

FURTHER STUDIES ON THE GENUS GYPONA AND IT'S ALLIES (RHYNCHOTA, HOMOPTERA).

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The systematic relations of this group were briefly discussed by the senior author in a previous paper.* It was recognized at the time as only a preliminary and tentative classification, hastily brought together and published in the hope of correcting a number of serious errors before they became established in the literature. During the past two years a number of the relatively rare species and varieties have been taken in numbers and food plants and life history observations on these and other species accumulated.

With the idea of more fully establishing the generic and specific limits in the group the junior author undertook to study the internal genitalia of all the available forms occurring in the United States. These studies not only confirmed the validity of the generic divisions established but definitely indicated that at least one more distinct generic group was advisable. The five divisions of the old genus *Gypona* all show distinct and strikingly different types of internal genitalia. *Dragonana* in many characters is more closely allied to *Xerophloea* than to *Gypona* proper and these two genera may well represent one line of development while the remaining genera represent another. *Dragonana* is either primitive or degenerate as judged by the simple internal genitalia. If we recognize irregularly reticulate venation as an indication of primitive character, as we probably must, then *Dragonana* may well represent the most primitive condition found in the group in our region, followed by *Gyponana*, *Gypona*, *Prairiana* and *Ponana* in the order named.

Gyponana rugosa is quite distinct in a number of characters from the other members of that genus and further study may warrant its segregation. Its internal genitalia are in certain characters very close to those of *Gypona glauca*, the type of the latter genus, and may indicate the line of divergence of the other groups from a primitive *Gyponana* type of ancestor.

*Ball, E. D. *Annals Ent. Soc. Amer.*, Vol. XIII, p. 83-96, 1920.

The three species of *Prairiana* are strikingly distinct in their complicated pattern of internal genitalia and show closer affinities with *Ponana* than with *Gypona*. *Ponana resima* has been considered the extreme modification in this complex type, on the other hand it may represent a primitive type. An extended study of the South American forms will be necessary to determine this. The pygofers in this species carry a long curved spine, a character not observed in any other member of this group.

KEY TO THE N. A. GENERA OF GYPONINAE.*

- A. Dorsal surface or at least elytra deeply pitted, body doubly wedge-shaped, elytra becoming vertical towards apex.
 - B. Pronotum pitted, front narrow, elongated, spines on hind tibia few,
 - 1. *Xerophloea* Germ.
 - BB. Pronotum striate, front broader wedge-shaped, spines on hind tibia numerous, stout..... 2. *Dragonana* Nov.
- AA. Dorsal surface not pitted except possibly along veins, body elongate or oval, elytra not appressed at apex.
 - C. Elytra reticulate, or at least apically..... 3. *Gyponana* Ball.
 - CC. Elytra with the venation regular or nearly so.
 - D. Face and vertex meeting in an acute angle, margin foliaceous.
 - E. Elytra without markings in areoles, species green, golden or black..... 4. *Gypona* Burm.
 - EE. Elytra with dots or lines in areoles, species straw or smoky,
 - 5. *Prairiana* Ball.
 - DD. Vertex rounding to face or overhanging, rarely with a slightly produced thick margin.
 - F. Elongate, clypeus acute, elytra not overlapping. 6. *Ponana* Ball.
 - FF. Oval, clypeus truncate, elytra broadly overlapping posteriorly,
 - 7. *Penthimia* Germ.

Genus *Dragonana* nov.

Intermediate in form and structure between *Gyponana* and *Xerophloea* with the pronotum definitely broadened and almost angled posteriorly. This broadening serves as the base of a short blunt anterior triangle and also of a long acute posterior one. Head much narrower than body, vertex obtusely angular, lower than the plane of the pronotum, the anterior margin slightly foliaceous. Ocelli on the vertex about equidistant between the anterior and posterior margins and between themselves and the eyes. Front narrow, flat, slightly wedge shaped as in *Gyponana*. Pronotum transversely striated, convex in

*Fowler in the *Biologia* lists *Epiclinae* A. and S. (from India) with a single (new) species from Mexico and Central America, but omits *Xerophloea*, which occurs throughout both North and South America. There is nothing in Fowler's figure or description that might not apply to a large species of *Xerophloea* and it has been thought best to omit *Epiclinae* from consideration as a New World form until the generic relationships can be determined.

both diameters, the anterior submargin very much depressed, rounding in front, straight behind. Elytra long, relatively narrow, appressed posteriorly, becoming vertical at the tip. Whole surface closely pitted or ornamented with setigerous pustules. Venation weak and indefinite with some irregular reticulations in the forks and toward the apex. Whole surface milky subhyaline with dark setigerous punctures.

