

REMARKS ON COCCIDAE FROM NORTHERN AUSTRALIA—II.

By E. E. GREEN, F.E.S., F.Z.S.

Further collections from Mr. G. F. Hill, gathered in the neighbourhood of Port Darwin, have produced several interesting new species which are described below.

Aspidiotus destructor, Sign.

On foliage of *Pandanus odoratissimus*, Darwin, N. T. (Hill, no. 636). These puparia have a rather more brownish tint than is usual in the species.

Aspidiotus fodiens, Mask.

On *Melaleuca leucadendron*, Koolpinyah, N.T. (Hill, 17, 18), and on *Pithecolobium moniliferum*, Stapleton, N.T. (Hill, 637). In the older examples from *Melaleuca* the pygidial lobes are worn and are not of such a regular outline as in the fresher material from *Pithecolobium*, but the two forms agree in all essential characters.

Aspidiotus orientalis, Newst.

On *Ficus orbicularis* (Hill, 23), and on "Milkwood Tree" (Hill, 24), Darwin, N.T. Also "on undetermined introduced tree" (Hill, 639).

Aspidiotus unilobis, Mask.

On *Melaleuca leucadendron*, Koolpinyah, N.T. (Hill, 18, 19). And on the same plant at Stapleton, N.T. (Hill, 638).

Aspidiotus (Aonidiella) miniatae, sp. nov.

Puparium of female small, circular, moderately convex; dull ochreous white; pellicles proportionately large, reddish or reddish-brown. Diameter 0.75 to 1 mm.

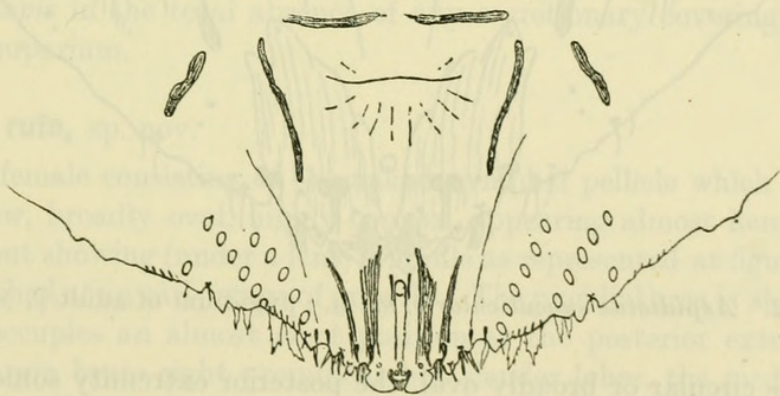


Fig. 1. *Aspidiotus miniatae*, sp. n.; pygidium of adult ♀,
× 280.

Adult female broadly oval. Pygidium (fig. 1) without circumgenital pores. Median lobes small but moderately prominent, constricted at base, hatchet-shaped, the outer margin evenly rounded. Lateral lobes (three on each side) represented

by marginal prominences. Squames very delicate and inconspicuous, the two immediately following the second lateral lobe irregularly fimbriate and considerably longer and broader than the remainder, which are almost spiniform. There are five pairs of small but well-defined claviform paraphyses, situated in the spaces between the lobes. Anal orifice small, at rather less than one-third of the distance from the extremity to the base of the pygidium. Two series of oval dorsal pores on each side, running diagonally from the margin between the second and third lateral lobes. Numerous long tubular glands open on to the extreme margin. Length 0.5 to 0.9 mm.

On twigs of *Eucalyptus miniata*, Darwin, N.T. (Hill, 22).

Aspidiotus (Aonidiella) subcuticularis, sp. nov.

Female puparium completely buried beneath the cuticle of the leaf, the reddish-brown larval exuviae partially exposed. The rest of the puparium is closely adherent to and difficult to separate from the superimposed cuticle. Its presence is indicated by very inconspicuous blister-like swellings on the surface of the leaf. These vesicles have a diameter of from 2.0 to 2.5 mm. Nymphal pellicle with a denser median area.

Male puparium slipper-shaped, exposed, but sunk in a shallow pit, or surrounded by a slight tumescence of the tissues. Exuviae thinly covered with whitish secretion, with a raised white ring and central boss, and surrounded by a narrow dark brown zone. The puparium is extended posteriorly by a paler reddish-brown appendix. Length approximately 1 mm.

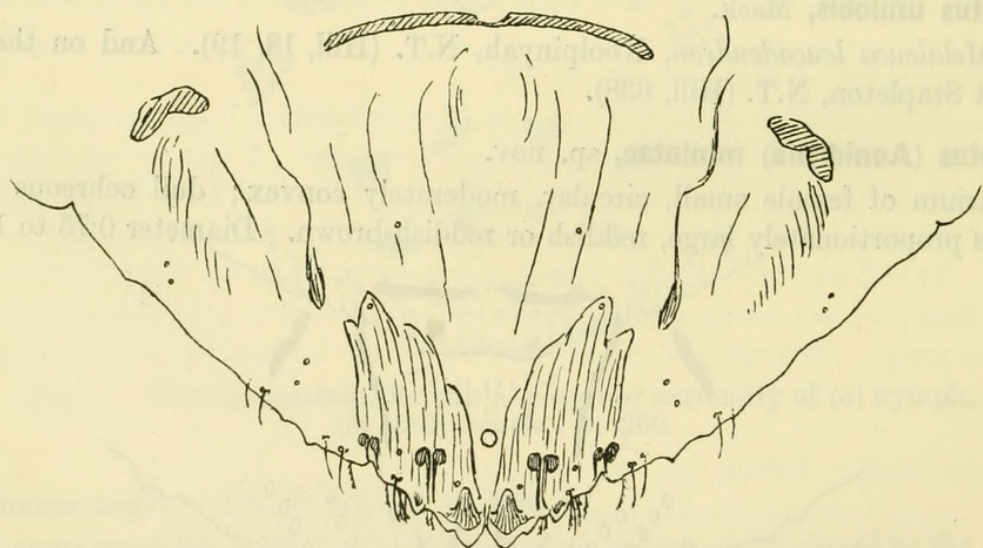


Fig. 2. *Aspidiotus subcuticularis*, sp. n. ; pygidium of adult ♀, × 280.

