened, especially the cephalic portion. Antennae (fig. 11, *a*) of eight segments, rarely of seven; formula of the former: 3 (2, 4, 5, 8) 1 (6, 7); there is a very long hair on the 2nd and 5th segments, and several shorter ones on the 8th, 6th and 7th, each with a distinctly stouter hair. Legs normal, though the anterior tarsi sometimes exhibit a faint, dorsal constriction. Anal lobes (fig. 11, *c*) attenuated distally, inner margin longest; apices with a few fine short hairs. Anal cleft slightly less than one-third the length of the body. Stigmatic cleft (fig. 11, *b*) very slight, sometimes scarcely

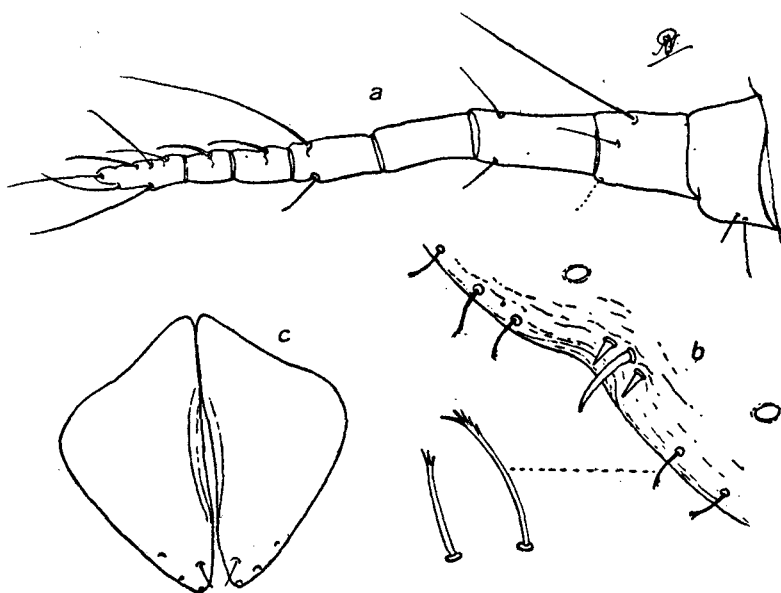


Fig. 11. *Lecanium africanum*, Newst., ♀; *a*, antenna; *b*, marginal and stigmatic spines; *c*, anal lobes.

visible; spines three in number, rather small, the central one being about three times the length of the laterals. Marginal spines (fig. 11, *b*) small, generally slightly curved and faintly fringed distally. There are three to four hairs of varying length near the attachment of each of the antennae, and usually four rather longer and stouter ones just in advance of the anal lobes. Derm cells oval and markedly distinct in stained preparations, but scarcely visible in unstained specimens.

UGANDA: Chagwe, on coffee, 12.xi.12 (*C. C. Gowdey*).

This insect is specifically identical with the examples recorded by me in this Bulletin (*l.c.*) as *Lecanium viride*, Green. At the time I called attention to the fact that the specimens submitted by Mr Gowdey differed from typical *L. viride* in having the derm cells placed more closely together, and that there was an entire absence of circular wax-glands surrounding the genital orifice. I now find that

although the latter are traceable in some examples, there are other marked differences; in the first place, the antennae consist normally of eight segments a character not noted in *L. viride*; and secondly, the form of the anal lobes is quite different. In the light of these important differential characters, I have given this insect specific rank.

Judging by the heavily infested leaves of the food-plant, this Coccid must cause serious injury to the coffee under cultivation in Uganda. It may be interesting to add that the examples from which I drew up the original diagnosis of *Lecanium* (*Coccus*) *viride* var. *africanum* came from Lagos, West Africa, and that they also occurred on coffee leaves.

***Lecanium cajani*, sp. nov.**

Female, adult. Very elongate, with a faint median abdominal keel; cephalic area wrinkled; sides with faint radial ridges. Marginal spines covered with a glassy secretion and forming a very faint fringe. Middle area of dorsum covered with an extremely thin pinkish white secretion, which presents a hard even surface

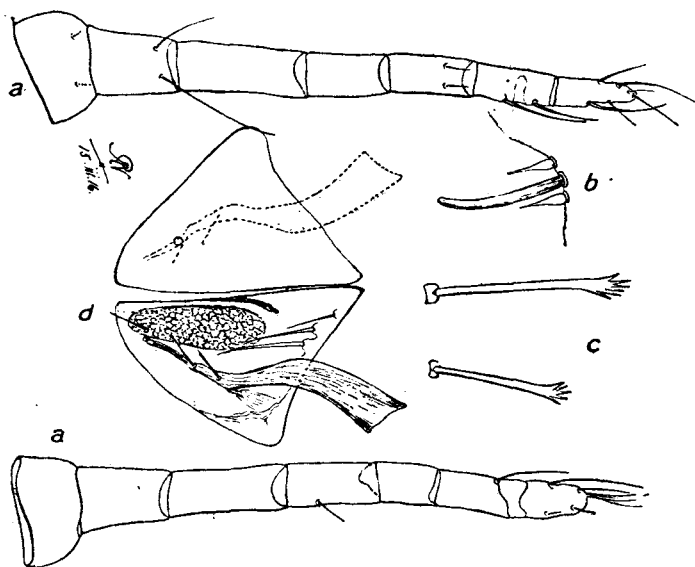


Fig. 12. *Lecanium cajani*, Newst., sp. n., ♀; a, a, antennae; b, stigmatic spines; c, marginal spines; d, anal lobes.

resembling dried oil-colour, and is firmly attached to the integument.* The remaining portion of the dorsum is of a bright yellowish-buff; eyes and submarginal gland-pores black. Young adults are pale, translucent yellow. Young parasitised examples with the whole of the central area of the dorsum intense shining black. After treatment with KOH the integument is thin and transparent. Antennae (fig. 12, a) of seven segments; 6th and 7th with two long slender spinose hairs; formula (one example): 3, (2, 4, 5, 6, 7) 1. The antenna on the opposite side is slightly malformed.

* This may be an artifact produced by foreign matter.

Rostral filaments very short. Legs well developed and the tibio-tarsal articulations very clearly defined; coxae with three very long, distal hairs. Dorsal pores very small, somewhat circular and very widely separated. Stigmatic spines (fig. 12, *b*) three, the central one very long, broad and curved; the laterals somewhat bulbous at the base, attenuated and finely pointed; clefts shallow. Marginal spines (fig. 12, *c*) very long, being equal in length to the 4th segment of the antennae; they are dilated and frayed or divided at the tips. Anal lobes (fig. 12, *d*) with the base and outer edge about equal in length; inner margin longest; a very large spine attachment on the dorsal surface, well within the distal angle; ventrally (fig. 12, *d*) there is a narrowly elongated patch of chitin which presents a finely reticulated pattern; spines and sclerite as shown in the illustration; the relative position of these may, however, vary according to the pressure of the covering glass. Anal cleft four times as long as the anal lobes.

Length, 4.2 mm.; width, 2.2 mm.

S. NIGERIA: on pigeon-pea, 19.xii.13 (*Dr. W. A. Lamborn*).

The description of the old adult female is based upon a single example. One young adult and several second stage females were also collected by Dr. Lamborn, but all of these had been attacked by Chalcidids.

This insect belongs to the *L. longulum* group, but seems to be quite distinct and hitherto undescribed.

***Lecanium hesperidum* (Linn.) (Plate vi, figs. 1-6).**

The colony from which I secured examples of the male puparia of this species, described by me* in the year 1902, was subsequently kept under observation until November 1904, when I was fortunate in securing perfect males—the first authentic examples obtained in any country, so far as I can trace, since Bouché's discovery in or about the year 1867. As his description, quoted by both Boisdual† and Signoret‡ under the synonym *L. lauri*, Boisd., is of the vaguest possible kind, I give the following details and append figures of this cosmopolitan pest which I trust may prove of interest.

Male (Pl. vi, fig. 1). Wings ample and faintly iridescent; costal nervure bright rose-pink. Body dull crimson or bright pale castaneous; thoracic plates and apodeme slightly darker. Legs and antennae paler than the body; hairs glistening white; eyes and ocelli black. Antennae (Pl. vi, fig. 2) very hairy, of ten segments; 4th and 7th longest; apical segment with five long and faintly clubbed hairs. Upper surface of head and genae hairy. Legs hairy; digitules normal. Abdomen hairy ventrally; anal segment (Pl. vi, fig. 3, 3*a*) with a pair of long white filaments, a pair of relatively long slender hairy tubercles and also a pair of large protruding gland-like processes. Each of the white filaments is supported by a pair of bristles one long the other relatively short. Stylus (Pl. vi, fig. 3) somewhat bluntly pointed.

Length, 1.75 mm.

Male puparium (Pl. vi, fig. 4). This has already been described (*l.c.*).

* Coccidae Brit. Isles, ii. p. 83.

† Essai. p. 230 (1873).

‡ Ent. Hort. p. 340 (1867).

Male, second stage (Pl. vi, fig. 5). Very elongate, translucent ochraceous-yellow, margins darker or yellowish green, dorsal ridge rich dark brown; anal lobes varying from pale yellow to pale red.

Male larva. Resembling that of the female but more elongate. Pale translucent yellowish-green; dorsal area ochraceous. Eyes black.

Pupa (Pl. vi, fig. 6). At first pale reddish-ochreous, later bright reddish-ochraceous. Thorax darkening with age. Eyes purple-brown or dark red-brown.

ENGLAND: Bournemouth and Chester, on a date palm (*Phoenix dactylifera*), 25.xi.1904 (*R. Newstead*).

