

By

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Further species collected about Kunming, Yunnan Province.

SISHANASPIS, new genus

GENERIC TYPE. *Sishanaspsis quercicola*, new species.

CHARACTERS. A genus of the tribe Diaspidini of the family Diaspididae belonging to the *Parlatoria* series; that is, with the dorsal pygidial ducts of the "two-barred" type and with the openings of the marginal pygidial macroducts in at least the second stage set transversely and surrounded by a crescentic sclerotization. It may be considered to be pupillarial as the adult female, if not actually enclosed within, is at least completely enveloped by the sclerotized second exuvium, which forms the greater part of the scale. Second stage with two pairs of well-developed lobes, the second pair not bilobed, the third pair represented merely by a minute point. A marginal fringe of plates is present, these being apically fimbriate as in *Parlatoria*. Adult female with the body membranous throughout except for the pygidium, the form more or less circular, the pygidium short and apically rounded, protruding somewhat. Dorsal ducts of the pygidium present, quite numerous, but none present along the margins, the ducts quite small; median lobes alone present, these widely separated from each other; margin of the pygidium with a series of short, stout, apically truncate processes, each of which bears a microduct, these probably to be regarded as modified gland-spines; perivulvar pores present in a more or less continuous arch; body with three or four clusters of gland-tubercles on the thorax.

Scale of the female composed mostly of the sclerotized second exuvium, which in unweathered specimens is covered with a thin film of wax. First exuvium relatively large, lying at the anterior end, of a slightly greenish color, which is characteristic of the members of the *Parlatoriini* series. Scale of the male of the type common to members of the *Parlatoriini* series, with the first exuvium as in the female and lying at one end.

NOTES. A search of the literature of the scale insects has revealed no species of this type. The genus is evidently not related to *Neoparlatoria*.

The exuvium of the second stage perhaps does not actually completely enclose the adult female for, although the dorsal portion is heavily sclerotized, the ventral part is membranous and it is difficult to determine whether this portion remains unbroken. The pygidium of the second stage, at maturity, is partially broken away from the remainder of the exuvium and acts as an operculum.

*Sishanaspsis quercicola*, new species  
Figure 3

HOSTS AND DISTRIBUTION. From *Quercus sinensis* at Si-shan, near Kunming, Yunnan Province, China, May 8, 1949, G. F. Ferris.

HABIT. Occurring on the twigs, at times associated with a species of the fungus genus *Septobas-*

*idium*, at other times freely exposed. In life the scales are grey or in rubbed specimens yellow. The scale of the male is slightly brown.

CHARACTERS. Second stage as seen in exuvia about .75 mm. long, oval. In rubbed specimens the second exuvium is somewhat yellow. Characters as described for the genus.

Adult female as described for the genus. The pygidium is evidently quite variable, varying even as between the two halves of the same individual as to the number of marginal points and the number of perivulvar pores, but the general form is essentially as here illustrated. Anal opening set well toward the anterior end of the pygidium. Perivulvar pores forming a more or less continuous arch about the vulva. Anterior spiracles variable, at times with a small cluster of associated pores on one side of the body and none on the other side.

Genus GREENASPIS MacGillivray

1921. *Greenaspsis* MacGillivray, The Coccidae, pages 307, 339.

1921. *Canaspsis* MacGillivray, The Coccidae, pages 308, 352.

1936. *Greenaspsis* MacGillivray, Ferris, Microentomology 1:25; figure 39.

1937. *Canaspsis* MacGillivray, Ferris, Microentomology 2:3; figure 1.

GENERIC TYPE. *Chthonaspsis elongata* Green is type of *Greenaspsis*, by original designation and *Chthonaspsis elongata* Green is type of *Canaspsis* by original designation.

CHARACTERS. Diaspididae referable to the tribe Diaspidini, having "two-barred" ducts, gland-spines and bilobed second pygidial lobes. Body form elongate. Median pygidial lobes definitely yoked together by a sclerosis between their bases, tending to be very small and more or less divergent, forming something of a V-shaped notch at the apex of the pygidium. Dorsal pygidial macroducts as large as those of the margin and set in distinct rows. Gland-spines present along the margin of the pygidium at least. Second pygidial lobes definitely present but quite small, definitely bilobed. Position of the third lobes indicated merely by low, serrate irregularities of the pygidial margin. Perivulvar pores present in five groups. Body membranous throughout except for a weak sclerotization of a narrow median region of the dorsum of the pygidium and slight submarginal sclerotizations of the pygidial venter.

First stage of the larva with a series of quite long, marginal hairs extending around the body.

Scale of the female in the type species relatively short and more or less oval, with the exuvia at one side. Other species of the genus with the scale of the female elongated and slender—at times much so—with the exuvia at one extremity. Scale of the male always very small, white, elongate, noncarinate.

NOTES. The author has in the past seen authentic material of the types of both *Greenaspis* and *Canaspis* and on the basis of these specimens and of material seen in connection with the present work is convinced that these two genera should be placed as synonyms. The name *Greenaspis*, having page precedence, is here adopted.

No general treatment of the genus is here possible, but it may be noted that *Chionaspis graminis* Green, its supposed "variety" *divergens* Green, *Chionaspis arundinariae* Green, *Chionaspis decurvata* Green and *Chionaspis bambusifolia* Takahashi seem definitely to belong to *Greenaspis*.

*Greenaspis yunnanensis*, new species

Figure 4

HOST AND DISTRIBUTION. From an undetermined bamboo, possibly a species of *Arundinaria*, at Si-shan, near Kunming, Yunnan Province, China, May 8, 1949, G. F. Ferris.

HABIT. Occurring on the underside of the leaves. Scale of the female attaining a length of 3 mm., very slender, usually somewhat sinuous because of pressure from surrounding leaf hairs, white, the exuvia when exposed pale yellow. Scale of the male likewise white, tending to be fluffy in part.

