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INSTITUTE PARIS



From a painting by Leopold Seyffert

W. H. Russell.

OBITUARY.

WILLIAM JACOB HOLLAND.

With the death of Dr. William Jacob Holland, which occurred on December 13, 1932, an eminent figure in the world of science passed away. He was the dean of American entomologists, the author of innumerable publications in this field. But Dr. Holland was far more than an eminent entomologist of world-wide reputation—he was a naturalist of a universality of erudition which is but rarely found among scientific men of the present day. With a prodigious memory, a keen understanding of the diversity of scientific problems, he was at home in the manifold domains of learning. Above all, he was a man of outstanding intellectual and spiritual culture, and that is why his loss has created an irreparable void in the community with which he has been associated for nearly three scores of years and within the ranks of his fellow workers in the scientific field.

William Jacob Holland was born in Bethany, on the island of Jamaica, on August 16, 1848. His family was of Moravian extraction, residing for a long time in Salem, North Carolina. From there his father was sent as a missionary to the West Indies.

From early boyhood Dr. Holland was trained in studies of natural history. Upon graduation from the Moravian College and Theological Seminary at Bethlehem, Pennsylvania, in 1867, he received the degree of bachelor of arts from Amherst College in 1869. For a year after graduation he served as principal of a high school in Amherst, and the following year occupied the same position at Westboro, Massachusetts. Having been ordained into the Moravian ministry he entered Princeton Theological Seminary and concluded the course in 1874. Subsequently he joined the Presbytery of Monmouth and came to Pittsburgh as pastor of the Bellefield Presbyterian Church, which position he held until 1891. In the course of his pastorate Dr. Holland devoted much time to scientific studies. He went to Japan as a member of the United States Eclipse Expedition in 1887 and used this opportunity in a very profitable way for various biological investigations. In 1891 he was made chancellor of the Western University of Pennsylvania, now the University of Pittsburgh. In 1898 his friend, Andrew Carnegie, invited him to assume the responsibilities as director of the

museum founded by this steel magnate. This office was held by Dr. Holland with signal success until 1922, when he became director emeritus of the Carnegie Museum. Under the administration of Dr. Holland the museum attained the rank of one of the most important scientific institutions of its kind on the continent. It would be scarcely possible to describe in a brief sketch all the outstanding services of Dr. Holland to this institution. Any attempt to enumerate his major accomplishments in this respect would be futile since it would necessitate a recital of the whole history of the growth of the Carnegie Museum since its inception. Dr. Holland performed the duties as vice-president of the Carnegie Hero Fund from 1904 to 1922, and upon his election as president of that body became a member of the Carnegie Corporation. In this latter capacity, Dr. Holland had an opportunity to devote his efforts in a most indefatigable way toward the promotion of the divers causes within the competence of that body.

Dr. Holland was an active member of the board of trustees of several institutions of higher learning, and carried on the duties of Belgian Consul for some years after the world war. He had the distinction of becoming the founder of the American Association of Museums in 1907, and remained president of the association until 1909. He was a member of scores of scientific societies, among them the Zoological and Entomological Societies of London, the Entomological Societies of America, Washington, New York, Cambridge, Germany, France, Russia, and Brazil; the American Zoological Society, Royal Society of Edinburgh, American Philosophical Society, and several foreign scientific academies. He was a councilor for the Association for International Conciliation, a member of the Academy of Natural Sciences, Philadelphia, the Pennsylvania Historical Society, Historical Society of Western Pennsylvania, and Moravian Historical Society.

Dr. Holland was the author of numerous scientific treatises and books, notably of "The Butterfly Book" and "The Moth Book," which became sources of reference for specialists and were chiefly instrumental in stimulating a widespread interest in lepidopterology among amateurs in this country. He also wrote many scientific papers issued by the United States Government and by various learned societies in America and abroad. The list of his contributions reaches about five hundred bibliographical items and covers an extraordinary variety of topics. The entomological papers alone approach one hundred and twenty titles from the year 1886 to the last years of his life.

A large proportion of his papers on Lepidoptera deal with forms of Rhopalocera and Heterocera from West Africa. The lepidopterous fauna of Congo was thoroughly studied by Dr. Holland who also contributed to the knowledge of the butterflies of Somaliland, Sierra Leone, Kamerun, and the Seychelles. Other articles deal with the Lepidoptera of the Bahamas, the Isle of Pines, Hainan, Celebes, and Buru. Several articles written at various times of his long entomological career were devoted to the fauna of different portions of North America. In recent years Dr. Holland paid much attention to certain taxonomic problems and discussed on several occasions the significance of Hübner's "Tentamen" as a basis for nomenclatorial changes proposed by some modern authors. The Encyclopædia Britannica applied to him as to a leading specialist in the museum field for the preparation of a survey of the history of scientific museums. For the last thirty-four years he edited the *Annals* and *Memoirs* of the Carnegie Museum, lending to these publications the imprint of his literary discrimination and brilliant scholarship. Numerous seats of higher learning honored themselves by bestowing degrees of honorary doctorate upon this distinguished scientist in recognition of his eminence in learning. Among such universities were Washington and Jefferson College, Amherst College, Dickinson College, New York University, Bethany College, St. Andrew's in Scotland, and the University of Pittsburgh.

Dr. Holland owned an extensive entomological collection which was particularly rich in Lepidoptera from North America, Africa, and certain regions of Asia. It contained representative series of Rhopalocera and Heterocera from various countries in different parts of the world. Especially valuable portions of the collection of Dr. Holland were the Pyralids collected by Pryer in Japan and the well-known collection of North American Rhopalocera assembled by Edwards, with all the types described by these noted entomologists. Dr. Holland's collection included types of many hundreds of new species which were described by him during his life time.

One of the most significant scientific achievements of Dr. Holland was connected with the paleontological explorations of the Carnegie Museum which were directed by him in Utah, Wyoming, Montana, and North Dakota. The finds of these expeditions resulted in many discoveries, including the celebrated *Diplodocus carnegiei*, the original skeleton of which is adorning the gallery of fossils in the Carnegie Museum, whereas nine replicas were presented to the leading scientific

institutions in Europe and both Americas. In recognition of his contributions to science Dr. Holland received decorations from Belgium, Austria-Hungary, Italy, Russia, and Spain.

Dr. Holland passed away amid his favorite labors, lending his concentrated attention, as throughout his life, to current problems of natural history advanced by contemporary investigations. Until the end he remained absorbed by the adventurous spirit of scientific research, responsive to the lure of exploring some new avenue of the ever-widening horizons of knowledge. He lived a life of exceptional usefulness. Endowed with a profusion of gifts, among which his linguistic abilities were by far not the least, he cultivated his native talents and molded them into a personality of unique qualities and values. A churchman, a leader in education, the father of the Carnegie Museum in Pittsburgh, a man of learning honored far and wide by academics, international congresses, and universities, Dr. Holland will not only be mourned sincerely, but his achievements will also not fail to remain an inspiration challenging the best within us.

A. AVINOFF.

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Art. 6	April 30, 1932.	Art. 12	January 10, 1933.
	Art. 13	January 18, 1933.	

ERRATA

Some changes in names of species were introduced in the genus *Galgupha* by the authors after the completion of the printing of the article together with the Index. These alterations together with other errata are indicated herewith.

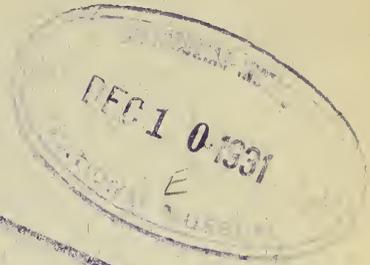
- p. 191: 12th line from top, for "201," read 201-388.
p. 195: 6th line from bottom, for "*Cænina*," read *Cænina*.
4th line from bottom, for "the last four names above cited," substitute *Chlænocoris* and *Cursula*.
p. 196: 10th line from bottom, add "*Coenina* belongs near *Eysarcoris*."
9th line from bottom, for "*scarabeoides*" read *scarabæoides*.
p. 198: 6th line from top, for "*gilletti*" read *gillettii*.
11th line from bottom, for "*gen. nov.*" and "*nom. nov.*," read *gen. nov.* and *nom. nov.*
p. 212: 13th line from top, for "paræ" read paræe.
19th line from top, for "paræ" read paræe.
p. 213: 8th line from top, for "paræ" read paræe.
p. 249: Omit 12th, 11th, 10th, and 9th lines from bottom.
p. 261: 16th line from bottom, for "differentialis" read *differentialis*.
p. 274: 6th line from top, for "*Tetyra*," read *Cimex*.
p. 286: Transfer last four lines to top of p. 287.
p. 287: Transfer first three lines to foot of p. 286.
p. 293: 7th line from bottom, for "anomala" read *bakeri*.
p. 294: 12th line from bottom, for "anomala," read *bakeri*.
p. 296: 15th line from top, for "anomala" read *bakeri*.
p. 306: 21st line from bottom, for "*anomala*" read *bakeri*.
11th line from bottom, for "*anomala*" read *bakeri*.
p. 313: 20th line from top, for "*schmidtii*" read *smidtii*.
p. 325: 7th line from bottom, for "*paratype*" read *paratype*.
p. 329: 12th line from bottom, for "australis" read *meridiana*.
6th line from bottom, for "australis" read *meridiana*.
p. 330: 11th line from top, for "australis" read *meridiana*.
p. 365: 2nd line from bottom, for "*intermedia*" read *alpina*.
p. 389: 13th line from top, for "circumfusa, flavo-bisignata, pampeana, setigera," read *circumfusus, flavo-bisignatus, pampeanus, setigerus*.
p. 396: Between 3d and 4th lines from top insert "GALGUPHA, cont'd."
p. 402: In last line, for "drawings" read drawn.

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Serial No. 150

ANNALS
OF THE
CARNEGIE MUSEUM



VOL. XXI, No. 1.

November, 1931

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ANNALS
OF THE
CARNEGIE MUSEUM

VOL. XXI, NO. 1

EDITORIAL NOTES.

Mr. Boulton and his wife returned to the Carnegie Museum on May 22, 1931. Mr. Pulitzer left them behind him in Angola to continue the work of collecting for the Carnegie Museum and they spent nearly five months in that country after Mr. and Mrs. Pulitzer left them, adding greatly through their diligent collecting to the large amount of material which they had already acquired. The Pulitzer Expedition on behalf of the Carnegie Museum has resulted in a notable addition to the natural history collections in our custody. It is too soon as yet to undertake even in outline to report upon what they acquired. They brought home a large collection of birds in excellent condition, and a large collection of mammals, including two specimens of the Giant Sable Antelope. The extensive collection of insects, which they made, is especially rich in coleoptera and orthoptera, representing many species which hitherto have not been contained in our collections. The collection of lepidoptera is also quite large. It is being mounted, but no formal report as to the numbers of the specimens or as to the species can be as yet given. The lepidoptera will be reported upon by the writer; in the determination and description of other orders the assistance of different specialists will be sought. Reports upon these collections will be published by the Museum as they are from time to time prepared. Mr. Boulton has in his hands a preliminary report describing a number of new species and subspecies of African birds, collected not only by the Pulitzer Expedition but by Mr. Boulton, while collecting for the Museum in previous years. This will appear in the present number of the Annals. The African collections in the Carnegie Museum are already most extensive and ex-

ceedingly valuable, thanks to the kindness of such collectors as the Goods, father and son, Dr. Weber, Dr. J. A. Reis, Dr. W. C. Johnston, the late William Doherty, Mr. Childs Frick, the late Théodore Roosevelt, and latterly Mr. Ralph Pulitzer, names which we are proud to associate as having been, or as now being, friends of this Museum.

Dr. Avinoff accompanied by his nephew employed the larger part of his summer vacation in a visit to the Island of Jamaica, many parts of which he traversed and in which he made collections particularly of the lepidoptera of the island. They have brought home with them quite a large collection and were especially happy in having secured two specimens of *Papilio homerus* that wonderfully beautiful butterfly, which until a few years ago was a great rarity in all the museums of the world. Their explorations extended from sea-level up to four thousand feet above the sea among the mountains.

About the first of July the newly revised and enlarged edition of The Butterfly Book, prepared by the Director Emeritus of this Museum was issued from the press of Doubleday, Doran and Company. It is not in any sense to be regarded as a mere reprint of The Butterfly Book, which first came out in 1898, but is in reality a new book, having been with the exception of certain parts of the introduction largely rewritten and thoroughly revised. The book is in quarto, the earlier book having been printed in octavo with narrow margins. The margins in the new book are broad. The earlier editions contained forty-eight colored plates, representing five hundred and thirteen species and varieties. The new edition is illustrated by seventy-seven plates, seventy-three of which are in color, representing all the butterflies of the continent from the Arctic Circle to the southern tip of Florida and the borders of Mexico. Nearly one thousand species and the leading varieties are represented, mostly by their types and paratypes, which are reproduced upon the plates. The book contains nearly twice as much printed matter as the earlier volume and is the only book now published which gives a complete view of the butterflies of the United States and Canada. The first printing of the first edition was sold before the book had passed through the bindery. The new book has already begun to find most favorable recognition, not only from the public, but from scientific entomologists in different parts of the world.

The Editor of "The Entomological News" of Philadelphia, Dr. P. P. Calvert says in a letter to the author: "I congratulate you on doing again for a new generation what you did by your first edition for its predecessor." The preparation of this new edition has consumed the leisure moments of the author for almost the whole of the past four years and he is grateful to have been spared in health and strength to complete what has been in reality a great, laborious, and expensive undertaking.

Early this spring Mr. Netting was invited to serve as instructor in Herpetology by the Oglebay Nature Training School, at Wheeling, W. Va. Accordingly Mr. and Mrs. Netting spent the last two weeks in June at this school. One week of the time was devoted to collecting in Ohio County near Wheeling, and the second week was spent in Pocahontas County, on and near the very interesting Cranberry Glades. During the two weeks, Mr. Netting collected five hundred herpetological specimens, and several hundred snails. Mrs. Netting collected over a hundred plants and some insects. The outstanding discoveries of the trip were these: Mr. Netting secured Wehrle's Salamander one hundred miles south of its known range; and the Marbled Salamander two thousand feet higher than it had been taken previously. Mrs. Netting secured an extremely rare orchid, which proved to be the second record for the state of West Virginia.

On August 10, Mr. and Mrs. Netting and Richard Freni left Pittsburgh to collect for a month in the southern Appalachians. All efforts on this trip were directed toward the study of salamanders. During the month seventeen hundred specimens were taken including such rare species as the Green Salamander, and the Red-legged Salamander. The collection also included one hundred specimens of reptiles and frogs, sixteen hundred snails, and about five hundred insects, including a specimen of *Argynnis diana*. As a result of these two trips the Carnegie Museum collection of salamanders has been doubled and many little known forms were collected in series of over one hundred specimens, which will enable the writer to work out age-groups, food-studies, and breeding data.

Mr. Arthur W. Henn, accompanied by his wife, spent his summer vacation in a transcontinental automobile ride. He went from Pittsburgh to Portland, Oregon, visited Astoria at the mouth of the Col-

umbia River, visited the region of Puget Sound, spent some time at the Rainier National Park in Washington, and on his return visited the Glacier National Park in Montana. Thence he proceeded to Banff in Alberta, and to Winnipeg, and returned by way of Minnesota to his home. He made some collections on the Pacific Coast and obtained among other things at Astoria a fine specimen of the Ocean Sunfish, *Mola mola* (Linnæus), and in Glacier National Park specimens of the Montana Grayling, *Thymallus montanus* Milner. The Montana Grayling has been introduced into a number of small lakes along the continental divide. It is very similar to the Michigan Grayling once abundant in Michigan, but now verging on extinction. He collected a series of the Top Minnow, *Gambusia patruelis* (Baird & Girard), taken from the warm waters flowing from the hot springs at Banff, National Park, in all probability introduced, though no record has been observed. This locality is one thousand miles north of the natural range of the species.

Mr. W. E. Clyde Todd has been engaged from the middle of August until the end of September in ornithological investigation on the banks of James Bay, Ontario. He reports excellent progress.

Mr. J. LeRoy Kay has spent the summer in carrying on further paleontological explorations in the neighborhood of Vernal, Utah. He reports that he thinks he has discovered imbedded in the rock a complete articulated skeleton of a primitive Titanotheres. This is a very fortunate find, if the work of extraction, which has begun, proves to be successful.

Mr. Ottmar von Fuehrer, accompanied by his wife has returned from Mt. Rainier where he made a series of sketches and landscapes, and collected accessories for a habitat group representing alpine vegetation, which is to be placed in the Hall of Botany. Mrs. Fuehrer found time to make a considerable collection of lepidoptera, which arrived in excellent condition, but has not yet been mounted.

Mr. Edward Graham has returned from a botanical collecting trip in Utah, a region which heretofore has been but poorly represented in our herbarium. He also spent some time in collecting in California, Oregon, and Washington, returning again to Utah to collect the later

summer flora. He has brought home a large mass of excellently prepared material.

The Museum begins this fall a course of instruction in "Museum Appreciation" for teachers in the schools of the city and the county. As in previous years, the training will be by various members of our curatorial staff.

The death in his eightieth year of Dr. David Starr Jordan, has robbed the Editor of these Annals of an admired and trusted friend, many of whose important papers have appeared both in the Annals and the Memoirs of the Carnegie Museum. His death terminates a long, strenuous, and fruitful life. His career from its beginning until near its close is embodied in his autobiography entitled "The Days of a Man," which well repays perusal.

He gained his early education in the face of adversity. "Working his way through college," he was one of the earlier graduates of Cornell University. Rapidly rising after graduation from one important position to another, he became the President of Indiana University in 1885, President of Leland Stanford University in 1891, and remained in this connection until the day of his death, although in later years designated as Chancellor Emeritus of the institution, which he had called into being with the millions placed at his command by the later Senator Stanford.

Dr. Jordan was an eminent zoölogist with a broad knowledge of the whole field. He specialized, however, as an ichthyologist. At the time of his death he was undoubtedly regarded as the ablest and most learned ichthyologist in America.

Fourteen papers written by Dr. Jordan, often in association with one or the other of his pupils and assistants, have appeared in the literature issued by the Carnegie Museum. Based upon the material acquired by this Museum, seven of these were published in the Annals and seven in the Memoirs, all of them more or less fully illustrated. They cover descriptions of new species of fishes from Siberia, Korea, Formosa, Japan, and the Hawaiian Islands, the types of the new species are contained in the ichthyological collections of this Museum.

The Editor is not prompted at this point to speak at length of the multiform activities of his friend and colleague as a naturalist, administrator, and advocate of world peace, but with profound sorrow

simply places upon record at this point the passing of a dear friend, with whom in Pittsburgh and in his own beautiful home at Palo Alto, California, he spent many delightful days in friendly intercourse and companionship.

I. A NEW SUBSPECIES OF POANES MASSASOIT Scudder.

BY AUSTIN H. CLARK.

1. *Poanes massasoit hughii*, subsp. nov.

Resembling *P. m. massasoit*, but slightly larger and darker, the female with the yellow markings above reduced to small spots and partly, or sometimes completely, absent. Beneath with the costal and outer border of the fore wings and the ground color of the hind wings much darker and more reddish than in *P. m. massasoit*, and the yellow markings on the hind wings less extensive. Yellow markings on the hind wings beneath consisting of a broad yellow band, often more or less obscured, except for the inner end and the outer third or fourth, with rusty, as wide as the interspace which basally extends for a short distance within the cell and outwardly ends at a distance from the outer border which is somewhat greater than the length of the fringe; above the outer third of this band is a small yellow oblong spot not twice as broad as long with sometimes a similar or smaller one above it; between the outer end of the band and the abdominal border of the wing is a series of two or three oblong spots which are usually about twice as long as broad.

Locality.—Beltsville, Maryland; bog between the railway station and the experiment farm of the Bureau of Animal Industry, U. S. Department of Agriculture; Hugh Upham Clark, collector, July 15, 1928.

Comparisons.—Compared with a series of five males and one female from a bog in the woods at Weston, Mass., taken on July 9, 1923, the specimens from Beltsville average slightly larger, while the color is uniformly darker in both sexes, being blackish brown, the darkest males with violet reflections.

The males not infrequently show three small spots in a row extending directly inward from the costal margin of the fore wings about two-thirds of the distance from the base to the apex, and on the hind wings the last two discal spots of the female may be indicated by a few yellow scales.

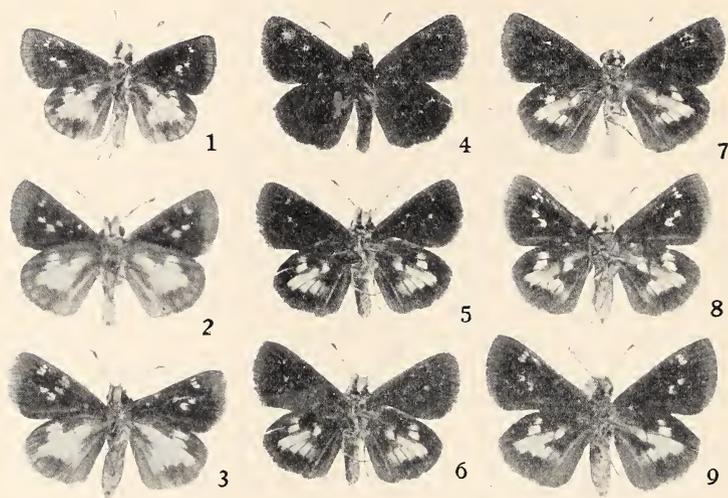


FIG. 1. 1, *P. massasoit massasoit* Scudder, ♂, underside, Weston, Mass., July 9, 1923; 2, Do.; 3, Do., ♀; 4, *P. massasoit*, var. *hughii* Clark, ♂, upperside, Beltsville, Md., July 15, 1928, type; 5, Do., ♂, underside, type; 6, Do., ♂, paratype, underside; 7, Do., ♂, paratype; 8, Do., ♀, underside; allotype; 9, Do., ♀, paratype.

All figures natural size.

The females have the yellow markings above greatly reduced. On the fore wings, while the three small dashes near the costal margin two-thirds of the distance from the base to the apex are similar to those in the northern form, the two spots in the lower median interspaces are only about half as large as they are in the northern female, and there are no other markings on the fore wings. On the hind wings only the last two of the row of four discal dashes are represented, these being only about half the size of those in the northern form, and the spot in the last subcostal interspace is absent, or is indicated by a few yellow scales. Rarely the females are wholly without yellow markings above.

Beneath in both sexes the costal and outer border of the fore wings and the ground color of the hind wings is much darker and more reddish than in northern (Massachusetts) specimens, and the yellow markings are much less extensive. The interspace between the third median and the lower radial veins is occupied by a broad yellow band as wide as the interspace, which basally extends for a short distance

within the cell and outwardly ends at a distance from the outer border, which is somewhat greater than the length of the fringe. Beneath this are two spots occupying the whole width between the next two interspaces which are about twice as long (parallel to the veins) as broad; their inner ends lie beneath about the middle of the yellow band and their outer ends lie some distance within its outer end. Above the yellow band and opposite its middle is a yellow spot occupying the whole width of the next interspace which is somewhat longer than broad. Above the inner end of this spot there may be another small spot. The conspicuous subcentral yellow band is usually somewhat, and occasionally largely, obscured with rusty scales, leaving clear yellow only the portion within the cell and the outer end for a distance about equal to the length of the spot next beneath. In the northern specimens the spots beneath the yellow band run inward to the origin of the veins between which they lie and there is a third spot which is only indicated in the Beltsville specimens.

(Note by W. J. Holland. An examination of the collections of W. H. Edwards in my possession reveals in the series of *P. massasoit* determined by Edwards, several specimens of the form *P. massasoit hughii* Clark, from Nebraska. In the Ehrmann Collection bequeathed to the Carnegie Museum are three specimens of the newly named subspecies from South Dakota. It is thus shown that the var. *hughii* Clark has a wide distribution).

II. FIELD KEYS TO THE LIZARDS AND AMPHIBIANS OF BRITISH GUIANA.

BY STANTON C. CRAWFORD.

DEPARTMENT OF ZOÖLOGY, UNIVERSITY OF PITTSBURGH.

The keys here devised are based on field characters, and are designed for the use of the general student rather than the taxonomist. Technical language has been avoided, so far as is consistent with the desire for brevity. The writer experienced the need for such keys, when in the summer of 1924 he was collecting material for histological study at the Kartabo Tropical Research Station. This laboratory had been loaned to the University of Pittsburgh through the kindness of Dr. William Beebe.

The literature describing forms from British Guiana is so scattered, and there has been so much controversy over records of the occurrence of the forms reported for the colony, that it seems desirable to collect and analyze the data anew, study the available specimens, and include the findings in one report. For all of the species named in the keys there seems to be authentic record of collection in the colony, except possibly in the cases of *Tropidurus torquatus torquatus*, *Atelopus pulcher*, *Atelopus varius*, and *Hyla fasciata*. The specimens of *Hyla marmorata*, reported by the author in a preliminary paper in 1926, afford the first record of the occurrence in British Guiana of this Ecuadorean species. The occurrence of *Ceratophrys cornuta*, reported by Dr. Beebe and later questioned, is confirmed by a specimen collected in 1926 by Mr. J. F. W. Pearson.

The main outlines of the scheme of classification followed here are based on Boulenger's keys, with the chief exception that the suggestions of Dr. G. K. Noble for the revision of the families of Amphibia have been adopted. Also many parts of the classification depend on the work of Barbour, Stejneger, Ruthven, Burt, Cope, and Camp. An effort has been made to correlate the contributions made by these writers, in so far as they apply to the forms found in British Guiana.

The earlier work on specimens was founded on material collected

by the writer in 1924, and by others working under his direction: Messrs. George D. Morgan and E. P. Jones in 1925, Mr. and Mrs. J. F. W. Pearson in 1926. Dr. S. H. Williams, also, kindly assisted in obtaining specimens. Most of the material has been turned over to the American Museum and to the Carnegie Museum. The animals were collected at various stations through the stretch of country extending twenty-four miles from Bartica to Matope Falls, and at Amatuk, further in the interior.

The keys have been checked from many specimens in the American Museum, including the types of *Gonatodes beebei*, *Leptodactylus rugosus*, *L. minutus*, and *Hyla ornatissima*. For making this material available, for identifying several specimens, and for many helpful suggestions, the writer is greatly indebted to Dr. G. K. Noble. Mrs. Helen T. Gaige kindly checked the keys against specimens in the collection of the Museum of Zoölogy at the University of Michigan. Valued criticism was also given by Dr. Thomas Barbour of the Museum of Comparative Zoölogy, and by Dr. W. J. Holland and Mr. M. Graham Netting of the Carnegie Museum. The writer nevertheless takes full responsibility for the keys as now presented.

The writer is aware of several shortcomings in the keys. Many controversial points could not be settled with the information available. Such characters as the concavity of "forehead" in *Anolis*, or the direction of the pupil in the Amphibia are not very satisfactory, but they are difficult to replace. The pupil may be nearly round, when fully dilated, but close inspection will reveal angles in the margin, showing the direction of the slit. Several of the characters used are difficult to observe in juvenile individuals. In general, such descriptions of coloration have been made as would be applicable to both living and preserved specimens. Frequently, general descriptive material is added to supplement the statement of diagnostic points.

THE LIZARDS OF BRITISH GUIANA.

KEY TO THE FAMILIES.

I. Tongue smooth, or velvety.

- A. Eyes large, without movable lids. Skin granular. Jaw teeth small, numerous, closely set, with obtuse points. No pterygoid teeth in roof of mouth.....GEKKONIDÆ.

B. Eyes moderate or small, with lids. Skin covered with scales. Jaw teeth conical or canine-like in front, and on the sides tricuspid or with edges finely denticulated, more or less compressed. Usually pterygoid teeth.....IGUANIDÆ.

II. Tongue covered with overlapping scaly projections, or with oblique folds.

A. Tongue ending in two long smooth points, more or less elongate, flattened. No osteodermal plates.

1. Scales of upper surfaces granular or overlapping. Scales beneath body usually squarish and not overlapping. Eyes and eyelids well developed. Limbs present, although digits may be lacking.....TEIIDÆ.

2. Scales usually absent. Scales of upper surfaces granular when present. Eye concealed under skin. Mouth small. No visible ear. Tongue arrowheaded. Limbs absent. Body wormlike, ringed. Tail short.AMPHISBÆNIDÆ.

B. Tongue feebly nicked in front; moderately long, flattened. Body with osteodermal plates.....SCINCIDÆ.

Family GEKKONIDÆ.

KEY TO THE GENERA.

I. Digits not, or but slightly, dilated at the base; the two or three distal joints more or less compressed and angularly bent. Digits with series of transverse plates beneath, and all clawed. Claw between two scales, a smaller upper and a large lower one, which extends upwards around the claw on either side.

A. Pupil of eye vertical. No superciliary spines (hand lens) above eye.....*Gymnodactylus* Spix

B. Pupil round. One or more superciliary spines. *Gonatodes* Fitzinger

II. Digits entirely dilated, with a double series of thin plates beneath; clawed, the claw retractile into a median groove. Pupil of eye vertical. No superciliary spines.. *Thecadactylus* Oken

III. Digits dilated, but the distal joints compressed. Distal joint long, free, rising from within the extremity of the digital dilation. Plates beneath digits are in a double series. Pupil of eye vertical. No superciliary spines..... *Hemidactylus* Oken

IV. Digits dilated at apex only, with very small sheathed claw, the sheath opening laterally. Digital expansion with a circular plate beneath. Pupil of eye circular or subelliptical. One superciliary spine.....*Sphærodactylus* Wagler

KEY TO THE SPECIES.

Genus GYMNODACTYLUS Spix.

Adult about 3.25 inches long. A U-shaped dark line from eye to eye over nape. Ground-color brown, marbled with darker spots, which tend to form bands. Tubercles form fourteen very regular longitudinal series on the back.....*G. geckooides* Spix

Genus GONATODES Fitzinger.

- I. A small projecting superciliary spine above eye. Gray-brown above, a series of large black spots along each side of the vertebral zone. Frequently a light vertebral line, with large serrations extending laterally. Usually a light line, preceded by a darker spot, in front of shoulder. Pale brown beneath. Throat often with oblique brown lines converging backwards. Six or seven upper labial shields. Total length about 2.5 inches.

G. annularis Boulenger

- II. A series of three or four superciliary spines. Uniform reddish brown above. Almost immaculate beneath, no spots on throat. Five upper labial shields. A large *Gonatodes*, with narrow head. Total length about 3.75 inches.....*G. beebei* Noble

Genus THECADACTYLUS Oken.

A large grotesque Gecko, attaining length of about 7.5 inches. Head covered with small granular scales. Digits strongly dilated, half webbed. Brown or grayish brown above, variegated. Whitish beneath, immaculate.....*T. rapicaudus* (Houttuyn)

Genus HEMIDACTYLUS Oken.

Attains a length of about 6.5 inches. Hinder part of head shows mixture of fine granules and round tubercles. Digits free, with slender distal clawed joints. Gray or light brown above, with dark spots or undulating cross-bands. Whitish beneath.

H. mabouia (Moreau de Jonnés)

Genus SPHÆRODACTYLUS Wagler.

Less than 2.5 inches long. Generally with a pair of longitudinal white stripes on each side of head and body, much more distinct on the head. Grayish brown above, whitish beneath. Fine keeled granules on the body.....*S. molei* Bœttger

Family IGUANIDÆ.

KEY TO THE GENERA.

- I. Femoral pores (beneath thighs) absent.
 - A. Digits more or less dilated, or depressed, with smooth transverse platelets beneath, the distal joint narrower, cylindrical, or compressed. No transverse folds on throat. Vertebral fold feebly developed, or absent. Tympanum distinct. Male with appendage on throat.
 - 1. Distal joint raised above the one next to it. Digits more or less dilated. Usually pterygoid teeth in roof of mouth.

Anolis Daudin
 - 2. Distal joint not raised. Digits scarcely dilated. No pterygoid teeth..... *Norops* Wagler
 - B. Digits not dilated.
 - 1. Plates beneath digits distinctly keeled or several-ridged.
 - a. Head more or less produced behind. A transverse throat fold, but no sac. Toes with dermal lobes on outer sides. Pterygoid teeth..... *Basiliscus* Laurenti
 - b. Head not produced behind.
 - x. A transverse throat-fold, or a very large occipital (or interparietal) shield, much larger than the eye opening. No sac on throat.
 - y. Digits straight, or nearly so. Pterygoid teeth.
 - z. Digits long and slender, toes strongly "toothed" laterally. Upper head-scales strongly keeled or tubercular. Strong transverse throat-folds. Body and tail crested..... *Uranoscodon* Kaup
 - z'. Digits compressed. Upper head-scales large, smooth. A strong curved or oblique fold on each side in front of shoulder, not extending across throat. Frequently a transverse fold in front of the latter. No crest on back.

Tropidurus Wied
 - y'. Digits laterally bent at the joints, compressed.
 - z. Scales of tail small, or moderately large. Upper head-scales keeled, or with granular prominences, large. Occipital plate very large about half as wide as head. Neck strongly folded beneath, fold forming a pair of pouches on each side. Tail long, cylindrical, or compressed. A vertebral crest. Pterygoid teeth present or absent

Plica Gray

- z'. Scales of tail very large and spiny. Upper head-scales moderate, granular. Two transverse throat-folds. Lips swollen. Tail short, flat. No vertebral crest. No pterygoid teeth..... *Urocentron* Kaup
- x'. No transverse throat-fold. Occipital shield small. A large appendage on throat. Body compressed. Pterygoid teeth..... *Tropidodactylus* Boulenger
2. Plates beneath digits smooth, or indistinctly keeled. Occipital shield slightly enlarged. A transverse throat-fold. No throat-sac. A slight crest or denticulation on back. Pterygoid teeth..... *Enyalius* Wagler
- II. Femoral pores in both sexes. Digits compressed. Pterygoid teeth. Body compressed.
- A. Third and fourth toes about equal. No transverse throat-fold. No crest on back..... *Polychrus* Cuvier
- B. Fourth toe much longer than third. A transverse throat-fold. A large non-dilatable throat-appendage. A lobed vertebral crest..... *Iguana* Gronovius

KEY TO THE SPECIES.

Genus ANOLIS Daudin.

- I. Forehead definitely concave. Vertebral fold feeble, or absent.
- A. Short frontal ridges. Canthus rostralis (ridge from forward angle of eye-opening to snout) feeble, three or four canthal scales. Ear-opening moderately large, vertically oval. No vertebral fold. Moderate throat-appendage, indicated in female. Occipital shield larger than ear-opening, separated from the supra-orbital shields by two or three rows of scales. Loreal rows (between eye and nostril, on side of head) five or six. Six to eight upper labial shields to below center of eye. Fourteen to sixteen platelets under phalanges II and III of the fourth toe. Tail slender, roundish. Total length not quite five inches. Gray-brown or olive above, with metallic green or coppery gloss. Frequently a light dark-edged cross-band between the eyes. Irregular darker spots. Other variable markings. Beneath, whitish, sometimes brown-dotted..... *A. fusco-auratus* D'Orbigny
- B. No frontal ridges. Canthus rostralis well marked.
1. Canthus rostralis short, two canthal scales. No vertebral fold. Upper head-scales keeled. Ear-opening rather large, vertically oval. Throat-appendage large, less developed in female. Scales of throat obtusely keeled.

Occipital shield small, smaller than ear-opening. Loreal rows seven to nine. Seven upper labial shields to below center of eye. Sixteen to eighteen platelets under phalanges II and III of the fourth toe. Tail rounded. Total length about five inches. Uniform coppery above, sometimes with darker spots or a light vertebral line. Beneath whitish, with metallic gloss.

A. schiedii (Wiegmann)

2. *Canthus rostralis* longer, four or five canthal scales. Male with feeble vertebral fold. Digital expansions well developed. Upper head-scales smooth.
 - a. *Canthus rostralis* rather obtuse, becoming sharp in front of eye. Four or five canthal scales. Ear-opening moderate, vertically suboval. Throat-appendage rather large, not developed in female. Scales of throat smooth. Occipital shield larger than ear-opening. Loreal rows four or five. Five to six upper labial shields to below center of eye. Twenty-two to twenty-six platelets under phalanges II and III of fourth toe. Tail compressed, with feebly serrated upper edge. Body above brownish or greenish, often with a dark network, enclosing whitish spots. Beneath whitish, or greenish, with metallic gloss. Total length eight inches.....*A. aneus* Gray
 - b. *Canthus rostralis* sharp, four canthal scales. Ear-opening moderate, suboval. Throat-appendage well developed in male, very small in female. Scales of throat smooth or obtusely keeled. Occipital shield at least as large as ear-opening. Loreal rows four to six. Seven to nine upper labial shields to below center of eye. Twenty-six to twenty-eight platelets under phalanges II and III of fourth toe. Tail feebly compressed. Purplish above, with scattered round white dots. Sometimes a vertebral series of light spots. Beneath, purplish or greenish. Length about 10.5 inches.....*A. punctatus* Daudin

II. Forehead scarcely or not concave. No vertebral fold.

- A. Occipital shield at least as large as ear-opening. Digits feebly dilated.
 1. Two or more vertebral series slightly larger than other scales of back. Tail rounded. Body grayish above, with metallic gloss, and oblique brown bands towards tail. Brown cross-bands on tail and limbs. Sides of head and neck marbled with brown. Beneath greenish white. Length about 4.25 inches.....*A. nitens* (Wagler)

2. Scales of back not larger in vertebral series. Frontal ridges absent, or short and feeble. Scales of the supra-orbital semicircles (above, between eyes) enlarged, separated by one or two series of scales. Throat-scales keeled. Upper head-scales each with one to three minute ridges. Loreal rows five to seven. Seven to nine upper labial shields to below center of eye. Tail rounded. Body brownish above, often a dark cross-band between the eyes. Back with indistinct symmetrical dark markings and metallic reflections. Flanks frequently with round black dots. Sometimes a light dark-edged vertebral line, wider behind. Beneath whitish, sometimes dotted, or with a black longitudinal streak. Length about 7.75 inches. *A. chrysolepis* Duméril & Bibron

B. Occipital shield smaller than the ear-opening. Digits feebly or moderately dilated. Canthus rostralis distinct and angular. Throat-scales keeled.

1. Fourteen platelets under phalanges II and III of fourth toe. Frontal ridges absent. Seven loreal rows. Upper head-scales minutely one- to three-ridged. Snout short, swollen between nostrils. Ear-opening rather large, suboval. Ten to eleven upper labial shields to below center of eye. Canthus rostralis short. Throat-appendage very small, black. Limbs short and slender. Scales of vertebral region almost as large as those beneath body. Tail rounded. A dark transverse band between the eyes. Golden-brown above, with black flecking and cross-bands. Length about 5.6 inches.

A. lentiginosus O'Shaughnessy

2. More than sixteen platelets under phalanges II and III of fourth toe. Frontal ridges distinct, but short. Eight to ten loreal rows. Eight to ten upper labial shields to below center of eye. Large oval ear-opening slightly oblique from horizontal. Occipital shield nearly as large as ear-opening. Canthal scales two or three. Throat-appendage small, nearly as much developed in the female as in the male. Upper head-scales small, keeled. Tail rounded. Above, olive or brownish, with metallic reflections; usually with large angular dark spots, sometimes confluent. A dark cross-band between the eyes. Sometimes a light, dark-edged vertebral line. A large dark blue spot on each side of throat-appendage. Beneath whitish, with metallic reflections; often a blackish longitudinal line. Total length about 9.75 inches.

A. scyphus Cope

- 3. Eighteen to twenty-one platelets under phalanges II and III of fourth toe. Ear-opening moderate, oval. Five or six labial shields to below center of eye. Four or five loreal rows. Occipital shield nearly as large as ear-opening. Canthal scales two or three. Throat-appendage moderate in male, indicated in female. Upper head-scales sharply keeled. Tail compressed, with slightly serrated upper edge. Body compressed. Brown above, with golden gloss, uniform or spotted with darker. Sometimes with three pale longitudinal vertebral lines, and lines from axilla to groin. Beneath whitish, with metallic gloss. Total length about six inches.

A. sagrei Cocteau

Genus NOROPS Wagler

Body slender. Five upper labial shields to below center of eye. Throat-scales keeled. Body-scales both above and beneath large, sharply keeled. Scales of sides smaller and keeled. Golden-brown above, with variable darker spots. Sometimes a dark band; if present, usually bordered below by a white one, extending over ear from eye to side of body. Beneath whitish or yellowish. In males a throat-appendage, blue, or with a bluish spot. Total length about 7.25 inches..... *N. auratus* (Daudin)

Genus BASILISCUS Laurenti

A large lizard, about thirty-two inches long, when fully grown. Head-crest in male more or less regularly hood-shaped, rising from an imaginary line connecting the upper borders of the ear-openings (hardly developed in female). Crest on back much developed, sometimes as high again as body, supported by bony rays. Toes with strong lateral fringe. Snout pointed. Eye-opening large. Upper labial shields large, six or seven to below center of eye. Olive-brown above, with more or less distinct angular black cross-bars. Light bands from temple to neck and from loreal region to forelimb.

B. basiliscus (Linnæus)

Genus URANOSCODON Kaup

Lizard about a foot and a half in length. Head moderately large, short, rounded. Five or six labial shields, upper and lower. No throat-pouch; scales of throat keeled. Pterygoid teeth. Limbs long. Tail strongly compressed, crested like the back. Brownish above, uniform or spotted with darker. Often a light irregular band from arm-pit to groin. Beneath brownish white. . *U. superciliosus* (Linnæus)

Genus TROPIDURUS Wied

- I. Upper body-scales small, but slightly larger than those beneath. A fringe of long scales in front of ear. Olive or brownish above, usually a more or less distinct light and a dark band on either side of the back. A strong black-banded slightly curved fold before the arm, widely separated from its fellow. One or two more or less marked transverse throat-folds. Sides of neck granular, with one or two oblique folds, or pouches. Occipital shield very large. Beneath yellowish, or grayish, often marbled in front with blackish. Animal about ten inches long.

T. torquatus torquatus (?) (Wied)

- II. Upper body-scales at least twice as large as those beneath. No light bands along body. Otherwise much like *T. torquatus torquatus* (Wied).....*T. torquatus hispidus* (Spix)

Genus PLICA Gray

- I. Sides of neck feebly folded, without spines. A strong oblique fold in front of arm, bearing a broad black band, often showing a yellowish spot in front. A feeble longitudinal and a strong transverse throat-fold. Reddish or purplish above, with more or less distinct blackish cross-bands. Brownish or yellowish beneath. Almost a foot in length.....*P. umbra* (Linnæus)
- II. Sides of neck with tufts of small erect spine-like scales. Neck constricted and strongly folded and pouched beneath. Rear-most throat-fold continuous with a lateral fold, curving above the shoulder, and ending above the hind limb. Grayish to blackish above, spotted or marbled with darker. Dark cross-bars on limbs and sometimes on back. Whitish beneath, a collar of black marblings. Throat black in adults. Total length about sixteen inches.....*P. plica* (Linnæus)

Genus UROCENTRON Kaup

A small lizard, not quite five inches long. Sides of neck irregularly folded. Tail shorter and narrower than the body, flat beneath, about twice as broad as deep, with whorls of large obtusely keeled spiny scales. Azure-blue or olive above, with crescentic black cross-bands. Beneath greenish or yellowish.....*U. azureum* (Linnæus)

Genus TROPIDODACTYLUS Boulenger

Snout sharp, canthus rostralis very short. Upper head-scales many-ridged. Eleven or twelve plates on upper lip to below center of eye. Throat-scales keeled. Yellowish brown above, marbled with dark brown. A dark cross-band between the eyes. A row of dark spots with lighter centers along each side of back. Throat-sac blackish. Length 8.5 inches.....*T. onca* (O'Shaughnessy)

Genus ENYALIUS Wagler

Upper head-scales small, smooth or feebly keeled. Pale brownish above, with an alternating series of squarish brown spots along the middle of the back. A brown band from eye to shoulder. Whitish beneath. Length about nine inches. *E. bibroni* Boulenger

Genus POLYCHRUS Cuvier

Upper head-scales enlarged, smooth, or feebly granulated, or lined. Eye-opening small, smaller than tympanum. Tail nearly three times as long as head and body. Color and markings very variable. Reddish brown above, with blackish spots or symmetrical transverse markings. Furrows between head-shields black. Black lines radiating from eye, the two most constant being to above tympanum and to angle of mouth. Lighter beneath, uniform, or brown-spotted. Full grown males are sixteen inches long, females larger.

P. marmoratus (Linnæus)

Genus IGUANA Gronovius

Very large (fifty-five inches) with a continuous lobed crest on neck, back, and tail. Snout rounded, with obtuse canthus rostralis. Pterygoid teeth. Nostril large, pierced in a swollen nasal, near tip of snout. Tympanum large, oval. Forward border of the throat-appendage with a crest of large triangular compressed scales. A large circular shield below tympanum. Scales of back very small, equal, keeled. Green, or greenish, lighter beneath. Upper surface usually variegated with darker and lighter. Usually with dark, light edged irregular bars down flanks. Tail with dark rings. Usually a whitish streak in front of arms. *I. iguana* (Linnæus)

Family TEIIDÆ.

KEY TO THE GENERA.

- I. Nostril pierced in a nasal head-shield, or in the furrow between the two nasals, on either side of head. Limbs well developed.
 - A. Right and left forward nasal shields not separated by the fronto-nasal. Plates beneath body. Tympanum exposed. No transparent disk in lower eyelid.
 - 1. Scaly portion of tongue not much widened; frequently retractable into a basal sheath. Not, or but feebly, nicked behind.
 - a. Plates beneath body small, forming more than twenty longitudinal series. A double collar-fold. Large lizards.

- x. Tail not, or but feebly, compressed. Scales of back small, uniform. Eight or nine lower labial shields.
Tupinambis Daudin
- x'. Tail strongly compressed, with a double longitudinal keel above. Scales of upper surfaces intermixed with large keeled tubercles. Eleven to thirteen lower labial shields. *Dracæna* Daudin
- b. Plates beneath body large, forming less than twenty longitudinal series. Five or six lower labial shields.
- x. Plates beneath body keeled. Collar-fold single.
Kentropyx Spix
- x'. Plates beneath body smooth. Collar-fold double.
Ameiva Meyer
2. Scaly portion of tongue arrow-headed, cleft, not retractile.
- a. Tail rounded. Head-shields large, regular. Shields beneath body in less than twenty longitudinal rows. Collar-fold double. *Cnemidophorus* Wagler
- b. Tail strongly compressed, twice ridged above. Scales of back small, uniform. One collar-fold.
Crocodilurus Spix
- B. Right and left nasal shields widely separated by one or two fronto-nasals. Tongue moderately elongate, arrow-headed. Lower eyelid with a transparent disk. Tympanum exposed.
1. Tail compressed, with a double toothed crest. A collar-fold. Back covered with small, intermixed with large, keeled scales. Plates beneath body.
Neusticurus Duméril and Bibron
2. Tail round or somewhat four-sided. Transparent disk of lower eyelid composed of several scales. Dorsal scales strongly keeled.
- a. No collar-fold. *Leposoma* Spix
- b. A strong collar-fold. *Euspondylus* Tschudi
- II. Nostril pierced between the nasal and the first labial head-shields. A fronto-nasal, separating the nasals. No ear-opening. Digits rudimentary, or absent. Digits, if distinct, clawless. Scales of back quadrangular. No plates beneath body. Tongue moderately elongate, arrow-headed. Eyes minute; eyelids developed. No collar-fold. Hind limbs undivided. . . *Bachia* Gray
- III. Nostril in the lower part of a single more or less bisected nasal shield. Nasal shields widely separated by a fronto-nasal. Ear exposed. Inner finger, if distinct, clawless. A transparent disk in lower eyelid. No plates beneath body. No collar-fold.