Adult female circular or broadly oval, the posterior extremity somewhat pointed. Rudimentary antennae with a single longish stout seta. No parastigmatic pores. Pygidium (fig. 2) deltoid, the sides converging evenly to the pointed extremity. Median lobes large and broad, closely approximated; so deeply indented on the outer edge as to appear almost duplex. A small conical lateral lobe on each side, situated close to the median lobes. Both median and lateral lobes with a translucent marginal area. Squames small, slender and inconspicuous—two between the median

and lateral lobes, two or three just outside the lateral lobe, and one or two beyond the outer pair of paraphyses. Spines rather large and more conspicuous than the squames. Paraphyses clubbed, large and conspicuous; two pairs on each side, the inner pair longest, arising from the interval between the median and lateral lobes, the outer pair arising from an indentation at a short distance beyond the lateral lobes. Anal orifice very small, near the extremity. No circumgenital pores. A transverse series of chitinous thickenings across the base of the pygidium. Length approximately 0.75 mm.

On the upper surface of leaves of *Ficus orbicularis*, Darwin, N.T. (Hill, 23).

This insect is a true "mining scale," the puparium being completely covered by the actual cuticle of the leaf. The peculiar paired and clubbed paraphyses sufficiently distinguish the species.

POROGYMNASPIS, gen. nov.

Female puparium consisting of the enlarged nymphal pellicle, with or without a superimposed larval pellicle, but without any secretory appendix or covering.

Male puparium with an oval or oblong secretory appendix, with the larval pellicle situated at the anterior margin.

Posterior extremity of nymphal pellicle with prominent lobes, broad fimbriate squames, and conspicuous semilunar marginal pores, as in *Parlatoria* and *Leucaspis*.

Adult female entirely enclosed within the nymphal pellicle. Pygidium with circumgenital pores; posterior margin with small lobes and cuspidate marginal processes.

The characters of the genus associate it with *Gymnaspis*, *Parlatoria* and *Leucaspis*. It is probably most nearly related to *Leucaspis*.

The genus differs from *Gymnaspis* in the presence of circumgenital pores; from *Parlatoria* in the enlarged naked nymphal pellicle which completely encloses the adult insect, and in the absence of semilunar marginal pores on the adult female; and from *Leucaspis* in the total absence of any secretory covering or appendix to the female puparium.

Porogymnaspis rufa, sp. nov.

Puparium of female consisting of the naked nymphal pellicle which is bright red or reddish yellow, broadly oval, highly convex, appearing almost hemispherical to the naked eye, but showing (under a lens) a profile as represented at figure 3, *a*. The larval pellicle is shed at an early stage of growth. The pygidial area is sharply defined (fig. 3, *c*) and occupies an almost erect position at the posterior extremity of the pellicle; its margin bears eight prominent but slender lobes, the median and first laterals obscurely trilobed, the second laterals obscurely indented on the outer edge, the third laterals simple. Squames broad, obscurely tricuspid at extremity. Conspicuous semilunar pores, three on each side. Length 0.75 mm.

Male puparium (fig. 3, *b*) oblong or broadly oval, moderately convex, sometimes with traces of two longitudinal ridges, whitish; the small fulvous pellicle placed close up to the anterior margin. Length 0.75 to 1 mm.

Adult female subcircular (fig. 3, *d*), posterior extremity slightly produced. Pygidium (fig. 3, *e*) with its truncate extremity bearing a close fringe of prominent tricuspid processes, of which from four to six are usually more densely chitinous than the remainder and represent the pygidial lobes. Anal orifice central. Genital orifice nearer the base. Circumgenital glands usually separable into five groups, but often forming a more or less continuous arch; the median group represented by from 1 to 5 isolated pores, upper laterals 10 to 15, lower laterals 11 to 17. Length approximately 0.5 mm.