***Lecanium (Saissetia) hurae*, sp. nov.**

Female, adult. Dried examples very irregular in shape, but the general outline is somewhat hemispherical; integument coarsely folded and indented; margin coarsely punctate; surface glabrous. Colour pale dull brown to dull castaneous, with irregular black spots, which are generally more numerous at the sides, more

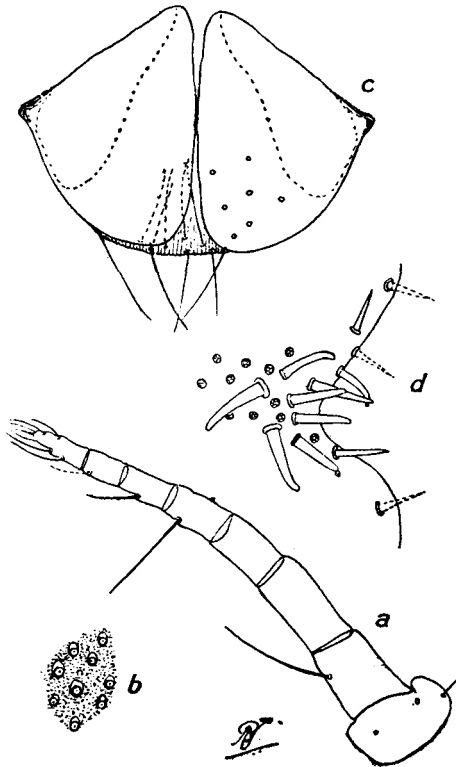


Fig. 13. *Lecanium hurae*, Newst., sp. n., ♀;
a, antenna; b, derm glands; c, anal lobes;
d, stigmatic cleft.

especially so in very old examples. After maceration in KOH the outline of the body is very broadly ovate with the ends almost equally rounded. Antennae (fig. 13, a) of eight segments, with a very long hair on the 3rd and 5th and a long slender spine (C357)

on the 6th and 7th ; terminal hairs short and stout. Legs strong, normal ; tarsus of 1st pair nearly as long as the tibia ; two hairs on the trochanter. Stigmatic clefts faintly indicated ; spines in a compact dense group consisting of from ten to twelve, all of them much stouter and longer than the marginal spines, the innermost ones largest of all and flattened. Marginal spines simple, short and pointed, very widely separated, excepting at the distal margin, where five to six are placed much more closely together ; within the margin is a series of smaller spines, somewhat irregularly disposed ; the chitinous disks upon which these hairs are seated are as large as the marginal ones ; similar minute spines are thinly scattered over the whole of the dorsum. Derm cells (fig. 13, *b*) very minute, with a central pore, and in old, well stained examples these give the integument a speckled appearance ; they are most numerous in the region of the anal lobes ; in younger examples these appear as minute pores. Anal lobes (fig. 13, *c*) thick, obtuse and broadly rounded distally ; dorsal surface with several widely separated hairs. Anal cleft very short. Anal ring with ten hairs ; retractile tube with not less than eight hairs ; ten or more may be present.

Length, 3.5–5.1 mm. ; height, 2.1–3.2 mm. (dried examples).

Female, second stage. Much more elongate than the adult. Integument, when dry, deeply wrinkled ; colour dusky buff, generally with conspicuous black spots. Antennae of seven segments. First pair of legs scarcely longer than the antennae ; tarsi with a clearly defined constriction dorsally. Marginal spines as in adult. Stigmatic cleft (fig. 13, *d*) small ; spines very like those in the adult, but seem to be fewer in number and not so closely packed together. Anal lobes not differing markedly from those of the adult.

Larva. Stigmatic spine long, stout and curved, marginal hairs simple and nearly as long as the corresponding spines in the adult female. Hair of the anal lobes about equal in length to the legs.

BRITISH GUIANA : Berbice, on *Hura crepitans*, 27.xi.13 (*G. E. Bodkin*).

***Lecanium (Saissetia) persimile*, sp. nov.**

Female, adult. Not differing appreciably in its external form, colour, and density of chitin from *Lecanium (Saissetia) oleae* (Bernard), but in two examples the dorsum was covered with a fine dusky-white, mealy secretion. The median longitudinal and two transverse ridges, forming roughly the letter H, well marked in two specimens, but absent in another. Anal cleft completely fused. Anal lobes attenuated, outer angle broadly rounded, inner edge much the longest ; apex bluntly pointed, with one or two short spines. No stigmatic clefts ; spines three, the central one slightly more than twice the length of the laterals. Antennae well developed, of eight segments. Legs rather slender ; lower digitules very robust, incrassate proximally, dilated distally. Derm thickly studded with small, but well-defined, oval and translucent cells ; these are much more crowded together at the marginal and also larger.

BRITISH EAST AFRICA : Nairobi, on peach stems, i.1914 (*T. J. Anderson*).

The one salient character by which this Coccid can be distinguished from *Lecanium (Saissetia) oleae*, (Bern.) is the non-reticulated appearance of the derm. In all

other respects, so far at least as I am able to judge by the scanty material at hand, the two insects are practically identical. But the derm cells in *oleae* are so strikingly different that I have no hesitation in erecting a new name for Mr. Anderson's specimens. *Lecanium* (*Saissetia*) *sylvestrii*, Leonardi,* bears some resemblance to *persimile*, but is clearly distinct.

***Lecanium* (*Saissetia*) *subhemisphaericum*, sp. nov.**

Female, adult. Not differing from *Lecanium hemisphaericum*, Targ., in its general form and colour. Dermal pores mores or less circular, exceedingly few in number,† irregularly scattered and extending almost to the margin; the latter with short, closely set pigment bands. Stigmatic clefts minute; spines three, the laterals short and stout; middle one also very stout and rather suddenly pointed. Marginal spines all broken away. Anal cleft united. Anal lobes more or less triangular, inner edge slightly the longest. Antennae (fig. 14) of seven segments, the 3rd, 4th and 7th much the longest; the last three each with a long spine, that on the terminal segment being markedly the stoutest; formula: 3, 7, 4, 2, 1 (5, 6), or (3, 7) 4, 2, 1, (5, 6). Legs slender but well developed; lower digitules stout.

Length, 1·9–2·9 mm.

UGANDA: Naguriga, Chagwe, on coffee, 27.ii.13 (*C. C. Gowdey*). GOLD COAST: Aburi, on coffee, 27.xii.15 (*W. H. Patterson*).

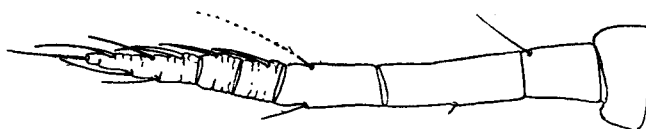


Fig. 14. *Lecanium subhemisphaericum*, Newst., sp. n.; antenna of ♀.

The affinities of this species are somewhat doubtful, but judging by the dermal characters alone, it fits best in the sub-genus *Coccus* in Fernald's classification. But as it bears such a close resemblance to *Lecanium* (*Saissetia*) *hemisphaericum*, I feel that it is best placed in this section for the time being. Easily determined by the somewhat unusual form of the antennae and the sparsity of the derm glands.

***Lecanium* (*Saissetia*) *signatum*, sp. nov.**

Female, adult. Broadly ovate, sometimes attenuated in front; flat and finely rugose, but slightly glossy. Dorsum generally with a well marked 1-shaped ridge, the transverse bar of which is longer than the stem. Colour varying from pale castaneous to dark piceous; the pale forms sometimes with a relatively broad dark marginal zone, the dark forms often with a paler margin. Antennae (fig. 15, *a*) of seven segments, of which the 4th is the longest; but this segment often has a partial, or in some instances even a complete, subdivision just below the distal constriction; 7th segment somewhat variable in length, but usually much longer than the preceeding one. Legs with the tibio-tarsal articulation (fig. 15, *g*) more or

* Bull. Lab. Zool. Gen. Agr. Portici, v, p. 276, fig. xxii (1911).

† In the field of a Leitz 7th objective (No. 4. eyepiece) the following counts were made in eight different parts of the derm: 3, 0, 0, 0, 1, 0, 4, 6.

less central; digitules long, the lower pair robust. Anal cleft fused and three times as long as the anal lobes; the latter (fig. 15, *b*) somewhat pointed, the outer edge much longer than the base. Stigmatic clefts obsolete; spines (fig. 15, *c*) three, the laterals very short and faintly bulbous. Marginal spines (fig. 15, *d*) small; some are slightly dilated and irregularly divided distally; others, especially in the cephalic and anal regions, are more or less palmate (fig. 15, *e, f*). Derm with a pronounced tessellation of irregularly polygonal cells, the central spots varying in size from a minute speck to a large oval one nearly filling the cell area.

Length, 3.5–4.5 mm.; width, 2.5–3.4 mm.

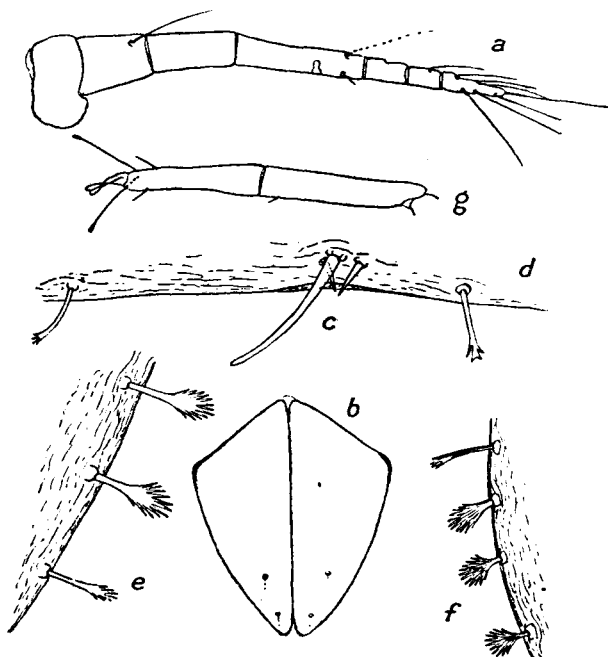


Fig. 15. *Lecanium signatum*, Newst., sp. n., ♀: *a*, antenna; *b*, anal lobes; *c, d*, stigmatic and marginal spines; *e, f*, other forms of marginal spines; *g*, leg.

