

**Report upon a collection of Coccidae from Lower California, by Gordon
Floyd Ferris ...**

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REPORT UPON A
COLLECTION OF COCCIDAE
FROM LOWER CALIFORNIA

BY
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STANFORD UNIVERSITY, CALIFORNIA
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INTRODUCTION

LOWER CALIFORNIA

The peninsula of Lower California, or, to use its Spanish name, Baja California, is a long, slender land finger extending southward for nearly eight hundred miles from its junction with the continent of North America. Its southern extremity, terminating in Cape San Lucas, lies just within the tropics two hundred miles across the Gulf of California from the mainland of Mexico, of which the peninsula is politically a part. It is, in the main, an isolated land whose scanty population clusters about the crumbling missions that stand as symbols of a romantic past through which there moves a procession of priests, pirates, and filibusters succeeded by long years in which the land was virtually forgotten.

It is withal a land to fire the interest of the scientific explorer, especially of the botanist, for its isolation and its climate have combined to develop what has been characterized as the strangest desert flora in the world. Yet until comparatively recent years but little has been known concerning the biota of the peninsula. The existing knowledge is based largely upon the explorations made by Dr. Gustav Eisen under the auspices of the California Academy of Sciences, and by Mr. T. S. Brandegee during the closing years of the past century, the results of the extended travels of Nelson and Goldman, supported by the Bureau of Biological Survey of the United States Department of Agriculture, having for the most part not yet been made public.

In certain fields enough work has been done to give a reasonably clear conception of the nature of the life of the peninsula, but there remain some groups that have been practically untouched. Among these groups are the insects. Rather extensive entomological collections were made by Dr. Eisen in the southern portion of the peninsula, the region to which scientific writers have applied the name "Cape Region," but even here practically no more than a beginning has been made. Throughout the remainder of the area almost no work at all has been done and concerning certain groups there is no information whatsoever. From all this great area, as far as I am able to determine, not a single species of the Coccidae or scale insects has heretofore been recorded, although the richness of the flora is in itself evidence that this group should be well represented. A few species have been taken from Carmen Island in the Gulf of California, but none from the peninsula itself.

The present writer has long been keenly aware of the possibilities of extending our knowledge of these insects by explorations within this region. With the financial support of the California Academy of Sciences, the Department of Entomology of Stanford University and the United States Bureau of Entomology, it became possible to spend some time during the summer of 1919 in the southern portion of the peninsula for the purpose, in part, especially of collecting these insects. It is upon the results of this work that the present paper is based.

ITINERARY

Except for a few hours spent ashore at Ensenada, a port about fifty miles south of the United States boundary, the collecting was confined to the extreme southern portion of the peninsula of which I have already spoken as the Cape Region. Accompanied by Mr. J. R. Slevin, assistant curator of Herpetology of the California Academy of Sciences, I landed at La Paz, a port about one hundred miles north of Cape San Lucas on the gulf side of the peninsula. Here a few days were spent while arranging the necessary formalities connected with passing our equipment through the customs, and then, with riding animals and a pack train, we started upon a circuit of the region.

Stops of a few days each were made at San Pedro, Triunfo, San Antonio, San Bartolomé (or, as it is commonly called by the natives and will be called throughout this paper, San Bartolo), the Eureka ranch at La Rivera, Agua Caliente, Miraflores, San Jose del Cabo and Cabo San Lucas. From the latter place the route lay by the roughest of trails over the mountains to Todos Santos on the western coast. From Todos Santos a trip of a few days was made to La Laguna, a meadow near the summit of the Laguna Mountains at an altitude of perhaps 5,000 feet, where one finds himself in surroundings reminiscent rather of regions some hundreds of miles to the northward than of the lowlands immediately about the base of the mountains. From Todos Santos we then returned directly across the peninsula to La Paz.

CHARACTERISTICS OF THE SCALE INSECT FAUNA

There are listed in the following pages 85 species of Coccidae. Of these, two, *Pseudodiaspis larreae* and *P. dentilobis* were not obtained in the peninsula, although the former doubtless occurs there, but are included because of their intimate connection with certain other included species. Two others, *Ehrhornia cupressi* and *Aspidiotus densiflorae* are represented by specimens taken from herbarium material from Guadeloupe Island, an island in the Pacific about two hundred miles off the coast of Lower California. Three species, *Erium lichtensioides* (Ckll.), *Pseudo-*

coccus eriogoni (Ehrh.), and *Pseudococcus sequoiae* (Coleman), were taken only at Ensenada. The remaining 79 species are from the Cape Region.

Of these 79 species, ten are cosmopolitan or at least tropicopolitan forms, the occurrence of which in this area is of no particular significance. These are the following:

Orthezia insignis (Douglas).
Pseudococcus filamentosus (Ckll.).
Pseudococcus virgatus (Ckll.).
Saissetia oleae (Bern.).
Saissetia nigra (Nietn.).
Chrysomphalus aurantii (Maskell).
Chrysomphalus aonidum (L.).
Lepidosaphes gloveri (Pack.).
Aspidiotus lataniae Sign.
Aspidiotus rapax (Comst.).

One species, *Aspidiotus spinosus* Comst., has previously been recorded from greenhouses in eastern United States and in England, but is of unknown origin. It is almost certainly introduced in Lower California also. Three species are neotropical in origin, but are probably introduced in this particular area. These are the following:

Asterolecanium pustulans (Ckll.).
Ceroplastes cirripediformis Comst.
Pseudoparlatoria parlatorioides (Comst.).

Six species, of which three are from oaks, are widely distributed throughout the United States and doubtless northern Mexico as well, these being the following:

Eriococcus quercus (Comst.).
Pseudococcus maritimus (Ehrh.).
Chionaspis pinifoliae (Fitch).
Chionaspis quercus Comst.
Aspidiotus diffinis Newst.
Aspidiotus osborni Ckll. and Newell.

Twenty-four species I am identifying as forms that have previously been recorded from southwestern United States or northern Mexico and that are more or less characteristic of that region. These are the following:

Icerya rileyi Ckll.
Steatococcus morrilli (Ckll.).

Dactylopius confusus (Ckll.).
Dactylopius tomentosus (Lam.).
Eriococcus cryptus Ckll.
Eriococcus bahiae Ehrh.
Eriococcus stanfordianus Ferris.
Pseudococcus salinus (Ckll.).
Trionymus smithii (Essig).
Puto yuccae (Coq.).
Phenacoccus helianthi (Ckll.).
Toumeyella mirabilis Ckll.
Ceroplastes irregularis Ckll.
Lichtensia lycii Ckll.
Ancepaspis tridentata (Ferris).
Pseudodiaspis yuccae (Ckll.).
Pseudodiaspis multipora Ferris.
Diaspis arizonica Ckll.
Diaspis echinocacti (Bouché).
Xerophilaspis prosopidis (Ckll.).
Lepidosaphes concolor (Ckll.).
Lepidosaphes mimosarum (Ckll.).
Aspidiotus candidulus Ckll.
Targionia yuccarum (Ckll.).

One species I am referring doubtfully to *Eriococcus palmeri* Ckll., a species heretofore recorded only from Carmen Island in the Gulf of California.

Twenty-nine species are here described as new. It is not impossible that some of these will eventually prove to be identical with species already described from Mexico. Some are very closely related to northern forms, being perhaps in the nature of subspecies as that term is understood by mammalogists and ornithologists, and others will almost certainly be found to occur in the United States and northern Mexico. A few may prove to be truly autochthonous in the peninsula. The list of new species is as follows:

Steatococcus tabernicolus.
Orthezia caudata.
Asterolecanium cristatum.
Fonscolombia peninsularis.
Eriococcus tillandsiae.
Eriococcus paucispinus.
Xerococcus fouquieriae.

Phenacoccus franseriae.
Aclerda attenuata.
Pulvinaria peninsularis.
Toumeyella cerifera.
Protodiaspis lagunae.
Ancepaspis novemdentata.
Diaspis simmondsiae.
Pseudodiaspis prosopidis.
Pseudodiaspis elaphrii.
Pseudodiaspis ruelliae.
Pseudodiaspis magna.
Chionaspis distichlii.
Lepidosaphes acuta.
Lepidosaphes calcarata.
Lepidosaphes obtecta.
Lepidosaphes peninsularis.
Odonaspis litorosa.
Odonaspis fistulata.
Chrysomphalus enceliae.
Chrysomphalus induratus.
Aspidiotus chortinus.
Aspidiotus pedilanthi.

Two of these species, *Odonaspis fistulata* and *Aclerda attenuata*, apparently have their nearest relatives in the East Indian region, as will be pointed out in the discussion concerning them. It is possible that they have been introduced into Lower California on bamboo, but in the present state of our knowledge speculation is idle.

Four species are left unidentified for lack of material or other reasons, but are listed for the sake of completeness.

It is obvious from the above résumé that the affinities of the scale insect fauna of this region are most intimately related with the fauna of southwestern United States and northwestern Mexico, which is quite in accord with the known facts concerning the other groups that have been studied to any extent. What connection, if any, there may be with the fauna of the tropical west coast of Mexico below Mazatlan, remains to be determined, for the scale insects of the latter region are still almost entirely unknown.

In general the collector in this area cannot fail to be impressed by the absence of conspicuous forms, especially in the Coccinae. A very large proportion of the species are only to be found by the stripping off of loose bark, the uprooting of such things as may be uprooted, or the

digging about the roots of those that may not. Practically all of the soft scales are attended by ants of the genus *Crematogaster* and are protected by shelters of a papery consistency built by the ants across the cracks in which the scales are hidden or even over individuals that may otherwise be freely exposed upon the twigs. It is frequently only by the presence of the ants that any indication is given of the presence of the scales.

TYPES

In the case of all the new species a holotype has been designated, and these types are deposited in the Stanford Collection of Coccidae. Paratypes of all the new species, except *Steatococcus tabernicolus*, will be deposited in the National Collection of Coccidae.

ACKNOWLEDGMENTS

To the authorities of the California Academy of Sciences, to Dr. W. K. Fisher and Professor R. W. Doane of Stanford University, and to Dr. L. O. Howard of the United States Bureau of Entomology, are due acknowledgments for assistance in obtaining the financial support that made possible this report. To Mr. Harold Morrison of the Bureau of Entomology I am indebted for the comparison of certain species with types in the National Collection of Coccidae. I am also indebted to my wife, Roxana S. Ferris, for much valuable assistance in the identification of various plants.

SYSTEMATIC TREATMENT

Genus **ICERYA** Sign.

Icerya rileyi Ckll.

Previous records. From *Prosopis* and *Covillea* in New Mexico and Arizona.

Lower California records. From undetermined mimosaceous shrub and *Prosopis* sp. at San Antonio; *Prosopis* sp., *Casuarina* sp., and undetermined ornamental at San Jose del Cabo; undetermined mimosaceous shrub on Mt. San Bernardo; *Franseria* sp., at Todos Santos.

Notes: It is with much doubt that I assign all these specimens to *I. rileyi*. There is some difference in the form and amount of the secretions, the specimens from *Franseria* having the ovisac very definitely yellow at the base while the others are all white, and there is some difference in the size and number of the setae on the body, the examples from the various hosts at San Jose del Cabo and Mt. San Bernardo having the setae more numerous and more slender.

Several species of this genus have been described from Mexico and slide mounts of some of these are at hand. It is obvious that all of these forms are very closely related and only a careful study of much material, and that the most favorable, can settle their relationships. I therefore place the Lower California material for the present with *I. rileyi*, the first described.

Genus **STEATOCOCCUS** n. gen.¹

1919. *Paleococcus* (part), Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 7.

Monophlebid Coccidae of the general type of the genus *Icerya*, that is: legs, antennae, and mouth parts present in all stages; anal tube lacking except in the first stage and in this stage very small; adult male alate, with but the caudal pair of fleshy appendages present; abdominal spiracles present only on the last three segments; antennae 10-11-segmented. Differing from *Icerya* in the possession of a marsupium which opens through a large, circular opening just behind the posterior legs, in this respect resembling *Mimosicerya* (= *Clypeococcus*), but differing from the latter in not having the derm chitinized.

Type of the genus *Paleococcus morrilli* Ckll. Other included species, *Paleococcus mexicanus* (Ckll. and Parrott), *P. flucheae* (Ckll.), *P. townsendi* (Ckll.), and *P. tabernicolus* n. sp.

¹ A single specimen of a species of this genus was taken from mistletoe at San Pedro, but was unfortunately lost. This specimen represented an undescribed species characterized by the presence of several large spine-like processes on the dorsum of the cephalothorax.

I have previously (ref. cited) called attention to the fact that the species of the type of *Paleococcus morrilli* probably are not congeneric with the type of *Paleococcus*, and have suggested that the genus *Crypticerya* might be revived for them. However, there have since come to hand examples of *C. rosae* (the type of this genus) and this proves to lack the marsupium that is a distinctive character of *Steatococcus*. The new genus is evidently of the type of *Mimosicerya* (= *Clypeococcus* Newst.), the type of which is *Paleococcus hempeli*, but from this it differs most noticeably in the unchitinized derm and the absence of the prominent clypeal region.

The genus as at present known is characteristic of southwestern United States and northern Mexico, the "Sonoran region" of biologists.

***Steatococcus morrilli* (Ckll.) n. sp.**

1914. *Paleococcus morrilli* Ckll., *Ent. News*: 25; 110.

1919. *Paleococcus morrilli* Ckll., Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 8, fig. 2.

Previous records. Known only from *Acacia greggii* in Arizona.

Lower California records. From *Haematoxylon boreale*, San Pedro, beneath the surface of the soil, associated with ants.

***Steatococcus tabernicolus* n. sp.**

Type from *Prosopis* sp. near La Rivera.

Habit. On the smaller twigs of the host beneath shelters built by ants. Owing to the attentions of the ants the Coccids were in all cases entirely devoid of secretion.

Morphological characteristics. Length (mounted on slide) 5 mm. Derm entirely destitute of large spines or setae, even between the bases of the antennae, except for a few quite large submedian setae on the ventral side behind the opening of the marsupium. Depression containing the anal opening beset with numerous small spines and a few such spines scattered over the body. Margin of the marsupial opening with numerous pores and the remainder of the body almost without pores except for the head and the posterior portion of the abdomen, where they are quite numerous. Antennae 10-segmented.

Immature stages not seen.

Notes: Only two specimens of this species are available for study and it might be thought that the absence of large spines is due to the fact that the spines have been broken off, but were this the case the bases of the spines would still remain, affording evidence of their presence. The almost complete absence of large setae at once distinguishes this species from the other members of the genus.

Genus **ORTHEZIA** Bosc.**Orthezia caudata** n. sp.

Fig. 1.

Type from a very large, shrubby composite, probably *Encelia palmeri*, at Todos Santos.

Habit. Dried specimens, with sac, about 5-6 mm. long, the sac occupying about half the total length. The lateral margins bear short tassels and in fully grown examples the dorsal plates extend to the margins, entirely concealing the derm, although in immature examples

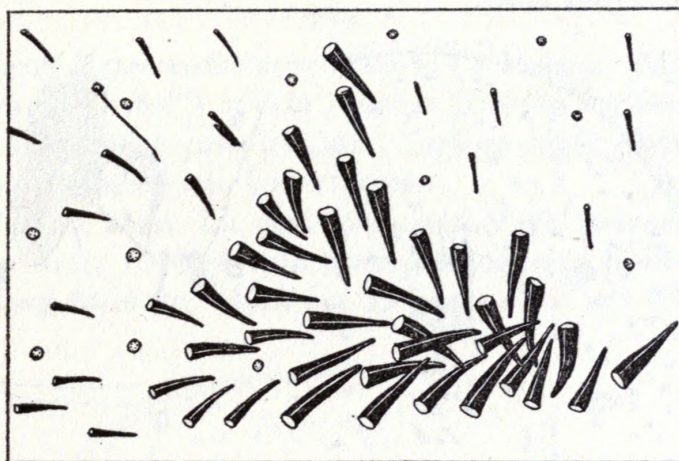


Fig. 1.—*Orthezia caudata* n. sp.: patch of spines from dorsum of abdomen.

there is a distinct, submedian bare area on each side. Arising from about the anus is a single long, slender process which extends fully to the end of the ovisac. Ovisac moderately stout, curved upward at the apex, composed of a single broad ventral plate and several narrow dorsal plates.

Morphological characteristics. Derm with the usual areas of clubbed spines and also with areas of much larger, very conspicuous black spines. Those of the smaller size are rather sparsely distributed over the entire dorsum while those of the larger size are arranged in conspicuous clusters (Fig. 1). There appears to be much variation in the size of these clusters and their arrangement, but in general it appears to be about as follows: each thoracic segment with a large, submarginal cluster on each side and each of the first four abdominal segments with two small clusters on each side, although these may in part be lacking. Abdominal spiracles very small, apparently but five pairs present.

Notes: The distinctive feature of this species in life is the long, caudal wax tassel. Morphologically it differs from any other species known to me by the presence of the conspicuous areas of large spines.

Orthezia insignis Douglas.

Previous records. A widely distributed tropical and greenhouse species.

Lower California records. Abundant upon *Capsicum* sp. ("Chile") in a garden at La Paz.

Genus **ASTEROLECANIUM**.**Asterolecanium pustulans** (Ckll.).

Fig. 2.

Previous records. A widely distributed species in the neotropical region on numerous hosts.

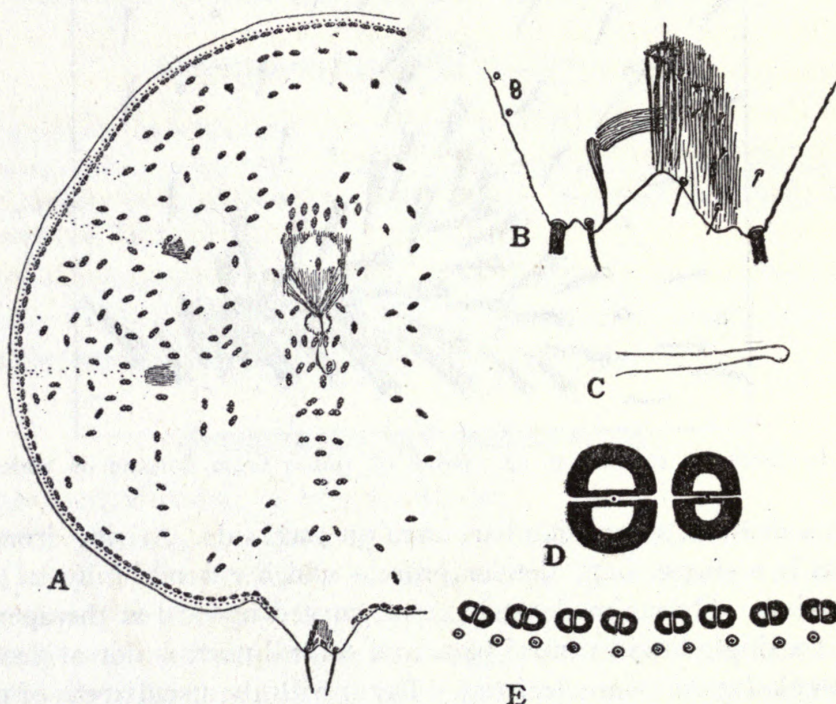


Fig. 2.—*Asterolecanium pustulans* (Ckll.): A, adult female; B, anal lobes, left half dorsal, right half ventral; C, type of duct; D, types of pores, the larger pore from the dorsum, the smaller from the marginal series; E, pores of the marginal series.

Lower California records. From oleander at La Paz and Miraflores, *Vachellia farnesiana* at Todos Santos and mango at San Bartolo.

Habit. Normally a pit-forming species, but the examples from mango and *Vachellia* were not in pits. The dorsum, when not rubbed, is covered with great numbers of short, curling, reddish wax filaments.

Morphological characteristics. Adult female (on slide) .9 mm. long, the body (Fig. 2A) nearly circular with the anal region projecting slightly. Pores of the 8-shaped type abundant on the dorsum, slightly

larger than those of the marginal series (Fig. 2D). Marginal pores arranged in a definite single row accompanied by a row of small circular pores (Fig. 2E). Stigmatic depressions marked by numbers of these circular pores which form a series from the margin to the corresponding spiracles. Anal lobes (Fig. 2B) quite prominent, closely united, their median area on the ventral side quite heavily chitinized. Tubular ducts of the type indicated in Fig. 2C.

Notes: The specimens at hand agree entirely with examples from fig at Tampico, Mexico, and from oleander at quarantine from Mexico.

***Asterolecanium cristatum* n. sp.**

Fig. 3.

Type from *Heteromeles arbutifolia* at La Laguna. Also from *Jatropha canescens* ("lombo") at San Antonio; *Celosia floribunda* ("bledo") at San Bartolo and San Jose del Cabo; *Tapirira edulis* ("ciruela") at San Bartolo; *Encelia palmeri* at Todos Santos.

Habit. Test about 1.5 mm. long, oval, high convex, in unrubbed specimens entirely covered with short curling wax filaments and with numerous long filaments which are as long as the test itself, these fre-

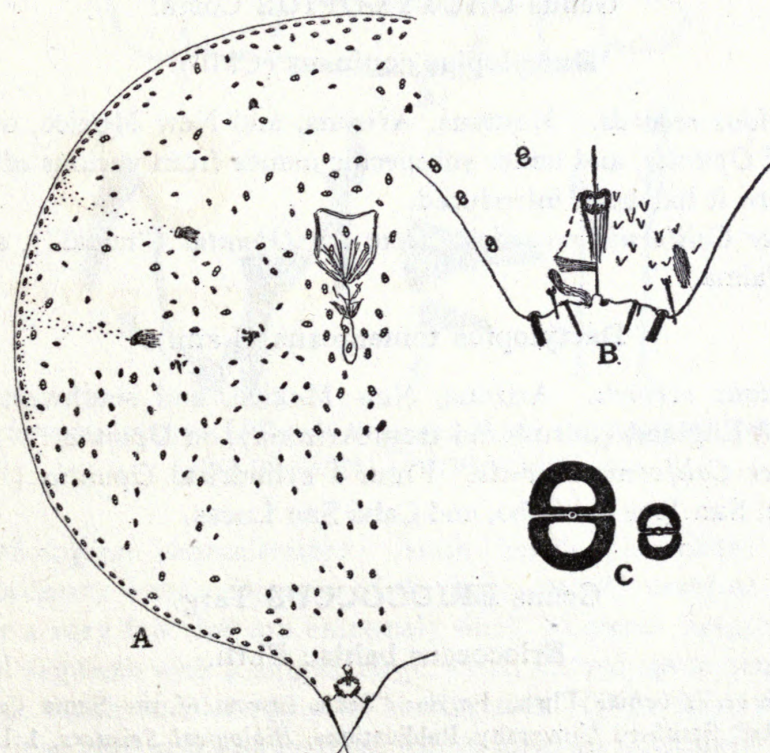


Fig. 3.—*Asterolecanium cristatum* n. sp.: A, adult female, to show distribution of pores; B, anal lobes, left half dorsal, right half ventral; C, types of pores, the larger from the dorsum, the smaller from the marginal series.

quently forming a prominent crest. Rubbed specimens of a uniform green. In no case was the species observed to cause the formation of pits.

Morphological characteristics. Adult female (Fig. 3A) (on slide) about 1 mm. long, nearly circular, the caudal region projecting slightly. Margin with a series of small 8-shaped pores which is continuous except for the caudal region, this series accompanied by a row of small, circular pores for a short distance on each side of the stigmatic depressions only. Dorsal pores numerous, of two sizes, the smaller size slightly larger than those of the marginal series, the others about twice as long (Fig. 3C) with some intergradation between the two extremes. Anal lobes (Fig. 3B) closely united, not chitinized ventrally. Anal ring with six slender setae. Tubular ducts numerous, of the same type as in *A. pustulans*.

Notes: Among the specimens which I refer to this species there is a considerable degree of difference, examples from *Celosia* and *Jatropha* having the dorsal pores fewer and with the large pores distinctly concentrated in the median region. It is possible that two species are involved but the specimens agree in other respects and the material available is not sufficient to permit the study of extensive series.