- A. Prefrontal head-shields moderate and forming a short suture. Scales of tail lanceolate, keeled. Two loreal shields. All scales roundish-hexagonal, overlapping, smooth. Two rows along back, and two along belly, much dilated transversely.
Iphisa Gray
- B. Prefrontal shields small and widely separated. Scales of tail smooth. One loreal shield..... *Calliscincopus* Ruthven

KEY TO THE SPECIES.

Genus TUPINAMBIS Daudin.

- I. Two loreal plates. Temples with small granular scales. Scales of back oval, flat. Thirty-six to forty scales across the middle of the belly. Olive above, marbled and transversely barred with black, and with rows of lighter spots. Black cross-bands beneath, on yellow brown. Furrows between the plates on upper surfaces of head black. About a yard in length.
T. teguixin (Linnæus)
- II. One loreal plate. A few large plates bordering the temple superiorly. Scales of back regularly hexagonal, flat. About thirty scales across middle of belly. No black cross-bands beneath. Head with large black spots above. About a yard in length.
T. nigropunctatus Spix

Genus DRACÆNA Daudin.

A large lizard. Scales of back small, irregular, intermixed with irregularly arranged large oval strongly keeled tubercles. Four or five small pores on each side in front of the region of the vent, and two or three under each thigh. Olive-brown above. Flanks with lighter spots. Yellowish beneath, marbled with blackish. Furrows between the labial shields and chin-shields black. Length when grown, thirty-three inches..... *D. guianensis* Daudin

Genus KENTROPYX Spix

- I. Scales of vertebral line much larger than the laterals; strongly overlapping, keeled. Border of collar-fold strongly toothed, formed of twelve or thirteen plates.
 - A. Scales along vertebral line very large, with sharp keels forming fourteen straight longitudinal rows. Color olive, a few black spots on each side of body in general region of fore limbs. Length twelve inches..... *K. striatus* (Daudin)
 - B. Scales along vertebral line smaller, the keels not continuous, and directed toward the median line of the back. Above olive; beneath greenish white. A light line on each side,

beginning from the eye, bordered above and beneath by a broad black band, or a series of black spots. A second, more or less distinct, beginning from the ear. Almost fourteen inches long..... *K. intermedius* (Gray)

- II. Scales along vertebral line a little larger than those on sides of body; hexagonal, keeled. Edge of collar not, or but slightly, toothed; the last row of the band in front of the collar-fold containing fifteen or sixteen plates sometimes separated from the fold by granules. Olive above, a light line on each side, commencing from the eye, bordered below and sometimes above by a row of black spots, sometimes confluent into a band. Sometimes other lines and spots. Eleven inches long.

K. calcaratus Spix

Genus AMEIVA Meyer

Twelve longitudinal and thirty to thirty-three transverse rows of plates beneath the body. Scales of tail straight, feebly keeled. Femoral pores less than twenty-three on each side. Nostril between the nasal plates. A broad band of enlarged scales across the throat. Granules of back small, smooth. Shields of forearm in two or three rows; the outer row wider than the others. Above pale olive-brown, tinged with green. Head, neck, and arms spotted with black. White spots on sides. Young with a black white-edged band on each side, commencing from the eye. Female fifteen inches in length; male larger..... *A. ameiva ameiva* (Linnæus)

Genus CNEMIDOPHORUS Wagler

- I. Ten to twelve longitudinal and thirty-five to forty-two transverse rows of plates beneath the body. Arm-shields small. Femoral pores twenty-seven to forty-five. Scales of the band in front of the collar-fold separated from free edge of collar by four or five rows of granules. Brown to olive above; sides with bluish white spots. Yellowish to slaty beneath. Total length of adult 17.5 inches..... *C. murinus murinus* (Laurenti)
- II. Plates beneath body in eight longitudinal rows. Large arm-shields. Femoral pores fifteen to twenty-seven. Scales of the band in front of collar-fold separated from free edge of collar by one to three rows of granules. Olive to bluish, with six to ten light longitudinal stripes, or without stripes. Whitish spots on limbs. Greenish white beneath. Female 8.5 inches long; male longer..... *C. lemniscatus lemniscatus* (Linnæus)

Genus CROCODILURUS Spix

Scales of back small, elongate, oval, slightly keeled or peaked. Abdominal plates with the rear border rounded, in twenty-four longi-

tudinal and thirty-seven transverse series. Femoral pores very small, rather indistinct, six to ten in number. Brown above, dotted with black. Yellowish beneath, with scattered blackish spots. Digits with black rings. Length 20.5 inches. *C. lacertinus* (Daudin)

Genus NEUSTICURUS Duméril & Bibron

- I. Transparent disk of lower eyelid composed of several pieces. Olive-brown above, with darker spottings. Three vertical dark brown bars on upper eyelid. More or less distinct white spottings on flanks. Snout pointed. Diameter of ear half that of eye. Eleven inches long. *N. bicarinatus* (Linnæus)
- II. Transparent disk of lower eyelid undivided. Brown above, spotted with darker. Usually white spotting on flanks, and axilla black. Snout more obtuse. Ear-opening almost as large as eye. Less than seven inches long. *N. ecpleopus ecpleopus* Cope
- III. Transparent disk of lower eyelid composed of five pieces. Uniform blackish brown above, whitish beneath. Snout rather short, pointed. Ear-opening as large as eye-opening. About seven inches long. *N. rudis* Boulenger

Genus LEPOSOMA Spix

- I. Chin-shields, one in front and three pairs, the members of the first two pairs in contact. Twenty-three or twenty-four scales around middle of body. Thirty-four scales from occiput to base of tail; thirty-three from third pair of chin-shields to the vent. Yellowish brown above, with three or four rows of small black dots on the back. Lower surfaces yellowish. Four inches long. *L. scincoides* Spix
- II. Chin-shields, one in front and three pairs, the members of the pairs in contact, except those of the third pair separated by a single scale. Twenty-five to twenty-nine scales around middle of body, thirty-five to thirty-nine from occiput to base of tail, and forty from the third pair of chin-shields to the vent. Reddish to yellowish brown above, whitish beneath, a broad band of dark brown extending along either side of head and body. Just under four inches long. *L. percarinatum* (Müller)
- III. Chin-shields, four pairs, the members of the first three pairs in contact. Thirty-two or less scales from occiput to base of tail. Dark brown above, black dotted. On each side of the back a light line, commencing from the region above the eye. Sides of the head with oblique black lines. Lower surfaces yellowish white. Just over four inches long. *L. dispar* Peters

Genus EUSPONDYLUS Tschudi

Snout short, obtusely pointed. Dorsal scales hexagonal. Lateral scales small, roundish, smooth. Black above and beneath, each scale or shield with one to three white dots, the dots larger on the ventral shields. Chin white. Animal about five inches long.

E. leucostictus (Boulenger)

Genus BACHIA Gray

- I. Two supraocular shields. Fore limb with three or four unclawed digits. Scale-rows of body; thirty longitudinal; forty-seven to fifty transverse. Brown, back lighter. Two or three longitudinal darker lines. Almost five inches long.

B. cophias (Schneider)

- II. One supraocular shield. Fore limb with three unclawed digits. Hind limb undivided. Scale-rows of body; twenty-six to twenty-eight longitudinal; fifty to fifty-one transverse. Back reddish brown, with paler vermiculations. Sides blackish, with a pale stripe. Head bluish black, iridescent. Pale yellowish beneath. Six inches long..... *B. parkeri* Ruthven

Genus IPHISA Gray

Head depressed; snout short and broad, truncate. Body elongate, limbs short. Tail long, tapering to point. Chestnut brown above, with small dark marblings. Yellowish white beneath. A more or less distinct light lateral line, separating the lighter upper surface from the blackish brown of the sides. Not quite six inches long.

I. elegans Gray

Genus CALLISCINCOPUS Ruthven

Body moderately elongate. Head flattened. Brown above, becoming darker towards the hind limbs. A light stripe on each side from end of snout to base of tail. Sides of head, neck and body and upper surface of limbs black. Throat light green. Blue beneath. Not quite six inches long..... *C. agilis* Ruthven

Family AMPHISBÆNIDÆ.

Genus AMPHISBÆNA Linnæus

Wormlike. Eyes under skin. A distinct lateral line.

- I. Not more than two hundred and seventeen rings on body, twenty-four to thirty-two on tail. Eye distinct through the ocular shield. Black and white variegated, either the one or the other color predominating..... *A. fuliginosa* Linnæus

- II. About two hundred and forty-eight rings on the body, thirteen on the tail. Eye not distinguishable through the ocular shield. Whitish, with some dark brown segments above, and some pale brown spots beneath..... *A. stejnegeri* Ruthven

Family SCINCIDÆ.

Genus MABUYA Fitzinger.

- I. Less than thirty-three scales around middle of body. Snout obtuse. No projecting lobules on ear-opening. Limbs short. Olive or bronzy above, uniform or with darker spots. A broad dark lateral band passing through the eye, usually bordered beneath by a light streak. Animals about nine inches long.
M. agilis (Raddi)
- II. More than thirty-three scales around middle of body. Snout elongate, rather sharp. Ear-opening with minute projecting lobules or granules on its front border. Limbs long. Olive above, variegated with darker and lighter. Over nine inches long..... *M. punctata* (Gray)

THE AMPHIBIA OF BRITISH GUIANA.

KEY TO THE FAMILIES.

- I. Four limbs and no tail.
 - A. Tongue absent. Eustachian tubes having a common exit from the pharynx. No tympanum..... PIPIDÆ
 - B. Tongue present. Eustachian tubes with separate openings from pharynx.
 - i. Pupil of eye horizontal, or, in one genus, vertical. If vertical, then with distinct tympanum, and with inner finger and toe opposable.
 - a. Parotoid glands (prominences behind ear and above shoulder on either side), but no vomerine teeth (in roof of mouth) or upper jaw-teeth; or no parotoid glands, but with both vomerine and upper jaw-teeth; or in genus *Allophryne*, (which see) neither parotoids, vomerine teeth, nor upper jaw-teeth, and tympanum hidden. If teeth, then one or more of the following additional characters:—a discoidal fold beneath the body; a tarsal fold; toes fringed; color black; head enormous, elevated, bony, upper eyelid with heavy appendage; a lumbar gland; tubercle on upper eyelid. Tubercles beneath digits and beneath metatarsals..... BUFONIDÆ

- b. Either parotoid glands or vomerine teeth or both. Teeth in upper jaw. Head more or less depressed. Both fingers and toes dilated into terminal disks. Body more or less granulated beneath. HYLIDÆ
 - c. Neither parotoid glands nor vomerine teeth. Teeth in upper jaw absent or present. If present, then toes webbed. Fingers free. BRACHYCEPHALIDÆ
 - d. No parotoid glands, but both vomerine and upper jaw-teeth. Fingers free. Toes entirely webbed. RANIDÆ
2. Pupil of eye round or vertical. If vertical, then tympanum hidden. Eyes small. Snout projecting beyond mouth. Neither vomerine nor upper jaw-teeth. Fingers free, toes webbed or free. Habit stout. BREVICIPITIDÆ
- II. No limbs. Tail rudimentary. A flap-shaped tentacle. CÆCILIIDÆ

Family PIPIDÆ.

Genus PIPA Laurenti

No teeth in upper jaw. A large dermal flap at angle of mouth. One or two short tentacles on upper lip in front of eye. Head extremely depressed, triangular. Eye minute. *P. pipa* (Linnæus)

Genus PROTOPIPA Noble

Teeth in upper jaw. No dermal flap at angle of mouth. No dermal filament on upper lip. Neither head nor body greatly flattened. Snout rounded, not angular. Skin rough, tubercular.

P. aspera (Müller)

Family BUFONIDÆ.

KEY TO THE GENERA.

- I. No vomerine teeth, but with parotoid glands. Toes more or less webbed. *Bufo* Laurenti
- II. Vomerine teeth, but no parotoid glands.
 - A. Toes free or slightly webbed.
 - 1. Digits not, or but slightly, dilated at tips.
 - a. No conspicuous lumbar gland.
 - Leptodactylus* Fitzinger
 - b. A very prominent oval lumbar gland, as large as eyeball. *Pleurodema* Tschudi
 - 2. Digits with medium or large disks.
 - Eleutherodactylus* Duméril & Bibron

- B. Toes webbed to tips. Digits pointed or slightly dilated at tips..... *Pseudis* Wagler
 - C. Toes two-thirds to three-fourths webbed. Head very large, bony, horny..... *Ceratophrys* Boie
- III. Neither vomerine teeth nor parotoid glands... *Allophryne* Gaige

KEY TO THE SPECIES.

Genus BUFO Laurenti

- I. Grayish brown or blackish beneath, with round light dots. Brown above. Cranial ridges none, or indistinct. A rather indistinct tarsal fold. Parotoid glands large, but depressed, and descending to armpit..... *B. guttatus* Schneider
- II. Immaculate beneath, or with dark spots. Head with bony ridges.
 - A. Angles of jaws projecting. Parotoid glands rather small, angular. No tarsal folds. Ridges on head very prominent and bony in adult. Above, brownish, with a few black spots. Small warts, forming lateral folds.... *B. typhonius* (L.)
 - B. Jaws normal. Very large parotoid glands. Tarsal folds. Brownish above, usually with large darker spots. Skin very rough..... *B. marinis* (L.)

Genus LEPTODACTYLUS Fitzinger.

- I. Toes without distinct dermal margins.
 - A. Tips of toes dilated into small but distinct disks.
 - 1. First finger not extending beyond second. Granular above, with longitudinal folds and rows of warts. A discoidal fold beneath. Brown above, marbled with darker, a dark band between the eyes. Hind limbs cross-barred. Hinder side of thighs dark brown, marbled with white..... *L. hylædactylus* (Cope)
 - 2. First finger extending slightly beyond second. Above, closely set tubercles. Smooth beneath. Blackish brown above, with white line on side of snout, upper eyelid, and on either side of back. A large spot on the loin, and smaller ones elsewhere on limbs, these spots crimson in life, whitish in alcohol. Beneath, light brown with small white dots..... *L. lineatus* (Schneider)
 - B. Tips of toes not, or but slightly, dilated.
 - 1. Tympanum at least two-thirds width of eye.
 - a. Head narrow, snout long and pointed. Back with many longitudinal folds. Dark spot on nape nearly

or quite divided. Sometimes a light vertebral stripe, accompanied by two very narrow light stripes on either side, and a light stripe beneath the thighs. Hind limbs cross-barred or marbled. A discoidal fold beneath..... *L. typhoni* (Daudin)

b. Head broader, snout more blunt.

x. Skin smooth above, generally with large flat glands on the flanks. Brownish above. A black stripe along canthus rostralis and temporal fold. Generally with dark spots arranged in transverse bars on the back. Limbs cross-barred. Thighs marbled behind with black and yellow. A glandular fold from eye over tympanum to shoulder. Generally another along each side of the back to the sacral region. Beneath, a more or less distinct discoidal fold. Very large and stout.

L. pentadactylus (Laurenti)

y. Skin smooth, with distinct pores, each surrounded with a whitish halo, on the upper surfaces of thighs, calves, and tarsi. Reddish brown to violet-rose above. A well-accentuated "moustache." Flanks with slightly prominent oval glands and incomplete black rings. A fold above the tympanum, curved to the arm. Beneath, a discoidal fold. A deep black streak on either side of the back. Other black and some white markings. No white line on thigh..... *L. mystacinus* (Burmeister)

z. Skin very rugose above, some of the tubercles forming short elevated longitudinal lines. Warts on eyelids and a few on the snout. Reddish brown above, with paler markings, especially on upper lip and thighs. Straw-color beneath, heavily blotched with brown, especially beneath skin.

L. rugosus Noble

2. Tympanum not two-thirds width of eye.

a. A narrow glandular lateral fold, partly white, from eye to groin, and one over tympanum. Skin minutely granular. A fine elevated mid-line from snout to vent. Brown above, with darker markings. A light-edged band between the eyes. A broad dark "moustache" stripe on canthus, and running through eye to tympanum. This stripe with an equally prominent white stripe beneath it. Limbs cross-barred. A white longitudinal stripe on the thighs. Beneath, a discoidal fold..... *L. mystaceus* (Spix)

- b. No dorsal folds. Size very small. Skin slightly glandular. Dull olive-gray above, with darker spottings. Three, sometimes irregular, pale stripes running the length of the back. Dark spots form cross-bars on limbs. Almost immaculate beneath. A ventral discoidal fold..... *L. minutus* Noble

II. Toes with distinct dermal margins.

- A. A fold from eye to groin on either side, with another over tympanum. Canthus and these folds dark brown. Skin smooth or slightly granular. General coloration of back reddish or chestnut. Thighs very dark behind, with three or four rows of irregular white dots. Three or four diffuse dark bars on upper side of thighs..... *L. stictigularis* Noble
- B. No extensive longitudinal folds, except from eye to forearm over tympanum.
1. Skin smooth, with a few scattered warts. Brownish or olive above, with darker markings. A large dark brown, black-edged, angular spot on the occiput. Beneath, white, always reticulated or vermiculated with brown or gray. Thighs light brown above, crossed by a few short wide slanting darker bars..... *L. caliginosus* Girard
2. Similar, but color deep yellow to reddish brown. Lighter and darker spots. A dark stripe between the eyes, from which a light ivory-colored area extends forward. Tympanum close to eye, very large, ivory-color. Under side nearly white, little vermiculated.... *L. pallidorostris* Lutz

Genus PLEURODEMA Tschudi.

Snout rounded, as long as diameter of eye. Tympanum indistinct. First finger extending considerably beyond second. Toes short, a rudimentary web extending as a slight fringe along the sides. A few small flat warts above. Olive-brown, with a few indistinct darker markings. A large black spot on inguinal region, sometimes including gland. Loins and hinder side of thighs rose. Upper sides of thighs with one to three large black spots. Sometimes a light vertebral line.

P. brachyops (Cope)

Genus ELEUTHERODACTYLUS Duméril & Bibron.

Skin smooth above. Belly granular. Gray-brown above, with dark brown markings and marblings.

- I. Digits with disks nearly as large as tympanum. The latter one-fourth diameter of eye. Feeble oblique glandular ridges on back of head. Limbs cross-barred; dark bars radiating from eye.

E. marmoratus (Boulenger)

- II. Disks much smaller than tympanum. The latter two-fifths diameter of eye. A small tubercle on upper eyelid and a curved fold over tympanum. Sides indistinctly granular. Sometimes a triangular light blotch between eyes. Limbs indistinctly cross-barred. Groin, upper anterior and lower posterior surface of femur and inner face of tibia, carmine. . . *E. urichi* (Boettger)

Genus PSEUDIS Wagler.

Snout tapering. Interorbital space broader than upper eyelid. Tympanum three-fourths diameter of eye. Fingers and toes pointed. Skin smooth, brownish above, with dark markings. Beneath with brown spots and vermiculations on creamy background.

P. paradoxa (L.)

Genus CERATOPHRYS Boie.

Head large, elevated. A broad ridge from eye to above tympanum. Eye very small. Upper eyelid produced in a horn-like appendage, the length of which equals the diameter of the eye. Upper surfaces with small tubercles, larger and conical on the flanks; beneath, granular. Grayish, head and back with dark markings, sides marbled with brown. Limbs with regular dark cross-bars. *C. cornuta* (L.)

Genus ALLOPHRYNE Gaige.

Head very small, broader than long. Tips of fingers and toes dilated into disks. No tympanic disk. Snout rounded. Back distinctly porous, with small pustulations, especially on snout, eyelids, and sides of head. A few of these pustulations tipped with a tiny spine. Fold from eye to shoulder and one across throat. Dark gray above, lighter beneath. Head dark; back with dark spots.

A. ruthveni Gaige

Family HYLIDÆ.

KEY TO THE GENERA.

- I. Pupil of eye horizontal. Toes more or less webbed. Tongue adherent or moderately free behind. *Hyla* Laurenti
- II. Pupil vertical. Toes free or shortly webbed. Tongue extensively free behind. *Phyllomedusa* Wagler

KEY TO THE SPECIES.

Genus HYLA Laurenti.

- I. Choanæ (internal openings of nasal passages) large. Vomerine teeth in two strong series, transverse, or forming together a trough, an arch, or a chevron.
- A. At least the outer fingers more than one-third webbed.

1. A projecting rudiment of pollex (in the form of a tubercle, or acute claw). Coloration beneath immaculate.

a. Outer fingers entirely webbed. Tympanum two-thirds diameter of eye. Skin minutely granulated above, and coarsely beneath. Heel with a triangular dermal appendage. Brown or reddish brown above, variegated with lighter and darker. Limbs usually with dark cross-bars. Sometimes a dark vertebral line from tip of snout to sacrum.

H. maxima (Laurenti)

b. Outer fingers two-thirds webbed. Tympanum one-half diameter of eye. Skin smooth above. Heel with a very short triangular dermal appendage. A narrow glandular lateral fold. Yellowish or light reddish brown above, closely and minutely dotted with brown..... *H. albomarginata* Spix

c. Outer fingers half webbed, or nearly so. Skin granulate, or with tubercles on upper surfaces.

x. Tympanum nearly two-thirds diameter of eye. Upper surfaces with scattered tubercles; in color brownish, dotted and marbled with darker. Limbs more or less cross-banded. Perhaps vertical dark bars on sides of body and thighs.

H. pardalis Spix

x'. Tympanum one-half diameter of eye, or less. Upper surfaces granulate. Almost colorless, with scattered purple dots. Upper eyelid rose.

H. granosa Boulenger

2. No projecting rudiment of pollex.

a. Outer fingers nearly half webbed. Body large. Tympanum nearly as large as eye. Borders of frontoparietals forming two strong ridges. Reddish or blackish brown above, spotted or marbled with darker and lighter. Limbs with broken dark cross-bands. Flanks sometimes white-spotted. Throat and chest spotted. Skin smooth above.

H. taurina (Fitzinger)

b. Fingers two-thirds webbed. Body medium size. Greatest diameter of tympanum (inconspicuous) less than one-half greatest diameter of eye. Ground-color straw. Two dark, pink-bordered spots on snout. A dark bar between the eyes. A diamond-shaped spot in front of pelvis..... *H. ornatissima* Noble

- B. Fingers one-third webbed, or nearly so. Tympanum two-thirds diameter of eye.
1. Head broader than long. Region between nostril and eye oblique. Fingers one-third, or one-fourth webbed. Light brown above, marbled with darker. Sides of body and of thighs (at least of hinder part) with vertical dark slender stripes. *H. crepitans* Wied
 2. Head as long as broad. Region between nostril and eye not very oblique. Three outer fingers one-third webbed. Grayish or reddish above, with darker and lighter markings. Smooth or tubercular above. A fold above tympanum. Sides of body immaculate. Upper surface of limbs with wide dark cross-bands.
H. leprieuri Duméril & Bibron
- C. Fingers with slight rudiments of web.
1. Tympanum one-half diameter of eye.
 - a. Region between nostril and eye oblique. Skin smooth above. Heel with a dermal spur. Reddish brown above, a dark brown vertebral line beginning from tip of snout. Sides of body and limbs with vertical black bars. *H. fasciata* (Schneider) (?)
 - b. Region between nostril and eye concave. Snout shorter than diameter of eye. Canthus rostralis distinct. Interorbital space much wider than upper eyelid. Above deep green, with numerous distinct brown spots. Legs marked with yellow, orange, and brown. *H. helenæ* Ruthven
 2. Tympanum about two-thirds diameter of eye. A narrow glandular fold from eye above tympanum to back, lost behind shoulder. Head rather narrow, otherwise much like *H. leprieuri*. Above skin smooth, color reddish brown, or grayish. Head, body, and limbs with slender cross-bands. A white line above anus. *H. boans* Daudin
- D. Fingers quite free. Region between nostril and eye very oblique and concave. Tympanum three-fifths diameter of eye. Brown above, spotted with darker. Limbs with regular dark cross-bands. Breast and limbs specked with brown. Female carries eggs on back. . . . *H. evansi* Boulenger
- II. Choanæ small or moderate. Vomerine teeth in two short series, transverse, or obliquely directed backwards and inwards, on a level with the hinder edge of the choanæ or a little behind them.
- A. Fingers more than one-third webbed.
1. Web reaching disks of second and fourth fingers. Tympanum very distinct, nearly two-thirds diameter of eye.

- a. Web reaching disk of third finger. Forearm and tarsus with a denticulated fringe. Upper surfaces slightly warty. Reddish brown above, marbled with dark brown. Hind limbs with dark cross-bars. Beneath, bright saffron, with small round black dots. Extremities black. Webs black and saffron.

H. marmorata (Laurenti)

- b. Web not reaching disk of third finger. Skin thick, leathery, minutely pitted above. Chestnut-brown above, a light hour-glass shaped figure between eyes and sacrum. Armpit black. *H. coriacea* Peters
- 2. Web not reaching disks of second and fourth fingers. Tympanum about one-half diameter of eye. Snout pointed, much projecting. Eyes small, head broad and very flat. Skin smooth or minutely granulate above, coarsely granulate beneath. A strong fold across chest. Short cutaneous flaps on either side of vent. Uniform yellowish or pinkish. A reddish brown streak on canthus.

H. aurantiaca Daudin

- B. Outer fingers one-third or one-fourth webbed. Tympanum about two-thirds diameter of eye. No tarsal fold. Upper surfaces warty. Brown above, marbled with darker. Broad dark cross-bars on hind limbs. *H. venulosa* (Laurenti)

- C. Outer finger perfectly free. Tympanum one-half diameter of eye, or a little more than that. Toes three-fourths webbed.

- 1. Snout twice as long as diameter of eye. Upper surfaces tubercular. Conical tubercle on heel. Brown above, marbled with darker. Throat and chest spotted with brown. *H. acuminata* Cope
- 2. Snout 1.5 to 1.66 times as long as diameter of eye. Smooth, or with small tubercles above, brownish. Usually a light streak along each side of back, beginning from eye. Sometimes an X-shaped dark figure. Sides of thighs sometimes black and white marbled. . . . *H. rubra* Daudin

Genus PHYLLOMEDUSA Wagler.

- I. Parotoids distinct. Vomerine teeth. Tympanum half diameter of eye. Upper surfaces bony. Blue-green above, purplish white beneath. Clearly defined light spots on sides of body, limbs, digits, and a line above anus. *P. bicolor* (Boddaert)
- II. Parotoids scarcely distinct. No vomerine teeth. Tympanum not half diameter of eye. Upper surfaces smooth. Light purplish or blue above, immaculate whitish beneath. Vertical purplish brown bands on limbs and sides of body. Colors brilliant when alive. *P. hypochondrialis* (Daudin)

- II. Fingers moderate, first short or rudimentary. Skin smooth.
- A. Toes nearly entirely webbed. Above blackish; beneath yellowish. Variable markings of crimson or greenish yellow above..... *A. varius* Stannius (?)
- B. Toes one-third webbed.
1. Bright yellow, marbled above with brown or black. Beneath immaculate, or marbled with brown.
A. flavescens Duméril & Bibron
2. Blackish brown above, with light green markings. Beneath carmine, more or less spotted with black.
A. pulcher (Boulenger) (?)

Genus OREOPHRYNELLA Boulenger.

- I. Snout short, rounded, not prominent. Digits somewhat swollen at ends. Upper surfaces very rough. Black, except variable yellow marblings or spottings beneath..... *O. quelchii* Boulenger
- II. Snout prominent, projecting much beyond mouth. Digits ending in distinct truncated disks. Upper surfaces olive, with lighter marblings and yellowish spots forming a line from eye to groin on either side of back. Beneath whitish.
O. macconnelli Boulenger

Genus DENDROBATES Wagler.

- I. First finger not extending so far as second. Skin smooth.
D. tinctorius (Schneider)
- II. First finger extending beyond second. Skin of back tubercular. A scarcely prominent glandular lateral fold. Black, with whitish line on side of back, upper eyelid, and canthus rostralis; another line on upper lip, extending to arm. White spots on limbs, and sometimes on ventral body surface..... *D. trivittatus* (Spix)

Family RANIDÆ.

Genus RANA Linnæus.

A moderately prominent glandular lateral fold. Another glandular fold from beneath eye to shoulder. Snout rounded. Tympanum distinct, at least two-thirds diameter of eye. Tongue more or less deeply notched. First finger extending slightly beyond second. Olive or brown above, immaculate or with small blackish spots; limbs with spots arranged in cross-bars. Beneath, yellowish white with small brownish specks or spots..... *R. palmipes* Spix

Family BREVICIPITIDÆ.

KEY TO THE GENERA.

- I. Tympanum very large and close to eye. Eye rather small. Snout short, pointed, obliquely truncated.
Otophryne Boulenger
- II. Tympanum hidden. Eye quite small. Snout very long, pointed, strongly projecting. Forelimb very short. Hind limb stout.
- A. Body immaculate light brown beneath.
Gastrophryne Fitzinger
- B. Body marbled with brown beneath. A broad, sometimes interrupted yellow line along hinder side of thigh.
Elachistocleis Parker

KEY TO THE SPECIES.

Genus OTOPHRYNE Boulenger.

Skin thick, smooth and shiny. A strong fold from eye to thigh. Blackish brown above. Groin and hinder side of thighs orange, spotted with black. Throat and chest dark brown. Beneath whitish, with some brown spots.....*O. robusta* Boulenger

Genus GASTROPHRYNE Fitzinger.

Above brown, more or less dotted with whitish. Diameter of eye one-fourth length of snout. Skin perfectly smooth.
G. microps (Duméril & Bibron)

Genus ELACHISTOCLEIS Parker.

Above brown. Diameter of eye one-half length of snout. A fold across the head behind the eyes.....*E. ovalis* Parker

Family CÆCILIIDÆ.

KEY TO THE GENERA.

- I. Two series of teeth in lower jaw.
- A. Tentacular groove situated below nostril. Cycloid scales imbedded in skin.....*Cæcilia* Linnæus
- B. Tentacular groove situated behind nostril. No scales.
Typhlonectes Peters
- II. A single series of teeth in lower jaw. Tentacular groove in front of eye. No scales.....*Siphonops* Wagler

KEY TO THE SPECIES.

Genus CÆCILIA Linnæus.

- I. Total length not sixty times greatest diameter of body. One hundred and thirty-five to one hundred and fifty circular folds.
C. tentaculata Linnæus
- II. Total length more than sixty times greatest diameter of body. two hundred and fifteen to two hundred and fifty-five circular folds..... *C. gracilis* Shaw

Genus TYPHLONECTES Peters.

Snout broad, rounded. Eyes distinct. Body stout, moderately elongate, becoming gradually compressed and keeled above towards posterior end. One hundred and thirty-five to one hundred and sixty-seven circular folds, interrupted on back

T. compressicauda (Dum. & Bib.)

Genus SIPHONOPS Wagler.

Snout broad, rounded, moderately prominent. Eyes distinct. Body stout, cylindrical, moderately elongate. Eighty-five to ninety-five circular folds, all complete..... *S. annulatus* Mikan.

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III. NEW SPECIES AND SUBSPECIES OF AFRICAN BIRDS.

BY RUDYERD BOULTON.

Preliminary studies of the four collections of African birds, which I have made, reveal several forms which are apparently undescribed, and it seems desirable to publish diagnoses of these in advance of the final reports upon the expeditions. These collections are being conjointly studied, as there are geographic races in one collection not represented in the others, and a more careful analysis is obtainable through an examination of the entire series.

The four collections dealt with in this paper were made by: 1, The Vernay Angola Expedition of the American Museum of Natural History, which was in the field from April until August, 1925, and collected about twelve hundred specimens in central and southern Angola; 2, The Straus African Expedition of the American Museum of Natural History, which secured nine hundred specimens in southern Tanganyika Territory and eastern Nyasaland from May until August, 1929; 3, The South African Expedition of the Carnegie Museum, which made a collection of six hundred specimens in western and southern Nyasaland and Southern Rhodesia from September, 1929, until February, 1930; 4, The Pulitzer Angola Expedition of the Carnegie Museum, which worked in central and southern Angola from October, 1930, until April, 1931, bringing back a collection of about thirteen hundred specimens.

I am indebted to the authorities of the American Museum of Natural History for permission to report on the birds of the Vernay and Straus Expeditions, and for their courtesy in extending to me all possible facilities. To Dr. James P. Chapin I am especially grateful for his advice and criticism. My thanks are due Dr. Lowe and Mr. Sclater of the British Museum for allowing me to examine certain specimens in the collections of that institution. To Dr. Friedmann of the United States National Museum, to Mr. Bangs of the Museum of Comparative Zoölogy, and to Mr. Bowen of the Philadelphia Academy of Natural Sciences I am grateful for the loan of specimens used in the studies here reported.

In the following descriptions the names of colors in quotations are those of Ridgway's "Color Standards and Nomenclature," 1912. All measurements are in millimeters. The wing is measured flat and straightened; that is, in a straight line from the bend of the shoulder to the tip of the longest quill. The tail is measured from the insertion of the middle rectrices to the tip of the longest feather. The measurement of the bill is that of the exposed culmen, in a straight line from its extremity to the point where the feathers of the forehead hide the culmen.

1. *Gymnobucco calvus vernayi*, subsp. nov.

Type.—American Museum of Natural History, No. 259419; adult male, gonads much enlarged; Mombolo, 6,000 ft., District of Cuanza Sul, Angola; February 13, 1925; Rudyerd Boulton, coll., Vernay Angola Expedition. Wing, 94; tail, 53; culmen, 20; tarsus, 21.

Subspecific characters.—Smaller than *G. c. major* Neumann. Differs from both *G. c. calvus* (Lafresnaye) and *G. c. major* in having the throat grayish white instead of dark grayish brown; the brown ground-color of the plumage more grayish brown and more heavily streaked above and below with grayish white; bristle-tufts grayish white instead of yellowish buff. Culmen shorter than in either *G. c. calvus* or *G. c. major*.

Description.—Nasal,¹ malar and mental bristles grayish white (slightly discolored in the type); fore part of the crown bare, skin black, unfeathered except for sparse, fine hair-like, black bristles; ground-color of the feathers of the upper parts dark brown (a little grayer than "mummy brown"); feathers of the hind crown with pale grayish brown centers, most distinct toward their bases; feathers of the back with white shafts and broad grayish white center streaks, distinct but poorly defined; rump and upper tail-coverts unstreaked, and washed with grayish brown; throat dirty grayish white; remainder of the under parts "buffy brown"; feathers of the breast and belly with white shafts and pale grayish white centers; crissum and under tail-coverts "buffy brown," washed with grayish and yellowish; wing-coverts "clove-brown," washed and shaded at the extremities of the feathers with "buffy brown"; primaries and outer secondaries dark "clove-brown" edged externally with black; inner secondaries olive-

¹Reichenow, *Vög. Afrika's*, II, 1902, p. 137, and Bates, *Handbook Birds of W. Africa*, 1930, p. 276, incorrectly state that there are no tufts of bristles behind the nostrils.

brown, tectrices edged internally with pale grayish brown on the basal portion of the inner web; lining of the wings silvery brown; under wing-coverts grayish brown; rectrices "clove-brown," slightly paler on the inner web.

Remarks.—*G. c. calvus* is distinguished from the other races by the darker and richer tone of the brown of the under parts and by an almost total lack of shaft-streaks on the feathers of the breast. *G. c. major* is intermediate in these two respects between *calvus* and *vernayi*, but the characters are constant and the race is well marked. *G. c. vernayi* is more distinct than either of the other races.

The five birds collected by Dr. Chapin on the Lower Congo are intermediate between typical *major* and *vernayi*. They are nearer to birds from Angola than to those from Cameroon, but are distinguished from the former by the narrower streaking of the lower parts and by the darker gray of the throat, and possibly merit subspecific recognition. In the series from Angola there are several subadult specimens, which are characterized by the narrow sulphur-yellow edges of the feathers of the back and under parts, and by the persistence of the curious spined tubercle on the proximal inferior portion of the tarsus. It would appear that this tubercle disappears through the agency of wear and occasional scaling, rather than by complete shedding at one time, as in the case of the "egg-tooth" on the bills of many nestling birds.

Comparative measurements of the three races of *calvus* are as follows:

G. c. calvus. One male: wing, 89 (worn); tail, 48; culmen, 22; tarsus, 23. Two females: wing, 90 (90); tail, 48-50 (49); culmen, 20-20.5 (20.2); tarsus, 22 (22). Two specimens (sex undetermined): wing, 87-92 (89.5); tail, 46-50 (48); culmen, 18.7-21 (19.8); tarsus, 20-23.5 (21.8).

G. c. major. Eight males: wing, 95-106 (99.2); tail, 49-60 (53.8); culmen, 20.5-22 (21.2); tarsus, 22.5-25 (24). Four females: wing, 95-100 (98.1); tail, 51-57 (54); culmen, 21-22 (21.5); tarsus, 23.5-24.5 (24).

*G. c. vernayi.*² Eight males: wing, 90-94 (92.5); tail, 51-59 (54); culmen, 19-20 (19.8); tarsus, 21-24 (22.8). Nine females: wing, 91-97.5 (94.5); tail, 52-58 (54.9); culmen, 19-20 (19.6); tarsus, 23-24 (23.5).

Specimens examined.—*G. c. calvus.* One from Sierra Leone (Am. Mus. Nat. Hist.); two from Bangah and one from Du River, Liberia (Mus. Comp. Zoöl.); one from "Taveta"—Ussher Coll. (U. S. Nat. Mus.).

²The five birds from the Lower Congo are not included. They are slightly smaller than typical *vernayi*.

G. c. major. Two from Efulen and eleven from Minikalli, Cameroon (Carnegie Mus.).

G. c. vernayi. Fourteen from Moco Mt., 6,400-6,500 ft., Angola (Carnegie Mus.); six from Mombolo, 6,000 ft., Angola; two from Thysville, and three from Ganda Sundi, Belgian Congo (Am. Mus. Nat. Hist.).

2. *Viridibucco coryphæa angolensis*, subsp. nov.

Type.—American Museum of Natural History, No. 264721; adult male; Mombolo, 6,000 ft., District of Cuanza Sul, Angola; June 20, 1927; H. and C. Chapman, coll. Wing, 56; tail, 28; culmen, 9; tarsus, 14.

Subspecific characters.—Wing slightly longer than in *V. c. coryphæa* (Reichenow); bill slightly shorter. Gray of the under parts much paler and less olive; yellow of the upper parts more greenish, instead of "lemon chrome." Differs from *V. c. jacksoni* W. Sclater by having a considerably longer wing and bill, and in that the gray of the under parts and yellow of the upper parts are paler.

Description.—Forehead, lores, superciliary stripe, sides of the crown, scapulars, back, and upper tail-coverts glossy blue-black; the feathers of the center of the crown, nape, and back mottled with "picric yellow"; auriculars black; a white line extends from the nostrils under the eye and ear-coverts to the side of the neck; rump "pale lemon-yellow"; under parts "pale smoke-gray" lightly washed with yellowish green on the breast and flanks; under tail-coverts the same; wing-coverts glossy black, the middle series broadly, and the greater series narrowly, edged with yellow; primaries and secondaries fuscous, the secondaries edged externally with yellow; all the wing-feathers internally edged at their bases with white; under wing-coverts white; tail glossy black, the feathers narrowly edged on the base of the outer web with yellowish white.

Remarks.—This race is most closely related to *V. c. jacksoni* from Mt. Ruwenzori and the Kivu Volcanoes, but is readily distinguished by its paler yellow and more grayish plumage, as well as by its larger size. *V. c. coryphæa* with its "lemon-chrome" marking is very distinct, and is intermediate in length of wing between *jacksoni* and *angolensis*.

In one specimen from Mombolo, which from the color of its bill and structure of the feathers is obviously immature, the yellow of the crown is very pale and indefinitely demarked from the black of the upper parts, and the under parts are more richly suffused with greenish than in two adults.

Unfortunately the four original specimens of this race collected by the Vernay Angola Expedition were lost in transit, and only their measurements were preserved in manuscript. Subsequently three others were obtained, one of which is made the type.

Comparative measurements of adults of the three races follow:

V. c. coryphaea. Five males: wing, 53-55 (54.1); tail, 26-28 (27); culmen, 9.4-10.5 (9.7); tarsus, 14.3-15 (14.8). Two females: wing, 53-53.5 (53.2); tail, 25.5-27.5 (26.5); culmen, 9.4-9.5 (9.4); tarsus, 15 (15).

V. c. jacksoni. Six males: wing, 50-53 (51); tail, 25.5-27 (26.7); culmen, 8-9 (8.5); tarsus, 13.5-14.5 (14.1). Three females: wing, 51-54 (52.4); tail, 25-26 (25.5); culmen, 8-8.5 (8.2); tarsus, 14-14.5 (14.2).

V. c. angolensis. Four males: wing, 55-57 (56); tail, 26.5-28 (27.3); culmen, 9-9.6 (9.4); tarsus, 14-14.5 (14.2). Two females: wing, 55-56 (55.5); tail, 25-27 (26); culmen, 9 (9); tarsus, 14-14.5 (14.2).

Specimens examined.—*V. c. coryphaea*. Two from Ninong, Manenguba Mts.; one from Bambulue Lake, 6,000 ft., near Bamenda; one from Kumbo, 6,000 ft.; one from Bamenda, 5,500 ft.; one from between Kumbo and Bamenda, 4,000 ft.; one from north of Chang, 5,000 ft. (Brit. Mus. Nat. Hist.).

V. c. jacksoni. One from Kanyango, Uganda, (the type) (Brit. Mus. Nat. Hist.). Two from northwestern slope of Mt. Mikeno, 7,900 ft.; four from near Lubero, 7,500-7,600 ft.; two from Kalongi, 6,900-7,100 ft., western slopes of Mt. Ruwenzori; one from Mt. Musandama, 7,900 ft., northeastern end of Mt. Ruwenzori, eastern Congo (Am. Mus. Nat. Hist.).

V. c. angolensis. Seven from Mombolo, 6,000 ft., Angola (Am. Mus. Nat. Hist.).

ONYCHORHINUS, subgen. nov.

Type: Macrosphenus (Onychorhinus) pulitzeri, sp. nov. (*vide infra*).

Diagnosis.—Bill shorter than head, stouter than in other species of *Macrosphenus* Cassin; exposed culmen gently decurved, more strongly so terminally; inferior outline of mandible uniformly convex, more so than in *Macrosphenus* or *Suaheliornis* Neumann; depth of bill at gonys equal to its width, not less than its width as in *Macrosphenus* and *Suaheliornis*. Wing short and greatly rounded. Tail about four-fifths the length of the wing. Legs, feet, and claws comparatively strong and robust.

Remarks.—*M. pulitzeri* is interesting because it is in many ways intermediate between the genera *Macrosphenus* and *Suaheliornis*. I accordingly propose to unite them, retaining the latter as a subgenus, in order to indicate more accurately the relationship. The arrangement would provide for three subgenera in the genus *Macrosphenus*: the first, *Macrosphenus*, including *flavicans* Cassin and *kempi* (Sharpe);³ the second, *Onychorhinus*, including *pulitzeri*, sp. nov., and *concolor* (Hartlaub); the third, *Suaheliornis*, including *kretschmeri* (Reichenow and Neumann) and *albigula* (Grote).³

A subgeneric division not only correlates structural characters within the genus, but also indicates geographical distribution. *Macrosphenus* is West African; *Suaheliornis*, East African; and *Onychorhinus* is West African and Angolan. If I may dare to suggest a phylogenetic tree, the cut here given seems best to illustrate the relationships of these six species.

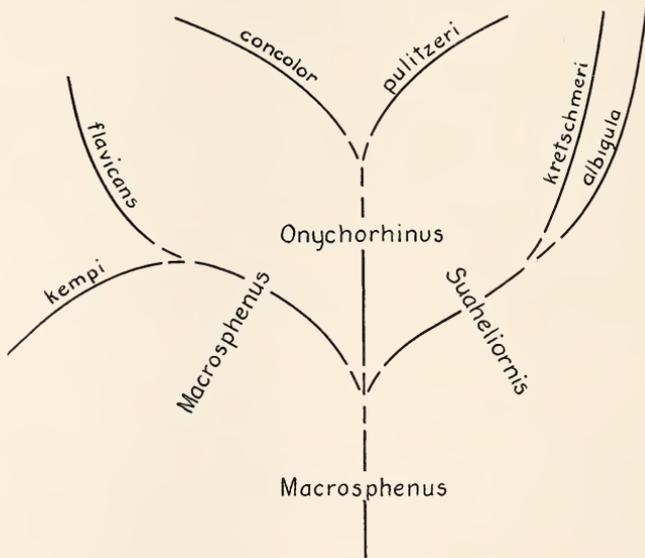
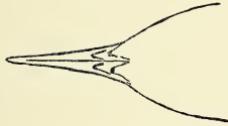
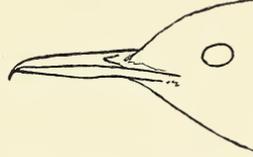
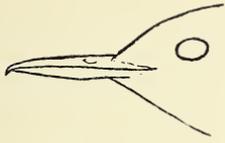


FIG. 1. Phylogenetic tree of the genus *Macrosphenus*

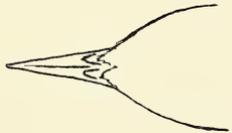
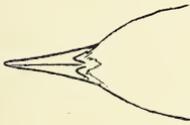
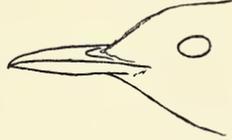
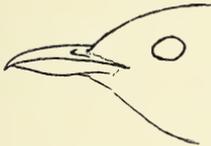
³As I have examined neither of these species I cannot be sure of their relationships. However, Mr. Bannerman's review of *Macrosphenus* (*Ibis*, 1921, p. 121) gives such a clear picture of *kempi*, and *albigula* appears to be so near *kretschmeri* that the above allocation of these species would seem justifiable.