Female, second stage. Elongate and flat. Colour translucent yellow to dull buff. Parasitised examples with a central elongated, polished, black swelling. Structural details similar to those of the adult, but many of the marginal spines (fig. 15, *f*) are markedly palmate.

UGANDA: Entebbe, on guava, 4.iii.14 (C. C. Gowdey).

Very like the flat forms of *Lecanium* (*Saissetia*) *nigrum* (Nietn). But the L-shaped ridge, the form of the antennae and the marginal spines are dissimilar and distinct.

***Lecanium* (*Saissetia*) *scutatum*, sp. nov.**

Female, adult. Generally more or less hemispherical; shining, rich, dark castaneous, often with obscure darker markings; small detached particles of glassy

secretion sometimes present in examples under cover of the ants "tents." When overcrowded the form is irregular, and the anal lobes are so arranged that they appear to be placed near the middle of the back, as in *Stictococcus*, but this is largely an artifact produced by the tilting of the posterior margin or by the pressure of an adjacent female. *Antennae* (fig. 16, *a*) and legs sub-rudimentary; the former not quite so long as the anal lobes, composed of six segments, the articulations being very clearly defined. Anal cleft partly fused. Anal lobes (fig. 16, *b*) very thick, rounded, and somewhat crescentic in outline, the pair together resembling the stumpy "jaws"

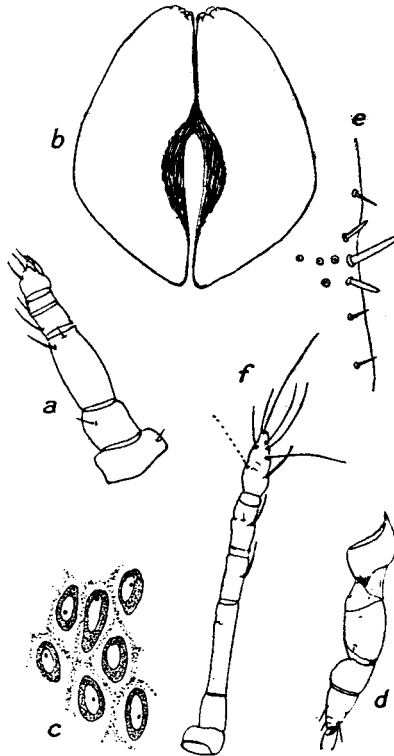


Fig. 16. *Lecanium scutatum*, Newst., sp. n., ♀;
a, antenna; *b*, anal lobes; *c*, gland pores;
d, leg; *e*, stigmatic and marginal spines;
f, antenna of larva.

of a pincers. Derm densely chitinised, and crowded with cells (fig. 16, *c*), which are irregularly ovate or elliptical, having a more or less concentric ring of darker chitin and a central, subcentral or submarginal pore. Between the cells, in places, is a faint line which, when well defined, gives a polygonal reticulation.

Length, averaging 2.4 mm.

Female, second stage. Covered with a thin, vesicular and opaque glassy test, which is easily deciduous. Form short, ovate, flat; dorsum with a median ridge, from which radiate irregular rugose ridges. Antennae and legs as in the adult, the legs (fig. 16, *d*) of about the same length as the antennae, all the segments clearly defined; tarsus

either equal to or a little longer than the tibia. Marginal spines (fig. 16, *e*) minute, slender and hair-like; stigmatic clefts scarcely indicated; their spines (fig. 16, *e*) three, small; the central spine about twice the length of the laterals. Anal cleft not fused, about one-fourth the length of the body. Anal lobes similar to those of the adult.

Length, 1.3–1.5 mm.

Larva. Normal in shape. Antennae (fig. 16, *f*) slender, about one and a half times as long again as those of the adult and second stage female; terminal segment in-crassate and with the apical hair nearly half the length of the antenna; 4th, 5th and 6th with a slender spine. Marginal and stigmatic spines similar to those in the succeeding stage. Rostral filaments nearly three times the length of the body. Apical setae on the anal lobes about the same length as the body.

Male puparium. Elongate ovate, glassy, white, and vesicular, but *not divided into plates* as is usual in the genus.

Length, 1.3 mm.; width, 0.8 mm.

BRITISH GUIANA: Botanic Gardens, Georgetown, on "Cannon Ball Tree" (*Mimosa globosa*), 12.iii.14 (G. E. Bodkin).

"The colonies of the female Coccids were attended by a small black ant which had constructed the rough covering over them" (G. E. B.).

***Lecanium (Saissetia) subpatelliforme*, sp. nov.**

Female, adult. Varying from broadly to narrowly ovate, centre generally highly gibbose; surface rather roughened or slightly rugose, often with widely separated patches of secretion, especially at the sides; dorsum (gibbosity) often shining. Derm

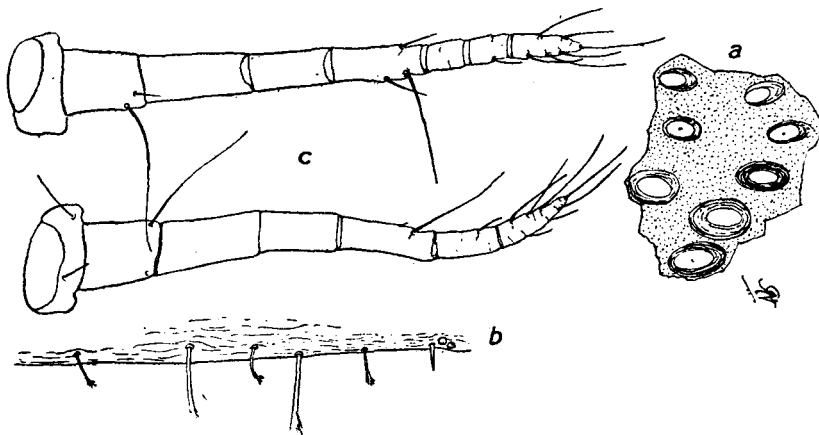


Fig. 17. *Lecanium subpatelliforme*, Newst., sp. n., ♀: *a*, derm cells; *b*, marginal spines; *c*, antennae.

cells (fig. 17, *a*) of the median and sub-median areas small, ovate and widely separated, those near the margin much larger. Marginal spines (fig. 17, *b*) of two kinds: (1) long and rather stout, dilated and divided on both sides; (2) similar spines, but only about half the length of the long ones. Stigmatic clefts practically obsolete; spines

three, the laterals small, stout and pointed; central one missing in all the preparations. Eyes well defined. Antennae (fig. 17, *c*) of seven or eight segments (both forms present in one ♀). Legs well developed; tarsus almost equal in length to the tibia; lower digitules stout, upper pair normal. Anal lobes with the base and outer edge of equal length, approximately. Anal ring of eight hairs. Anal cleft varying in length from a little less than a third to one-third the length of the body.

Length, 3·8–5·2 mm.

GOLD COAST: Aburi, food-plant not stated (*W. H. Patterson*).

Young females are flattish and very like large examples of *L. nigrum*.

***Lecanium (Saissetia) subhirsutum*, sp. n.**

Female, adult. Form on slender branches very elongate, highly convex and narrowed anteriorly, on thick branches (rare) broadly ovate and less convex; anal cleft forming a more or less distinct keel; lobes prominent and seated in a well marked depression. Integument "matted," with the dorsum often slightly polished or

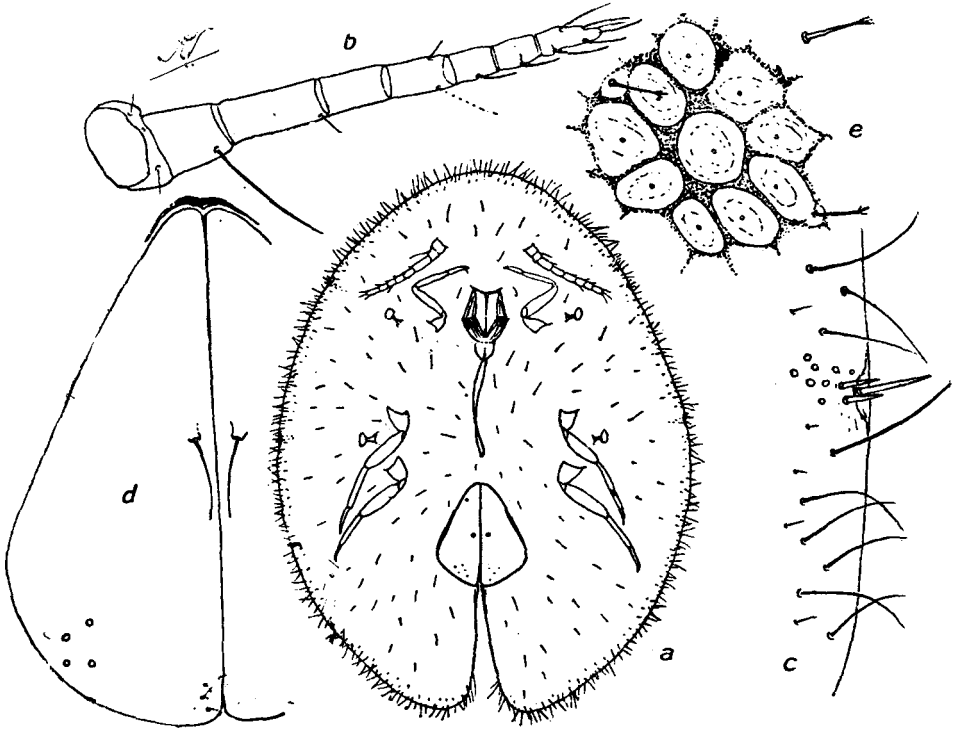


Fig. 18. *Lecanium subhirsutum*, Newst., sp. n., ♀; *a*, adult as seen in optical section; *b*, antenna; *c*, marginal and stigmatic spines; *d*, anal lobes; *e*, derm cells and spines.