The species differs from *A. pustulans* most conspicuously in the incomplete marginal series of circular pores and also in the variable size of the dorsal pores.

Genus **DACTYLOPIUS** Costa.

Dactylopius confusus (Ckll.).

Previous records. Montana, Arizona, and New Mexico, on various species of *Opuntia*, and under subspecific names from various other countries where it has been introduced.

Lower California records. From flat *Opuntia* ("nopal"), at La Paz and La Palma.

Dactylopius tomentosus (Lam.).

Previous records. Arizona, New Mexico, and southwestern California and England (introduced from Arizona), on *Opuntia*.

Lower California records. From a cylindrical *Opuntia* ("cholla"), at La Paz, San Jose del Cabo, and Cabo San Lucas.

Genus **ERIOCOCCUS** Targ.

Eriococcus bahiae Ehrh.

1920. *Eriococcus bahiae* Ehrh., Ferris: "Scale Insects of the Santa Cruz Peninsula," Stanford University Publications, *Biological Sciences*, 1:1:17, fig. 4.

Previous records. From *Eriophyllum confertiflorum*, near Stanford University, Calif. (type), and *Gutierrezia* sp., near Las Cruces, New

Mexico. It has also been recorded from France, this latter record possibly the result of misidentification.

Lower California records. From the roots of *Dalea emoryi* at La Paz and Todos Santos; *Porophyllum gracile* ("yerba del venado") near San Jose del Cabo; mimosaceous shrub at San Antonio; *Chamaecybe* sp. ("golondrina") between La Paz and San Pedro.

Notes: The specimens from *Porophyllum* agree very closely with typical examples, the others differ somewhat but yet come within the range of variation of the species.

***Eriococcus cryptus* Ckll.**

Fig. 4.

Previous records. Known only from roots of *Gutierrezia* in New Mexico.

Lower California records. From *Atriplex* sp. at La Paz.

Habit. Sac about 3.5 mm. long, white, smooth and closely felted, rather brittle.

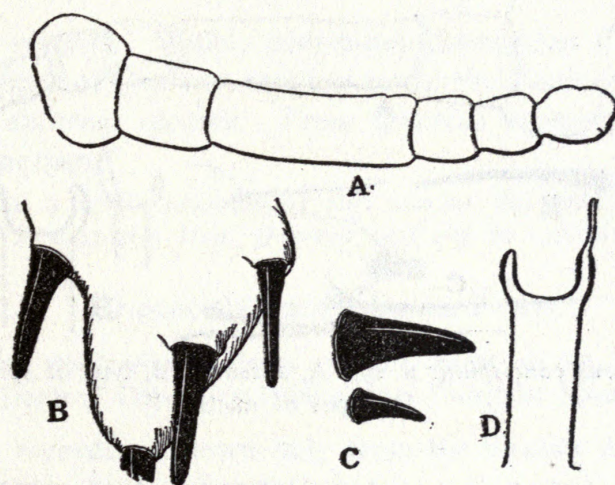


Fig. 4.—*Eriococcus cryptus* Ckll.: A, antenna; B, dorsal aspect of anal lobe; C, types of spines; D, type of duct.

Morphological characteristics. Adult female (on slide) 2.5 mm. long, of ordinary form. Dorsum of the body entirely destitute of spines except for a very few that are extremely small. Lateral margins of each abdominal segment with a single, large, stout, curved spine accompanied by a single much smaller spine of similar form (Fig. 4C). Along the margin of the head and thorax these spines form an irregularly single or double row. Anal lobes (Fig. 4B) prominent, slightly chitinated, each with two slender setae ventrally and three spines dorsally, these somewhat

smaller and straighter than the larger of the marginal spines. Anal ring with eight setae, these about half as long as the anal lobe setae. Legs with the tarsus slightly longer than the tibia, the claw with a distinct tooth, the posterior coxae with numerous small pores beneath. Antennae (Fig. 4A) 6-segmented, the third segment as long as or even slightly longer than the last three together. Wax ducts (Fig. 3D) with a rather broad, deep and symmetrical cup.

Notes: Examples from this material have been compared by Mr. Morrison with specimens in the National Collection at Washington and this determination has been confirmed by him. The species was originally described as a variety of *E. tinsleyi*, but the latter species is quite different, having the dorsum thickly beset with stout spines.

***Eriococcus paucispinus* n. sp.**

Fig. 5.

Type from *Celosia floribunda* ("bledo"), Cabo San Lucas.

Habit. Sac presenting no distinctive characters.

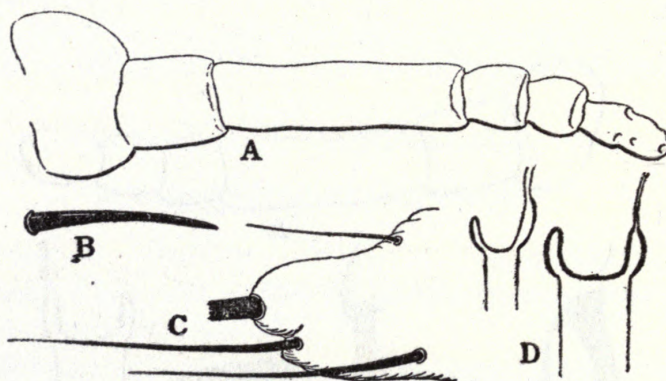


Fig. 5.—*Eriococcus paucispinus* n. sp.: A, antenna; B, type of spine; C, anal lobe; D, types of ducts.

Morphological characteristics. Adult female (on slide) 3 mm. long. Derm entirely destitute of spines and setae except for the usual slender setae on the venter of the abdomen, a very few extremely small spines on the dorsum and a slender spine (Fig. 5B) at the lateral margin of the last two or three abdominal segments. Anal lobes (Fig. 5C) prominent and quite heavily chitinized, each with two quite long and slender setae on the dorsum and two somewhat longer setae on the ventral side. Antennae (Fig. 5A) 6-segmented, the third segment longer than any three others together. Legs with the tarsus slightly longer than the tibia, the claw with a denticle, the hind coxae with numerous pores beneath. Wax ducts (Fig. 5D) of two sizes, some quite small and with the cup

deep and distinctly asymmetrical, the others larger and with the cup broad and shallow. Anal ring with eight setae, these about half as long as the anal lobe setae.

Notes: The only described species known to me that at all approaches this is *E. inermis* Green, from grass in England. The two are very similar in the absence of spines but differ in that *E. inermis* bears stout spines instead of slender setae on the anal lobes.

***Eriococcus palmeri* Ckll.**

Two specimens were taken from *Ruellia* sp. at Todos Santos which Mr. Morrison considers possibly to be nearest *E. palmeri* Ckll. In view of the scanty material they may be placed with this species for the present. It has previously been recorded from *Bouyeria sonora* on Carmen Island in the Gulf of California.

***Eriococcus quercus* (Comst.).**

1920. *Eriococcus quercus* (Comst.); Ferris: "Scale Insects of the Santa Cruz Peninsula," Stanford University Publications, *Biological Sciences*, 1:1:19, fig. 6.

Previous records. Widely distributed throughout the United States on various species of *Quercus*, ranging across the continent.

Lower California records. From *Quercus brandegeei*, between La Rivera and Santiago.

Notes: But a single example of this species was obtained, this agreeing quite closely with examples from *Quercus agrifolia* in California.

***Eriococcus stanfordianus* Ferris.**

1920. *Eriococcus stanfordianus*, Ferris: "Scale Insects of the Santa Cruz Peninsula," Stanford University Publications, *Biological Sciences*, 1:1:21, fig. 7.

Previous records. Known only from the vicinity of Stanford University, California, from unknown host.

Lower California records. From *Cassia* sp. at Todos Santos; *Mimosa* sp. at San Pedro; feral domestic cotton at San Jose del Cabo.

Notes: It is only with much hesitation that I refer all these specimens to this species. The specimens from *Cassia* agree very closely with the type, except for the presence of a very few small spines on the dorsum of the abdomen in addition to the large spines. Those from *Mimosa* likewise agree quite closely except that the spines are noticeably shorter and stouter than in the type. The specimens from cotton differ most widely, there being many smaller spines on the dorsum which at times approach the larger spines in size. Specimens from this latter lot have been compared by Mr. Morrison with the *Eriococcus* material in the National Collection and he informs me that he cannot connect these with any species in the collection. It may be noted that these approach *E. toumeyi* Ckll. (*E. quercus* var. *toumeyi* Ckll.) in spine characters.

Eriococcus tillandsiae n. sp.

Fig. 6.

Type from *Tillandsia recurvata*, about midway between Cabo San Lucas and Pescadero.

Habit. Occurring among the crowded leaf bases of the host. Sac not noted.

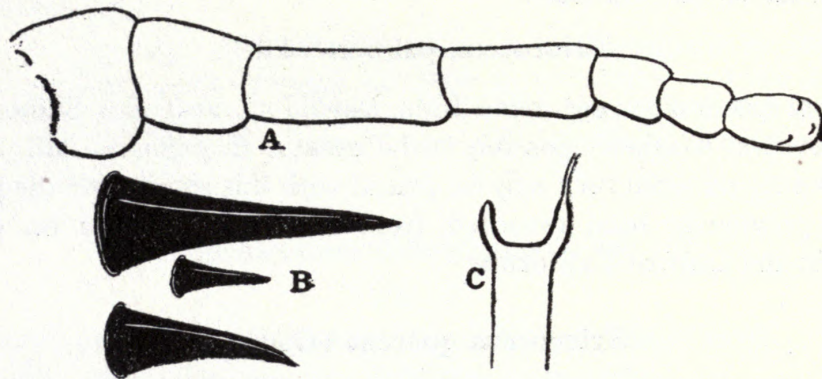


Fig. 6.—*Eriococcus tillandsiae* n. sp.: A, antenna; B, types of spines; C, type of duct.

Morphological characteristics. Adult female (on slide) about 3 mm. long. Spines confined to the margin of the body except for a few extremely small, sharply-pointed spines on the dorsum. Marginal spines (Fig. 6B) along the abdomen arranged in groups of four to six on each segment, two of these being large, tapering and sharply pointed and sometimes slightly curved, the others of the same shape but smaller. Along the head and thorax the spines are more numerous, forming an irregularly double or triple series and are more nearly of the same size. Anal lobes prominent, weakly chitinized, each dorsally with two spines which are practically of the size and shape of the larger marginal spines, ventrally with three quite long setae, the longest of which is perhaps three-fourths as long as the anal lobe setae. Antennae (Fig. 6A) 7-segmented, quite large and long. Legs with the tarsus slightly longer than the tibia, the claw with a denticle, the posterior coxae with very few pores beneath. Anal lobe setae only slightly longer than the anal ring setae. Wax ducts (Fig. 6C) with the cups quite deep, symmetrical.

Genus FONSCOLOMBIA Licht.**Fonscolombia peninsularis** n. sp.

Fig. 7.

Type from *Asclepias subulata*, near the beach at San Jose del Cabo. Also from *Franseria* (?) sp. at San Antonio.

Habit. Occurring on the crowns of the host, surrounded by a small amount of secretion.

Morphological characteristics. Adult female (Fig. 7A) (on slide) about 2.5 mm. long, regularly oval. Derm slightly pigmented. Dorsum destitute of all but a few very small, slender spines. Venter with a transverse row of small, slender setae on each abdominal segment and a few

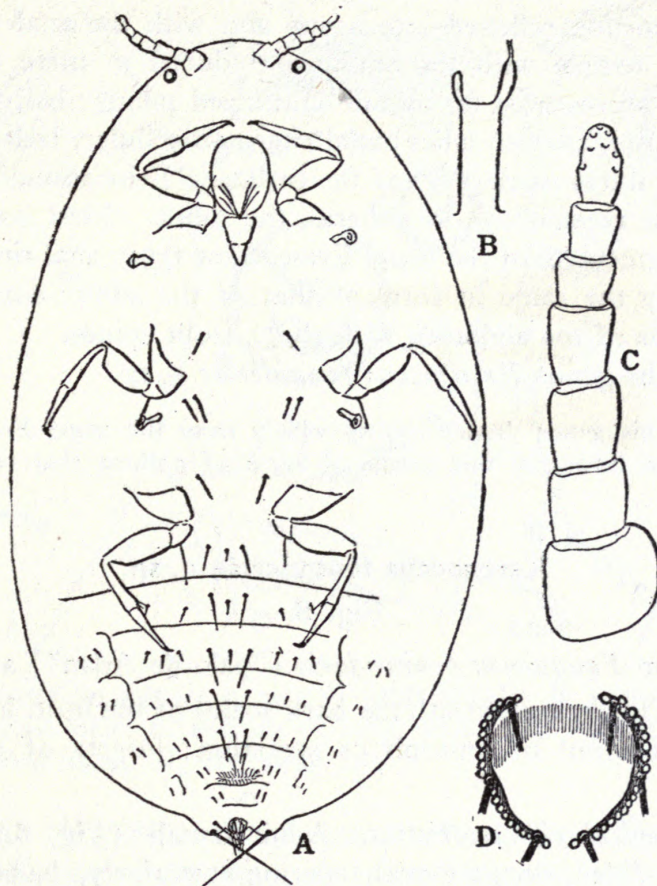


Fig. 7.—*Fonscolombia peninsularis* n. sp.: A, adult female; B, type of duct; C, antenna of adult female; D, anal ring.

such setae on the thorax. Anal lobes low, each with one long and one short seta. Anal ring (Fig. 7D) distinctly cellular, bearing six setae which are somewhat longer than the diameter of the ring. Derm beset with numerous small, multilocular pores, both dorsally and ventrally, especially on the abdomen. Antennae (Fig. 7C) 7-segmented, moderately stout. Legs quite slender, the claw with a very minute denticle. Spiracles small, not surrounded by a ring of pores. Wax ducts (Fig. 6B) with the cup quite deep, slightly asymmetrical.

Immature stages not seen.

Notes: This is the third species of this genus to be recorded from North America. It is very distinct from *F. yuccae* Ferris, and *F. braggi* Ckll. and Rob., the cellular anal ring and the absence of pores about the spiracles serving to distinguish it at once.

Genus **XEROCOCCUS** n. gen.

Coccidae referable to the subfamily Dactylopiinae (of the Fernald Catalogue) and belonging probably to the *Eriococcus* group, that is without dorsal ostioles, with tubular ducts which have the inner extremity of the basal portion reflexed into a cup and with the anal ring bearing setae. Adult female with the antennae reduced to mere vestiges and with the legs represented by minute chitinized points; body terminating in a pair of large, swollen lobes; anal ring non-cellular, bearing six small setae; tubular ducts numerous, of the ordinary Eriococcine type. Intermediate stages resembling, in general, the adult. First stage with the antennae 6-segmented, of the usual Eriococcine type; anal ring very small and apparently the same in form as that of the adult; dorsum without spines, margins of the abdomen with short, stout spines.

Type of the genus *Xerococcus fouquieriae* n. sp.

Notes: This genus departs rather widely from the usual Eriococcine type, yet it appears to belong to this group. I know of nothing that very closely resembles it.

***Xerococcus fouquieriae* n. sp.**

Fig. 8.

Type from *Fouquieria peninsularis* ("palo de Adan") at La Paz.

Habit. Occurring beneath the bark scales of the host, imbedded in a considerable amount of amorphous secretion; insects of a bright red color in life.

Morphological characteristics. Adult female (Fig. 8A) about 2.5 mm. long (on slide), elongate-oval, tapering posteriorly, the body terminating in a pair of large, swollen lobes. In fully mature individuals the derm becomes quite heavily chitinized throughout, but in younger examples only the posterior portion of the abdomen and the lobes are chitinized, these heavily so. On the anal lobes and the posterior portion of the abdomen the derm presents a somewhat papillate appearance. Antennae (Fig. 8E) very small, consisting of three minute segments. Legs represented by small chitinized points. Derm almost destitute of setae except for a few that are extremely small and slender. Anal ring (Fig. 8D) quite small, almost concealed between the lobes, simple and bearing six small spines. Derm with large numbers of tubular ducts (Fig. 8F) which bear internally a filamentous prolongation and have the larger basal part terminating in a reflexed, somewhat asymmetrical cup. Spiracles (Fig. 8B) rather small, surrounded by many small ducts with a trilocular center (Fig. 8C).

Penultimate stage similar to the adult except that the anal lobes are much less prominent, the tubular ducts fewer and the abdomen bears a row of moderately large spines along the margin.

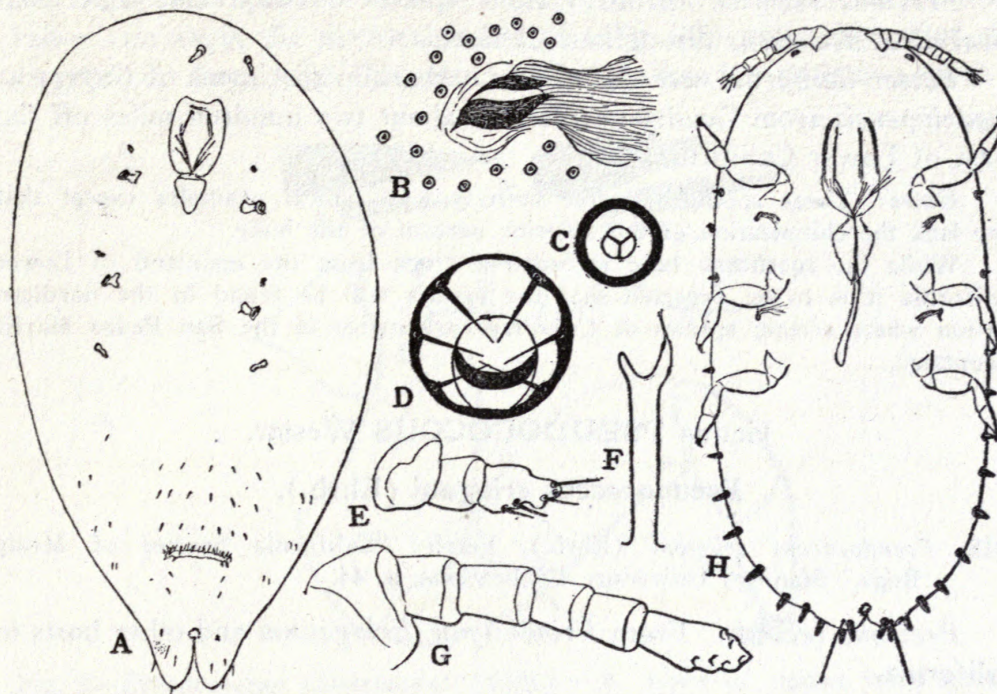


Fig. 8.—*Xerococcus fouquieriae* n. sp.: A, adult female; B, spiracle; C, type of pore; D, anal ring; E, antenna of adult female; F, type of duct; G, antenna of first stage; H, first stage.

First stage (Fig. 8H) with 6-segmented antennae (Fig. 7G). Margins of the body, especially along the posterior portion of the abdomen, beset with a single row of short, stout spines. Anal lobes very low, each with a single slender seta. Anal ring very small, apparently as in the adult.

Notes: The host of this species is restricted to Lower California, but one other species of the same genus, *Fouquieria splendens*, is abundant throughout southwestern United States and northwestern Mexico and it is probable that this Coccid will eventually be found to occur upon it.

Genus **KERMES** Boitard.

Kermes sp.

Host and locality. From *Quercus idonea* on Mt. San Bernardo.

Notes: But a few specimens of this species were taken. Owing to the fact that determinations in this genus are scarcely possible in the existing condition of the literature and to a belief that new species should be described in the genus only when the younger stages are available I refrain from describing this species.

Genus **EHRHORNIA** Ferris.**Ehrhornia cupressi** (Ehrh.).

Previous records. From various species of *Cupressus* and from *Libocedrus decurrens* throughout California.

Lower California records. From herbarium specimens of *Cupressus guadelupensis* from Guadeloupe Island, about two hundred miles off the coast of Lower California.

Notes: These specimens agree entirely with typical examples except that they lack the chitinization of the anterior portion of the body.

While the specimens here recorded are not from the mainland of Lower California it is to be expected that the species will be found in the northern portion where certain species of *Cupressus* are native in the San Pedro Martir Mountains.

Genus **PSEUDOCOCCUS** Westw.**Pseudococcus eriogoni** (Ehrh.).

1918. *Pseudococcus eriogoni* (Ehrh.), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 44.

Previous records. From *Eriodictyon*, *Eriogonum* and other hosts in California.

Lower California records. From leaves of *Eriodictyon* sp. at Ensenada.

Pseudococcus filamentosus (Ckll.).

Fig. 9.

Previous records. A widely distributed tropical species, occurring on various hosts.

Lower California records. From *Lysiloma* sp. ("palo blanco") at La Paz; undetermined mimosaceous shrub at San Antonio; *Cercidium* sp. on the beach at San Jose del Cabo.

Habit. The specimens from *Lysiloma* were found in cracks in the bark, while those from the other hosts were exposed upon the twigs. In all cases the insects are entirely enveloped in fluffy masses of sticky secretion.

Morphological characteristics. Length (on slide) 4 mm. Derm blue green. Cerarii present only on the last 6-7 abdominal segments, each with two cerarian spines and no auxiliary setae, except for two or three in the anal lobe cerarii, and with no grouped pores. Spines stout, conical, distinctly constricted at the base and, except in the last two cerarii, so widely separated that their identity is obscured. Dorsal body spines few, those on the abdomen arranged in a single transverse row on each seg-

ment, in form (Fig. 9A) resembling the cerarian spines, variable in size, those of the cephalic region noticeably more slender. Anal ring large, in some examples bearing as many as 15 setae of various lengths, in others but the normal 6 setae. Tubular ducts abundant, all small and without a raised rim about the mouth. Antennae (Fig. 9C) noticeably short, 6-7-segmented. Legs (Fig. 9D) short and stout, the claw without a tooth.

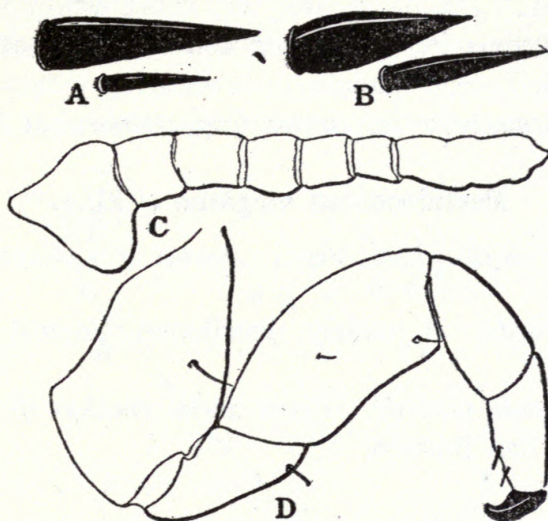


Fig. 9.—*Pseudococcus filamentosus* (Ckll.): A, types of spines from specimen from Hawaii; B, types of spines from specimen from *Lysiloma* in Lower California; C, antenna; D, leg.

Notes: The above description and the accompanying figures are from examples from *Lysiloma*. The Lower California examples differ somewhat from specimens from Hawaii in having the spines stouter and more distinctly constricted at the base (compare Figs. 9A and 9B, the former from Hawaiian examples), but there appear to be no other special differences. The presence of supplementary setae on the anal ring is unusual but seems to be extremely variable.

***Pseudococcus maritimus* Ehrh.**

1918. *Pseudococcus maritimus* (Ehrh.), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 48, pl. 2, fig. 13.

Previous records. From many different hosts throughout the United States.

Lower California records. From *Tapirira edulis* ("ciruela") at Cabo San Lucas.

***Pseudococcus salinus* (Ckll.).**

1918. *Pseudococcus salinus* (Ckll.), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 52, pl. 1, fig. 5.

Previous records. From *Distichlis spicata* in the San Francisco Bay region and at La Jolla, Calif.

Lower California records. From *Distichlis spicata* at La Paz.

Notes: These specimens agree quite closely with typical examples, except that the anal ring is perhaps not quite so far behind the anal lobe cerarii.