RECOGNITION CHARACTERS. Adult female quite slender. Median pygidial lobes relatively quite small, divergent, forming a somewhat U-shaped notch in the apex of the pygidium. Between the median and second lobes is a single large gland-spine, followed by a small gland prominence. Second lobes small, but distinctly developed, both lobes slightly elongate. Laterad of the second lobes is another large gland-spine and laterad of this a strongly serrate, almost toothed, marginal area in the position of the third lobe. Laterad of this is another large gland-spine, followed by a slightly projecting portion of the pygidial margin which is quite strongly toothed and laterad of this is another gland-spine. Dorsum of the pygidium with the usual narrow, parallel-sided area of sclerotization which extends from the anterior margin to the base of the median lobes. Laterad of this area is a row of longitudinal five or six macroducts. There is a transverse row of three to four macroducts along the posterior border of the first prepigial abdominal segment, with one macroduct in the marginal region of this segment and a few such ducts in the marginal regions of the remaining segments including the metathorax. Perivulvar pores in five small groups having a maximum of about six pores. Lateral margins of the two prepigial segments with two quite large gland-spines and the lateral areas of the first abdominal segment and the metathorax with several small gland prominences.

NOTES. This species is very close to *Greenaspis elongata* (Green) but appears to differ especially in the projecting and serrate margin of the pygidium at the position of the third lobe. Existing descriptions of other species are not sufficiently precise to permit its assignment to any of them.

Genus FORMOSASPIS Takahashi

1932. *Formosaspis* Takahashi, Journal of the Society of Tropical Agriculture, Taihoko Imperial University, Formosa 4:42.

GENERIC TYPE. *Protodiaspis nigra* Takahashi.

RECOGNITION CHARACTERS. Referable to the tribe

Diapsidinae of the family Diapsididae; that is, with "two-barred" ducts and with gland-spines. Pupillarial forms, the adult female being retained within the exuvium of the second stage, which is elongate. Second stage with two pairs of pygidial lobes, the second lobes distinctly bilobed; the marginal macroducts large, their pores surrounded each by a partial, sclerotized ring which is not closed posteriorly, the open posterior area being marked by the presence of a series of short processes or serrations. Adult female with its characters reduced, the median lobes consisting merely of short, acute points or almost lacking, the second lobe indicated at the most by low, rounded prominences; dorsal ducts very small, distributed in a submarginal zone; perivulvar pores present; anal opening set well toward the anterior margin of the pygidium.

NOTES. Three species referable to this genus are now known, all being from bamboos.

*Formosaspis nigra* (Takahashi)

Figure 5

1930. *Protodiaspis nigra*

1930. *Protodiaspis nigra* Takahashi, Department of Agriculture, Government Research Institute, Formosa, Report 43:25; figure.

1932. *Formosaspis nigra* (Takahashi), Takahashi, Journal of the Society of Tropical Agriculture, Taihoku Imperial University, Taihoku, Formosa 4:47.

HOSTS AND DISTRIBUTION. Described as from *Bambusa* sp., Suisha, Formosa. Specimens are at hand from an undetermined bamboo, possibly a species of *Arundinaria*, at Si-shan, near Kunming, Yunnan Province, China, May 8, 1949, G. F. Ferris.

HABIT. Occurring on the underside of the leaves. Adult female appearing as a little, slender, elongate, black body, irregular in form covered in part with a thin film of secretion with the relatively large first exuvium perched at one end.

RECOGNITION CHARACTERS. Length of second stage exuvium about 1 mm. Pygidium of the second stage with the median lobes sharply spear-shaped; these are followed by a prominent gland-spine; this by a series of marginal points opposite the first marginal pore; these by the small, bilobed and sharply pointed second lobe; this by another long gland-spine; this by a second cluster of points opposite the second marginal pore; this after a considerable interval by another large gland-spine; this by another pore which is borne upon a fringed projection; and this by a series of intermingled gland-spines and fimbriate processes.

Adult female elongate-ovoid. Pygidium relatively large, bearing merely a pair of unsclerotized or weakly sclerotized, pointed median lobes. Near the base of the median lobes are five or six submarginal small setae and along the margin are four or five small, submarginal ducts. On the ventral side there is a submarginal series of very small gland-tubercles, each bearing a minute duct, these extending from the median lobes almost to the anterior angle of the pygidium. Perivulvar pores in five groups, the median group with but two or three, the anterior lateral and posterior lateral groups with 4-6. Ventral side of the body in the region of the posterior spiracles and about the mouthparts with numerous very small gland-tubercles.

NOTES. This seems quite definitely to be identical with the form described from Formosa by Takahashi. It is not *Formosaspis formosana* Takahashi, of which specimens are at hand, received from Takahashi.

It is not the species described by Ferris (*Microentomology* 2; figure 84, 1937) as *Formosaspis nigra*. The species there illustrated is *Formosaspis formosana* Takahashi, which was mistakenly forwarded by Dr. Takahashi as *nigra*.

*Formosaspis steġana*, new species  
Figure 6

**HOSTS AND DISTRIBUTION.** From a small bamboo, possibly a species of *Arundinaria*, at Si-shan, near Kunming, Yunnan Province, China, May 10, 1949, G. F. Ferris.

**HABIT.** Occurring on the stems of the host. Adult female entirely enclosed within the strongly sclerotized, elongate-ovoid second exuvium which is jet black except for the posterior portion which is dark brown. In unweathered specimens the first exuvium clings to the end of the second stage which is covered by a thin film of wax, but both the first stage exuvium and the wax covering disappear in weathered specimens and the appearance is that of a small, black seed.

**CHARACTERS.** Adult female entirely enclosed within the second stage, entirely membranous, ovoid, with the small pygidium projecting somewhat. Pygidium with the dorsal surface very slightly sclerotized, marked by transverse striations. Median lobes represented by a pair of sclerotized points. Second lobes represented by a pair of rounded prominences. No gland-spines. Dorsal side with a few small marginal or submarginal ducts. Anal opening large, set close to the anterior margin of the pygidium. Ventrally a conspicuous sclerotized area is present about the bases of the lobes. Perivulvar pores in four or five groups, the lateral groups with 10-15 pores, the median with 2-3 or lacking. Margins of the body, anterior to the pygidium, with scattered clusters of minute ducts. Anterior spiracles with a cluster of about 10 pores, posterior with none.