entirely glabrous and shining. Colour generally dark castaneous, with minute, pale, obscure freckles, which are often more conspicuous in the marginal areas. Immature examples are dusky ochraceous with obscure blackish markings; on drying, these generally lose their form and become shrivelled or wrinkled. After maceration in

KOH the general outline of the insect is approximately ovate (fig. 18, *a*) but almost invariably asymmetrical. Antennae (fig. 18, *b*) of eight segments, rarely of seven; in the former there is a very long hair on the 2nd, and the terminal hairs on the 8th are all very short; 3rd segment sometimes with a very faint sub-division. Legs well developed and somewhat robust; tarsal digitules stout and faintly knobbed; lower digitules markedly incrassate proximally, distally very broadly spathuliform. Stigmatic clefts obsolete; stigmatic spines (fig. 18, *c*) three, stout and pointed, central one generally more than twice the length of the laterals, but in some instances one of the latter may be nearly as long as the median. Marginal spines (fig. 18, *c*) reduced to long, fine, flagellate hairs; these are arranged in an irregular series two or three deep, and immediately within them an irregular row of small hairs. The anal cleft appears slightly fused in some examples, but it generally separates quite readily. Anal lobes (fig. 18, *d*) subcentral and exceptionally large; length equal to that of antennae; base bluntly pointed, apex very broadly rounded, so that together they are broadly pyriform in outline; a long stout hair is present near the centre of the inner margin; there is also a group of from four to six much smaller hairs towards the outer rounded portion, and two to three minute ones near the inner angles. Anal ring of (?) eight hairs; there is a bilateral group of four long hairs on the retractile tube, and a similar pair of hairs near to the somewhat ill-defined chitinous sclerite. Derm (fig. 18, *e*) sparsely hirsute (*some of the hairs having divided tips*) and packed with well-defined but somewhat irregular translucent cells, the majority of which are roughly oval in shape, the dividing lines between them presenting a polygonal tessellation.

Length, 2.3–2.3 mm.; width, 1.8–2.5 mm.

Female, young adult. Differs from the old adult ♀ only in having the derm cells less pronounced.

Larva. Margin with a series of long stout hairs, which are widely separated, excepting those on the frons, which are placed much more closely together. Stigmatic spines three, the laterals exceedingly minute, the central one of great length, being slightly longer than the marginal hairs.

GOLD COAST: Odumasi, on *Blighia sapida*, iii, 1906; “very abundant, especially on the smaller branches. Attended freely by small red ants” (*Dr. Slater Jackson*); Aburi, on *Tabernaemontana*, *Landolphia*, *Oroxylon* and *Garcinia* (*W. H. Patterson*).

The colony on *Tabernaemontana* is remarkable for the highly polished surface of the integument; this characteristic is present also in a few of the individuals collected from the other food-plants both by Jackson and Patterson respectively, but to a much less marked degree. The glandular character of the derm, the large size of the anal lobes and the deep transverse depression in the dorsum, apart from the setose character of the derm, are the salient characteristics of this Coccid. It is near *L. catori*, Green (*Bull. Ent. Res.*, vi., p. 43), but differs from this species by the hirsute character of the derm, the larger number and irregular arrangement of the marginal hairs, and also in having a free abdominal cleft; in *L. catori* the last-named is fused.

***Lecanium setigerum*, sp. nov.**

Female, adult. Short ovate and flat; generally slightly narrowed in front, rarely more or less deltoid. Bright buff to smoky brown in colour when dried. Antennae (fig. 19, *a*) of seven segments; 3rd very slightly longer than the 4th, the latter with a

large clear space in the chitin, in the region of the long outstanding hair; all the articulations broad. Legs normal. Anal lobes (fig. 19, *b*) conjointly pyriform in outline, narrowest proximally. Anal cleft twice the length of the lobes. Derm glands (fig. 19, *c*) relatively large, irregularly and narrowly ovate. Marginal spines (fig. 19, *d*) more or less alternately very long and short, all divided distally and a few somewhat palmate; the longest are of exceptional length and markedly conspicuous. At the angles of the anal cleft are three to four, usually three, very long bristles, the longest of which is equal in length to the anal cleft. Stigmatic clefts obsolete; spines three, the central one exceptionally long.

Length, 1.5–2.2 mm.

Female, second stage. Antennae of six segments, the 3rd the longest. Stigmatic clefts and spines as in the adult; marginal spines also similar, but much more widely separated.

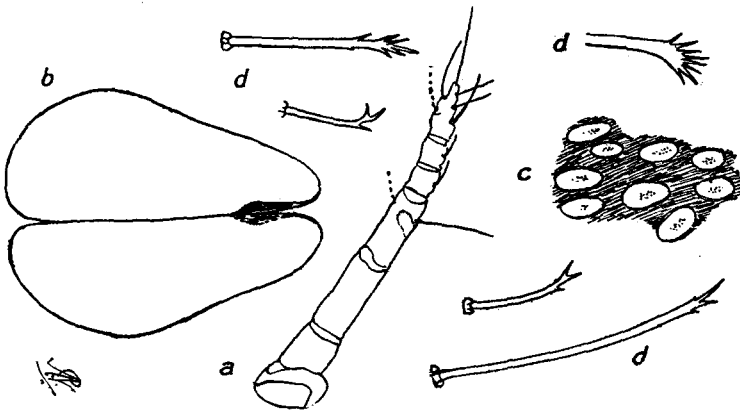


Fig. 19. *Lecanium setigerum*, Newst., sp. n., ♀; *a*, antenna; *b*, anal lobes; *d*, *d*, *d*, marginal spines.

UGANDA: Nagunga, on guava, 18.ix.15 (*C. C. Gowdey*).

A very small species, belonging apparently to the *hesperidum* group, but markedly distinct and easily determined by the group of bristles at the angles of the anal cleft, the relatively large marginal spines and the form of the anal lobes. Some of the females contained embryo larvae.

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

Female, adult. Form flat; very broadly ovate or narrowly so, and more or less asymmetrical. Completely covered with a thin, glassy test, which is divided into distinct, easily separable plates, corresponding exactly with the plates in the integument of the dorsum (fig. 20, *a*); margin of each plate with a strongly defined, narrow ridge; the flat interior generally with very faint radial and concentric striae. Colour of dried specimens varying from pale to rich dark castaneous, margins paler. Young adults are dusky amber brown. Dorsum, after maceration in KOH, divided into large plates (fig. 20, *a*) forming a more or less regular marqueterie pattern; there are three rows of these plates on either side of the median line, but the divisional sutures between

the 2nd and 3rd or marginal series are partly incomplete and replaced by a series of pores. Cephalic plate large and *not divided medially*; pores exceedingly minute and very widely separated; a few only on each plate. A submarginal tubercle is present in nearly all of the sutures. Antennae (fig. 20, *b*) of seven segments, of which the 3rd is slightly the longest; the 4th–7th, inclusive, exceptionally long and varying but slightly in their relative lengths. Stigmatic clefts (fig. 20, *c*) small, narrow, but clearly defined; spines three to four (usually three), very short and stout, with bluntly rounded tips. Marginal spines (fig. 20, *c*) almost invariably broken away, but the few which remained in the preparations are exceedingly minute. Anal lobes (fig. 20, *d*) obtusely rounded distally.

Length, 5–6.5 mm.

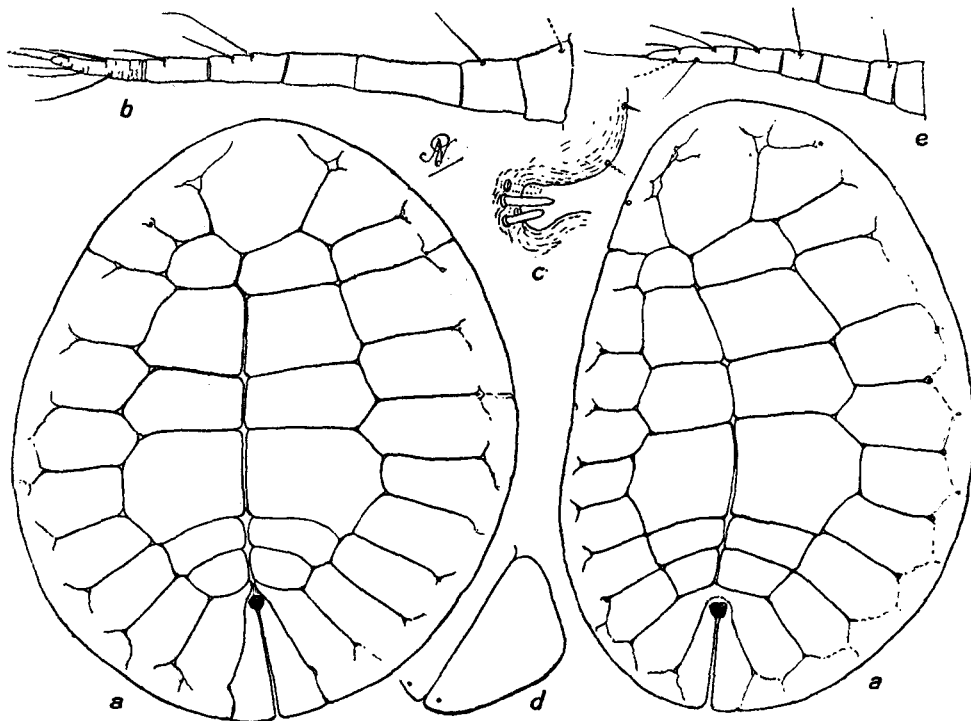


Fig. 20. *Lecanium chelonoides*, Newst., sp. n., ♀; *a*, *a*, dorsal aspect of adults; *b*, antenna; *c*, stigmatic cleft; *d*, anal lobe; *e*, antenna of second stage ♀.