***Pseudococcus sequoiae* (Coleman).**

1918. *Pseudococcus sequoiae* (Coleman), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 53, pl. 1, fig. 3.

Previous records. From *Sequoia* and various species of *Cupressus* in California.

Lower California records. From *Cupressus* sp. at Ensenada.

***Pseudococcus virgatus* (Ckll.).**

1919. *Pseudococcus virgatus* Ckll., Ferris: *Journal of Economic Entomology*, 12: 297, fig. 17.

Previous records. A widely distributed tropical and subtropical species.

Lower California records. From aerial rootlets of *Ficus palmeri* in the canyon below San Bartolo.

Genus *TRIONYMUS* Berg.

***Trionymus smithii* (Essig).**

1918. *Trionymus smithii* (Essig), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 71, pl. 3, fig. 27.

Previous records. From various species of *Elymus* in California.

Lower California records. From *Chaetochloa caudata* at San Jose del Cabo.

***Trionymus* sp.**

A few specimens of a species of this genus were taken from beneath the bases of the leaves of yucca at Triunfo. These closely resemble examples from yucca in Arizona and it is possible that it is the species originally described by Cockerell as *Dactylopius olivaceus*.

Genus *PHENACOCOCCUS* Ckll.

***Phenacoccus helianthi* Ckll.**

1919. *Phenacoccus helianthi* (Ckll.), Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 22.

Previous records. From various hosts in New Mexico.

Lower California records. From *Celosia floribunda* ("bledo") and *Cassia* sp. at Todos Santos, and *Elaphrium microphyllum* ("torote") at Cabo San Lucas.

***Phenacoccus franseriae* n. sp.**

Fig. 10.

Type from *Franseria* sp. at San Jose del Cabo. Also from *Hymenoclea monogyra* at the same place and *Encelia palmeri* at Todos Santos.

Habit. Of a rather greenish color, slightly dusted over with powdery secretion and with very short marginal tassels. Ovisac long and slender.

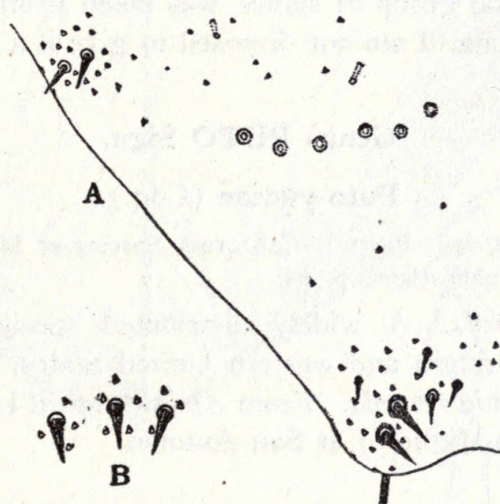


Fig. 10.—*Phenacoccus franseriae* n. sp.: A, anal and penultimate cerarii; B, group of spines from dorsum of abdomen.

Morphological characteristics. Adult female of the usual elongate oval form; length (flattened on slide) 4–4.25 mm. Eighteen pairs of cerarii present, these for the most part with but two cerarian spines, the anal pair, however (Fig. 10A), with three or four smaller spines and the first two or three cephalic pairs with three. All the cerarii without auxiliary setae and with few pores. Anal lobes without chitination either dorsally or ventrally, the ventral side with two slender setae. Dorsal body setae few and very small except for a median group of three (Fig. 10B) on the penultimate and antepenultimate segments, these as large as the cerarian spines and accompanied by a cluster of pores. Ventral body setae quite long and slender, with a single isolated sub-marginal seta near each lateral margin of each abdominal segment. Derm of the dorsum beset with numerous small trilocular pores and an occasional small tubular duct, the three segments preceding the last each with a transverse row of multilocular pores along the posterior margin. Venter

with numerous trilocular pores and small tubular ducts and with many multilocular pores on the posterior portion of the abdomen. Anal ring setae about two-thirds as long as the anal lobe setae. Antennae 9-segmented.

Notes: This species is one of a group, including such forms as *P. colemani* and *P. cevalliae*, which are extremely difficult to separate. It differs from any similar form that I have seen in the presence of the median groups of spines on the dorsum of the abdomen.

Phenacoccus sp.

A species very closely resembling the preceding, but differing in not possessing the dorsal group of spines, was taken from a species of *Phyllanthus* at La Laguna. I am not disposed to give it a name.

Genus **PUTO** Sign.

Puto yuccae (Coq.).

1918. *Puto yuccae* (Coq.), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 64.

Previous records. A widely distributed species on many hosts throughout southwestern and western United States.

Lower California records. From *Atriplex* sp. at La Paz, and *Antigonum* ("flor de San Miguel") at San Antonio.

Genus **ERIUM** Ckll.

Erium lichtensioides (Ckll.).

1918. *Erium lichtensioides* (Ckll.), Ferris: "California Species of Mealy Bugs," Stanford University Publications, p. 75, pl. 3, fig. 25.

Previous records. Occurring throughout western United States on species of *Artemisia*.

Lower California records. From *Artemisia californica* at Ensenada.

Genus **TACHARDIA**.

Tachardia sp.

A species of this genus was found in some abundance on *Acacia flexicaulis* ("palo de fierro") at La Paz, San Pedro, and San Bartolo. The North American species of this group are all structurally almost identical, differing only in the form and color of the secretions, and until a careful review of all our species has been made attempts at identification are not likely to be very successful.

Genus **ACLERDA** Sign.**Aclerda attenuata** n. sp.

Fig. 11.

Type from *Distichlis spicata* on the beach at the Eureka ranch near La Rivera. Also from bamboo or *Arundo* at the same place and at Todos Santos.

Habit. Concealed beneath the sheathing bases of the leaves.

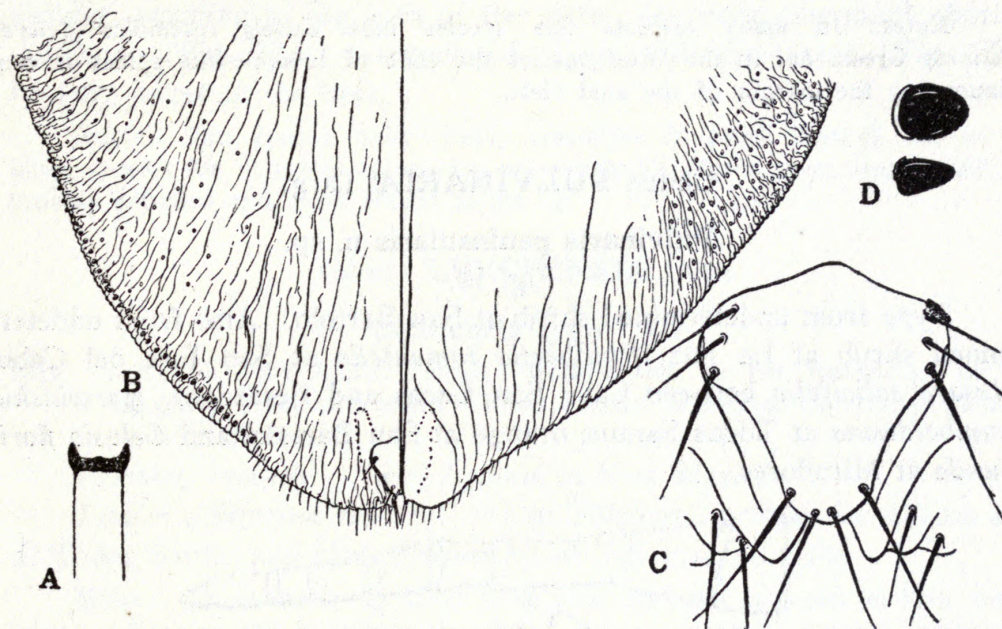


Fig. 11.—*Aclerda attenuata* n. sp.: A, type of duct; B, posterior portion of abdomen, left half dorsal, right half ventral; C, anal plate; D, types of marginal spines.

Morphological characteristics. Adult female varying greatly in length and width, the largest examples attaining a length of 7–9 mm. In the specimens from the type host (the stems of which are very slender) the body of the insect is usually much attenuated, while in those from the other host it is usually relatively much broader, although it is always distinctly elongate. In practically all of the specimens examined, the posterior extremity is turned to one side as in *Aclerda distorta* Green.

In old specimens the body becomes very heavily chitinized except the median and extreme anterior portions, but in immature examples of the last instar the chitinization is confined to the posterior portion of the abdomen. This posterior area (Fig. 11B) is beset both dorsally and ventrally with numerous shallow furrows. Margin of the body with a narrow zone of small, tubercle-like spines, some of which (Fig. 11D) are almost spherical, others somewhat elongate, this zone extending entirely about the margin of the body except for a short distance on each side of the

anal cleft, where the spines are replaced by short setae. The spines are accompanied by numerous tubular ducts of the type common to the genus (Fig. 11A), which are also quite abundant over the chitinized posterior portion of the abdomen, and within this zone is another of small, cylindrical ducts. Anal plate (Fig. 11C) entire, tapering and sometimes quite acute at the apex and bearing several setae as indicated in the figure. Anal ring cephalad of the anterior margin of the plate. Ventral furrow almost closed.

Notes: In many respects this species most closely resembles *Aclerda distorta* Green, but in the latter species the zone of tubercle-like spines is continuous to the margin of the anal cleft.

Genus **PULVINARIA** Targ.

Pulvinaria peninsularis n. sp.

Fig. 12.

Type from undetermined shrub at San Bartolo. Also from undetermined shrub at La Paz, *Philibertia tomentella* at San Jose del Cabo, *Nesaea salicifolia* between Cabo San Lucas and Pescadero, *Karwinskia humboldtiana* at Todos Santos, orange at San Bartolo, and *Celosia floribunda* at Miraflores.

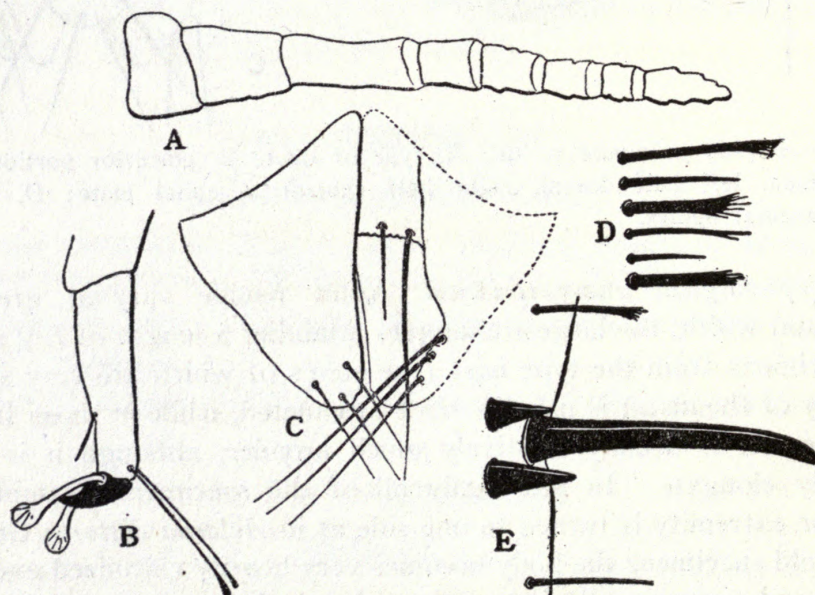


Fig. 12.—*Pulvinaria peninsularis* n. sp.: A, antenna; B, tarsus; C, anal plates; D, types of marginal spines; E, spines of stigmatic depression.

Habit. Adult female secreting a rather loose and quite slender ovisac from 5–8 mm. long, the insect becoming much shriveled at maturity.

Morphological characteristics. Length (on slide) 2–3 mm. Derm membranous throughout. Stigmatic depressions (Fig. 12E) with two

short, stout spines and a rather slender curved spine about four times as long. Marginal spines quite numerous, arranged in an irregularly single or double series, of various shapes and sizes. Some (Fig. 12D) are quite short and stout, flattened and frayed at the tip, others are longer, more slender and little or not at all frayed, and between these extremes are various intermediate forms. Anal plates (Fig. 12C) of normal form, each with three slender dorsal apical setae and three very long ventral subapical setae and with two pairs of fringe setae, the outer long and slender, reaching to the apex of the plates, the inner pair much shorter. Antennae (Fig. 12A) 8-segmented. Legs with the tarsus (Fig. 12B) broadly joined at the tibia.

Notes: This species most closely resembles *P. psidii* Maskell but in the latter species the marginal spines are practically all of the same length and are broadly flattened and much frayed at the tip.

Genus **LICHTENSIA** Sign.

Lichtensia lycii Ckll.

1919. *Lichtensia lycii* Ckll., Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 38, fig. 17.

Previous records. From *Lycium* in New Mexico.

Lower California records. From *Solanum* sp. near La Rivera and at Todos Santos and from *Lycium* sp. at San Jose del Cabo.

Notes: These specimens differ from New Mexican examples in their somewhat smaller size and in lacking the glazed appearance of the ovisac; structurally they appear to be identical.

Genus **CEROPLASTES** Gray.

Ceroplastes cirripediformis Comst.

Previous records. From southern United States, Mexico and West Indies, on various hosts.

Lower California records. From undetermined ornamental vine at La Paz.

Notes: I have not seen authentic specimens of *cirripediformis* but these examples agree quite closely with the various descriptions and figures of that species.

Ceroplastes irregularis Ckll.

Previous records. From various species of *Atriplex* throughout southwestern United States.

Lower California records. From *Atriplex* sp. at La Paz.

Notes: These specimens agree structurally with typical examples of the species but have the secretionary covering very thin and dark brown with black apical markings.

Genus **SAISSETIA** Dep.**Saissetia oleae** (Bern.).

Previous records. A widely distributed tropical and subtropical species.

Lower California records. From *Ficus palmeri* at San Bartolo, oleander at Miraflores, *Tapirira edulis* ("ciruela") at Todos Santos, and undetermined vine at La Paz.

Saissetia nigra (Nietn.).

Previous records. A widely distributed tropical and subtropical species.

Lower California records. From undetermined species of *Ficus* at La Paz.

Genus **TOUMEYELLA** Ckll.**Toumeyella cerifera** n. sp.

Fig. 13.

Type from *Albizzia occidentalis* ("palo escopeta") at Agua Caliente.

Habit. Found in deep cracks beneath loose bark under shelters built by an ant of the genus *Crematogaster*. Adult female secreting a distinct ovisac, high convex, broadly oval, length as much as 5 mm., height 3 mm.

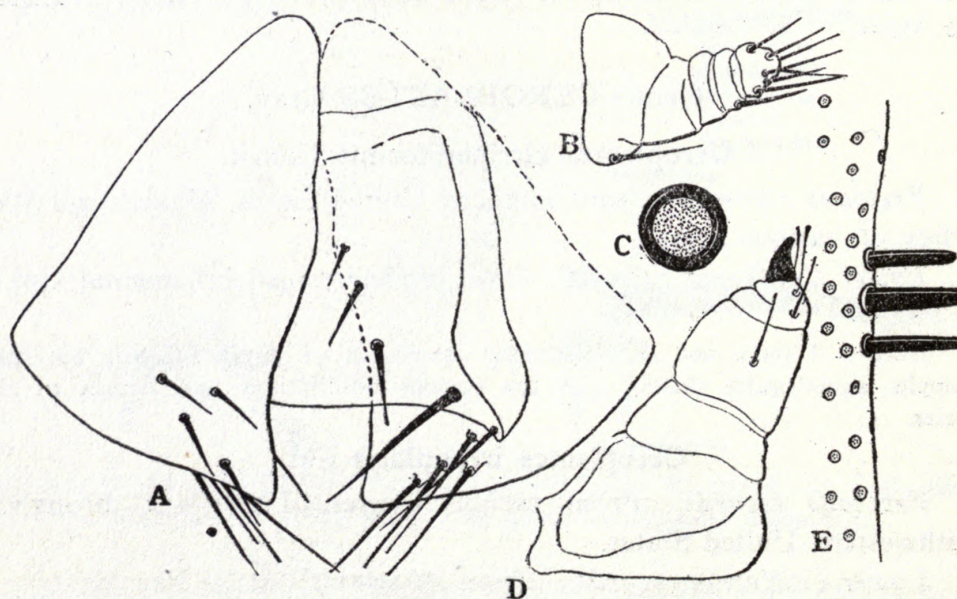


Fig. 13.—*Toumeyella cerifera* n. sp.: A, anal plates; B, antenna; C, type of dorsal pore; E, spines and pores of stigmatic depression; D, leg.

Morphological characteristics. Derm membranous throughout. Antennae (Fig. 13B) very short and stout, apparently 5-segmented, but the segmentation very obscure. Legs (Fig. 13D) likewise very short and stout. Marginal spines very few, small and slender. Stigmatic depressions (Fig. 13E) each with three short, stout spines of practically equal length and connected with the corresponding spiracles by a broad zone of pores. Anal plates (Fig. 13A) large, the cephalo-lateral margin much longer than the caudo-lateral margin. Each plate with four or five apical and subapical dorsal setae and with five ventral subapical setae. On each side there is a single stout fringe seta and there are several hypopygial setae. On the dorsum anterior to the anal plates are numerous pores of the type indicated in Fig. 13C.

Notes: In spite of the development of an ovisac this species is a *Toumeyella*.

***Toumeyella mirabilis* Ckll.**

1919. *Toumeyella mirabilis* Ckll., Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 44, fig. 21.

Previous records. From *Prosopis* in Arizona and Mexico.

Lower California records. From *Prosopis* sp. at La Paz.

Notes: The Lower California examples differ from typical specimens in having the dorsal white markings much larger, in some the white being so extensive that the insect is really white with black markings.

Genus *PROTODIASPIS* Ckll.

***Protodiaspis lagunae* n. sp.**

Figs. 14, 15.

Type from *Quercus brandegeei* at Triunfo. Also from the same host at Santiago and La Laguna.

Habit. Occurring in crevices of the bark. Scale of female more or less circular, less than 1 mm. in diameter, variable in size and form in conformity with its environment, quite high convex, normally well formed, but in certain cases where the insect is deeply buried in a crack the scale is composed merely of loose threads. Scale of male elongate, white, non-carinate, with the exuvium at one end.

Morphological characteristics. Adult female .5-.6 mm. long, form rather broadly oval; derm membranous throughout except for a slight chitinization of the pygidium and sometimes of the anterior portion of the body. Pygidium (Fig. 14) with two pairs of weakly chitinized lobes which are frequently very obscure; with a few very minute and scattered dorsal ducts and with the circumgenital pores present in five groups

which in some specimens are nearly confluent, each group with about six pores. Anal opening close to the anterior end of the pygidium, surrounded by some chitinization but not by a heavy ring as in *P. parvula*.

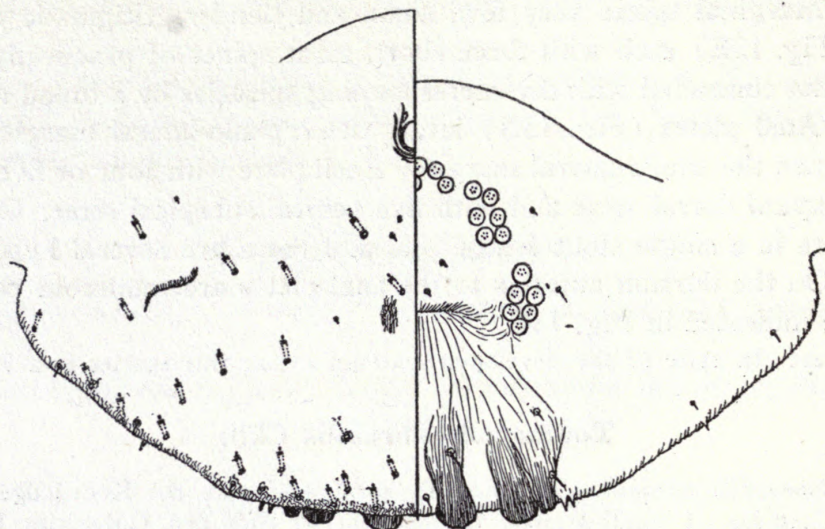


Fig. 14.—*Protodiaspis lagunae* n. sp.: pygidium.

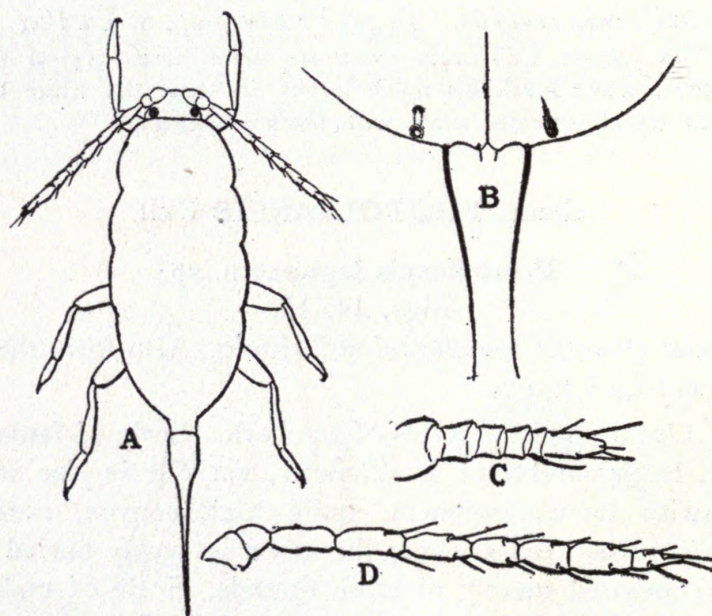


Fig. 15.—*Protodiaspis lagunae* n. sp.: A, adult male; B, pygidium of larva; C, antenna of larva; D, antenna of male.

Margin of the body anterior to the pygidium with a continuous single or double row of small gland spines.

Second stage (from exuvium) closely resembling the adult, but with very few dorsal ducts. The exuvium is shed in the normal manner by the pushing back of the ventral skin and does not at all enclose the adult.

First stage with the antennae (Fig. 15C) 5 or obscurely 6-segmented, the terminal segment short and not annulate. Apex of the abdomen (Fig. 15B) with the usual pair of long setae, with a pair of very small lobes which lie on the ventral side and do not reach beyond the margin and with a pair of large tubular, dorsal ducts.

Adult male (Fig. 15A) apterous, otherwise of the ordinary Diaspine type, the body terminating in a long style, the head with a dorsal and a ventral pair of ocelli, the body entirely hairless, the antennae (Fig. 15D) 9-segmented, very slightly clavate.

Notes: This differs from *P. lobata* Ferris and *P. parvula* Ckll. in the presence of the circumgenital pores and from *P. agrifoliae* Essig. in the presence of well developed lobes.

Genus **ANCEPASPIS** Ferris.

Ancepaspis novemdentata n. sp.

Fig. 16.

1920. *Ancepaspis* sp., Ferris: *Can. Ent.*, 52:32.

Type from *Lysiloma* sp. ("palo blanco") at La Paz.