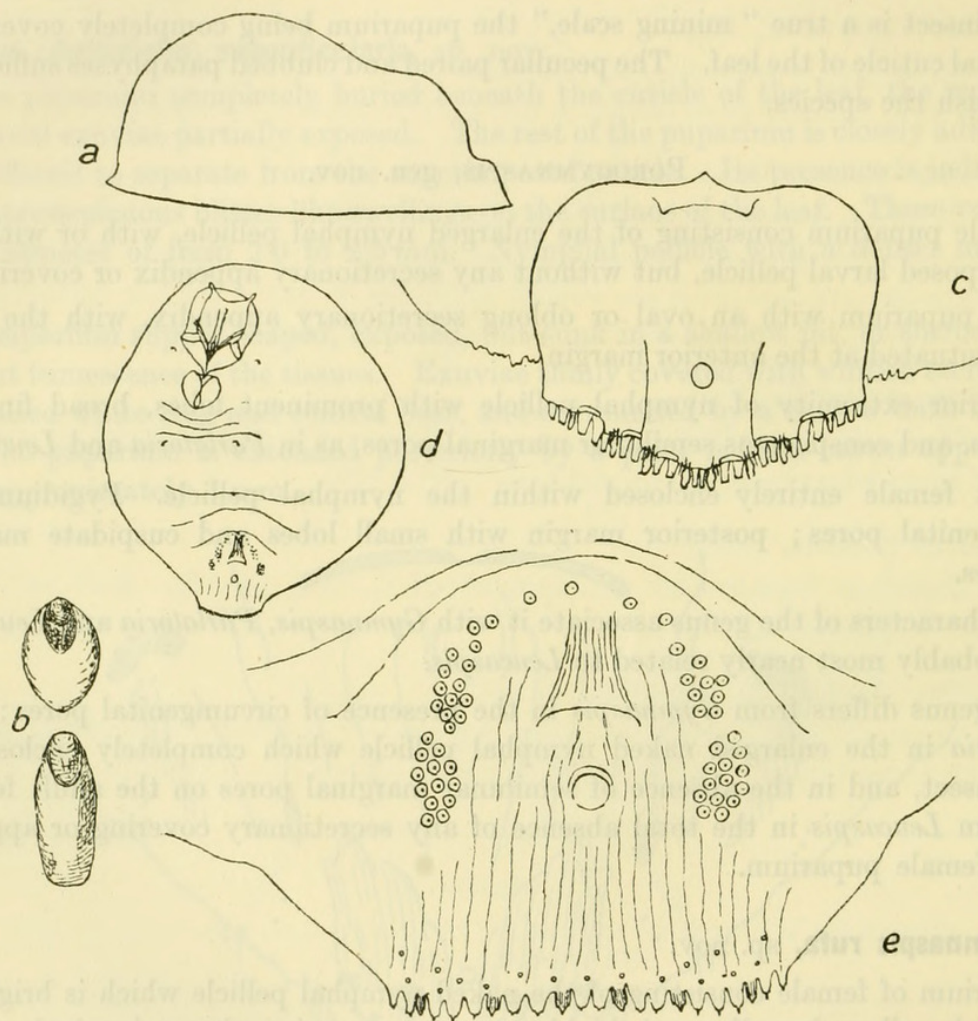


Fig. 3. *Porogymnaspis rufa*, sp. n.; *a*, profile view of female puparium, $\times 75$; *b*, male puparia, $\times 16$; *c*, posterior extremity of nymphal pellicle, $\times 280$; *d*, adult female, $\times 80$; *e*, pygidium of adult female, $\times 450$.

Adult male not observed.

On *Pandanus odoratissimus*, Koolpinyah, N.T. (Hill, 13, 14).

A minute and inconspicuous species, occurring singly amongst a crowd of *Hemichionaspis pseudaspidistreae*, or in small scattered groups along the margins of the leaves. Later material (Hill, 648) was collected on the fruits of the plant where it occurs in somewhat greater abundance.

***Porogymnaspis angulata*, sp. nov.**

Puparium of female (fig. 4, *a*, *b*, *c*) consisting of the naked nymphal pellicle, with (*c*) or without (*b*) a superimposed larval pellicle; yellow or orange yellow, with a broad transverse blackish or brownish fascia just behind the middle; oval, the posterior extremity slightly constricted and produced. In profile (*a*) the dorsum is seen to be medially depressed and roundly swollen on the area covered by the dark fascia. Posterior margin (fig. 4, *d*) with six prominent lanceolate (or obscurely hastate) lobes and a fringe of ligulate squames. There are three conspicuous semilunar marginal pores on each side, situated in shallow recesses. Length 0.55 mm.

Puparium of male not observed.