Type of Genus *Gypona dracontia* Gib. (Ariz.).

This genus is quite distinct structurally and probably represents a more primitive type than either *Gyponana* or *Xerophloea*. Superficially this species might be taken for a *Xerophloea* but the members of that genus have the head and pronotum pustulate instead of striate and the elytra have a definite cell pattern toward the apex.

Gyponana octolineata Say.

This is one of the most puzzling and variable forms in the whole group and has been the subject of much difference of opinion as to specific and varietal limits. It ranges from coast to coast and from Canada to Mexico and probably on to South America. It is the most abundant species in most of its range and varies from small pale forms of 9 or 10 mm. to the robust ones of 13 or 14 mm. in length. Certain forms are heavily and irregularly reticulate while in others the reticulations are reduced to a few extra ones in the apical and antepical cells. The authors have studied external structures and internal genitalia throughout and have found no character that is not widely variable if the series studied is large enough.

The following varieties seem to be relatively constant. They are for the most part correlated with differences in food habits or life histories which probably explain the partial segregation.

KEY TO THE VARIETIES.

- A. Scarlet, or at least stripes and reticulations scarlet. .1. *octolineata* Say
- AA. Green or green with yellow stripes on vertex and pronotum.
- B. Elytra heavily and irregularly reticulate, usually including all or part of clavus.2. *cana* Burm.
- BB. Elytra not reticulate at base or on clavus, sometimes with only a very few reticulations.
- C. Species large, 10 mm. or over, the apical part of elytra reticulate; often either striped with yellow or pruinose.
- D. Green with or without yellow stripes.3. *striata* Burm.
- DD. Pruinose.4. *pruinosa* Spbg.
- CC. Smaller, narrower forms, green shining, found on pine. .5. *tenella* Spbg.

Var. *octolineata* Say is the "pink katydid" expression of this species and probably does not represent a true variety in nature and yet certain puzzling variations need to be considered before uniting it with the second. It is found from Missouri and Minnesota eastward to the Atlantic, a region in which *striata* is the dominant form and yet the red *octolineata* forms are often heavily reticulated and apparently cannot be simply a red phase of the less reticulate variety.

Var. *cana* Burm. a short compact heavily reticulate form occurs in less numbers than *striata* from the Atlantic to the Pacific and from Canada to Mexico. It appears to be more abundant in the extreme southern region of the U. S. Nymphs and adults have been taken in numbers from the shrubby growths of the Florida flat woods. The nymphs are usually heavily dotted with brown and frequently margined with reddish brown. They are more abundant on *Pyrus* and *Vaccinium* than on the Myrtles. Burmeister describes this form as with an angulate vertex, but only an occasional example shows this character. He gives the length the same as that of *striata* but on the average *striata* will run a millimeter longer and all the extremely large examples seen have been of that form.

Var. *striata* Burm. is the commonest form found on the Pacific Coast and as stated above the dominant one in the Northern U. S. and Canada. The largest forms found in the United States (often as much as 13-14 mm. in length) are found here. The nymphs are found in almost all situations where mixed vegetation, weeds and shrubs occur. These are rare in pure grass stands or on isolated trees or pure tree stands. The true character of *G. quebecensis* Prov. has been a puzzle. Van Duzee insists that it is distinct, and characterizes it as small and heavily reticulate, although after he examined the Provancher collection in the museum at Quebec he recorded the specimen found there as a typical *cana*. Osborn in his Leafhoppers of Maine describes a small (8-9 mm.) slightly reticulate form as *cana* and lists *quebecensis* as a synonym, but Van Duzee in his catalogue places this reference under *quebecensis* despite the sparse reticulations. There appears to be no reason to believe that *quebecensis* is other than a synonym of *striata*, the common form in the region where Provancher worked. He recognized and described two species and only two, *quebecensis* = *striata* and *hullensis* = *pectoralis*, the two common forms found there.

He says nothing about reticulations, but gives the length as longer than *pectoralis* and its occurrence as in damp places which would be correct for *striata*, but would not fit in with the idea of a small species, such as Van Duzee and Osborn describe or with *tenella*, the only small form occurring in that region that we have been able to differentiate.