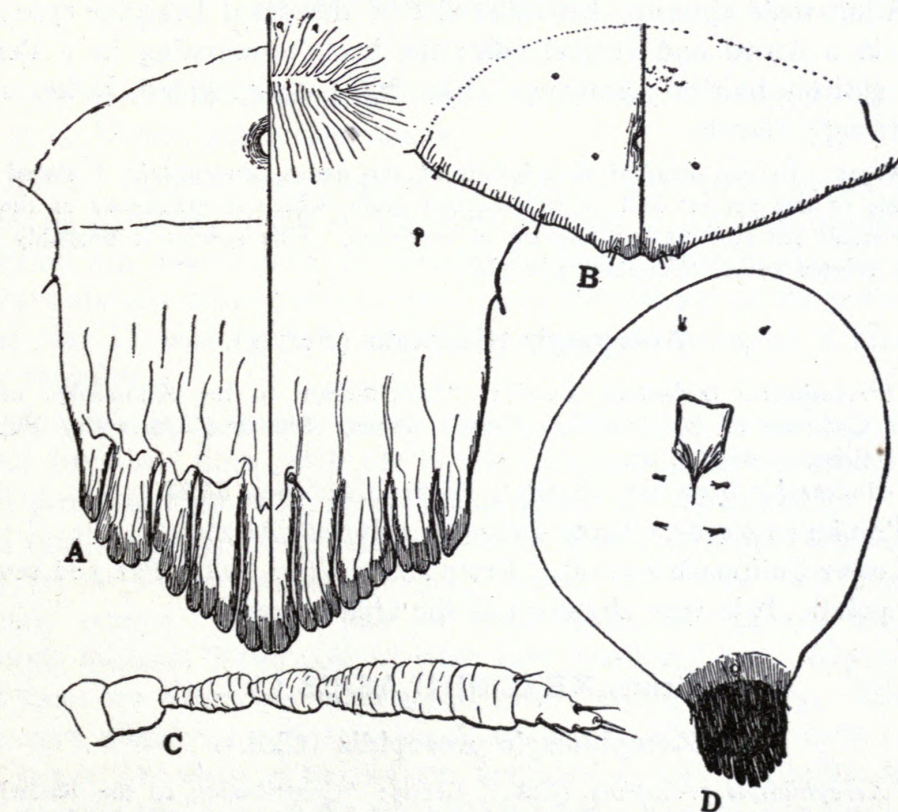


Fig. 16.—*Ancepaspis novemdentata* n. sp.: A, pygidium of adult female; B, pygidium of second stage; C, antenna of male; D, adult female removed from exuvium of second stage.

Habit. Occurring in cracks in the bark and about the buds. There is no scale, but a small amount of wax is secreted. The adult female is inclosed within the black, heavily chitinized second exuvium of the second stage. The male is inclosed within the hardened exuvium of the first stage, from the posterior extremity of which arises a very short secretionary scale.

Morphological characteristics. Adult female, when removed from the enclosing second exuvium, about .5 mm. long, irregularly oval in form (Fig. 16D), membranous throughout except for the heavily chitinized pygidium. Pygidium (Fig. 16A) terminating in nine quite long and slender lobes, the central one of which is somewhat the longest, the others successively slightly shorter. Anal opening near the anterior margin of the pygidium. Pores and ducts entirely lacking.

Second stage with the pygidium (Fig. 16B) without lobes, slightly acute at the apex.

First stage larva with the antennae short, 6-segmented, the terminal segment not elongate and not annulate; the pygidium without lobes or gland spines.

Adult male apterous but otherwise of the usual Diaspine type; the ocelli in a dorsal and ventral pair; the body terminating in a slender style, entirely hairless; antennae (Fig. 16C) 8-segmented, rather short and strongly clavate.

Notes: In my original description of the genus *Ancepaspis*, I stated that the male of this species had no secretionary scale, which is erroneous as there is a very small but still distinct amount of secretion. This species is probably most closely related to *A. tridentata* (Ferris).

***Ancepaspis tridentata* (Ferris).**

1919. *Protodiaspis tridentata*, Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 46, fig. 22.

1920. *Ancepaspis tridentata* (Ferris), Ferris: *Can. Ent.*, 52:32.

Previous records. From *Prosopis velutina*, Arizona.

Lower California records. From *Prosopis* sp. at La Paz and several other points. It is very abundant in the area visited.

Genus *XEROPHILASPIS* Ckll.

***Xerophilaspis prosopidis* (Ckll.).**

1919. *Xerophilaspis prosopidis* (Ckll.), Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 58, fig. 31.

Previous records. From *Prosopis* in Arizona and California.

Lower California records. From *Prosopis* at La Paz.

Genus **DIASPIS** Costa.**"Diaspis" arizonica** Ckll.

1919. "*Diaspis*" *arizonica* Ckll., Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 49, fig. 24.

Previous records. From *Prosopis velutina*, Arizona.

Lower California records. From *Acacia flexicaulis* ("palo de fierro") and *Lysiloma* sp. ("palo blanco") at La Paz and an undetermined mimosaceous shrub at Triunfo.

Diaspis echinocacti (Bouché).

Previous records. A native of the western hemisphere, but widely distributed in company with its hosts, the various species of cacti.

Lower California records. On *Pereskopsis brandegeei* ("alcájer") at Agua Caliente.

Diaspis simmondsiae n. sp.

Fig. 17.

Type from *Simmondsia californica* at La Paz. Also from the same host at La Rivera and Todos Santos.

Habit. Scale of the female of the type common to the genus, about 2 mm. in diameter. Scale of the male likewise of the type common to the genus but noncarinate; frequently the males occur massed in great numbers about a female, and in these cases the identity of the individual scales may be entirely lost, the whole group appearing as a mass of fluffy secretion.

Morphological characteristics. Adult female 1.25 mm. long, of the normal turbinate form, with the lateral margins of the abdominal segments projecting but little; membranous except for the pygidium.

Pygidium (Fig. 17A) relatively large, with the median lobes (Fig. 17B) set in a depression, diverging sharply and with their margins minutely serrate. Second pair of lobes small, but quite prominent, obscurely bilobed. Third pair of lobes very small and low. Beyond the third lobes are numerous small gland spines arranged singly. Tubular ducts very numerous and very small, scattered. Marginal ducts somewhat larger than those of the dorsum, arranged as indicated in the figure. Anal opening well toward the posterior margin. Ventral side apparently without tubular ducts. Circumgenital pores in five groups with 6-12 pores in each. Margins of abdominal segments with many small ducts,

but only the last segment anterior to the pygidium with gland spines. Dorsum with submedian groups of ducts.

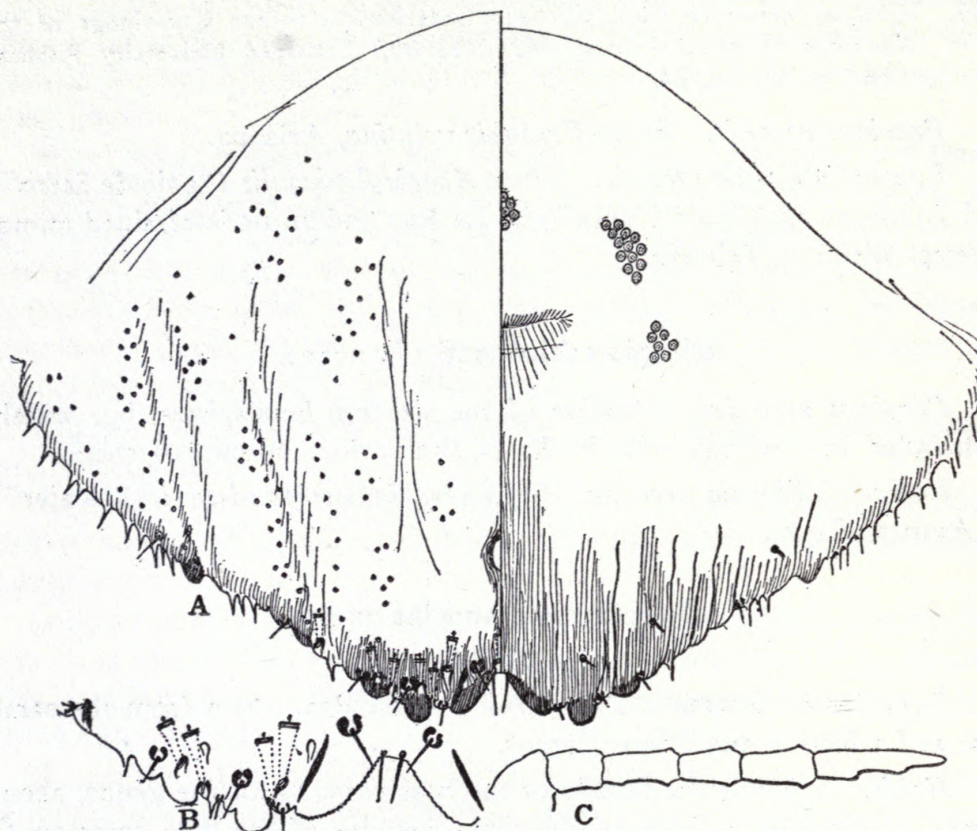


Fig. 17.—*Diaspis simmondsiae* n. sp.: A, pygidium; B, margin of pygidium; C, antenna of first stage.

Second stage closely resembling the adult, but with very few ducts.

First stage with the antennae (Fig. 17C) 6-segmented, the terminal segment not annulate but slightly elongate. Pygidium without lobes.

Notes: This species is one of a group to which belong such forms as *Diaspis texensis* Ckll., *D. manzanitae* (Whit.), and *D. toumeyii* Ckll.

Genus PSEUDODIASPIS Ckll.

1897. Cockerell: *Bulletin* 6, t. s., Division of Entomology, Department of Agriculture, p. 21.

1919. Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 52.

Considering only the type species and one other (*P. elaphrii* n. sp.) which I believe to be strictly congeneric, I should define this genus as follows:

Diaspine Coccidae referable by the character of the tubular ducts to the *Diaspis* series; with more or less conspicuous paraphyses at the bases of the lobes, the lateral lobes not bilobed; with the dorsal ducts few, not arranged in definite transverse rows; with the microducts very long and slender; with the circumgenital pores present or absent; gland spines few or lacking; the scale of the female more or less circular with the exuviae subcentral, exuviation occurring by the pushing back of the ventral derm; scale of the male somewhat elongate, with the exuvium at one end, the texture as in the female.

This definition, however, will exclude certain species now referred to the genus and for which there appears to be no other available. Therefore, rather than name a new genus in a group where practically none of the existing genera are at all definitely limited, I prefer to extend the definition of the genus to include these and certain other forms. Upon this basis I understand the genus to include certain forms belonging to the *Diaspis* series, in which the scale of the female is circular and that of the male somewhat elongate but resembling that of the female in texture; the circumgenital pores either lacking or if present the pygidium with paraphyses; the gland spines few or lacking; the dorsal ducts for the most part few, although at times abundant, but never arranged in sharply marked transverse rows, the lobes never bilobed; the microducts usually very long.

As thus understood, the genus (including certain species here described as new) contains ten species all of which are natives of southwestern United States and Mexico. It is in all probability a highly artificial group, but withal less so than the majority of the so-called genera of the Diaspinae.

***Pseudodiaspis larreae* (Ckll.).**

Figs. 18, 19

1897. *Aspidiotus* (*Pseudodiaspis*) *larreae* Ckll., *Bulletin* 6, t. s., Division of Entomology, Department of Agriculture, p. 21.

Type from *Covillea glutinosa* (= *Larrea tridentata*), Yuma, Ariz.

Habit. " . . . Scale about 2 mm. diameter, flat, irregular, round to suboval, dull white with a slightly creamy tint; exuviae not visible in the mature scale, but in younger scales the elongate-oval, pale straw-colored first skin is exposed, sublateral or even quite lateral. . . . Male scale small, elongate, mytiliform, white, with the elongate first skin projecting at the small end like a *Mytilaspis*. . . ."

Morphological characteristics. Adult female (Fig. 18) about 2 mm. long, of the usual turbinate form, the cephalothorax quite heavily chitin-

ized and occupying the greater part of the body. Margins of the abdominal segments with small ducts but without gland spines. Dorsum of the abdomen with a few small ducts, the arrangement of which is not determinable in the specimens at hand.

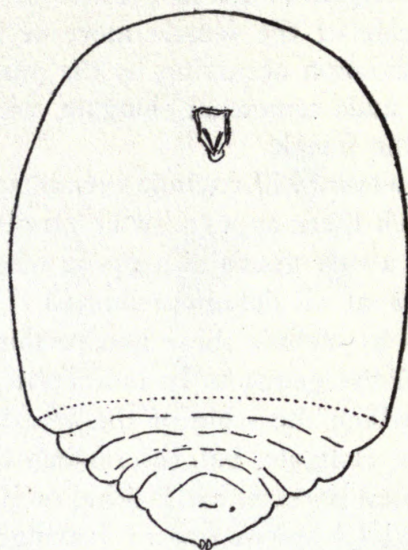


Fig. 18.—*Pseudodiaspis larreae* Ckll.: adult female.

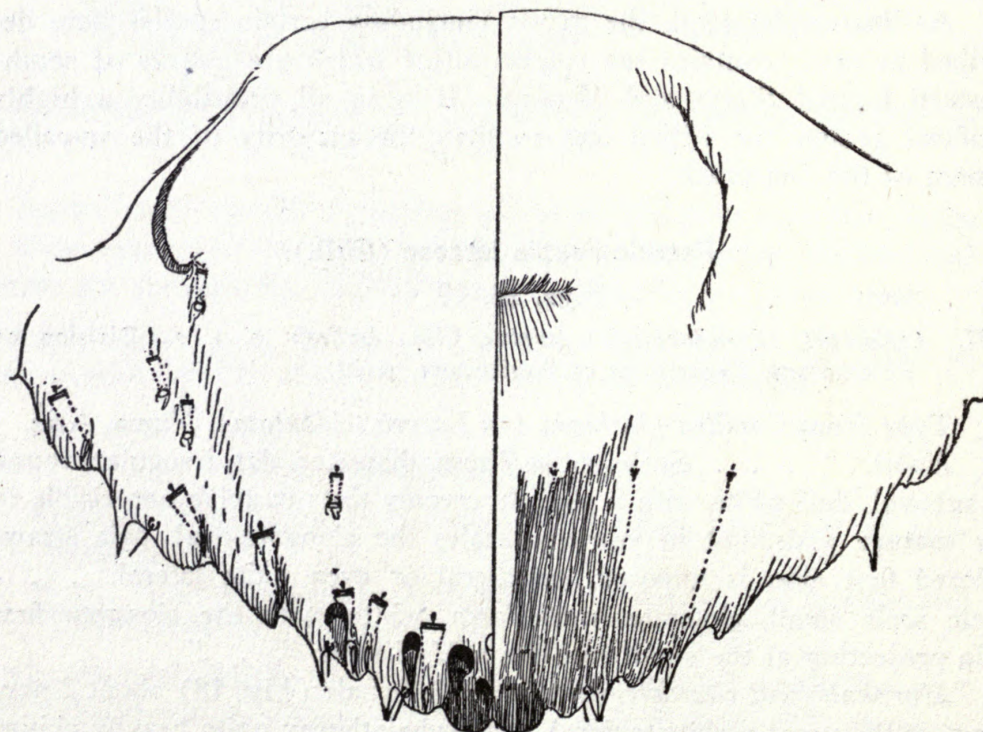


Fig 19.—*Pseudodiaspis larreae* Ckll.: pygidium.

Pygidium (Fig. 19) quite large, with the median lobes alone developed, these broad, low, rounded at the apex and close together. A short, club-like paraphysis extends into the pygidium from the base of each lobe. Beyond the first lobes is a gland pore followed by a slender paraphysis, a small spine, a small gland spine, two gland pores, a spine, a gland spine, two deep and quite widely separated notches with a pore at the base, a spine, a gland spine and another slight notch with a pore. The inner extremity of the paraphyses is heavily chitinized, presenting a lunate form. Marginal tubular ducts quite large, their pores without a chitinized rim. Dorsal ducts very few, smaller than those of the margin. On each side there are three or four long, slender microducts. Anal opening very small, close to the apex of the pygidium. Ventral side apparently without ducts or pores.

Notes: The above description is based upon a single specimen from the type lot, received through the kindness of Professor Cockerell. The species has not been recorded from Lower California but it undoubtedly occurs on the peninsula and I take this opportunity of redescribing it. The available specimen is in very poor condition for study and it is possible that the examination of more material will require some modifications in the description.

***Pseudodiaspis elaphrii* n. sp.**

Figs. 20, 21.

Type from *Elaphrium microphyllum* ("torote") at Cabo San Lucas.

Habit. Found on the bark of the host. Scale of the female about 2 mm. in diameter, circular, flat, gray, with the exuviae central and entirely covered by secretion; ventral scale lacking. Scale of male not observed.

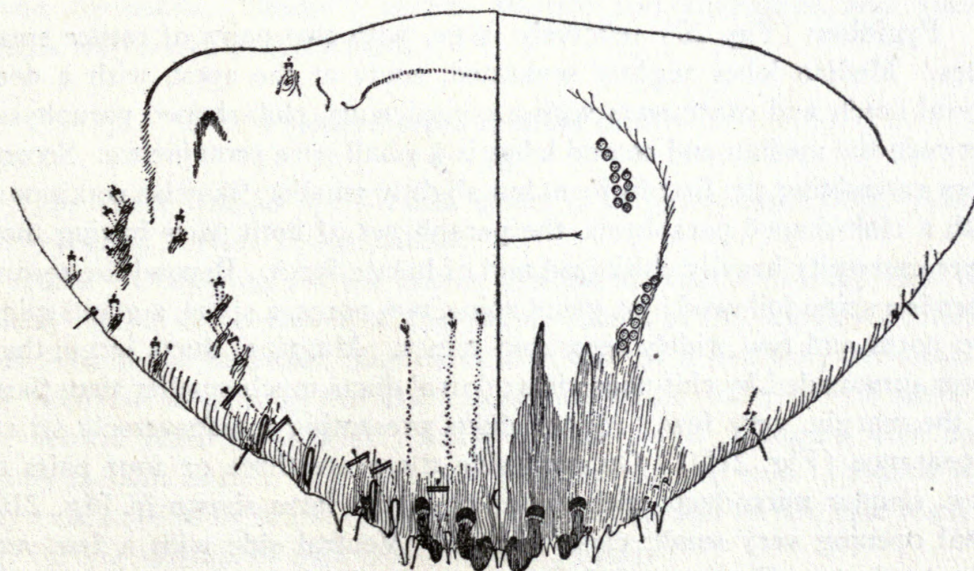


Fig. 20.—*Pseudodiaspis elaphrii* n. sp.: pygidium.

Morphological characteristics. Adult female (Fig. 21A) about 1 mm. long, somewhat elongate, the cephalothorax expanded and somewhat wider than the abdomen, from which it is separated by a constriction. Anterior portion of the cephalothorax tending to be quite heavily chitinized at maturity, the remainder of the body, except for the pygidium, membranous. Dorsum with pores only at the margins of the abdominal segments.

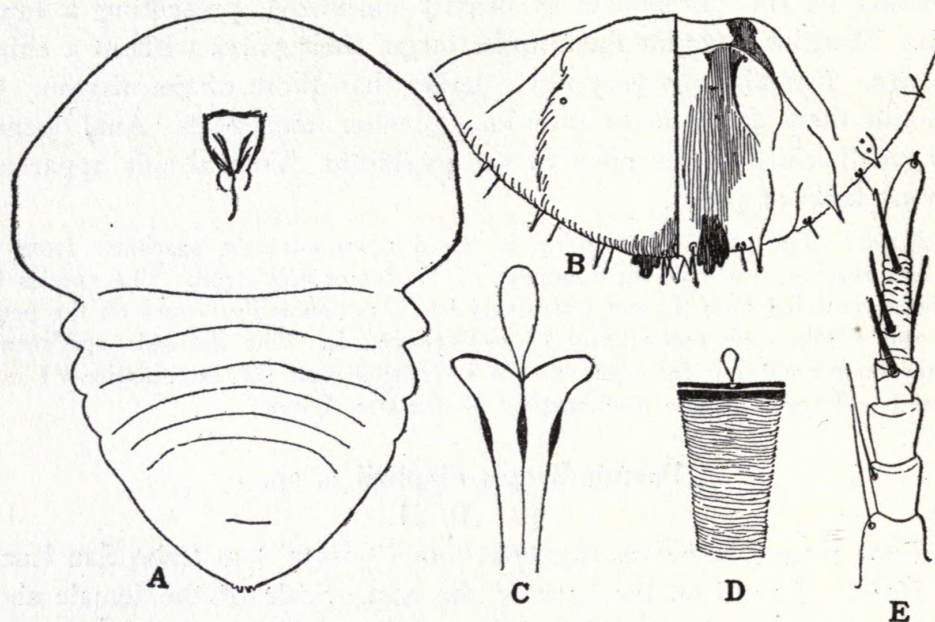


Fig. 21.—*Pseudodiaspis elaphrui* n. sp.: A, adult female; B, pygidium of first stage; C, extremity of microduct; D, duct; E, antenna of first stage.

Pygidium (Fig. 20) relatively large, with two pairs of rather small lobes. Median lobes slightly separated, acute at the apex, with a deep lateral notch and continuous with a conspicuous, club-shaped paraphysis. Between the median and second lobes is a small pore prominence. Second lobes resembling the first in form but slightly smaller, likewise continuous with a club-shaped paraphysis, the paraphyses of both pairs having their inner extremity heavily chitinized and of lunate form. Beyond the second lobes is a spine followed by a gland spine, two pores, a spine, a gland spine, two pores and two widely separated spines. Marginal ducts large, their pores surrounded by chitinous rims; dorsal ducts much smaller than those of the margin, very few. All the ducts presenting a transversely striate appearance (Fig. 21D). On each side there are three or four pairs of long, slender microducts with the apex of the form shown in Fig. 21C. Anal opening very small, close to apex. Ventral side with a few very minute ducts. Circumgenital pores present in four groups, each with about 10 pores.

Second stage with pygidium as in the adult except for the almost entire absence of dorsal ducts.

First stage with the antennae (Fig. 21E) 5-segmented, the terminal segment somewhat elongate and slightly annulate; pygidium (Fig. 21B) with a single pair of rather large lobes and with several small gland spines.

Notes: In spite of the presence of circumgenital pores I regard this species as strictly congeneric with *P. larreae*.

***Pseudodiaspis multipora* Ferris.**

1919. *Pseudodiaspis multipora* Ferris, *Ent. News*, 30:275.

Previous records. From *Phoradendron flavescens* on oak in southern California.

Lower California records. Abundant on mistletoe on *Cercidium* throughout the area visited.

Notes: In the original description (which was based upon but two specimens) it was stated that the derm was membranous throughout. The examination of more material shows that the cephalothorax tends to become quite heavily chitinized at maturity.

***Pseudodiaspis yuccae* (Ckll.).**

1919. *Pseudodiaspis parkinsoniae* (Ckll.), Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," p. 56, fig. 30.

1920. *Pseudodiaspis yuccae* (Ckll.), Ferris: *Can. Ent.*, 52:64.

Previous records. From *Yucca*, *Celtis*, *Acacia*, and *Cercidium* (= *Parkinsonia*) in southwestern United States.

Lower California records. From *Cercidium* sp. at San Antonio, *Celosia floribunda* ("bledo") at San Bartolo and Miraflores, and *Simmondsia californica* at La Rivera.

***Pseudodiaspis ruelliae* n. sp.**

Fig. 22.

Type from *Ruellia* sp. ("rama prieta") at Cabo San Lucas. Also from the same host at Todos Santos.

Habit. Occurring on the leaves associated with a curling that is probably due to the presence of the insect. Scale of the female circular, about .75 mm. in diameter, slightly convex and of a distinctly yellowish color; exuviae subcentral, the first naked, the second covered with secretion; ventral scale quite thick. Scale of male white, elongate with an obscure median carina and with the exuvium at one end. Frequently many males are to be found massed about a female, and in this case many long, curling threads of wax arise from the mass.

Morphological characteristics. Adult female 1 mm. long, of the usual turbinate form, the thorax not separated from the abdomen by a

constriction, the abdominal segments projecting but little at the margins. Cephalothorax quite heavily chitinized cephalad of the mouthparts. Margins of the abdominal segments with at the most a few very minute gland spines and with numerous small ducts. Dorsum with a submedian group of small ducts on each side of each abdominal segment.