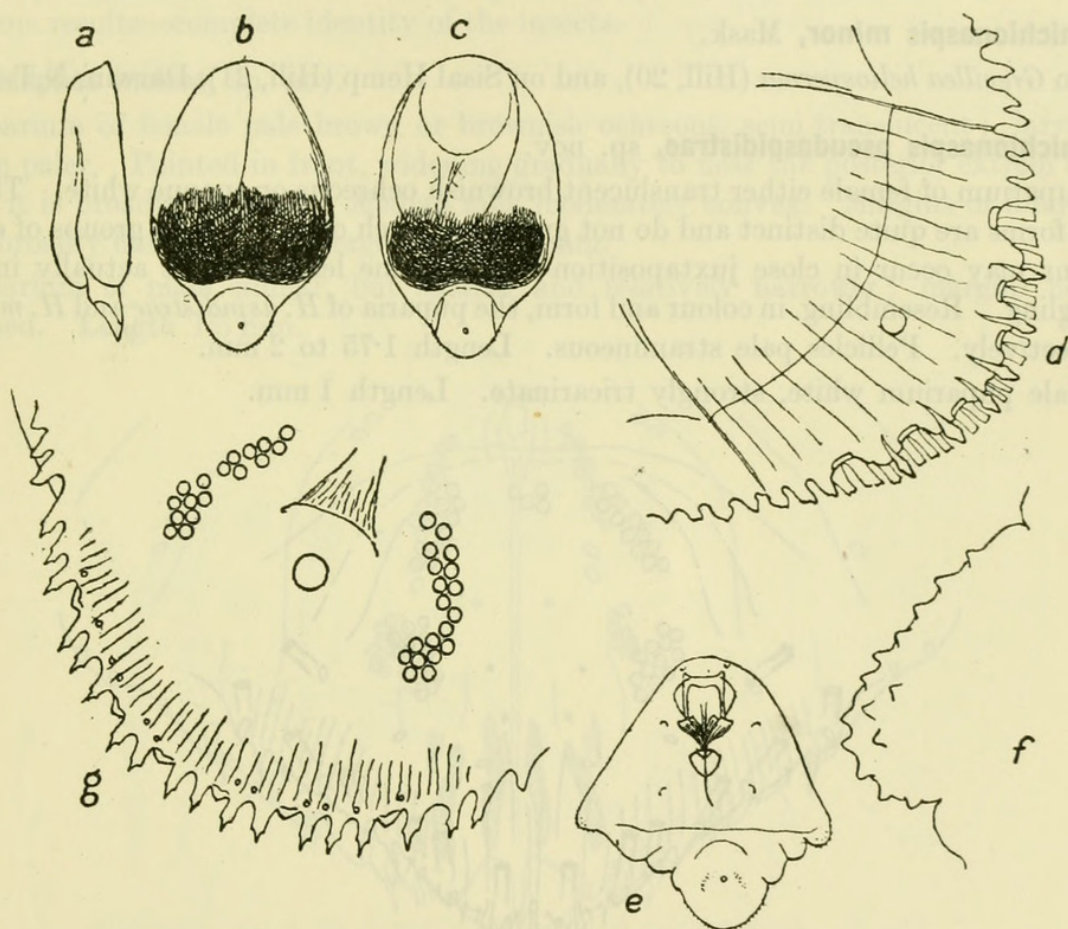


Fig. 4. *Porogymnaspis angulata*, sp. nov.; *a*, female puparium, in profile, $\times 60$; *b*, the same, dorsal view, $\times 60$; *c*, the same, with larval pellicle, $\times 60$; *d*, posterior extremity of nymphal pellicle, $\times 280$; *e*, adult female, $\times 80$; *f*, lateral angle of female, $\times 450$; *g*, pygidium of adult female, $\times 450$.

Adult female (fig. 4, *e*) minute; hinder margin of thorax strongly produced on each side into a lateral angle which is studded with minute conical points (fig. 4, *f*). Pygidium (fig. 4, *g*) with two groups of from 17 to 21 circumgenital pores, connected (in some individuals) by a series of three or four isolated pores; the larger lateral groups occasionally subdivided into two on each side. Margin with six minute broadly triangular lobes and a fringe of prominent tricuspid processes, the median cusp of each produced into a sharp point. Length averaging 0.36 mm.

A still smaller and less conspicuous species than the last. On *Pandanus odoratissimus*, Koolpinyah, N.T. (Hill, 13), and Darwin, N.T. (Hill, 636). Associated, in the former case, with *Hemichionaspis pseudaspidistrae*, and in the latter with *Aspidiotus destructor*.

***Chionaspis dilatata*, Green.**

On *Pandanus odoratissimus*, Koolpinyah, N.T. (Hill, 14, 15).

***Chionaspis graminis*, Green, var. near *divergens*.**

On grasses, Darwin, N.T. (Hill, 433).

Differs from the Ceylon form in the narrower and more pointed pygidium.

***Hemichionaspis minor*, Mask.**

On *Grevillea heliosperma* (Hill, 20), and on Sisal Hemp (Hill, 21), Darwin, N.T.

***Hemichionaspis pseudaspidistrae*, sp. nov.**

Puparium of female either translucent brownish ochreous or opaque white. These two forms are quite distinct and do not grade into each other. Large groups of each colour may occur in close juxtaposition on the same leaf, without actually intermingling. Resembling, in colour and form, the puparia of *H. aspidistrae* and *H. minor* respectively. Pellicles pale stramineous. Length 1.75 to 2 mm.

Male puparium white, strongly tricarinate. Length 1 mm.

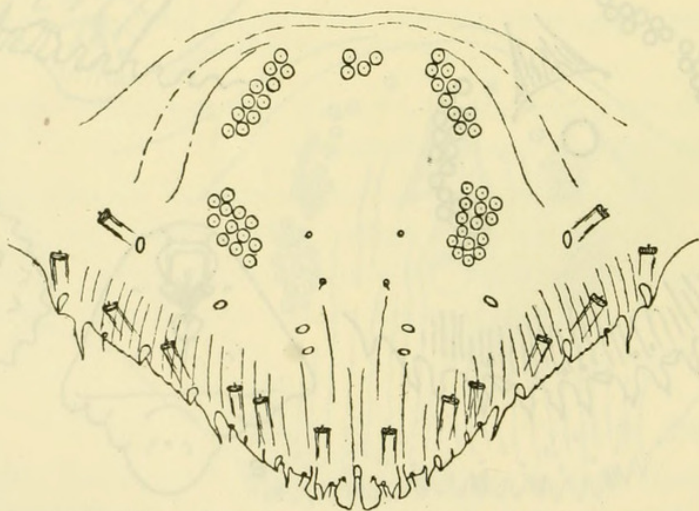


Fig. 5. *Hemichionaspis pseudaspidistrae*, sp. n.; pygidium of adult ♀, $\times 280$.

Adult female very similar to that of *H. aspidistrae*. Margins of abdominal segments moderately produced. Pygidium (fig. 5) with prominent median lobes which are distinctly separate or even slightly divergent, and indented at two points on the outer margin; lateral lobe single, slender, dolabriform. Circumgenital glands in five groups: median with from 2 to 4 pores, upper laterals 8 to 13, lower laterals 8 to 15, averaging 4.10 and 12 respectively. Dorsal oval pores few. Length averaging 0.75 mm.

On *Pandanus odoratissimus*, Koolpinyah, N.T. (Hill, 13, 14, 15).

The strongly marked separation of the median lobes is a distinguishing character of this species. In this respect it resembles *Pinnaspis siphonodontis* of Cockerell, but differs from that insect in the lateral lobe being single instead of duplex.

I am not sure if Prof. Cockerell has adopted the name *Pinnaspis* to cover the numerous species at present placed under *Hemichionaspis*, but if so, I am of opinion that he is fully justified in such a course. *Pinnaspis buxi* (the type of the genus) is clearly congeneric with *Hemichionaspis aspidistrae*.

The segregation of the two forms of puparia (ochreous and white) is quite remarkable. They are sometimes massed in large clearly defined patches that actually adjoin each other without commingling. Such a marked differentiation led me to doubt my original determinations, but repeated preparations have invariably shown the same results—complete identity of the insects.

***Lepidosaphes incisor*, sp. nov.**

Puparium of female pale brown or brownish ochreous, semi-translucent; larval pellicle paler. Pointed in front, widening gradually to near the posterior extremity where it is broadly rounded. Median area moderately convex. Margins of hinder parts broadly flattened. Average length 2.5 mm.