The figures of the bills shown below demonstrate more adequately than long descriptions their differences and similarities.



M. flavicans

M. kretschmeri



M. concolor

M. pulitzeri

Fig. 2. Variation of bills in the Genus *Macrosphenus*

The wing formulæ of the four species examined show a considerable degree of variation. In every case the wing is greatly rounded and the amount of rounding is probably correlated with the habits and local habitat of the individual species. The first primary is considered to be the one at the carpal joint; the tenth is the outermost. In *flavicans* the formula is 5, 4, 6, 7, 8, 9, 10; in *concolor*, 6, 5, 7, 8, 9, 10; in *pulitzeri* and *kretschmeri*, 4, 5, 6, 7, 8, 9, 10.

The proportion of length of wing to length of tail is also variable.

In *kretschmeri* they are almost equal, and in *flavicans* the tail is proportionately shorter. The following percentages are calculated by dividing the length of wing by the length of tail: *M. kretschmeri*, 95 percent; *M. pulitzeri*, 81 percent; *M. concolor*, 70 percent; *M. flavicans*, 69 percent. The graduation of the tail-feathers puts *kretschmeri* again at one extreme, while *pulitzeri* has the least rounded tail. The length of the outermost rectrix is divided by the length of the middle pair of rectrices, giving the following percentages: *M. kretschmeri*, 77 percent; *M. flavicans*, 82 percent; *M. concolor*, 83 percent; *M. pulitzeri*, 83 percent.

Subgenera are in my opinion of value only when they show to advantage the relationships of the species within a genus. The six species under discussion form such a heterogeneous, yet at the same time obviously related group, that it is illogical to accord to any one form generic rank. Uniting them simplifies the taxonomy, but disregards their biological significance. Splitting them into monotypic genera could serve no useful purpose. Accordingly, a subgeneric division seems desirable, even though it adds to an ever-growing multitude of names.

The following notes on specimens of the genus *Macrosphenus* that have been examined may be of interest. Of two specimens of *M. f. flavicans* examined, a female collected by Sr. Correia on Fernando Po, is much larger than a male collected by Mr. Bates at Biteye. The latter is, however, subadult. Compared with the series of *M. f. hypochondriacus* (Reichenow) collected by Dr. Chapin in the Upper Congo, these birds are more greenish yellow and less orange. An immature specimen of *hypochondriacus* from Avakubi is in brownish juvenal plumage. The throat is irregularly grayish and greenish brown, and the sides of the breast are distinctly golden brown. Two specimens of *M. concolor* collected by Sr. Correia on Fernando Po are distinctly larger than birds from either Cameroon or the Upper Congo, and they are more yellowish on the breast, grayer on the flanks and belly, and paler grayish green on the upper parts. They may represent a distinct race.

3. *Macrosphenus pulitzeri*, sp. nov.

Type.—Carnegie Museum, No. 108951; adult female, egg in oviduct; Chingoroi, 2,200 ft., District of Benguela, Angola; December 1, 1930;

R. and L. Boulton, coll., Pulitzer Angola Expedition. "Iris, putty-color; mandible, horn-color; maxilla, flesh-color; legs and toes, flesh-color; nails, horn-color." Wing, 63; tail, 51; culmen, 16; tarsus, 25.

Description.—Entire upper part of the head, ear-coverts and nape between "light brownish olive" and "citrine drab"; lores dusky; back, scapulars, and upper tail-coverts between "deep olive" and "brownish olive"; chin and throat "olive-buff," the margins of the feathers darker than the centers, which have a grayish tinge; breast and belly "yellowish olive-buff," the terminal portions of the feathers faintly "reed-yellow"; flanks "ecru-olive"; under tail-coverts "olive-ocher"; wings and tail "brownish olive," feathers margined externally with greenish olive; basal inner margins of the wing-feathers grayish white; under wing-coverts dirty yellowish white.

Comparative measurements of specimens examined are as follows:

M. k. kretschmeri. One male: wing, 66; tail, 61; culmen, 17; tarsus, 23. One female: wing, 70; tail, 70; culmen, 16; tarsus, 23.5.

M. pulitzeri. One female: wing, 63; tail, 51; culmen, 16; tarsus, 25 (type).

M. f. flavicans. One male: wing, 56; tail, 45; culmen, 15.5; tarsus, 22. One female: wing, 64; tail, 44; culmen, 16; tarsus, 22.5.

M. f. hypochondriacus. Six males: wing, 58-64 (61); tail, 41-47 (44); culmen, 15-16.5 (15.9); tarsus, 21-21.5 (21.3). Four females: wing, 53-58 (56); tail, 35-39 (37); culmen, 15-16 (15.5); tarsus, 19.5-21 (20.3).

M. concolor. Six males: wing, 56-63 (58.8); tail, 38-44 (40.7); culmen, 13-16 (13.9); tarsus, 20.5-22 (21.2). Four females: wing, 56-60 (57.5); tail, 38-43.5 (40.1); culmen, 13-13.5 (13.4); tarsus, 19-21 (19.9).

Specimens examined.—*M. k. kretschmeri*. Two from Bungu, Usambara, Tanganyika Terr. (Am. Mus. Nat. Hist.).

M. pulitzeri. One from Chingoroi, Benguela, Angola (Carnegie Mus.).

M. f. flavicans. One from Bitye, Cameroon, and one from Fernando Po (Am. Mus. Nat. Hist.).

M. f. hypochondriacus. Five from Avakubi, one from Medje, two from Rungu, two from Niangara, one from Ngayu, and one from Manamama, between Bafwabaka and Ngayu, northeastern Belgian Congo (Am. Mus. Nat. Hist.).

M. concolor: Three from Avakubi, four from Medje, one from Ngayu, and one from Irumu, Belgian Congo; two from Fernando Po; one from Assobam and one from Yaunde, Cameroon (Am. Mus. Nat. Hist.). One from Lolodorf, Cameroon (Carnegie Mus.).

4. *Apalis cinerea grandis*, subsp. nov.

Type.—Carnegie Museum, No. 109479; adult male, gonads somewhat enlarged; Moco Mt., 6,500 ft., District of Benguela, Angola; February 27, 1931; R. and L. Boulton, coll., Pulitzer Angola Expedition. Wing, 62; tail, 73; culmen, 11; tarsus, 21.5.

Subspecific characters.—Larger than *A. c. cinerea* (Sharpe) or *A. c. sclateri* (Alexander). Crown ashy gray instead of brown; flanks grayer.

Description.—Forehead "pale mouse-gray," top of head and hind crown "mouse-gray"; lores and auriculars "deep mouse-gray"; back, scapulars, and upper tail-coverts "deep neutral gray"; under parts white, washed with buffy, brightest on the upper breast and flanks, all of the feathers with gray bases, which are most prominently revealed on the sides of the belly; flanks "deep gull-gray"; wing-coverts fuscous edged with "deep neutral gray"; alula, primaries, and secondaries fuscous, the latter edged externally with lighter brown; all the wing-feathers internally edged with silvery gray; under wing-coverts white; tail considerably graduated, the outermost feathers thirty-two millimeters shorter than the middle pair; two central pairs of rectrices uniform fuscous; the third pair with a triangular white spot at the tip, the apex of which extends eleven millimeters along the shaft; three outer pairs of rectrices white.

Remarks.—*Apalis cinerea minor* Granvik (= *granviki* Grote) seems almost certainly to be a synonym of typical *cinerea*. There is a great amount of individual variation in size, and the series in the American Museum demonstrates that this variation cannot be correlated geographically. The range of variation in birds taken in the vicinity of Nairobi practically includes the range in size of Elgon birds. Although I have seen no specimens of supposed *sclateri* from West Africa, I am inclined to follow Count Gyldenstolpe⁴ in uniting all East and West African specimens under the name *cinerea*. Following are the comparative measurements of the adult specimens examined:

A. c. cinerea. Eight males: wing, 49-56 (53.5); tail, 49-60 (56); culmen, 10-11 (10.5); tarsus, 19-20 (19.6). Six females: wing, 48-58 (52.5); tail, 46-51 (49.8); culmen, 10-11 (10.3); tarsus, 18-20.5 (19.3).

A. c. grandis. Five males: wing, 61-64 (62.4); tail, 69-74 (71.4); culmen, 10.8-11 (10.9); tarsus, 21-22 (21.4). One female: wing, 58; tail, 58; culmen, 10.5; tarsus, 22.

Specimens examined.—*A. c. cinerea*. Three from Marsabit, six from Ngong Forest, one from Mara River, five from Molo, one from Kijabe,

⁴1926, Arkiv. för Zoologi, Bd. 19A, N:o. 1, p. 48.

and one from Mt. Kenya, Kenya Colony; one from Djugu, eastern Ituri District, Belgian Congo (Am. Mus. Nat. Hist.).

A. c. grandis. Six from Moco Mt., 6,300-6,500 ft., Angola (Carnegie Mus.).

5. *Apalis bamendæ strausæ*, subsp. nov.

Type.—American Museum of Natural History, No. R. B. 2799; adult male, gonads not enlarged; Mt. Rungwe, 5,650 ft., Tanganyika Territory; June 11, 1929; R. and L. Boulton, coll., Straus African Expedition. Wing, 50; tail, 49; culmen, 9; tarsus, 18.

Subspecific characters.—Similar to *A. b. bamendæ* in that the face and ear-coverts are chestnut, rather than the same color as the back as in *A. porphyrolæma*. The chestnut on the head of the new race is, however, much darker than it is in *A. b. bamendæ*. It differs from *A. b. chapini* in having the chin, throat, and malar region tawny instead of white.

Description.—Lores, superciliary stripe, auriculars and forehead dark "chestnut," extending from the latter as a wash over the grayish brown of the crown; back, scapulars, and wing-coverts "deep neutral gray," overlaid with a very slight wash of fuscous; upper tail-coverts more strongly washed with brownish; throat "tawny"; feathers of the upper chest "tawny" with gray bases; sides of breast and flanks "pale mouse-gray," center of belly paler and with a buffy wash; under tail-coverts gray, strongly washed with "tawny"; tibiæ dark "chestnut"; primaries and secondaries blackish brown, the inner secondaries edged externally with "olive-brown"; tectrices internally edged with pale gray; "axillars" whitish; under wing-coverts white, tipped with "tawny"; rectrices, twelve in number, dark grayish brown, each feather with an indistinct buffy tip.

Remarks.—In place of the arrangement of certain species and subspecies of *Apalis* given in Mr. Sclater's "Systema Avium Ethiopicarum," I propose the following:

<i>Apalis porphyrolæma</i>	<i>porphyrolæma</i>	Reichenow and Neumann
"	"	<i>affinis</i> Ogilvie-Grant
"	"	<i>vulcanorum</i> Gyldenstolpe
"	<i>bamendæ bamendæ</i>	Bannerman
"	"	<i>chapini</i> Friedmann
"	"	<i>strausæ</i> , sp. nov.
"	<i>goslingi goslingi</i>	Alexander
"	"	<i>hardyi</i> Bannerman

I am grateful to Dr. Chapin for calling my attention to the fact that *goslingi* is obviously not conspecific with *porphyrolæma*. *Goslingi* and

hardyi are birds of the lowland forests; all of the other races are found only in forest at high latitudes. In the races of *porphyrolæma* the lores, forehead, auriculars, and subocular region are slate-gray, the same color as the back. The races of *bamendæ* have these same areas tawny rufous, the same color as the throat. The distribution of *Apalis bamendæ* is unusual, including as it does the Cameroon and Tanganyika highlands, while *porphyrolæma* occupies the Kenya and eastern Congo highlands.

Comparative measurements are as follows:

A. p. porphyrolæma. Two males: wing, 49-55 (42); tail, 49-63.5 (66.2); culmen, 9-9.4 (9.2); tarsus, 18-19 (18.5).

A. p. affinis. Three males: wing, 51-54 (52.3); tail, 56.5-61.5 (59); culmen, 8.9-9.5 (9.1); tarsus, 19.3-20 (19.6). Two females: wing, 50 (50); tail, 45.5-50 (47.7); culmen, 9-9.2 (9.1); tarsus, 18-19.5 (18.7).

A. b. bamendæ. One female: wing, 50; tail, 38.5; culmen, 9.5; tarsus, 18.4.

A. b. chapini. Three females: wing, 47.5-50.5 (49); tail, 45-52 (48.6); culmen, 9.5-10 (9.8); tarsus, 17-18.5 (17.8).

A. b. strausæ. Two males: wing, 49-50 (49.5); tail, 49-51 (50); culmen, 9 (9); tarsus, 18 (18).

Specimens examined.—*A. p. porphyrolæma.* One from Nandi, and one from Molo, Kenya (Am. Mus. Nat. Hist.).

A. p. affinis. One from Lubero, one from Kalongi, and three from western slopes of Mt. Ruwenzori, eastern Congo (Am. Mus. Nat. Hist.).

A. b. bamendæ. One from Dschang, Cameroon (Am. Mus. Nat. Hist.).

A. b. chapini. Two from Kigogo, Uzungwe, and one from Vituru, Uluguru, Tanganyika Territory (Mus. Comp. Zoöl.).

A. b. strausæ. Two from Mt. Rungwe, Tanganyika Territory (Am. Mus. Nat. Hist.).

A. g. goslingi. The series in the American Museum of Natural History, from the Ituri River, near Penge and Avakubi, and from the Lindi River near Bengamisa, Belgian Congo.

6. *Seicercus lauræ*, sp. nov.

Type.—Carnegie Museum, No. 109478; adult male, gonads not enlarged; Moco Mt., 6,600 ft., District of Benguela, Angola; February 27, 1931; R. and L. Boulton, coll., Pulitzer Angola Expedition. Wing, 62; tail, 43; culmen, 9; tarsus, 21.

Specific characters.—Differs from other known species in pattern of coloration. Most nearly related to *S. ruficapilla* (Sundeval), but easily distinguished by its larger size and the uniform yellow-green of the upper parts.

Description.—Entire upper parts between "yellowish oil-green" and "warbler-green"; superciliary stripe greenish yellow; lores and a narrow streak behind the eye dusky; eye-ring bright yellow, interrupted by the dusky lores and postocular streak; throat, breast, and cheeks bright "lemon-yellow," the latter washed with dusky; lower breast and center of the belly white; flanks pale gray slightly washed with olive-green; tibiae and under tail-coverts "pale lemon-yellow"; wing-coverts, primaries, and outer secondaries dark fuscous; inner secondaries and rectrices more olive-brown, each feather broadly margined externally with yellowish green; inner margins of the primaries and secondaries whitish; "axillars" and feathers of the edge of the wing bright yellow; under wing-coverts white, tipped with "lemon-yellow."

Remarks.—This species, the first of its genus to be found in southwestern Africa, is apparently confined to the mountain forest of the Benguela highlands. Its bill is not so sharp and attenuated as that of *S. umbrovirens* (Rüppell), and is intermediate in shape between that of *S. ruficapilla* and *S. budongoënsis* (Seth-Smith).

A female also collected on Moco Mountain does not differ in coloration from the type. Its measurements are: wing, 58; tail, 39; culmen, 8.5; tarsus, 19.

7. *Laniarius nyasæ*, sp. nov.

Type.—Carnegie Museum, No. 107130; female, ovaries not enlarged, skull almost completely ossified; twenty miles east of Mzimba, 6,200 ft., Nyasaland; October 2, 1929; R. and L. Boulton, coll., South African Expedition. Wing, 82; tail, 72; culmen, 19; tarsus, 32.

Specific characters.—Unlike any known species of *Laniarius*. Upper parts slate-olive; under parts dusky olive-green.

Description.—Upper parts slate-olive ("chætura-drab"), the head slightly darker; forehead blackish; ear-coverts and sides of the head more brownish than the back; feathers of the rump indistinctly tipped with dusky olivaceous buff; throat and upper chest dusky olive; breast buffy olive; center of the belly "colonial buff," shaded with dusky olive; flanks and sides of the breast "brownish olive"; crissum and under tail-coverts olive; tibiae "dresden brown"; primaries and secondaries blackish brown, slightly edged with dark gray on their outer webs; rectrices blackish brown; lining of the wings and tail silvery brown; under wing-coverts dusky brown.

Remarks.—Unfortunately this specimen is not entirely adult. I feel confident, however, that its characters do not differ in any essential from the adult plumage. Juvenal specimens of *L. funebris* (Hartlaub), *L. fülleborni* (Reichenow), and *L. leucorhynchus* (Hartlaub) have been examined, and they show no resemblance to this bird from the Vipya plateau. The new form is probably most nearly related to *Laniarius fülleborni* of the Mt. Rungwe district.

Note on **Chlorophoneus münzneri** Reichenow.

A male of this beautiful Bush-Shrike, collected on Mt. Rungwe, Tanganyika Territory, by the Straus Expedition, agrees in every detail with Reichenow's original description. For several reasons I am of the opinion that *münzneri* constitutes a distinct species, and is not a race of *Chlorophoneus rubiginosus* (Sundeval). It has no indication of a white eyebrow; the tail is entirely olive-green and yellow with no trace of black; the throat is pure white; the bill is much weaker. While the details of the range of *Chlorophoneus rubiginosus*, to which this form has heretofore been referred, are not yet completely worked out, Mt. Rungwe and Sanyi (type-locality of *münzneri*) are directly between northern Nyasaland and the Uluguru Mts., in Tanganyika, from which localities *C. r. bertrandi* (Shelley) has been recorded. It would be illogical to make such very distinct forms conspecific, when they occupy similar and in some details overlapping territory. A female of *C. münzneri* from the Usambara Mountains is similar to the male above described, except that the blue-gray of the head and nape is duller. It has no trace of white lores or eyebrow. Comparative measurements are as follows:

C. münzneri. One male: wing, 92; tail, 94; culmen, 15; tarsus, 25. One female: wing, 89; tail, 84; culmen, 14; tarsus, 24.

C. r. bertrandi. Two males: wing, 81-86 (83.5); tail, 79-84 (81.5); culmen, 17-17.5 (17.3); tarsus, 26-26.5 (26.3). Four females: wing, 79-81 (80.2); tail, 76-78 (76.8); culmen, 16-17.5 (16.6); tarsus, 25-26.5 (25.4).

Specimens examined.—*C. münzneri*. One from Mt. Rungwe (Am. Mus. Nat. Hist.). One from Usambara (Acad. Nat. Sci. Phila.).

C. r. bertrandi. Three from Mt. Selinda (Carnegie Mus.). One from Mt. Mlanje (Am. Mus. Nat. Hist.). Two from Mt. Selinda (Mus. Comp. Zoöl.).

Carnegie Museum, November 10, 1931.

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ANNALS
OF THE
CARNEGIE MUSEUM

VOL. XXI, NO. 2.

EDITORIAL NOTES

The thirty-fifth formal celebration of Founder's Day took place on October 15th, at which time public announcement was made of the opening of the Thirtieth International Exhibition of Paintings under the auspices of the Department of Fine Arts of the Institute. The principal address was made by his Excellency, Governor Albert E. Ritchie, of Maryland. Mr. Ralph Pulitzer was asked by Col. Samuel Harden Church, who presided, to address the audience; but, with that modesty which characterizes him, he only responded with a bow to the presiding officer and to the audience. At a small dinner, attended only by the Trustees of the Institute and the Heads of departments, Mr. Pulitzer was prevailed upon to speak and gave a most interesting account of some of his experiences on the occasion of his expedition to Angola on behalf of the Carnegie Museum.

A great deal of the interesting material collected by the Pulitzer Expedition to Angola, giving at least a synoptic view of the results of the expedition, was placed upon exhibition on the lower floor of the Carnegie Museum, where it will remain for a while as a temporary exhibit. The display consists of maps showing the regions visited, photographs of the scenery, and representative specimens of the mammals, birds, reptiles, fishes, insects of various orders, and plants collected. The whole was tastefully arranged, and among other things included is a miniature case showing the Giant Sable Antelope, as it will appear when mounted.

In the early evening of Saturday October 31, 1931, it was discovered that a fire had broken out in a large switch board which at

MAY 9 1932

the time of the construction of the building had been placed in the room for many years designated as The Laboratory of Mammals. After a vain attempt had been made by Mr. Fulton, the assistant superintendent of the building, to extinguish the flames by "hand extinguishers," which were available, he sent in an alarm to the Fire Department of Pittsburgh, which was quickly responded to. The firemen distinguished themselves by the speedy manner in which they got the flames under control and also preserved the contents of the room and of the building from damage by water, they having brought with them many tarpaulins which they used with energy and efficiency. The heartfelt thanks of all connected with the Museum and its friends are due to these sturdy firemen for the quick manner in which they acted, thus averting what might have been a catastrophe of considerable magnitude. This large switch-board was erected at the time the new building came into being and we have always believed that the building was fire-proof. Unfortunately the doors, which concealed the electric apparatus had been built of mahogany instead of metal. A crossed wire on the switchboard set fire to the door which evidently burned for some time and the heat set fire to two cases, one quite large and the other a smaller one resting upon it. The contents of the larger case on the floor, consisting of skins of bears, of seals, and of walruses, was so badly injured as to make it impossible to use the skins for mounting purposes. They were very badly singed. The contents of the small upper case were partly destroyed. Our chief regret in connection with this case is that a few days before there had been placed in it two trays containing some of the smaller mammals collected on the Pulitzer Expedition to Angola, which had not yet been studied, nor reported upon. The loss sustained is greatly to be deprecated, but as Dr. Thomas Arbuthnot so kindly said in a letter to the Director: "I weep not for the loss of the specimens of the Alaskan Brown Bear, which I presented to the Museum, because the species is not extinct, and this may be an argument for my having another hunting expedition." What is most deprecated by all of us is the loss of over one hundred specimens of small mammals, principally rodents, collected by the Pulitzer Expedition. Among these we had fondly hoped that we might detect possibly some species new to science, for they had been obtained in localities not often visited by zoölogical collectors.

The work of rebuilding the switchboard, which controls the lights

on the second and third floors of the Museum in the rear, is rapidly going forward, and precautions are being taken, which it is believed will prevent the recurrence of such an accident, not only in this part of the building but elsewhere. Metal and unflammable doors are being provided not only for the switchboard, which was destroyed, but elsewhere in the building.

It is a comfort to reflect that the great collections made by the Pulitzer Expedition with the exception of the small rodents were all in places of absolute safety. We may, however, have to send another expedition to Angola, if the ways and means can be found.

On October 16, 1931, at 4:00 o'clock in the afternoon the friends and associates of Mr. and Mrs. Boulton met them in farewell at a tea given in their honor. Mr. Boulton has accepted the Assistant Custodianship of Ornithology in the Field Museum of Chicago. While we congratulate Mr. Boulton upon his advancement to a position in which he will be more adequately recompensed for his services, than could be arranged in this Museum with its limited resources, we feel that we are not entirely sundered from him, and we have the assurance that he will in due time make to this Museum for publication a full report upon the collections of birds which he made for us in Africa on his previous journeys and upon his last journey with Mr. Pulitzer.

On November 2, 1930, Oliver Perry Hay departed this life in the eighty-fifth year of his age. He was born in Saluda Township, Jefferson County, Indiana, on May 22, 1846.

He was the author of several papers published in the *Annals of the Carnegie Museum* upon fossil Testudinata, the types of which are in this Museum.

His great work upon the fossil turtles of North America, published by the Carnegie Institution of Washington in 1908 will always remain as a monument to his assiduous researches and learning in this special field. But he will probably be more widely known by paleontologists through his *Bibliography of Fossil Vertebrates* first published by the U. S. Geological Survey in 1902, in one volume of 868 pages, and again issued in revised and completed form in two volumes by the Carnegie Institution of Washington. The first volume, giving the names of authors and the titles of their papers, contains pp. i-viii+1-918; the second volume, pp. i-xiv+1-1074, gives a systematically arranged

Catalog of the Fossil Vertebrates of the Continent. To the student these works are indispensable. Besides these great works he was the author of one hundred and ninety-one articles, shorter or longer, upon various subjects in later years relating principally to fossils from various Pleistocene deposits. A list of these papers from the pen of Professor R. S. Lull of the Peabody Museum has just appeared in the Bulletin of the Geological Society of America, Vol. XLII, pp. 34-48.

The Editor of these Annals was well acquainted with and prized his friendship with Dr. Hay, which covered nearly the last forty years of Hay's life. We differed sometimes with each other in our opinions on scientific matters, and sparred with each other in print, but personally our relations were most friendly. In common with his fellow paleontologists the Editor deeply mourns his loss as that of a friend and most assiduous and capable worker in a difficult field. *Peace to his ashes!*

IV. NEW SPECIES FROM THE OLIGOCENE OF THE UINTA.

BY O. A. PETERSON.

It is quite clear that the name "Upper Uinta," which was used by Peterson and Kay in their publication, *Ann. C. M.*, Vol. XX, pp. 293-305, might in the future be a source of confusion to students. The "Upper Uinta" is a term which was and will be commonly used by geologists and paleontologists in referring to the upper series of the Uinta Eocene, especially "Horizon C." The name "Duchesne," suggested by Scott,¹ is therefore proposed for the Oligocene horizon, which rests upon the Upper Eocene (Horizon C) in the Uinta Basin. The Duchesne River in Duchesne County, Utah, has its source on the southern side of the Uinta Mountains. The stream traverses these upper beds, which are now determined to be Basal Oligocene, before its confluence with the Green River a half mile below Ouray, Utah. As stated by Peterson and Kay, *l.c.* p. 294, the geographical area covered by these Oligocene strata has an east-west extent of approximately eighty miles, and seldom exceeds from twelve to fifteen miles in a north-south direction along the northern margin of the Uinta Basin. From Randlette westward, along the Duchesne river, these Oligocene beds are quite clearly defined from the underlying Uinta series (Horizon C). Peterson and Kay (*l.c.*, p. 295) have already called attention to the fact that "the sandstones weather out to characteristic reddish brown cliffs, which rest on softer clays [Horizon C of the Uinta] along the streams and on the divides between Lake Fork, 'Dry Gulch,' Duchesne, and the course of other rivers." Although a tentative division was made by Peterson & Kay between the Duchesne beds and the underlying Uinta strata to the eastward from Randlette, the distinction between the two horizons is not so clear toward the eastern end of the basin.

The relationship of the fauna of the Duchesne Oligocene, as now known, is less sharply defined from that in the underlying Uinta

¹Since the publication of *Annals of the Carnegie Museum*, Vol. XX, 1931, Art. XII, pp. 293-305, Professor W. B. Scott of Princeton University has in a letter kindly suggested the name "Duchesne" for the Oligocene formation named "Upper Uinta," by Peterson and Kay.

sediments (Horizon C) than is usually the case in the superimposed horizons of other localities. There is, nevertheless, an advance corresponding to that of the lithological change noted.² The Titanotheres of the Duchesne Oligocene so far known represent an advance upon those found in Horizon C of the Uinta series. *Teleodus uintensis*³ is a typical Oligocene form, with frontonasal horns well developed; with two upper and three lower incisors, bearing the characteristic button-shaped crowns found in all the known Titanotheres of the White River Oligocene. The horses, or Anchitheres, and Tapiroids have the lower premolars more like the molars. The Cameloids are very distinctly advanced in the direction of those found in the White River Oligocene. The genus *Hyænodon* of the eastern Oligocene, not heretofore found in the Eocene of America, is recognized. With this assembly of forms there are, so far found, remains of Anchitheres, Amynodonts, Homacodonts, Agriochærids, and Mesonychids, as survivors from the underlying Eocene. The Amynodonts have the second lower premolar reduced to vestigial proportions. The Homacodonts and Mesonychids⁴ have advanced in their trend of evolution. It is quite safe to say, that, when more complete material is found representing the Agriochærids and the Oreodonts, they will be found to have similarly advanced.

The Duchesne Oligocene of the Uinta Basin may thus be regarded as a horizon quite perfectly transitional between the Upper Eocene and the Chadron horizon⁵ of the White River series of South Dakota. We were gratified in finding in the Duchesne Oligocene the genus *Hyænodon*, hitherto not reported from so low a level in the American Oligocene. In this vast deposit of strata, over one thousand feet thick, we have not yet discovered any horizons which abruptly traverse the formation, such as the well known *Metamynodon* and *Protoceras* Sandstones; the two latter being stream deposits, which contain sudden breaks in the Oligocene fauna of the White River Badlands of

²See Annals Carnegie Museum, Vol. XX, 1931, pp. 294-298.

³Annals Carnegie Museum, Vol. XX, 1931, p. 308.

⁴Annals Carnegie Museum, Vol. XX, 1931, p. 338.

⁵It should be noted here that the fauna which Mr. Douglass described from the "Sage Creek Beds" of Montana, Ann. Car. Mus. Vol. II, 1903, pp. 155-160, is in part probably a later facies than that in the Duchesne Oligocene of Utah. The stratum of the Sage Creek Beds of Montana in which "*Metamynodon*" was found might therefore have to be placed between the Chadron of Nebraska-Dakota and the Duchesne series of Utah.

South Dakota. The evidence of stream-action is abundant in the Duchesne series, but the scarcity of fossil remains through the entire formation precludes at this time any clear comparison with what is known of the Oligocene of Dakota.

Of the fossils described in the following pages the fragment of an upper jaw as well as limb bones of *Hyænodon* were found in 1929 in the Titanotheres quarry of the upper Duchesne Oligocene and the fragment of a lower jaw of the Amynodont described in the following pages was found in the same quarry in 1930. The rest of the material described in what follows was collected in different horizons of the Oligocene of the Uinta Basin by the field-party of the Carnegie Museum in charge of Mr. J. LeRoy Kay in 1931. The illustrations are from drawings made by Mr. Sydney Prentice.

Class REPTILIA.

Order CROCODILIA.

Family ALLIGATORIDÆ.

Genus CROCODILUS.

1. *Crocodylus* (?) *acer* Cope.

A very poorly preserved skull and lower jaws, C. M., No. 11858, discovered near the base of the Duchesne Oligocene in the Uinta Basin, Utah, is provisionally referred to the genus *Crocodylus*. The specimen was found three miles north of the Leota Ranch in Uinta County. By the liberal use of shellac and extreme care in collecting it was possible to transport this frail specimen from the field to the Museum. For detailed and reliable description this specimen requires an amount of most painstaking and careful work in the laboratory, which cannot be done in advance of the publication of the present paper. From the superficial study, which I have been able to give in the present condition of the specimen, it appears most nearly like *Crocodylus* (?) *acer* Cope⁶ from the "Manti formation" in central Utah, re-described by Charles C. Mook.⁷ The long and comparatively narrow form of the head; the irregularly rounded and anteriorly pointed orbits; the flat surface of the snout (undoubtedly due, in a great measure, to crushing); the broad surface between the superatemporal fenestræ and the apparently large infratemporal fenestræ are the

⁶"Tertiary Vertebrata" 1884, p. 154, Pl. XXIII, fig. 1.

⁷Bull. Amer. Mus. Nat. Hist., Vol. XLIV, 1921, p. 117, Pls. XVIII, XIX.

chief characters, on which I rely for the present identification. The upper and lower jaws are so closely appressed that no idea can be had of the characters or position of the teeth in the present condition of the specimen. The lower jaws are quite slender, there being apparently no such expanse between the alveolar and inferior borders of the rami as in *Allognathosuchus*, or as in *Crocodylus americanus*.

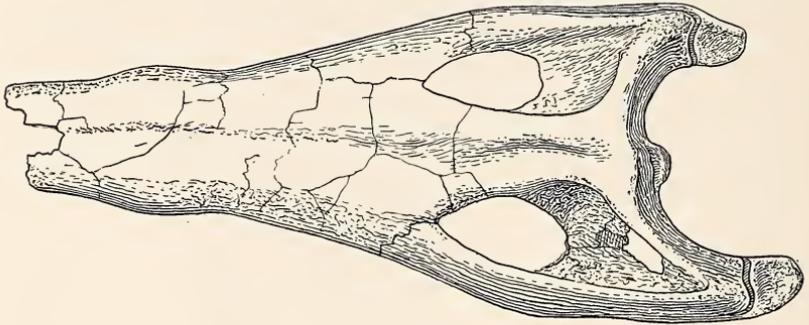


FIG. 1. Top view of skull. *Crocodylus (?) acer* Cope. C. M., No. 11858, One-fourth natural size.

MEASUREMENTS OF SKULL.

Greatest length, approximately.....	400 mm.
Length from occipital condyle to end of snout, approximately.....	350 mm.
Width opposite orbits.....	155 mm.
Width of snout midway to anterior extremity.....	86 mm.
Width at narrowest part, behind anterior nares.....	68 mm.

Class MAMMALIA.

Order CARNIVORA.

Family HYÆNIDÆ.

Genus HYÆNODON.

2. *Hyænodon* sp. (?)

A portion of a maxillary of the right side, with the two last molars in place (C. M., No. 11770), and a humerus (C. M., No. 11764), is referred to the well known genus *Hyænodon* of the Nebraska and Dakota Oligocene. The specimens were found in the Duchesne Oligocene together with the great mass of material representing *Teleodus uintensis* in the Titanothera Quarry eleven miles west of Vernal. The maxillary represents an animal smaller than *Hyænodon*

cruentus, but larger than *Hyænodon crucians*. With the exception of a well-marked swelling on the external face of the sheering blade, midway between the anterior cusp and the posterior limit of the last tooth, the detailed structure of these teeth most closely suggests those of *Hyænodon cruentus*. On the last tooth there is no indication of an antero-internal basal tubercle, while on the tooth in front there is a very slight indication of such a tubercle. The maxilla is broken off at the posterior alveolus of the larger tooth and in front of the first molar.

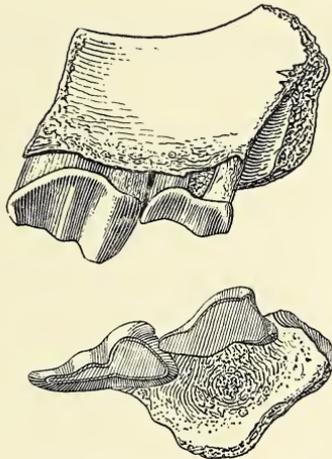


FIG. 2. External and crown views of M¹, M². *Hyænodon* sp.?
C. M., No. 11770. Natural size.

MEASUREMENTS.

M ¹ length, measurement taken at base of crown.....	13 mm.
M ¹ width, at anterior face.....	7 mm.
M ² length, measurement taken at base of crown.....	20 mm.
M ² width, at anterior face.....	7 mm.

The right humerus, C. M., No. 11764, represents that of a smaller animal, about the size of *Hyænodon mustelinus*, though slenderer and relatively less expanded at the head and distal end. As in *Hyænodon* the articulation for the scapula faces almost as much backward as proximally. The tuberosities are wide apart, displaying a wide and shallow bicapital groove. The deltoid crest is not prominent. The supinator ridge is low and poorly developed and the external epi-

condyle is likewise poorly developed, while the inner condyle is large and perforated by the characteristic foramen. The supratrochlear and anconeal fossæ communicate by a large foramen characteristic of the genus. The distal trochlea is distinctly typical of *Hyænodon* and quite perfectly answers the description given by Professor Scott,⁸ who states that the trochlea "is divided into three facets, of which the inner one is both the widest and the highest, while the outer one is very narrow; the median facet is a broad and strongly convex [ridge]."

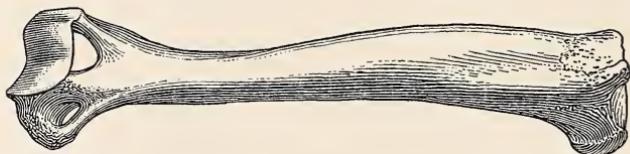


FIG. 3. Anterior view of right humerus, *Hyænodon* sp.?
C. M., No. 11764. Natural size.

Family MIACIDÆ.

3. *Pleurocyon* sp. ? an *Uintacyon* sp. ?.

Included in the small collection found near the base of the Duchesne Oligocene, three miles north of Leota Ranch, are a number of fragments, C. M., No. 11850, which are provisionally referred to such genera as *Pleurocyon* described by Peterson⁹ or to *Uintacyon*. The specimens consist of the head of a humerus, a portion of an ulna, fragments of shafts of limb-bones and a number of foot-bones. The first metatarsal of this specimen perhaps compares best with that of *Pleurocyon*, while the phalanges are apparently more depressed and certainly broader than those in *Pleurocyon*, but otherwise quite similar in structure.

SUBORDER PERISSODACTYLA.

Family EQUIDÆ.

SUBFAMILY HYRACOTHERIINÆ.

4. *Epihippus intermedius* sp. nov.

Type: Symphysis and right ramus of lower jaws with incisors, canine, and P₂ and M₃ of adult. C. M., No. 11845.

Horizon: Duchesne Oligocene.

⁸Journal Acad. Nat. Sci. Philad. Vol. IX, 1894, p. 513.

⁹Annals of the Carnegie Museum, Vol. XII, 1919, p. 52.

Locality: Uinta Basin, Half-way Hollow, five miles north of United States Highway 40, and one mile south of Vernal-La Point road, Uinta County, Utah.

Specific Characters: Antero-internal cusp on P_3 single; antero-internal cusp on P_4 , on tooth not worn, very faintly twinned; on very slight wear twinning disappears. On M_1 and M_2 twinning of antero-internal tubercle practically the same as on P_4 ; P_1 single-rooted. No diastema between P_1 and P_2 . Animal slightly larger than *Epihippus gracilis*.

In comparing P_2 of the present specimen with fig. 5b, on Pl. XVIII, in Granger's paper on the "Revision of American Eocene Horses" (Bull. Amer. Mus. Nat. Hist. Vol. XXIV, 1908) it appears that the paraconid of *Epihippus gracilis* (= *uintensis*) is less developed and does not turn inward as in *E. intermedius*. Furthermore, when the lower premolars of the type of the new species are compared with those in a specimen, C. M., No. 3397, referred to *Epihippus parvus*, it becomes quite apparent that the anterior cross-crests in the latter species are higher than the posterior cross-crests, while in *E. intermedius* the anterior cross-crests are no higher than the posterior, exactly the condition found in *Mesohippus bairdii*. P_2 in the latter species differs from that in *Epihippus intermedius* by having the anterior part of the paraconid turned more inwardly and the posterior part (the cross-crest portion of the paraconid) better developed. The transverse diameter of the premolars in *Mesohippus bairdii* is also relatively greater than in *Epihippus intermedius*. These differences together

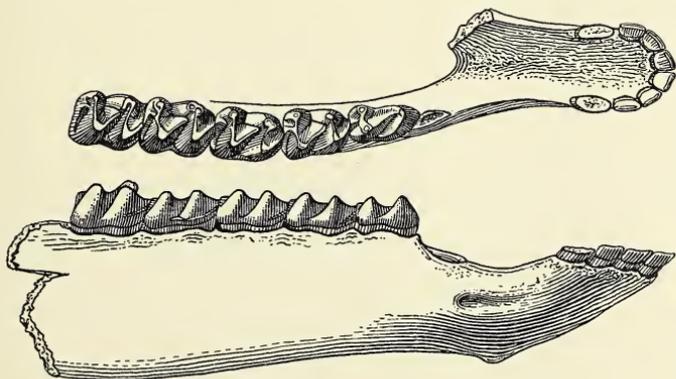


FIG. 4. Crown and side views of right jaw. *Epihippus* (*Duchesnehippus*) *intermedius* Peterson. C. M., No. 11845. Natural size.

with relatively smaller incisors, a larger canine, a longer diastema between P_1 and the canine in *E. intermedius* appear to be the chief differences between *Epihippus intermedius* and *Mesohippus bairdii*.

When the upper dentition of *E. intermedius* is found in the Duchesne Oligocene, it is quite safe to predict, that the antero-internal tubercle on P^2 will be much further advanced in its development of molariform structure than it is in *Epihippus parvus*, and that, the fifth digit of the manus in *E. intermedius* will be found to be considerably more reduced than it is in the species from the lower levels in the Uinta Basin. That *Epihippus intermedius* may represent a distinct genus is entirely probable. When more satisfactorily determined this new genus may be called *Duchesnehippus*.

MEASUREMENTS.

Total length of jaw fragment, including incisors.....	84	mm.
Length of diastema between canine and P_1	13	mm.
Length of cheek-teeth P_1 , M_2	49	mm.
Length of P_2	9	mm.
Breadth of P_2 at posterior cross-crest.....	4.5	mm.
Length of P_3	8.5	mm.
Breadth of P_3 at posterior cross-crest.....	6	mm.
Length of P_4	9	mm.
Breadth of P_4 at posterior cross-crest.....	6	mm.
Length of M_1	9	mm.
Breadth of M_1 at posterior cross-crest.....	6	mm.
Length of M_2	9	mm.
Breadth of M_2 at posterior cross-crest.....	6	mm.
Depth of ramus of P_2	15.5	mm.
Depth of ramus at M_2	19	mm.

SUPERFAMILY TAPIROIDEA.

Family HELALETIDÆ.

5. *Heteraletes** *leotanus*, gen. et sp. nov.

Type: Pair of lower jaws in adolescent stage. C. M., No. 11849.

Horizon: Duchesne Oligocene, near base of series.

Locality: Uinta Basin. Three miles north of Leota Ranch and one mile west of Green River, Uinta Co., Utah.

Generic Characters: I_3 , C_1 , $P_2^?$, M_3 .

P_2 with low tricuspid crown, P_3 , sub-molariform; P_4 completely

*ἕτερος + ὀλήτης

molariform; M_1 and M_2 with cross-crests, anterior and posterior cingulæ as in *Dilophodon* or *Helaletes* from the Bridger Eocene.

The incisors are fan-shaped, the first and second of subequal size, while the lateral incisor is reduced to almost half the size of those in front. The lower canine is rather low-crowned, but of considerable antero-posterior diameter at the base of the crown. The latter rises to a trenchant point. There is a considerable diastema between the canine and the cheek-dentition, which may possibly be slightly exaggerated due to the mending of the specimen. P_1 may, or may not, be present. P_2 has a comparatively simple crown, consisting of the para-, proto-, and metaconids, the protoconid the larger of the three. The crown of P_3 is almost completely molariform; besides the typical paraconid the crown of this tooth has the two complete cross-crests, as in the molars, and there is a well-formed cingulum on the posterior face. P_4 has reached the complete molarization with the two cross-crests and well marked cingulum in front and back. The first and second molars are cross-crested with cingulæ in front and back, as in *Helaletes* or *Dilophodon* from the Bridger Eocene. M_3 is rather deeply buried in the jaw. Its detailed structure cannot be correctly described. The mandibular rami are quite heavy, deep, and have a strong symphysis, the posterior border of which is opposite the junction between P_3 and P_4 .

Not knowing the detailed structure of M_3 the proposed genus is, with the exception of the advanced condition of P_3 and P_4 , most nearly like *Dilophodon* of the Bridger Eocene, though smaller than the latter genus.

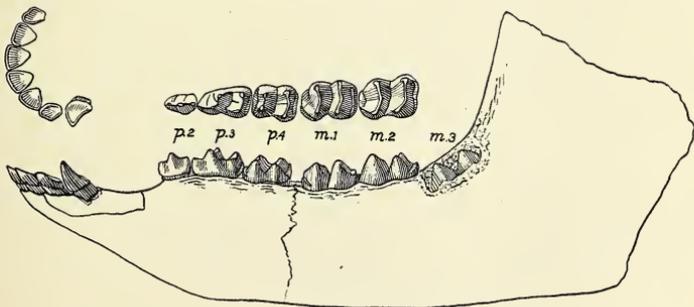


FIG. 5. Crown and side views of lower teeth. *Heteraletes leotanus* Peterson.
C. M. No., 11849, Natural size.

MEASUREMENTS.

Length of jaw, incisors to angle of ascending ramus, approximately.....	95 mm.
Length of cheek-dentition P ₂ , M ₂	33 mm.
P ₂ length.....	4.5 mm.
P ₂ breadth.....	5.2 mm.
P ₃ length.....	6.5 mm.
P ₃ breadth.....	4 mm.
M ₁ length.....	6.5 mm.
M ₁ breadth.....	5 mm.
M ₂ length.....	7 mm.
M ₂ breadth.....	5 mm.

Family HYRACODONTIDÆ.

6. Genus *Hyracodon* ? sp. ?

To the genus *Hyracodon* is provisionally referred a femur, C. M., No. 11846, which was found well up in the Duchesne Oligocene of the

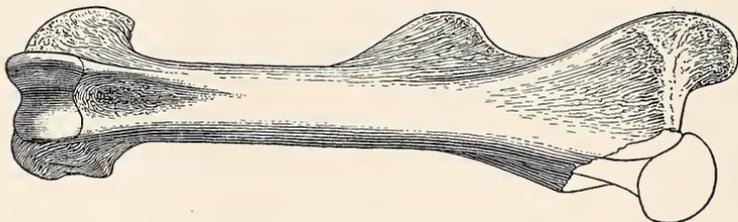


FIG. 6. Anterior view of femur. *Hyracodon*? C. M., No. 11846.
One-fourth natural size.

Uinta Basin. The bone, though slightly slenderer, compares best with the femur of the larger species of that genus found in the Nebraska

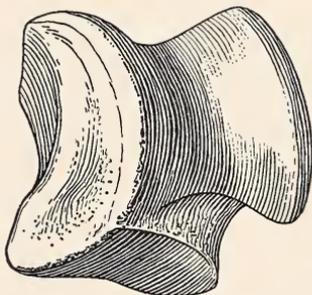


FIG. 7. Dorsal view of astragalus. C. M., No. 11855. Natural size.

Oligocene. The great trochanter, which is relatively slenderer, projects higher above the head than in the eastern form. The latter feature is, however, due mostly to the crushing of the bone. The rotular trochlea is shorter and the condyles are of relatively greater extent vertically than in the eastern species, but this feature may also be due to the distortion of the specimen. An astragalus, No. 11855, found in the same locality and horizon as the femur just described, is also provisionally placed with the genus *Hyracodon*.

Family AMYNODONTIDÆ.

7. *Mesamynodon medius* gen. et sp. nov.

Type: Fragment of ramus of the lower jaw of adult animal with portion of root of P₂, P₃, and P₄, together with M₁ and M₂, C. M., No. 11762.

Horizon: Duchesne Oligocene, Upper series.

Locality: Uinta Basin. Titanother Quarry, eleven miles west of Vernal, Uinta County, Utah.