Var. *pruinosa* Spgb. Spangberg described this form from Georgia and Texas placing it between *flavolineata* and *scrupulosa*, both forms of *striata* without giving any character by which it could be separated except the name. Certain pruinose forms from that region resembling *striata* have been placed here, but at the best it is a weak variety and pruinose forms also occur in *tenella*. The size given and the location in his system both incline one to believe that this is a pruinose variety of the larger forms.

Var. *tenella* Spgb. (*Gypona geminata* Osb. *Gypona quebecensis* Van Duzee, and Osb. in part (not Prov.). This is a small (7-9 mm.) pale green, almost parallel margined variety with relatively few reticulations; in some of the smaller examples they are almost absent. Some of the Northern examples have relatively strong reticulations in the anteapical and apical regions and may be what Van Duzee had in mind as *quebecensis* and what Osborn referred to in his Maine list. Provancher, however, described a larger insect, as noted under *striata*.

Osborn records it from pine on Long Island. Examples are at hand from Cranberry Lake, N. Y. (Osb. and Drk.). The senior author has taken it from Jack Pine in Northern Wisconsin, in August, and the writers have taken it commonly from Long-Leaf Pine in a number of places in Florida during the past two years.

The usually smaller size and shorter head, as well as its association with pine, would seem to warrant specific rank, but a study of internal as well as external genitalia of numerous examples from Florida and Wisconsin compared with a long series of *striata* and *cana* from Florida, District of Columbia, Wisconsin, Iowa, Colorado, Utah and California shows no more than individual variation throughout the series.

Examples of a pruinose form of this species from Southern Florida, also taken on pine, and an example from Costa Rica extend the distribution and suggest further synonymic complications when the Mexican and South American tangle is worked out.

It was through a misinterpretation of Spangberg's comparison of this species with *bigemmis* that it was placed as a synonym of *angulata*. The smaller size (7-8 mm.), round head and pale color described all fit this form much better than any other occurring in the Georgia region.

Gyponana rugosa Spgb.

Specimens of this species are at hand from Boston, Mass., District of Columbia, Virginia, Wisconsin, Southern Colorado, and Salt Lake, Utah, all collected by the senior author from oak; specimens have been examined from Texas, New Mexico and several places in Arizona and Costa Rico. The writers have found nymphs and adults on nearly all species of oaks in Florida. It is apparently, only limited in distribution by the range of its food plant, the oaks.

The species, while heavily reticulated, is quite distinct in the genus *Gyponana* and in other characters is very close to *unicolor* and its relatives in *Gypona*. The nymphs are thickly covered with long silky hairs, while the nymphs of other species have relatively inconspicuous ones.

Gyponana chadana nov. sp.

Similar to *rugosa*, but smaller with narrower head and a long and acutely angled vertex. Length, 8 mm.

Head much narrower than pronotum, vertex almost as long as pronotum, right angled, with the margin very slightly convex; ocelli almost equidistant between base and apex, set well in front of eyes, equidistant from each other and the line of the eyes; front narrow, inflated so as to appear straight to the apex of the vertex in profile. Pronotum broad and short, rapidly narrowing from the prominent lateral angles to the very small eyes; elytra resembling *rugosa* in the type and pattern of reticulation, but narrowing posteriorly and lacking an appendix.

Color pale golden as in *rugosa* (greenish in life) but lacking the stripes of that species except a pair on scutellum. A pair of black spots on pronotum, another on hinges and milky white markings between the reticulations as in *rugosa*.

Holotype male, "Chads," Utah, July 11, 1910 (Ball). Swept from oak (*Q. undulata* var. *wrighti*). This is a strikingly distinct addition to this group. In head character it resembles *angulata*, but is much narrower and even more acutely angled, while in other characters it is close to *rugosa*, but again narrower and more acute at the apex of elytra.

Gypona signoreti Stal.

This species varies from golden green to tawny or even reddish with a smoky cloud in the apical cells. The females are about the size and shape of the western males of *unicolor*, but with a shorter and less foliaceous vertex. This species was described from Mexico and the female examples are at hand from Salt Lake, Utah in August, and Cedar City, Utah in September taken on oak (Ball).