Puparium of male similar, but smaller and relatively narrower; margins not flattened. Length 1.5 mm.

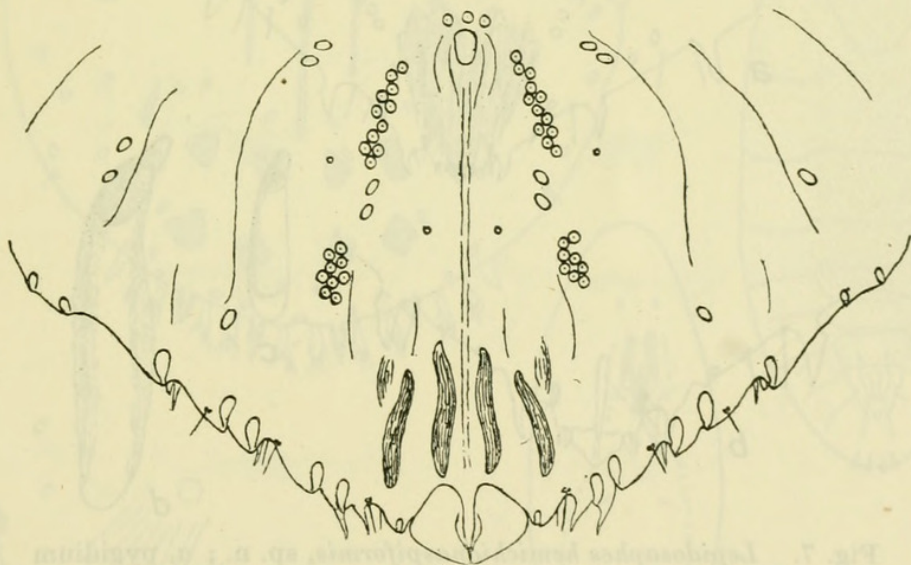


Fig. 6. *Lepidosaphes incisor*, sp. n.; pygidium of adult ♀, × 280.

Adult female elongate, narrowed in front, broadest across the median abdominal segments. Margins of abdominal segments strongly produced, especially in parasitized examples. Anterior spiracles with two or three parastigmatic pores; posterior spiracles without pores. Pygidium (fig. 6) with a single median pair of large prominent triangular lobes, closely approximated and set at an angle so that their apices meet like a pair of pincers. Margin of pygidium with a series of small prominences, each bearing a conspicuous oval pore. Tubular squames few and inconspicuous, often more or less obsolescent. Anal orifice of moderate size, near the base of the pygidium. Four elongate thickenings of the derm run inwards from

a point just above the median lobes. Circumgenital glands in five groups: median group 3 to 5 (average 4), upper laterals 7 to 12 (average 10), lower laterals 8 to 12 (average 8). Dorsal oval pores very few on the pygidium; groups of smaller pores on lateral margins of abdominal and metathoracic segments. Length 1 to 1.5 mm.

On foliage of *Melaleuca leucadendron*, Koolpiniyah, N.T. (Hill, 18), and Stapleton, N.T. (Hill, 88).

The only other Diaspid that has median lobes of a form at all resembling those of this insect is *Aspidiotus acaciae*.

***Lepidosaphes hemichionaspiformis*, sp. nov.**

Puparium of female (fig. 7, d) translucent white, pellicles pale stramineous; elongate, narrow; lateral margins flattened. Average length 2 mm.

Male puparium (fig. 7, c) similar but smaller; without flattened margin. Length approximately 1 mm.

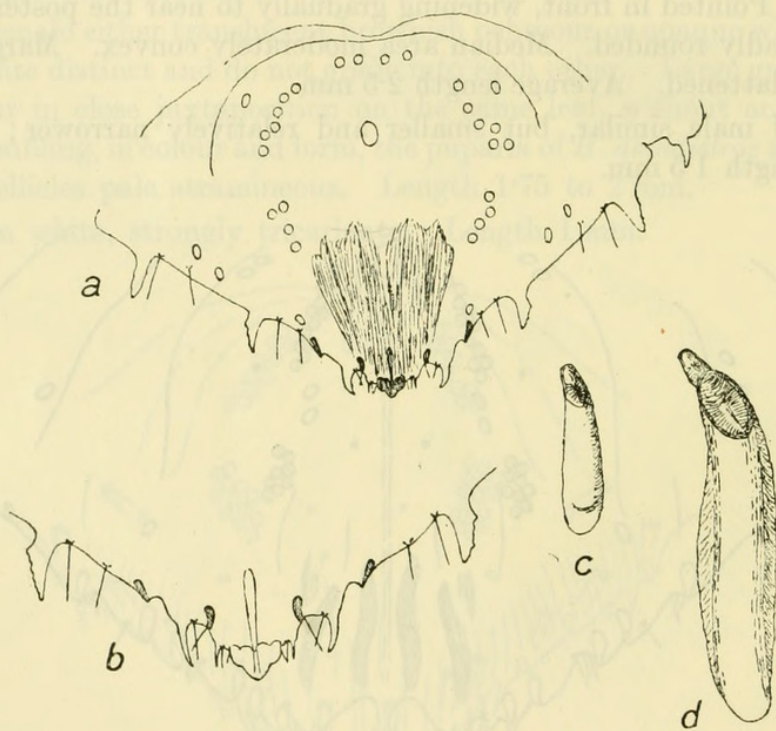


Fig. 7. *Lepidosaphes hemichionaspiformis*, sp. n.; a, pygidium of adult female, $\times 280$; b, posterior margin of pygidium, $\times 450$; c, male puparium, $\times 20$; d, female puparium, $\times 20$.