Generic Characters: P₂ vestigial; proto- and deutoconid, which form the main cross-crest, relatively low; paraconid and posterior cross-crest high and more completely developed, when compared with

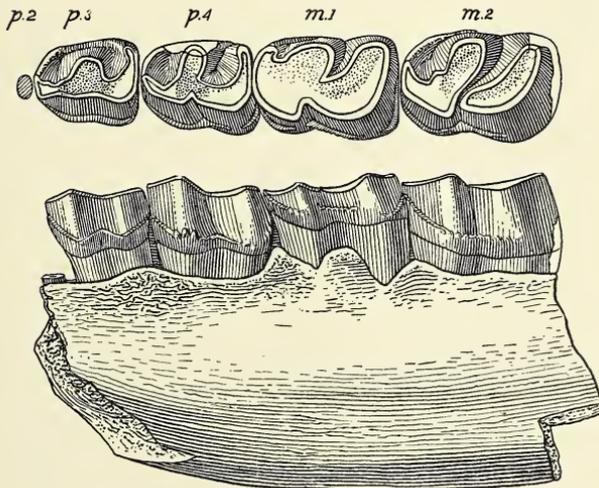


FIG. 8. Crown and side views of left jaw. *Mesamynodon medius* Peterson. C. M., No. 11762. Natural size.

lower premolars of *Amynodon*. Molars as in *Amynodon*, but with cingulum better developed.

In excavating the alveolar border in front of P₃ of the type, a portion of a shallow alveolus with a small fragment of the root of P₂ was found. Judging from this very shallow alveole and the minuteness of the root-fragment this tooth is evidently reduced to a mere vestige in comparison to the already much reduced P₂ of *Amynodon*. In fact the tooth may even be entirely wanting in some individuals, indicating a considerable step beyond *Amynodon* toward such forms as *Metamyndon* of the White River Oligocene. The prominence of the cingulum on both premolars and molars of the present specimen strongly suggests *Hyracodon* of the Nebraska-Dakota Oligocene, but P₃ and P₄ are reduced too much in length, to say nothing of the vestigial P₂, to place the specimen with the *Hyracodonts*. Provisionally I therefore place *Mesamyndon* in the subfamily *Amynodontinæ* pending the discovery of better diagnostic material.

MEASUREMENTS.

Length of jaw fragment.....	66	mm.
Depth of ramus at M ₁	31	mm.
Length of P ₃	13	mm.
Breadth of P ₃ opposite posterior cross-crest.....	95	mm.
Length of P ₄	15	mm.
Breadth of P ₄ opposite posterior cross-crest.....	10.5	mm.
Length of M ₁	17	mm.
Breadth of M ₁ opposite posterior cross-crest.....	12	mm.
Length of M ₂	20	mm.
Breadth of M ₂ opposite posterior cross-crest.....	12.5	mm.

SUBORDER ARTIODACTYLA.

Family DICHOBUNIDÆ.

SUBFAMILY HOMACODONTINÆ.

8. *Pentacemylus** *progressus* gen. et sp. nov.

Type: Two upper molars of the left side; inner portion of P₄; M₁ and M₂ of right side. C. M., No. 11865.

Horizon: Duchesne Oligocene, near base.

*πέντα = five; ἄκρη = point; μῦλος = molar tooth.

Locality: Uinta Basin, Utah. Three miles north of Leota Ranch, one mile west of Green River.

Characters obtained from the type material. Upper molars five-pointed with protoconule well developed; no evidence of the vestigial hypocone on M^2 which is present in *Bunomeryx*.

Cusps of molars distinctly more crescentic than in *Homacodon* Marsh, from the Bridger Eocene, *Bunomeryx* Wortman, and other genera from the Uinta (Horizon C) described later by Peterson.¹⁰ Upper molars of more nearly equal size than those in earlier genera. P_4 with well developed deuterocoid and paraconid. Lower molars with slightly more advanced selenodont and hypsodont condition than in genera from the Bridger and the Uinta.

With the advanced condition of the cheek-dentition from that of the *Homacodonts* found in the lower strata there still persists the antero-medial tubercle, well developed and entirely separated from the protocone as in *Bunomeryx*. Furthermore, the para- and mesostyles and the cingulum are even better developed than in *Bunomeryx*. The well developed meso- and parastyles in *Pentacemylus* closely suggest *Protoreodon*, but the latter does not have the heavy cingulum bounding the tooth anteriorly, internally, and posteriorly, as is the case in *Pentacemylus*.

The advanced condition in the lower dentition of *Pentacemylus* consists chiefly in the greater development of the para- and deuterocoids and of the greater height of the tubercles along the buccal side of the molars, when compared with *Hylomeryx*, but is more nearly like those in *Bunomeryx* of the lower horizons.

The new genus here proposed evidently stands very close to *Bunomeryx* of the lower horizons of the Uinta, while *Hylomeryx*, *Sphenomeryx*, and *Mesomeryx* stand perhaps closer to *Homacodon*.

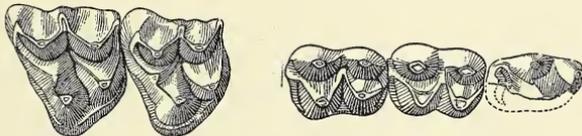


FIG. 9. Crown views of upper and lower teeth. *Pentacemylus progressus* Peterson. C. M., No. 11865. Twice natural size.

¹⁰Annals Carnegie Museum, Vol. XII, 1919, pp. 67-76.

MEASUREMENTS.

M ¹ anteroposterior diameter.....	6.5 mm.
M ¹ transverse diameter.....	7.5 mm.
M ² anteroposterior diameter approximately.....	6.5 mm.
M ² transverse diameter.....	7.5 mm.
P ₄ , M ₂ anteroposterior diameter.....	19 mm.
M ₁ anteroposterior diameter.....	6.5 mm.
M ₂ anteroposterior diameter.....	6.5 mm.
M ₁ transverse diameter.....	4 mm.
M ₂ transverse diameter.....	4 mm.

Family AGRIOCHERIDÆ.

9. Genus *Diplobunops* (?) sp. ?

An upper molar tooth, C. M., No. 11853, about the size of that of *Diplobunops leotensis* found well up in the Duchesne Oligocene series in Half-way Hollow, Uinta County, Utah, is provisionally placed in the genus *Diplobunops*. My principal reason for doing this is the presence of the vestigial protoconule on the crown of the tooth, the poorly developed posterior horns of proto- and hypocones, and the heavy and obliquely backward directed parastyle, as in the Eocene Oreodonts in general.



FIG. 10. Crown view of upper molar. ? *Diplobunops*. C. M., No. 11853. Natural size.

That the tooth may pertain to a distinct new genus is entirely probable, but I prefer to wait until a more complete specimen is found before adding another genus from this new horizon.

Near the base of the Duchesne Oligocene, three miles north of Leota Ranch, Uinta County, Utah, there was found a second specimen consisting of a fragmentary skeleton, C. M., No. 11848, which is provisionally referred to the genus *Diplobunops*. The fragments of the upper teeth indicate an animal the size of *Diplobunops uintensis*. The humerus, femur, and tibia appear to be proportionally lighter and the cnemial crest of the tibia not extending so low as in *Diplobunops*. The astragalus on the other hand, is low and broad, as in the latter genus. The distal articulation of Mt. IV is not hemispherical on the dorsal face, as it is in *Diplobunops*, but more nearly like that in *Merycododon*. The two terminal phalanges present are not high, narrow, and claw-like, as in *Diplobunops*, nor as much depressed, though fully as broad as in *Merycododon*. The lateral borders of the anterior half of the ungual is expanded near the plantar face, giving the bone a

unique appearance. If this specimen pertains to one individual, the combination of the characters noted would certainly indicate a distinct species of the genus *Diplobunops*, if not a distinct genus, nearly allied to the latter. The material is, however, in my judgment unsatisfactory to serve as a type.

Well towards the base of the Duchesne Oligocene series, three miles north of Leota Ranch and one mile west of Green River, Uinta County, Utah, there were found a few fragments of an Oreadont, No. 11864, very nearly the size of *Merycoidodon culbertsoni*. I provisionally place this specimen with *Protoreodon*. The astragalus of the specimen from Utah is wider than in *Protoreodon medius*, but not as broad as in *Merycoidodon*.

Likewise the cuboid is relatively lower than in the latter genus. Altogether the new material, which is too incomplete to be made a type, apparently represents an intermediate form between *Protoreodon* and *Merycoidodon*.

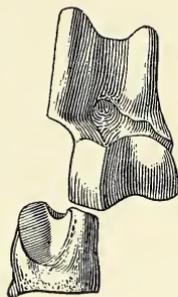


FIG. 11. Dorsal views of astragalus and cuboid. *Protoreodon*. ? C. M., No. 11864. Natural size.

Family CAMELIDÆ.

10. *Poabromylus*** *kayi* gen. et sp. nov.

Type: Left ramus of the lower jaw with the molar series, including P₃ and P₄. C. M., No. 11753.

Horizon: Duchesne Oligocene, upper series.

Locality: Uinta Basin. Titanothera Quarry, eleven miles west of Vernal, Uinta Co., Utah.

Generic Characters: Jaw slender¹¹; P₂, P₃, and P₄, of semiequal length, as in *Poëbrotherium wilsoni*. P₃ and P₄ relatively shorter and thicker; protoconid rounder and higher, and the basal accessories less distinct than in *Poëbrotherium*. There is a diastema in front of P₂ as in *Poëbrotherium wilsoni*. The molars are relatively shorter and less hypsodont than in *Poëbrotherium*. Animal nearly the size of *Poëbrotherium wilsoni*.

***πάα* = grass; *βρώω* = I eat; *μύλος* = molar tooth.

¹¹The greater part of the inferior border of the ramus is missing, but enough is preserved to determine that the animal had a slender jaw, as in *Poëbrotherium*.

The diastema in front of P_2 is of considerable length (8 mm. from P_2 to where the jaw is broken). As already stated P_2 is close to P_3 , the tooth was implanted by two roots, the alveoli of which are directly anteroposterior, indicating an anteroposterior diameter approximately equal to either of the posterior premolars. The protoconid of P_3 is rather high and terminates in a round pointed apex. The internal face of the main cusp (protoconid) has near its posterior base a cusp-like rib closely adhering to the main body of the protoconid. Together with the external body of the heel this rib on P_3 helps to form a fossa which is open behind. Forward and inward from the protoconid there extends a sharp blade-like tubercle, which likewise helps to form a vertical shallow groove on the inner face of that portion of P_3 , not unlike that in *Poebrotherium*. P_4 is very similar to P_3 , except that the posterior heel in P_4 is more pronounced, the plate-like tubercle on the inner face of the protoconid is slightly better indicated, and the anterior blade-like tubercle heavier. Altogether the premolars in *Poabromylus* are less trenchant than in *Poebrotherium*.

The molars are narrow when compared with the known selenodonts of the Upper Eocene, with the possible exception of *Leptotragulus*. On the whole the molars, as well as the two premolars just described, are most nearly like those of *Poebrotherium wilsoni* of the White River Oligocene, though less hypsodont. The lingual face of M_2 and part of that of M_3 are destroyed, but enough remain to determine that, though the inner face of the molars have the vertical grooves and ridges more pronounced than in *Poebrotherium*, they are on the whole most nearly comparable to those in that genus. A cingulum between the crescents on the external face of the molars is slightly

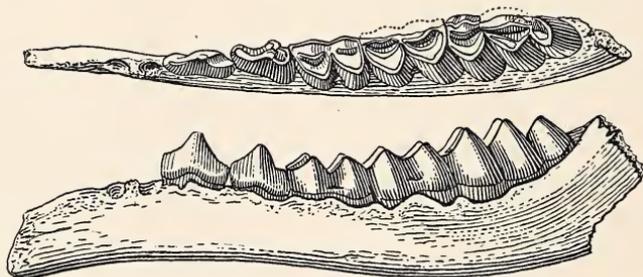


FIG. 12. Crown and side views of dentition and left jaw. *Poabromylus kayi* Peterson. C. M., No. 11753. Natural size.

indicated, especially on the first and second molars. The heel of M_3 is fully as large proportionally as that in *Poebrotherium wilsoni*, but the pillar on the inner face at the junction with the postero-internal crescent in *Poebrotherium* is in the present form represented only by a tubercle, as in *Leptotragulus* of the Uinta.¹²

MEASUREMENTS.

Total length of the jaw fragment.	80	mm.
Depth of jaw at posterior part of symphysis.	10	mm.
Depth of jaw opposite M_3 , approximately.	18	mm.
Length of P_3	8.5	mm.
Greatest breadth P_3	3	mm.
Length of P_4	8	mm.
Greatest breadth P_4	4	mm.
Length of the molar series.	35	mm.
Length of M_1	9.5	mm.
Greatest breadth of M_1	6	mm.
Length of M_2	11	mm.
Greatest breadth of M_2 approximately.	7	mm.
Length of M_3	21	mm.
Breadth of M_3 anterior crescents.	7	mm.

The proposed genus, just described, differs from "*Leptotragulus*" *profectus* Matthew (Bull. Amer. Mus. Nat. Hist. Vol. XIX, 1903, p. 224) by having the posterior internal crests of the premolars less developed and the anterior crests of the premolars less pronounced. Judging from Matthew's illustration (*l.c.*) of the lower jaw, P_2 in "*Leptotragulus*" *profectus* is very probably a smaller tooth than that in *Poabromylus kayi*. *Camelodon arapahovius* Granger (Bull. Amer. Mus. Nat. Hist. Vol. XXVIII, 1910, p. 248), differs from *Poabromylus kayi* by having a diastema between P_2 and P_3 , heavier heels, and the protoconid more nearly in the mid-body of the premolars, and by a more complicated fifth lobe of M_3 .

The proposed new genus *Poabromylus* is distinctly further advanced than *Eotylopus reedi* from the Lower Oligocene of Wyoming and apparently cannot therefore be regarded as holding an intermediate position between *Protylopus* of the Uinta and *Poebrotherium* of the White River Oligocene. The late Dr. Matthew has pointed out that *Eotylopus* stands closer to *Protylopus* of the Uinta Eocene than to

¹²In the type specimen of *Poabromylus kayi* this pillar is not well indicated due to the broken surface, but a second smaller specimen, No. 11856, has the inner face of the molars well preserved.

Poëbrotherium of the Eastern Oligocene.¹³ From present evidence *Poabromylus* certainly stands closer to *Poëbrotherium* than to *Protylopus*.

¹³Bull. Amer. Mus. Nat. Hist. Vol. XXVIII, 1910, p. 40.

V. A NEW ARCTIC WEASEL FROM SOUTHAMPTON
ISLAND, HUDSON BAY.

BY GEORGE MIKSCH SUTTON AND WILLIAM J. HAMILTON, JR.

In studying the mammals collected by the senior author at Southampton Island, Hudson Bay, during 1929-1930, we find that the series of twenty-one weasels belong to an undescribed race of *Mustela arctica*. This form may be described as follows:

Mustela arctica semplei¹ subsp. nov.

Type.—Male, adult, No. 6470, Carnegie Museum Collection, taken at Coral Inlet, South Bay, Southampton Island, October 8, 1929, by George Miksch Sutton. Original Field-Catalog Number: 3M.

Diagnostic Characters: Considerably smaller than *Mustela arctica arctica*. General coloration that of the *arctica*-group, but in summer *upper lips white* as in *Mustela cicognani*, and a small, but distinct, post-orbital white spot in most specimens. Skull as in *arctica*, but zygomata not so strongly bowed outwardly. Average measurements² of twelve adult males in the flesh: Total length, 283 (324-267); tail, 78.5 (94-64); hind foot, 39.6 (43-38). Average measurements of seven adult females in the flesh: Total length, 260 (288-250); tail, 70 (74-63); hind foot, 35 (38-33). The average measurements of four adult male

¹The name *semplei* is given in honor of our friend, Mr. John Bonner Semple, Trustee of the Carnegie Institute, and in recognition of Mr. Semple's personal interest in geographical and zoölogical explorations of the North Country.

²Unfortunately our specimens, with two exceptions, were measured in the field to the end of the fur on the tail. By measuring this tip or "brush" and subtracting this figure from that for the total length and that for the tail, we have obtained *corrected* measurements, which we feel are reasonably trustworthy. It is significant that these *corrected* tail-measurements (average for *corrected* tail measurements of 12 males: 78.5 mm.; of 7 females: 70 mm.) agree surprisingly well with the tail-measurements of two specimens in which the tail vertebræ only were measured in the field (male, Carnegie Museum No. 6470, tail: 72 mm.; and female, Carnegie Museum No. 6472, tail: 69 mm.)

Mustela arctica arctica from Point Barrow, Alaska, listed by Stone³ are as follows: Total length, 376.5; tail, 134; hind foot, 45.7. These specimens were obviously measured to the tip of the tail hairs, and the total length and tail measurements are not, therefore, strictly comparable to these same measurements given above for *semplei*. We find that the "brush" at the end of the tail in fourteen adult *semplei* from Southampton Island measures 46 mm. Taking this as an average length of the "brush," and subtracting it from the averages of Stone's specimens, we obtain the following corrected measurements for the Point Barrow animals: Total length, 330.5; tail, 88;⁴ hind foot, 45.7.

Merriam's⁵ type of *arctica*, an adult male from Point Barrow, Alaska, measured from a dry skin, is said to have the following measurements: "Total length, 380; tail vertebrae, 75; pencil, 55; hind foot, 48 (at least 50 in the flesh)." The total length of this specimen probably was obtained by measuring to the tip of the tail hairs.

It will be noted from a comparison of these measurements with those of *semplei* that the Southampton Island form is appreciably smaller than that of Alaska.

Coloration of *Mustela arctica semplei*. Summer pelage: Upper parts brown (a shade somewhat between *Dresden brown*⁶ and *Proust's brown*) with a somewhat yellowish cast resulting from the color of the under fur, and lighter in general appearance than in *Mustela cicognani*. *Upper lips*, chin, upper throat, sides of cheeks, toes, and small post-orbital spot, white; rest of underparts, including practically all of fore feet, distal half and inner half of hind feet and a distinct line on the under side of the tail extending almost to the black tip, pale yellowish white, ranging from *pale chalcedony yellow* to pale *straw yellow* and *sulphur yellow*, brightest on the sides of the lower neck and in front of

³Stone, Witmer. 1900. Report on the Birds and Mammals collected by the McIlhenny Expedition to Point Barrow, Alaska. Proceedings of the Philadelphia Academy of Natural Sciences, Vol. 52, pp. 44.

⁴This "corrected measurement" is probably somewhat high, since the 46 mm. subtracted in obtaining this figure is the average length of the "brush" in a race, which is admittedly smaller than *M. a. arctica*. We might have used Merriam's figure for this "pencil" (55 mm.) had we been certain that this "pencil" included only the distance from the end of the last caudal vertebra to the tip of the longest hairs.

⁵Merriam, C. Hart. 1896. North American Fauna No. 11, Washington, D. C., p. 16.

⁶All underlined words descriptive of colors in this paper are from Ridgway's Color Standards and Nomenclature.

the fore feet, and palest on the breast and inguinal region; terminal half of the tail, black.

Winter pelage: White all over, except terminal half of tail, which is black. The base of the tail, the hind legs, and to a lesser extent the fore legs are suffused with clear *sea foam yellow*.

Specimens examined: Twenty-one, all from Southampton Island; eighteen from Coral Inlet, South Bay, the type locality; one from Native Point; one from Prairie Point, and one from Ranger or Kashigiak River, near Cape Low.

Range: Southampton Island, so far as known.

A more extended discussion of this animal will be included in the paper upon the mammals of Southampton Island which we are now preparing.

TABLE OF CRANIAL MEASUREMENTS OF *MUSTELA ARCTICA SEMPLEI* FROM SOUTHAMPTON ISLAND, HUDSON BAY.

ADULT MALES.							
Carnegie Museum Number	Greatest Length	Basal Length	Palatal Length	Zygomatic Breadth	Inter-orbital Breadth	Breadth across Post-orbital Process	Foramen Magnum to last Molar
6470.....	40.6	37	16.7	24.5	10.7	12.5	25
6478.....	37.1	34	14	20.7	9.4	12.2	23
6493.....	42.3	38	17	22.5	11	13.3	26
6499.....	40.8	37.4	16.1	22.9	10.9	14.1	25.6
6537.....	42.7	39.3	17	23	10	12.4	26.5
6569.....	39.6	36	16	22.6	10	12	25.4
6570.....	39.5	36	15.5	23.2	10.8	13.4	24.9
6588.....	39.7	36	16.3	23.8	10.2	12.2	24.9
6599.....	41	37.2	16.4	23.7	11	13.4	25.7
6605.....	38.7	36	16	22	10	12.5	24
6691.....	42	38.5	17	25.6	11	.....	26.1
Average for 11 males...	40.3	36.8	16.4	23.1	10.4	12.8	25.2
ADULT FEMALES.							
6472.....	.....	.....	14.6	20	9.7	11.9	.....
6484.....	37.6	34	15	20	9.4	12	23.8
6547.....	37	34.6	14.8	21	10	12.2	24
6600.....	38.4	35	15	21.9	10	12	24.7
6689.....	36.9	33	14.2	22	9.5	12.8	22
6690.....	35.9	32.7	14.1	21.4	9.6	11.7	22.7
Average for 6 females...	37.6	33.9	14.6	21.1	9.7	12.1	23.4

TABLE OF CRANIAL MEASUREMENTS OF *MUSTELA ARCTICA ARCTICA*.

MALES.						
Point Barrow, Alaska (Merriam).....	44.5	20.5	29.5	12.5	14.5	29
Franklin Bay, Arctic Coast (Merriam)	43.5	19.5	27.5	11	13	28.5
St. Michaels, Alaska (Merriam).....	43	.....	26.5	12	13.5	28
Alaska (Stone).....	44	18	.....	11.8	15	29
FEMALE.						
St. Michaels, Alaska (Merriam).....	38	16.5	22.5	10	12	24.5

VI. A SYNOPSIS OF THE GENUS *METROBATES* UHLER.
(Hemiptera: Gerridæ).

BY C. J. DRAKE AND H. M. HARRIS.

(PLATE II)

Water-striders of the genus *Metrobates*, subfamily *Halobatinæ*, family Gerridæ, have the body comparatively short and broad and the inner margins of the eyes convexly rounded. From other halobatinoid genera they may be distinguished by the somewhat flattened body and the characters of the antennæ and legs. The antennæ are almost as long as the entire body, segment I being nearly as long as, or even a little longer than, the remaining three segments taken together. Sometimes individuals of the same species show a slight degree of variation in lengths of both antennæ and legs. The first segment of the anterior tarsus is very short, being only about one-fourth of the length of the second. In addition the femora of the hind legs are about twice as long as the tibiæ, and also are much longer than the femora of the middle legs. The front legs are much shorter and stouter and somewhat hairy. The first tarsal segment is beset beneath with a row of five to ten long setaceous hairs, which are progressively shortened from the base to the apex.

The species of *Metrobates* exhibit a marked degree of both sexual dimorphism and pterygodimorphism. In the males the antennæ are stout and bear special structures and clothing, whereas they are comparatively simple in the females. The more strongly developed armature of the second and third antennal segments and the row of very long bristly hairs beneath on the first in all five species, and also that of the front femora in *denticornis* (Champ.) and that just in front of the middle legs in *spissus*, sp. nov., represent special structures peculiar to the male sex. Alate individuals are known in four species and probably occur in the other members of the genus. In *Metrobates*, as in a number of other genera of *Halobatinæ*, the wings are frequently mutilated, being broken off near their bases by the insects themselves. This deälatating operation takes place in both sexes and as a result many specimens in collections have artificially shortened

wings with truncate and ragged tips. In the five known species, including the two described below as new, the male claspers are very distinctive and reliable specific characters. As the essential characters of Champion's *Trepobatopsis* are the same as those of *Metrobates* the writers are here considering the two groups as synonymous.

In habits the members of the genus are gregarious. They are confined entirely to the surface of inland waters, inhabiting lakes, creeks, and rivers; and probably being more at home in the quiet waters of the broad expanses of slow-moving streams and in secluded coves of lakes. Although not uncommon, they are decidedly local in occurrence, but do not live in such compact schools as do the *Rhagoveliæ*. On the smaller lakes *M. hesperius* Uhler may sometimes be found in immense numbers, the surface being densely populated over a considerable area by imagoes and nymphs. For food, they prey largely upon insects, which chance to fall into the water. Very little is known regarding the breeding and hibernating habits and life-cycle of the members of the genus.

This paper is based upon material belonging to the Carnegie Museum, the U. S. National Museum, and the writers. The writers are indebted to Mrs. E. L. Travis for the illustrations. As the structure of the thorax is quite different in the winged and wingless forms of the same species, and as both forms are very infrequently represented in a single collection, the characters used in the key to distinguish the different species apply equally well to either alate or apterous males. Except for *M. hesperius* and *spissus* the structural characters of the females are too comparative for satisfactory keys. The females, however, may be readily identified by comparing with determined specimens, and checking with the descriptions.

Genus METROBATES Uhler, 1871.

Haplotype, *M. hesperius* Uhler.

Metrobates Uhler, Proc. Bost. Soc. Nat. Hist., XIV, 1871, p. 108; *ibid.*, XIX, 1878, p. 437; Kirkaldy, Trans. Amer. Ent. Soc., XXXII, 1906, p. 155; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, pp. 246 and 249; Hungerford, Sci. Bull. Univ. Kan., XXI, No. 17, 1919, p. 113; Van Duzee, Cat. Hemip., 1917, p. 430; Torre-Bueno, Conn. Geol. & Nat. Hist., Surv., Bull. 34, 1923, p. 662; Blatchley, Heter. of E. N. Amer., 1926, p. 986.

Trepobatopsis Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 158.

KEY TO SPECIES

MALES

1. Anterior femora armed below near the middle with a stout downwardly projecting tooth, fig. 3; male clasper as in fig. 4b. *M. denticornis* (Champ.)
 Anterior femora unarmed; male claspers different. 2
2. Mesosternum just in front of the middle legs armed with a stout, slightly recurved, downwardly projecting spine-like tubercle, fig. 1b; male claspers as in fig. 4d. *M. spissus*, sp. nov.
 Mesosternum unarmed; male claspers different. 3
3. Intermediate femora and basal portion of tibiæ densely clothed within with long hairs; second segment of antennæ one and one-half times as long as four, fig. 2a; male claspers as in fig. 4a. *M. hesperius* Uhler
 Intermediate legs clothed only with pile; second antennal segment scarcely longer than fourth, the third distinctly shorter 4
4. Male clasper long, strongly curved inwardly, somewhat blade-like, pointed, as in fig. 4c. *M. trux* (Torre-Bueno)
 Male clasper short, widest at apex, as in fig. 4e. *M. cubanus*, sp. nov.

Metrobates hesperius Uhler (Pl. II, figs. 2a and 4a)

Metrobates hesperius Uhler, Proc. Bost. Soc. Nat. Hist., XIV, 1871, p. 109; *ibid.*, Uhler, XIX, 1878, p. 438; Uhler, Stand. Nat. Hist., II, 1884, p. 271; Van Duzee, Can. Ent., XXI, 1889, p. 6; Torre-Bueno, Jour. New York Ent. Soc., XIII, 1905, p. 41; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, p. 249; Torre-Bueno, Can. Ent., XLIII, 1911, p. 228; Parshley, Psyche, XXI, 1914, p. 144; Osborn and Drake, Ohio Jour. Sci., XV, 1915, p. 504; Hungerford, Sci. Bull. Univ. Kan., XXI, 1919, pp. 114 and 119; Parshley, Bost. Soc. Nat. Hist., VII, No. 14, 1917, p. 108; Parshley, Bull. Brook. Ent. Soc., XV, 1920, pp. 67-70; Parshley, Bull. Brook. Ent. Soc., XXIV, 1929, pp. 157-160; Drake, Tech. Pub. No. 16, N. Y. State Col. For., 1922, p. 81; Blatchley, Heterop. E. N. Amer., 1926, p. 980.

Halobatopsis beginni Ashmead, Can. Ent., XXIX, 1897, p. 56.

Antennæ long, black, the basal portion of first segment yellowish brown; first segment a little longer and distinctly stouter in male than in female; second segment one and one-half times as long as the fourth, entirely black. Rostrum more densely clothed with long hair than in the other species. Color somewhat variable, especially the gray or bluish gray markings in the apterous form. Winged form darker, blackish brown, the anterior lobe of pronotum with an orange spot, the bluish stripes wanting.

Length (apterous), 3.40-4.50 mm.; width, 1.70-2.35 mm. Winged form broader and about 5 mm. long. The wingless form is the commoner.

*References to figures all refer to Pl. II, of this volume.

This is the commonest and most widely distributed member of the genus. It may be readily recognized by the characters given in the key. It should also be noted that the antennæ are stouter and longer in *hesperius*, also the first segment in the male is densely clothed beneath with hairs. In the streams and lakes of Eastern North America it is to be not infrequently found in association with species of *Trepobates* and *Rheumatobates* and occasionally with *Tenagogonus*, *Gerris*, and *Rhagovelia*. Specimens have been examined from Maine, New York, New Jersey, Massachusetts, Rhode Island, Maryland, North and South Carolina, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Nebraska, Missouri, West Virginia, Tennessee, Mississippi, Louisiana, and Ontario, Canada.

Dr. H. M. Parshley has shown that *H. beginii* is not a composite species, but represents only the nymphal stage of *M. hesperius*.

***Metrobates cubanus*, sp. nov.** (Pl. II, Figs. 2e, 4e).

Smaller than the other members of the genus. Apterous form black, with bluish gray markings, sometimes with the broad median stripe of mesonotum not reaching to hind margin. Body not so strongly flattened nor as strongly widened anteriorly as in *spissus*, in this respect about the same as *hesperius*; the underside bluish and clothed with short hairs. Antennæ (Pl. II, fig. 2e) shorter and slenderer than in *hesperius*, blackish, the basal portion yellowish brown; segment I slightly curved at the base, obliquely truncate at the apex, clothed beneath with one long hair, segment III shortest. Anterior legs brownish black, clothed with numerous setaceous hairs, the apex of tibia somewhat enlarged and produced into a prominent tubercle within. Intermediate legs clothed only with dense pile. Pronotum in alate form large, tumid, depressed in front, rounded behind, almost subtruncate at the middle, the humeri prominent. In apterous form pronotum small, broadly depressed in the middle and there grayish or yellowish brown; mesonotum large, sinuate behind. Last venter almost twice as long as the preceding, yellowish brown at apex. First genital segment of male tumid and blackish above, distinctly depressed on each side and yellowish brown beneath; the clasper short and very distinctive (fig. 4e). Female larger and broader than male.

Length, 3.41-3.62 mm.; width, 1.61-1.92 mm.

Holotype: deãlated male and *allotype*, apterous female and two *paratypes*, apterous males, Baracoa, Cuba, Aug. 1901, collected by Aug. Busck; types in collection of U. S. National Museum.

In general facies this species seems closest to *hesperius*, but the legs lack the hairy clothing characteristic of that species. As in other

members of the genus the first antennal probably bears several long setaceous hairs, but these except one, seem to be broken off in the specimens at hand.

Metrobates trux (Torre-Bueno) (Pl. II, Figs. 2*c* and 4*c*).

Trepobatopsis trux (Torre-Bueno), Ent. News, XXXII, 1921, p. 274.

Antennæ moderately stout, long, black, the basal portion of the first segment and sometimes of the second yellowish brown. Male clasper as in fig. 4*c*. Bluish color markings slightly variable. Winged form larger and brownish black.

Length, 4.00-5.00 mm.; width, 2.20-2.70 mm.

Originally described from specimens collected on Yampa River, Northwestern Colorado. The writers have a very long series of specimens from Corvallis, Oregon, and Parma, Idaho, also several winged and apterous examples from New Braunfels, Texas, June 22, 1917, collected by Dr. H. H. Knight. The latter differ from the Oregon and Idaho specimens in having the basal portion of the second antennal segment yellowish brown. The types in the collections of the University of Kansas and Mr. J. R. de la Torre-Bueno have been studied. The male of this species is easily recognized through the absence of the special armature or clothing peculiar to the male of each of the other species, except *cubanus*. From the latter it differs especially in the slightly swollen front femora and shape of the clasper.

Metrobates denticornis (Champion) (Pl. II, Figs. 3, 2*b*, 4*b*).

Trepobatopsis denticornis Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 158, Pl. IX, fig. 26, 26*a*; Drake and Harris, Ohio Jour. Sci., XXVIII, 1928, p. 273.

Antennæ moderately slender, black, the base of first and the proximal two-thirds of the third yellowish brown; segments II and IV subequal. Anterior femora of male armed on the lower edge a little before the middle with a very stout projecting tooth. Male claspers as in Pl. II, fig. 4*b*. Winged form darker and broader than apterous. Female larger and broader than male. Bluish marking somewhat variable in apterous form.

Length (apterous), 3.50-4.00 mm.; width, 2.00-2.20 mm. Winged form about 5 mm. long. This species was described from Mexico. Specimens are at hand from Texas, New Mexico, Mexico, and Guatemala.

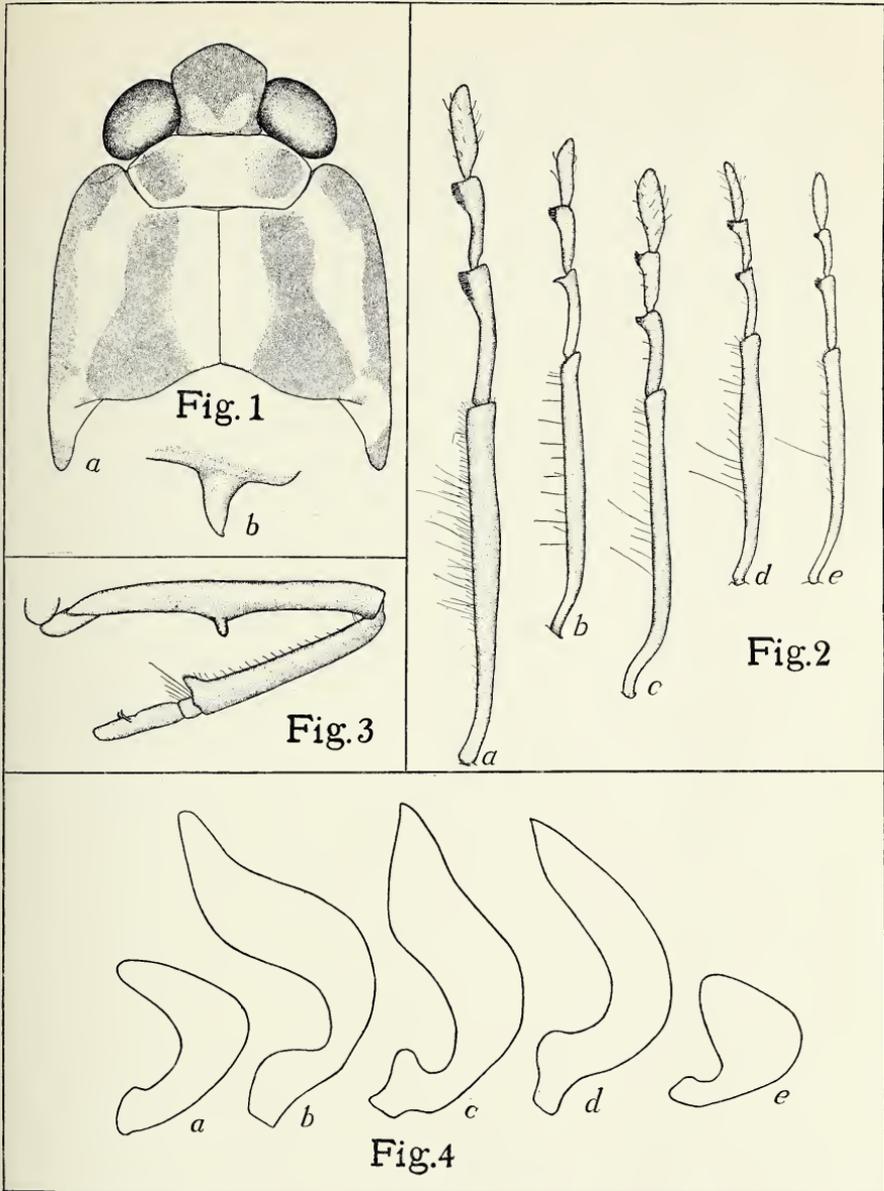
Metrobates spissus, sp. nov. (Pl. II, Figs. 1a and b, 2d, 4d).

Size, color, and marking very similar to other members of the genus; ground-color black, with bluish gray markings and stripes, the head and pronotum usually with orange spots. Antennæ (fig. 2d) long, moderately stout; segment I black, the basal portion yellowish brown, beset beneath with a row of extremely long setaceous hairs, stouter and longer in male than in female; II with basal third brownish. Anterior legs shorter and stouter in male than female, black, the coxæ, trochanters, and basal portion of femora yellowish brown. Middle and hind legs entirely black. Mesosternum in male armed a little in front of coxal cavities with a stout, moderately long, pointed, slightly recurved, downwardly projecting, spine-like tubercle (fig. 1b).

Body broad, robust, strongly flattened, black, the bluish gray markings variable as in other members of the genus. Head black, tumid, with two oblique brownish spots near the base. Eyes large, black, extending beyond the sides of the pronotum. Pronotum strongly depressed on the disc, the slate-gray stripe frequently replaced by a large orange spot. Mesonotum very large, with a deep, line-like median groove, very deeply excavated in front, and strongly sinuate behind, its sides almost parallel and in front nearly touching the eyes. Coxal plates and metanotum marked with slate-gray. Venter slate-gray, the apex of last segment being yellowish brown. Female broader and more robust than male; last venter about as long as the two preceding, broadly and roundly emarginate; first genital segment beneath very strongly depressed, the clasper very distinct, fig. 4d.

Length, 3.60-4.00 mm.; width, 2.00-2.20 mm. Punta Gorda, British Honduras, 41 specimens. *Holotype* (male) and *allotype* (female) in collection of authors. The characters used in the key separate this species at once from any known form. It is the only species having the sternum armed in the male (Pl. II, fig. 1b.). The antero-lateral sides of the mesonotum are more strongly produced, the body distinctly more flattened, and the sides of the mesothorax (Pl. II, fig. 1a) are more nearly parallel than in any other species of the genus.

Telmatometra whitei Bergroth and *Potomobates horvathi* Esaki, both in the apterous form, were taken in association with this very distinct and easily recognizable species.



DRAWN BY MRS. E. L. TRAVIS

FIG. 1. *a.* *Metrobates spissus*, sp. nov., dorsal aspect of male; *b.* Side view of mesosternum showing acetabular spine.

FIG. 2. Antennæ of males: *a.* *Metrobates hesperius* Uhler; *b.* *M. denticornis* (Champion); *c.* *M. trux* (Torre-Bueno); *d.* *M. spissus*, sp. nov.; *e.* *M. cubanus*, sp. nov.

FIG. 3. Front leg of *Metrobates denticornis* (Champion).

FIG. 4. Right claspers of males: *a.* *Metrobates hesperius* Uhler; *b.* *M. denticornis* (Champion); *c.* *M. trux* (Torre-Bueno); *d.* *M. spissus*, sp. nov.; *e.* *M. cubanus*, sp. nov.

VII. A NEW SPECIES OF DELOCRINUS.

BY J. J. BURKE.

(Plate III)

Some years ago, while making a collection of Pennsylvanian invertebrates from the Conemaugh formation in West Virginia, I found some dorsal cups of an interesting little crinoid, apparently representing an undescribed species. Since that time, collections from the same horizon in Pennsylvania have yielded some additional material, and the following description applies to the specimens at hand.

I am indebted to Mr. Sydney Prentice for the drawings from which the illustrations which accompany the description were taken.

CRINOIDEA.

POTERIOCRINIDÆ.

Genus *DELOCRINUS* Miller and Gurley.

Delocrinus allegheniensis Burke, sp. nov.

(Plate III, Figs. 1-5b.)

Type: A well preserved dorsal cup, C. M. No. 4947. Cat. Foss. Invert.

Paratypes: Three dorsal cups, C. M. Cat. Foss. Invert. Nos. 4945, 4946, 4948, and a dorsal cup with four primaxils, the special anal plate missing and the two radial plates on the right side rather badly weathered, C. M. Cat. Foss. Invert. No. 4949.

Horizon: Ames limestone, Conemaugh formation, Pennsylvanian.

Localities: The type, C. M. No. 4947, and paratypes C. M. Nos. 4945 and 4946 from Painter Hollow, near Wellsburg, West Virginia.

Paratype C. M. No. 4948 from Schenley Park, Pittsburgh, Pennsylvania.

Paratype C. M. No. 4949 from Brilliant Cut-off, Pittsburgh, Pennsylvania.

Dorsal cup small, basin-shaped, base sharply impressed upward within the body cavity. Diameter about three times the height, greatest diameter about two-thirds the height from the base. Plates

smooth, tumid, rather massive, impressed at the corners. Sutures depressed.

Infrabasals apparently small and concealed by the proximal facet for the insertion of the column.

Basals five, equal in size and pentagonal, except for the posterior, which is larger than the others, elongated, hexagonal, and truncated for the reception of the special anal. These plates are a little longer than wide, and sharply incurved below to form the impressed base. In this incurved area each plate has a slight mesial concavity. Beyond this region they are gently convex until the lower extremities of the radials are reached, superior to which place the basals become tumid, bulging outward strongly, their apical sides forming spherical triangles.

Radials five, pentagonal, about one-third wider than high, except for the two flanking the special anal, which lack the width of the other three. At their inception, the radials are less convex than the adjacent portions of the basals, but become quite tumid a little above the midpoint of their height. The upper outer surface of each plate is beveled and concave. Superiorly, the radials are truncated and bear facets for articulation with the primaxils.

The special anal is hexagonal, one-half or less than one-half its total length projecting above the radials. It is a little higher than wide, strongly incurved superiorly, truncates the posterior basal and is inserted between the right and left posterior radials.

Primaxils five, pentagonal, about two-thirds wider than high, their lower surfaces faceted for articulation with the radials and their upper surfaces faceted for articulation with the secundibrachs. They are produced outward to form a rather slender spinous process.

The sutures between the plates of the dorsal cup of *D. allegheniensis* are reminiscent of those found in *D. texanus* Weller, which have been described as "slightly impressed, especially the lateral sutures of the basal plates and at the distal extremities of the same plates."¹ In *D. allegheniensis*, however, the sutures appear to be more deeply impressed than in the latter species, while the corners of the plates show small indentations, considerably deeper than the impressions between the sides of the plates. In the spherical-triangular outline of the apical sides of its basal plates *D. allegheniensis* also resembles

¹Weller, Stuart, "Description of a Permian Crinoid Fauna from Texas." Jour. of Geol., Vol. 17, (1909), p. 627.

D. texanus. On the other hand, the species under discussion is of smaller size than *D. texanus*, does not have the broad basal excavation characteristic of the latter species, has more convex basal and radial plates, is constricted at the summit of the radial plates and has a special anal plate relatively larger than that which occurs in *D. texanus*. In addition to the characters enumerated above, the lack of ornamentation on the dorsal cup, together with the presence of spinous primaxils, should serve to distinguish *D. allegheniensis* from other members of the genus.

MEASUREMENTS.

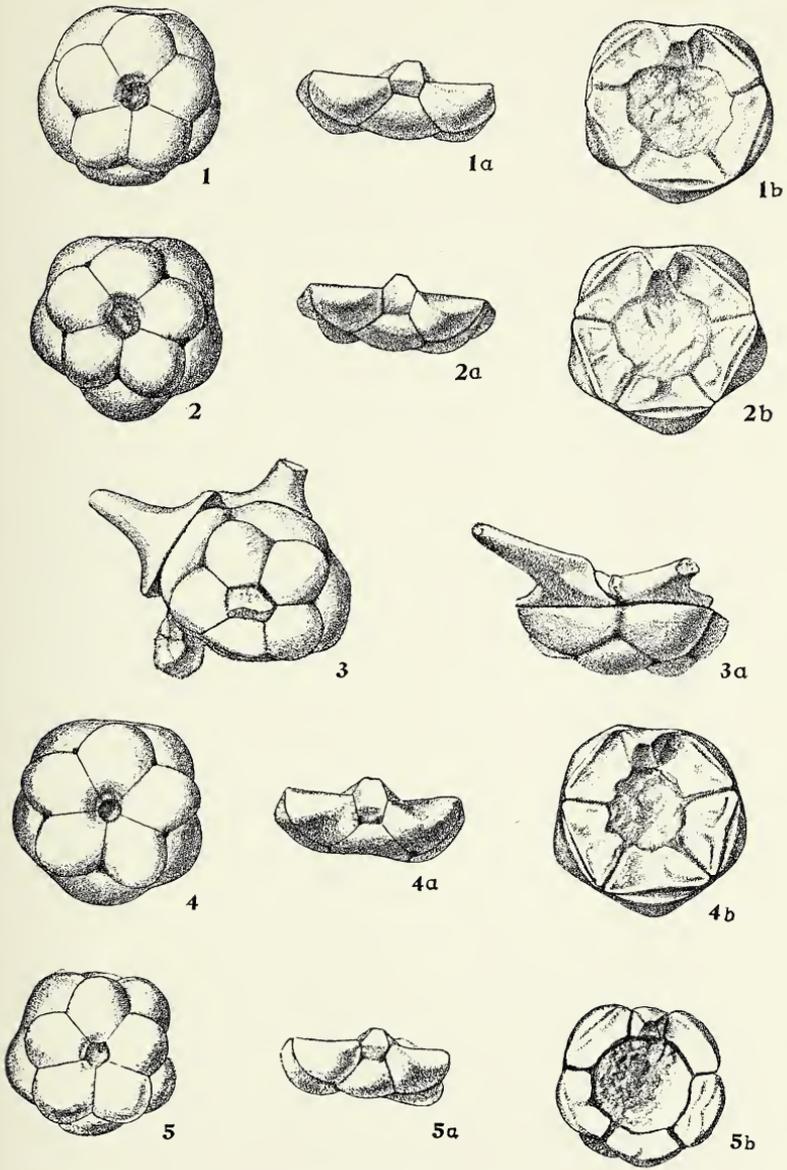
	Type No.	Paratype No.	Paratype No.	Paratype No.	Paratype No.
	4947	4948	4946	4945	4949
Entire height of dorsal cup.	4.9 mm.	3.7 mm.	5 mm.	4.5 mm.	4.8 mm.
Greatest diameter of dorsal cup.	12.4 mm.	11.8 mm.	12.8 mm.	11.6 mm.	14 mm.
Diameter of dorsal cup at summit of radials.	10.8 mm.	10 mm.	12 mm.	10.8 mm.	12 mm. (app.)

EXPLANATION OF PLATE III.

All figures X2.

DELOCRINUS ALLEGHENIENSIS Burke, sp. nov.