Var. *pilula* nov. Intermediate in form and color between *tenella* and *signoreti*. Smaller than *tenella* (7 mm.) golden or bright straw (green in life), with red eyes and ocelli, vertex quite definitely but slightly obtusely angulate, front slightly inflated so as to almost eliminate the foliaceous margin, female segment truncate; venation as in *unicolor*.

Holotype female, Allotype male and four Paratypes collected by Ball at "Chads," Utah, July 11, 1910, on *Cowania mexicana*. The material reported as *unicolor* by Ball from Arizona and that collected on oak at Dolores, Colo., (Aug., 2, 1900) belongs to this variety. A nearly full grown nymph was taken with the types. *G. signoreti* appears to be widely distributed through Mexico, the West Indies and on to South America and no doubt there will be some synonymy and many of its varieties will have been named, but most of its variations in the humid tropics are towards the reds with dark margins, while this form from the extremely arid dwarf oak environment, is strikingly small and pale.

Gypona unicolor Stal.

Gypona melanota Spgb., *G. bipunctulata* Wood., *G. nigra* Woodw., *G. germari* Fowl. (not Stal).

This large, broad, green, species with five varieties of males ranging from pure green to shining black is now known from Massachusetts to Utah and south to Georgia in the Alleghenics and to Panama in the mountain meadows of the Rockies. The senior author has collected it in District of Columbia, Virginia, Wisconsin, Minnesota, Iowa, North Dakota, Colorado and Utah, and has examples from New York, West Virginia, Kansas, Sierra Madre Mountains and Nepantla, Mexico. Spangberg described it from New Jersey and Georgia, Fowler (as *germari*) lists it for Mexico and Central America. It has not been taken in Florida or in the southern Mississippi valley

and will probably be found to be confined to the northern prairie belt with extensions southward in the mountains. The Colorado and Utah examples were found in high mountain meadows with heavy grass covers. The western material is all relatively longer and narrower than that from the humid east.

This species was listed as *melanota* Spgb. in the former review, as at that time no material had been studied (the western material was as yet unmounted) from the Rocky Mountain region or southward and all descriptions from this region were thought to apply to the following species. On restudying these descriptions with the new material it became fairly certain that *unicolor* of Stal. was based on a female of this species without spots on the pronotum and that the species listed by Fowler as *germari* was *unicolor* and not *angulata* as formerly suggested.

Gypona verticalis Stal.

Material of this species is at hand from many places in Colorado and Utah (Ball) New Mexico (Townsend), Arizona (Williams) and from a number of places in Mexico. The synonymy given before appears to be correct and in addition it is probable that *fuscinervis* Stal, which was described from a single male, will be found to belong to this group, in which case the name will take precedence. This species is found in the clumps of Snowberry growing on rocky ridges and warm mountain slopes and is typically arid in its distribution, while on the other hand *unicolor* is found only in the high wet mountain valleys in the arid regions and is typically humid in distribution.

Prairiana cinerea Uhl.

This rusty straw-colored species in its many striking varieties ranges from Massachusetts to California and from Montana to Mexico, but is abundant only in the short grass region and the transition zone to the prairies. Isolated examples have been found in Iowa, Illinois and Connecticut on the east and in extreme southern California and down to Vera Cruz, Mexico on the west. Ball suggested that the Massachusetts reference probably belonged to *miliaris*, but through the kindness of Dr. DeLong, the writers have examined a typical example of var. *kansana* from Connecticut (Garman). The senior author in many years collecting west of the Rocky Mountains only found

it in one isolated spot in Southern California. Varieties *kansana* and *subta*, two of the extremes, were the only ones with sufficient material for study, but there was no appreciable difference in their internal genitalia.

P. cinerea var. *moneta* Van D., resembles *kansana*, but is much smaller, narrower, with a long and extremely foliaceous vertex, smoky with the vertex and pronotum paler. This variety seems to be confined to the extreme Southwest. It was described from three females from the Gulf of California and the senior author took two males at Chino, California, in June.

P. cinerea var. *orizaba* nov. var. Still longer and more slender than *moneta*, as long as *kansana*, but much narrower, pale straw with a few elongate dashes around the margins of elytra. Length, 9 mm.

Vertex and pronotum much elongated, over three-fourths of vertex in front of eyes, acutely subangular with the apex rounded. Elytra very long and narrow, pale straw. The vertex and pronotum very finely irrorate with scarlet, a pair of fine fuscous points back of the ocelli and a few irregular linear dashes in the areoles mostly around the margins.