Second stage at full development elongate-ovoid, tapering posteriorly. Median lobes well developed, prominent, parallel, preapically with a notch on each side. Second lobes somewhat smaller, definitely bilobed, the lobules of almost the same size. Third lobes represented by 2-3 small points. Three large gland-spines present, one just laterad of each lobe. Three large marginal ducts present, one just laterad of each gland-spine, their orifices surrounded by a sclerotized ring which is widely open at the posterior margin, the margin being minutely fimbriate between the ends of the ring. No dorsal ducts.

**NOTES.** This species, in the opinion here held, is close enough to *Formosaspis nigra* (Takahashi), the type of *Formosaspis*, to be included in the same genus, but is very definitely distinct, differing in all of its details.

Genus *CHORTINASPIS* Ferris  
*Chortinaspis decorata*, new species  
Figure 7

**HOSTS AND DISTRIBUTION.** From an undetermined, small, perennial grass, at An-lin-wen-chian, near Kunming, Yunnan Province, China, April 29, 1949, G. F. Ferris.

**HABIT.** Occurring among the bases of the roots, mostly below the level of the ground. Scale of the female black, almost circular, quite convex, rather rough, marked with lines concentric with the exuvia which are at one side. A distinct ventral scale is formed. Scale of the male not recognized.

**CHARACTERS.** Body about 1.5 mm. in diameter, almost circular, as flattened on the slide. Derm membranous except for the sclerotized areas of the pygidium. Pygidium relatively very small, broad and short, usually bearing a very strong, somewhat T-shaped median sclerotization which is flanked on each side by a short, slender sclerotized area extending in from the posterior margin and this in turn by another sclerotized area. Anal opening moderately large, slightly posterior to the center of the pygidium. Median pygidial lobes slightly separated and nearly parallel, with a pair of small plates between and with an elongated sclerotization extending into the body on the ventral side. Second lobes represented by a low, apically somewhat serrate prominence, the third lobes by a somewhat stronger prominence. Between the first and second lobes is a pair of very small plates. Dorsal ducts numerous, distributed along the submarginal area from the median lobes to the middle of the pygidium and forming a suggestion of two rows that extend forward to almost the level of the anal opening. The ducts are very small and slender and seem to be moderately long. No intersegmental scleroses or paraphyses present. On the ventral side there is a very large and strongly developed sclerotization somewhat in the shape of a V with strongly divergent arms, and numerous small ducts are present along the margins of the body, these extending in a marginal zone and in small numbers about to the metathorax. Perivulvar pores lacking. Scattered over the body are a very few extremely minute ducts.

**NOTES.** In the opinion here adopted this species finds its nearest relatives in the genus *Chortinaspis*. There are ample technical bases for the naming of a new genus, and placing it in *Chortinaspis* adds one more to an already diverse series of species, making the genus still more difficult to define, but it may be referred here until further knowledge of these grass-infesting forms has been developed. There are probably many more species in the world.

Genus *TEMNASPIDIOTUS* MacGillivray

1921. *Temnaspidotus* MacGillivray, The Coccidae, page 387.  
1921. *Brainaspis* MacGillivray, The Coccidae, page 390.  
1938. *Brainaspis*, Ferris, *Microentomology* 3:65; figure 39.  
1941. *Aspidiotus*, Ferris, *Microentomology* 6:37; figure 20.

**GENERIC TYPE.** Type of *Temnaspidotus*, by original designation, *Aspidiotus excisus* Green. Type of *Brainaspis*, *Aspidiotus kellyi* Brain.

**CHARACTERS.** *Aspidiotinae* in which three distinct pairs of pygidial lobes are present, the median lobes usually shorter than the second lobes, although at times almost equalling them in length, the lobes well separated and with their axes parallel to the longitudinal axis of the body. Paraphyses and intersegmental thickenings entirely lacking, the second lobes, however, each with a distinct, although at times very narrow, sclerosis which extends anteriorly from the median margin of the lobe. Plates, some of which are variously fringed or fimbriate, are present between the first and second, and second and third, lobes and anterior to the third lobes. Dorsal ducts short and slender, those near the margins mostly rising from the poriferous furrows but in some forms occurring also



irregularly over the pygidium even anterior to the anal opening. Perivulvar pores present or absent. Body in the known species membranous except for the pygidium.

NOTES. I have in an earlier paper placed *Temnaspidotus* as a synonym of *Aspidiotus* but the discovery of an apparently new species in China has led to a review of the question and a reversal of this opinion. This new species is extremely close to *Aspidiotus kellyi* Brain, which has been used as the type of the genus *Brainaspis*. With all of these species brought together it seems clear that the genus *Temnaspidotus* should be separated from *Aspidiotus* and that *Brainaspis* should be placed as a synonym of it, *Temnaspidotus* having page precedence.

*Temnaspidotus sinensis*, new species  
Figure 8

HOSTS AND DISTRIBUTION. From a small, undetermined grass at An-lin-wen-chian, near Kunming, Yunnan Province, China, April 30, 1949, G. F. Ferris.

HABIT. Occurring on the leaves and stems. Scale of the female white, oval, the exuvia entirely or nearly covered by secretion. Scale of the male similar to that of the female but smaller.

CHARACTERS. Length on the slide about 1 mm. Body of the adult female broadly turbinate. Derm membranous except for the rather weakly sclerotized pygidium. Median lobes quite distinctly shorter than the second lobes, quite broad and prominent, somewhat separated and with parallel sides, the apices truncate and with a slight median tooth. Second lobes large and prominent, apically rounded, each with a sharply defined, narrow sclerotization arising from its median basal angle and extending forward for a distance that is somewhat greater than the length of the lobe itself. Third lobes small, but distinct, apically rounded. Between the median lobes is a pair of slender, apically toothed plates. Between the median and second lobes are two long, slender plates, which do not exceed the apices of the lobes, one being simple, the other apically divided. Between the second and third second and third more or less fimbriate. Beyond the third lobe are four plates which are simple or slightly fimbriate. Dorsal ducts slender and quite short, there being a row of two or three ducts arising from the poriferous furrow between the first and second lobes, of 5-6 in a poriferous furrow between the second and third lobes, and an irregular row of about 6 beyond the third lobe. In addition there are a number of ducts irregularly arranged in the area anterior to and laterad of the anal opening. There seem to be no ducts anterior to the pygidium except for a very few along the margins of the abdominal segments. Anal opening relatively large. On the ventral side of the pygidium there are a very few extremely minute ducts. Perivulvar pores lacking.