- FIGS. 1, 1a, 1b. Dorsal, lateral and ventral views of a paratype, a worn dorsal cup C. M. No. 4945. Ames limestone, Conemaugh formation, Painter Hollow, near Wellsburg, West Virginia.
- FIGS. 2, 2a, 2b. Dorsal, lateral and ventral views of the type, a well-preserved dorsal cup C. M. No. 4947. Ames limestone, Conemaugh formation, Painter Hollow, near Wellsburg, West Virginia.
- FIGS. 3, 3a. Dorsal and lateral views of a dorsal cup with two primaxils nearly in place. Two other primaxils are contained in the matrix on the ventral side. The special anal plate is missing and the right posterior radial, together with the right anterior radial is badly worn. Paratype C. M. No. 4949. Ames limestone, Conemaugh formation, Brilliant Cut-off, Pittsburgh, Pennsylvania.
- FIGS. 4, 4a, 4b. Dorsal, lateral and ventral views of a paratype, a slightly worn dorsal cup C. M. No. 4946. Ames limestone, Conemaugh formation, Painter Hollow, near Wellsburg, West Virginia.
- FIGS. 5, 5a, 5b. Dorsal, lateral and ventral views of a paratype, a dorsal cup, the ventral side showing wear. C. M. No. 4948. Ames limestone, Conemaugh formation, Schenley Park, Pittsburgh, Pennsylvania.



Delocrinus allegheniensis Burke.

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Publications of the Carnegie Museum

Serial No. 157

ANNALS

OF THE

CARNEGIE MUSEUM



VOL. XXI, No. 3.

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ANNALS
OF THE
CARNEGIE MUSEUM

VOLUME XXI, NO. 3

EDITORIAL NOTES.

Mr. Howard Heinz has kindly loaned to the Museum a volume containing autographs and portraits of the five women who have reigned as queens in England: Mary I (1553-1558) daughter of Henry VIII by Catherine of Aragon, born 1516; Elizabeth (1558-1603) daughter of Henry VIII by Anne Boleyn, born 1533; Mary II (1689-1694) daughter of James II, born 1662; Anne (1702-1714) second daughter of James II, born 1665; Victoria (1837-1901) daughter of Edward, Duke of Kent, the fourth son of George III, born 1819.

The volume contains a large miniature of Queen Victoria seated in state, which is inserted on the inside of the cover in a gold frame, adorned by opals and mother-of-pearl. The volume also contains five miniatures on ivory of the Queens mounted in smaller settings. The book is artistically and sumptuously bound in French Morocco. Displayed in one of the cases in the H. J. Heinz gallery, it has attracted the attention and admiration of multitudes.

Two groups which have been recently finished and placed on exhibition in the Carnegie Museum have excited much admiration. One of these is what is known as the "Alligator Group," located in the Gallery of Reptiles. The material for this group was collected by Mr. Harold J. Clement and Mr. Charles T. Agostini of the staff of the Museum, who went to Florida to obtain the specimens and the accessories which are united in the group, which was fabricated by Mr. Clement and Mr. Ottmar F. von Fuehrer, the latter having painted the background. The locality selected is at the southern extremity of the Everglades.

The collectors of the material were granted laboratory facilities by the University of Miami, to whom grateful acknowledgment should be made, as well as to Mr. Albert Pflueger, who kindly assisted them.

The other group, made by Mr. and Mrs. von Fuehrer, representing a scene in subtropical Florida shows the luxuriant tropical vegetation of that part of the world. It has just been opened to exhibition in the northeastern corner of the Gallery of Plants. It is one of four groups. The first illustrates the spring flora of Pennsylvania. It was executed some years ago and is most admirable. The second group shows the desert regions of Arizona and conveys in incomparable beauty of execution an idea of the vegetation of these arid lands. The fourth group, which is rapidly being brought forward, displays the alpine vegetation of the mountains of the northwestern parts of the United States, the scene being located above Paradise Valley on Mt. Rainier, the glaciers of which form the background.

Mrs. Josiah Cohen, whose husband was one of the first members of the Board of Trustees of the Carnegie Institute appointed by Mr. Carnegie, and who served as a member of the Committee on the Museum from its organization in 1898 to 1900 inclusive, has graciously presented to the Museum an exceedingly handsome piece of Brussels lace bequeathed to her by her sister-in-law Mrs. Aaron Naumberg of New York City. It is a masterpiece, exquisitely illustrating the delicacy of this form of needle-work, and will be treasured not only for its inherent beauty, but as a memorial of the lovely woman who has so generously presented it to us. The writer of these lines recalls the days long ago, when the kind donor of this gift used to seat herself in Mr. Carnegie's cottage at Cresson, and charm him and his friends by her superb renditions upon the pianoforte. When meeting her today, with her youthful face and sprightly bearing, it is impossible to realize the flight of time, during which she and the Editor of the *Annals* have claimed friendship. She and her father, of blessed memory, were among the founders of the Art Society of Pittsburgh, of which the writer, half a century ago was for a time the Secretary.

The Curator of Ornithology, Mr. W. E. Clyde Todd, is devoting the months of June and July to natural history investigations, more particularly of an ornithological character, in Saskatchewan. He is accompanied by Dr. George M. Sutton and Mr. A. C. Lloyd.

The publication of Dr. G. M. Sutton's account of his work on Southampton Island, Hudson Bay, is nearing completion, and will constitute Vol. XII, of the Memoirs of this Museum. The Introductory Part, which deals with the discovery of the Island, its physical features, its human inhabitants, and an extensive bibliography at the end, with five plates, was issued from the press on March 31, 1932.

The Part dealing with the birds of the Island, including pp. 1-267, and Plates XI to XXIV was published on May 31, 1932. The Part covering the Mammals of the Island, illustrated with five plates (VI-X) is going through the press and will appear about the end of June. The Parts dealing with the Fishes, the Invertebrates, and the Plants will quickly follow.

The Carnegie Museum is deeply indebted to Mr. John B. Semple, whose generosity made it possible for Mr. Sutton to spend a year upon Southampton Island. Of course Mr. Sutton, who is an ornithologist, devoted more time to the birds than to other things, but his collection of mammals was large, and his observations upon them were extensive and minutely accurate.

At the time when the first building erected to house the Carnegie Library of Pittsburgh was dedicated, including at that time the somewhat limited space intended to contain the collections of the Museum and the Department of Fine Arts, the placing of displays in the Museum was temporarily undertaken by the Academy of Science and Art of Pittsburgh. Among those members of the Academy who generously loaned material from their private collections was the late Mr. S. H. Stupakoff. Mr. Stupakoff was an enthusiastic amateur conchologist. He was an engineer in the employment of the Westinghouse Electric Company. He devoted his leisure hours to his favorite study, and made a very large collection of shells. Recently his son, Mr. S. H. Stupakoff, Jr., with great generosity has turned over this collection in its entirety to the Carnegie Museum. It includes approximately thirty-two hundred sets of gastropods and pelecypods. This gift almost doubles in size the collection of marine shells in the Museum. The beautiful set of Cones and Cowries are a welcome and valuable addition. The large series of land-shells of Europe, Asia, and America add many species hitherto not represented in the Museum. We are deeply grateful for the generous action of Dr. Stupakoff's son in making this gift.

The Section of Recent Invertebrates received a collection of some 500,000 shells as a gift to the Museum from Mrs. Christina Wright, of Indiana University, Bloomington, Indiana. It contains chiefly representatives of the fauna of the Tippecanoe and Wabash river-systems. The whole consignment, contained in twenty-four cases, was shipped from Indiana to the Museum. It is a valuable accession.

Mrs. Thomas R. Hartley presented to the Museum a collection of Indian antiquities and oriental objects assembled by her late husband. The total number of items is approximately three hundred and forty. The Indian basketry is of particular interest, and has been already placed on display in our galleries. One of the objects contained in this collection, a Japanese carving in wood of a dragon, was represented on page 6 of the April number of *THE CARNEGIE MAGAZINE*.

Dr. A. I. Good has sent us an interesting collection of mammals, insects, shells, etc., from Spanish West Africa. There are sixty skins and fifty-three skulls of mammalia forming a desirable addition to our African material.

Dr. O. E. Jennings, Mr. Remi H. Santens, Dr. Stanley T. Brooks, and Dr. A. Avinoff, the Director, were present at the Annual Meeting of the American Association of Museums, held in Cambridge, Mass., May 12 to 14. In the absence of the Chairman of the Technical Section, Mr. Santens, in his capacity of Vice-chairman, took his place. Dr. Jennings and Dr. Brooks performed their respective duties as Chairman and Secretary of the Scientific Section, to which offices they had been elected during the previous meeting in Pittsburgh. The next meeting will be held in Chicago.

VIII. JURASSIC INSECTS FROM SOLENHOFEN IN THE
CARNEGIE MUSEUM AND THE MUSEUM OF
COMPARATIVE ZOÖLOGY.

BY F. M. CARPENTER.

Museum of Comparative Zoölogy

The lithographic limestone at Solenhofen, Bavaria, and vicinity, has long been famous as a source of Jurassic fossils. Although the reputation of the formation has depended largely upon the discovery of certain remarkable vertebrates, such as *Archæopteryx* and *Rhamphorhynchus*, invertebrates are far commoner. Most of these are marine types, the limestone being marine in its origin; but numerous insects, which undoubtedly fell into the water, have also been preserved. More publications have been devoted to these insects than to any other fossil insect-fauna of equivalent size, chiefly because the commercial working of the limestone has produced an almost continuous output of specimens.

In view of the extensive bibliography of the fossil insects of Solenhofen, one might conclude that all positive information about them has already been published. This would probably be true, were it not for the fact that, exclusive of Handlirsch's extensive compilation on fossil insects (1906-08), and a few papers of a general nature, or brief notes, all the literature was published prior to 1900, before the geological history of the insects as a whole was well enough known to enable a proper appreciation of the species contained in any one stratum. Handlirsch, of course, straightened out most of the taxonomic difficulties encountered by the older investigators, and was able to make the necessary comparisons with other extinct faunas; but he was not able to examine specimens of all the species from Solenhofen, and, with a few exceptions, took his figures without modification from the earlier writings.

Several years ago, while engaged in a rearrangement of the fossil insects in the Museum of Comparative Zoölogy, I was impressed by the large number of specimens from Solenhofen in that collection. Studies on other fossil insects already in progress prevented my immediate examination of these, but last year my attention was called

to another large collection in the Carnegie Museum. This material, although secured many years ago from Baron de Bayet,* the Private Secretary of King Leopold II of Belgium, when he sold his vast collection to Mr. Andrew Carnegie, had not been critically studied until 1930, when Mr. Stephen Herrick, a graduate student in the University of Pittsburgh, undertook its arrangement and description. Mr. Herrick, however, did not proceed far, and did not prepare any account for publication. Accordingly the entire collection was sent to me for detailed description. This is particularly desirable, not only because the Bayet Collection contains new material, but because the percentage of excellent specimens in it is unusually high. The present paper is essentially an annotated list of the specimens in the collection of the Carnegie Museum. I have, however, considered it opportune to mention and occasionally describe some of the important fossils in the Museum of Comparative Zoölogy. About half of the Harvard collection was secured from Krantz as far back as 1860, and was studied by Hagen; but many of the specimens have not been properly described.¹ The other half of the collection was purchased from Haberlein about 1883; it has not been studied, or at least published upon, except very briefly.² For the benefit of those who desire further discussion of the fossils of Solenhofen, I have included under each species the reference to the original description and to the important subsequent redescriptions; a more complete series of references will be found in Handlirsch (1906-08). In the bibliography I have listed the most useful papers on the fauna. The synonymy of these fossils is very confusing and uncertain. In the main I have followed Handlirsch, but I believe that he recognizes many more species than are actually valid. This is chiefly due to the inadequacy of the figures and descriptions published during the Eighteenth and early

*The Editor, who acted as the agent of Mr. Andrew Carnegie in the purchase of the Collection of Baron de Bayet, and spent many weeks in Brussels in 1908 packing it for shipment to Pittsburgh, recalls that the Baron informed him that the specimens from Solenhofen had been acquired at the quarries from the superintendents to whom the Baron had made an offer to recompense them for all fossils found by them in good condition as they proceeded with their work. This offer continued for a couple of years and it was thus that Baron de Bayet succeeded in amassing among other things the fine collection of insects from Solenhofen. W. J. H.

¹One of these I have already described in *Psyche*, Vol. XXXVI; No. 3, pp. 190-194, 1929.

²See Tillyard, 1921, 1927; Needham, 1903, 1907.

Nineteenth Centuries. The authors of these accounts often made a new species for every specimen preserved in a different position.

It is surprising, that, although the shales of Solenhofen were used for building purposes in the time of the Roman Empire, no recognizable accounts of fossils were published, so far as I am aware, until 1705, when Rumphius described a fish from the formation. Knorr (1755) was the first to mention the presence of insects; in 1782 Schmidel figured a dragon-fly from the limestone; two years later Schröter published a description of a supposed Sphingid, which is now known to be a Siricoid wasp. During the first third of the Nineteenth Century a few isolated accounts were published, mostly on Dragonflies (Kœhler, Parkinson, Van der Linden); but after the discovery of lithography in 1834,³ large collections of the fossils were secured, which were first studied by Germar (1837, 1839, 1842), later by Hagen (1862, 1866, et seq.), and Weyenbergh (1869, 1873, et seq.). Deichmüller (1886) published a very complete account of the lithographic insects in the Dresden Museum; and Handlirsch made a comprehensive compilation and classification of the species (1906).

In the Carnegie Museum there are one hundred and forty-six specimens sufficiently well preserved at least to permit generic classification. In the Museum of Comparative Zoölogy there are two hundred and eighty-six such specimens. In the accompanying table I have listed the percentages of specimens falling into each order. The figures in the first column are based upon the four hundred and thirty-two specimens, which I have examined in these two collections; those in the second column are the percentages which Deichmüller found in his collection of two hundred and seventy-two specimens; and in the last column are the averages of these, based upon the seven hundred and four specimens in all three collections. This last computation probably represents a fairly accurate picture of the relative abundance of the several orders. From this it is apparent that the *Odonata* are far in the lead, followed by the *Hymenoptera*, *Coleoptera*, *Blattaria*, *Hemiptera*, *Orthoptera*, *Phasmodea*, *Plectoptera*, *Neuroptera*, and finally the *Trichoptera*. These figures do not, however, represent the composition of the insect-fauna, which existed in the region of Solenhofen during the Upper Jurassic; for the limestone is of such a nature that only the larger insects were capable of being preserved,

³See Crook, A. R., "The Lithographic Stone Quarries of Bavaria, Germany," Stone, Oct., 1894.

the smaller ones having been decomposed, or devoured by fishes before fossilization took place.

Table I. Approximate percentages of specimens from Solenhofen in each order of insects.

	Carpenter (432 specimens)	Deichmüller (272 specimens)	Average (704 specimens)
Plectoptera.....	4. pr. ct.	.3 pr. ct.	2.1 pr. ct.
Odonata.....	33. pr. ct.	34. pr. ct.	34. pr. ct.
Blattaria.....	6. pr. ct.	11. pr. ct.	9. pr. ct.
Orthoptera.....	9. pr. ct.	5. pr. ct.	7. pr. ct.
Phasmodea.....	8. pr. ct.	5. pr. ct.	7. pr. ct.
Hemiptera.....	10. pr. ct.	6. pr. ct.	8. pr. ct.
Neuroptera.....	2. pr. ct.	1. pr. ct.	1.5 pr. ct.
Trichoptera.....	.2 pr. ct.	.... pr. ct.	.1 pr. ct.
Coleoptera.....	13. pr. ct.	12. pr. ct.	13. pr. ct.
Hymenoptera.....	12. pr. ct.	24. pr. ct.	18. pr. ct.

Order PLECOPTERA.

The May-flies of Solenhofen, although few in number, are particularly interesting, since they are the first representatives of members of the order in rocks above the Permian. Aside from a few fragments from the Lower Cretaceous of Mongolia (Cockerell, 1924, 1927) they are the only Ephemerids known in the whole Mesozoic. However, because of the delicacy of the wings and their tendency to fold together in such a way that the venation is badly confused, good specimens of these fossils are extremely rare. Thirteen species of May-flies from Solenhofen have been described, but many of these are undoubtedly synonymous. Handlirsch has separated most of these species into two genera, *Mesephemera* and *Paedephemera*, the former including species with nearly homonomous wings, and the latter species with the hind wings more reduced in size, about two-thirds the length of the fore wings. Although the general shape of the wings is known in *Mesephemera*, the details of the venation have not been determined. But in *Paedephemera* the venation is known in two species, *multinervosa* Oppenheim, and *schwertschlagerei* Handlirsch. The latter, which was based upon a fine specimen, is in all probability synonymous with one of the other species of the genus, but in view of the obscurity of these other species, I believe we should retain a separate name for Handlirsch's specimen. The single remaining genus,

Hexagenites Scudder is probably synonymous with *Mesephemera*, but because the hind wing is unknown and for another reason given below, I believe Scudder's genus should be regarded as valid.

Inasmuch as the existing Ephemerids have now been divided into recent families, I propose the name *Mesephemeridæ* for these forms from Solenhofen. At present, because of our lack of knowledge of their tarsal and other body-structures, I do not believe we can assign them to existing families or even superfamilies.

Family MESEPEMERIDÆ.

Genus MESEPEMERA Handlirsch.

1. *Mesephemera procera* (Hagen).

Ephemera procera Hagen, 1862, Palæontogr., X, 116; pl. 15, f. 2.
Mesephemera procera Handlirsch, 1906, Foss. Ins.: 600.

I consider *speciosa* Oppenheim (1888) and *weyenberghi* Handlirsch (1906) as synonyms of this species. *Lithophila* Germar (1842) is probably the same insect also, although it was considered by its author to be a Lepidopteron; but Germar's figure and descriptions do not serve as sufficient identification of the species. In the Bayet Collection in the Carnegie Museum there are five specimens of *M. procera*; Nos. 3835, 3836-3837,* 3838-3839, 5083-5084, 5085-5086. In the Museum of Comparative Zoölogy there are four specimens, of which one (No. 6280a, b) is marked "type" by Krantz. In none of these is the venation distinct, and I can add nothing to Hagen's description.

2. *Mesephemera cellulosa* (Hagen).

Ephemera cellulosa Hagen, 1862, Palæontogr., X, 115; pl. 15, f. 3.
Mesephemera cellulosa Handlirsch, 1906, Foss. Ins.: 601.

In the Bayet Collection (Carn. Mus.) there are two specimens: Nos. 3840 and 5087. In the Museum of Comparative Zoölogy there are four specimens, one (No. 6281a, b) being the type figured by Hagen.

*In this paper all the figures connected with a dash indicate the reverse of the first numbered specimens.

Genus PAEDEPHEMERA Handlirsch.

3. *Paedephemera mortua* (Hagen).

Ephemera mortua Hagen, 1862, Palæontogr., X, 117; pl. 15, f. 5.

Paedephemera mortua Handlirsch, 1906, Foss. Ins.: 602.

I consider Handlirsch's *oppenheimi* a synonym of this species. There are no representatives in the Bayet Collection of the Carnegie Museum, but in the Museum of Comparative Zoölogy, there is the type figured by Hagen (No. 6283).

Genus HEXAGENITES Scudder.

4. *Hexagenites weyenberghi* Scudder. (Fig. 1)

Ephemerida, Eaton, 1871, Trans. Ent. Soc. Lond., p. 158; pl. 1, f. 10.

Hexagenites weyenberghi Scudder, 1880, Anniv. Mem. Bost. Soc. Nat. Hist., 6.

Length of fore wing, 15 mm.

Scudder's description of this fossil was based entirely upon Eaton's published figure of a specimen in the British Museum. In the Museum of Comparative Zoölogy I find a very fine specimen of a May-fly, to which is attached the following note, in Hagen's characteristic writing: "*Ephemera cellulosa* Hagen, front wings and outline of body and setæ." On the reverse side of this label, written in a hand unfamiliar to me, is the following: "The counterpart was described by Scudder as *Palin. Weyenberghi*." Although this note is incorrect in its reference to the genus in which Scudder placed the species, there can be no doubt that this fossil (No. 6277) in the Museum of Comparative Zoölogy is the reverse of the specimen examined by Eaton in the British Museum. A comparison of the venation of our

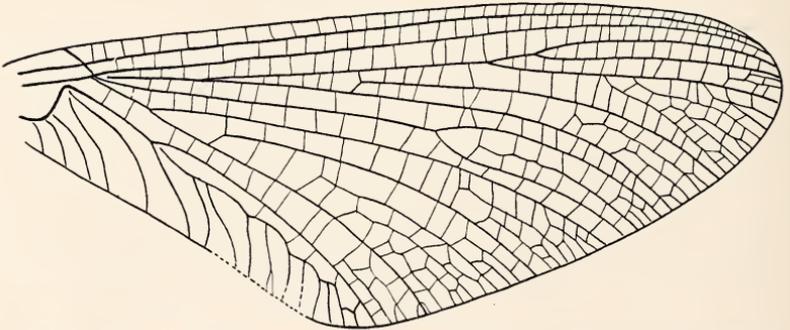


FIG. 1. *Hexagenites weyenberghi* Scudder, fore wing. Type (No. 6277), Mus. Comp. Zoöl. Magnified.

fossil and the figure given by Eaton shows that not only do all the cross-veins and cells correspond, but also the various breaks and imperfections in the wing occur in the same places, although our half of the fossil has been chipped out of the matrix, so that the whole wing is exposed. The specimen before me is therefore the counterpart of the type of Scudder's *weyenberghi*. Hagen's determination of this species as *cellulosa* perhaps indicates that *weyenberghi* is synonymous with *cellulosa*; but in view of the fact that *cellulosa* is a very obscure species, and is closely involved with the synonymy of the several species of *Mesephemera*, I believe that *weyenberghi* should be regarded as a separate species of a distinct genus. Figure 1, showing the fore wing of this May-fly, is based on the specimen in the Museum of Comparative Zoölogy. The entire wing is preserved with remarkable clearness. This is the only known complete wing of a Mesozoic May-fly. The figure shows more clearly than can be depicted in words the characteristics of the wing, but I wish to call attention to the similarity of this wing to that of recent May-flies, even to the formation of the third auxiliary vein at the base of the wing (3 *Ax*). The triad forking of *CuA* and the peculiar branching of *ICuA* are very distinctive features. As Scudder pointed out, the nearest approach to this *CuA* is found in the recent genus *Hexagenia*.

Order ODONATA.

As previously noted, the *Odonata* are the commonest insects in the shales of Solenhofen and they are usually well preserved. This fact, together with the importance of venational features in classifying the members of the order, has made the species of Solenhofen particularly valuable in studies of the evolution of the order. Unlike the May-flies, the dragon-flies are well represented in the Mesozoic strata. The Triassic of Australia, Liassic of England and Germany, and the Upper Jurassic of Turkestan have contributed many fossils of this order. The beds of Solenhofen, however, are the oldest rocks to yield fossils of the *Anisoptera*, which is now the predominant suborder. The *Zygoptera* are known as far back as the Upper Permian; and the *Anisozygoptera* from the Triassic to the Upper Jurassic and perhaps the Tertiary.⁴

⁴Some students of the *Odonata* consider that the recent Japanese *Epiophlebia* is a member of the *Anisozygoptera*. For an account of this subject, see my discussion in the American Journal of Science, (Ser. 5), Vol. XXXI, p. 97-139, 1931.

Probably the best and most reliable original work on the *Odonata* of Solenhofen has been done by Hagen, who accumulated a large personal collection of the Jurassic dragon-flies, many of which were subsequently given to the Museum of Comparative Zoölogy. Deichmüller described some additional species and contributed a great deal to our knowledge of the venation of Hagen's species; Handlirsch, of course, has given a more modern classification of them. Although about fifty species of *Odonata* have been described from the shales of Solenhofen; more than half of them are synonyms.

SUBORDER *ANISOZYOPTERA*.

This suborder was established by Handlirsch to include a series of forms ancestral to the true *Anisoptera*. As more and more fossil *Odonata* are found, it is becoming increasingly difficult to draw the boundary between these two suborders. Tillyard has pointed out that Handlirsch included two distinct types of families in the *Anisozygoptera*: one in which the discoidal cell of the hind wing is radically different from that of the fore wing (more specialized); and another, in which the discoidal cell of the fore wing has finally attained the degree of specialization reached by that of the hind wing. He has suggested that the former series be included in the *Anisozygoptera*, and the latter in the *Anisoptera*. This view I was also led to accept from my review of the Permian species (1931). According to this use of the subordinal name, the family *Stenophlebiidæ* from Solenhofen becomes a member of the *Anisoptera*, instead of the *Anisozygoptera*, where it was placed by Handlirsch.

Family TARSOPHLEBIIDÆ.

Genus TARSOPHLEBIA Hagen.

5. *Tarsophlebia eximia* (Hagen). (Fig. 2)

Heterophlebia eximia Hagen, 1862, Palæontogr., X, 106.

Tarsophlebia eximia Hagen, 1866, Palæontogr., XV, 65; pl. I, f. 1-6, 11.

Length of fore wing, 30-36 mm.

This is not a common species in the limestone and was undoubtedly a delicate species, for the specimens are not nearly so well preserved as the other *Odonata*. It is one of the most interesting of all the species in the formation, however, because of the simple structure of the discoidal cell, which is open (or really absent) in at least the fore wing. The hind wing was figured by Hagen as having a similar structure,

and that view has been generally accepted; but in no specimen which I have seen, including Hagen's types, are the hind wings sufficiently well preserved to convince me that this was actually the case. The venation has been figured by Hagen and his drawing has been reproduced in several of Handlirsch's works; but I have included a new figure of the basal part of the wing, showing the peculiar structure of the arculus, which distinguishes *Tarsophlebia* at once from the other genera of Solenhofen. The oblique vein joining the media with *CuP* at the base is obviously a cross-vein or a derivative of a cross-vein, for it is much thinner and weaker than the stem of *MA* or *Rs*.

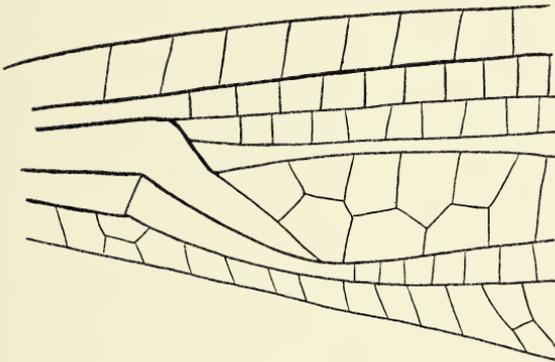


FIG. 2. *Tarsophlebia eximia* (Hagen), base of fore wing. Type (No. 6223), Mus. Comp. Zoöl. Greatly magnified.

In the Bayet Collection of the Carnegie Museum there are four specimens of *eximia*, Nos. 3807, 3808, 5089, 5090, and No. 3828 from the collection received from the Paleontological Museum of Bavaria, Munich, of which the last is very good, although unusually small. In the Museum of Comparative Zoölogy there are twenty-one specimens, Nos. 6216-6227 being a part of the type-series of Hagen.

Family ISOPHLEBIIDÆ.

Genus ISOPHLEBIA Hagen.

6. *Isophlebia aspasia* Hagen.

Isophlebia aspasia Hagen, 1866, Palæontogr., XV, 70; pl. 2, f. 12; pl. 4, f. 13. Deichmüller, 1866, Mitt. Königl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 56; pl. 4, f. 4-6.

Length of fore wing, 95-100 mm.

This is the largest of the dragon-flies of Solenhofen. It is distinguished from the other genera by the quadrilateral shape of the

discoidal cell in the fore wing; I believe that in the hind wing this cell is divided by an oblique cross-vein, forming a triangle; but unfortunately in all of the specimens which I have examined the wings overlap in such a way that one cannot be sure of the presence of the cross-vein. In the Bayet Collection of the Carnegie Museum, there are six specimens of *aspasia*, Nos. 3811, 3812, 3813-3814, 5091, 5092, 5093. In the Museum of Comparative Zoölogy there are twelve specimens, of which Nos. 6186-6189 are Hagen's types.

SUBORDER *ANISOPTERA*.

Family *STENOPHLEBIIDÆ*.

Genus *STENOPHLEBIA* Hagen.

7. *Stenophlebia latreillei* (Germar). (Fig. 3)

Agrion latreillei Germar, 1839, Verh. L. Car. Ak., XIX, 218; pl. 23, f. 16.

Stenophlebia æqualis Hagen, 1866, Palæontogr., XV, 86; pl. 1, f. 24.

Stenophlebia latreillei Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus., Dresd., VII, 44; pl. 4, f. 13.

Length of fore wing, 50-60 mm.

This slender-winged dragon-fly is characterized by a simple type of discoidal cell, which is similar in structure in both pairs of wings. Hagen and Deichmüller have given good figures, but I include a more detailed drawing of the base of the wing. The arculus is very clearly shown in one specimen (Carnegie No. 3996). The media is more detached from R at the base than it is in any of the *Odonata*, which I

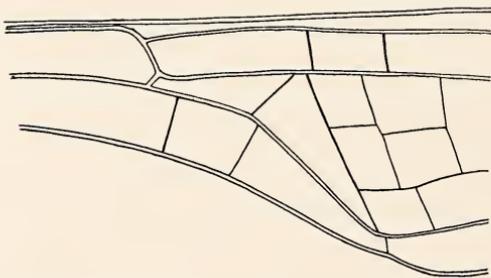


FIG. 3. *Stenophlebia latreillei* (Germar), diagram of main veins at base of fore wing. No. 3796, Carn. Mus.

have seen, and its course at the arculus is very clear. The vein dividing the discoidal cell is much weaker than the longitudinal veins and has the appearance of a cross-vein. In the Bayet Collection of the

Carnegie Museum there are ten specimens of this species (Nos. 3796, 3997, 5094, 5095, 5096-5097, 5098-5099, 5100, 5101-5102 and 3798. No. 3798 from the collection of the Paleontological Museum of Bavaria in Munich). In the Museum of Comparative Zoölogy there are sixteen specimens, of which Nos. 6205, 6210, 6211, 6212, 6213, 6214, 6215 are types of Hagen's synonymous species, *æqualis*, *lithophila*, and *phryne*.

8. *Stenophlebia amphitrite* (Hagen).

Heterophlebia amphitrite Hagen, 1862, Palæontogr., X, 105.

Stenophlebia amphitrite Hagen, 1886, Palæontogr., XV, 83; pl. 3, f. 1.

Length of fore wing, 80 mm.

This species is similar to *latreillei*, but is larger, and has narrower wings with a broader discoidal cell. It is a rare species, and only two specimens are in the Museum of Comparative Zoölogy.

Family ÆSCHNIDÆ.

SUBFAMILY ÆSCHNIDINÆ.⁵

This subfamily includes the most highly specialized of the Jurassic *Odonata* and is related to several recent groups of the family. It was originally established by Handlirsch to include *Æschnidium* Westwood and *Urogomphus* Handlirsch. The former genus was based on fragments of a species (*bubas* Westwood) from the Jurassic of England, but Handlirsch also placed here a second species from the English Jurassic (*antiquum* Brodie), one finely preserved species from the lithographic limestone (*densum* Hagen), and one species from the Cretaceous of Australia (*flindersiensis* Woodward). The latter was placed by Tillyard (1917) in a separate genus *Æschnidiopsis*. In *Urogomphus* Handlirsch placed three species from the lithographic limestone (*giganteus* Hagen, *eximius* Hagen, and *abscissus* Hagen), none of which were represented by species showing details of structure. Now in the Bayet Collection there is a very fine specimen of *giganteus*, showing the minute structure of both pairs of wings. The wings of this fossil turn out to be very close to those of *Æschnidium densum*

⁵As Tillyard has pointed out, if we use the long-established classification of the *Anisoptera*, dividing them into two families, *Æschnidæ* and *Libellulidæ*, then Handlirsch's *Æschnididæ* deserve only subfamily rank. This is the arrangement I have used here.

Hagen, also from the limestone of Solenhofen; in fact these species are so close, that it is obvious they belong to the same genus. However, instead of placing these three species of *Urogomphus* in *Æschnidium* (thus synonymizing *Urogomphus* with *Æschnidium*), I believe it is more satisfactory to transfer the species *densum* from *Æschnidium* to *Urogomphus*. By so doing we include the species from England (*bubas* and *antiquum*) in *Æschnidium*, and all the species from Solenhofen in *Urogomphus*; and there can be no question that these species from Solenhofen are more closely related to each other, than to the English forms. According to this arrangement the subfamily *Æschnidinæ* includes the following:

- Æschnidium* Westwood (1854). Jurassic of England.
bubas Westwood, *genotype*.
antiquum Brodie.
- Æschnidiopsis* Tillyard (1917). Cretaceous of Australia.
flindersiensis (Woodward), *genotype*.
- Urogomphus* Handlirsch (1906). Jurassic of Bavaria.
giganteus (Germar), *genotype*.
eximius (Hagen).
abscissius (Hagen).
densus (Hagen).

9. *Urogomphus giganteus* (Germar). (Fig. 4)

Æschna gigantea Germar, 1839, Nova Acta, XIX, 216; pl. 22, fig. 14.

Estemoa gigantea Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 35; pl. 3, f. 1-3.

Urogomphus giganteus Handlirsch, 1906, Foss. Ins., 594; pl. 47, f. 18.

Length of fore wing, 90-95 mm.

This rare species has previously been known only from very poor specimens. The only original figure is that of Deichmüller, who was able to determine only the general characteristics of the main longitudinal veins in the apical half of the wing. In the Carnegie Museum there is an excellent specimen of this species, showing all details of the venation, including the cellules, except at the very apex of the fore wing. This fossil provides us with the first complete picture not only of *giganteus*, but of *Urogomphus* as a whole, since none of the species of the genus have been represented by good specimens. The fore wing is narrow basally and pointed apically; the posterior margin

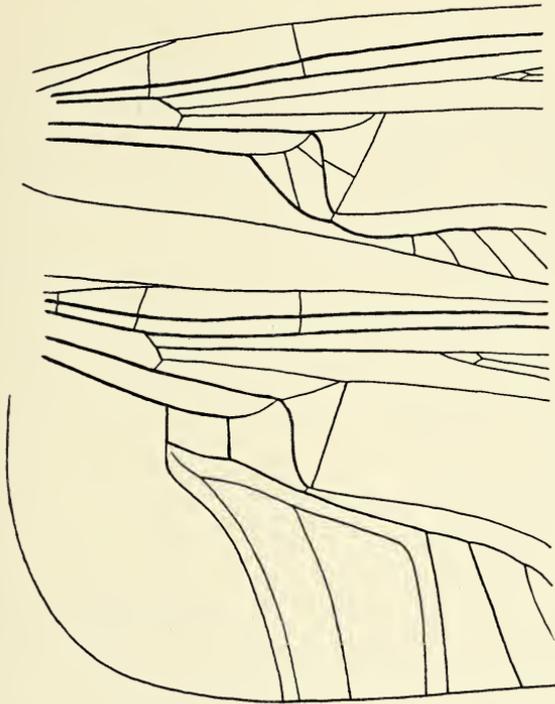


FIG. 4. *Urogomphus giganteus* (Germar), bases of fore and hind wings; specimen No. 3829-3830, Carnegie Museum. The fine network of cross-veins resembling that of *densus* is omitted from the figure. Magnified.

possesses two indentations, one at the termination of R_3 and the other at the end of R_4 ; nodus at about midwing; both $1R_2$ and R_3 , R_4 and M converging at the margin; the two original antenodals very distinct; supratriangle very long and narrow; triangle large. The hind wing is very broad basally; there is a third prominent antenodal at the very base of the wing. The surface of both wings, including the costal space, is covered with a fine network of cells.

This species is close to *densus* Hagen, but is nearly twice as large and has much narrower wings. In the Carnegie collection there are two specimens of this species: No. 3829-3830 described above; and No. 3831, a complete, but poorer specimen. In the Museum of Comparative Zoölogy there is one specimen, showing the base of the two right wings and the whole of the left wings.

SUBFAMILY CYMATOPHLEBINÆ.

Genus CYMATOPHLEBIA Deichmüller.

10. *Cymatophlebia longialata* (Germar). (Fig. 5)

Libellula longialata Germar, 1839, Nova Acta, XIX, 216; pl. 23, f. 15.

Cymatophlebia longialata Deichmüller, 1886, Mitt. Königl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 49; pl. 3, f. 5-8.

Length of fore wing, 70 mm.

This is a common dragon-fly, the genus being distinguished by the upward bend in R₃ just below the pterostigma. The venation of *longialata* has been figured by Hagen and Deichmüller, but in neither case are the wings complete or detailed.⁶ I have therefore included

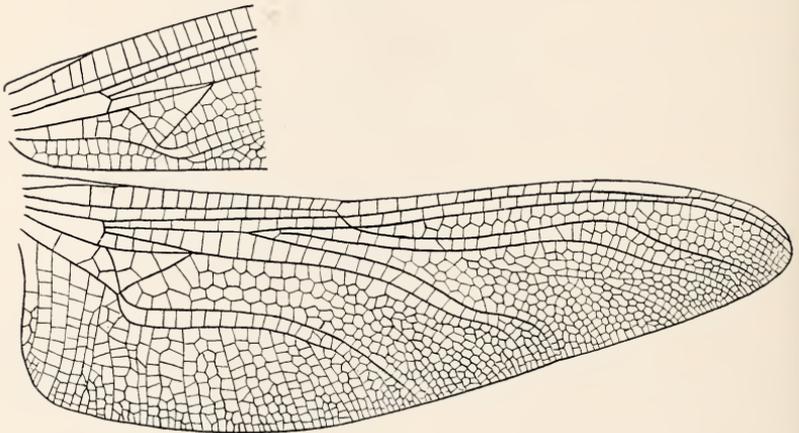


FIG. 5. *Cymatophlebia longialata* (Germar), hind wing and base of fore wing; drawn from specimens Nos. 3823-3824, Carn. Mus. Magnified.

a drawing of the hind wing and the base of the fore wing. In general structure of the wing and especially in the undulation of R₃ *Cymatophlebia* is close to the *Æschninæ*; but the anal loop, characteristic

⁶Needham (1907) has figured this species in the Bulletin of the American Museum of Natural History (figure 2), based upon a specimen in the Museum of Comparative Zoölogy which he supposed to be Germar's *Æschna munsteri*. Needham established a new genus (*Morbæschna*) for this fossil, but it is of course synonymous with *Cymatophlebia*, since the specimen was really *longialata*. In the same paper he has also given a figure of what he supposed to be *longialata*, also based on a specimen in the Museum of Comparative Zoölogy; but his figure is really of a new species, described below (*jurassica*), as shown by the hind wing.

of this recent subfamily, is entirely absent. For that reason, a separate subfamily for *Cymatophlebia* is justified.

In the Carnegie Museum there are specimens of *longialata* belonging to the Bayet Collection, Nos. 3823, 3824-5103, 3825-3826, 5104, 5105, 5106, 5107, 5108, and No. 3827 received from the collection of the Paleontological Museum of Bavaria in Munich. Nos. 3823 and 3824 are excellent specimens, showing fore wings in detail. In the Museum of Comparative Zoölogy there are fourteen specimens, of which Nos. 6295 and 6248 are excellent.

11. *Cymatophlebia jurassica*, sp. nov. (Fig. 6)

Length of fore wing, 43 mm.; width 10 mm.; length of hind wing, 42 mm.; width, 14 mm.

In addition to its smaller size this species is distinguished from *longialata* by the following features: (1) the fore wing is broader in the distal half of the wing; (2) the hind wing is relatively broader throughout, and the inner margin is distinctly more rounded; and (3) in both wings and especially in the fore, the undulations of R₃ are more pronounced.

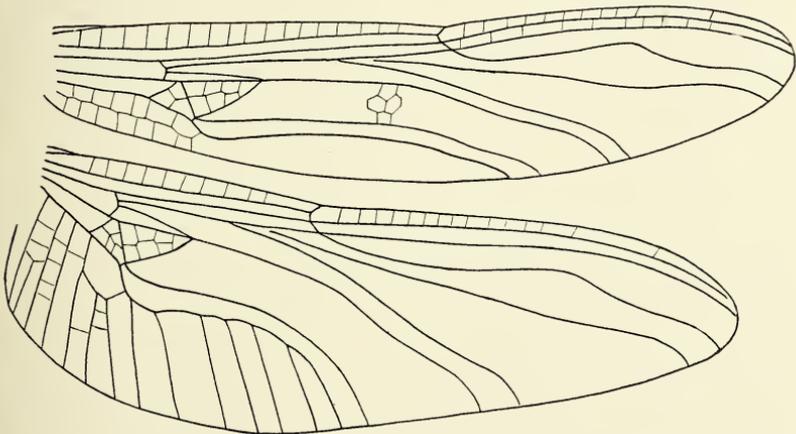


FIG. 6. *Cymatophlebia jurassica*, sp. nov., based on the holotype (No. 3819, Carn. Mus.) and the paratype (No. 6193, Mus. Comp. Zoöl.) Magnified.

Holotype: No. 3815, Carnegie Museum (Secured by Baron de Bayet) from the collection of Mrs. Gordon Thomson. This specimen

is faintly preserved, but under good illumination all the structures indicated in figure 6 are visible; the fossil shows all four wings outspread. Paratype: No. 6193 and reverse (6275) in the Museum of Comparative Zoölogy. This fossil does not show quite so much detail as the holotype, but includes all the structures essential for determination.

This is almost certainly the species represented in Needham's figure of *longialata*, based upon a specimen in the Museum of Comparative Zoölogy, although I am unable to locate in the collection the specimen which he has illustrated.

SUBFAMILY PROTOLINDENIINÆ.

Genus PROTOLINDENIA Deichmüller.

Protolindenia Deichmüller, 1886, Mitt. Kœnigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 37.

Mesuropetala Handlirsch, 1906, Foss. Ins.: 588.

The genus *Protolindenia* was established by Deichmüller for the single species *wittei*, but new specimens of *koehleri* Hagen, the type of Handlirsch's genus *Mesuropetala*, show that this species is exceedingly close to *wittei* and should be included in the same genus. *Protolindenia* is distinguished from *Cymatophlebia* by the absence of the undulation in R₃, mentioned above; in *Protolindenia* R₃ and 1R₂ are parallel in the region of the pterostigma.

12. *Protolindenia wittei* (Giebel).

Æschna wittei Giebel, 1860, Zitsch. Ges. Nat., XVI, 127; pl. 1, f. 1.

Protolindenia wittei Deichmüller, 1886, Mitt. Kœnigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 37; pl. 4, ff. 1, 2, 9, 10.

Length of fore wing, 40-50 mm.

This common species has been figured in detail by Deichmüller and needs no further description. The triangle of the fore wing has the top side the same length as the apical side. In the Carnegie Museum there are three specimens, Nos. 3818, 5109-5110, and 3820, the latter being the most perfectly preserved of all the Solenhofen *Odonata* which I have seen. In the Museum of Comparative Zoölogy there are twenty-one specimens.

13. *Protolindenia kœhleri* (Hagen). (Fig. 7)

Gomphus (?) *kœhleri* Hagen, 1848, Stett. Ent. Zeit., IX, 8.

Uropetala kœhleri Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 52; pl. 4, ff. 3, 11, 12.

Mesuropetala kœhleri Handlirsch, 1908, Foss. Ins. p. 588; pl. 47, f. 9.

Length of fore wing, 45-50 mm.

This species is distinguished from the previous one by having the apical side of the triangle of the fore wing much shorter than the top side. Since no complete figure of *kœhleri* has been published, I include one based on specimens No. 6194 and 1998 in the Museum of Comparative Zoölogy. There are no specimens of this species in the

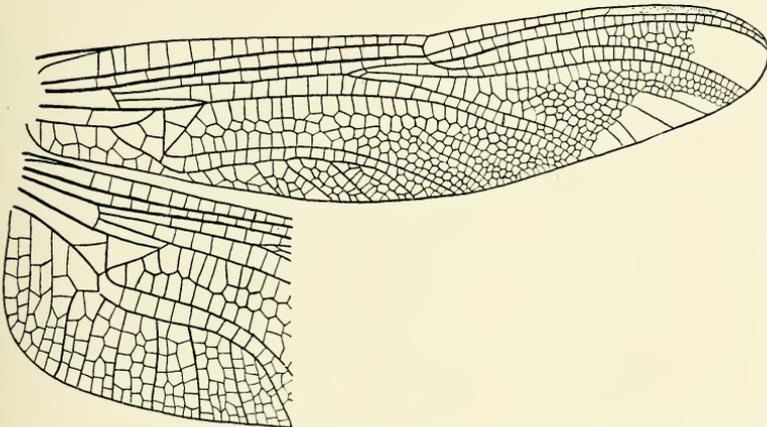


FIG. 7. *Protolindenia kœhleri* (Hagen), fore wing and base of hind wing (Specimens Nos. 6194, 1998, Mus. Comp. Zoöl.) Magnified.

Carnegie Museum. *Münsteri* (Germar), which has been doubtfully referred to *Mesuropetala*, was described only by a very crude figure showing the outlines of the wings. Specimens in Hagen's collection labelled *Æschna münsteri* are a mixture of *Cymatophlebia wittei*, and *kœhleri*. The specimen, which Needham figured as *münsteri*, and for which he established the new genus *Morbæschna* is really a *Cymatophlebia (longialata)* as shown by the contour of R3. *Schmideli* (Giebel), which was figured but not described by Schmidel in 1782, is also unrecognizable. I believe that both these species, *münsteri* and *schmideli*, should be dropped from the literature as unrecognizable insects.

SUBFAMILY CORDULEGASTERINÆ Calvert.

Genus ÆSCHNOGOMPHUS Handlirsch.

14. *Æschnogomphus intermedius* (Hagen). (Fig. 8)

Anax intermedius Hagen, 1848, Stett. Ent. Zeit., IX, 10.

Cordulegaster intermedius Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 45; pl. i, f. 7.

Length of fore wing, 90-95 mm.

This large species is a rare one and has only been figured by Deichmüller, who was able to represent only the main longitudinal veins. Among the specimens at my disposal there are some very fine representatives of this insect, from which I have drawn a figure of the base of the hind wing. These specimens show that the wings did not pos-

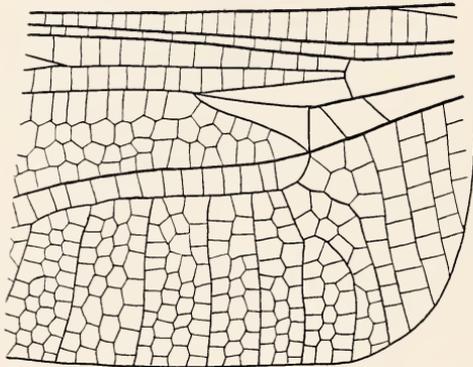


FIG. 8. *Æschnogomphus intermedius* (Hagen), base of hind wing. Drawn from specimens No. 3822 Carn. Mus. and 1997, Mus. Comp. Zool.

sess the anal loop characteristics of *Cordulegasterinæ*, and support Handlirsch's view that *intermedius* requires a separate genus. In the Carnegie collection there are five specimens: Nos. 3822, 3821, 5111-5112, 5113, all derived from the Bayet collection. The fifth specimen, No. 1221, was purchased at Ward's Establishment. The best of all of these specimens is No. 3822. In the Museum of Comparative Zoölogy there is one finely preserved specimen (No. 1997).