Female, second stage. Very elongate; cephalic margin slightly broader than the posterior margin. Antennae (fig. 20, *e*) of six segments, the 6th much the longest. Legs rather short, first pair about equal in length to the antennae. Stigmatic spines three in number, and very like those in the adult ♀, but relatively smaller, and the laterals slightly curved. Marginal spines exceedingly minute, simple.

Male puparium. Thin, glassy and transparent; surface finely rugose and divided into eight plates; central plates unusually narrow. Length, 3 mm.

BRITISH GUIANA: Botanic Gardens, Georgetown, on *Pachira insignis*, 12.ii.14; Essequibo River, near Agatask, on *Pachira aquatica*, 11.v.13 (G. E. Bodkin).

A very interesting and strikingly characteristic species. Closely related to *L. brunfelsia*, Hempel,* and *L. gracile*, Hempel,† but distinguishable from both by the presence of a well formed test, the arrangement of the dorsal plates and the antennal formulae.

***Aspidiotus camelliae*, Sign.**

Puparium of female. Larval pellicle blackish or piceous; second pellicle rich brown to piceous. Secretionary portion of puparium with a free admixture of fibres from the food-plant. Form as in typical examples. Margin of pygidium (fig. 21, *a, b*) with the squamae, especially those beyond the third pair of lobes, varying in a marked degree in different individuals and presenting a distorted or malformed appearance;

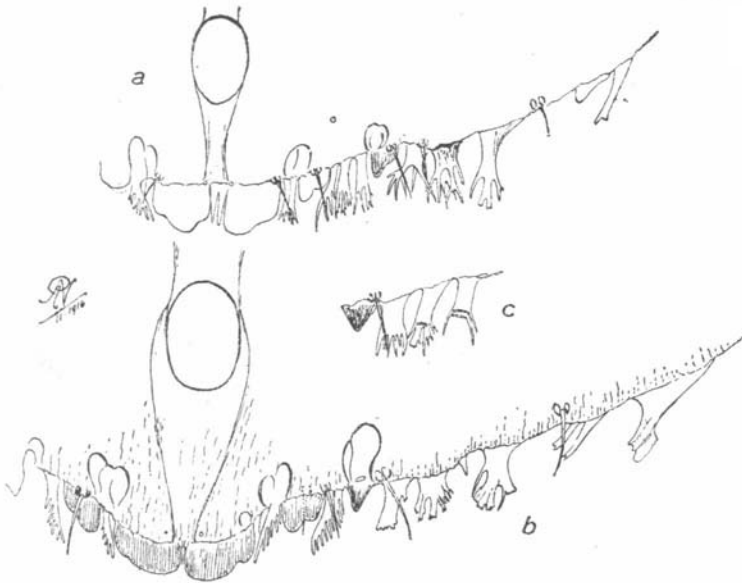


Fig. 21. *Aspidiotus* ? *camelliae*, Sign., ♀; *a, b*, malformed fringe of pygidium; *c*, curiously truncated squamae.

in two instances the structures were truncate (fig. 21, *c*) just above the origin of the lateral processes, with a single or double ring of chitin at the extremity. In other respects the females appear to be quite normal.

The inconstancy of form and strikingly malformed appearance of the squamae is, I think, due to disease, but certainly not to either fungi or insects, as no trace of such parasites were found.

BRITISH GUIANA: Turkeyn, on *Erythraspis glauca*, 17.ix.15 (*G. E. Bodkin*).

***Aspidiotus (Chrysomphalus) dictyospermi*, Morgan.**

UGANDA: Entebbe, on rose-shrubs, 20.ii.13 (*C. C. Gowdey*).

The branches submitted were heavily infested by this Coccid; and about 80 per cent. of the colony had been destroyed by a fungus. The parasitised examples had

* Revista do Museu Paulista, iv, p. 418, pl. vii, figs. 15, 16.

† Ibid, p. 419, pl. vii, fig. 1.

greyish and very brittle puparia, such examples agreeing very closely with Morgan's description.* The healthy females had pale orange-brown puparia and were much tougher than those which were parasitised; these, though paler, are clearly referable to the var. *arecae*, Newst. In the light of this discovery one feels that Morgan's examples may also have been parasitised, and if this were so, my var. *arecae* must sink. It may be interesting to add that the parasitised puparia show no external signs of the fungus apart from the colour, and when examined microscopically little trace of hyphae could be found; on the other hand the females showed a very heavy infestation.

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

Female puparium. More or less circular or irregularly ovate, moderately convex, surface more or less roughened by the fibres of the plant upon which it was fixed. Pale brownish buff or greyish buff, sometimes with slightly darker lines of growth.

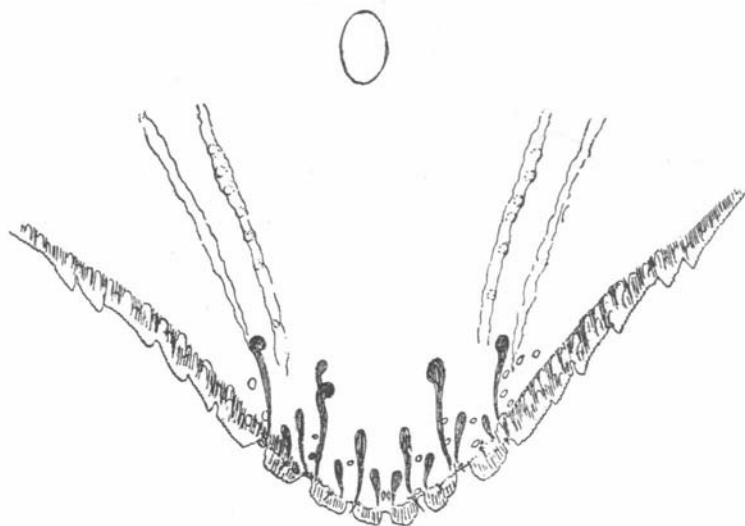


Fig. 22. *Aspidiotus erythraspidis*, Newst., sp. n.;
pygidium of ♀.

Underside blackish, margin similar in colour to the exterior. Pellicles central, sub-central or submarginal, black; the secretory covering greyish, but usually absent from the larval pellicle. Greatest diameter, 1.7–2.1 mm.

Male puparium. Dark brown or brownish black, margin paler; larval pellicle black, with a narrow, but sharply defined, concentric ring of white secretion. Shape normal.

Female, adult. Pyriform, with the pygidium strongly produced and somewhat pointed; thoracic area with a very faint tubercular projection, which almost entirely disappears under pressure. Rudimentary antennae with three spines; one very

* Ent. Mo. Mag., xxv, p. 352, pl. v, fig. 2 (1889).

long and curved, the others exceedingly minute. Parastigmatic glands absent. Circumgenital glands in four groups; formulae of five examples:—

9	8	7	6	8	7	8	7	8	6
5	4	4	4	4	4	4	4	3	4

In one instance the fifth group is represented by a single gland. Anal orifice immediately below the posterior-lateral groups of circumgenital glands. Above the the grouped glands a narrow transverse thickening of the derm, which may be entire or divided into three parts: a median and two lateral. Margin of pygidium (fig. 22) with three pairs of lobes, all of which are relatively broad; the third pair the largest; distal margins irregularly and faintly dentate or serrate. Beyond the lobes the margin is thickened and projecting, with minute serrations and, usually, six deep indentations. In some examples the lobes and serrated projections of the margin are so continuous that it is somewhat difficult to determine where the one begins and the other ends. The ducts which lead to the spaces between the lobes are fourteen in number, of which four are much longer than the rest; each with a distinct knob-like terminal. Squamae, when present, exceedingly minute; these were traced with difficulty, between the lobes, in a few instances only.

BRITISH GUIANA: Turkeyn, on *Erythraspis glauca*, 17.ix.15 (G. E. Bodkin).

Nearly allied to *A. scutiformis*, Ckll., and *A. kelloggii*, Ku., but differs in the form and arrangement of the pygidial appendages, the club-shaped ducts, and the circumgenital glands.

Aspidiotus (Evaspidiotus) fimbriatus, Mask., var. **capensis**, var. n.

Female, adult. Differing from typical *Aspidiotus fimbriatus* in having much more deeply fringed squamae to the margin of the pygidium (fig. 23, *a*) and fewer

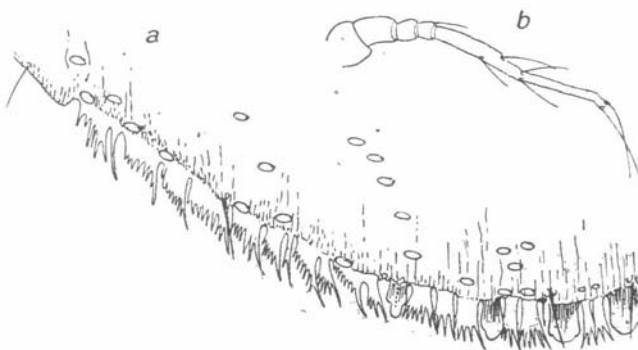


Fig. 23. *Aspidiotus fimbriatus* var. *capensis*, Newst., nov.;
a, fringe of pygidium of ♀; *b*, antenna of larva.

circumgenital glands; the latter are also often arranged in five groups instead of four. The following are the formulae of five examples:—

0	2	0	3	2
8	8	6	8	4
5	5	5	4	5
5	4	6	5	5

Larva. Antennae (fig. 23, *b*) of five segments, last segment nearly as long again as the rest and finely ringed.