NOTES. This species is evidently very close to *Temnaspidotus kellyi* (Brain), which is recorded from a grass, *Andropogon* sp., in South Africa. If the illustration given by Ferris (reference cited) is correct they differ in the form of the median lobes and the form of the plates, but it is conceivable that more specimens might reveal a degree of variation which would require the union of the two supposed species.

It has been possible to obtain but a single prepared female from the very scanty material at hand.

Genus *QUADRASPIDIOTUS* MacGillivray  
*Quadraspidotus ternstroemiae*, new species  
Figure 9

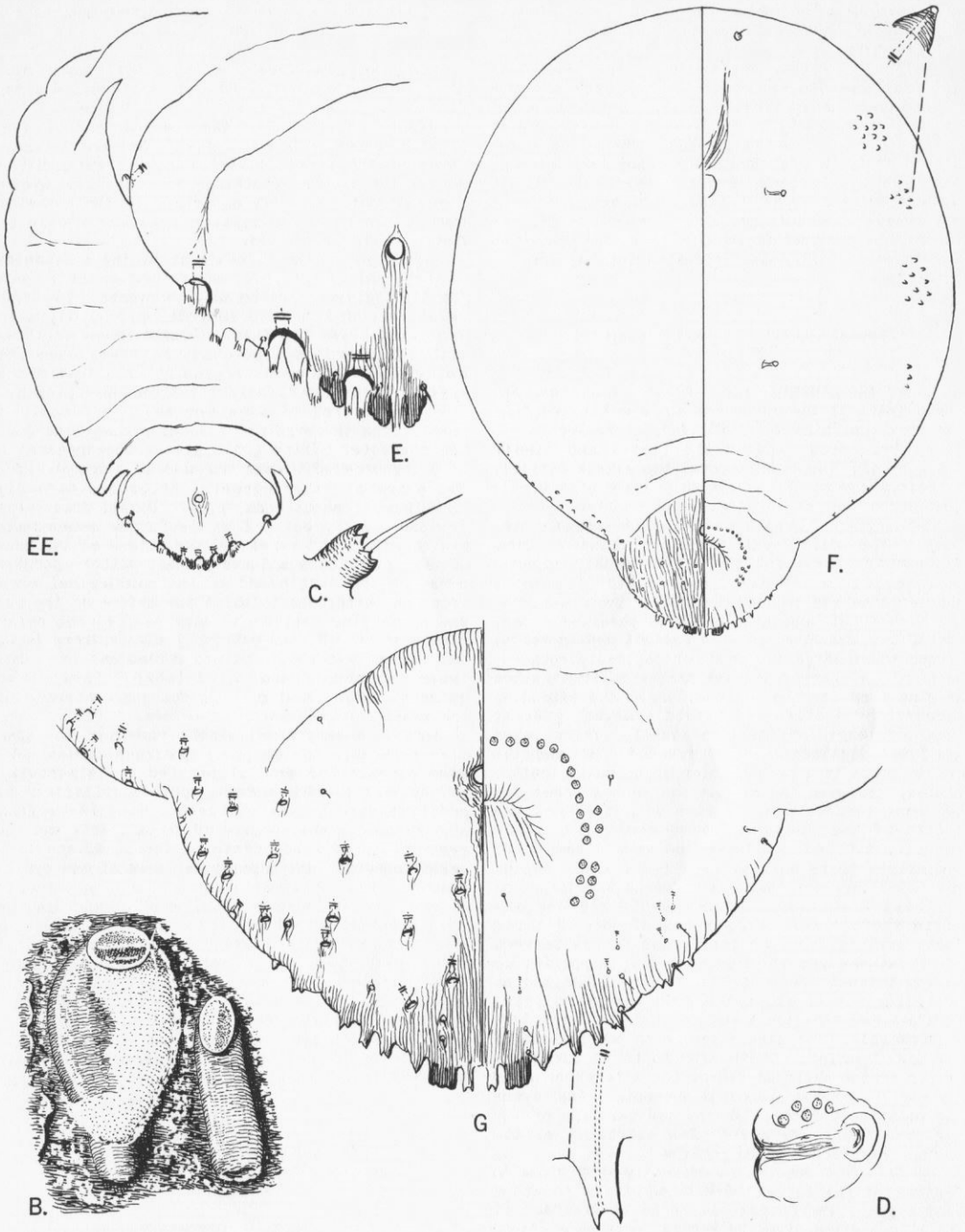
HOSTS AND DISTRIBUTION. From *Ternstroemia* sp., at Si-shan, near Kunming, Yunnan Province, China, May 8, 1949, G. F. Ferris.

HABIT. Occurring on the branches almost completely concealed beneath bark flakes and lichens. Scale of the female almost circular, quite high-convex, the exuvia apparently more or less toward one side, color usually concealed by the covering bark and debris but apparently grey. Scale of the male not recognized.

CHARACTERS. Adult female attaining a diameter of 1.75 mm. Body membranous throughout except for the pygidium, very broadly turbinate. Pygidium relatively acute. Median lobes prominent, quite large, set close together. Second lobes well developed, sclerotized, somewhat narrower than the median lobes and more or less notched toward the apex on each side. Third lobes definitely developed, consisting of a rather acute sclerotized point. The three pairs of lobes present the common character of the genus, giving the appearance of being crowded toward the apex of the pygidium. Two pairs of intersegmental scleroses strongly developed, of about equal size. Dorsal ducts very few, there being but 3-4 in the furrow between the median and second lobes and the furrow at the base of the third lobes and a very small number—perhaps 6—along the margin and in the submarginal area from the third lobe to about the middle of the pygidial margin. All ducts very slender and relatively short. Plates extremely minute, there being but two between the first and second and three between the second and third lobes. Perivulvar pores lacking. Anal opening set just anterior to the mesal intersegmental scleroses.