SUBFAMILY GOMPHINÆ.

Genus NANNOGOMPHUS Handlirsch.

15. *Nannogomphus bavaricus* Handlirsch.

Nannogomphus bavaricus Handlirsch, 1906, Foss. Ins., 587; pl. 47. f. 8.

Length of fore wing, 20-25 mm.

This is the smallest *Anisopteron* in the limestone; it has been completely figured by Handlirsch and I can add no details to his description. I think that there can be no doubt that *gracilis* Meunier (1896) and *nævicus* Hagen (1862) are to be referred to this species; but Handlirsch was the first to publish a recognizable description of the species and I consider that his specific name should be used. In the Carnegie collection there are three specimens, Nos. 3815, 3816, and 3817-5114. In the Museum of Comparative Zoölogy there are five specimens.

SUBORDER ZYGOPTERA.

The Damsel-flies of Solenhofen are very unsatisfactorily preserved; apparently the insects were too delicate to withstand decomposition long enough to become well preserved. In the collections of the Carnegie Museum and the Museum of Comparative Zoölogy there are but a few poor specimens, which can only be determined with doubt. One specimen in the Museum of Comparative Zoölogy, however, I believe to be the one figured by Needham (1903, p. 9) as an "undescribed Agrionid genus"; at least on the back of this specimen in Needham's writing are the words "Agrionid—apparently new, a fine specimen." Unfortunately, although the body and veins of this insect are well preserved, all four wings are folded together in such a manner that I am unable to produce a satisfactory figure of the fossil. If this is the specimen which Needham figured, it may be that he has correctly depicted the venation, but I am not able to follow the course of the veins, and therefore leave the species unnamed.

In the Museum of Comparative Zoölogy, in addition to the type of *Malmagrion eichstattensis* (Hagen), there is a poorly preserved fossil, which probably belongs to the same species. In the Carnegie collection there is a specimen of this insect (No. 5115) and a poorly preserved individual apparently belonging to the genus *Pseudoeupheon* (3832-3833).

Order BLATTARIA.

Family MESOBLATTINIDÆ.

Genus LITHOBLATTA Handlirsch.

16. *Lithoblatta lithophila* (Germar).

Musca lithophila Germar, 1839, Verh. L. Car. Ak., XIX, 22; pl. 23, f. 19.

Mesoblatta lithophila Scudder, 1886, Mem. Bost. Soc. N. H., III, 464.

Mesoblatta lithophila Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 6; pl. 1, ff. 1-6.

Lithoblatta lithophila Handlirsch, 1906, Foss. Ins., 530; pl. 46, f. 7.

Length of fore wing, 13-14 mm.

This is one of the commonest insects in the limestone. It has been completely figured and described by several authors. In the Carnegie collection there are seven specimens: Nos. 3791-3792, 5116-5117, 5118, 5119, 5120, 5121, 5122. In the Museum of Comparative Zoölogy there are twenty specimens. The specimens are usually preserved with the elytra outspread, as in the case of the *Coleoptera*; but they can be distinguished from the latter by the flat surface of the elytra, which are convex in the coleopterous specimens.

Order ORTHOPTERA.

The true *Orthoptera* represented in the formation are almost exclusively *Locustoid* types. In the Carnegie Museum there is one specimen, which I believe is undoubtedly a Grylloid; the habitus is strikingly like that of the true crickets. These have been found in the Mesozoic only in the English Jurassic, where two species have been located. It is not improbable, therefore, that this form from Solenhofen is a member of the suborder *Grylloidea*; but unfortunately neither the venation nor the structure of the body is preserved well enough to permit a definite decision.

Family ELCANIDÆ.

In the genus *Elcana* Handlirsch has recognized eight species from this one formation, although he suggests that several of the species may be synonymous. From a survey of the material at hand I believe that at most only four species are valid: *phylophora* Handlirsch (= *bavaricus* Handlirsch, *oppenheimi* Handlirsch); *lithophila* Germar (= *amanda* Hagen, *quærule* Weyenbergh); *deichmuelleri* Handlirsch, and *longicornis* Handlirsch. *Phylophora* and *lithophila* are unquestionably represented in the material before me, but there are a number of specimens of *Elcana* which do not show the characteristics necessary for specific determination.

Genus ELCANA Giebel.

17. **Elcana phyllophora** Handlirsch.

Elcana phyllophora Handlirsch, 1906, Foss. Ins., 516; pl. 44, f. 1.

Length of fore wing, 22-25 mm.

Rs has 12 to 14 branches, two of which usually give rise to several short marginal veinlets. In the Carnegie collection there is one very fine specimen (No. 5123), showing the venation clearly, as well as the body and the antennæ. Another specimen is Nos. 5125-5126. In the Museum of Comparative Zoölogy there are four poorer specimens.

18. **Elcana lithophila** (Germar).

Asilicus lithophilus Germar, 1842, Münster Betrag, VIII, 87; pl. 9, f. 7.

Elcana lithophila Handlirsch, 1906, Foss. Ins., 517.

Length of fore wing, 20 mm.

Rs has 10 branches in all specimens with distinct venation. In the Carnegie Museum there is one specimen, No. 5124; and in the Museum of Comparative Zoölogy two specimens.

Family LOCUSTOPSIDÆ.

Genus CONOCEPHALITES Handlirsch.

19. **Conocephalites capito** Deichmüller.

Conocephalites capito Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 24; pl. 2, f. 2.

Length of fore wing, 40 mm.

This is a rare species, of which one specimen (No. 3781) is in the Carnegie Museum and another in the Museum of Comparative Zoölogy.

Family LOCUSTIDÆ.

Genus PYCNOPHLEBIA Deichmüller.

20. **Pycnophlebia speciosa** (Germar).

Locusta speciosa Germar, 1839, Verh. L. Car. Ak., XIX, 198; pl. 21, f. 1.

Pycnophlebia speciosa Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 20; pl. 30, f. 4.

Length of fore wing, 90-95 mm.

This large and conspicuous species is common in the limestone. It has been completely figured by Deichmüller and needs no further

description. In the Carnegie collection there are two specimens, Nos. 3783-3784 and 3793. In the Museum of Comparative Zoölogy there are nine specimens, of which one (No. 6099) is very finely preserved.

21. *Pycnophlebia minor* Handlirsch.

Pycnophlebia minor Handlirsch, 1906, Foss. Ins., 520.

Length of fore wing, 70 mm.

This is a much smaller and rarer species than the foregoing. The venation, which is well preserved in one Carnegie specimen (No. 5127) is apparently very similar (if not identical) with that of *speciosa*. There are two other specimens in the Carnegie Museum (5128, 5129) and one in the Museum of Comparative Zoölogy.

Order PHASMODEA.

Family CHRESMODIDÆ.

Genus CHRESMODA Germar.

22. *Chresmoda obscura* Germar.

Chresmoda obscura Germar, 1839, Verh. L. Car. Ak., XIX, 201; pl. 22, f. 4; Deichmüller, 1886, Mitt. Koenigl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 10; pl. 1, ff. 7-12. Handlirsch, 1906, Foss. Ins., 525; pl. 44, ff. 15, 19.

This striking insect caused much confusion to the older students of the lithographic insects; Germar considered one specimen to be a Mantid and another to be a Reduviid (*Hemiptera*); Oppenheim regarded it as an aquatic Homopteron, allied to the *Hydrometridæ*; and Deichmüller thought it was an Acridiid. Handlirsch, however, demonstrated conclusively that the fossil was really a Phasmid, possessing seventeen segmented antennæ and distinct cerci, as well as the wing-venation characteristic of the Phasmids. More recently Martynov has reviewed the evidence and established the suborder *Chresmododea* to include the families *Chresmodidæ*, *Necrophasmidæ* (Lias of Turkestan), *Aërophasmidæ* (Trias of Australia, and Lias of Turkestan).

Handlirsch has given a complete account of this fossil and there is little to add. Not only are the adults present (length of body 30-40 mm.), but very small immature specimens, with a body only 8 mm.

long, likewise occur. The Carnegie collection is especially rich in specimens of *obscura*, there being a total of eighteen: Nos. 3776-3777, 3778-3779, 3780, 5131-5132, 5133-5134, 5135-5136, 5137-5138, 5139, 5140, 5141, 5142, 5143, 5144-5145, 5146, 5147, 5148, 5149 are parts of the Bayet Collection; No. 3775 was received in exchange from the Paleontological Museum of Bavaria, in Munich. No. 3778 is a fine nymph. In the Museum of Comparative Zoölogy there are thirteen specimens, No. 6105 being the best I have seen.

Order **HEMIPTERA.**

Both the *Heteroptera* and the *Homoptera* are represented in the lithographic limestone. The *Heteroptera* are of unusual interest, since all the species belong to groups which were undoubtedly aquatic. as the *Belostomatidæ*, *Nepidæ*, and *Notonectidæ*. In view of this fact, and particularly in view of the abundance of the *Belostomatidæ*, it does not seem unlikely that these insects actually lived as adults in the waters that deposited the limestone, regardless of the fact that it was unquestionably saline. It is almost certain, however, that they did not breed there, but flew after the emergence of the adult from some neighboring fresh-water lake.

Family BELOSTOMATIDÆ.

Genus MESOBELOSTOMUM Haase.

23. **Mesobelostomum deperditum** (Germar)

Scarabæides deperditum Germar, Verh. L. Car. Ak., XIX, 218; pl. 23, f. 17.

Mesobelostomum deperditum Haase, 1890, N. Jahr. Mineral., II, 88.

This common species is strikingly close to the existing *Belostomum*. Most of the specimens are poorly preserved, but some show details of the wing- as well as body-structure. None of the specimens before me are exceptionally well preserved, however. There are eleven in the Carnegie Museum, of which Nos. 3843, 5150, 5151, 5152, 5153, 5154, 5155, 5156, 5210 are derived from the Bayet Collection; 3845 was obtained from the Paleontological Museum of Bavaria, in Munich, and 1219 was bought from Ward's Establishment. There are nineteen in the Museum of Comparative Zoölogy.

Family NEPIDÆ.

Genus MESONEPA Handlirsch.

24. **Mesonepa primordialis** (Germar).

Nepa primordialis Germar, 1839, Verh. L. Car. Ak., XIX, 206; pl. 22, f. 7.
Mesonepa primordialis Handlirsch, 1906, Foss. Ins., 637; pl. 51, f. 20.

This is an obscure insect, no complete specimens yet having been found. The general habitus of the body indicates that it is a relative of the recent *Nepa*. In the Carnegie Museum there are two specimens: Nos. 5157-5158, 5159-5160. There are also three in the Museum of Comparative Zoölogy.

25. **Mesonepa minor** Handlirsch.

Mesonepa minor Handlirsch, 1906, Foss. Ins., 637; pl. 51, f. 21.

Similar to the preceding insect, but much smaller. In the Carnegie Collection there are three specimens, Nos. 3842, 5161-5162, 5163-5164. In the Museum of Comparative Zoölogy there are five.

Family NOTONECTIDÆ.

Genus NOTONECTITES Handlirsch.

26. **Notonectites elterleini** (Deichmüller).

Notonecta elterleini Deichmüller, 1886, Mitt. Königl. Mineral.-Geol. Præhist. Mus. Dresd., VII, 64; pl. 5, f. 67.
Notonectites elterleini Handlirsch, 1906, Foss. Ins., 639; pl. 51, f. 28.

This small Notonectid is represented by one specimen in the Museum of Comparative Zoölogy (No. 6151). Nothing is known of its general habitus.

Order HOMOPTERA.

Family PALÆONTINIDÆ.

Genus LIMACODITES Handlirsch.

27. **Limacodites mesozoicus** Handlirsch.

Limacodites mesozoicus Handlirsch, 1906, Foss. Ins., 622; pl. 49, ff. 12-15.

Length of fore wing, 35-40 mm.

This fossil, together with the others in the family, were placed by Handlirsch in the *Lepidoptera*, but Tillyard demonstrated (1921) that they are really *Homoptera*, allied to the recent *Cicadidæ*; and Martynov in a more recent paper (1930), based on a re-examination of

some of the type specimens from other formations, has substantiated Tillyard's conclusions. *L. mesozoicus* is represented in the Carnegie collection by one specimen (No. 5165), and in the Harvard collection by three specimens. None of them are well preserved.

Genus ARCHEPSYCHE Handlirsch.

28. **Archepsyche eichstättensis** Handlirsch.

Archepsyche eichstättensis Handlirsch, 1906, Foss. Ins., 624; pl. 50, ff. 1-2.

Length of fore wing, 25-29 mm.

In general appearance similar to the preceding, but smaller. The venation has been determined in several specimens, but is not clear in the material at hand; one specimen (No. 5166) in the Carnegie collection and two in the Museum of Comparative Zoölogy.

Genus EOCICADA Oppenheim.

29. **Eocicada microcephala** Oppenheim

Eocicada microcephala Oppenheim, 1881, Palæontogr., XXXIV, 222; pl. 31, f. 30; Handlirsch, 1906, Foss. Ins., 626; pl. 50, ff. 7-9.

Length of fore wing, 70-75 mm.

This remarkable fossil is distinguished by the short, stout body and the proportionally long wings. No specimens are in the Carnegie Museum and only one is in the Museum of Comparative Zoölogy.

Order **NEUROPTERA.**

The *Neuroptera* are not at all common in the lithographic limestone, but enough good specimens have been found to give an idea of the general composition of the fauna. Handlirsch recognizes four families, *Nymphitidæ*, *Prohemerobiidæ*, *Mesochrysopidæ*, and *Killigrammidæ*. Specimens of each of these groups except the *Killigrammidæ*, which is known from a single specimen, are present in the collections placed before me for study.

Family NYMPHITIDÆ.

Genus MESONYMPHES Carpenter.

30. **Mesonymphes hageni** Carpenter.

Mesonymphes hageni Carpenter, Psyche, 1929, pp. 35, 190; f. 1.

Length of fore wing, 40 mm.

The type specimen (No. 1999) is in the Museum of Comparative Zoölogy.

Family PROHEMEROBIIIDÆ.

Genus OSMYLITES Haase.

31. **Osmylites protogæus** (Hagen).

Chrysopa protogæus Hagen, 1862, Palæontogr., X, 108.

Osmylites protogæus Haase, 1890, N. Jahr. Mineral., II, 22; f. 10.

Length of fore wing, 25-28 mm.

One of the smallest of the *Neuroptera* from Solenhofen, this obscure species is represented in the Carnegie Museum by one specimen (Nos. 5167-5168), and another in the Museum of Comparative Zoölogy. The venation is only partially known, and in neither of these specimens can I discern any features additional to those already described.

Genus ARCHEGETES Handlirsch.

32. **Archegetes neuropterorum** Handlirsch.

Archegetes neuropterorum Handlirsch, 1906, p. 605; pl. 48, ff. 1-2.

Length of fore wing, 70-75 mm.

In the Museum of Comparative Zoölogy there is one specimen, very close to the one described by Handlirsch, but a little smaller.

Genus GIGANTOTERMES Haase.

33. **Gigantotermes excelsus** (Hagen).

Apochrysa excelsus Hagen, 1862, Palæontogr., X, 108.

Gigantotermes excelsus Haase, 1890, N. Jahr. Mineral., II, 12.

Length of fore wing, 52-59 mm.

One specimen (No. 5169) in the Carnegie Museum. All four wings are preserved, but only the faintest traces of the venation.

Family MESOCHRY SOPIDÆ Handlirsch.

Genus MESOTERMES Haase.

34. **Mesotermes heros** (Hagen).

Termes heros Hagen, 1862, Palæontogr., X, 114; pl. 15, f. 1.

Mesotermes heros Haase, 1890, N. Jahr. Mineral., II, 13.

Length of fore wing, 45-48 mm.

The type specimen (No. 1996) is in the Museum of Comparative Zoölogy, as well as another specimen, which is well preserved. The

venation in the latter is very clear and demonstrates that *heros* is a *Mesochrysoptid*, as Handlirsch suspected. The species is so close to *Mesochrysoptera zitteli* Meunier, differing only in size, that the two species undoubtedly belong to the same genus. However, if this view is taken, then the appropriate generic name *Mesochrysoptera* will become *Mesotermes* and the family *Mesotermitidæ*, which is very misleading. For this reason, I suggest that regardless of the close affinities of *heros* and *zitteli*, the generic separation be retained.

NEUROPTERA, incertæ sedis.

35. "*Corydelis*" *vetusta* Oppenheim. (Fig. 9)

Corydelis vetusta Hagen, 1862 (not described), Palæontogr., X.—Oppenheim, 1888, Palæontogr., XXXIV, pl. 30, f. 3; pl. 31, f. 31.—Meunier, 1898, Arch. Mus. Teyler, II, (6); pl. 18, ff. 50-51.

Length of fore wing, 40 mm.

This obscure insect has been known by several specimens, which showed the general habitus of the body only, including a large elongate head. Handlirsch suggests that the insect is a Sialid or a Perlid. In the Carnegie Museum there is one well preserved specimen (No. 3846), showing the wings as well as the characteristic body. Unfortunately, however, only a portion of the fore wing is clear enough

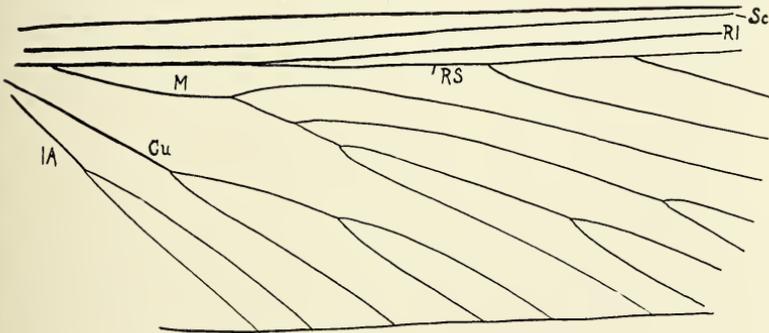


FIG. 9. "*Corydelis*" *vetusta* Hagen, part of fore wing (Specimen No. 3846 Carn. Mus.)

so that the veins can be distinguished. Enough is preserved, I believe, to show that the insect is a *Neuropteron*, probably one of the *Megaloptera*; the two parallel branches of *Rs*, which is parallel to *RI*, are certainly more characteristic of the *Neuroptera* than of the *Perlids*.

However, since the apex of the wing is missing, it is impossible to state with certainty just to what family of *Neuroptera* this fossil is most closely related.

Order COLEOPTERA.

The *Coleoptera* of the lithographic limestone are the most unsatisfactory of all the insects in the formation. Nearly always the whole insect is preserved with the elytra outspread, but with the hind wing folded up or twisted in such a manner that the venation is not decipherable. This condition and the absence of taxonomic characteristics in the elytra alone prevent us from determining even the family position with any degree of certainty. The most that can be said is that beetles were common in the vicinity of the water, which deposited the limestone; and that a diversity of forms existed. Handlirsch recognizes forty species, but I believe that many of these are synonymous.

In the Carnegie Museum and the Museum of Comparative Zoölogy the following species are présent:* *Pyrochroophana brevipes* Deichmüller (5170), *Ditomoptera dubia* Germar (3785-3786), *D. minor* Deichmüller (3794-5172, 5171, 5173, 5174, 5175), *Sphærodermopsis jurassica* Oppenheim (3847, 5176-5177), *Actea sphinx* Germar (3790, 3795, 5178-5179, 5180, 5181, 5182), *Malmelater costeri* Weyenbergh (5183, 5184), *Pseudohydrophilus avitus* Heyden (3788, 5185-5186), and *Procalosoma major* Handlirsch (3787).

Order TRICHOPTERA.

Specimens representing this order are extremely rare in the lithographic shales. In none of these has the venation been so distinct that a satisfactory concept of the wing could be reached, and there is a possibility that the fossils belong to the allied order *Paratrichoptera*, which is amply represented in the Jurassic of Turkestan. The only specimen of *Trichoptera* from Solenhofen, which I have seen is probably *Archotaullus bavaricus* Handlirsch (No. 5187), in the Carnegie Museum. The complete insect is preserved, even the long antennæ; but none of the veins can be distinguished.

*The numbers following the names are those representing specimens in the Bayet Collection.

Order **HYMENOPTERA.**

Family PSEUDOSIRICIDÆ.

Genus PSEUDOSIREX Weyenbergh. (Fig. 10)

The *Hymenoptera* of Solenhofen, although apparently belonging to a single genus and very few species, are perhaps the most important of all the insects in the formation. Until the discovery of *Hymenoptera* in the Jurassic of Turkestan in 1927, these specimens have been almost the sole representatives of the order in the Mesozoic. Most of the fossils show only the general habitus of the wings and body, but these are so characteristic of the siricoid wasps that even the older students of fossil insects recognized them as belonging to that group. Even poorly preserved specimens show the stout ovipositor of the female very plainly, and good specimens possess the numerous wrinkles in the distal part of the wings, typical of the siricoid wasps.

The members of this genus are common in the limestone and, like the recent siricids, are highly variable in size; as a consequence, fourteen species have been described, based largely on differences in dimensions. Handlirsch lists all of these as distinct species, but suggests that some are synonyms. In the material before me there are forty-six specimens of *Pseudosirex*, and from my study of them I am led to believe that there are only two valid species: *nanus* Handlirsch and *schroeteri* (Germar) (genotype), which includes all the other species.

Nanus is distinguished by its very small size, the fore wing being only 25 mm. long. *Schroeteri*, as I consider it, has a length of wing which varies from 30-60 mm., most specimens being about 40 mm. In the collections at hand there is a series with a complete gradation in sizes between these extremes. The smaller specimens are probably males, and the larger females. It is even possible that *nanus* is a small male of *schroeteri*, for there is no apparent difference in venation. *Schroeteri* is represented in the Carnegie collection by eleven specimens (Nos. 3799-3800, 3805-3806, 3809, 3810-5199, 5200-5201, 5202-5203, 5204-5205, 5206, 5207, 5208, 5209), and in the Museum of Comparative Zoölogy by thirty-one specimens. Specimen No. 3810 in the Carnegie Museum is unusually well preserved, showing all but the distal parts of the veins. *Nanus* is represented in the Carnegie Museum by several poor specimens and one other (No. 5189), which I believe is the best specimen of *Pseudosirex* that has been found; the two fore wings and the body are preserved, the wings being outstretched

on each side. The Carnegie Museum also lists Nos. 3803-3804, 5188, 5189, 5190-5191, 5192-5193, 5194-5195, 5196, 5197, 5198, 3801-3802.

In spite of the abundance of specimens of *Pseudosirex* the venation has been hitherto more or less uncertain. Figures of the wings given by Deichmüller, Oppenheim, Weyenbergh, and Handlirsch were very generalized, only the heaviest veins being indicated. Tillyard has published a complete analysis of the venation of the wings (1927), based upon specimens in the Paleontological Museum at München, although he states that in none of these specimens could the veins be made out with absolute accuracy, owing to the wrinkles in the distal half of the membrane. In the specimen of *nanus* in the Carnegie

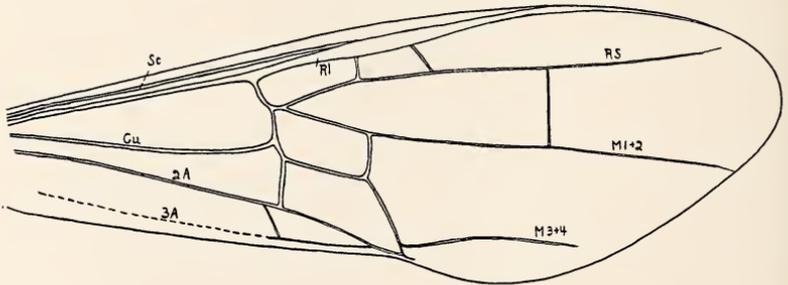


FIG. 10. *Pseudosirex nanus* Handlirsch, fore wing; specimen No. 5189, Carnegie Museum. For convenience I have used the venational nomenclature suggested by Bradley ("Guide to the Wings of Insects"), without, however, intending to imply a complete acceptance of this interpretation.

Museum, as well as in the above mentioned specimen of *schroeteri*, the veins are exceptionally clear; in the former specimen they are preserved as brown or yellow-brown lines, instead of being merely ridges or grooves. In figure 10 I have reproduced a detailed drawing of the fore wing of this fossil, in which I have included only the structures which are clear enough to be positive. There may be additional cross-veins between *R*₅ and *M*₁₊₂, or *M*₁₊₂ and *M*₃₊₄ in the distal part of the wing, but I can see no traces of them in the fossil.

It will readily be noted that there are numerous differences between the venation as I have represented it, and as it was figured by Tillyard. An enumeration of these differences is hardly necessary, but they comprise such important features as the position of *Sc* with respect to *R*, the point of termination of *Sc*, the position of the pterostigma, the

number of branches in Rs, and the point of termination of Cu1, 2A, and 3A; as well as minor characters, such as the shape of the wing and the cells. These discrepancies are far too great to be due to individual variation, but there remain two possible explanations: either the specimens which Tillyard figured belong to an entirely different species (or genus) than those which I have studied; or they were not well enough preserved to enable him to determine accurately the course of the veins. I think that there can be no question that the specimens, upon which I have worked, are the true *Pseudosirex*; the venation in the specimen of *schroeteri* is precisely the same as that in the specimen of *nanus*, so far as it can be distinguished; so that if Tillyard's specimens were as he believed them to be, they probably belong to a different genus.

This Carnegie specimen of *nanus* enables us to characterize the family *Pseudosirex* more definitely than before: the costal space is narrow, the subcosta being very close to the radius, almost contiguous to it; Sc terminates on R1 in the region of the pterostigma; the pterostigma is well developed, R1 being swollen and thickened, and the costal space being chitinized at this point; M diverges from R1 almost at right angles, instead of being directed basally as in the recent *Siricoides*; two cross-veins are present between Rs and R1, in the region of the pterostigma; 3A is slightly removed from the posterior margin and fuses apically with Cu1+Cu2.

The venation of *Pseudosirex* seems to approach that of *Xeris* much more closely than that of any of the other recent genera.⁷ If we bear in mind that in the distal part of the fossil wing there may be one or two cross-veins, which I have not been able to see, the similarity to *Xeris* is very striking (Figure 11). M in *Pseudosirex* is more primi-

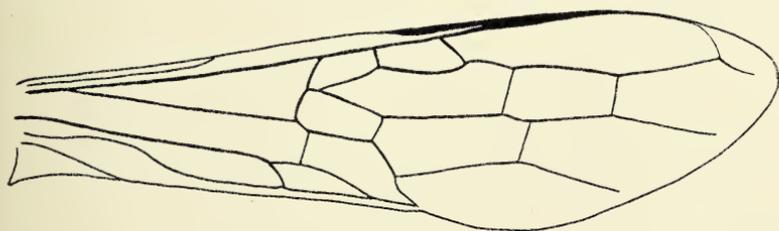


FIG. 11. Fore wing of *Xeris caxdatus* (original).

⁷I am indebted to Professor C. T. Brues for furnishing me with specimens of *Siricidae* for comparison with *Pseudosirex*.

tive in its origin and perhaps 3A is also; but the venation is remarkably modern for a Jurassic species, especially for one which is the oldest record of the *Hymenoptera*.

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IX. A NEW TURTLE FROM THE DUCHESNE OLIGOCENE OF THE UINTA BASIN, NORTHEASTERN UTAH.

BY JOHN CLARK.*

During the summer of 1931, the Carnegie Museum field-party under Mr. J. LeRoy Kay discovered and collected a fossil turtle from the basal Oligocene of the Uinta Basin, Utah. The specimen was recovered from two large blocks, which had broken from massive light gray sandstone weathering brown at the surface. Although the two portions into which the shell had been broken nowhere made contact with each other, the matrix of the blocks made such broad and excellent contacts that the shell could be restored exactly as it had been before the breakage occurred. All through the sandstone were masses of poorly preserved vegetable matter, including several parts of leaves, which resembled maple- or oak-leaves; and one small fragment, which Dr. O. E. Jennings, Curator of the Section of Botany, Carnegie Museum, has identified as either the cone of a sequoia, or the base of an alder-stem.

Study of the specimen was conducted under the direction of Mr. O. A. Peterson, Curator of Fossil Mammals, Section of Vertebrate Paleontology, Carnegie Museum. The author is indebted to Mr. Peterson and Mr. Kay for assistance and encouragement in the preparation of this paper; to Messrs. L. S. Coggeshall and S. Agostini, preparators, for advice and assistance in freeing the specimen from the matrix; to Mr. Sydney Prentice for his patience and skill in making the drawings; and to Dr. W. J. Holland for assistance in coining the generic name and for finally revising and editing the paper. Measurements of early Tertiary species of the genera *Hadrianus*, *Stylemys*, and *Testudo*, used throughout the text, are those published by Hay¹ and Gilmore.² Mr. Barnum Brown of the American Museum of

*Submitted by John Clark, B.S., 1931, University of Illinois, to the Graduate School of the University of Pittsburgh in partial fulfilment of the requirements for the degree of Master of Science.

¹Hay, O. P. *Fossil Turtles of North America*. Carnegie Institution of Washington. 1908.

²Gilmore, C. W. *The Fossil Turtles of the Uinta Formation*. Memoirs of the Carnegie Museum, Vol. VII, No. 2, Nov. 1915.

Natural History has very kindly made available for comparison the pelvic girdles of *Hadrianus* and *Testudo*, A. M. N. H., No. 1068 and No. 1160.

Family TESTUDINIDÆ Gray.

Genus CYMATHOLCUS³ gen. nov.

Cymatholcus longus Clark, sp. nov.

Type: Carapace; plastron; pelvis; pectoral girdle; both sides complete series of caudals; two complete and one partially complete cervical vertebrae (C. M. Cat. Vert. Foss., No. 11,891).

Locality: "Hoot Owl Canyon," fifteen miles southwest of Vernal, Uinta County, Utah.

Horizon: Duchesne beds, basal Oligocene.

Generic characters: Sulcus between marginal scutes and plastral scutes strongly looped. Sulcus between costal scutes and marginal scutes ventral to costo-peripheral suture. Costo-peripheral suture minutely and openly, but definitely, digitated. Differentiation of costal bones about midway between that of *Hadrianus* on the one hand and of *Stylemys* and *Testudo* on the other. Shell longer and higher in proportion to width than in other genera of the family. Anterior lobe of plastron with lip conforming to the general contour of the lobe. Bridge short. Posterior lobe very long. Antero-posterior dimension of pelvis about equal to width of pelvis across dorsal rims of acetabula. Pubes long, lateral borders making a very low angle with the midline. External tail very short or absent.

Specific characters: Lateral border of first vertebral scute flared anteriorly. Lateral border of third vertebral bracket-shaped. Anterior border of plastral lip thick, semi-circular in cross-section. Sulci of plastron deeply incised. Pectoral scutes very narrow, with anterior and posterior borders parallel. Deep posterior notch in plastron. Epipubes long antero-posteriorly, narrow transversely. Ischio-pubic foramina long antero-posteriorly and narrow transversely.

CARAPACE

As seen from the front, the carapace is marked by its gently rounded, almost vertical sides and its broad, flat top. The flatness is somewhat

³From *κῦμα* = wave; *ὄλκος* = furrow.

accentuated by crushing over the inguinal buttresses, but anteriorly it is actual. The anterior opening is broad, and higher dorso-ventrally than in *Stylemys*; the lip of the plastron gives the effect of the sides of the opening being depressed, although the rim of the carapace is al-

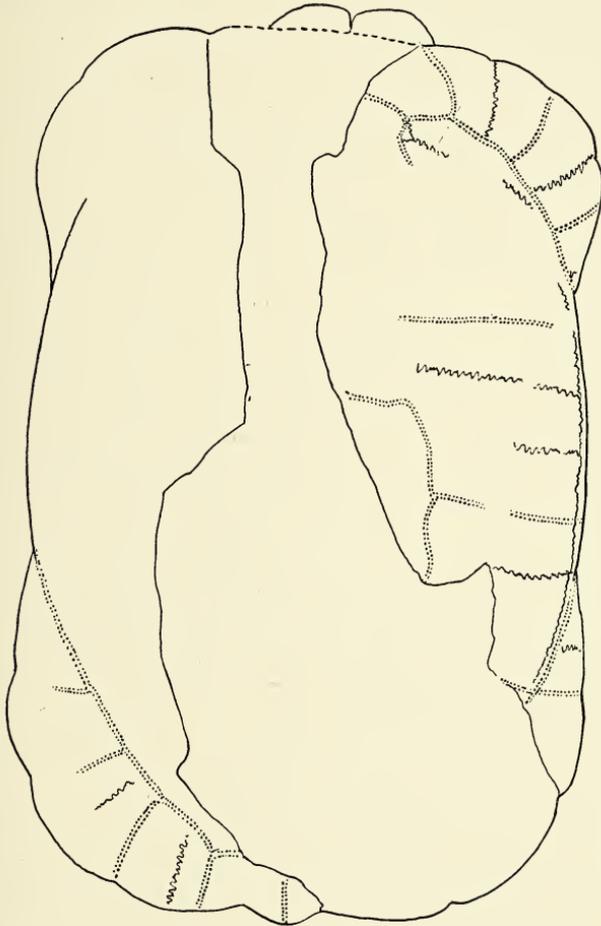


FIG. 1. Dorsal View of Shell of *Cymatholcus longus*, *Gen. et sp. nov.* (C. M. Cat. Vert. Foss., No. 11.891). 1/6 nat. size.

most straight. The lateral flare produces a marked prominence at the angle of the free border. The sides of the carapace are so curved that the upper ends of the peripherals swell out slightly further laterally than does the marginal keel.

From a lateral view the arch of the carapace, highest over the inguinal buttresses, is most apparent. Anteriorly the slope is moderate; posteriorly it falls away with steepness, which is slightly increased by distortion of the caudal region. The center of gravity of the mass seems to fall upon the inguinal buttress rather than the center of the bridge, which gives the shell an unbalanced appearance. The down-sloping anterior border continues across the bridge in a strong marginal keel, deeply indented for the sulci of the bridge marginals, and merges with the posterior border, which changes its downward course at the suture between the seventh and eighth peripherals, and slopes upward to form the posterior flare. The bridge is higher anteriorly than posteriorly, causing the axillary buttress to slope steeply downward and only slightly inward, and the inguinal to extend inward rather than downward.

As seen from below, the outline is decidedly rectangular. The lateral marginal lines bend inward slightly from both ends to the sulci between marginals five and six, which are situated at the narrowest point of the carapace. The plaster restoration of the median section of the anterior rim has a straight border; it is very possible that the border was somewhat recurved to the mid-line, but as there is no evidence in either direction the simpler line was used. Certainly the border did not project anterior to the line of the restoration.

The carapace is much longer in proportion to its width than in the case of the other early Tertiary genera of the *Testudinidæ*. Measurements show the proportion of width to length to be 62.6 per cent in this specimen; 72.3 per cent to over 85 per cent in *Stylemys*; 83.3 per cent (*Testudo uintensis*) to 91 per cent (*T. brontops*) in the pre-Miocene species of *Testudo*; and 68.5 per cent (estimated, *Hadrianus tumidus*) to 83 per cent (*H. majusculus*) in *Hadrianus*.

Due to the absence of the nuchal and pygal regions, the widespread obliteration of the sutures, and a ferruginous coating, the removal of which often entailed removal of the bone-surface, very little can be determined about the bony structure of the carapace. Costals three and four and peripherals from one to eight are distinguishable; about half of the bridge-suture and most of the costo-peripheral suture can be traced definitely.

The costo-peripheral suture is situated about half-way between the plastron and the top of the carapace, and is thrown into open digitations approximately 1 mm. long. It differs thereby from *Stylemys*

and *Hadrianus*, in which⁴ "the rounded border of each peripheral joins the similar border of a neighboring costal." In *Hadrianus*, *Styemys*, and the Oligocene species of *Testudo*, the costo-peripheral suture follows closely the costo-marginal sulcus. In the specimen at hand the suture is from 8 to 13 mm. higher than the sulcus along the sides of the carapace; at the sutural angle between the nuchal, first peripheral, and first costal, it is 33 mm. higher; and at a point 29 mm. lateral to the angle it is 52 mm. higher. The first peripheral of *S. capax* and of *H. corsoni* rises considerably above the dorsal sulcus of the first marginal of those species, so that the height of the first peripheral is at most a specific and not a generic character.

Costals three and four reveal a degree of differentiation, which is intermediate between that of *Hadrianus* on the one hand and of *Styemys* and *Testudo* on the other. The third costal is decidedly wedge-shaped, but the fourth costal is almost rectangular. In *H. majusculus* there is no appreciable differentiation in the third and fourth costals. Costal three of *H. corsoni* loses distally about 25 per cent of its proximal width, and costal four loses about 8 per cent. Costal three of *Cymatholcus longus* narrows distally 43 per cent, and costal four expands 16 per cent. Hay gives no measurements for *S. nebrascensis*, but says⁵ "the degree of this differentiation differs somewhat in individuals, and in general is not so well developed as in *S. conspecta* and *S. capax*." Costal three of *S. conspecta* loses 58 per cent of its proximal width and costal four gains 100 per cent; costal three of *S. capax* narrows by 45 per cent of its width; and costal four expands 48 per cent. In *T. brontops*, costal three narrows 27 per cent; costal four expands 60 per cent; in *T. laticunea* costal three widens .05 per cent; costal four widens 113 per cent.

In regard to the peripherals there is very little that need be said. The free borders are acute, with a noticeable flare at the anterolateral angle and a strong flare over the hind legs. The suture between the peripherals and the plastron is irregular, but its general trend is in a straight line. About half of the bridge is plastral and half peripheral. The bridge is so deeply furrowed for the sulci of the marginals that the intervening spaces look inflated, resembling in this respect *T. brontops*.⁶ The angle between the nuchal, first peripheral,

⁴Hay, O. P. Fossil Turtles of North America. p. 370.

⁵Hay, *op. cit.*, p. 387.

⁶Hay, *op. cit.*, p. 398.

and first costal is outside the lateral sulcus of the first vertebral scute; a characteristic which is regarded as being of specific significance.

The scutes are represented by half of vertebral three, costals one, two, and three; and marginals two to nine on the right side, and marginals nine through twelve on the left side.

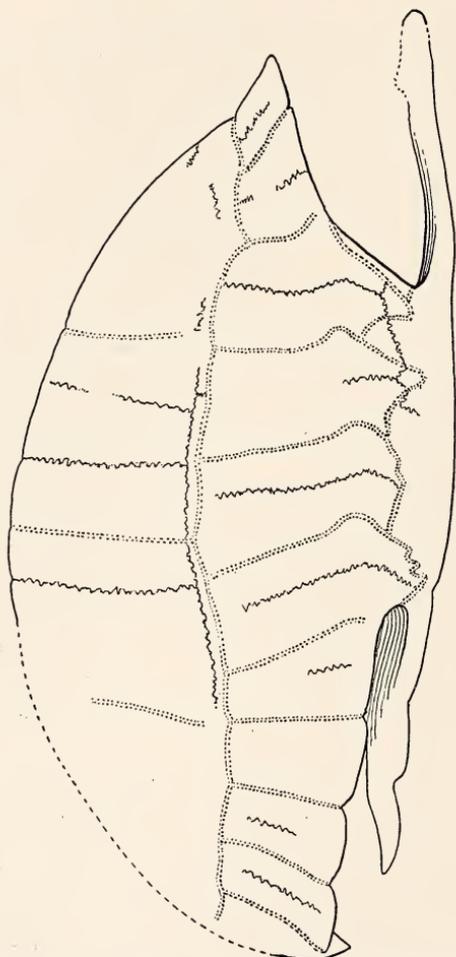


FIG. 2. Lateral View of Shell of *Cymatholcus longus* Gen. et sp. nov. (C. M. Cat. Vert. Foss., No. 11,891). 1/6 nat. size.

A small but very interesting bit of the border of vertebral one is also preserved. Starting from a broken edge at a point 61 mm. from the midline and 60 mm. from the vertebro-marginal sulcus, it extends down-

ward and slightly inward 36 mm. to a point 57 mm. from the midline and 23 mm. from the vertebral-marginal sulcus. Making at this point an angular turn outward, it extends 30 mm. to its junction with the vertebral-marginal sulcus 75 mm. from the midline and 23 mm. mesial to the sulcus between marginals one and two. This angulated expansion is unparalleled among the other early Tertiary *Testudinidæ*, and is apparently characteristic of this species.

Vertebral three is approximately as long as it is wide. The anterior sulcus extends postero-laterally from the midline in a curve which is convex anteriorly and reverses its convexity near its junction with the vertebral-costal sulcus. The vertebral-costal sulcus is shaped like a printer's bracket, (). It possesses no differences from corresponding scutes in specimens of *Stylemys* and *Testudo*, other than slight features subject to individual variation.

The costals are simple, separated from each other and from the marginals by sulci, which are almost straight and possess no distinctive characteristics.

The marginals are highly specialized, and form one of the chief bases for erection of the genus. As the inter-marginal sulci pass over the marginal keel of the carapace they are curved forward, and recurve below the keel. The sulcus separating the axillary scute from marginal four parallels and lies immediately posterior to the externo-anterior border of the axillary buttress for its entire length. Just above the axillary notch, a short sulcus demarcates the boundary between the axillary and the plastron. From the junction of these two, the plastro-marginal sulcus swings antero-dorsally in a sharp curve, and gradually works postero-dorsally until it reaches its highest point, the junction with the sulcus between marginals four and five, when it is running directly posteriorly. The inter-marginal sulcus continues its postero-ventral course (becoming, of course, plastro-marginal), and makes an open curve slightly more ventrally located than the first curve. It passes postero-dorsally to a high point considerably less dorsal than the first, and about 20 mm. anterior to its junction with the sulcus between marginals five and six, and thence in an undulating line, lowest where crossed by the suture between peripherals five and six, to its junction with the sulcus between marginals six and seven. The inter-marginal sulcus, continuing plastro-marginally, is convoluted into two reversed S curves just before it reaches the border of the inguinal buttress, which it does about 30 mm. above the inguinal notch.

The general effect is as if the rectanguloid marginals were set *en echelon*, the antero-distal corner of each projecting over the plastral portion of the bridge.

PLASTRON

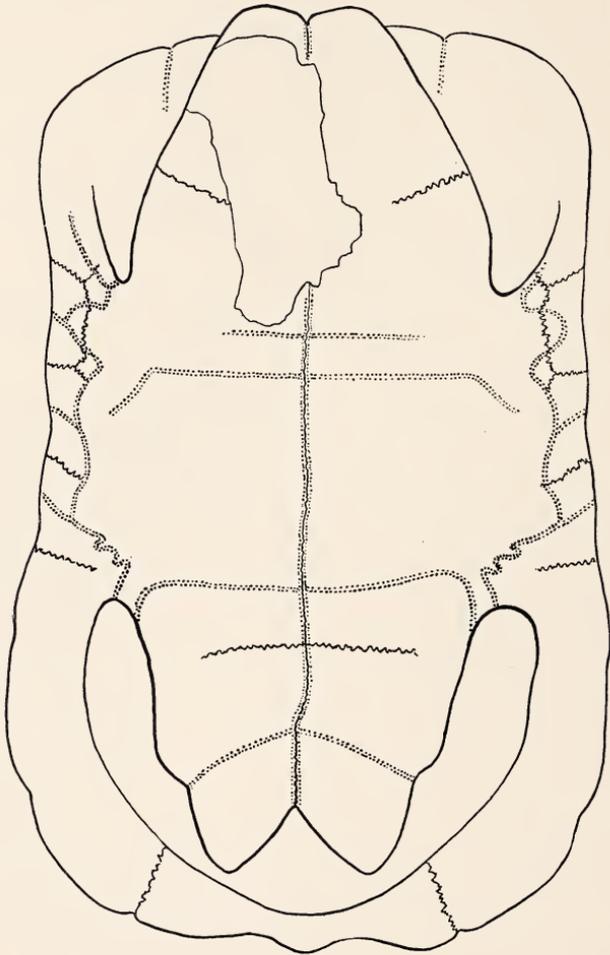


FIG. 3. Ventral View of Shell of *Cymatholcus longus*, *Gen. et sp. nov.* (C. M. Cat. Vert. Foss., No. 11,891). 1/6 nat. size.

The plastron has unfortunately undergone such extensive fracturing of the anterior lobe that many important characters are lost. The

sutures are coalesced so completely that parts of the epi-hyoplastral and hypo-xiphyplastral are all that remain. The right bridge has been faulted, forcing that side of the plastron about 65 mm. dorsally; the left is uncrushed.

The plastron is long, relatively narrow, and massively built. Posterior to the pectorabdominal sulcus it is decidedly concave, so the individual was probably a male.

In its general features the anterior lobe strongly resembles that of *Stylemys*. It is sharply upcurved anteriorly, and the lip is confluent with the general contour of the lobe, as in *Stylemys*. Transversely the lobe is flat, or very slightly convex downward. As nearly as can be determined, the lip is short, rather wide, and thicker and more rounded at its anterior border than is the case in *Stylemys*. The lateral borders of the lobe are bevelled from the dorsal side to an acute edge, while the rim of the lip is 14 mm. thick and semi-circular in cross-section. Back of the lip, the epiplastra are 25 mm. thick, and at the humero-pectoral sulcus the hyoplastra have a thickness of 15 mm. The length of the anterior lobe is 73.4 per cent of its width, which corresponds closely to the proportions in various other species of the *Testudinidæ*.

The bridge in *Cymatholcus* is remarkably short—only 228 mm. from the axillary notch to the inguinal notch. Gilmore⁷ has computed the proportion of length of bridge to length of plastron in all the specimens available to him and has arrived at the following percentages: *Hadrianus*, 38 per cent; *Stylemys*, 49 per cent; *Testudo*, 44 per cent. *Cymatholcus* has the bridge 37 per cent of the total length of the plastron, 656 mm. If, as Hay⁸ states, the *Testudinidæ* have tended to elongate the bridge at the expense of the posterior opening of the shell, then in this character *Cymatholcus* is very primitive. This is to be expected from its stratigraphic relations to *Stylemys* and *Testudo*, but forms a marked contrast to the specialization evident in the carapace.

The concavity of the plastron between the bridges produces a strong ventral swelling extending from the axillary to the inguinal notches.

As might be expected from the shortness of the bridges, the posterior lobe is very long. Using the measurements of Hay and Gilmore as a basis for comparison, the proportion of length to width is

⁷Gilmore, *op. cit.*, p. 155.

⁸Hay, *op. cit.*, p. 370.

60.8 per cent to 65.6 per cent in *Hadrianus*; about 56 per cent in *Stylemys*; and 45.9 per cent to 60 per cent in the Oligocene species of *Testudo*. In *Cymatholcus longus* the proportion is 75 per cent.