SOUTH AFRICA: Port Elizabeth, on Cycads, 1914 (*de Charmoy*).

***Aspidiotus* (? *Chrysomphalus*) *mauritanus*, sp. nov.**

Female puparium (fig. 24, *a*). Subcircular; anterior extremity very slightly produced; posterior extremity strongly uptilted by the ventral pellicle, which is markedly thickened and tongue-shaped, but does not project beyond the dorsal pellicle; the thickened portion rests upon a thinner pellicle of secretory matter, so that when examined in profile the puparium resembles the partly open bivalve shell of a mollusc with the "foot" showing between the valves. Larval pellicle subcentral, very prominent, and somewhat hemispherical. Colour bright yellowish-buff or reddish-buff, with generally distinct concentric bands of a darker colour.

Length, 0·8–1 mm.

Female, adult (fig. 24, *b*). Broadly pyriform; free abdominal segments tuberculate at the margins, the tubercles finely but sparsely setose and glandular. Frons sparsely spinose. Rudimentary antennae with *five hairs*, two of which are much thicker and longer than the rest and also strongly curved over the tips of the short

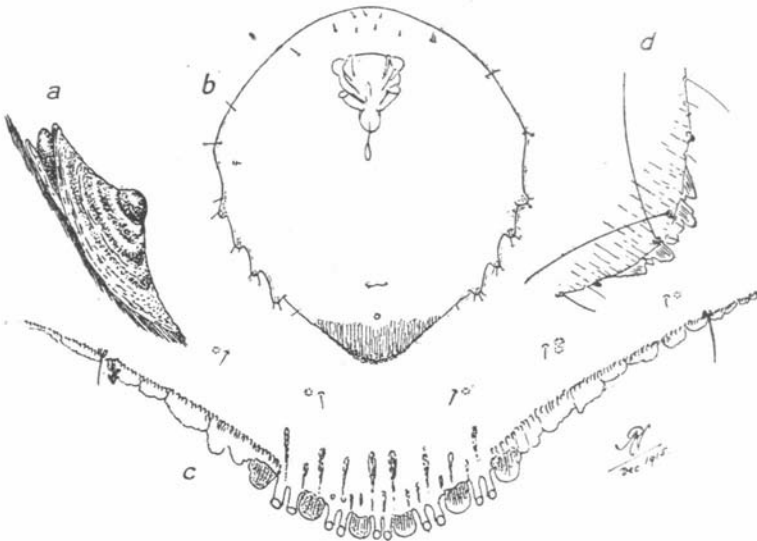


Fig. 24. *Aspidiotus mauritanus*, Newst., sp. n., ♀; *a*, puparium; *b*, adult; *c*, fringe of pygidium; *d*, pygidium of larva.

hairs. Anterior stigmata with five to six glands, arranged in line, the innermost one considerably beyond the proximal end of the stigmata. Pygidium sparsely spinose; lower portion strongly chitinised, and finely striated vertically; fringe (fig. 24, *c*) with three pairs of well developed lobes; between each lobe a pair of tubular-shaped squamae, the tips, in well stained specimens, appearing as if obliquely truncated; margin beyond the third lobe with thin, irregular, dentate plates. Anal orifice just above the chitinous portion. No circumgenital glands.

Length, 0·5–0·65 mm.

Male puparium. Larger than that of the female and strongly produced posteriorly; pellicle subcentral and very prominent; colour as in that of the female, but with no zonal bands.

Length, 1–1·1 mm.

Male, second instar. Elongate, markedly attenuated posteriorly. Pygidium narrowed distally; lobes and tubular squamae as in the adult female.

Male, third instar. Completely enclosed within the pellicle of the second instar, and filling it with the exception of the pygidial area. Short, stumpy antennal and leg-sheaths present. Anal segment of abdomen lobed, each lobe with a pair of stiff stout hairs, one of which is as long again as the other; the two succeeding segments have also a pair of short stiff hairs.

Male. Winged. Legs strongly spinose. Two pairs of large ocelli.

Larva. Short ovate. Antennae of six segments; terminal segment as long as the three preceding ones, with a long slender lateral spine; formula: 6, 1 (2, 3, 4, 5). Between the antennae, dorsally, are two pairs of very long hairs, the longest pair *two-thirds the length of the body*; behind these are four much shorter hairs; marginal hairs in pairs, one about one-third the width of the body, the other much shorter. Pygidium (fig. 24, d) with two pairs of lobes and a pair of long setae.

MAURITIUS: Botanic Gardens, on palm trees, 1915 (*de Charmoy*).

Chiefly on the upper surface of the leaves, in association with *Asterolecanium spectabile*, sp. nov., but the latter almost exclusively on the *under* surface of the leaf.

Green* has described a Coccid under the name *Aspidiotus (Chrysomphalus) cistuloides*, the female puparium of which is very like that of *mauritanus* in having the anal portion highly tilted. But the female of the latter species is entirely different and approaches very closely *Furcaspis rufa*, Lindinger,† in the structural characters of the fringe of the pygidium, both species possessing the singular truncated tubular squamae. *F. rufa* however possesses *three* of these structures between the second and third pairs of lobes, and also two additional pairs of long spinose hairs just beyond them. Moreover Lindinger makes no reference to the singular tilting upwards of the puparium in his species. I take it, therefore, that this marked characteristic was entirely wanting in his specimens. The larval characters of *A. mauritanus* differ from those of *F. rufa* only in the minute details of the pygidium.

***Aspidiotus pimentae*, sp. nov. (Plate vii).**

Female puparium. Central pellicle resting in a well-defined circular pit or depression in the bark of the food-plant. Form subcircular, slightly produced posteriorly and uptilted by the thick ventral pellicle, which does not extend to the margin behind. Dorsal pellicle strongly convex or subconical; larval pellicle subcentral (in young forms it is central), more or less nipple-like, generally nude and bright castaneous or piceous; secretory portion covered with the grey epidermal layer of the bark; beneath this the pellicle is thick and varies from dark castaneous to dark piceous. Ventral pellicle low convex externally, fitting closely into the pit or depression; central area with a thin, circular, whitish pellicle, the diameter of which is approximately equal to the width of the very dense dark border surrounding it. Greatest diameter averaging 1.5 mm.

Female, adult (fig. 25, a). *Without* thoracic constriction. Three or four of the abdominal segments well marked and slightly tuberculate at the margin. Rudimentary antennae with two long spines of equal length. Anterior parastigmatic glands

* Jour. Bombay Nat. Hist. Soc., xvi, p. 342.

† Jahrb. Hamburg Anst., xxx, Beih. 3, p. 39 (1913).

(fig. 25, c) three to eight in number, usually five to six. A few very long scattered hairs are present on the cephalo-thoracic and free abdominal segments; some well within the margin, others marginal; *small* circular pores occupy the same regions, and are much more numerous than the hairs, especially at the margins, but do not extend far beyond the region of the anterior stigmata. Pygidium *markedly but very finely striate longitudinally* over the whole area. Anal and vaginal orifice opposite and central. Pores minute, circular, extending over the whole area, but forming four bilateral linear bands; margin (fig. 25, b) with *seven* elongate paraphyses or rod-like thickenings of the body-wall; one central, arising from between the median lobes; the outer pair often faintly indicated in old, highly chitinised individuals. Lobes in

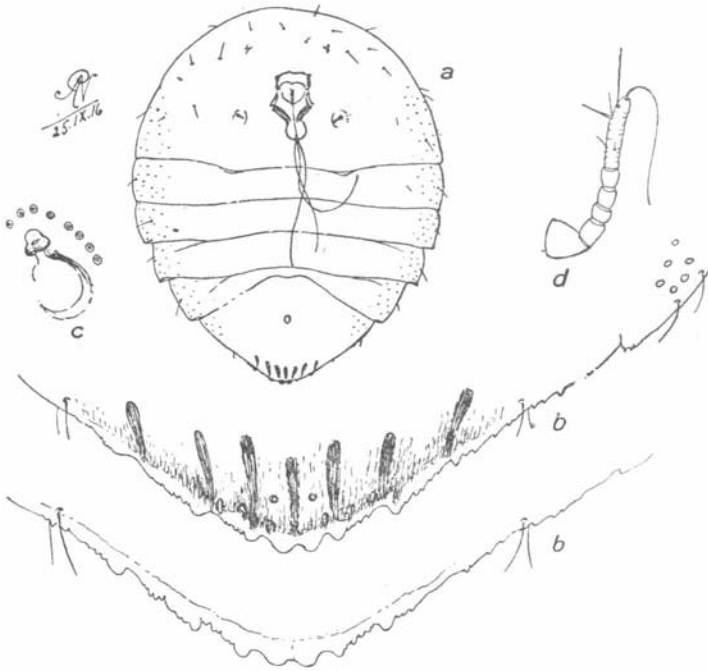


Fig. 25. *Aspidiotus pimentae*, Newst. sp. n., ♀; a, ventral view of adult; b, b, margin of pygidium; c, parastigmatic glands; d, antenna of larva.

two pairs, the median pair the larger, but all are relatively small and in some individuals more or less rudimentary. Margin beyond the lobes with two or three dentate prominences, the intervening spaces finely dentate; three pairs of spinose curved hairs beyond the last dentate process, the middle pair much the smallest and often wanting.