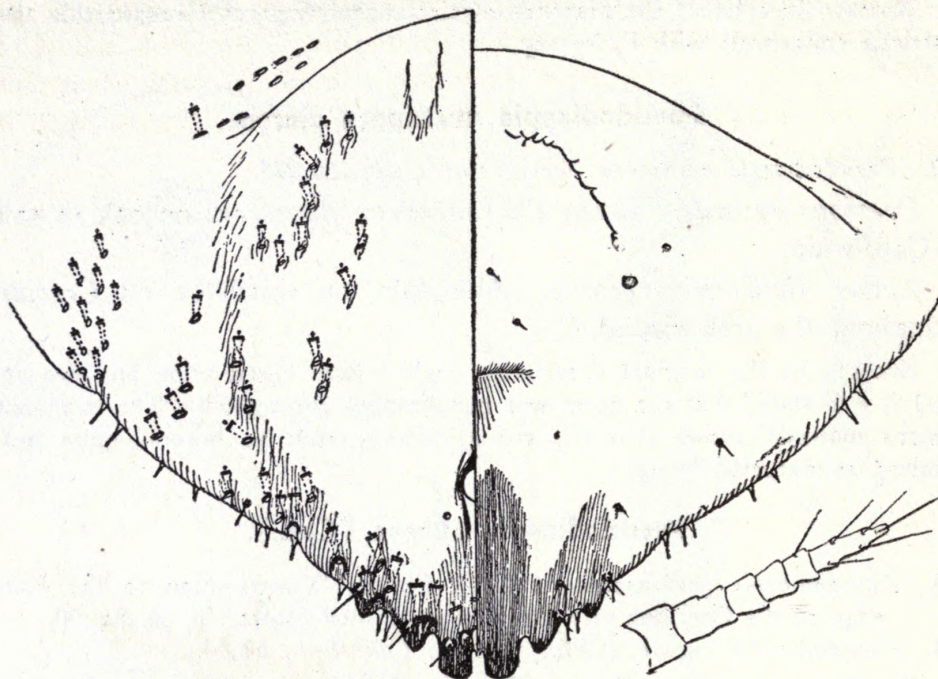


Fig. 22.—*Pseudosiaspis ruelliae* n. sp.: pygidium of adult and antenna of first stage.

Pygidium (Fig. 22) rather acute at the apex. Median lobes quite large, prominent, straight and with their apices nearly truncate. Second and third pairs consisting merely of an acute prominence. Between the second and third lobes are two small gland spines and beyond the third lobes a series of such spines arranged singly. Dorsal ducts rather few, somewhat smaller than those of the margin, the arrangement as indicated in the figure. Microducts very minute and short. Anal opening moderately large, about one-fourth of the length of the pygidium from its apex. Ventral side apparently without tubular ducts. Circumgenital pores lacking.

Second stage with the pygidium very closely resembling that of the adult, differing only in having very few ducts.

First stage larva with the antennae (Fig. 22) 6-segmented, the terminal segment neither elongate nor annulate. Pygidium with a single pair of very small lobes.

Notes: I know of no species that this closely resembles.

***Pseudodiaspis magna* n. sp.**

Figs. 23, 24, 25, 26B.

Type from an undetermined shrub on the beach at La Paz.

Habit. Occurring on the stem and twigs of the host. Scale of the female 3.5–4 mm. in diameter, nearly circular, flat, white or gray and of very firm texture; exuviae submarginal, the first naked, the second normally covered with secretion. Scale of male resembling that of the female in color and texture, slightly elongate with the exuvium at one end.

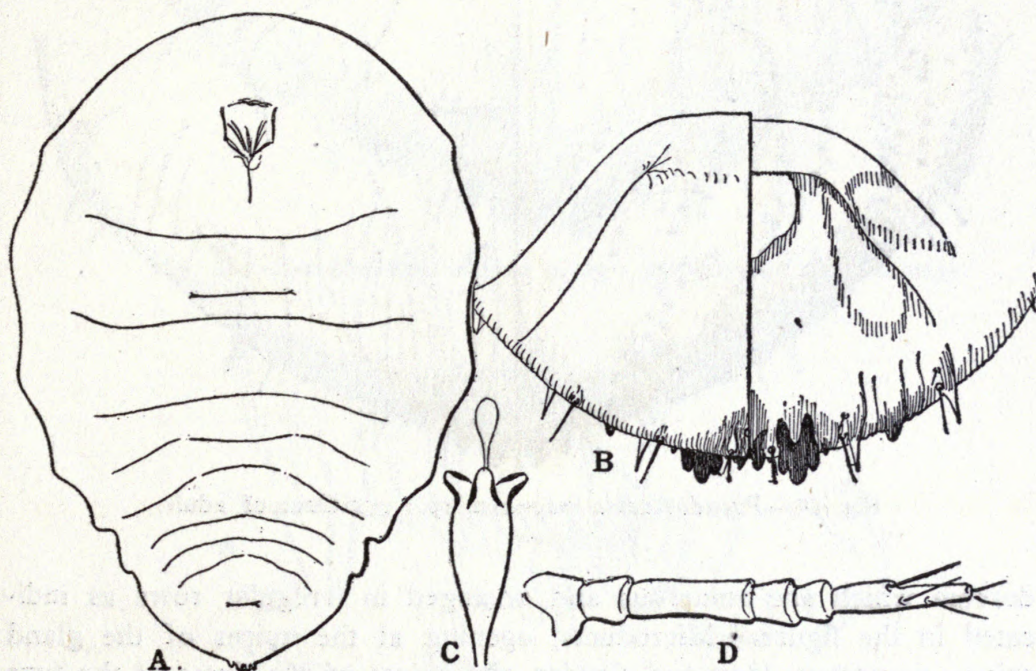


Fig. 23.—*Pseudodiaspis magna* n. sp.: A, adult female; B, pygidium of first stage; C, extremity of microduct; D, antenna of first stage.

Morphological characteristics. Adult female (Fig. 23A) 2.5 mm. long, form somewhat elongate, the cephalothorax not separated from the abdomen by a constriction. Derm at maturity everywhere heavily chitinated. Abdominal segments with at the most a single gland spine, but with many small ducts at each lateral margin and with submedian groups of ducts on the dorsum.

Pygidium (Fig. 24) large and heavily chitinated, with two pairs of lobes which, relatively to the rest of the pygidium, are very small. Median pair (Fig. 26B) rather widely separated, their mesal margins diverging somewhat, the apex deeply notched. Second pair much smaller than the first, tooth-like. Between the first and second pairs is

a small gland prominence, beyond the second pair a large spine, followed by a large gland spine, a prominence that perhaps represents the third lobe, a spine, a large gland spine, and at wide intervals two more spines followed by a single gland spine. The lobes and the margin, including the mouths of the submarginal pores, are very heavily chitinized. Marginal ducts quite short and stout, somewhat larger than those of the

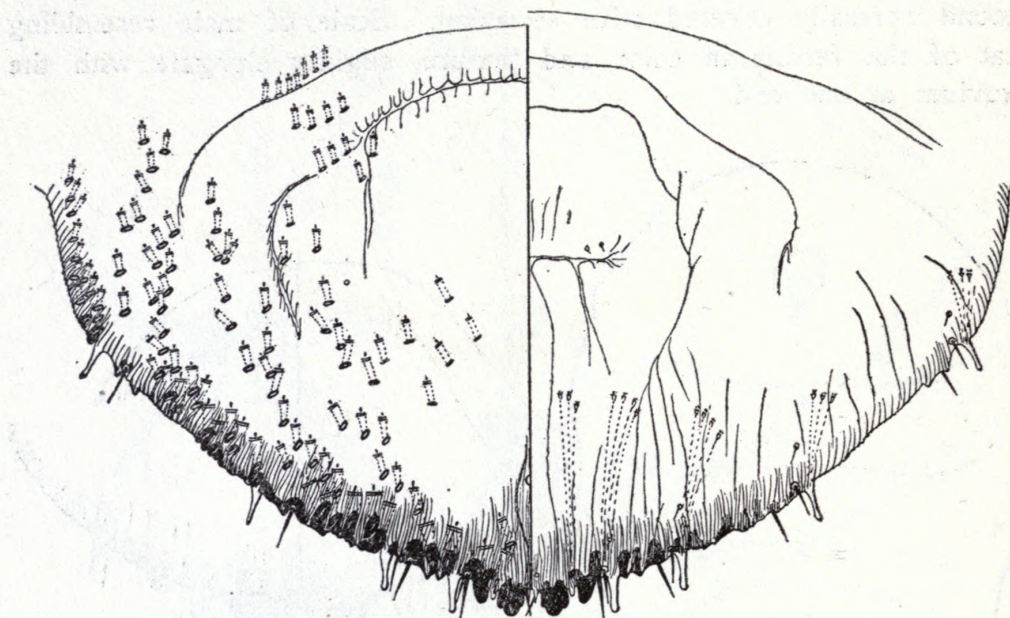


Fig. 24.—*Pseudodiaspis magna* n. sp.: pygidium of adult.

dorsum which are numerous and arranged in irregular rows as indicated in the figure. Microducts, opening at the apices of the gland spines, numerous, long and slender, the apices of the ducts of the type indicated in Fig. 21C. Anal opening small, placed well toward the apex of the pygidium. Ventral side apparently without tubular ducts. Circumgenital pores lacking.

Second stage with the pygidium (Fig. 25) with the lobes as in the adult but with practically no dorsal ducts.

First stage, with the antennae (Fig. 23D) 6-segmented, the terminal segment neither elongate nor annulate, the third segment noticeably long; pygidium (Fig. 23B) with a pair of large, toothed lobes and between these a pair of very small simple lobes.

Notes: This species is evidently quite close to *P. dentilobis* Ckll., the description of which follows, but it is apparently distinct. The two species differ chiefly in the form of the lobes (compare Fig. 26B and 26C) the lobes in *dentilobis* being distinctly truncate while in *magna* they are acute. Also the marginal ducts of *dentilobis* are noticeably longer and more slender.

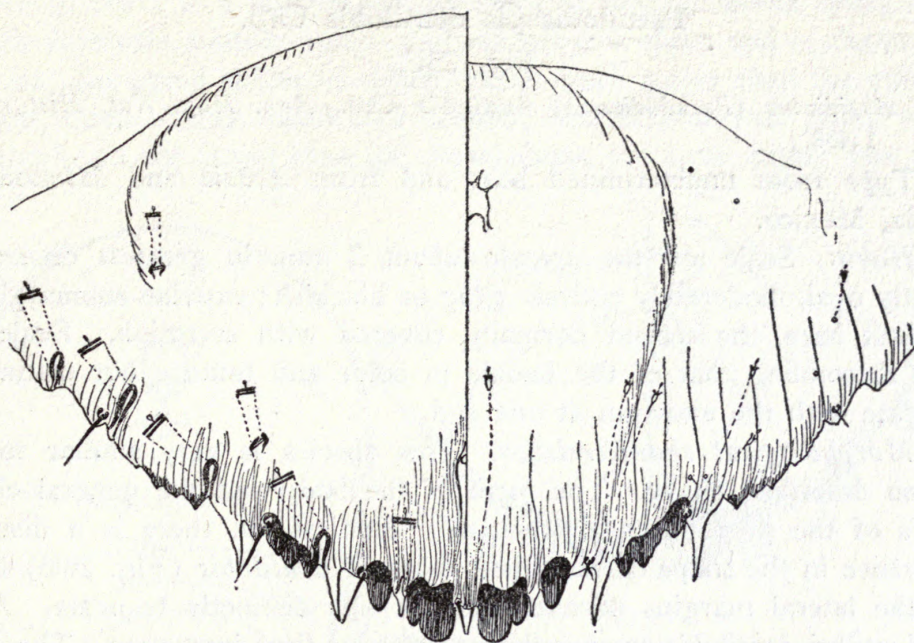


Fig. 25.—*Pseudodiaspis magna* n. sp.: pygidium of second stage.

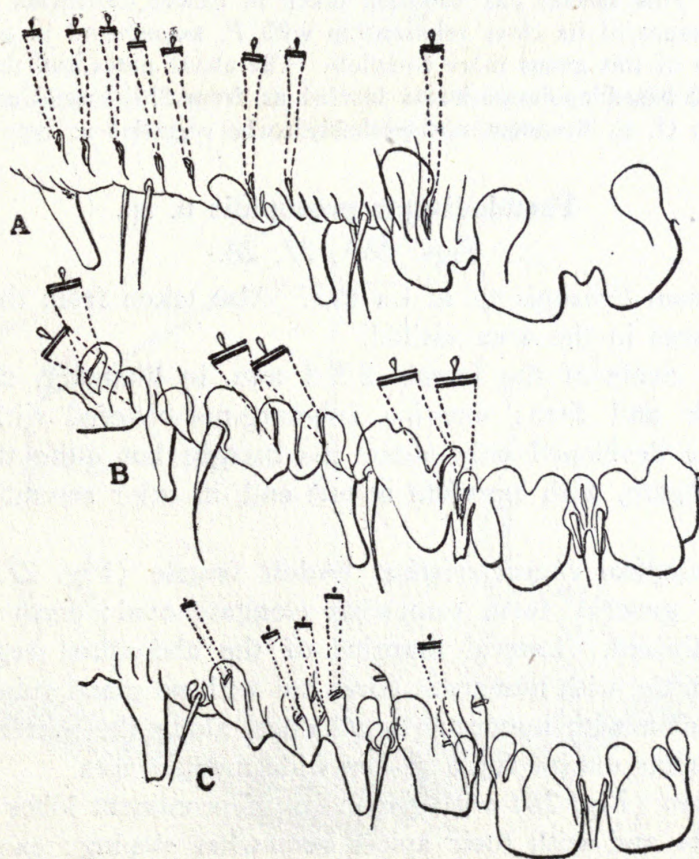


Fig. 26.—Margin of pygidium of: A, *Pseudodiaspis prosopidis* n. sp.: B, *Pseudodiaspis magna* n. sp.: C, *Pseudodiaspis dentilobis* Ckll.

Pseudodiaspis dentilobis Ckll.

Fig. 26C.

1898. *Aspidiotus* (*Pseudodiaspis*) *dentilobis* Ckll., *Ann. Mag. Nat. Hist.*, (7) 1:438.

Type from undetermined host and from *Acacia* and *Mimosa* at Cuatla, Mexico.

Habit. Scale of the female about 2 mm. in greatest diameter, slightly oval, moderately convex, gray or blackish; exuviae submarginal, the first bare, the second normally covered with secretion. Scale of male resembling that of the female in color and texture but distinctly elongate with the exuvium at one end.

Morphological characteristics. This species is very similar to *P. magna* described above. The form of the body and the general characters of the pygidium are practically identical but there is a distinct difference in the shape of the lobes, those of *dentilobis* (Fig. 26C) having the lateral margins parallel and the tips distinctly truncate. Also the ducts of *dentilobis* are much more slender than in *magna*. The first stage is identical with that of *magna*.

Notes: This species has not been taken in Lower California but I am including it because of its close relationship with *P. magna* and in order to make the discussion of this genus more complete. The above notes and the accompanying figure are based upon specimens labeled as from "Mimosa, Cuatla, Mexico," received from O. E. Bremner, and probably to be regarded as type material.

Pseudodiaspis prosopidis n. sp.

Figs. 26A, 27, 28.

Type from *Prosopis* sp. at La Paz. Also taken from the same host at other places in the area visited.

Habit. Scale of the female 2.5–3 mm. in diameter, circular, flat, white, thick and firm; exuviae submarginal covered with secretion; ventral scale developed only about the margin but quite thick. Scale of male elongate, with exuvium at one end, in color resembling that of the female.

Morphological characteristics. Adult female (Fig. 27A) about 2 mm. long; general form somewhat elongate oval; derm at maturity heavily chitinized. Lateral margins of the abdominal segments projecting but little, with numerous pores but with no gland spines. Dorsum of the abdomen with numerous small ducts along the posterior margins of the segments except for a rather wide median area.

Pygidium (Fig. 28) with two pairs of prominent lobes with nearly parallel sides and with their apices somewhat sloping; each lobe continuous at its base with a club-shaped paraphysis. Beyond the second

lobe (Fig. 26A) is a large spine, followed by a large gland spine, and at wide intervals another spine, a gland spine, a spine and a cluster of three or four gland spines of which one is much larger than the others. Tubular ducts rather small and slender, the submarginal ducts very numerous and not larger than the dorsal ducts, the latter rather few and

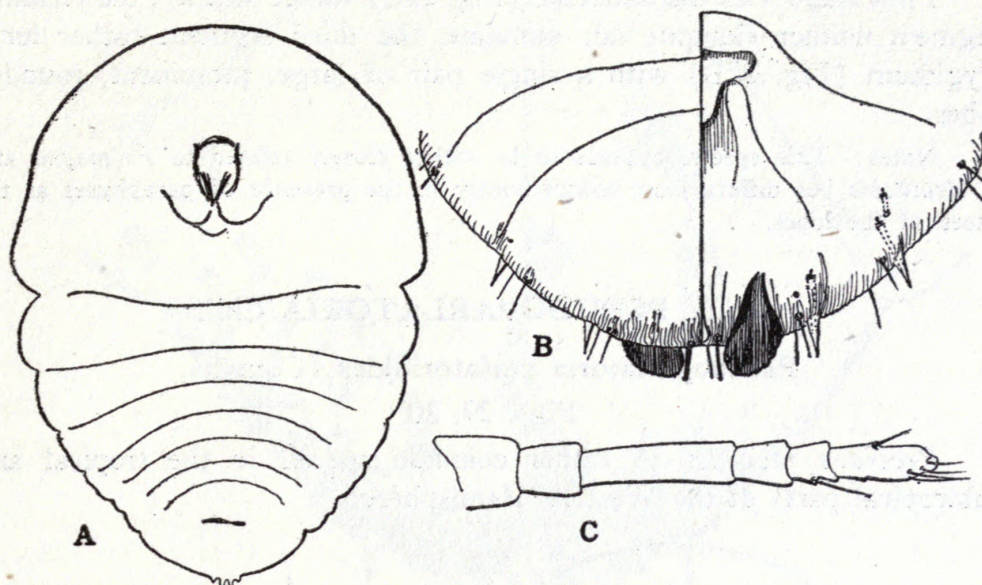


Fig. 27.—*Pseudodiaspis prosopidis* n. sp.: A, adult female; B, pygidium of first stage; C, antenna of first stage.

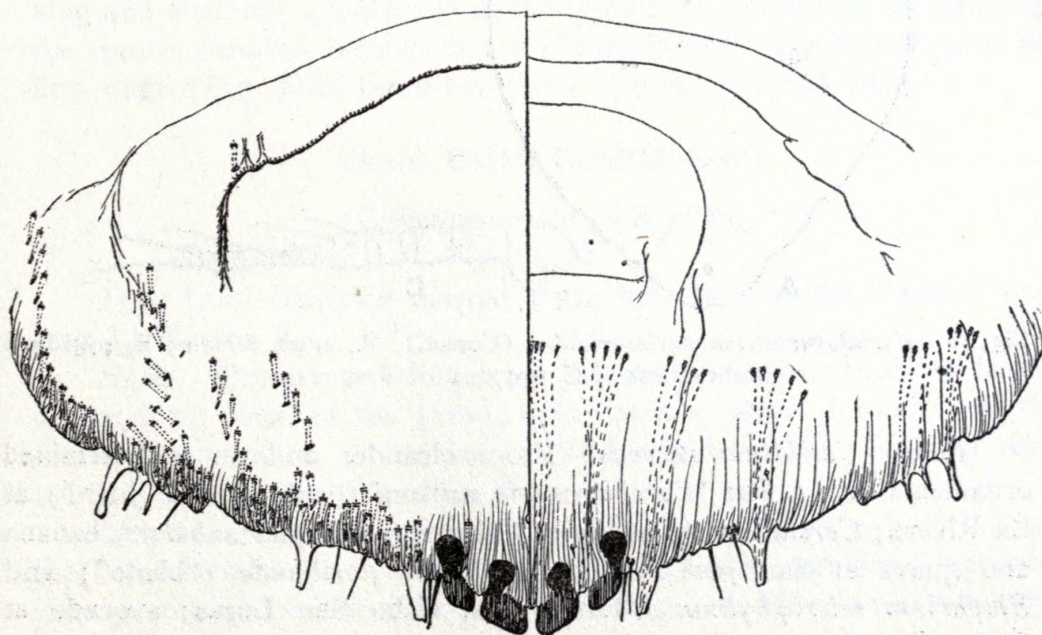


Fig. 28.—*Pseudodiaspis prosopidis* n. sp.: pygidium of adult.

arranged in fairly definite rows as indicated in the figure. Microducts, opening at the apices of the gland spines, abundant, long and slender. Anal opening very small, quite close to the apex of the pygidium. Ventral side apparently without tubular ducts. Circumgenital pores lacking.

Satisfactory preparations of the second stage not seen.

First stage with the antennae (Fig. 27C) rather slender, the terminal segment neither elongate nor annulate, the third segment rather long. Pygidium (Fig. 27B) with a single pair of large, prominent, rounded lobes.

Notes: This species appears to be rather closely related to *P. magna* and *P. dentilobis* but differs most conspicuously in the presence of paraphyses at the bases of the lobes.

Genus **PSEUDOPARLATORIA** Ckll.

Pseudoparlatoria parlatorioides (Comst.).

Figs. 29, 30.

Previous records. A rather common species in the tropical and subtropical parts of the Western Hemisphere.

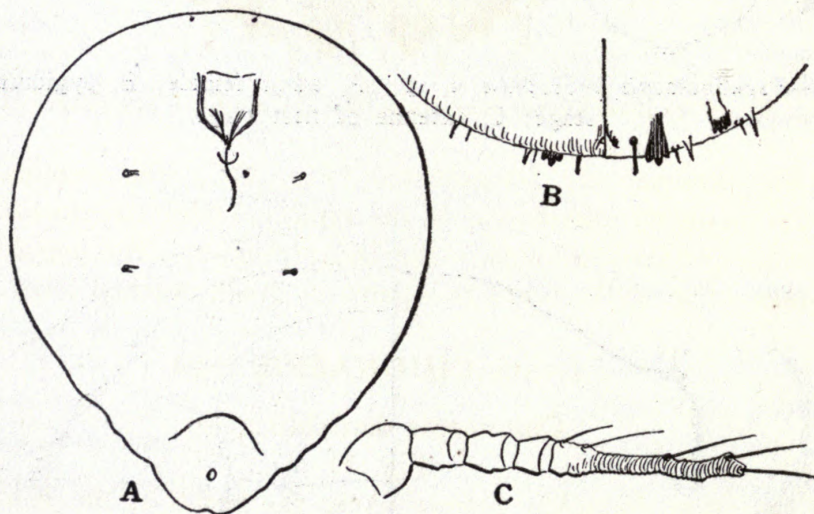


Fig. 29.—*Pseudoparlatoria parlatorioides* (Comst.): A, adult female; B, pygidium of first stage; C, antenna of first stage.

Lower California records. From oleander and an undetermined ornamental at La Paz; *Forchammeria watsoni* ("palo de San Juan") at La Rivera; *Cercidium* sp. at Agua Caliente; *Asclepias subulata*, banana and guava at San Jose del Cabo; *Celosia floribunda* ("bledo") and *Elaphrium microphyllum* ("torote") at Cabo San Lucas; avocado at Todos Santos.

The accompanying figures will supplement the original description. I may note that there is some variation in the number of groups of circumgenital pores, there being at times five groups. In the first stage

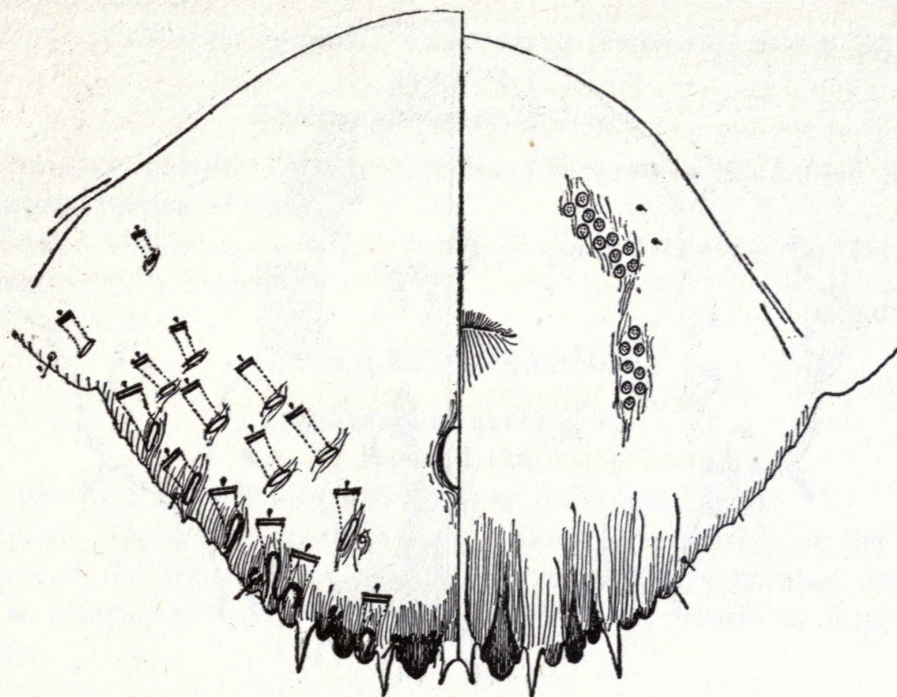


Fig. 30.—*Pseudoparlatoria parlatorioides* (Comst.): pygidium of adult.

larva the antennae are 5-segmented (Fig. 29C), the terminal segment long and distinctly annulate as in the typical Aspidiotine forms, although the species certainly belongs in the *Diaspis* series. The pygidium of the first stage (Fig. 29B) bears two pairs of small, notched lobes.