The lobe is massively yet beautifully constructed. The borders taper gently backward toward their intersection with the femoral anal sulcus, narrow sharply to the intersection, then continue parallel to their former course to the tips of the xiphyplastra. The terminal notch is deep, and the free borders of the xiphyplastra curve slightly to the subacute terminations of the bones. The lateral borders of the lobe are at the inguinal notches planes 45 mm. high and almost vertical. Posteriorly they warp to the dorsal surface of the plastron, and bevel the xiphyplastra to acute lateral edges. Meeting on each tip a plane which bevels the border of the notch, they form on the dorsal surface of each tip a low median ridge, concave antero-dorsally. The ventral portion of the lobe covered by the anal scutes is convex antero-dorsally, while that covered by the femorals is noticeably concave antero-dorsally and strongly so transversely. A ridge extends around the dorsal rim of the lobe from the inguinal buttresses to the midline, where it dies out. Cupped in the posterior curve of this ridge is an ovoid swelling, measuring 70 mm. antero-dorsally and 102 mm. transversely.

As has been mentioned, the sutures of the plastron have been almost entirely obliterated. The epihyoplastral suture meets the border of the plastron 137 mm. from the free edge of the lip, and extends postero-mesially for 52 mm. to a fracture, making an angle about thirty degrees posterior to a straight transverse line. As there is at the point where it is broken no sign of the epientoplastral suture, the entoplastron cannot have been more than 144 mm. (twice the distance from the fracture to the midline) wide, and was probably somewhat less.

The sutures between the hypoplastra and the xiphyplastra show near the midline. They are somewhat less curved than is the case in the other genera of the family, forming an almost straight transverse line.

In contrast to the weak expression of the sutures, the sulci are deeply grooved and, except around the axillary notch, are strikingly evident.

On inspecting the plastron, the character most immediately apparent is the tabular shape of the pectoral scutes. Their anterior and posterior sulci are parallel transverse lines, continuing 29 mm. apart as if plotted with instruments, to the points where the pectorals flare over the anterior portions of the bridges. The figures of Hay show

this character developed in *Testudo farri*, *T. osborniana*, *T. impensa*, *T. orthopygia*, and to a lesser extent in *Hadrianus tumidus*, *H. schucherti*, *Styemys conspecta*, and *S. capax*, so it must be considered a character of specific and not of generic importance.

The abdominal scutes are rather long. The femoral-abdominal sulcus is convex posteriorly, with its intersection with the midline as its most posterior point. The femoral scutes are trapezoidal, with the midline and the almost parallel lateral borders as bases, and the posteriorly convex abdominal-femoral sulci and the anteriorly convex femoral-anal sulci as sides. The anals are irregularly quadrilateral and have curved edges; they are of medium size. A small axillary scute is present, covering the anterior border of the axillary buttress and not reaching the ventral or lateral surfaces of the bridge. Whether or not there was an inguinal scute cannot be determined.

VERTEBRAL COLUMN

The portions of the vertebral column which have been preserved are: one partial and two complete cervical vertebræ; part of the first thoracic vertebra with the heads of the first, second, and third ribs; and the complete series of caudals, lacking only the anterior portion of the first caudal and the left side of the first six.

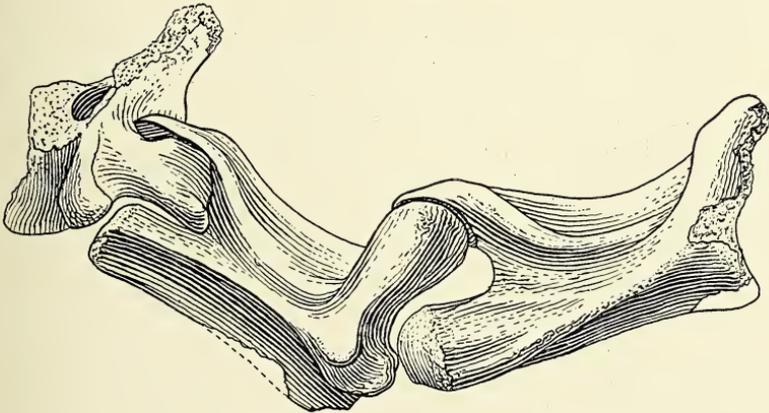


FIG. 4. Cervical Vertebræ of *Cymatholcus longus*. (C. M. Cat. Vert. Foss., No. 11,891). About 4/5 nat. size. (Shown from the right)

Judging from the nature of their zygapophysial articulations, the cervical vertebræ represent numbers four, five, and six, or numbers

five, six, and seven. The centrum of the foremost vertebra is concave anteriorly and convex posteriorly; the middle vertebra has its centrum concave anteriorly. The anterior portion of the last vertebra is so closely appressed to the posterior portion of the second that it was thought better not to separate them, so the characters of those portions of their centra cannot be determined.

Each of the three vertebræ has heavy transverse processes arising from the anterior terminal portion of the centrum. These are closely associated with the pedicles forming the bases for the almost vertical prezygapophyses, which are supported along their anterior edges by a flare of bone from the anterior end of the neural arch. This arrangement forms a deep concavity, open dorsally and posteriorly, for reception of the postzygapophyses of the preceding vertebra during flexion of the neck. A strong ridge extends from the transverse process posteriorly to the antero-ventral rim of the intervertebral foramen.

The postzygapophyses extend backward almost parallel to the centrum and their articular facets are set facing laterally and only a little ventrally. A ridge extends from the lateral side of the postzygapophysis antero-ventrally over the lateral wall of the neural arch; in the anterior-most vertebra it joins the dorsal portion of the transverse process; while in the middle vertebra it fades out immediately after leaving the postzygapophysis.

A very slight, threadlike ridge lies along the midline of the neural arch, on the foremost vertebra flanked for the posterior third of its course by narrow depressions, which in turn are bordered laterally by small ridges, which diverge posteriorly and extend out on the dorsal surfaces of the postzygapophyses. In the middle vertebra the median ridge coalesces with the flanking ridges about midway along the neural arch, leaving a shallow median depression, triangular in shape, which has for its base the posterior rim of the neural arch.

A narrow, prominent ventral keel follows the midline for the anterior two-thirds of the length of the centrum. The posterior part of the centrum of the anterior vertebra is so badly crushed that its characters cannot be determined accurately, but in the middle vertebra the keel terminates in a rather deep triangular depression, which has its apex directed anteriorly.

The right prezygapophysis and a fragment of the centrum of the first thoracic vertebra have been preserved. Dimensions are given in Table IX.

The three ribs present show an advanced stage of the reduction described by Hay⁹ as one of the features of the evolution of the *Testudinidæ*. The first and second ribs are strong, and fused for most of their free length, forming an admirable, arched support for the centrum of the first thoracic vertebra. The third rib, which is almost certainly typical of all the ribs save the first two and the tenth, is so reduced that the shaft is but 5 mm. wide and 2.5 mm. thick. Hay¹⁰ mentions a specimen of *Testudo radiata* with a shell 305 mm. long, in which the rib-heads are "very slender blades 5 mm. thick horizontally and 2 mm. high." Since the specimen at hand has a carapace more than twice as large as that of Hay's *T. radiata*, reduction of the rib-heads to the same actual size would mean a proportionate reduction twice as great. Although in his monograph Hay gives no measurements for *Hadrianus* and *Stylemys*, it is safe to assume from his statements regarding these genera¹¹ that the reduction in *Cymatholcus* is carried much further than in *Hadrianus*, and is at least equal to that in *Stylemys*.

The sacrum is represented by a few fragments, too battered to merit description, which adhere to the left ilium.

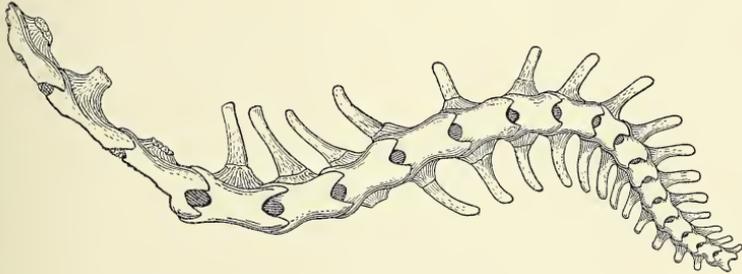


FIG. 5. Caudal vertebræ of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size.

The tail is composed of nineteen vertebræ. It was enmatrixed in death pose, with the first caudal abutting against the sacrum.

The shortness of the tail is worthy of note. The vertical height of the pelvis is 175 mm.; the length of the tail is 210 mm. From the nature of the articulations of the anterior caudals it is apparent that

⁹*Op. cit.*, p. 369.

¹⁰*Ibid.*, p. 369.

¹¹*Ibid.*, p. 369.

the maximum downward curvature possible during life would not suffice to bring the tip of the tail ventral to the dorso-posterior border of the plastron. Moreover, as the anal portion of the posterior lobe of the plastron is contained within the flare of the carapace, rather than being ventral to it, the skin of the anal region must have stretched horizontally, so that the external tail was at most a tiny protuberance and very possibly was not present at all.

Hay's figures of the distal end of the tails of *Testudo osborniana*¹² and *T. orthopygia*¹³ show the caudals expanded to support the dermal armor; the tapered caudal termination of *Cymatholcus* obviously is not constructed to furnish support. As one dermal bone was found with the shell there is no doubt that *Cymatholcus* possessed this. This is added evidence for the absence of an external tail.

Caudals numbers one, two, and three resemble one another; number two is best preserved. It has the transverse process short and heavy, ending in a tuberosity. The neural arch is high, and flat on the dorsal surface, and the inter-vertebral foramina are large.

From caudal number four to number nineteen, the vertebræ are similar, differing from the first three in having lower neural arches and long, tapering transverse processes. Number nineteen is merely a terminal button. The transverse processes are separated from the centra by definite articular surfaces, as in the modern *Testudo radiata*. Hay's figures of the caudals of *T. orthopygia*¹⁴ show the transverse processes continuous with the centra, and he does not mention the matter in his description, so the status of this character is not clear. The position of the transverse process is at the anterior part of the centrum in caudal number six. In the more distal vertebræ the process shifts posteriorly; it is attached about in the middle of the centrum of caudal number nine. It is attached at the rear of the centrum of caudal number ten, and distal to number ten each process articulates partly with the succeeding vertebra.

PECTORAL GIRDLE

The shoulder-girdles are powerfully, but gracefully proportioned, and exhibit the two characters described by Hay¹⁵ as typical of the

¹²*Op. cit.*, p. 427.

¹³*Ibid.*, p. 445.

¹⁴*Op. cit.*, pp. 445-446.

¹⁵*Op. cit.*, p. 370.

Testudinidæ, i.e., an expanded coracoid and a procoraco-scapular angle of more than ninety degrees. Hay has figured the shoulder-girdle for those species where it is known, but in his monograph he has made no attempt to describe it for any members of the family. From comparison with his illustrations and with the shoulder-girdle of *Hadrianus corsoni* (A. M. N. H., No. 1068), it apparently seems that the shoulder-girdle of *Cymatholcus longus* possesses no generic characters exclusively its own.

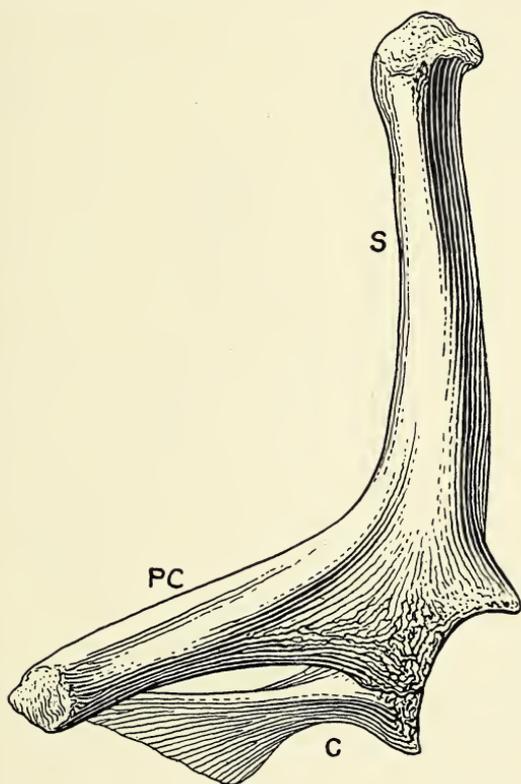


FIG. 6. Anterior view of left side of pectoral girdle of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size. S, scapula; PC, precoracoid; C, coracoid.

The lateral side of the scapula is enlarged into a supporting pillar, which flattens as it extends dorsad and is expanded at its tip into the dorsal termination of the bone. The termination is elongated ovoid in cross-section, with the long axis running anteromesially to postero-

laterally. A rounded eminence arises from the anterior moiety of the termination, embraced posteriorly by a comma-shaped depression with the tail of the comma pointing mesially. There is a slight, but distinct, recurve in the lower part of the pillar, before it flares out as the dorsal rim of the glenoid cavity. For the ventral half of its course the pillar is flanked mesially by a gradually widening flange of bone, flat posteriorly and broadly concave anteriorly, which merges in a sweeping curve with the precoracoid.

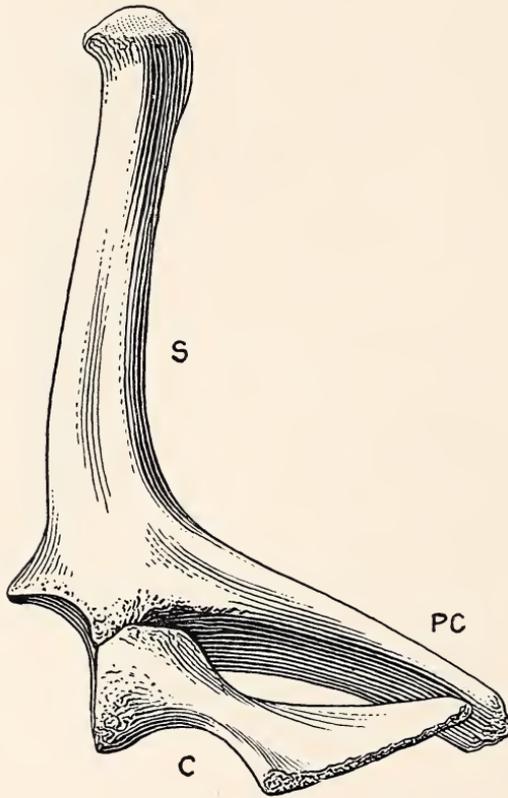


FIG. 7. Posterior view of left side of pectoral girdle of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size. S, scapula; PC, precoracoid; C, coracoid.

The precoracoid is very elongated, with a cross-section ovoid in outline for its entire free length. The bone is twisted so that the long axis of the cross-section is vertical near the glenoid cavity and almost

horizontal at the median termination, the ventral edge curving out and becoming anterior and the dorsal edge swinging posteriorly as they approach the median tip. On the anterior face of the precoracoid a triangular concavity with its base meets the similar concavity descending the scapula; the two together form a broad, depressed area with apical tongues extending along the shafts of the bones. On the posterior surface of the precoracoid just mesial to the glenoid cavity, the ventro-laterally directed apex of a sharp triangular prominence forms the dorsal border of the facet for articulation with the coracoid. The precoracoid terminates medially in a simple rounded end, with a slightly expanded rim.

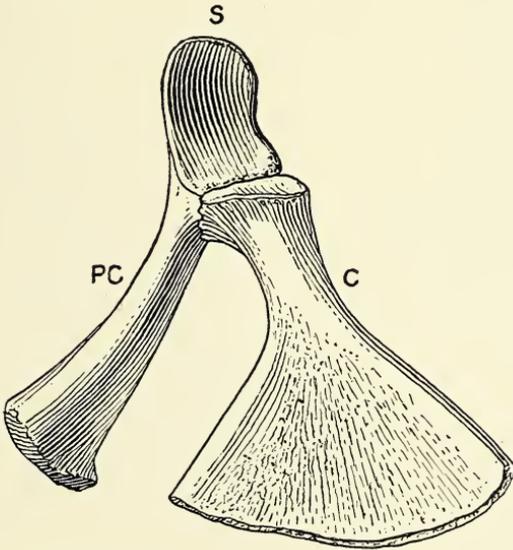


FIG. 8. Inferior view of left side of pectoral girdle of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size. S, scapula; PC, precoracoid; C, coracoid.

From a massive head forming the ventral part of the glenoid cavity, the coracoid narrows to a short neck and then flares to a wide, almost flat blade. The head is thickened dorsally by a heavy protuberance bearing a dorsolaterally directed facet for articulation with the facet of the precoracoid. The neck of the coracoid is directed away from the precoracoid at an angle of about sixty degrees, but the expansion of the coracoid blade is so great that its anterior border approaches the medial end of the precoracoid at a low angle. The blade of the

coracoid is not a true plane; its anterior third is warped very slightly dorsally, and its postero-mesial angle is a little depressed.

The glenoid cavity is in outline a narrow rectangle with semicircles replacing the short sides. The scapular-precoracoid portion is almost twice as long as wide and is gently concave longitudinally and transversely. The coracoid portion is almost circular, with a broad, convex rim and a small central concavity, and is set at an angle of about one hundred twenty degrees to the scapular-precoracoid portion.

PELVIC GIRDLE

A casual inspection suffices to make evident the marked differences between the pelvic structure of *Cymatholcus longus* and that of the other *Testudinidæ*. First, the pelvis is very high dorso-ventrally, and its length is slightly greater than its width. In all the specimens figured by Hay the width, measured across the ilia at the dorsal rim of the acetabula, is much greater than the length, measured from the anterior tips of the pubes to the posterior rim of the ischia. The pelvis of *Hadrianus corsoni* (A. M. N. H. No. 1068) is 113 mm. wide and 87 mm. long. The width of a pelvis of *Testudo laticuneæ* (A. M. N. H. No. 1160) is 108 mm., and its length is 95 mm. The measurements given by Hay for *Testudo vago*¹⁶ are: width, 120 mm.; length, 58 mm. For *Testudo impensa*¹⁷ his measurements are: width, 276 mm.; length (measured by me from his illustration, *op. cit.*, p. 435), 192 mm. The pelvis of a specimen of *Stylemys* in the Carnegie Museum (Cat. Vert. Foss., No. 1515) has the following dimensions: width 131 mm.; length, 105 mm. In *Cymatholcus longus* the width is 145 mm., and the length is 150 mm. Secondly, the pubes, anterior to the ischiopubic foramina, are very broad, and their lateral borders make angles of about fifteen degrees with the midline, while in all of Hay's illustrations the angle is forty-five degrees, or greater. Finally, the pelvic elements are so thoroughly ankylosed, that it is difficult to perceive the symphyses, whereas the specimen of *Stylemys* at hand and many specimens figured by Hay have the symphyses loose and the bones somewhat separated. While the extensive ankylosis in the present specimen is unquestionably due in part to the advanced age of the individual, it is probable that the union of the pelvic elements was

¹⁶*Op. cit.*, p. 416.

¹⁷*Ibid.*, p. 435.

always closer than was the case in the other early Tertiary *Testudinidæ*.

The ilium resembles that of *Stylemys nebrascensis*. It is heavy, and has an anterior pillar, which is continuous with the ascending

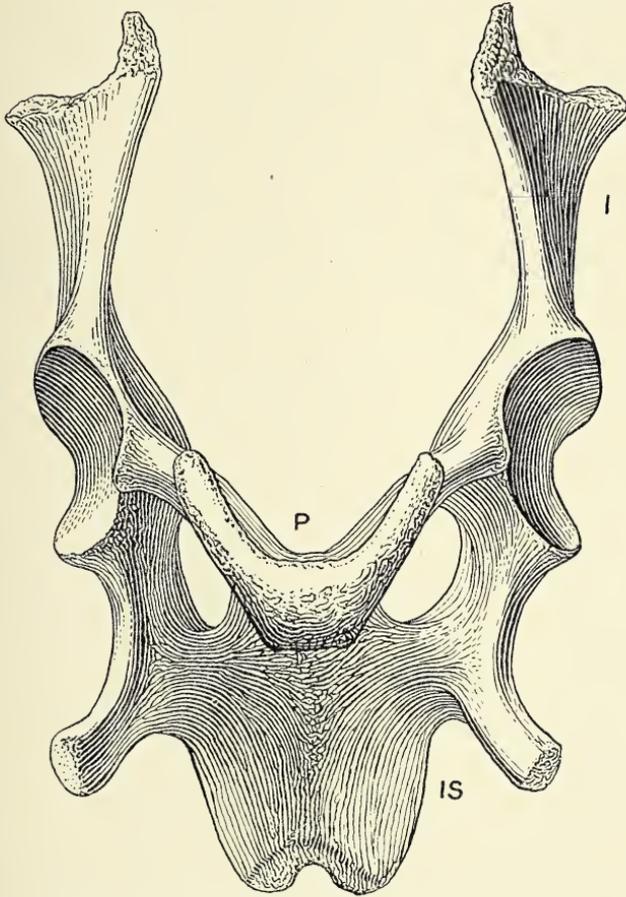


FIG. 9. Ventral view of pelvic girdle of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size. I, ilium; P, pubis; IS, ischium.

buttress of the pubis. The dorsal border has a wide posterior flare; the flare curves inward, as in *Stylemys*. The length of the ilium is less than the antero-posterior length of the pelvis, while in *Stylemys* the two are almost the same, and in *Testudo vaga* the ilium is the longer; however, this difference is due rather to the lengthening of the pelvis of *Cymatholcus* than to any iliac peculiarity.

The ischium is very massive. A short, flat bar with an acute anterior edge and a rounded posterior edge extends from the posteroventral portion of the acetabulum to the main ischiac mass. The anterior ischiac process, meeting the posterior pubic process to form the ischiopubic bar, is very short and heavy. Its cross-section is an isosceles triangle with the sides concave outwardly. The main portions of the ischia are ankylosed to form a posteromedian mass,

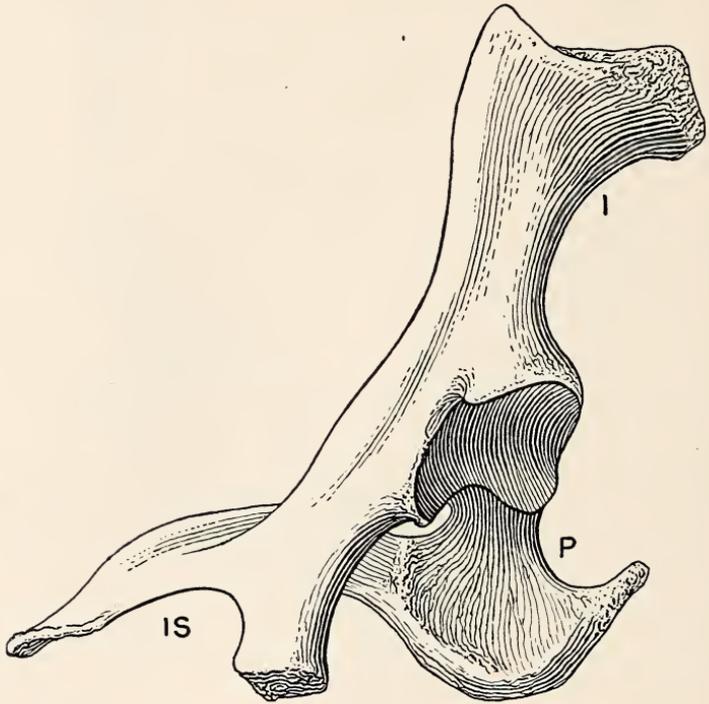


FIG. 10. Lateral view of right side of pelvic girdle of *Cymatholcus longus*. (C. M. No. 11,891). One-half natural size. I, ilium; P, pubis; IS, ischium.

deeply excavated posterodorsally, and possessing a strong, acute ventral keel along the midline. The posterior border is deeply arched downward, and lies in a plane almost parallel to the plane of the ascending pubic buttresses. The free tips of the ischia are small, conical, and acute. The ischiac symphysis is set at an angle of about one hundred and ten degrees to the line of the pubic symphysis.

Each pubis consists of four parts: a laterodorsal ascending buttress;

a lateroventral epipubis; a medio-anterior expanded blade; and a medioposterior pubo-ischiac process.

Posteriorly the ascending buttress expands into the pubic portion of the glenoid cavity; anteriorly it rises to blend with the anterior pillar of the ilium. For the ventral half of its course, the anteromedial border of the buttress is acute, extending as a ridge, which rapidly merges with the dorsal surface of the blade of the pubis. The antero-internal rim of the ischiopubic foramen curves behind this ridge and flattens against the inner surface of the buttress.

The epipubis is of medium length, having a cross-section more nearly flat than that of *Hadrianus corsoni*, and is rather long antero-dorsally. It is inclined about thirty degrees from the vertical, and is directed slightly forward. Its distal termination is very slightly expanded anteroposteriorly.

The pubo-ischiac process of the pubis is longer and slenderer than the corresponding process of the ischium. Starting near its anterior portion is a median ventral keel, increasing posteriorly, which continues on the ischiac process as the ventral ischiac keel. The ischiopubic foramina, which are encircled by the ischia and the parts of the pubes just described, are ovoid in outline and of medium size.

The blade of the pubis is long anteroposteriorly and very thin. The median symphysis is elevated in a prominent dorsal carina. The tips of the pubic blades are situated latero-anteriorly, so that there is between them a wide and deep notch. Anteriorly there is a poorly ossified, poorly preserved extension of the blades, which seems to represent an ossified cartilage. This has been omitted from all measurements of the bones of the pelvis and its measurements have been placed in Table VIII, so that anyone, considering it a portion of the pelvis proper, may by adding its measurements to those given arrive at what he would conceive to be the correct pelvic dimensions. It seems highly unlikely that in an individual so old, in which all of the other parts are thoroughly ossified and some are ankylosed, the anterior portion of the pubes would remain partly cartilaginous. On the other hand, it is extremely probable that in such an individual several of the cartilages would be partly calcified and in the present case this offers apparently the more logical interpretation.

The acetabula are trilobate; the pubic portion of the acetabulum is demarcated by marginal notches deeper than that which separates the iliac from the ischiac. The sutures are completely obliterated.

Although the difficulties of determining evolutionary affinities of a genus from the study of one individual are evident, it appears that *Cymatholcus* possesses such decisive characteristics, that I feel justified in stating what seems to be its most probable relationship to the other genera of the *Testudinidæ*. It is to be hoped that future collections may establish beyond doubt the phylogeny of this interesting group.

RELATIONS

Hay¹⁸ and Gilmore¹⁹ regard *Hadrianus* and *Testudo* as being closely related, using the shape of the anterior plastral lobe as a character separating these genera from *Stylemys*. The anterior lobe of the plastron of *Cymatholcus* closely resembles that of *Stylemys* in the configuration of the lip to the general outline of the lobe. It is logical, therefore, to assume that *Hadrianus* and *Testudo* belong to one phylum²⁰ of the *Testudinidæ*; *Stylemys*, and *Cymatholcus* to another. Hay's genus *Achilemys* differs from both these groups in having no epiplastral lip.

It is clear, however, that *Cymatholcus* is to be regarded not as ancestral to *Stylemys*, but rather as related to the latter genus through a common ancestral stock. This idea is supported by the development of certain specializations not found in *Stylemys*. The long, narrow outline of the carapace, the digitate costoperipheral suture, the elaborately looped marginoplastral sulcus, the high degree of reduction evident in the third rib, and the long, narrow pelvis are specializations along lines, in all of which *Stylemys* is less developed.

As has been quoted previously, Hay believes that one of the tendencies of Testudinate evolution has been the lengthening of the bridge posteriorly. The axillary buttress of *Cymatholcus* rises slightly upon the first costal; the inguinal buttress does not cross the costoperipheral suture, and due to obliteration of the sutures, it cannot be determined whether the buttress rises toward costal five or costal six. However, the proportionately short bridge and very long posterior plastral lobe are made apparent by inspection and measurement.

It is possible that in this case retention of a primitive character

¹⁸*Op. cit.*, pp. 374-386.

¹⁹Gilmore, C. W., *Fossil Turtles of the Uinta Formation*, Mem. Carn. Mus., Vol. VII, No. 2, Nov. 1915, p. 154.

²⁰Using the word "phylum" as it is employed by Prof. H. F. Osborn in his monograph on the Titanotheres. (U. S. G. S. Monograph 55).

was distinctly to the advantage of the race. The long posterior free space gives the animal room for a powerful stride, and the lung space provided in the high, arched shell suggests that *Cymatholcus* was able to move swiftly and easily. The sturdy, beautiful construction of the skeletal elements, particularly the pelvis, is in agreement with this idea. As the posterior lobe of the plastron is within the flare of the carapace, the posterior limbs must have been situated almost under the body rather than lateral to it, which also represents an adaptation for more efficient movement on land.

The Eocene and basal Oligocene ancestors of *Stylemys* are yet to be found. Forms transitional between the ancestral Stylemids and the rather highly specialized *Cymatholcus* should occur not later than the lower Eocene.

TABLE I

CARAPACE.

GENERAL PROPORTIONS.

Length.....	690
Width of bridge.....	432
Length, anterior to axillary notches.....	195
Width across axillary notches.....	290
Greatest width anterior to bridge.....	420
Width across inguinal notches.....	305
Greatest width posterior to bridge.....	440
Length posterior to inguinal notches.....	280
Height, marginal keel to top of shell (Plus about 50 mm. short due to crushing).....	275
Approximate height of anterior opening.....	90
Width, narrowest point along marginal keel (Sulcus between marginals five and six).....	404*
Length of bridge.....	250

TABLES

(NOTE):

1. All measurements are in millimeters.
2. Measurements with a possible error of more than five and less than ten millimeters are starred.

Measurements with a possible error of more than ten millimeters are given as approximations.

3. In the carapace, the length of an element is its proximodistal extent, and its width is circumferential. Length is measured along the anterior border.

4. In the plastron, length of all elements is measured anterodorsally; width is measured transversely.

TABLE II
CARAPACE. PLATES.

COSTALS.			
No.	Length	Width, proximal	Width, distal
3	235*	72*	41
4	235*	84*	98
PERIPHERALS			
No.	Length	Width, proximal	Width, distal
1	95	66	
2	101	40	113
3	98	70	93 along margin, 116 extreme
4	90	88	68
5	112	82	93
6	134	91	64
7	131	55	85
8	138*		
10	110	54	93
11	105		

TABLE III
CARAPACE. SCUTES.

VERTEBRAL NUMBER 3			
Length, antero- posteriorly lateral border		midline	
142		155*	
Width, transversely posterior border		medially	
116*		152	
COSTALS			
No.	Length	Width, proximal	Width, distal
1	(Same as width proximal)	205	229
2	204	150	150
3	215	133	152

MARGINALS

No.	Length	Width, proximal	Width, distal
1			
2	53	66	95
3	73	64	98
4	65	88	88 along marginal keel
5	117	87	73 along marginal keel
6	154	92	70 along marginal keel
7	199	75	82 along marginal keel
8	125	37	79
9	108	54	88
10	99	50	95
11	98	56	71
12	88	74	78*
	Posterior		
12	100		

TABLE IV

PLASTRON. GENERAL PROPORTIONS.

Extreme length.....	656*
Length along midline.....	612*
Length of anterior lobe.....	210*
Width at base of anterior lobe.....	286
Length of bridge.....	228
Width midway along bridges.....	426
Length of posterior lobe.....	209
Width at base of posterior lobe.....	278
Length of lip (approximate).....	80
Width of lip, posteriorly (approximate).....	130
Thickness of lip, posteriorly (approximate).....	50
Length of posterior notch.....	45
Width of posterior notch.....	109

TABLE V

PLASTRON. PLASTRAL BONES.

XIPHYPLASTRON

Length along midline.....	124
Length along lateral edge.....	165*
Approximate width at anterior end.....	120

TABLE VI
PLASTRON SCUTES.

PECTORAL	
Length at midline.....	29
Width { to axillary notch.....	146
{ to border of marginals.....	186
ABDOMINAL	
Length { at midline.....	174
{ along ventral swelling at bridge.....	163
Width, anterior.....	199
FEMORAL	
Length { at midline.....	109
{ along lateral border.....	158
Width, anterior.....	132
ANAL	
Length at midline.....	58
Anterior border.....	94
Posterior border.....	73
Lateral border.....	76

TABLE VII
SHOULDER GIRDLE.

SCAPULA	
Length, to rim of glenoid cavity.....	155
Distal expansion { antero-posterior.....	21
{ transverse.....	33
Length to angle of precoracoid.....	125
Scapular-precoracoid angle.....	115*
PRECORACOID	
Length to rim of glenoid cavity.....	76
Length to angle of scapula.....	90
Free termination { antero-posterior.....	30
{ dorso-ventral.....	16
CORACOID	
Length of external border.....	95
Length of anterior border.....	82
Length of internal border.....	89
Length of blade { anterior.....	50
{ posterior.....	61
Length, glenoid cavity to blade.....	37
Thickness of neck, dorsoventrally.....	12
Thickness of neck, anteroposteriorly.....	17

GLENOID CAVITY

Length (straight line).....	51
Length, scapular-precoracoid.....	38
Length, coracoid.....	24
Width, scapular.....	25
Width, coracoid.....	28

TABLE VIII

PELVIS.

GENERAL

Tip of prepubis to dorsal border of ilium (measured vertically).....	175
Width across iliac rims of acetabula.....	145
Width between tips of epipubes.....	124
Width between antero-dorsal tips of ilia.....	134*
Extreme length of pelvis.....	150

ILIUM

Length to pubo-iliac symphysis.....	100
Length to ischio-iliac symphysis.....	96*
Length of dorsal border.....	68*
Antero-posterior thickness of neck.....	29
Mesio-lateral thickness of neck.....	11

ISCHIUM

Length along midline { Dorsal.....	59
{ Ventral.....	46
Length from ischio-iliac symphysis to posteromedial termination of ischium....	74
Distance between posterior tips of ischia.....	64
Distance from midline to posterior tips { Antero ventral.....	65*
{ Postero dorsal.....	42
Free length of posterior tips.....	17
Transverse measurement of ischiopubic symphysis.....	27

PUBIS

Width just anterior to epipubes.....	75
Width across anterior tips of pubes.....	44
Length of symphysis (dorsal).....	75
Distance from anterior pubo-epipubic angle to anterior tip of pubis.....	51
Distance between bases of ascending pillars.....	39
Proximo-distal length of epipubes { Anterior.....	30
{ Posterior.....	37
Antero-posterior length of epipubis at neck.....	22
Antero-posterior length of epipubis at distal termination.....	26
Mesio-lateral thickness of epipubis.....	11
Length of pubis along midline from ascending pillars to pubo-ischial symphysis.....	28

ACETABULAR CAVITY

Tip of iliac rim to pubo iliac symphysis.....	38
Tip of iliac rim to ischio iliac symphysis.....	24
Tip of ischiac rim to ischio iliac symphysis.....	14
Tip of ischiac rim to ischio pubic symphysis.....	19
Tip of pubic rim to pubo iliac symphysis.....	26
Tip of pubic rim to pubo ischiac symphysis.....	23
Iliac tip to pubic tip.....	50
Iliac tip to ischiac tip.....	37
Pubic tip to ischiac tip.....	36

ISCHIO-PUBIC FORAMINA

Antero posterior dimensions	{ Right..... 39 Left..... 41
Transverse dimensions		{ Right..... 31 Left..... 27
Distance between foremost points on rims.....	56
Distance between hindmost points on rims.....	43
Distance between lateral borders.....	73

OSSIFIED CARTILAGE

Length at midline.....	22
Length at pubic tips.....	15

TABLE IX

VERTEBRAL COLUMN.

ANTERIOR CERVICAL VERTEBRA

Length of centrum.....	51
Length of neural arch along midline.....	34
Distance from anterior tip of prezygapophysis to posterior tip of postzygapophysis.....	60
Width of anterior face of centrum.....	17
Width of posterior face of centrum (approximate).....	15
Height of posterior intervertebral foramen.....	7
Length (antero-posterior) of posterior intervertebral foramen.....	11
Width across prexygapophyses.....	26
Width across postzygapophyses.....	25

MIDDLE CERVICAL VERTEBRA

Length of centrum.....	46
Length of neural arch along midline.....	31
Distance from anterior tip of prezygapophysis to posterior tip of postzygapophysis.....	49
Width of anterior face of centrum.....	13
Width across prezygapophyses.....	28
Width across postzygapophyses.....	24

POSTERIOR CERVICAL VERTEBRA

No significant dimensions preserved.

FIRST THORACIC VERTEBRA

Length of centrum.....	20*
Transverse distance between tip of prezygapophysis and anterior rim of centrum.....	18
Length of prezygapophysis anterior to the anterior epiphysis of the centrum..	12

FIRST RIB

Free length.....	25
Anterior-posterior length of head.....	15
Dorso-ventral thickness of head (approximate).....	4

SECOND RIB

Free length.....	34
Antero-posterior thickness of head.....	23
Dorso-ventral thickness of head (approximate).....	6
Antero-posterior thickness of shaft 10 mm. from point of fusion with costal plate.....	14
Dorso-ventral thickness of shaft 10 mm. from point of fusion with costal plate.....	7

THIRD RIB

Free length.....	36
Antero-posterior thickness 10 mm. from centrum.....	5
Dorso-ventral thickness 10 mm. from centrum.....	2.5
Antero-posterior thickness 5 mm. from point of fusion with costal plate.....	12.5
Dorso-ventral thickness 5 mm. from point of fusion with costal plate.....	2.0

CAUDAL SERIES

Length.....	210
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SECOND CAUDAL VERTEBRA

Length of centrum.....	17
Length of neural arch.....	25
Width of neural arch (approximate).....	13
Height of neural arch.....	15
Height of centrum (posterior).....	11
Length of transverse process (approximate).....	11
Height of intervertebral foramen (between vertebræ 1 and 2).....	10
Length of intervertebral foramen (between vertebræ 1 and 2).....	10.2

SEVENTH CAUDAL VERTEBRA

Length of centrum.....	14
Length of neural arch.....	16
Width of neural arch.....	9
Height of neural arch (posterior).....	6

Length of transverse process.....	17
Height of intervertebral foramen (between vertebræ 6 and 7).....	2.5
Length of intervertebral foramen (between vertebræ 6 and 7).....	5.0

TERMINAL CAUDAL VERTEBRA

Length.....	4
Width anteriorly.....	3.4
Width posteriorly.....	2.2

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X. A NEW ANOSTEIRID FROM THE UINTA EOCENE.

BY JOHN CLARK.

The specimen here described was collected by Mr. J. LeRoy Kay, in charge of field-work for the Section of Vertebrate Paleontology, Carnegie Museum, in 1930. It was found in the Leota Quarry,¹ Uinta County, Utah. The study of the specimen was pursued under the general direction of Mr. O. A. Peterson, Curator of Fossil Mammals, Carnegie Museum. The illustrations are from drawings by Mr. Sydney Prentice. Mr. Barnum Brown, Curator of Fossil Reptiles in the American Museum of Natural History, very kindly lent for comparison the shell of *Anosteira ornata* (A. M. N. H., No. 6132) described by Hay.²

Family DERMATEMYDIDÆ Gray.

SUBFAMILY ANOSTEIRINÆ Lydekker.

***Pseudanosteira** *pulchra*, gen. et sp. nov.**

Type: Complete carapace, almost complete hyoplastra, hypoplastra, and anterior extremities of xiphyplastra (C. M., No. 11808).

Horizon: Upper part of Horizon C, Uinta Eocene.

Locality: Quarry L. Leota Ranch, near Green River, six miles above Ouray, Uinta County, Utah.

Generic characters: Carapace ovate in outline, emarginate anteriorly; posteriorly there is a median dorsal carina. Ten pairs of peripherals, eight pairs of costals, seven neurals. First costal in contact with first neural only. Fourth costal in contact with fourth neural only. Neurals highly differentiated: first and fourth octagonal; second, third, and fifth tetragonal; sixth and seventh hexagonal. Costals ornamented with obsolete transverse ridges; peripherals with pustules and acute vermicular ridges. First vertebral scute bisected

¹See *Ann. Carn. Mus.*, Vol. XX, Plates IV, X.

²Hay, O. P. *Fossil Turtles of North America*. Carnegie Institution of Washington, 1908. pp. 279-281.

**Ψευδος* = false; *ἀνοστειρα* = Name of a genus of fossil turtles set up by Prof. Leidy.

anteriorly by a median sulcus, posteriorly by the anterior end of the second vertebral scute. Second vertebral scute embraced posteriorly by the antero-lateral tips of the third vertebral scute. Fourth vertebral scute very much reduced. Fourth costal scute bordered by third, fourth, and fifth vertebral scutes. Plastron, so far as known, as in *Anosteira ornata*.

In its general features, the carapace resembles that of *Anosteira ornata* (A. M. N. H. No. 6132). Its outline is broadly oval, with a shallow anterior emargination; a strong median carina rises as a blunt, posteriorly directed spine on the third and fourth neurals, and continues almost to the free border of the pygal. The shell is almost twice as large as that of *A. ornata*, and seems to be less highly arched, but crushing in all the specimens makes the latter character difficult to determine. The sculpture is like that of *A. ornata*, but is much less clearly expressed, especially upon the costals and the plastron, which are almost smooth.

Examination of the bony structure of the carapace reveals a degree of specialization much greater than in the case of *Anosteira*. The sutures between the first and second costals meet the first neural about one-third of its length from its posterior end, rather than meeting the anterior part of the second neural. The suture between the second and third costals is continuous on the left side with the suture between the second and third neurals, and on the right side meets the second neural immediately anterior to its posterior suture. The fourth neural receives, near its anterior end, the sutures between the third and fourth costals, and near its posterior end the sutures between the fourth and fifth costals. The sixth neural receives the sutures between the fifth and sixth costals and the seventh neural receives the sutures between the sixth and seventh costals, as in *Anosteira*. The first and fourth neurals are octagonal; the second, third, and fifth are tetragonal; and the sixth and seventh are hexagonal. The nuchal, supra-pygal, and peripherals are similar to the corresponding bones in *Anosteira*. As in *Anosteira*, the free borders of the anterior peripherals are rounded and sub-acute, while the borders of the posterior peripherals are acute.

In marked contrast to the condition of the bony plates, the scutes are much more primitive than those of *Anosteira*, and present the key to certain formerly little understood trends of specialization of the Anosteirid epidermal armor.

The first vertebral scute resembles that of *Anosteira* in all important respects. The second vertebral scute, which has lost its identity in *Anosteira*, thrusts the median spike of its helmet-shaped anterior end between the lateral wings of the divided first vertebral scute as far as the posterior part of the first neural. The wings of the first vertebral extend back to a point two-thirds of the length of the second vertebral toward its posterior end. The posterior termination

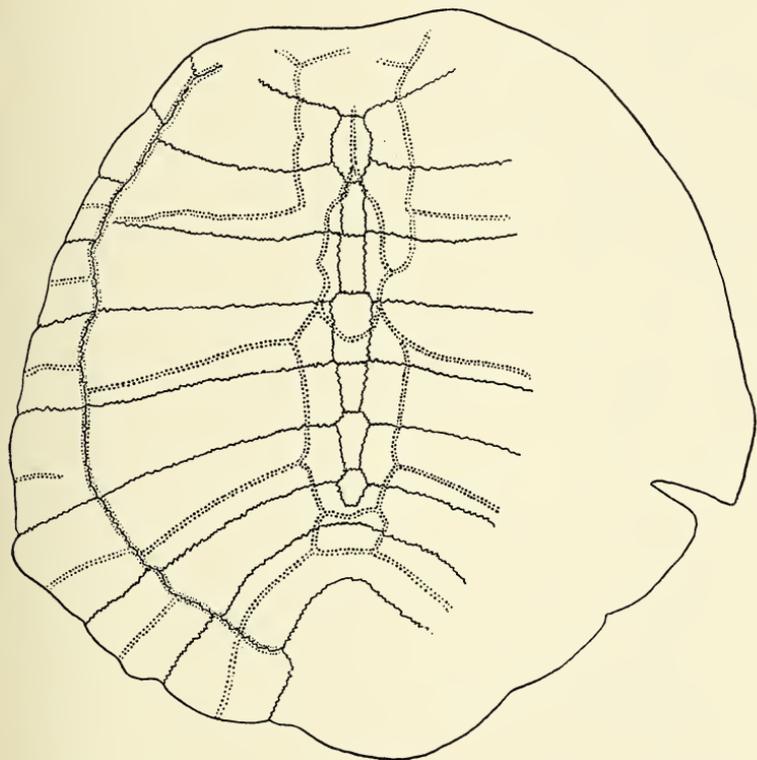


FIG. 1. Dorsal View of Shell of *Pseudanosteira pulchra*, *sp. nov.* (C. M. Cat. Vert. Foss., No. 11, 808) $\frac{1}{2}$ nat. size.

of the second vertebral scute is convex, set firmly in the median anterior socket of the third vertebral. The third vertebral scute is very long, extending from the fourth neural back almost to the anterior suture of the eighth costal bones; it is met at its widest point by the sulcus between the second and third costal scutes and more posteriorly by the sulcus between the third and fourth costal scutes.

The fourth vertebral is reduced, almost extinct. It is a small, rectangular scute, with its anterior third resting upon the seventh costal plates and its posterior two-thirds upon the eighth costal plates. The fifth vertebral scute is triangular with curved borders, and is wider than is the corresponding scute in *A. ornata*.

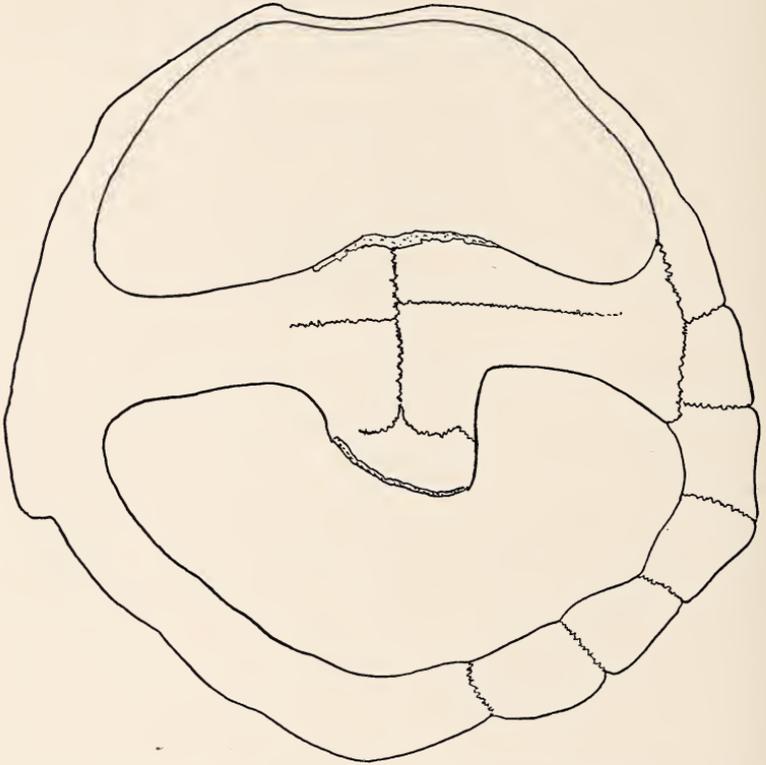


FIG. 2. Ventral View of Shell of *Pseudanosteira pulchra*, *sp. nov.* (C. M. Cat. Vert. Foss., No. 11,808) $\frac{1}{2}$ nat. size.