Adult female elongate, broadest across abdominal area. Lateral margins of abdominal segments moderately protuberant. Posterior extremity rather acutely pointed. Pygidium (fig. 7, a, b) with a single prominent median lobe, the outer margin of which is sinuous. This undivided lobe simulates the closely contiguous median lobes of certain species of *Hemichionaspis*. A small but conspicuous paraphysis on each side, near the extremity, and a densely chitinous cuneiform ingrowth from a small prominence at a short distance further up the margin. What appears to correspond with the usual tubular squames are—in this species—flattened;

four on each side, the one nearest the extremity minute and spiniform, the two nearest the base broadly expanded and externally sinuate. Dorsal oval pores few. Circumgenital glands in five groups, the number of pores unusually constant, median group 4, upper laterals 6, lower laterals 4. Length 0.75 mm.

On *Melaleuca leucadendron*, Stapleton, N.T. (Hill, 635). Heavily attacked by a red parasitic fungus.

In the peculiar structure of the pygidial margin, this insect approaches *Chionaspis cinnamomi*, mihi; but in that species the median lobes, though closely approximated, are distinctly divided, and *cinnamomi* is without circumgenital glands.

***Leucaspis japonica* var. *darwiniensis*, nov.**

Female puparium dull brown, thinly overlaid with whitish secretion.

Male puparium white; rather convex, not carinated.

Nymphal pellicle (fig. 8, *a*) coarsely granulose. Posterior extremity (fig. 8, *b*) with four sharply tricuspid lobes. Length 1 to 1.15 mm.

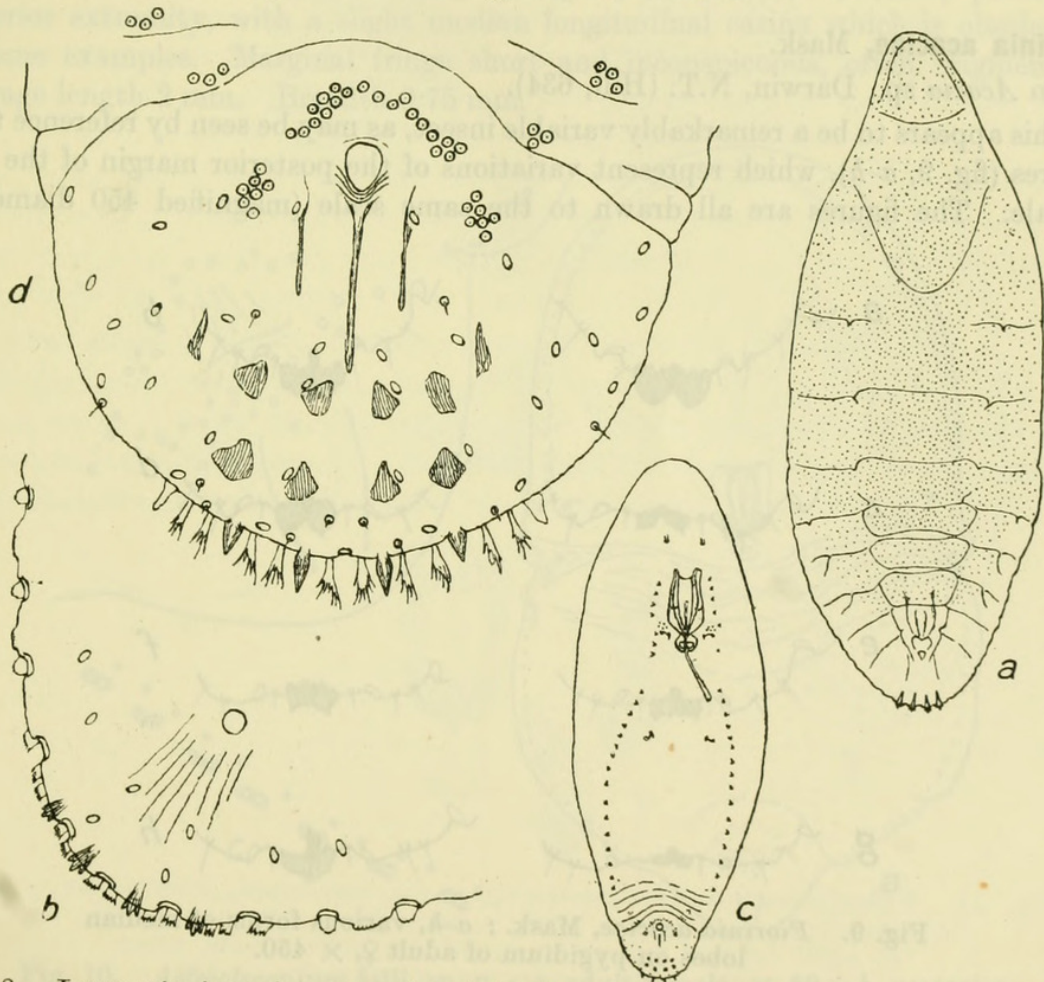


Fig. 8. *Leucaspis japonica* var. *darwiniensis*, var. n.; *a*, nymphal pellicle, $\times 65$; *b*, posterior extremity of nymph, $\times 280$; *c*, adult female, $\times 65$; *d*, pygidium of female, $\times 450$.

Adult female (fig. 8, *c*) slender before gestation; later contracted and proportionately broader. Two sinuous longitudinal series of minute conical points on the venter, embracing the rostrum and extending downwards to near the base of the pygidium. Anterior spiracles with a small group of four or five parastigmatic pores.

Pygidium (fig. 8, *d*) rounded, with four acutely pointed prominent lobes, of which the median pair are lanceolate and the laterals conical. Squames long and deeply fimbriate. There is a very delicate prominent pointed process immediately beyond the outermost squame, on each side, which is obsolescent in older examples. Circum-genital glands in three groups: median group 20 to 25, laterals 7 to 8; small supplementary groups (of 3 or 4 pores) on each of the two preceding segments. Oval dorsal pores numerous, scattered. There are two transverse series of irregularly quadrate or triangular thickened patches across the hinder half of the pygidium. Length of extended insect 0.75 to 0.85 mm.; after gestation 0.5 mm.