Holotype male Orizaba, Mexico, January 9 to 16, '92 (H. Osborn). Type in senior authors collection. This must also, be a rare form as it does not seem to be listed in the Biologia.

Genus *Ponana* Ball.

This genus is distinctly subtropical in distribution only one species (*scarlatina*) occurring in the Northern States and then with only 3 or 4 of its numerous varieties. The past two years collecting in Florida has brought together a large amount of material in this group. The internal genitalia of all these forms has been studied and as a result several more forms previously recognized as distinct species have been found to be only varieties of *scarlatina*. On the other hand the new materials has indicated that several more varieties are sufficiently constant and have food plant or environmental factors that warrant their recognition.

KEY TO SPECIES OF *PONANA*.

- A. Vertex moderately long and slightly produced, elytra usually with spots, dots or flecks.
- B. Vertex longer, species variable in color, moderate to large,
 - 1. *scarlatina* Fh.
- BB. Vertex shorter, species small dull gray.....2. *curiata* Gib.
- AA. Vertex short and very broad, almost parallel-margined elytra with apical and discal cells free from spots or dots.
- C. Pale green with concolorous nervures, often with black along suture, vertex margin thick but definitely produced...3. *dorsalis* Spbg.

- CC. Brown with darker nervures, vertex margins rounding broadly to face, ocelli just back of margin.
 D. Nervures lightly, narrowly lined with brown, spots along anterior margin of pronotum.....4. *marginifrons* Fowl.
 DD. Nervures brown, marginal spots on pronotum back of eyes only.
 5. *resima* Fowl.

Ponana scarlatina Fitch.

There are a number of additions to the former list of varieties and some consequent regrouping as shown in the following key.

KEY TO THE VARIETIES.

- A. Smoky or pale with little trace of red (rare in *puncticollis*), areoles without red flecks and rarely with a few transverse vermiculations.
 B. A smoky median stripe or heavy transverse fuscous vermiculations, without pronotal spots (at most 2). (Northern varieties).
 C. A variable smoky brown median line, few if any transverse vermiculations.
 D. Elytra smoky with only lateral margins pale...1. *limbatipennis* Spbg.
 DD. Elytra with only a narrow median line smoky....2. *pectoralis* Spbg.
 CC. No smoky median line, heavy transverse vermiculate reticulations,
 3. *scarlatina* Fh.
 BB. Pale varieties usually with four spots on submargin of pronotum and four on each elytron, two large on claval suture and two smaller on margin in form of pack saddle (mostly Guif Coast).
 E. Pale brown or with a reddish tinge, spots on pronotum and elytra and some transverse vermiculate lines at least along suture.....4. *puncticollis* Spbg.
 EE. Yellowish or greenish varieties, sometimes almost white, no transverse vermiculate lines, pack saddle spots on elytra.
 F. Stout, yellowish, no spots on pronotum.....5. *citrina* Spbg.
 FF. Smaller, more slender greenish four spots on pronotum,
 6. *meditabunda* Spbg.
 AA. Red or red flecked or brownish, with numerous definite dots or spots in the areoles.
 G. Elytra without black spots in the areoles, except for the pack saddle and a few other paired marks, whole insect usually flecked.
 H. Scarlet or testaceous varieties.
 I. Heavily flecked with scarlet, the nervures inconspicuous,
 7. *irrorella* Spbg.
 II. Testaceous, the nervures conspicuous, red flecking faint or absent.....8. *rodora* Ball.
 HH. Straw colored with faint red flecking giving a reddish tinge, pack saddle marks, the base of appendix and one or two pairs of spots adjoining dark.....9. *pauperata* Spbg.
 GG. Elytra with numerous black spots in the areoles, a pair of black spots on the pronotum back of ocelli, rarely more than a trace of red flecking.
 J. Ground color scarlet by virtue of inconspicuous red flecking,
 10. *sanguinolenta* Spbg.
 JJ. Ground color dirty straw, washed with pale brown.
 K. Spots in areoles inclined to be round and irregularly placed, a single pair of black spots on pronotum back of ocelli,
 11. *grisea* Spbg.
 KK. Spots in areoles inclined to be transverse and arranged along nervures, usually a pair of spots on base of vertex, another on pronotum in line with ocelli and two additional pairs, forming a crescent.....12. *dohrni* Stal.