Genus **CHIONASPIS** Sign.

Chionaspis distichlii n. sp.

Fig. 31.

Type from *Distichlis spicata* along the beach at the Eureka ranch near La Rivera.

Habit. Occurring on the upper side of the leaves. Scale of female of the form usual to the genus, quite narrow, about 1 mm. long, the first exuvium naked, the second covered with secretion. Scale of male but little shorter than that of the female, non-carinate.

Morphological characteristics. Adult female about .75 mm. long, the derm membranous throughout except for the pygidium; the margins of the abdominal segments projecting but little, with numerous small ducts but without gland spines except on the first segment anterior to the pygidium. Dorsum of the abdomen with a few very small ducts.

Pygidium (Fig. 31) with three pairs of lobes, the median pair alone well developed, these simple and rounded at the tip, the second and third pairs very small, simple and scarcely projecting beyond the margin.

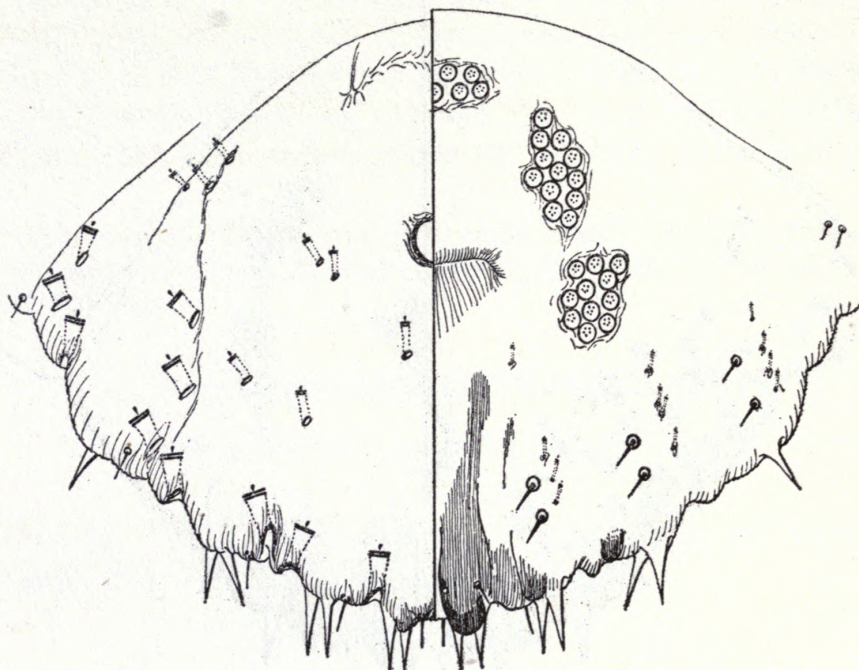


Fig. 31.—*Chionaspis distichlii* n. sp.: pygidium of adult.

Near the base of each lobe is a pair of quite large gland spines and between the third pair and the anterior margin of the pygidium is a single gland spine. The marginal and submarginal ducts are quite large, those of the dorsum for the most part smaller, all very few, their arrangement as indicated in the figure. Anal opening quite large, somewhat in advance of the center of the pygidium. Microducts all very minute. Ventral side with three rows of very small tubular ducts and with three or four pairs of quite large spines at some distance from the margin. Circumgenital pores in three groups of 10–15 pores.

Second stage closely resembling the adult except for the absence of all but the marginal ducts.

First stage with the antennae 6-segmented, all the segments very short except the first and sixth which are slightly elongate, the latter not annulate. Pygidium without lobes but with two or three pairs of gland spines.

Notes: This species is a member of a rather characteristic grass-infesting group to which belong such forms as *C. spartinae*. From this, the only American member of the group, it differs in the inconspicuous lobes and the small number of dorsal ducts.

Chionaspis pinifoliae (Fitch).

Previous records. Widely distributed throughout the United States on various conifers.

Lower California records. From *Pinus cembroides* at La Laguna.

Chionaspis quercus Comst.

Previous records. Widely distributed throughout the United States on various species of oaks.

Lower California records. From *Quercus brandegeei* at Triunfo, Santiago and La Laguna.

Genus **LEPIDOSAPHES****Lepidosaphes acuta** n. sp.

Figs. 32, 33.

Type from an undetermined shrub at Cabo San Lucas.

Habit. Occurring on the twigs. Scale of the female of the type common to the genus, white, about 2.5 mm. long, the exuviae covered with secretion. Scale of male resembling that of female in form and texture.

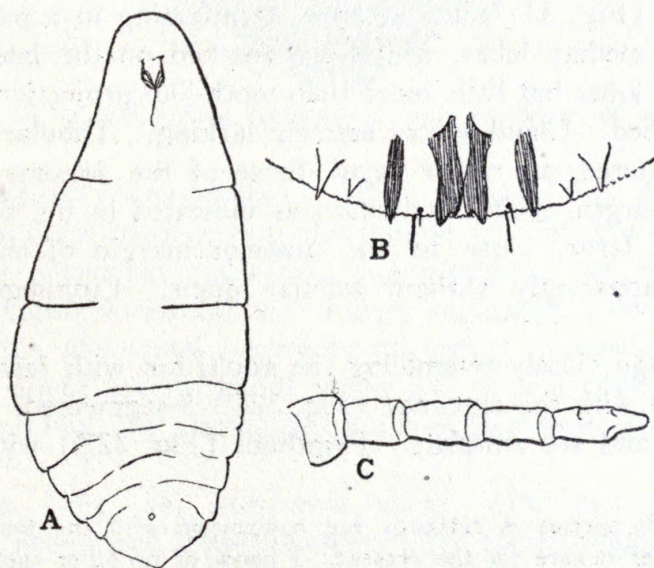


Fig. 32.—*Lepidosaphes acuta* n. sp.: A, adult female; B, pygidial margin of first stage; C, antenna of first stage.

Morphological characteristics. Adult female (Fig. 32A) about 2 mm. long, the derm tending to be quite heavily chitinized, especially on the cephalothorax. Cephalothorax elongate, with faint intersegmental constrictions, not sharply separated from the abdomen. Margins of the

abdominal segments not projecting, without gland spines but with a few small ducts.

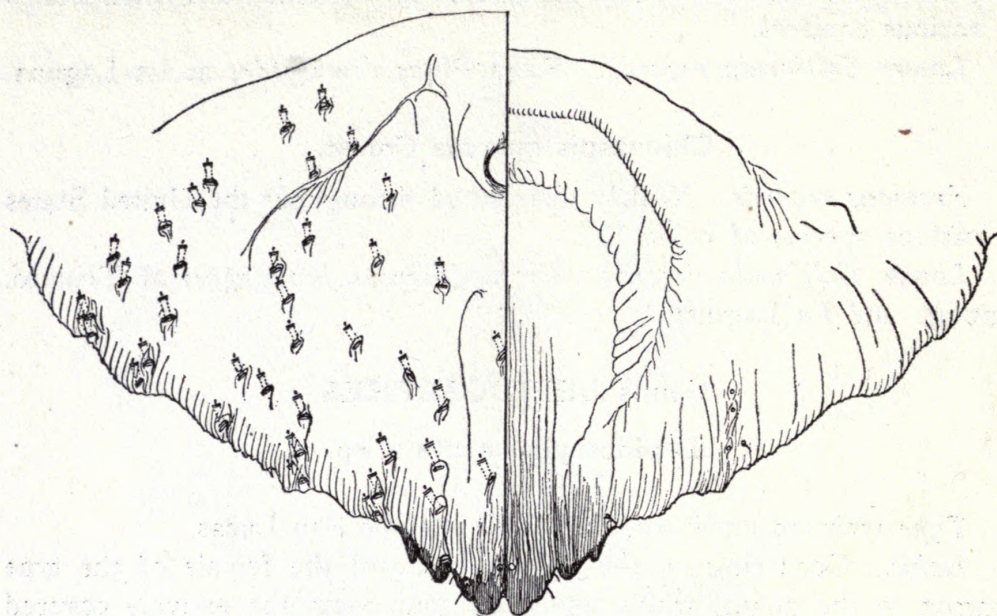


Fig. 33.—*Lepidosaphes acuta* n. sp.: pygidium of adult.

Pygidium (Fig. 33) acute at apex, terminating in a pair of rather small, pointed median lobes, which are notched on the lateral margin. Second pair of lobes but little more than tooth-like projections which are somewhat bilobed. Gland spines entirely lacking. Tubular ducts quite numerous, scattered, all rather small, those of the dorsum as large as those of the margin, their distribution as indicated in the figure. Anal opening quite large, close to the anterior margin of the pygidium. Ventral side apparently without tubular ducts. Circumgenital pores lacking.

Second stage closely resembling the adult, but with fewer ducts.

First stage with the antennae (Fig. 32C) 5-segmented, the terminal segment short and not annulate. Pygidium (Fig. 32B) with two pairs of lobes.

Notes: This species is certainly not congeneric with the type of *Lepidosaphes*, but I refer it here for the present. I know of no other species that it at all closely resembles.

***Lepidosaphes calcarata* n. sp.**

Figs. 34, 35.

Type from *Haematoxylon boreale* ("palo de brazil") at La Paz. Also from *Acacia flexicaulis* ("palo de fierro") at La Paz; *Cassia occidentalis* ("palo de zorillo") and *Lysiloma* sp. ("palo blanco"), at Miraflores.

Habit. Occurring on the trunk and limbs. Scale of female of the type common to the genus, about 2.5 mm. long, quite broad posteriorly, sometimes strongly curved; exuviae naked, yellow. Scale of male not observed.

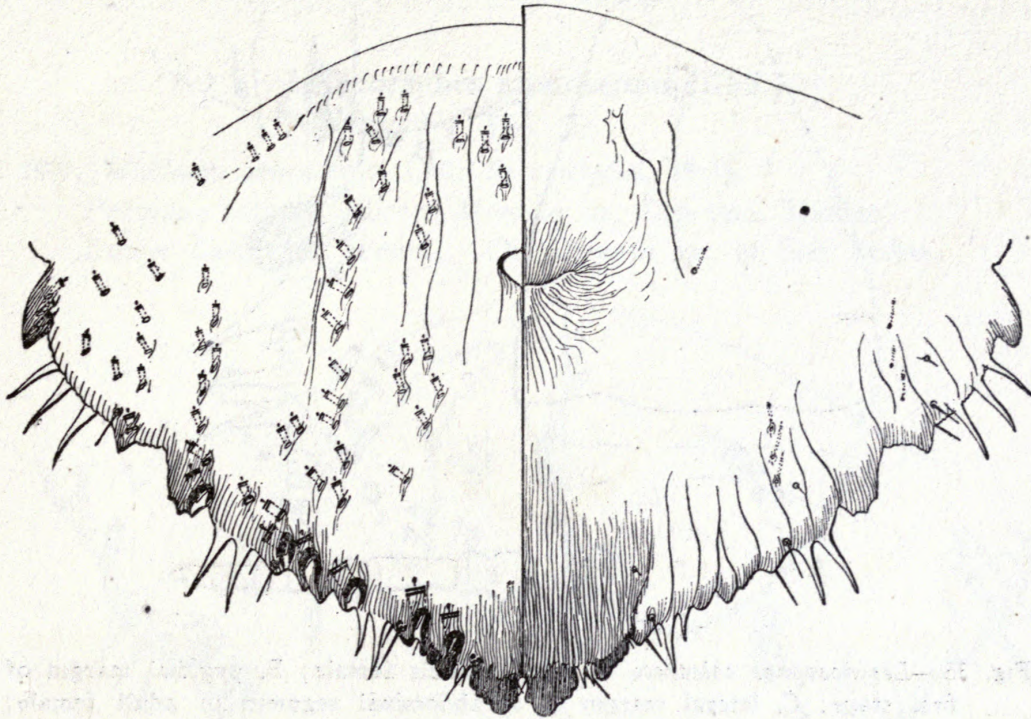


Fig. 34.—*Lepidosaphes calcarata* n. sp.: pygidium of adult.

Morphological characteristics. Adult female (Fig. 35A) about 2 mm. long, the derm membranous throughout or with the cephalothorax tending to be somewhat chitinized. Cephalothorax not divided by intersegmental constrictions and not sharply separated from the abdomen. Margins of the abdominal segments projecting somewhat, each with several small ducts, several gland spines and with a rather conspicuous chitinous spur (Fig. 35C) which bears one or two ducts which open near the apex.

Pygidium (Fig. 34) somewhat acute, with two pairs of lobes. Median lobes prominent, close together, their apices sloping and crenulate. Second lobes of the same shape as the first but smaller, not bilobed. Between the first and second lobes are two very small gland spines and at the base of the second lobe there is at each angle a large pore with a heavily chitinized rim. Beyond the second lobe are two large gland spines followed by three large pores with chitinous rims, a spine, two large gland spines, a large pore, three gland spines and a spur. Dorsal ducts somewhat smaller than those of the margin, arranged in rather definite rows as indicated in the figure. Microducts very small. Anal

opening somewhat cephalad of the center of the pygidium. Ventral side with two or three rows of very small ducts. Circumgenital pores lacking. Second stage closely resembling the adult but with few ducts.

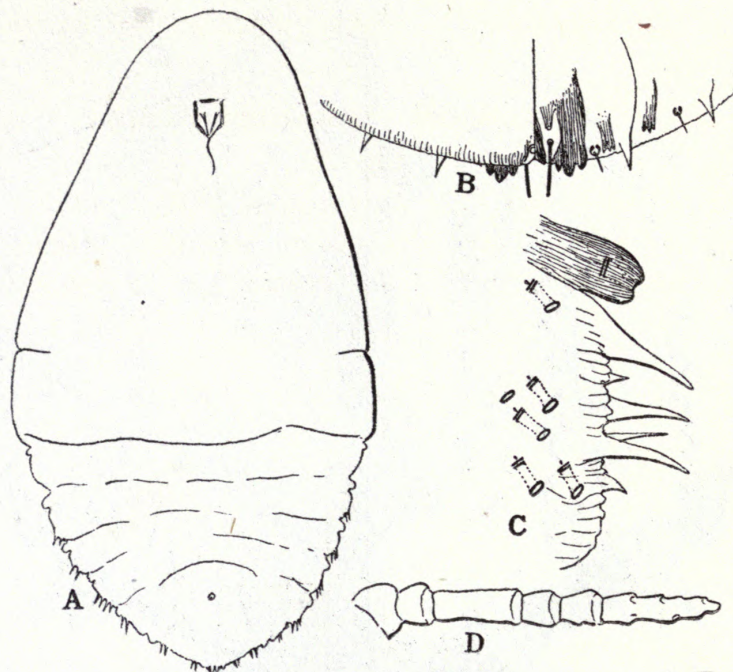


Fig. 35.—*Lepidosaphes calcarata* n. sp.: A, adult female; B, pygidial margin of first stage; C, lateral margin of an abdominal segment of adult female; D, antenna of first stage.

First stage with the antennae (Fig. 35D) 6-segmented, the terminal segment neither elongate nor annulate. Pygidium (Fig. 35B) with the lobes well developed, the median pair very small, almost fused, the second pair quite large and with the tip twice notched, the third and fourth pairs like the second but very small.

Notes: This species, like the preceding, is not a *Lepidosaphes* and is merely referred to this genus temporarily. I know of no species that closely resembles it.

Lepidosaphes concolor (Ckll.).

1919. *Lepidosaphes concolor* (Ckll.), Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 60, fig. 33.

Previous records. From *Atriplex* in Texas, New Mexico and California.

Lower California Records. From *Encelia farinosa* and *Franseria* sp. at Todos Santos, and *Pedilanthus macrocarpa* ("candelilla") near Pescadero.

Notes: The specimens from these hosts agree very closely with typical examples.

Lepidosaphes gloveri (Pack.).

Previous records. A widely distributed tropical and subtropical species infesting citrus fruits.

Lower California records. From orange at San Bartolo.

Lepidosaphes mimosarum (Ckll.).

Fig. 36

1903. *Mytilaspis mimosarum* Ckll., *Entomologist*, 36:45.

Previous records. From *Mimosa* sp., Zapotlan, Mexico.

Lower California records. On *Mimosa* sp., at San Pedro.

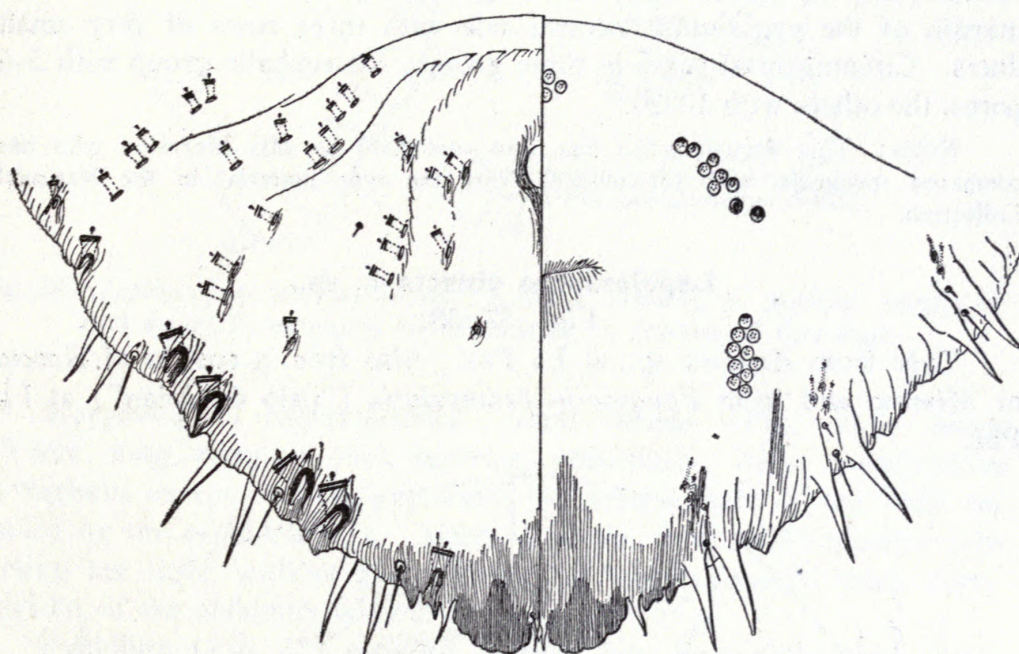


Fig. 36.—*Lepidosaphes mimosarum* (Ckll.): pygidium of adult.

Habit. Occurring for the most part beneath the surface of the ground but occasionally on the twigs or even on the leaves. Scale of female of the type common to the genus, about 2 mm. long, gray or brown, rather slender, frequently curved; exuviae naked. Scale of male in form resembling that of the female but lighter in color.

Morphological characteristics. Adult female about 1 mm. long, derm membranous throughout except for the pygidium. Cephalothorax not greatly elongate, not divided by intersegmental constriction and not sharply separated from the abdomen. Lateral margins of the abdominal segments projecting but little, each with two or three small gland spines and several small ducts. Dorsum of abdomen without ducts.

Pygidium (Fig. 36) with the median lobes alone well developed, these large, low and broad, with the tips rounded and slightly crenulate. Second pair of lobes represented merely by a small, toothlike projection. Between the first and second lobes is a small gland spine and a pore prominence bearing a rather large pore with chitinous rim. Beyond the second lobe are two large gland spines followed by two gland prominences bearing large pores with chitinous rims, then a spine, two more large gland spines, two large submarginal pores, a spine, two gland spines, and another submarginal pore. All the submarginal pores with conspicuous chitinous rims. Dorsal ducts considerably smaller than those of the margin, rather few, arranged as indicated in the figure. Microducts very small. Anal opening large, quite close to the anterior margin of the pygidium. Ventral side with three rows of very small ducts. Circumgenital pores in three groups, the cephalic group with 5-6 pores, the others with 10-20.

Notes: This determination has been confirmed by Mr. Morrison who has compared specimens with the mounts from the type material in the National Collection.

***Lepidosaphes obtecta* n. sp.**

Figs. 37, 38.

Type from *Atriplex* sp., at La Paz. Also from a species of *Acacia* or *Mimosa* and from *Fouquieria peninsularis* ("palo de Adan") at La Paz.

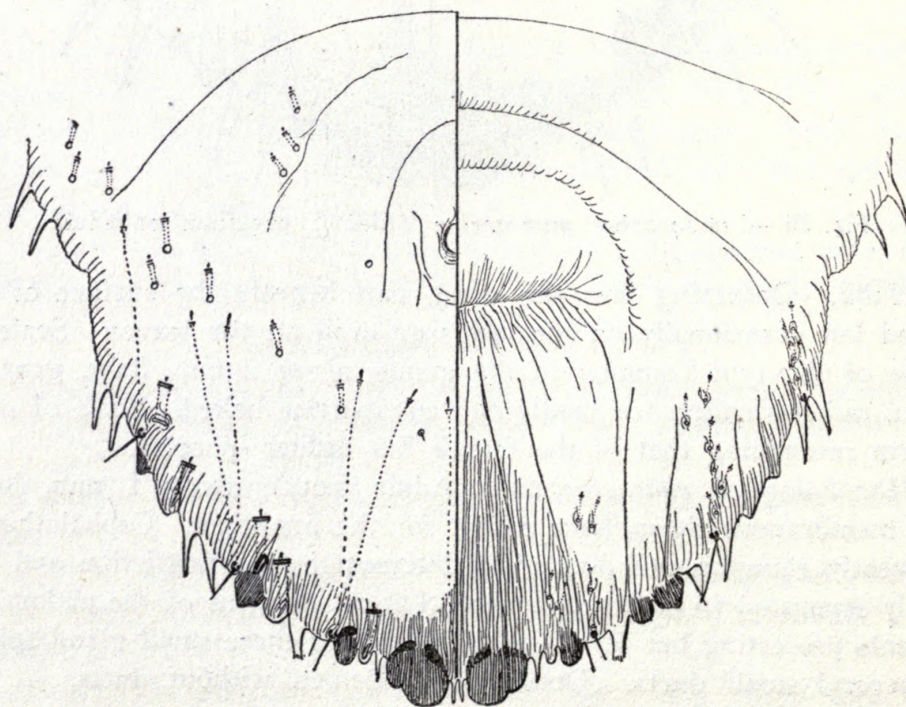


Fig. 37.—*Lepidosaphes obtecta* n. sp.: pygidium of adult.

Habit. Occurring in cracks in the bark. But a few specimens were found and in each case the scale was destroyed in searching for it. The second exuvium is very large but does not inclose the adult.