On foliage of *Ficus orbicularis*, Darwin, N.T. (Hill, 23, 25).

Differs from the type in its smaller size. Nymphal pellicle more strongly granulose: its pygidial lobes more deeply cleft. The ventral series of conical points more extended. Posterior margin of adult female with longer and more deeply fimbriate squames.

***Fiorinia acaciae*, Mask.**

On *Acacia* sp., Darwin, N.T. (Hill, 634).

This appears to be a remarkably variable insect, as may be seen by reference to the figures (fig. 9, *a-h*), which represent variations of the posterior margin of the adult female. The figures are all drawn to the same scale (magnified 450 diameters).



Fig. 9. *Fiorinia acaciae*, Mask.; *a-h*, various forms of median lobes on pygidium of adult ♀, × 450.

Extreme forms might be mistaken for distinct species, but intermediate forms occur, often in the same gathering. Forms *a*, *e*, and *h*, for instance, all occur in a small gathering from Somerville, Victoria. Maskell, in his diagnosis of the species, describes "a single median floriated lobe." I have seen no examples in which the lobes are actually united, except an aberrant and asymmetrical specimen shown at *h*. In the form *b*, which otherwise answers closely to Maskell's description, there is a distinct

median division, though the lobes are closely approximated. Leonardi ("Saggio di Sistematica delle Fiorinae") figures a form that is nearer to my figure *a*. Fuller ("Notes and Descriptions of some Species of Western Australian Coccidae") describes—as *F. acaciae* var. *biloba*—a form with "two lobes, closely adjacent and at first sight appearing as one semi-circular lobe." In some examples the lobes are widely divergent (see fig. 9, *c*). In others (*g*) they are small and almost obsolescent.

Lecanium nigrum, Nietn.

Darwin, N.T. (Hill, 565); food-plant not stated.

Pulvinaria psidii, Mask.

Darwin, N.T. (Hill, 507); food-plant not stated.

Asterolecanium hilli, sp. nov.

Puparium of female yellow. Elongate, slightly convex above, bluntly pointed at posterior extremity, with a slight median longitudinal carina which is obsolescent in some examples. Marginal fringe short and inconspicuous, often fragmentary. Average length 2 mm. Breadth 0.75 mm.

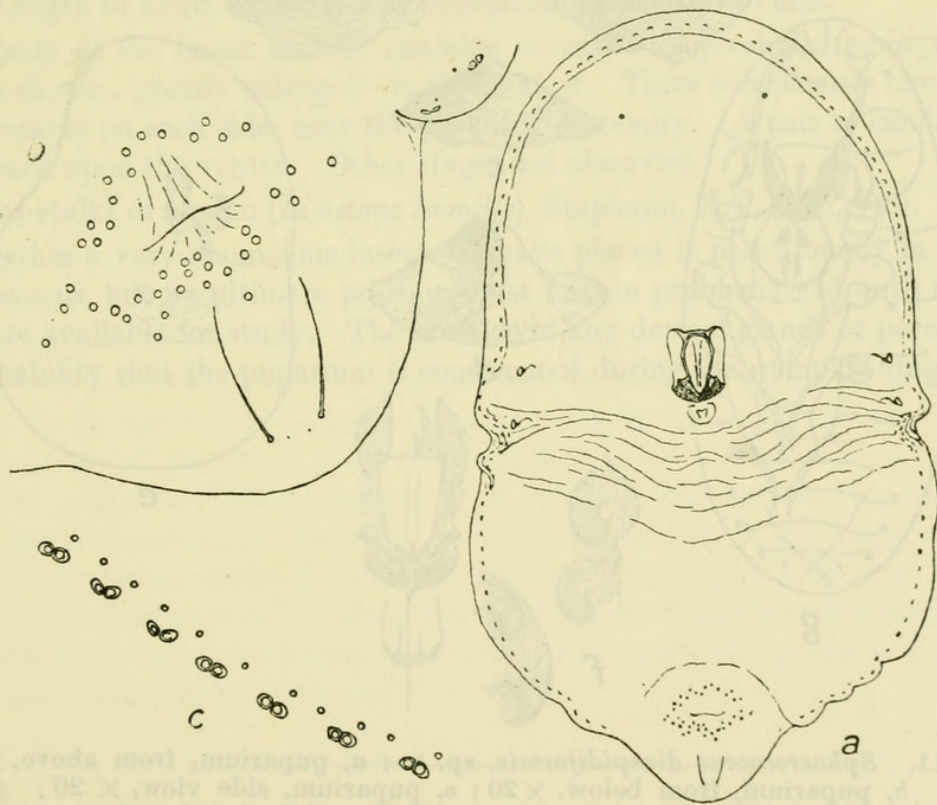


Fig. 10. *Asterolecanium hilli*, sp. n.; *a*, adult female, $\times 80$; *b*, posterior extremity, $\times 280$; *c*, marginal pores, $\times 500$.

Adult female at first elongate, the posterior extremity bluntly pointed; afterwards the body becomes greatly contracted and transversely wrinkled across the base of the abdomen (fig. 10, *a*). Frons strongly produced in front of the rostrum, which, in the later stages, assumes a central position, the rudimentary antennae remaining near the anterior extremity. Spiracles placed close to the margin.

Marginal paired pores (fig. 10, *c*) in a single row, rather small and inconspicuous, discontinued at the base of the posterior segment, which is pygidiform (fig. 10, *b*). Genital orifice surrounded by circular ceriferous pores. Caudal setae folded back upon the venter. No trace of anal lobes or of a setiferous ring. After examination of many preparations, I have been unable to locate the position of the anal orifice.

On foliage of a palm (*Livistona humilis*), Stapleton, N.T. (Hill, 640).