Average length, 1 mm.

Larva. Antennae (fig. 25, d) of six segments, 1st much wider than the rest, 6th nearly equal in length to the 2nd, 3rd, 4th and 5th together, and furnished with three to four fine slender hairs, a subapical spinose hair and a very long apical one. Margin

of body with long stiff bristles. Pygidium with the usual caudal setae; median lobes relatively large and rounded distally; 2nd pair about half the length of the former, but twice the width and distinctly serrated.

JAMAICA: On *Pimenta officinalis* (A. H. Ritchie).

The following note was submitted with the specimens: "One property—Great Valley, in the Parish of Hanover—has lost upwards of 2,000 pimento trees and I can attribute no other cause than scale No. 504, which covers the trunks. It is travelling on this property in the direction of the prevailing winds and healthy trees are quite free, but trees showing scale gradually begin to die back from the tips of the branches. This scale is affected by a black fungus."

This species differs from *Aspidiotus bigeloviae*, Kll.,* in the number, arrangement and size of the paraphyses to the pygidium, and markedly so in the form of the puparium. Very few members of the DIASPINAE have the puparium uptilted as in this insect, and the pit-making habit is even more restricted in this group.

***Chionaspis distorta*, sp. nov.**

Female puparium. White, elongate, gibbose anteriorly, attenuated posteriorly; more or less straight, curved or contorted. Larval pellicle apical, dull red-brown, buff-yellow or sometimes dull crimson, margin generally paler; secretory covering thin, white. Second pellicle large; colour intense rich orange-crimson, and generally

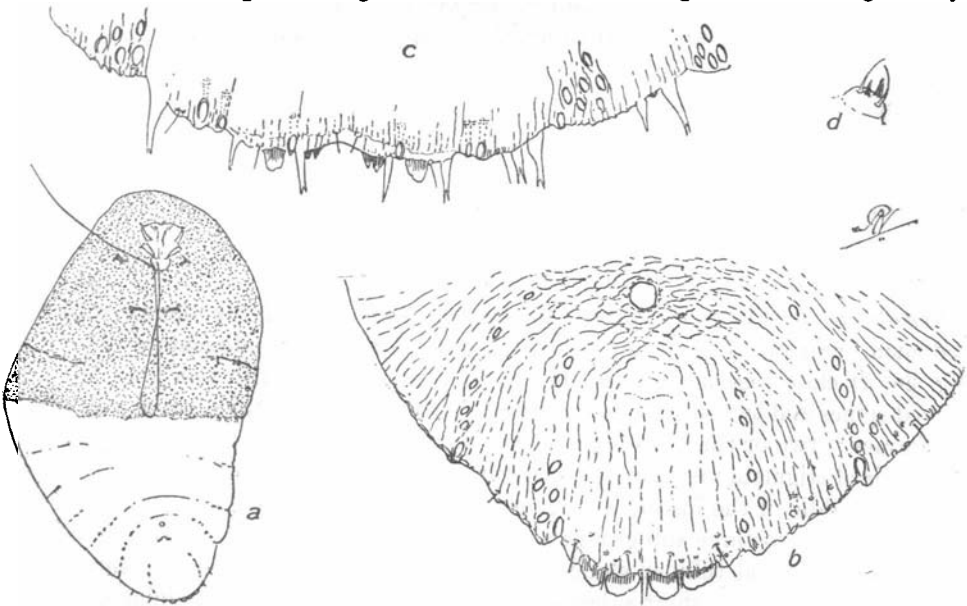


Fig. 26. *Chionaspis distorta*, Newst., sp. n., ♀; a, adult; b, pygidium of the same. *Chionaspis capensis*, Newst., sp. n., ♀; c, fringe of pygidium; d, antenna.

nude; secretory covering, when present, thin, white. The secretory portion of the puparium is often secreted in the small crevices of the bark so that it is almost completely hidden. Ventral scale rather dense under the anterior half of the female.

Length, 1 mm., average; greatest width, 0.4 mm.

* U.S. Dep. Agr. Div. Ent. Tech. Ser. No. 6., p. 20, fig. 12 (1897).

Female, adult (fig. 26, *a*). More or less elongate; cephalo-thoracic area highly convex, generally distorted, asymmetrical, and *highly chitinised*. Free abdominal segments and pygidium, constituting the lower half of the body, not highly chitinised; the line of demarcation between the non-chitinised and chitinised areas sharply defined. Proximal portion of rostrum very near to the cephalic margin. Rudimentary antennae midway between the rostrum and margin, each with a single spine. Stigmata large, anterior pair with four to five glands. Three free abdominal segments above the pygidium each with a few large glands and one or two minute spines. Pygidium (fig. 26, *b*) with strong convoluted striae in the region of the anal orifice, which lies just below the articulation. Margin thickened and somewhat irregular; median lobes moderately developed and very slightly divergent, the distal edge sometimes faintly but irregularly dentate; immediately adjacent to the lobes are two extensions of the body-wall and beyond them two prominent glandular extensions forming the terminals to the two short series of dorsal pores. Two minute spines between the lobes, one in each of the adjacent spaces, four within the margin, and one beyond the second series of dorsal glands. Two or three minute simple squamae are sometimes present between the series of dorsal glands.

Length, 0.7–0.75 mm.

SOUTH AFRICA: Windersboom, Transvaal, on an unnamed tree, 1915 (*de Charmoy*).

The highly chitinised anterior half of the body of the female and its remarkable distortions may readily serve to distinguish this species from its allies.

***Chionaspis capensis*, sp. nov.**

Female puparium. Broadly pyriform and rather highly convex; opaque white, with a semi-glossy surface and a hard close texture. Pellicles terminal; colour dull orange-yellow with darker confused markings. Ventral scale well formed, but generally ruptured along the middle line.

Length, 1.5–2 mm.; width, 0.9–1.1 mm.

Female, adult. Very elongate, widest at the juncture of the thorax with the abdomen, narrowest in front. Rostrum well forward. Rudimentary antennae (fig. 26, *d*) close together immediately above the rostrum, with two long, slender, curved spines and two very stout spines, the latter a little less than half the length of the former; two or three fine hairs on the dorsum immediately above the antennae. First pair of stigmata very near the mentum, with nine to eleven glands; lower pair near the middle of the insect, with generally two glands; the glands in the former often form two to three sub-groups and collectively present a somewhat tessellated appearance. Dorsal tubular glands on the thoracic and first three abdominal segments small, with very short subcutaneous tubes; those on the remaining segments a little more than twice the size of the former and similar to those on the pygidium. Derm with fine convoluted striae. Pygidium (fig. 26, *c*) broadly rounded, with three groups of dorsal glands similar to those on the succeeding segments. Anal orifice close up to the articulation. Vaginal orifice a little in advance of the centre. No circumgenital glands. Fringe with two pairs of lobes; the median pair rudimentary, widely separated, duplex, and dentate; the second pair moderately developed and generally with a very faint notch towards the apex of the inner margin. Squamae

large, generally incrassate proximally and forked at the tips. There is one marginal tubular pore immediately in advance of the 1st squama, and two beyond the 2nd. Spines relatively short.

Male puparium. Non-carinated. Larval exuviae pale amber-yellow, cephalic region darker.

SOUTH AFRICA: Pretoria, on *Acacia* sp., 1914 (*de Charmoy*).

***Chionaspis fici*, sp. nov.**

Female puparium. More or less mytiliform, highly convex. Colour creamy white, often rendered obscure by dirt or by the incorporation of the epidermal layer of the food-plant; in many individuals the incorporated material is arranged in more or less well defined conchoidal layers; larval pellicle dull orange; second pellicle similar in colour, but generally rendered obscure by a thick secretory covering.

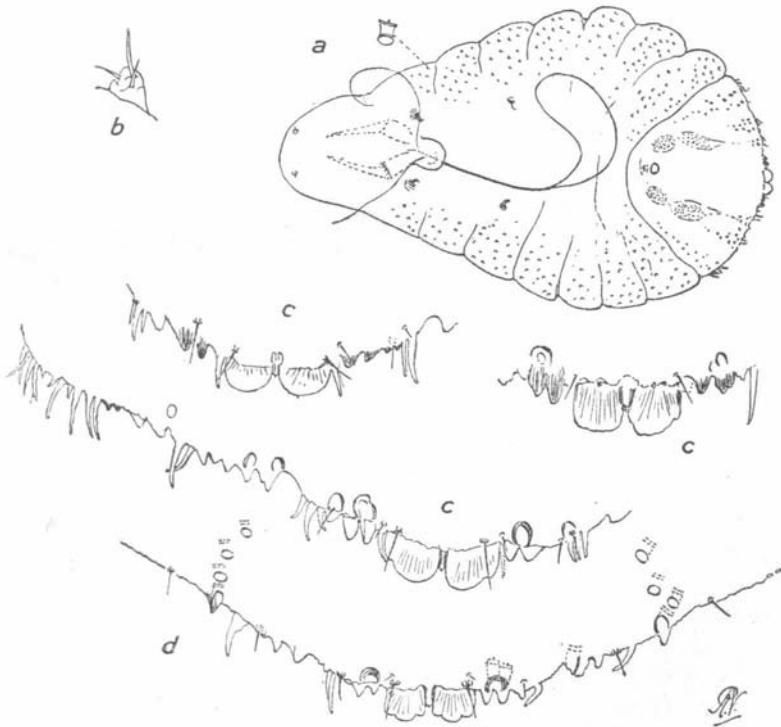


Fig. 27. *Chionaspis fici*, Newst., sp. n., ♀; a, adult; b, antenna; c, c, c, fringe of pygidium of adult; d, fringe of pygidium of second stage ♀.