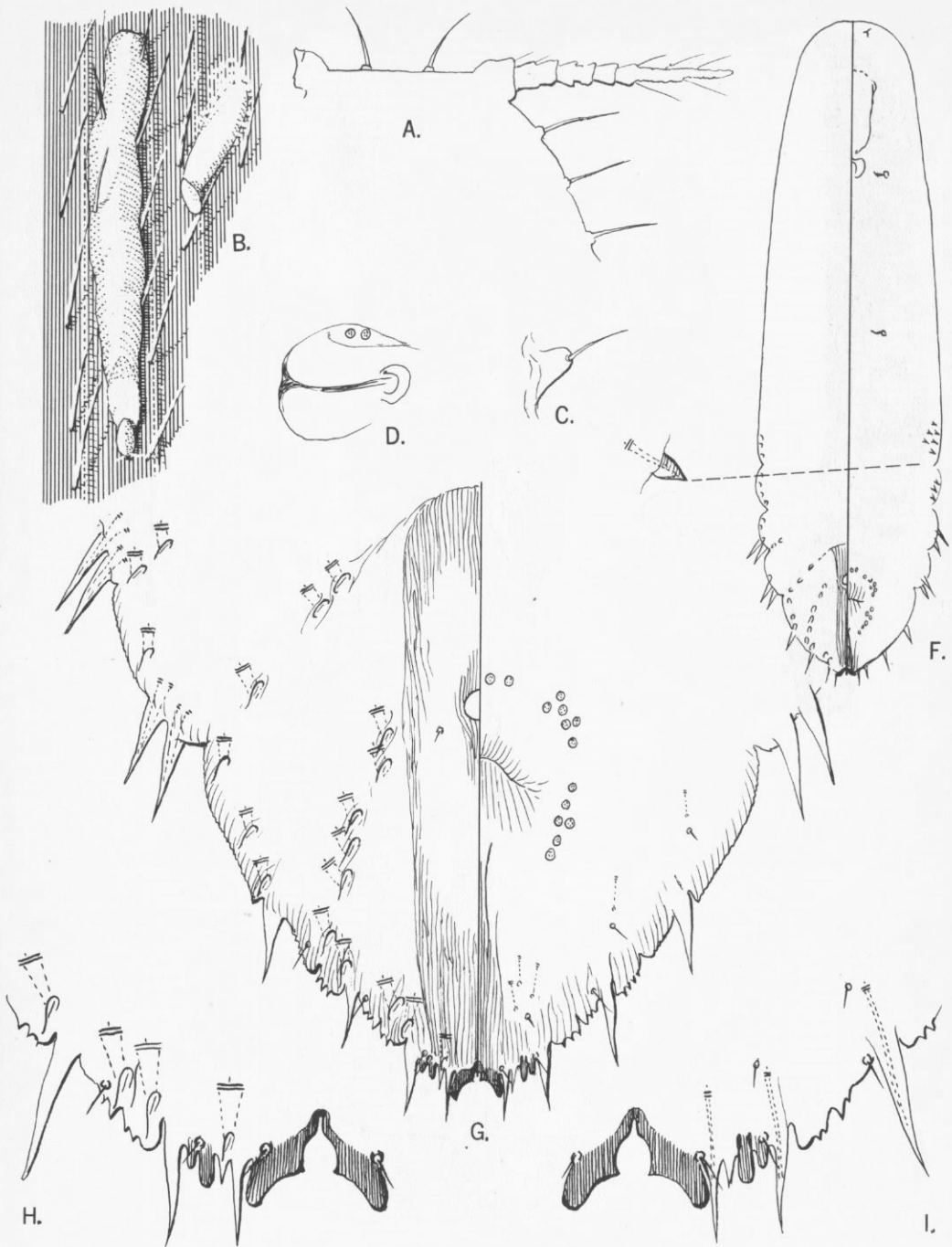
NOTES. A very considerable number of the species referable to the genus *Quadraspidotus* have been redescribed and illustrated by Balachowsky and by Ferris. The present species definitely is not referable to any of these. It differs from any of them in the paucity of dorsal ducts and the restriction of these ducts to the immediate posterior marginal and submarginal area of the pygidium.