Distinguishable from any other known species by the peculiar characters of the posterior segment.

? ***Sphaerococcus diaspidiformis*, sp. nov.**

Puparium of female (fig. 11, *a*, *b*, *c*) circular, convex above, with a central raised boss. Texture firm and hard, of a horny consistency, resisting the action of boiling potash. Surface coarsely granulate and corrugate. Colour yellowish, the central

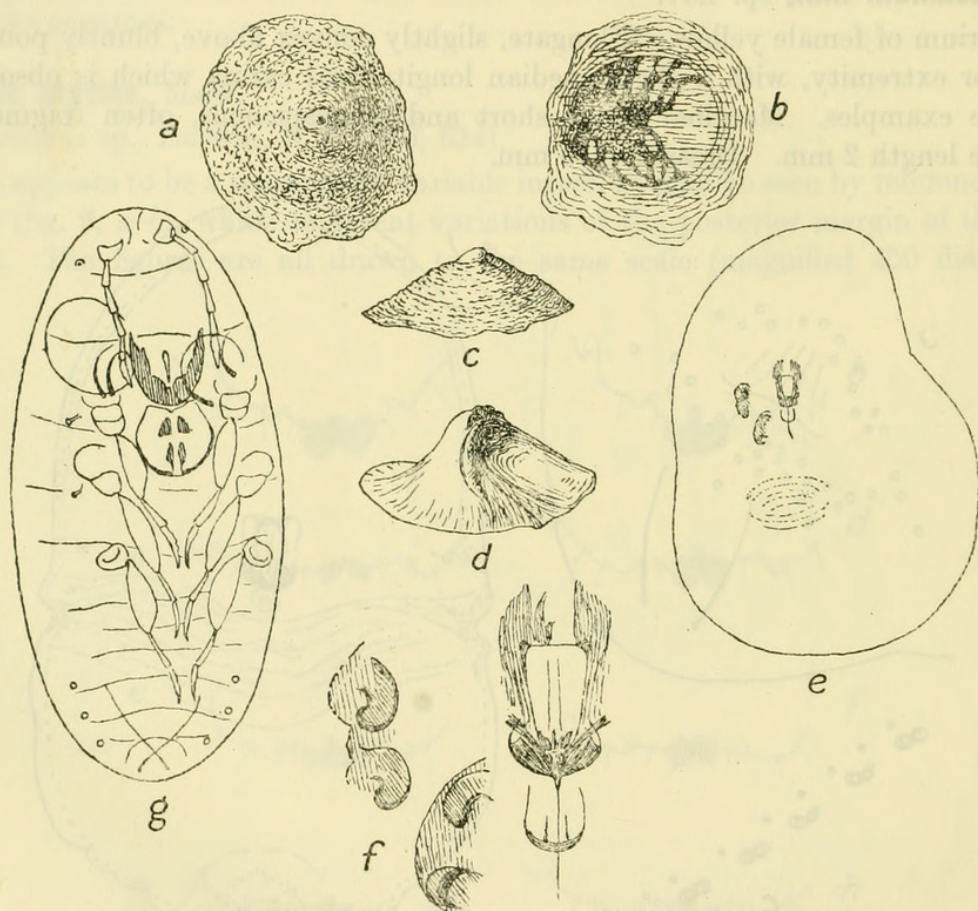


Fig. 11. *Sphaerococcus diaspidiformis*, sp. n.; *a*, puparium, from above, $\times 20$; *b*, puparium, from below, $\times 20$; *c*, puparium, side view, $\times 20$; *d*, adult female, side view, $\times 33$; *e*, adult female, after maceration, $\times 65$; *f*, rostrum and spiracles, $\times 280$; *g*, embryonic larva, $\times 280$.

boss clear and translucent. Exuviae not included in the substance of the puparium. Under surface flat, with a thin translucent pellicle revealing the form of the insect within (fig. 11, *b*). Diameter 1.1 mm.

The female lies loose within the puparium, but is difficult to extract entire. Its removal can be effected only by gradually breaking away the upper part of the

puparium. When extracted it is seen to be of the form shown in figure 11, *d*. The median dorsal area rises into a central hump, on the summit of which are grouped the four spiracles which—in this insect—have taken up a dorsal position. Immediately behind the central prominence the body is abruptly depressed, transversely folded for a short distance, and encloses a large circumscribed flattened or slightly concave area extending to the posterior margin. Colour of dried insect reddish brown, marbled with pale spaces; the flattened posterior area colourless and translucent. After maceration and preparation for microscopical study, the insect displays a remarkable lack of characters (see fig. 11, *e*); the derm appears to be devoid of ceriferous pores, and no rudiments of antennae are to be seen. The only conspicuous features are the mouth-parts and the spiracles. Some faint concentric lines near the centre indicate what I take to be the genital orifice, but I have been unable to locate any anal aperture. The actual position of the spiracles is upon the summit of the dorsal prominence, but under compression they become displaced and usually appear together on one side of the rostrum. The genital orifice also appears to have assumed a dorsal position—amongst the folds at the base of the posterior depressed area. The characters of the rostrum and spiracles are shown in figure 11, *f*. Each pair of spiracles is partially surrounded by an ill-defined denser area. Length of adult female (under compression) 0·5 to 0·75 mm.

The body of the insect usually contains several well-developed embryos, one of which is shown—greatly enlarged—in figure 11, *g*. Three conspicuous circular pores are noticeable on each side, near the posterior extremity. A pair of caudal setae is folded back upon the venter. Other stages not observed.

On leaf-stalks of a palm (*Livistona humilis*), Stapleton, N.T. (Hill, 640).

Altogether a very anomalous insect. I have placed it provisionally in the genus *Sphaerococcus*, but its ultimate position must remain problematical until the earlier stages are available for study. The absence of any dermal glands or pores suggests the probability that the puparium is constructed during the nymphal stage.



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