The food plants and habitats of the varieties are quite strikingly diverse and suggest that there are at least three groups of species involved. The study of both external and internal genitalia from long series of examples, however, gives no basis of separation and each locality seems to have its own slight variation from the type as well as extremes that intergrade in all directions.

Var. *limbatipennis* has been recorded from Buttercups and *pectoralis*, from Basswood, *scarlatina* has no recorded food plant but has been taken where Basswood and Buttercups were both abundant.

Var. *puncticollis* both nymphs and adults have been taken from Basswood sprouts in deep shady swamp areas in Florida the past year.

Var. *citrina* occurs abundantly in damp shaded areas where the Labiate *Micromeria brownei* forms dense mats. The green nymphs and greenish creamy adults have both been taken from these mats.

Var. *meditabunda* has been taken in low flat pine woods, usually in open grass and swampy areas where the little water pennywort (*Hydrocotila*) is abundant.

Varieties *irrorella*, *rodora* and *pauperata* are all very strictly confined to the mat like areas of the Gopher plum (*Chrysobolanus oblongifolius*) occurring in the high, dry, sandy areas. The difference in color and markings is largely a seasonal effect. The brilliant red flecked *irrorella* is largely a summer form, the dark coppery *rodora* a summer and fall extreme while the pale *pauperata* is the winter and spring form. The nymphs of all these forms are dark red. *G. spadix* DeLong, proved to belong to var. *rodora* on examination of an example kindly sent by Dr. DeLong.

Var. *sanguinolenta* is found both larvæ and adults in the thick mats of the low growing oaks in the higher spots of the flat pine areas.

Var. *grisea* also appears to feed on the low oaks but only where they are in deep shade of the hammock forest type probably a different species of oak as the relative abundance of the species of low oaks is quite different in the two areas.

Var. *limonea* nov. Form and size of *pectoralis*, but entirely lacking the dark markings. Uniform pale tawny yellow, glistening, the eyes and ocelli dark brown, disc of scutellum paler.

Holotype female and paratype female, Vinton, Ohio, June 5, 1900 (Osborn Collection).

Allotype male and paratype female, Washington, D. C. (Ball Collection).

After the completion of this paper Doctor Osborn sent a large tawny yellow female that at first sight was mistaken for *Gypona unicolor*, but on examining the vertex margin it proved to be a *Ponana* and evidently the pale extreme in the *limbati-pennis-pectoralis* group. The more tawny examples of *citrina* are similar in color, but the thickening of the apex of the head will at once separate them.

***Ponana resima* Fowl.**

This species occurs abundantly on the mat forming oaks and both nymphs and adults are occasionally found on practically all species of oak. The nymph is easily recognized by its blunt head, alternate red and green bands and the presence of silver scales on the dorsum.

THE NYMPHS

The generic characters in the nymphs are as definite and constant as those in the adults, *Xerophloea* nymphs have an even larger and more foliaceous, angularly pointed, head than the adults and a similarly tapering body. *Gyponana* nymphs are green, flat with long foliaceous vertices that are definitely narrowed immediately in front of the eyes. The antennæ are extremely long and thread-like. *Gypona* nymphs are heavy bodied with long vertices that are thickened slightly at the apex. The antennæ are shorter and the bristles on the body sparse but strong. *Prairiana* nymphs are dirty rusty straw colored usually dotted with black. They are almost parallel margined with very long foliaceous heads. The eyes are very small and set into the posterior part of the margin. The front is very long and narrow, the antennæ short and the first three segments large. *Ponana* nymphs are red or reddish green, short and stout bodied with relatively short rounding vertices. The front is broad, the antennæ short and the hind legs extremely broad and bowed. *Penthimia* nymphs are red and even shorter and rounder than those of *Ponana* with heavily overhanging vertex margins. The abdomen is shorter than the thorax.

EXPLANATION OF PLATES.

PLATE XXV.

Internal Genitalia of typical species of each genus in situ. a, Pygofer; b, Styles; c, Oedagus, d, Plates; e, Pygofer spine.

PLATE XXVI.

Showing style and oedagus of each species arranged by genera. The style is on the left and the oedagus on the right. The oedagi except in *rugosa* and *angulata* viewed from the side. All drawings made to the same scale from cleared and dissected material in permanent balsam mounts with the cover glass pressed down.