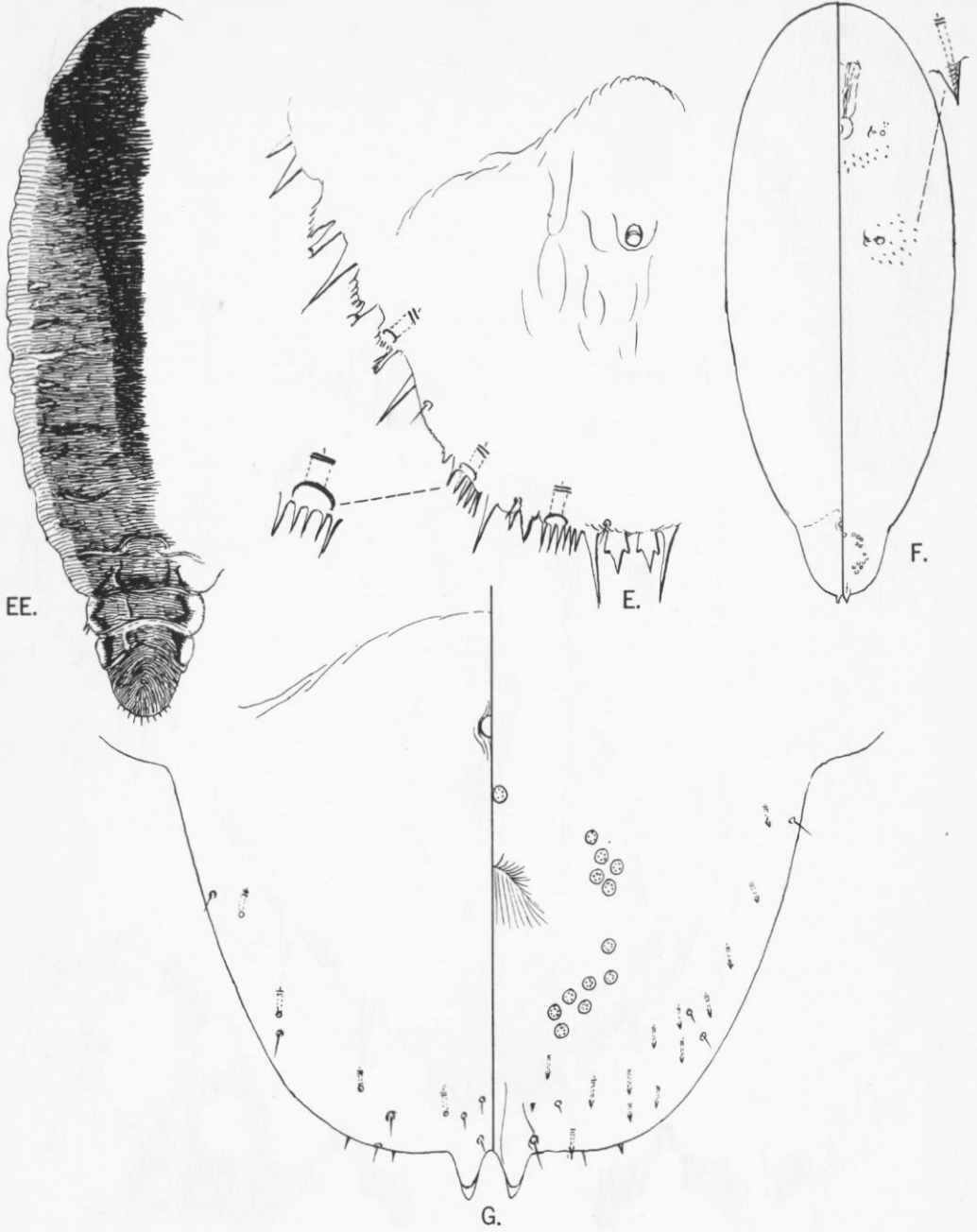
*Sishanaspis quercicola*, new species

Figure 3



*Greenaspis yunnanensis*, new species

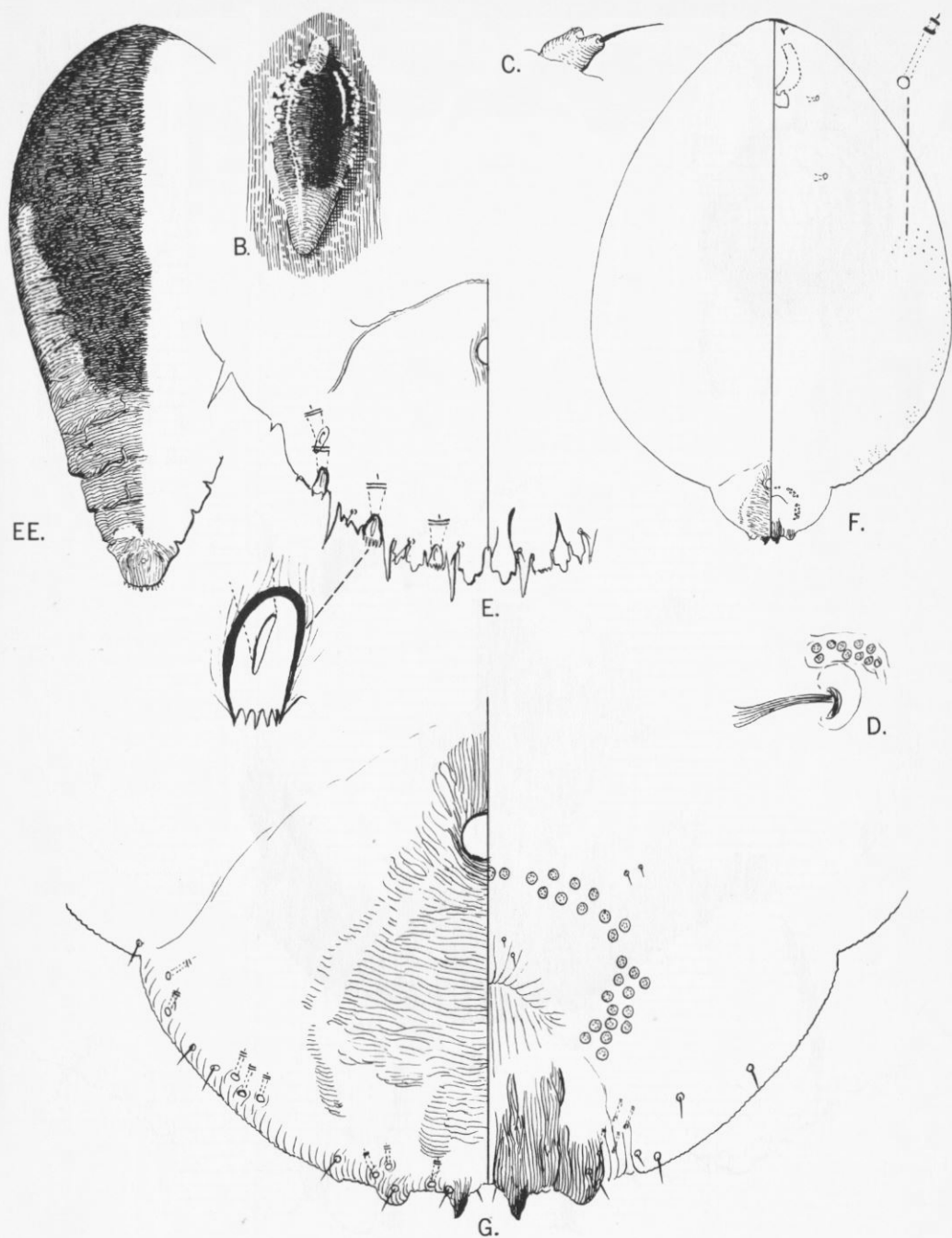
Figure 4



*Formosaspis nigra* (Takahashi)