Female, adult (fig. 27, a) generally broadly pyriform, after maceration in potash; widest in the mid-abdominal region; segmentation distinct; cephalic region much narrowed. Rudimentary antennae (fig. 27, b) with two to three spines, usually three. Stigmata relatively large; a large compact group of parastigmatic glands present at the anterior pair. Large tubular glands numerous and extending as far as the anterior pair of stigmata. Pygidium with five groups of circumgenital glands; in

the lateral groups the glands are exceptionally numerous: median group, two to eight; upper laterals, twenty-three to thirty-five; lower laterals, forty-two to sixty-five; margin of pygidium (fig. 27, *c*) with a single pair of median lobes, narrowly separated, relatively large, generally rounded distally, but sometimes with a lateral indentation; margin beyond distinctly and irregularly dentate, owing to thin and highly chitinised extensions of the body-wall below the large pores.

Female, second stage. Pygidium (fig. 27, *d*) with a pair of strongly tricuspid, median lobes; marginal extensions similar to those of the adult but fewer in number.

Male puparium. Thickly felted and generally with a faint median carina. Pellicle bright orange yellow.

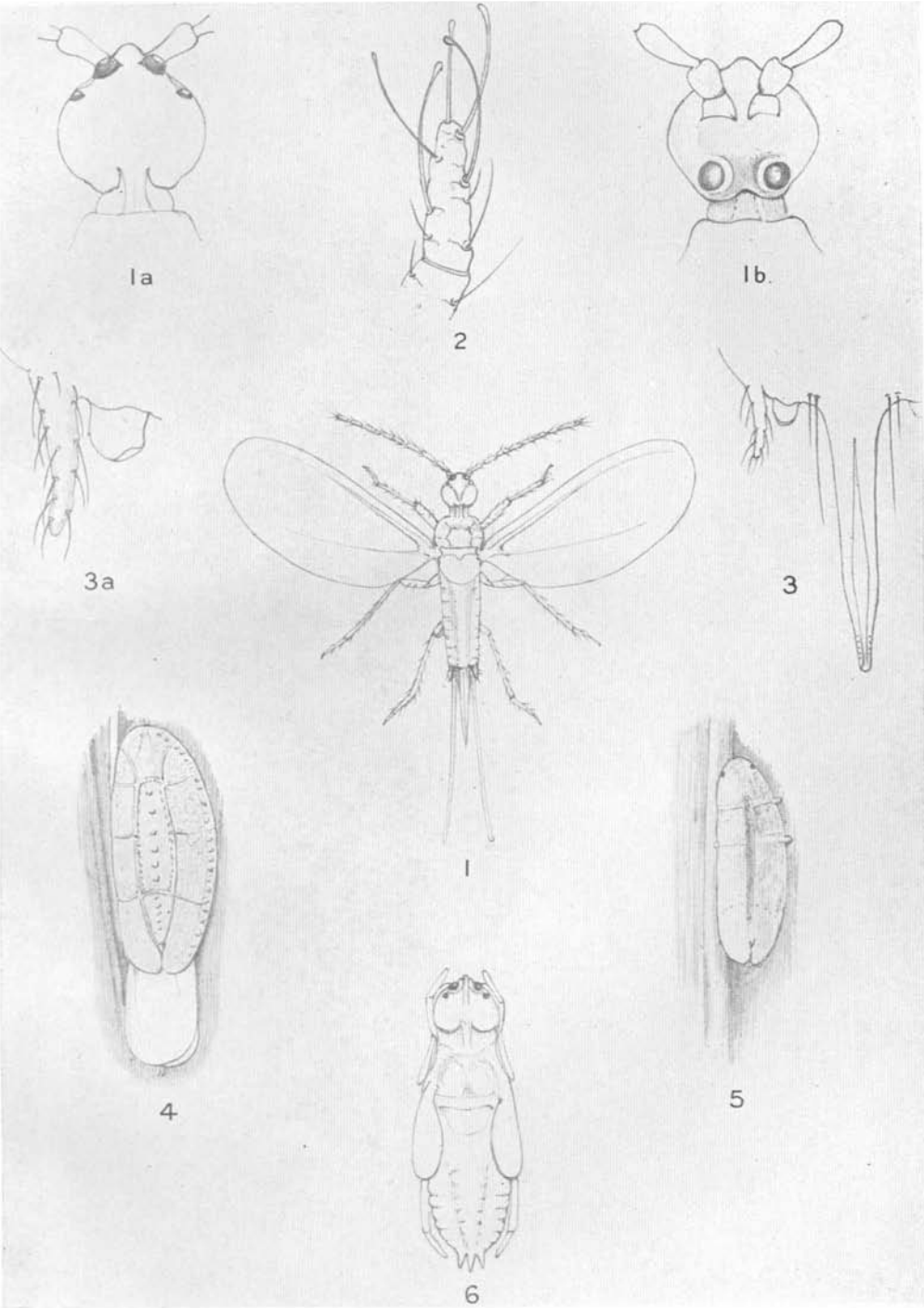
BRITISH EAST AFRICA: Kabete, on wild fig tree, 7.i.14 (*T. J. Anderson*).

EXPLANATION OF PLATE VI.

Lecanium hesperidum (Linn.) ♂.

Fig. 1. Adult.

- 1a. Head, dorsal view.
- 1b. Head, ventral view.
2. Terminal segment of antenna.
3. Terminal segment of abdomen.
- 3a. Terminal fleshy tubercle and gland, more highly magnified.
4. Puparium, with the insect emerging.
5. Male, second stage.
6. Pupa.



THE MALE OF *LECANIUM HESPERIDUM* (Linn.)

EXPLANATION OF PLATE VII

Pimento Trees in Jamaica attacked by Scale insects (*Aspidiotus pimentae*, Newst., sp. n.).

- Fig. 1. Scale attacked by the fungus *Myriangium duriaei*, Mont. & Berk.
2. Abnormal shedding of bark by an attacked tree. The trouble gradually gets worse, until the tree becomes bark-bound. The scales remain on raised islands of live uncast bark tissue.
 3. Tree dying from attacks by scales.

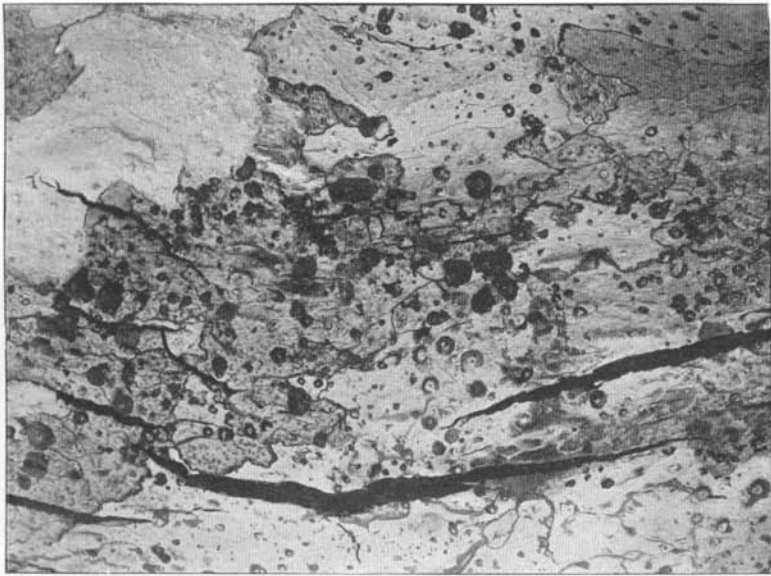


Fig. 1.

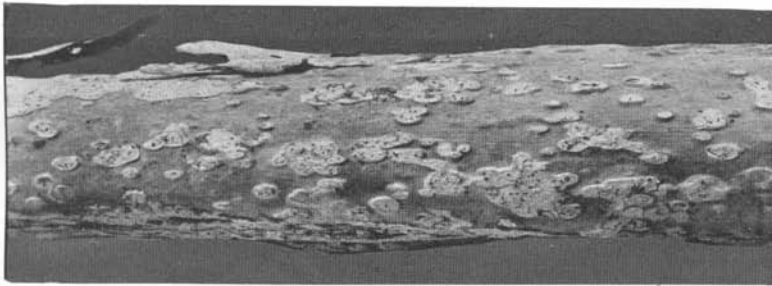


Fig. 2.

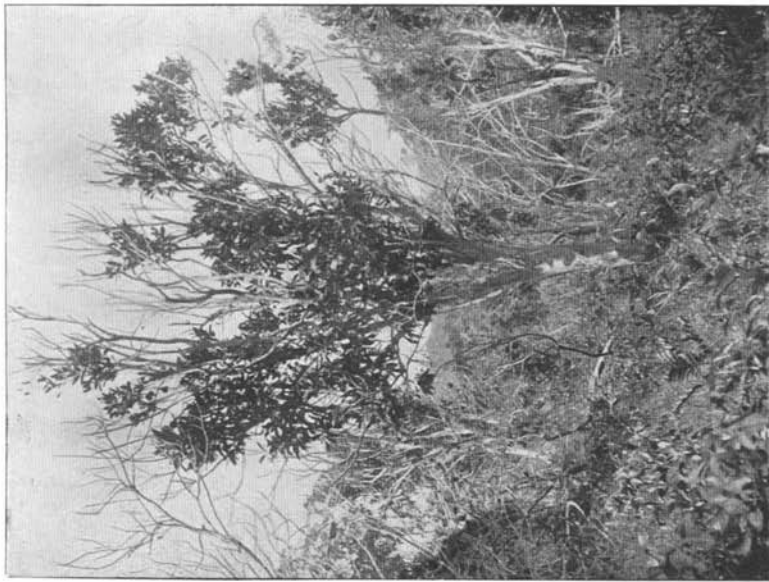


Fig. 3.