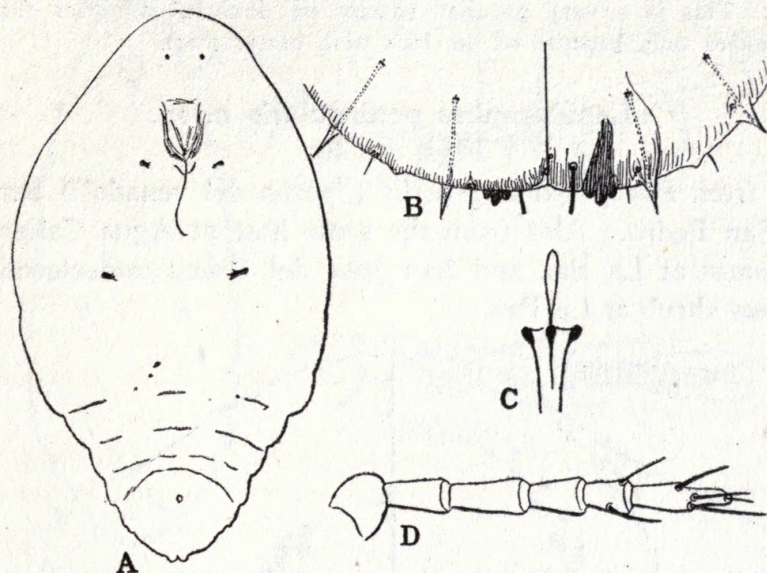


Fig. 38.—*Lepidosaphes obtecta* n. sp.: A, adult female; B, pygidial margin of first stage; C, extremity of microduct; D, antenna of first stage.

Morphological characteristics. Adult female (Fig. 38A) about .75 mm. long, elongate oval, tapering posteriorly, derm membranous throughout except for the pygidium, the greater part of the body occupied by the cephalothorax. Margins of the abdominal segments projecting but little, without gland spines but with numerous small ducts. Dorsum of the abdomen without ducts.

Pygidium (Fig. 37) rounded, bearing two, or perhaps three, pairs of lobes. Median pair quite large with a deep notch on the outer margin, separated by a small space in which are two small gland spines. Second pair very small, low and rounded. Between the first and second pairs is a small gland spine and a pore prominence. Beyond the second lobe is a rather large gland spine, a pore prominence, and a sharply pointed, chitinous prominence, a small chitinous tooth, a spine and two gland spines. Ducts few, those of the dorsum smaller than those of the margin, their arrangement as indicated in the figure. Microducts very long and slender, terminating in a structure of the type indicated in Fig. 37C. Anal opening moderately large, somewhat cephalad of the center of the pygidium. Ventral side with three rows of small ducts. Circumgenital pores lacking.

Second stage resembling the adult but without dorsal pores.

First stage with the antennae (Fig. 38D) 5-segmented, the terminal segment neither elongate nor annulate, the pygidium (Fig. 38B) with a single pair of rather large lobes.

Notes: This is a very peculiar species of doubtful affinities that I place in *Lepidosaphes* only because of the lack of a better place.

***Lepidosaphes peninsularis* n. sp.**

Figs. 39, 40.

Type from *Porophyllum gracilis* ("yerba del venado") between La Paz and San Pedro. Also from the same host at Agua Caliente; *Asclepias subulata* at La Paz and San Jose del Cabo; undertermined Euphorbiaceous shrub at La Paz.

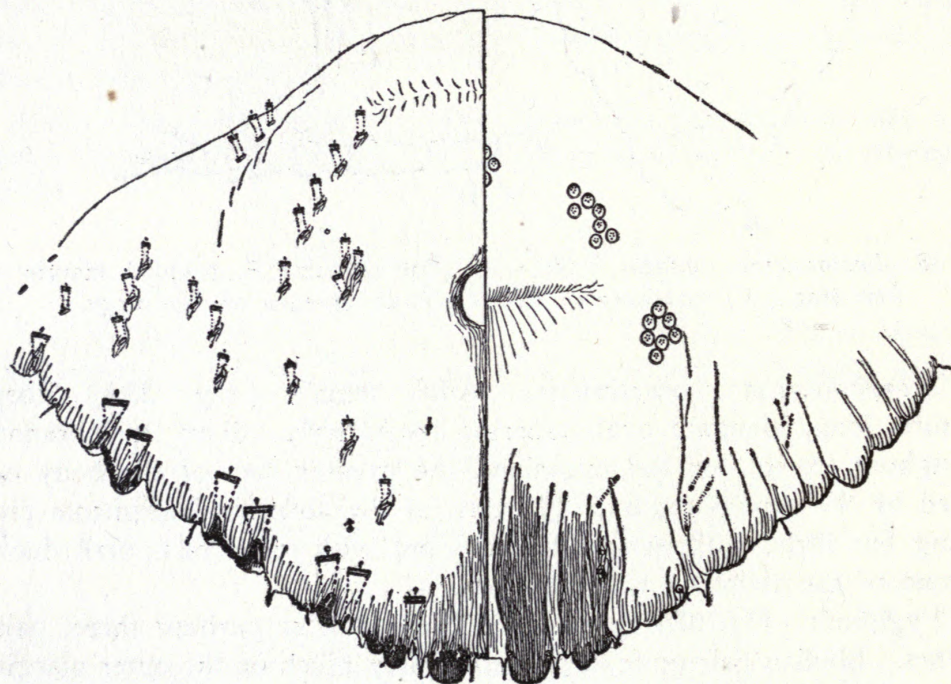


Fig. 39.—*Lepidosaphes peninsularis* n. sp.: pygidium of adult.

Habit. Occurring on the stems and leaves of the host. Scale of female of the form common to the genus, about 3 mm. long, straight, white, or slightly brown; exuviae covered with secretion. Scale of male similar to that of female but smaller.

Morphological characteristics. Adult female (Fig. 40A) about 2 mm. long, derm membranous except for the pygidium; margins of the abdominal segments projecting but little, without gland spines but with numerous small ducts. Dorsum of the abdomen practically without ducts.

Pygidium (Fig. 39) rounded, with two pairs of lobes. Median pair widely separated, short, rounded. Second pair small, distinctly

bilobed. Between the first and second lobes is a very small gland spine and pore. Beyond the second lobes is a very small gland spine followed by two submarginal pores, a spine, a gland spine, two submarginal pores,

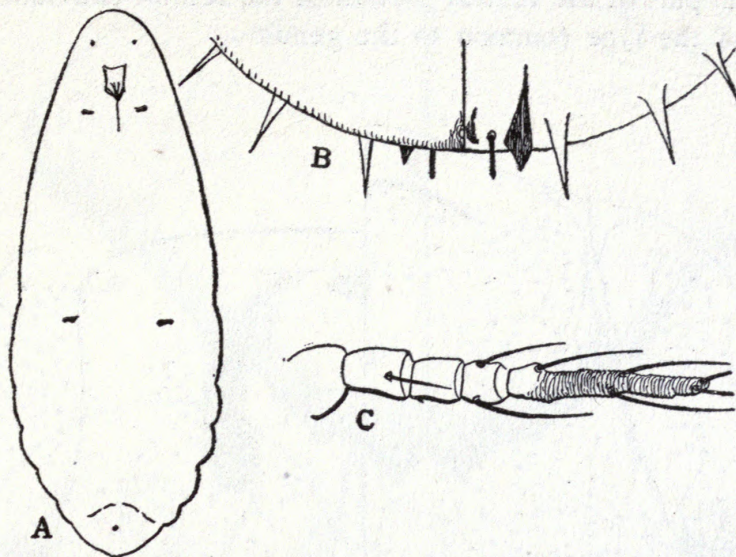


Fig 40.—*Lepidosaphes peninsularis* n. sp.: A, adult female; B, pygidial margin of first stage; C, antenna of first stage.

a spine, two submarginal pores, a spine and a single pore. Submarginal pores with chitinous rims. Dorsal ducts smaller than those of the margin, scattered, their arrangement as indicated in the figure. Microducts very small. Anal opening large, near the center of the pygidium. Ventral side with a few very small ducts. Circumgenital pores in five groups of 5 to 12 pores.

Second stage very similar to adult but lacking dorsal ducts.

First stage with the antennae (Fig. 40C) 5-segmented, the terminal about as long as the others combined and distinctly annulate; pygidium (Fig. 40B) with one pair of quite large lobes.

Notes: This species is very close to *L. concolor* (Ckll.), but it differs from the latter in the low, rounded and rather widely separated median lobes. In the numerous specimens of both species that I have examined I have found no intergradation.

Genus *ODONASPIS* Leon.

Odonaspis litorosa n. sp.

Figs. 41, 42.

Type from *Rachidospermum mexicanum* on the beach at the Eureka ranch near La Rivera. The host is a coarse, stiff beach grass that is known only from this region.

Habit. Occurring beneath the sheathing base of the leaves. Scale of female 2.5 mm. long, elongate oval, white. First exuvium naked, second white. Ventral scale continuous with the dorsal scale, thick, composed in part of the ventral portion of the second exuvium. Scale of the male of the type common to the genus.

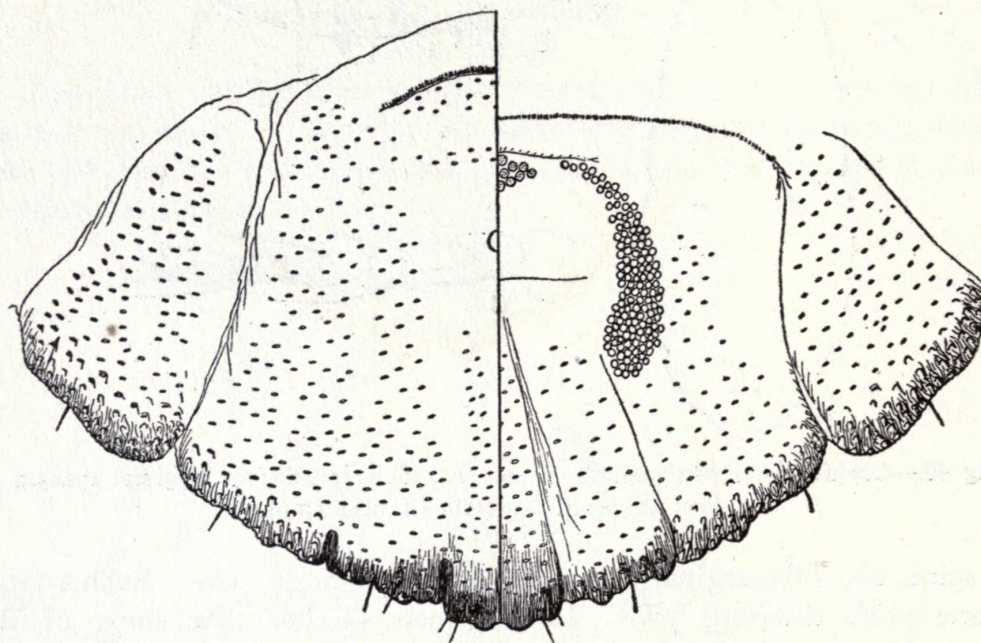


Fig. 41.—*Odonaspis litorosa* n. sp.: pygidium of adult.

Morphological characteristics. Adult female (Fig. 42B) about 1.25 mm. long, elongate oval, derm membranous except for the pygidium and the margins of the abdominal segments. Lateral margins of the abdominal segments with great numbers of small ducts.

Pygidium (Fig. 41) without definite lobes but with two pairs of small and quite widely separated paraphyses. Dorsum with a great number of small ducts. Anal opening quite small, somewhat cephalad of the center of the pygidium. Ventral side with numerous small ducts, these confined to a broad marginal zone. Circumgenital pores numerous, arranged in three more or less confluent groups.

Second stage with the ducts almost lacking, the pygidium (Fig. 42A) with two pairs of paraphyses as in the adult and with a series of acute points along the margin.

First stage with the antennae (Fig. 42C) 5-segmented, the third segment quite long, the terminal segment somewhat elongate and slightly annulate; pygidium (Fig. 42D) with a single pair of small lobes.

Notes: Of the species known to me this most closely resembles *O. ruthae* Kotinsky, an Hawaiian species, from which it differs chiefly in the presence of the second pair of paraphyses.

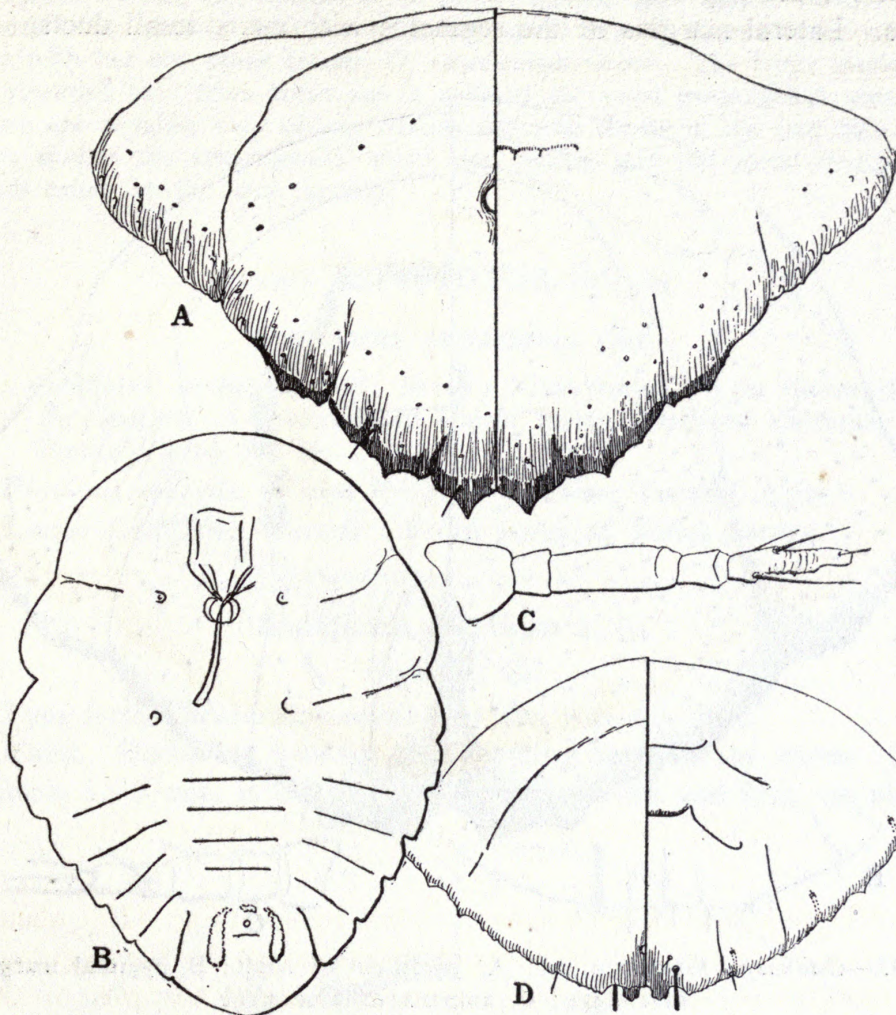


Fig. 42.—*Odonaspis litorosa* n. sp.: A, pygidium of second stage; B, adult female; C, antenna of first stage; D, pygidium of first stage.

***Odonaspis fistulata* n. sp.**

Fig. 43.

Type from *Distichlis spicata* at Punta Palmilla near San Jose del Cabo.

Habit. Occurring beneath the sheathing bases of the leaves or on the upper surface of the leaves near the base. Scale of female about 2.5 mm. long, white, somewhat elongate with the exuviae near one end and naked; ventral scale thick, continuous with the dorsal scale, and composed in part of the ventral portion of the second exuvium as is common in this genus. Scale of male white, somewhat elongate, with the exuvium near one end.

Morphological characteristics. Adult female about 1 mm. long, somewhat elongate oval, in general resembling *O. litorosa*; derm membranous except for the pygidium and the lateral margins of the abdominal segments. Lateral margins of the segments with many small ducts.

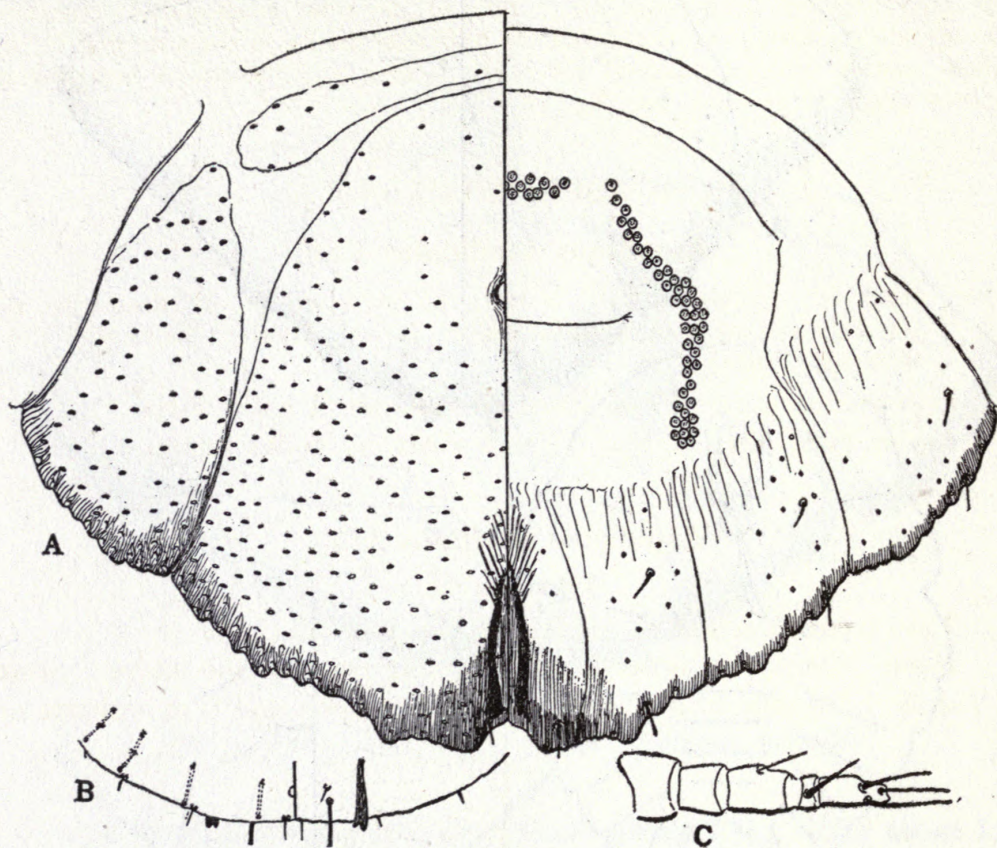


Fig. 43.—*Odonaspis fistulata* n. sp.: A, pygidium of adult; B, pygidial margin of first stage; C, antenna of first stage.

Pygidium (Fig. 43A) without lobes or paraphyses but with a median notch which is continuous with a tubular invagination which extends into the pygidium, and from the inner extremity of which there arises a cluster of slender ducts. Tubular ducts small, extremely numerous. Anal opening quite small, placed well toward the anterior margin of the pygidium. Ventral side with a few ducts, these confined to a broad marginal zone. Circumgenital pores present, numerous, arranged in three more or less confluent groups.

Second stage with the pygidium practically as in *O. litorosa* but with the tube present and with but the first pair of paraphyses developed.

First stage with the antennae (Fig. 43C) quite short and stout, 5-segmented, the third segment not elongate, and the terminal segment

neither elongate nor annulate; pygidium (Fig. 43B) with a single pair of widely separated lobes.

Notes: While this species is in most respects quite typical of the genus *Odonaspis* the presence of the invaginated apical tube is a peculiarity which it shares with but one other species, *O. canaliculata* Green. The latter species has been recorded only from India but in spite of the great geographical separation the two are certainly very closely related, differing chiefly in the fact that in the Indian species the circumgenital pores are lacking and the apical invagination extends nearly to the anal opening.

Genus **ASPIDIOTUS** Bouché.

***Aspidiotus candidulus* Ckll.**

1919. *Aspidiotus candidulus* Ckll., Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, p. 63, fig. 35.

Previous records. From *Prosopis velutina*, Tucson, Ariz.

Lower California records. From yucca at Todos Santos.

***Aspidiotus chortinus* n. sp.**

Figs. 44, 45.

Type from *Chaetochloa caudata* at San Jose del Cabo.

Habit. Occurring beneath the sheathing bases of the leaves. Scale of female 1.5-2 mm. in diameter, white, quite thick and firm, circular or

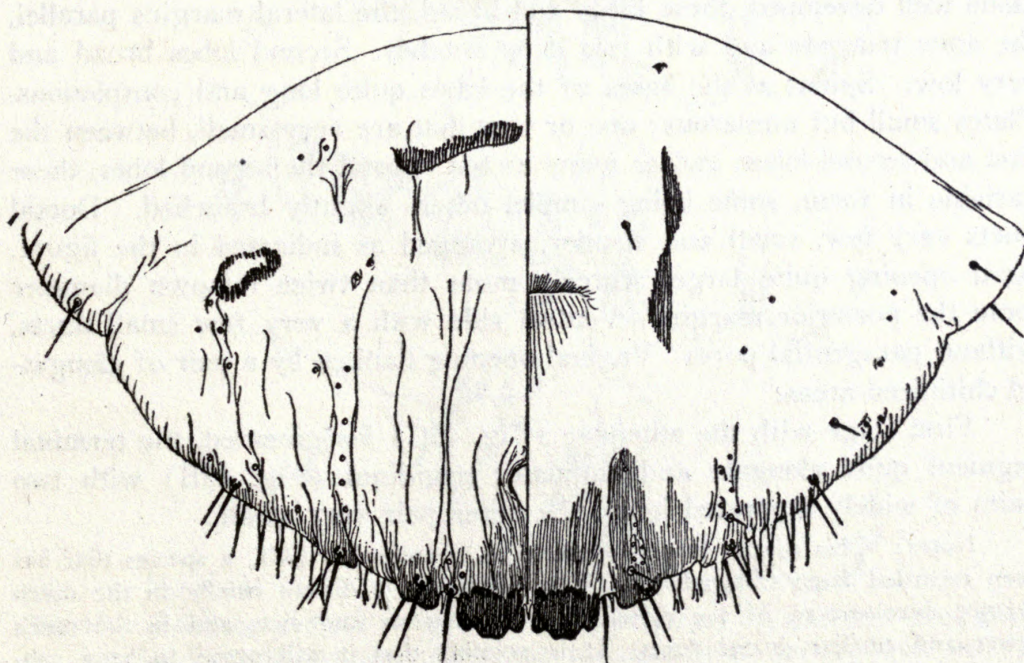


Fig. 44.—*Aspidiotus chortinus* n. sp.: pygidium of adult.

subcircular, with the exuviae subcentral, covered with secretion; ventral scale thick, composed in part of the ventral portion of the second exuvium. Scale of male quite elongate oval, with the exuvium at one end, in color and texture resembling that of the female.

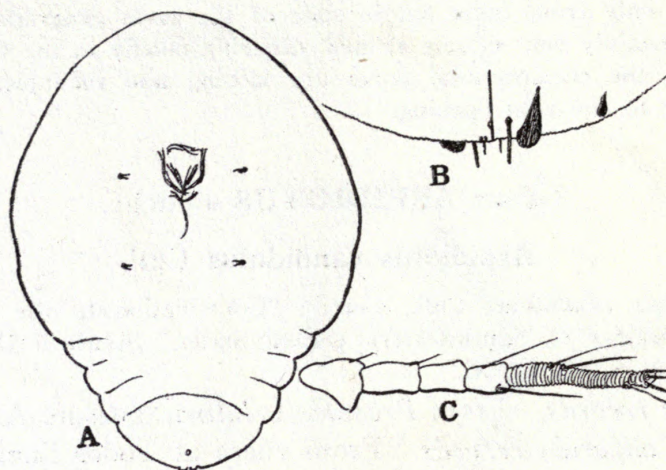


Fig. 45.—*Aspidiotus chortinus* n. sp.: A, adult female; B, pygidial margin of first stage; C, antenna of first stage.

Morphological characteristics. Adult female (Fig. 45A) 1.5 mm. long, of ordinary form; derm membranous or with the anterior portion of the cephalothorax somewhat chitinized.