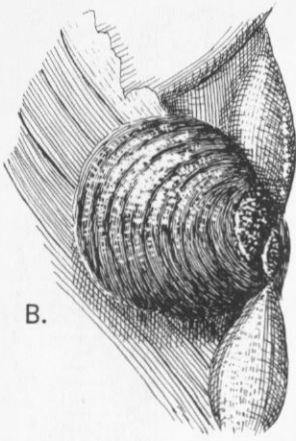
Figure 5



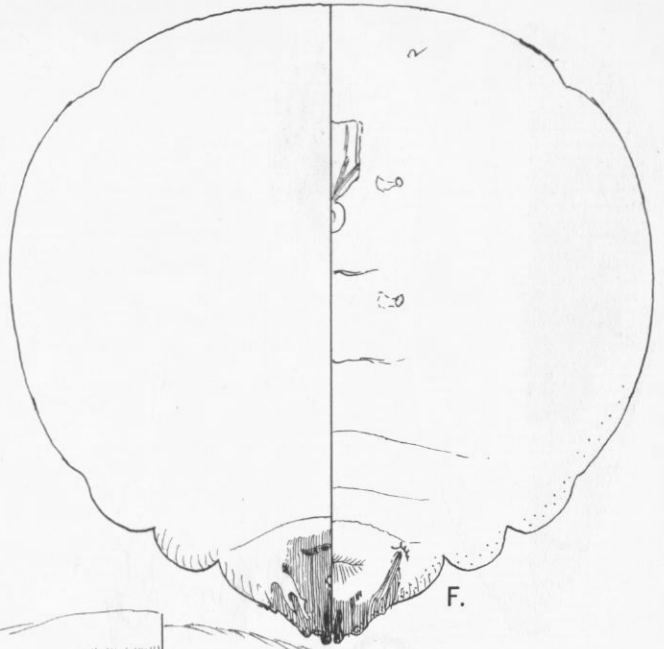


*Formosaspis stegana*, new species

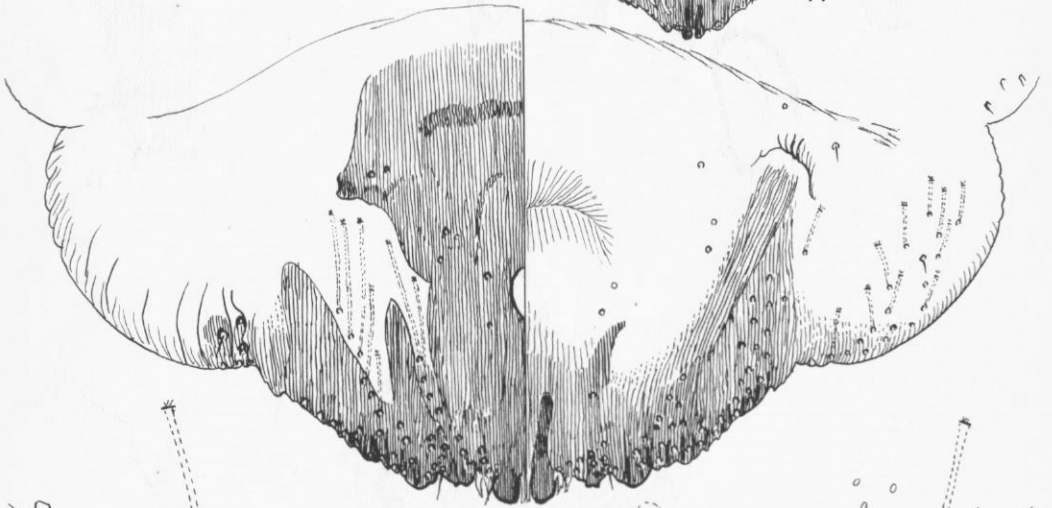
Figure 6



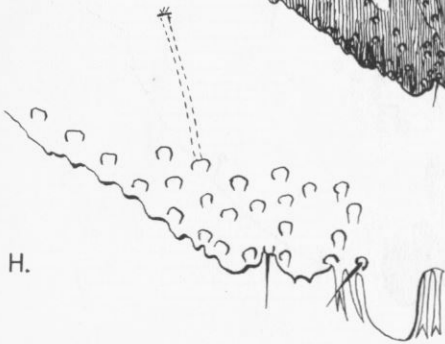
B.



F.



G.