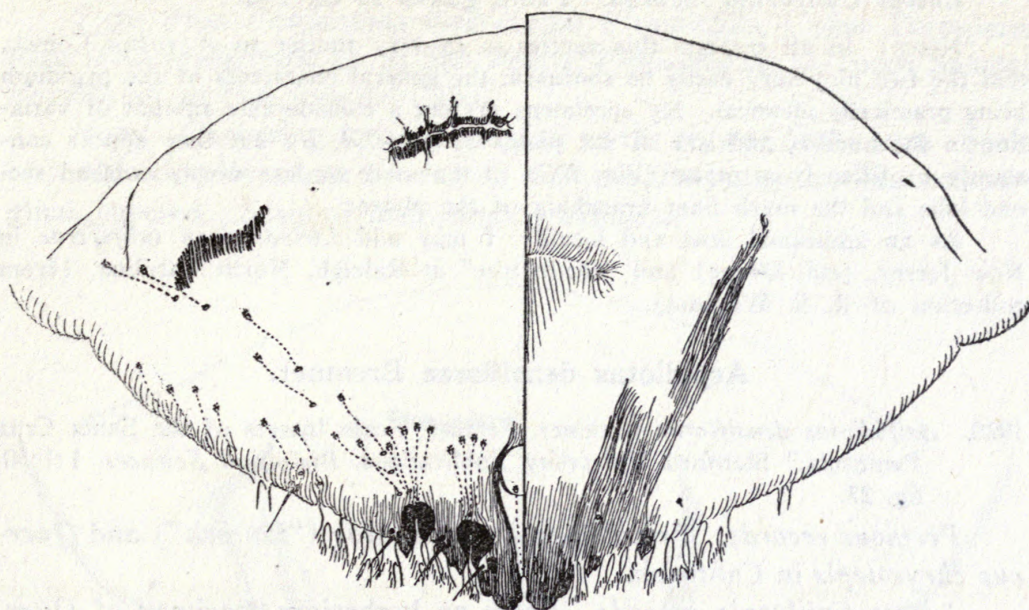
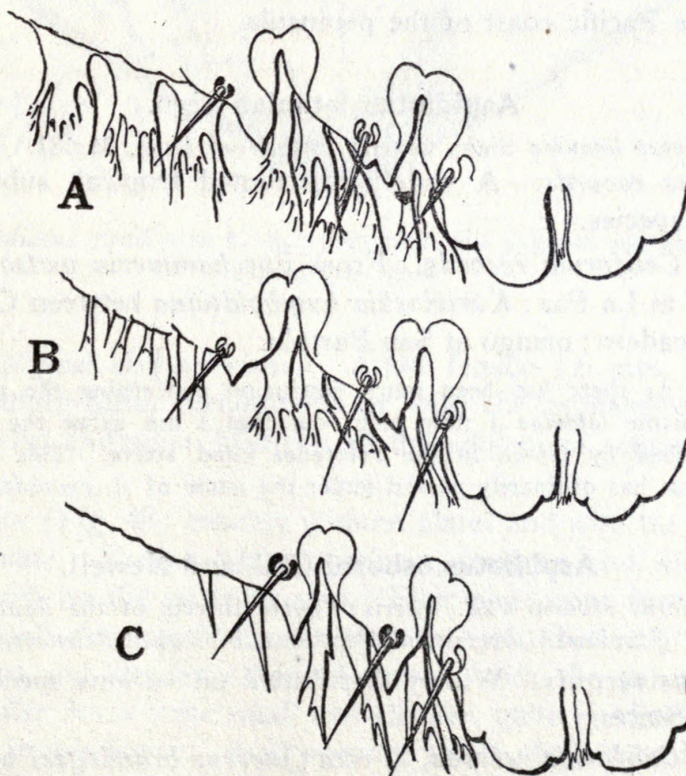
Pygidium (Fig. 44) rather short and broad, with the median lobes alone well developed, these large and broad, the lateral margins parallel, the apex truncate and with two deep notches. Second lobes broad and very low. Spines at the bases of the lobes quite long and conspicuous. Plates small but numerous; one or two that are very small, between the first and second lobes, and as many as ten beyond the second lobes, these variable in form, some being simple, others slightly branched. Dorsal ducts very few, small and slender, arranged as indicated in the figure. Anal opening quite large, scarcely more than twice its own diameter from the posterior margin. Ventral side with a very few small ducts, without paragenital pores. Vaginal opening flanked by a pair of elongated chitinized areas.

First stage with the antennae (Fig. 45C) 5-segmented, the terminal segment quite elongate and annulate; pygidium (Fig. 45B) with two pairs of widely separated lobes, the outer pair very small.

Notes: This species is very close to *A. graminellus* Ckll., a species that has been recorded from Colorado and New Mexico. It differs chiefly in the much greater development of the plates, both in number and size, and in the much fewer and smaller dorsal ducts. It is possible that it will prove to be a subspecies of *graminellus*.

Aspidiotus diffinis Newst.

Figs. 46, 47A, 47B.

Fig. 46.—*Aspidiotus diffinis* Newst.: pygidium of specimen from guava at La Paz.Fig. 47.—*Aspidiotus diffinis* Newst.: A, pygidial margin of specimen from guava at La Paz; B, pygidial margin of specimen from *Liriodendron* in New Jersey; *Aspidiotus rapax* Comst.: C, pygidial margin of specimen from *Ceanothus* in California.

Previous records. From Canada, eastern United States, Mexico, and the West Indies, on various hosts.

Lower California records. From guava at La Paz.

Notes: In all respects this species is so very similar to *A. rapax* Comst., that the two may very easily be confused, the general characters of the pygidium being practically identical. My specimens present a considerable amount of variation in the number and size of the plates (Figs. 47A, B) but they appear constantly to differ from *rapax* (Fig. 47C) in the more or less deeply notched second lobe and the much finer branching of the plates.

As an additional host and locality, I may add *Liriodendron tulipiferae* in New Jersey, (col. Doane) and "shade tree" at Raleigh, North Carolina, (from collection of R. S. Woglum).

***Aspidiotus densiflorae* Bremner.**

1920. *Aspidiotus densiflorae* Bremner, Ferris: "Scale Insects of the Santa Cruz Peninsula," Stanford University Publications, *Biological Sciences*, 1:1:50, fig. 27.

Previous records. From *Pasania densiflorae* ("tan oak") and *Quercus chrysolepis* in California.

Lower California records. From an herbarium specimen of *Quercus tomentella* from Guadeloupe Island, an island about two hundred miles off the Pacific coast of the peninsula.

***Aspidiotus lataniae* Sign.**

1899. *Aspidiotus lataniae* Sign., Green: *Ent. Mon. Mag.*, 35:181.

Previous records. A widely distributed tropical, subtropical, and greenhouse species.

Lower California records. From *Forchammeria watsoni* ("palo de San Juan") at La Paz; *Karwinskia humboldtiana* between Cabo San Lucas and Pescadero; mango at San Bartolo.

Notes: As there has been much confusion concerning the proper application of the name *lataniae* I may point out that I am using the name for the species described by Green in the reference cited above. This appears to be the species that has ordinarily passed under the name of *A. cydoniae* Comst.

***Aspidiotus osborni* Ckll. and Newell.**

1920. *Aspidiotus osborni* Ckll., Ferris: "Scale Insects of the Santa Cruz Peninsula," Stanford University Publications, *Biological Sciences*, 1:1:51, fig. 29.

Previous records. Widely distributed on various species of oak in the United States.

Lower California records. From *Quercus brandegeei* near Santiago.

Notes: I have but a single specimen from Lower California, this agreeing quite closely with typical *osborni* except in having the plates somewhat larger.

Aspidiotus pedilanthi n. sp.

Fig. 48.

Type from *Pedilanthus macrocarpa* ("candelilla") near Pescadero. Also from *Horsfordia* sp. at San Pedro; *Franseria* sp. at Todos Santos; *Populus* sp. at San Jose del Cabo.

Habit. Occurring for the most part on the crowns of the host. Scale of female circular, about 1.5 mm. in diameter, flat, gray, exuviae submarginal, covered. Scale of male slightly elongate.

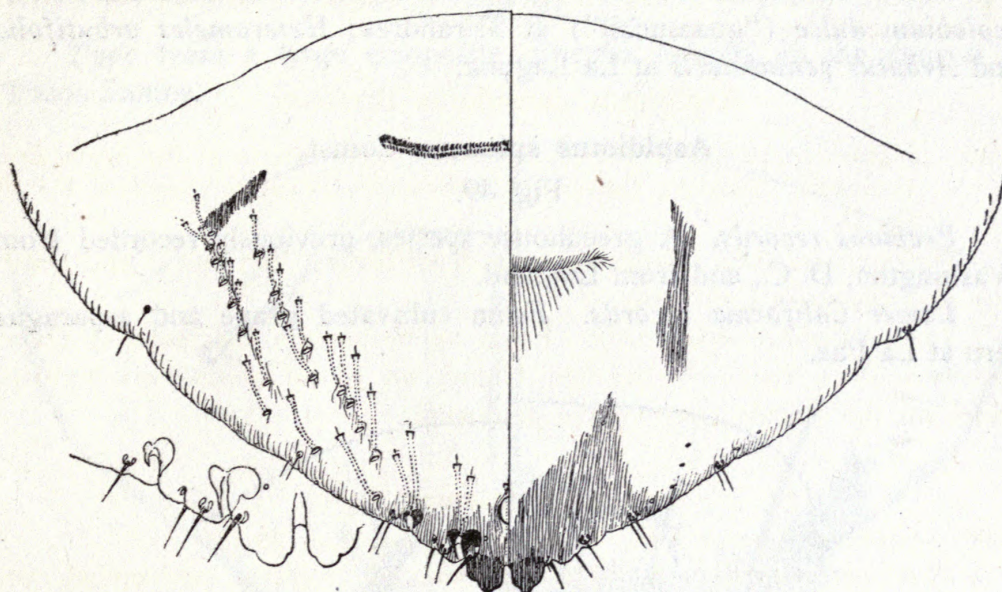


Fig. 48.—*Aspidiotus pedilanthi* n. sp.: pygidium and pygidial margin of specimen from type host.

Morphological characteristics. Adult female 1.6 mm. long, of the normal turbinate form, membranous or with the cephalothorax tending to be somewhat chitinous. Margins of the abdominal segments without ducts.

Pygidium (Fig. 48) entirely without plates and with the lateral lobes entirely obsolete. Median lobes prominent, straight, and with a distinct subapical notch on the outer margin. First poriferous furrow with the paraphyses well developed, the inner paraphysis distinctly clavate, the outer straight and slender. Second furrow with the paraphyses quite small. Tubular ducts quite small and slender, quite numerous, arranged as indicated in the figure. Anal opening small, slightly cephalad of the apex of the first paraphyses. Ventral side with a few very minute marginal and submarginal ducts. Paragenital pores lacking. Vaginal opening flanked by a pair of elongated chitinized areas.

Notes: This species is certainly very close to *A. coursetiae* Marlatt, from northwestern Mexico, and *A. covilleae* Ferris (which is perhaps a synonym of *coursetiae*) from Arizona. It differs from both in the complete absence of paragenital pores. It is not impossible that the examination of a large enough series would show an intergradation in this respect as *coursetiae* is described as having the number of pores in each group very small.

***Aspidiotus rapax* Comst.**

Previous records. A cosmopolitan species on innumerable hosts.

Lower California records. From *Rhus laurina* at Ensenada; *Pithecolobium dulce* ("guamuchil") at Miraflores; *Heteromeles arbutifolia* and *Arbutus peninsularis* at La Laguna.

***Aspidiotus spinosus* Comst.**

Fig. 49.

Previous records. A greenhouse species, previously recorded from Washington, D. C., and from England.

Lower California records. From cultivated grape and asparagus fern at La Paz.

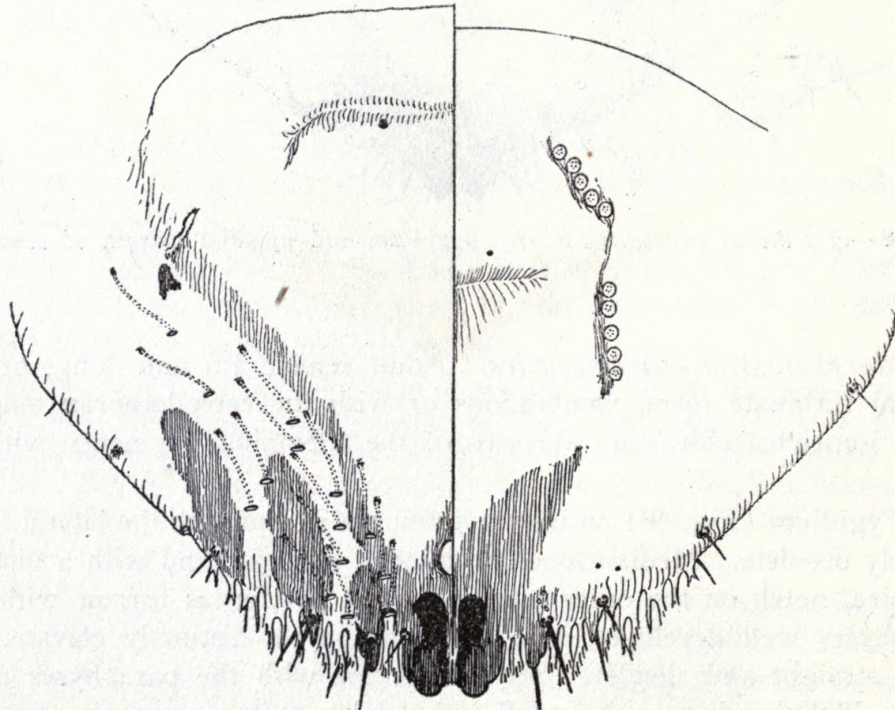


Fig. 49.—*Aspidiotus spinosus* Comst.: pygidium of specimen from grape at La Paz.

Notes: This determination has been confirmed by Mr. Morrison, who has compared specimens with the type. I present a figure of the pygidium.

Genus **CHRYSOMPHALUS** Ashmead.**Chrysomphalus aonidum** (Lin.).

Previous records. A widely distributed tropical and greenhouse species.

Lower California records. From an undetermined ornamental at La Paz.

Chrysomphalus enceliae n. sp.

Fig. 50.

Type from a large composite, *Encelia palmeri*, in the canyon at Todos Santos.

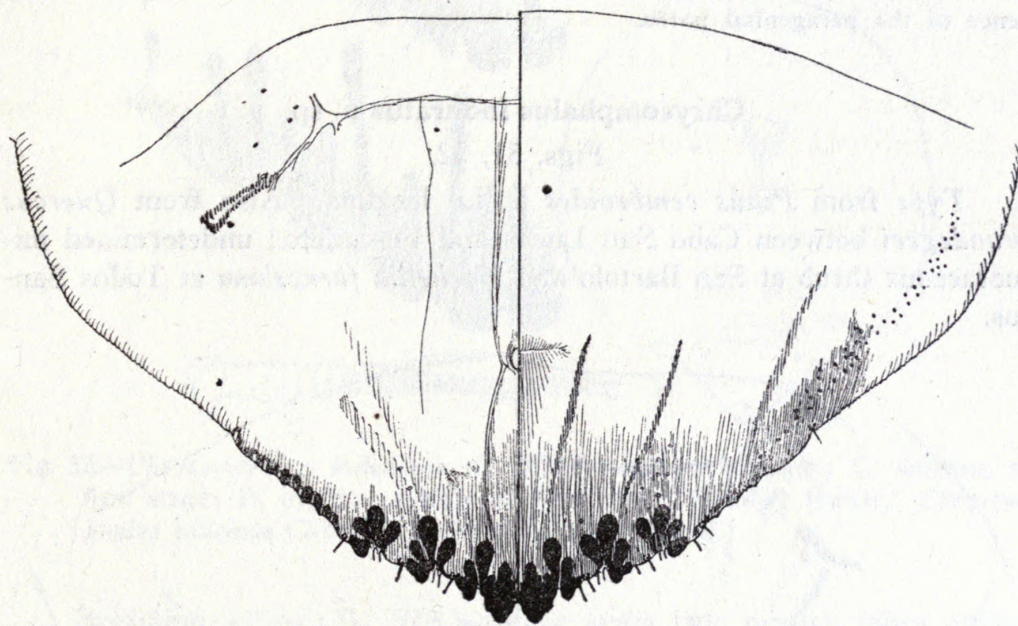


Fig. 50.—*Chrysomphalus enceliae* n. sp.: pygidium of adult.

Habit. Occurring on the trunk of the host, sometimes concealed beneath loose bark. When not thus concealed the dorsal scale becomes very easily detached, leaving the conspicuous white ventral scale. Scale of female roughly circular, flat, black, hard and brittle, 2-3 mm. in diameter. Scale of male not identified.

Morphological characteristics. Adult female about 2 mm. long, of the normal turbinate form, the anterior portion of the cephalothorax tending to be quite heavily chitinized.

Pygidium (Fig. 50) heavily chitinized, short and broad. Four pairs of lobes present, the median pair quite large, the others mere projections, all rounded at the apex. Paraphyses well developed, rather short

and stout, arranged as follows: One at each basal angle of the median lobe, the outer the longer; one at the base of the second lobe, this quite short; three at the inner basal angle of the third and fourth lobes, the middle one of each group the longest. Tubular ducts few, slender, and inconspicuous, confined, except for one or two, to the margin beyond the third pair of lobes. Anal opening quite small, slightly caudad of the center of the pygidium. Ventral side with numbers of very minute ducts. Paragenital pores lacking.

First stage identical with that of *C. induratus* n. sp. (Fig. 52D) which is described below, except that the terminal segment of the antennae is slightly shorter.

Notes: Of the species known to me this most closely resembles *C. nigropunctatus* (Ckll.), from Mexico, from which it differs essentially only in the absence of the paragenital pores.

***Chrysomphalus induratus* n. sp.**

Figs. 51, 52.

Type from *Pinus cembroides* at La Laguna. Also from *Quercus brandegeei* between Cabo San Lucas and Pescadero; undetermined mimosaceous shrub at San Bartolo and *Vachellia farnesiana* at Todos Santos.

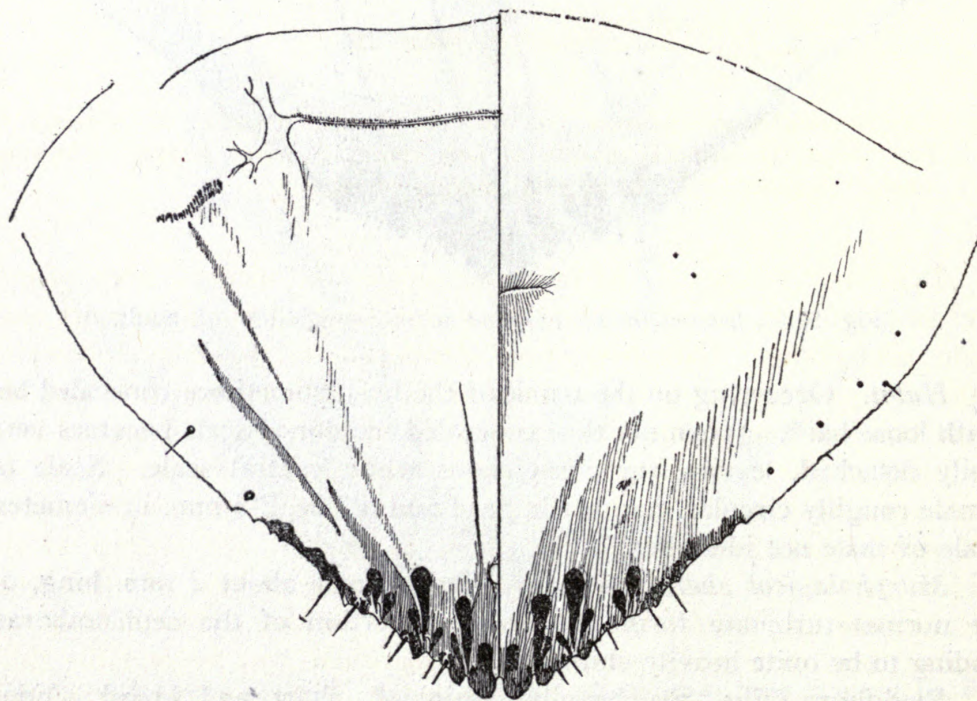


Fig. 51.—*Chrysomphalus induratus* n. sp.: pygidium of specimen from *Pinus cembroides*.

Habit. Occurring on the bark of the host, those on pine being chiefly on the smaller twigs, the dorsal scale becoming detached very easily. Scale of female circular, about 2 mm. in diameter, black, flat, hard and brittle. Ventral scale very thin. Scale of male not identified.

Morphological characteristics. Adult female (Fig. 52E) of the usual turbinate form, the derm membranous except for the anterior portion of the cephalothorax, which tends to be more or less heavily chitinized anteriorly.

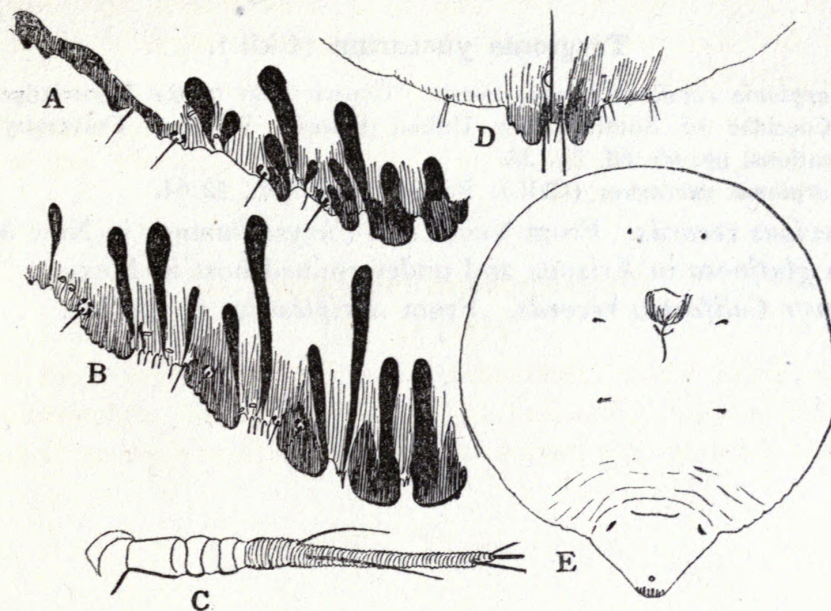


Fig. 52.—*Chrysomphalus induratus* n. sp.: A, pygidial margin; C, antenna of first stage; D, pygidial margin of first stage; E, adult female. *Chrysomphalus lilacinus* Ckll.: B, pygidial margin of adult.

Pygidium (Figs. 51, 52A) rather acute, the median lobes prominent and rounded, the second and third consisting of but little more than slight projections. Paraphyses well developed, arranged as follows: a rather long paraphysis at inner basal angle of each median lobe and one about twice as long at the outer angle; one at each angle of second lobe, the inner of these the longer but not exceeding half the length of the outer paraphysis of the median lobe; one very small, between the second and third lobes, followed by one about as long as the longest of the median paraphyses and one less than half as long at base of third lobe; two beyond the third lobe. Plates entirely lacking. Ducts long and slender, few, their pores confined to a marginal area beyond the third lobes. Anal opening small, slightly cephalad of the median paraphyses. Ventral side with a few very small ducts. Paragenital pores lacking.

First stage with the antennae (Fig. 52C) 5-segmented, the terminal segment much elongate and annulate; pygidium (Fig. 52D) with a single pair of prominent median lobes.

Notes: This species is quite close to *C. lilacinus* Ckll., a species that has been recorded from oaks in southwestern United States and northern Mexico. However, the lobes in *lilacinus* (Fig. 52B) are much larger, the paraphyses are much longer and somewhat differently arranged.

Genus **TARGIONIA** Sign.

Targionia yuccarum (Ckll.).

1919. *Targionia covilleae* Ferris, Ferris: "Contribution to the Knowledge of the Coccidae of Southwestern United States," Stanford University Publications, pp. 66, 68, fig. 38.

1920. *Targionia yuccarum* (Ckll.), Ferris: *Can. Ent.*, 52:64.

Previous records. From *Yucca* and *Chrysothamnus* in New Mexico, *Covillea glutinosa* in Arizona and undetermined host in Mexico.

Lower California records. From *Atriplex* sp. at La Paz.

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