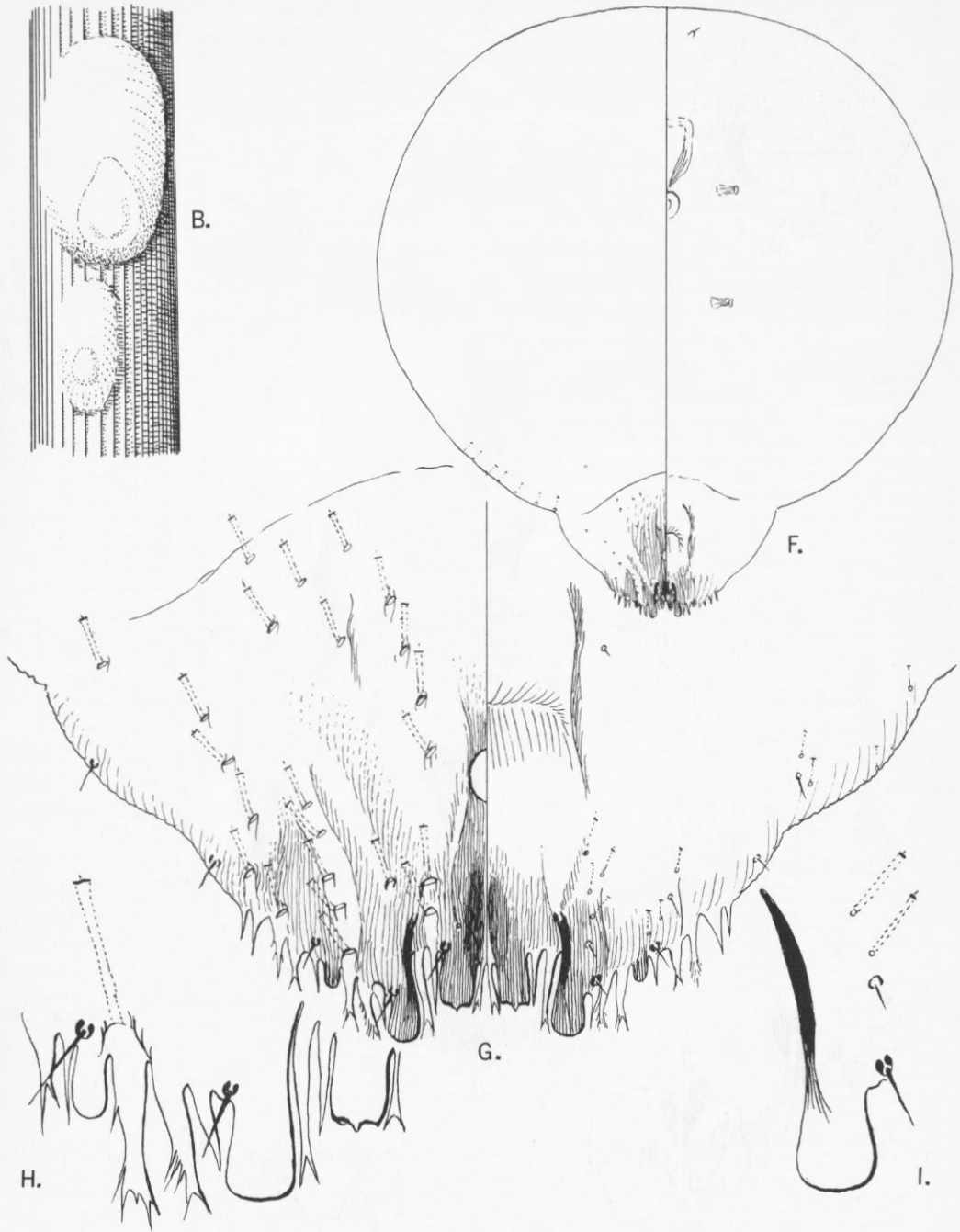
H.



I.

*Chortinaspis decorata*, new species

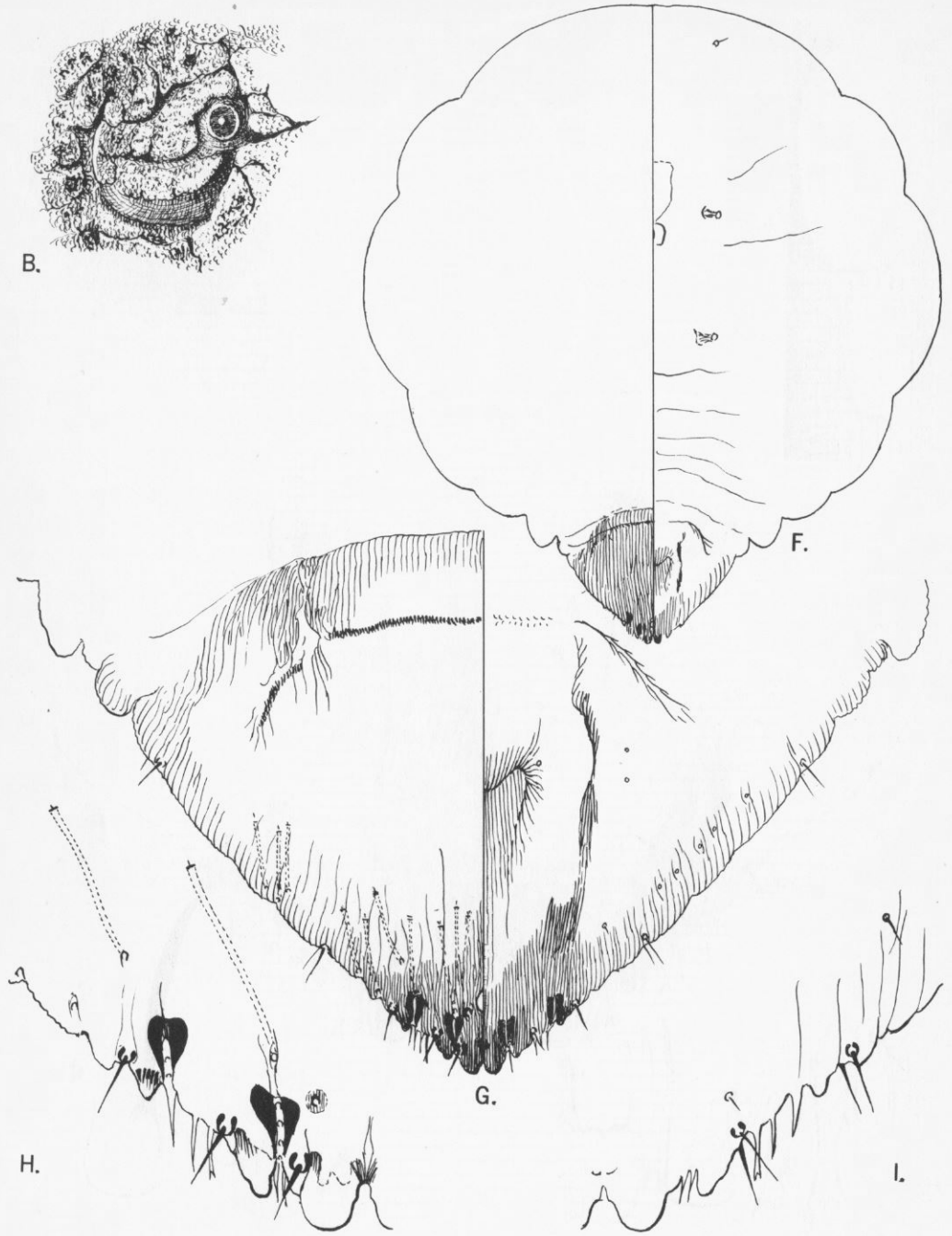
Figure 7



*Temnaspidotus sinensis*, new species

Figure 8





*Quadraspidiotus ternstroemiae*, new species

Figure 9