The costal scutes are simple; the changes in their relationships to the various vertebral scutes has been caused entirely by modification of the vertebral series.

Hay, referring to *Anosteira ornata* (A. M. N. H. No. 6132) says³ "From this and other specimens it becomes quite certain that (the costo-marginal sulci) ran along the upper borders of the peripherals, just below the costo-peripheral sutures." I have not found satis-

³Hay, O. P., *op. cit.*, p. 280.

factory evidence in Hay's specimen, and certainly there is none in *Pseudanosteira*, for supposing that the costo-marginal sulci ran otherwise than coincident with the costo-peripheral sutures. Therefore, the costo-marginal sulci of *Pseudanosteira* may be supposed, until evidence is found to the contrary, to be coincident with the costo-peripheral sutures. The "other specimens" which Hay mentions may have furnished him with good evidence for *Anosteira*, but this does not have bearing upon the condition in *Pseudanosteira*.

The marginal scutes possess no distinctive characteristics.

The nuchal scute is narrower antero-posteriorly than the nuchal of *Anosteira* and is contained within the borders of the nuchal plate rather than reaching them laterally, as does the nuchal scute of *Anosteira*.

The portion of the plastron which has been preserved resembles the corresponding plastral region of *Anosteira ornata* in all its significant characters.

Through the anatomical characteristics which have constituted the subject of the foregoing description, *Pseudanosteira* illuminates several points formerly not understood in the phylogeny of the *Anosteirids*.

That the neural series is more highly developed than the neural series of *Anosteira* and *Pseudotrionyx* is obvious. Dr. Leidy's first description of the type material of *Anosteira ornata*⁴ is brief, is not accompanied by illustrations, and is necessarily limited by the fragmentary nature of his specimens. In 1873 he published⁵ a more complete description, in which he says the "vertebral plates of the carapace are narrow coffin-shaped," which may mean anything from tetragonal to octagonal. However, his illustration shows neurals numbers three, four, five, and six as hexagonal, while number seven is pentagonal, exactly as those bones are shaped in *Å. M. N. H. No. 6132*⁶. Moreover, in both Dr. Leidy's specimens and Dr. Hay's, each neural is met at its lateral angles by the sutures demarcating the anterior borders of its accompanying costals. In his description of the type of *Pseudotrionyx* (which Hay considers closely related to *Anosteira*), Dollo says,⁷ "quatre plaques vertebrales hexagonales, dont

⁴Leidy, Joseph. Proc. Acad. Nat. Sci. Phila., 1871, p. 102.

⁵Leidy, Joseph. Contrib. Ext. Fauna West. Terrs. 1873., p. 175, Plate XVI.

⁶See Hay, O. P., *op. cit.*, p. 280 and Plate 43.

⁷Dollo, M. L. Bull. Musée Roy. D'Hist. Naturelle de Belgique. Vol. IV, 1884. "Première Note sur les Cheloniens du Bruxillien (Eocene Moyen) de La Belgique," p. 92, and Plates I and II.

chacune est comprise entre quatre plaques costales, la plus postérieure étant saisie entre les plaques C₆ et C₇ droites et gauches"—a charming description of exactly the condition which exists in *Anosteira*. To recapitulate briefly the specializations in *Pseudanosteira*, the sutures between costals one and two, between costals two and three, and between costals four and five, have migrated anteriorly so that they meet in each case the posterior part of the neural preceding their own; while neurals one and four have become octagonal, neurals two, three, and five have become tetragonal, and neural seven has become hexagonal.

As both *Pseudotrionyx* and the specimens of *Anosteira* in which the median portion of the carapace is known occurred in beds no higher than the middle Eocene, were it not for the epidermal peculiarities of the present specimen, one might suppose that the differentiation of the neural and costal bones was merely the development to be expected within a phylum⁸ in a considerable period of time, and that the specimen represents an advanced species of *Anosteira*.

The fact that the vertebral scutes of *Pseudanosteira* are much less highly specialized than those of *Anosteira* indicates definitely that the two are members of different phyla, which separated long before Bridger times; the one developing a highly specialized epidermal armor and retaining a primitive arrangement of bones (*Anosteira*), while the other retained the more primitive epidermal structure and modified the bones of the carapace (*Pseudanosteira*).

Hay's discussion of the process of development of the vertebral scutes in *Anosteira*⁹ gives the most logical order of events in the light of the evidence available to him. The present specimen, however, makes necessary important modifications of his ideas.

Hay believed that "the first and second normal vertebrals have coalesced." The anteriormost vertebral of *Pseudanosteira* is developed almost exactly as is the corresponding vertebral of *Anosteira*, and it embraces with its posterior wings the second vertebral, which lies in a position homologous to that of what Hay considered the anterior extension of vertebral three. Apparently, then, the normal second and third vertebrals of *Anosteira* have coalesced, while the wings of the first have extended posteriorly around the second, cutting

⁸Using the word "phylum" in the sense in which it is employed by Prof. H. F. Osborn in his monograph on the Titanotheres, U. S. G. S., Monograph 55.

⁹Hay, O. P., *op. cit.*, p. 281.

it off from its normal junction with the sulcus between the first and second costal scutes. This is borne out by the fact that the anterior part of the sulcus between the first and second vertebrae of *Pseudanosteira*, and that between the first and coalesced second and third of *Anosteira*, still rests on the first neural as in other turtles.

The posterior part of the second vertebral of *Pseudanosteira* has extended backward as a median wedge, flanked by the lateral tips of the third vertebral, which reaches toward the old position of the intervertebral sulcus on the third neural and costal bones.

The fourth vertebral has been driven from its junction with the sulci between the third and fourth costal scutes by the backward extension of the third vertebral, and has been crowded almost to non-existence against the anterior border of the fifth vertebral. In *Anosteira*, the third vertebral has reached the suture between the seventh and eighth costal bones, and the fourth vertebral has coalesced with the fifth, while in *Pseudanosteira* the third vertebral has not reached the suture and the fourth vertebral retains its identity.

In brief, modification of vertebral scutes in the *Anosteirinae* has taken place by the median bifurcation of the first vertebral, the posterior extension of the first, second, and third, and the partial suppression of the fourth. In the *Anosteira* phylum, the second and third have coalesced and also the fourth and fifth.

Ever since Dr. Leidy's original description there has been much debate, occasionally acrimonious, as to the taxonomic position of the genus *Anosteira*. (See papers by Leidy, Cope, Lydekker, Baur, Boulenger, Hay, and others, referred to in Hay's *Bibliography and Catalogue of the Fossil Vertebrates of North America*, 1930, under the heading "*Anosteiridae*" pp. 91, 92.). In his monograph on the Turtles, Hay gave a definition of the family *Dermatemydidae*¹⁰ and included under it the genus *Anosteira*. Following Baur, Hay in 1902 and again in 1930¹¹ included *Anosteira* in the family *Anosteiridae*, which he erected for it. As I see no characters of *Anosteira* which exclude that genus from the *Dermatemydidae* as defined by Hay in 1908, I prefer at present to consider it a member of that family, as did Gilmore in 1931.¹² As the genus *Pseudanosteira* is more closely related to *Ano-*

¹⁰Hay, O. P., *op. cit.*, p. 223.

¹¹Hay, O. P. *Bibliography and Catalogue of the Fossil Vertebrates of North America*. First Catalogue, p. 446. Second Catalogue, p. 91.

¹²Gilmore, C. W., *Bull. Amer. Mus. Nat. Hist.*, Vol. LIX, Art. IV, 1931, "*Fossil Turtles of Mongolia*." p. 217.

steira than to any other known genera of the Dermatemydidae, it seems expeditious to group the two in one subfamily, the Anosteirinae, a name which was proposed by Lydekker in 1889.¹³ My knowledge of the genus *Pseudotrionyx* is not sufficient to warrant my including it within or excluding it from the subfamily Anosteirinae.

TABLE I*

CARAPACE.

GENERAL DIMENSIONS

Length along midline.....	190 mm.
Greatest width (est.).....	175 mm.
Height at nuchal rim.....	42 mm.
Height at dorsal spine.....	65 mm.

NEURAL BONES

No.	Length	Greatest width	Width at anterior suture
1	19	10	6
2	14	6.8	3.5
3	15	7	6.5
4	18.5	11	7
5	14	7	7
6	14	9	4
7	9.5	7	3.3
			posterior
			3.0

COSTAL BONES

No.	Length, anterior border	Width, proximal	Width, distal
1	29	15.5	33
2	54	19	25
3	70	17	24
4	73	16	25
5	72	17	22
6	68	15	23
7	56	12	18
8	46	14	17
	posterior		
	28		

¹³Lydekker, R. Cat. Foss. Rept., III, 1889, p. 143.

*Dimensions in millimeters.

PERIPHERALS

No.	Length, anterior border	Width, proximal	Width, distal
1	11 (est.)	16 (est.)	21 (est.)
2	11	16	17
3	14 (est.)	21	25
4	19	16	24
5	21	19	21
6	21	22	22
7	20	23	31
8	28	22	29
9	25	20	26
10	25	24	27
	posterior		
	17		

NUCHAL BONE

Width along anterior rim	Length along midline	Length along lateral border
45 (est.)	25	11 (est.)

SUPRAPYGAL BONE

Length along midline	Length of posterior border
25 (est.)	37 (est.)

VERTEBRAL SCUTES

No.	Greatest length	Length along midline	Width, anterior	Greatest width
1	57	32	29	29
2	46	46	14	19
3	55	46	16	28
4	11	9	14	17
5	37 (est.)	37 (est.)	14	58 (est.)

COSTAL SCUTES

No.	Length, anterior	Width, proximal	Width, distal
1	..	42	66
2	60	36	46
3	61	32	46
4	51	23	32

MARGINAL SCUTES

No.	Length, anterior	Width, proximal	Width, distal
5	22	19 (est.)	23 (est.)
6	21	21 (est.)	23 (est.)
7	20	28	28
8	21	24	30
9	27	18	27
10	24	20	29
11	22	29 (est.)	31 (est.)

NUCHAL SCUTES

Length along midline	Greatest antero- posterior length	Length along anterior rim
10	14	36

TABLE II

PLASTRON

Width of plastron at bridges.....	152
Length of plastro-carapace suture.....	47
Length of lateral hyo-hyoplastral process.....	52
Length of hyo-hyoplastral suture.....	71
Length of hypo-plastron at midline.....	28
Width of posterior lobe at its base.....	42

XI. NEOTROPICAL BATS IN THE CARNEGIE MUSEUM.

BY COLIN CAMPBELL SANBORN.¹

The collection of unidentified South and Central American bats belonging to the Carnegie Museum was loaned to the Field Museum of Natural History for the examination of certain genera. Represented in the collection are some very rare genera and species, besides many records of distributional interest. It was, therefore, thought advisable to put these data on record in a list of the material. The specimens are mostly from Costa Rica, Colombia, and Bolivia, with a few from Venezuela and Brazil, and represent thirty genera and forty-six species and subspecies. The two hundred and eighty-eight specimens are preserved in the form of one hundred and eighty-five skins with skulls, twenty-three skins only, four skulls only, and seventy-six examples preserved in alcohol.

I wish to thank Dr. A. Avinoff, Director of the Carnegie Museum, for the privilege of studying and reporting upon this interesting collection. I am indebted to Dr. Glover M. Allen, Curator of Mammals at the Museum of Comparative Zoölogy in Cambridge, Massachusetts, and to Mr. Gerritt S. Miller, Jr., Curator of Mammals at the United States National Museum in Washington, D. C., for aid in the identification of two species. Mr. H. E. Anthony, Curator of Mammals at the American Museum of Natural History, New York, kindly loaned the type of *Dermonotus suaipurensis* Allen.

All specimens are skins with skulls, unless otherwise stated. The Carnegie Museum number is placed in parentheses. The collector's name appears at the end of each series of specimens.

ANNOTATED LIST.

Genus SACCOPTERYX Illiger.

I. *Saccopteryx bilineata* (Temminck).

Urocryptus bilineatus Temminck, Van der Hoeven's Tijdschr. Natuurlijk. Gesch., u. s. w., 5, 1838-1839, p. 33.

¹Assistant Curator of Mammals, Field Museum of Natural History, Chicago, Illinois.

COLOMBIA: (647) skin only; Bonda (645) June 1898, H. H. Smith; Mamatoco, Santa Marta (2651-2654, 2658) two males and three females, August 2, 1913, M. A. Carriker, Jr.

BRAZIL: Santarem (1904-1910) four males and three females (in alcohol) Dec. 9, 1909, J. D. Haseman.

2. **Saccopteryx leptura** (Schreber).

Vespertilio lepturus Schreber, Säugethiere, I, 1774, p. 57.

COLOMBIA: Mamatoco, Santa Marta (2650) not sexed (skin only) July 31, 1913; Fundación, Santa Marta (2682) male, Aug. 17, 1913; Dibulla, Santa Marta (3161) female (skin only) Feb. 21, 1914, M. A. Carriker, Jr.

Genus CORMURA Peters.

3. **Cormura brevirostris** (Wagner).

Emballonura brevirostris Wagner, Wiegmann's Arch. f. Naturg., ix, I, 1843, p. 367.

COSTA RICA: El Pozo de Terraba (1595-1596) two males, July 8, 1907, M. A. Carriker, Jr.

COLOMBIA: Don Diego, Santa Marta (3124) male, Jan. 26, 1914, M. A. Carriker, Jr.

These specimens appear to furnish the first records of this rare bat from Costa Rica and Colombia.

Genus DICLIDURUS Wied.

4. **Diclidurus albus** Wied.

Diclidurus albus Wied, Isis, 1819-1820, p. 1630.

BRAZIL: Rio Purus, Hyutanahan (5300) female, March 22, 1922, S. M. Klages.

The forearm of this specimen measures 64 mm.

Genus NOCTILIO Linnæus.

5. **Noctilio leporinus** (Linnæus).

Vespertilio leporinus Linnæus, Syst. Nat., Ed. 10, I, 1758, p. 32.

BOLIVIA: Santa Cruz de la Sierra (2248) male (alc.) 1909 (?) J. Steinbach.

Forearm 86.7 mm.

6. **Noctilio albiventer** Spix.

Noctilio albiventer Spix, Sim. et Vesp. Brasil., 1823, p. 58, figs. 2-3.

BRAZIL: Santarem (1912) male (alc.) Dec. 14, 1909, J. D. Haseman.
Forearm 60 mm.

Genus CHILONYCTERIS Gray.

7. **Chilonycteris rubiginosa rubiginosa** Wagner.

Chilonycteris rubiginosa Wagner, Wiegmann's Arch. f. Naturg., ix, 1, 1843, p. 367.

COSTA RICA: Boruca (1610) female, July 25, 1907, M. A. Carriker, Jr.

Forearm 62.5 mm.

Genus PTERONOTUS Gray.

8. **Pteronotus suapurensis** (Allen).

Dermonotus suapurensis Allen, Bull. Am. Mus. Nat. Hist., 20, 1904, p. 229, Suapure, Venezuela.

COSTA RICA: Boruca (1613) male, July 29, 1907, M. A. Carriker, Jr.

This male, compared with the type which is a female, is a few shades darker throughout and is externally slightly larger. The skulls agree very closely in size and shape, but the mandible of the male is six millimeters longer than that of the female. This is the first specimen taken outside of Venezuela. In Dr. Allen's Venezuela series (Bull. Am. Mus. Nat. Hist., 30, 1914, p. 265), the males appeared to be a little smaller than the females.

GENUS MICRONYCTERIS Gray.

9. **Micronycteris megalotis megalotis** (Gray).

Phyllophora megalotis Gray, Ann. Mag. Nat. Hist., (1), 10, 1842, p. 257.

COLOMBIA: Bonda (662, 667) Nov. 30, 1898, Jan. 6, 1899, Mrs. H. H. Smith; Aguachicha, Magdalena (3877) male, (3878) male (skin only) July 19, 1916; El Tambor, Santander (3940) male, Nov. 26, 1916; La Colorada, Boyaca (3966) female, (3967) male (skin only) April 27, 1917; Jaraquiel, Bolivar (3603-3604) one male, one not sexed, March 3, 1916, M. A. Carriker, Jr.

Genus XENOCTENES Miller.

10. **Xenoctenes hirsutus** (Peters).

Schizostoma hirsutum Peters, Monatsb. Akad. Berlin, 1869, p. 396, no exact locality.

Micronycteris hirsutum Thomas, Ann. Mag. Nat. Hist., (7), 2, 1898, p. 318, Pozo Azul, Costa Rica.

Xenoctenes hirsutus Miller, Bull. U. S. Nat. Mus., No. 57, 1907, pp. 124-125, gen. nov.

COLOMBIA: Mamatoco, Santa Marta (2659) female, Aug. 2, 1913, M. A. Carriker, Jr.

This appears to be the fourth known specimen of this bat and the only skin and skull in good condition, the other specimens being in alcohol. It is also the first record for Colombia.

The upper parts are dull brown, the hairs of the upper back, shoulders, head, and sides of neck with light gray bases; those of the lower back and rump of uniform color to bases. The underparts are brownish-gray, a little darker on the throat.

The short tail is not well marked in the membrane. The identity of the specimen has been confirmed by Dr. G. M. Allen.

Measurements (from dried skin): total length 90 mm.; length of interfemoral membrane 26 mm.; tibia 21 mm.; foot with claw 12 mm.; calcar 9.7 mm.; forearm 42.7 mm.; pollex, metacarpal 8 mm., first phalanx 6 mm.; second digit, metacarpal 30.3 mm., first phalanx 5 mm.; third digit, metacarpal 35.4 mm., first phalanx 17 mm., second phalanx 18 mm.; fourth digit, metacarpal 36.1 mm., first phalanx 13.9 mm., second phalanx 7.5 mm.; fifth digit, metacarpal 38.5 mm., first phalanx 14.5 mm., second phalanx 11 mm. (Ear and nose-leaf dampened before measuring). Ear, from meatus 22 mm., greatest width 14.5 mm., from crown 15 mm.; height of tragus 6.4 mm., greatest width 2.3 mm.; nose-leaf, height 6.7 mm., width 4.6 mm.

Skull: total length 22.6 mm.; condylo-basal length 20.1 mm.; palatal length 9.7 mm.; zygomatic width 11.5 mm.; interorbital width 4.7 mm.; width across M^2 7.2 mm.; mastoid width 9.7 mm.; length upper tooth-row C- M^3 8.8 mm.; length lower tooth-row C- M_3 9.5 mm.; length of mandible 14.6 mm.

Genus LONCHORHINA Tomes.

11. *Lonchorhina aurita* Tomes.

Lonchorhina aurita Tomes, Proc. Zool. Soc. Lond., 1863, pp. 81-84.

BOLIVIA: San Matais (1890) male (alc.) June 8, 1909, J. D. Hase-man.

This bat has been represented previously from the West Indies (three specimens), from Panama (seven specimens), and Venezuela (three specimens). A subspecies, *L. a. occidentalis* Anthony, known from one specimen, is found in Ecuador. This specimen from Bolivia, while well south of the known range of the species, agrees with descriptions and with a skull from Venezuela. It was caught in a cave

near San Matais with four *Anoura geoffroyi* and one *Carollia perspicillata*.

A few years ago the Field Museum of Natural History received a skin and skull of this bat from Alto Parnahyba, Maranhão, Brazil, which extends the range to the east. The specimen is typical in all but one respect; the second lower premolar is crowded inward from the tooth-row so that the first and third premolars are in contact. This may be individual variation.

Genus PHYLLOSTOMUS Lacépède.

12. *Phyllostomus hastatus* (Pallas).

Vespertilio hastatum Pallas, Spicil. Zoöl., 3, 1767, p. 7.

BOLIVIA: Prov. del Sara (2755-2756) male and female; (2757) male (skin only) May 17, 1913; (2767) male (skin only) July 14, 1913; Buenavista (2729) male, Jan. 22, 1911, J. Steinbach.

13. *Phyllostomus hastatus* subsp.

COLOMBIA: Rio Atrato, Soatata (4434-4437) four females, Jan. 23, 1918; Mamatoco, Santa Marta (2665-2677) four males, eight females, and one not sexed, Aug. 3, 1913, M. A. Carriker, Jr.

14. *Phyllostomus verrucosus* Elliot.

Phyllostomus verrucosus Elliot, Proc. Biol. Soc. Wash., 18, 1905, p. 236.

COSTA RICA: Boruca (1617) female, July 29, 1907, M. A. Carriker, Jr.

Formerly known from Mexico only.

Genus TRACHOPS Gray.

15. *Trachops cirrhosus* (Spix).

Vampyrus cirrhosus Spix, Sim. et Vesp. Brasil., 1823, p. 64.

COLOMBIA: Rio Atrato, Soatata (4440) male, Jan. 23, 1918, M. A. Carriker, Jr.

Genus CHROPTERUS Peters.

16. *Chropterus auritus* (Peters).

Vampyrus auritus Peters, Abh. Akad. Wiss. Berlin, 1856, p. 415.

BOLIVIA: Prov. del Sara (2170) female, May 30, 1910; Rio Dolores, Prov. del Sara (2761-2762) male and female, Oct. 2, 1911; Surutu, Santa Cruz (4968) female (skin only) Oct. 5, 1917, J. Steinbach.

The following collector's notes on the labels are of interest: "In camp house;" "A number, six specimens, together in a hole of termite house in a palm tree."

Genus GLOSSOPHAGA Geoffroy.

17. *Glossophaga soricina* (Pallas).

Vespertilio soricinus Pallas, Misc. Zoöl., 1766, p. 48.

COLOMBIA: Jaraquiel, Bolivar (3605) male, March 3, 1916; Aguachicha, Magdalena (3879) female, July 19, 1916, M. A. Carriker, Jr.

VENEZUELA: Santa Lucia, Miranda (6042-6044) three females, Aug. 18, 1929, H. J. Clement.

BRAZIL: Pará (2780, 2782) male and female, Jan. 1914, J. Steinbach.

BOLIVIA: Santa Cruz de la Sierra (1945) female, July 21, 1909; (2229) male (alc.) 1909, J. Steinbach.

18. *Glossophaga longirostris longirostris* Miller.

Glossophaga longirostris Miller, Proc. Acad. Nat. Sci. Phil., 1898, p. 330.

COLOMBIA: Tagauga (839-840) male and female, June 22, 1899, Mrs. H. H. Smith; Mamatoco, Santa Marta (2655-2656, 2663-2664, 2679, 2681) three males, three females, Aug. 2, 3, 1913, M. A. Carriker, Jr.

19. *Glossophaga elongata* Miller.

Glossophaga elongata Miller, Proc. Biol. Soc. Wash., 13, 1900, p. 124.

CURAÇAO: Savonet (2687) female (skin only) May 12, 1911, M. A. Carriker, Jr.

Genus ANOURA Gray.

20. *Anoura geoffroyi* Gray.

Anoura geoffroyi Gray, Mag. Zoöl. Bot., 2, 1838, p. 490.

BOLIVIA: San Matias (1897-1900) three males, one female (alc.) June 8, 1909, J. D. Haseman.

This appears to be the first time this species has been recorded from Bolivia.

Genus CAROLLIA Gray.

21. *Carollia perspicillata perspicillata* (Linnæus).

Vespertilio perspicillatus Linnæus, Syst. Nat., Ed. 10, 1, 1758, p. 31.

COLOMBIA: Rio Atrato, Soatata (4424-4433) three males, seven females, Jan. 23, 1918; Mamatoco, Santa Marta (2657, 2660-2662,

2678, 2680), two males, four females, Aug. 2, 3, 1913, M. A. Carriker, Jr.; Bonda (832) female, Apr. 23, 1899, H. H. Smith.

BRAZIL: Pará (2781) female, Jan. 1914, J. Steinbach.

BOLIVIA: Prov. del Sara (2159-2160) male, female, Oct. 29, 1909; (2161-2163) three males; (2164) female (skin only) Nov. 3, 12, 1909; (2200) female, Sept. 24, 1910; (2728) not sexed (skin only) Jan. 1911; Santa Cruz de la Sierra (1955) male, Aug. 3, 1909; (2228, 2230) male, female (alc.) 1909 (?); Buenavista (2799) male (alc.) Sept. 1911; (5190) male, no date, J. Steinbach. San Matais, (1891) male (alc.) June 8, 1909, J. D. Haseman.

Genus STURNIRA Gray.

22. *Sturnira lilium* (Geoffroy).

Phyllostoma lilium Geoffroy, Ann. du Mus. 15, 1810, p. 181.

BOLIVIA: Santa Cruz de la Sierra (1944) male, July 20, 1909; (1956) female, Aug. 3, 1909; Prov. del Sara (2171, 2173) male, female, May 31, June 1, 1910; Buenavista (2796-2797) two males, Jan. and Oct., 1911, J. Steinbach.

Collector's note: "In house."

Genus URODERMA Peters.

23. *Uroderma bilobatum* Peters.

Uroderma bilobatum Peters, Monatsb. Akad. Berlin, 1866, p. 394.

COLOMBIA: Bonda (835-836) male and female, May 24, 25, 1899; Cacagualito (642-643) not sexed, May 13, 17, 1899, H. H. Smith; Minca, Santa Marta (2620) male, June 27, 1913, M. A. Carriker, Jr.

VENEZUELA: Santa Elena, Merida (5303) male, Aug. 17, 1922, M. A. Carriker, Jr.

COSTA RICA: Boruca (1632-1638) two males, five females, Aug. 12-13, 1907; Miravalles (1519) male, May 27, 1906, M. A. Carriker, Jr.

BOLIVIA: Buenavista (2730) male, April 25, 1911, J. Steinbach.

Dr. Knud Andersen described *Uroderma bilobatum thomasi* (Ann. Mag. Nat. Hist., 1906, (7), 18, p. 419), from two very large specimens from Bolivia. The one Bolivian specimen in this series is no larger than *bilobatum*. *Uroderma* appears to be a rare genus in Bolivia, if we can judge by the single specimen collected by José Steinbach. The Field Museum has never received any among the many bats he sent in.

The large *Uroderma* can be paralleled by specimens of three other genera from Bolivia with exceptionally large forearms: *Myotis nigricans* (C. M. No. 5256) forearm 41.4 mm.; *Carollia perspicillata* (C. M.

No. 2753) forearm 46.2 mm.; *Saccopteryx bilineata* (F. M. N. H. No. 21,475) forearm 50.5 mm. Only the *Carollia* has a skull and it is but slightly larger than the average.

It seems that very large individuals tend to develop in the highlands of Bolivia, and it is possible that *Uroderma b. thomasi* represents specimens of this sort. Further specimens from Bolivia are needed, however, to settle the question.

Genus VAMPYROPS Peters.

24. *Vampyrops lineatus* (Geoffroy).

Phyllostoma lineatum Geoffroy, Ann. Mus. Hist. Nat., Paris, 1810, p. 180.

BOLIVIA: Santa Cruz de la Sierra (1940-1942) three males, July, 16, 1909; Buenavista (2731-2733, 2736) three males, one female, May 6-8, 1911, J. Steinbach.

Genus ARTIBEUS Leach.

25. *Artibeus planirostris planirostris* (Spix).

Phyllostoma planirostris Spix, Sim. et Vesp. Brasil., 1823, p. 66.

VENEZUELA: El Cantado, Miranda (6039-6041) male, two females, July 26, 1929; San Rafael (6333) female, Nov. 5, 1929, H. J. Clement.

26. *Artibeus planirostris fallax* Peters.

Artibeus fallax Peters, Monatsb. Akad. Berlin, 1865, pp. 355-357.

BRAZIL: Santarem (1913) female, Dec. 19, 1909, J. D. Haseman.

27. *Artibeus jamaicensis jamaicensis* Leach.

Artibeus jamaicensis Leach, Trans. Linn. Soc. Lond. Zool., 13, pt. 1, 1821, p. 75.

COSTA RICA: Buenos Aires (1649) female, Aug. 30, 1907, M. A. Carriker, Jr.

28. *Artibeus jamaicensis lituratus* Lichtenstein.

Phyllostomus lituratus Ill., Lichtenstein, Verz. Doubl. Berlin, Mus., 1823, p. 3.

BOLIVIA: Prov. del Sara (2147, 2154-2157) male, four females; (2158) female (skin only) Oct. 29, 1909; (2167) juv. male, Apr. 14, 1910; (2235) male, May 8, 1911; Santa Cruz de la Sierra (2232-2236) male and four juvs. (alc.) 1909, J. Steinbach.

The juvenal male (2167) is in the dark, almost black pelage. Contrary to Andersen's findings in the *jamaicensis*-group, this specimen

has a small upper third molar. The second upper molar does not have the characteristic notch of *planirostris*, however, but does have the strong emargination of the hinder margin of the tooth typical of *jamaicensis*.

29. *Artibeus* sp.

COLOMBIA: Rio Atrato, Soatata (4438-4439) Jan. 23, 1916, M. A. Carriker, Jr.

Too young to classify.

30. *Artibeus watsoni* Thomas.

Artibeus watsoni Thomas, Ann. Mag. Nat. Hist. (7), 7, 1901, pp. 542-543.

COSTA RICA: Buenos Aires (1644-1646) two males, one female, Aug. 26, 1907; Boruca (1605, 1616) male and female, July 24, 30, 1907, M. A. Carriker, Jr.

31. *Artibeus anderseni* Osgood.

Artibeus anderseni Osgood, Field Mus. Nat. Hist., Zoöl. Ser. 10, No. 14, 1916, p. 212, Porto Velho, Brazil.

BOLIVIA: Buenavista (2734) female, May 6, 1911, J. Steinbach.

This specimen is a little older than the type and topotype and is slightly larger in the length of the forearm and skull. The Field Museum of Natural History has a skin without skull from the same locality in Bolivia. These two specimens represent the light and dark color-phases and their forearms measure 39.3 mm. and 39.5 mm. respectively. The one skull has a total length of 19.1 mm.; zygomatic breadth 11.7 mm.; length of palate 7.6 mm. It has five lower incisors.

Genus ENCHISTHENES Andersen.

32. *Enchisthenes harti* Thomas.

Artibeus harti Thomas, Ann. Mag. Nat. Hist., (6), 10, 1892, p. 409, Trinidad.

Enchisthenes harti Andersen, Ann. Mag. Nat. Hist., (7), 18, 1906, p. 419; Proc. Zoöl. Soc. Lond., 1908, pp. 221-224.

VENEZUELA: Petare, Merida (6035) female, July 19, 1929, J. H. Clement.

This appears to be the second specimen recorded and represents a new locality for the genus.

Color: Above "bone brown," more blackish on shoulders. Underparts slightly lighter with a blackish area on chest. Face and head

to back of ears almost black marked by two narrow "buffy brown" stripes about 12 mm. long extending from nose-leaf to back of front margin of ears.

Measurements (taken from dried skin): total length 73 mm.; forearm 40 mm. Skull: greatest length 20.1 mm.; mastoid width 10.8 mm.; width of brain-case 9.1 mm.; zygomatic width 12.4 mm.; maxillary width across M¹ 8.7 mm.; width across cingula of canines 5.4 mm.; mandible to front of incisors 13 mm.; upper tooth-row C-M³ 6.8 mm.; lower tooth-row C-M₃ 7.4 mm. This specimen agrees fairly well with the type as described, except in the measurements of the mandible and tooth-rows, which are much shorter.

Genus DESMODUS Wied.

33. **Desmodus rotundus** (Geoffroy).

Phyllostoma rotundum Geoffroy, Ann. Mus. d' Hist. Nat., 15, 1810, pp. 181-186.

COLOMBIA: Bonda (646, 647) female, and one not sexed, June, 1898 and July 25, 1899, H. H. Smith.

BOLIVIA: Prov. del Sara (2148-2153) three males, three females, Oct. 28, 1909, J. Steinbach.

Genus THYROPTERA Spix.

34. **Thyroptera discifera major** Miller.

Thyroptera discifera major Miller, Journ. Mamm., 12, No. 4, 1931, p. 411, San Julian, Venezuela.

COLOMBIA: Rio Negro, Boyaca (3964-3965) two females, April 2, 1927, M. A. Carriker, Jr.

The forearms of these specimens measure 37.2 and 35.4 mm. respectively which in one is a little larger and in the other is the maximum given for this measurement by Miller. The skulls appear to be a trifle longer, but are in poor condition for accurate measurements. A single skull which was associated with a *Saccopteryx b. bilineata* (647) with no data but "Colombia" (probably from Bonda), is referred to this form.

Genus MYOTIS Kaup.

35. **Myotis nigricans nigricans** (Wied).

[espertilio] nigricans Wied, Beiträge Naturgesch. Bras., 2, 1826, p. 266.

COLOMBIA: Aguachica, Magdalena (3880) female, July 26, 1916, M. A. Carriker, Jr.

BOLIVIA: Incachaca, Cochabamba (5256) male, Oct. 15, 1921; Buenavista (2201) male, Sept. 10, 1910; (2804-2805) female and juv. (alc.), Dec. 1912; (2806-2808) two females, one juv. (alc.) Nov. 1913; (5186, 5194-5195) male, female, juv. (alc.) no date; Prov. del Sara (2739) male, Jan. 13, 1912; Santa Cruz de la Sierra (1933, 1943) two males, July 11, 18, 1909; (2231, 2247) two males (alc.) 1909, J. Steinbach; São Antonio de Guaporé (1893-1896) four (alc.) July 27, 1909, J. D. Haseman.

Genus *EPTESICUS* Rafinesque.

36. ***Eptesicus montosus*** Thomas.

Eptesicus montosus Thomas, Ann. Mag. Nat. Hist., (9), 5, 1920, p. 363, Choro, north of Cochabamba, Bolivia.

BOLIVIA: Prov. del Sara (2738) male, Jan. 3, 1912, J. Steinbach.

The forearm of this specimen measures 38.5 mm. This is smaller than the type, which measures 43 mm.

37. ***Eptesicus bahamensis*** (Miller).

Vespertilio fuscus bahamensis Miller, N. A. Fauna No. 13, 1897, p. 101.

BAHAMAS: Ft. Charlotte, Nassau, New Providence (1856-1874), eighteen in alcohol, Jan. 7, 1909, W. W. Worthington.

Genus *DASYPTERUS* Peters.

38. ***Dasypterus ega*** subsp.

BOLIVIA: Prov. del Sara (2727) female (skin only) Dec. 6, 1910; (2743) juv. (skin only) Feb. 22, 1912; Buenavista (2798) female (alc.) Oct., 1911, J. Steinbach.

Available material is not sufficient to identify these specimens.

Genus *RHOGEËSSA* H. Allen.

39. ***Rhogeëssa tumida*** H. Allen.

R [hogeëssa] tumida H. Allen, Proc. Acad. Nat. Sci. Phil., 1866, p. 286.

COSTA RICA: Miravalles (1250) female, May 22, 1906, M. A. Carriker, Jr.

Genus *MOLOSSOPS* Peters.

40. ***Molossops brachymeles*** Peters.

Molossus (Molossops) brachymeles Peters, Monatsbr. Akad. Berlin, 1865, p. 575. Peru.

M [olossops] brachymeles Thomas, Ann. Mag. Nat. Hist., (8), 7, 1911, p. 114.

BOLIVIA: Villa Bella (1892) male (alc.) Oct. 6, 1909, J. D. Haseman.

The forearm of this specimen measures 43.5 mm. which is about half way between the measurements of *M. brachymeles* Peters of Peru (forearm 42) and *M. cerastes* Thomas (Ann. Mag. Nat. Hist., (7), 8, 1901, p. 440) of Paraguay and Southern Brazil (forearm 44-46). It seems possible that more specimens will show *cerastes* to be a synonym of *brachymeles*. The head is so crushed that only fragments of the skull could be removed and no measurements were taken.

The external measurements are: total length 117 mm.; tail 41 mm.; forearm 43.5 mm.; pollex with claw 7.7 mm.; metacarpal, second digit 40.5 mm.; metacarpal, third digit 40.5 mm., first phalanx 21.8 mm., second phalanx 18 mm.; metacarpal fourth digit 42.9 mm., first phalanx 17.5 mm.; metacarpal fifth digit 27.9 mm., first phalanx 11 mm., second phalanx 3.8 mm. Tibia 16 mm.; foot with claw 10.6 mm.

Genus TADARIDA Rafinesque.

41. *Tadarida brasiliensis* (Geoffroy).

Nyctinomys brasiliensis Geoffroy, Ann. Sci. Nat., Paris, 1, 1824, p. 337.

BOLIVIA: Yungas de Cochabamba (5278) male; (5279-5280) two males (skins only) May 13, 15, and 19, 1921, J. Steinbach.

PARAGUAY: Asunción (1915) male (alc.) March 23, 1909, J. D. Haseman.

42. *Tadarida macrotis* (Gray).

Nyctinomus macrotis Gray, Ann. Nat. Hist., 4, 1839, p. 5-6.

COLOMBIA: Tagauga (842, 844) male and female, June 23, 1899, H. H. Smith.

Genus EUMOPS Miller.

43. *Eumops abrasus milleri* (Allen).

Promops milleri Allen, Bull. Am. Mus. Nat. Hist., 13, 1900, p. 92.

COLOMBIA: Don Diego, Santa Marta (3091-3097, 3108-3111, 3098 skin only), five males, seven females, Jan. 15-19, 1914, M. A. Carriker, Jr.

Genus *MOLOSSUS* Geoffroy.

44. *Molossus pretiosus* Miller.

Molossus pretiosus Miller, Proc. Acad. Nat. Sci. Phil., 1902, p. 396.

VENEZUELA: Santa Lucia, Miranda (6045) female, Aug. 18, 1929, H. J. Clement.

45. *Molossus sinaloæ* Allen.

Molossus sinaloæ Allen, Bull. Am. Mus. Nat. Hist., 22, 1906, p. 236.

COSTA RICA: Boruca (1620-1625) male, three females, two juv., July 31, 1907, M. A. Carriker, Jr.

46. *Molossus obscurus* Geoffroy.

Molossus obscurus Geoffroy, Ann. Mus. Hist. Nat., Paris, 6, 1805, p. 155.

Molossus obscurus currentium Thomas, Ann. Mag. Nat. Hist., (7), 8, 1901, p. 438, Goya, Argentina.

BRAZIL: Santarem (1911) female (alc.) Dec. 14, 1909, J. D. Hase-man.

BOLIVIA: Buenavista, Prov. del Sara (2195-2198) four females, Sept. 22, 1910; (2801-2803) male and three females (alc.) Dec. 1912; (5185, 5187-5189, 5191-5193) two males and five females (alc.) no date; Prov. del Sara (2178) male, July 25, 1910, (2742) female (skin only) Jan. 21, 1912; Rio Dolores, Prov. del Sara (2760) male, Sept. 30, 1911, J. Steinbach.

The forearms in this series measure from 39 mm. to 42.7 mm. and the total length of the skulls from 16.5 to 18.2, covering the range in size between *obscurus* and *currentium*. Dr. G. M. Allen (Bull. M. C. Z. 52, 1908, p. 59) considered *currentium* a synonym of *obscurus*, but Miller (Proc. U. S. Nat. Mus., 46, 1913, p. 89) later recognized the species. In view of the great variation in this Bolivian series I feel that *currentium* must be regarded as a synonym of *obscurus*.

47. *Molossus crassicaudatus* Geoffroy.

Molossus crassicaudatus Geoffroy, Ann. Mus. Nat. Hist., Paris, 6, 1805, p. 156.

COLOMBIA: Jaraquiel, Bolivar (3606-3607) male and female, March 3, 1916; El Tambor, Santander (3945) female, Dec. 13, 1916, M. A. Carriker, Jr.

VENEZUELA: Petare, Miranda (6036-6038) three males, July 22, 25, 1929, H. J. Clement.

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OF THE
CARNEGIE MUSEUM

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ANNALS
OF THE
CARNEGIE MUSEUM

VOLUME XXI, No. 4

EDITORIAL NOTES.

This issue of the ANNALS is devoted to the publication of a very important monograph by McAtee and Malloch upon the subfamily *Thyreocorinæ* belonging to the family *Pentatomidæ* of the *Hemiptera-Heterocera*. It represents the labors of the authors covering a number of years, in which they have consulted not only all the material contained in the great museums of America, but of Europe. It lays a secure foundation for future study in this hitherto little investigated group of insects. It adds one hundred and fourteen new species, subspecies, and varieties to those hitherto described. Taken altogether it is the most important contribution which has been made to our knowledge of a neglected, but interesting, subfamily of the *Pentatomidæ*.

The Editor of the ANNALS for the first time in many years refrained from taking a vacation during the summer. A measure of physical infirmity has not prevented him from attending to his editorial duties, which have consisted in preparing for publication not only this volume of the ANNALS, but the Twelfth Volume of the MEMOIRS, which embodies the results of Mr. George M. Sutton's researches on Southampton Island. The first part of this volume of the MEMOIRS containing the Prefatory and Introductory matter, as well as an extensive Bibliography, was issued from the press on March 28th. The part relating to the Ornithology of the Island was issued on May 31st, and that dealing with the Mammals on August 4, 1932.

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The section of the volume dealing with the Invertebrates and Botany will shortly appear.

It is needless to say that this great work, which embodies everything known up to date in reference to the great island of Southampton in Hudson Bay, is a most important contribution to our knowledge of that hitherto little explored territory, which in size equals one-half of the state of Pennsylvania. The fauna and flora of this island are more nearly like that of Baffinland and Greenland than territories lying westward and even farther north. The islands and peninsulas, ranging toward the Pole immediately west of Davis Strait and Baffin Bay, in their climatic conditions are more strictly arctic, corresponding with Greenland, than the lands drained by the Mackenzie and Yukon Rivers. The latter, including Alaska, are more or less affected by the warm currents of the Pacific Ocean running northward from equatorial regions and corresponding in their action to the Gulf Stream in the Atlantic, which gives to western Europe its temperate climate.

Miss Elizabeth D. Gill, the capable Secretary of the Editor of these ANNALS, was absent from the Museum from July 2 to August 26. She joined the party which sailed from New York on board the "S. S. Lancastria" for Mediterranean and northern European lands. She returns full of enthusiasm and pleasant memories of northern Africa, Italy, Scandinavia, and the countries southward. Necessarily her stay in Madeira, Algiers, Italy, and other countries which she visited, was brief. The last days of her journey were spent in Paris. During her visit she took occasion to resort to numerous scientific institutions, with which her connection with the Carnegie Museum made her more or less familiar. She brings back pleasant memories of the Oceanic Institute at Monaco, the museums in Rome, Bergen, Copenhagen, and Paris. At The Hague the party devoted themselves among other things to a visit to The Peace Palace founded by Mr. Andrew Carnegie, where she was delighted to find a very lifelike bust of the founder of the Carnegie Museum.

Dr. Avinoff, the Director of the Carnegie Museum, during the past summer spent about two months in Europe. At Geneva he attended a meeting of a committee convened by the International Institute for Intellectual Cooperation for the purpose of organizing an international

center of information for museums of science. England, Germany, France and the United States were represented at the sessions of this committee, of which Dr. Avinoff was made the Chairman. The other members of the committee are Sir Henry Flett, Director of the Geological Museum in London; Dr. Unverzagt, Director of the Museum of Archeology and Ethnology in Berlin; and Dr. Lemoine, Director of the Museum d'Histoire Naturelle and the Jardin des Plantes in Paris. The chief function of the new organization will be to establish a center of information and documentation upon all questions concerning the scientific museums of the world, this material to be assembled and kept at the disposal of interested institutions and individuals upon request. The center will serve gradually to collect information as to material possessed by scientific museums; data on technical methods and practical museology; lists of duplicates, models, casts, and publications, and a register of specialists in various branches. Through the medium of such a clearing house of information the exchange of materials and curatorial services will be greatly facilitated. The recommendations of this committee were unanimously adopted by the International Institute. Mme. Curie, as one of the members of the board, was particularly satisfied with the creation of this new instrument of international good-will in the realm of science and education. It is the hope of the committee that the formation of this Center of Information for Museums of Science, as it will now be known, will inspire the formation of national associations of museums in countries where such unions have not yet been organized. The plan approved by the Institute was subsequently offered to the consideration of the Entomological Congress in Paris, where representatives of scientific museums of some twenty countries were present. With a few additional suggestions the Congress indorsed the plan for the creation of the center and many of the entomologists pledged their assistance in the collation of necessary data.

Dr. Avinoff attended the sessions of the Fifth International Entomological Congress as a delegate from the Carnegie Institute and read a paper comparing the Rhopalocerous Fauna of North America with that of the temperate regions in the eastern hemisphere. At the centenary of the Entomological Society of France, which immediately preceded the Congress, Dr. Avinoff conveyed greetings in the name of the Museum, the University of Pittsburgh, and the American Association of Museums. The Entomological Congress adjourned to

meet in Madrid three years hence, having elected Dr. Ignacio Bolivar y Urrutia as President of the coming congress.

The field collectors of the Section of Paleontology consisting of Mr. J. LeRoy Kay, Mr. J. J. Burke, and their volunteer assistant, Mr. Mather Greenleaf Elliott, resumed the work which has been recently undertaken in the Lower Oligocene near Vernal, Utah. Their work in this field continued until the first of July, when, through the liberality of Mr. George H. Clapp, their further stay in that part of the world was extended until September. In the interval they have examined the country for about sixty miles around Vernal as a center and have secured valuable data as well as some apparently new species.

Mr. W. E. C. Todd and Mr. George M. Sutton volunteered on their own account to go to Saskatchewan to collect birds. They were assisted by Mr. Albert C. Lloyd who shortly before their departure had been sent from the Museum to that region and accompanied Mr. Todd and Mr. Sutton during their exploration of the prairie region of that part of the world. The result was a collection of about seven hundred birds and seventy sets of eggs, some of them hitherto lacking in our collection. Mr. Todd before his return made a flying visit to Banff in Alberta, where he succeeded in making some important observations and collections.

Dr. Tolmachoff, the Curator of Invertebrate Fossils and Mr. R. L. Fricke during the month of August joined our field party in Utah. Both made collections which they have returned to the Museum.

The completion of the dam which will result in the ultimate flooding of Pymatuning Swamp prompted special efforts to collect, while still possible, a good representation of the terrestrial fauna of that region. The expense of this investigation was partly defrayed by the Game Commissioners of the State of Pennsylvania. In this connection we are especially indebted to Dr. S. A. Williams who made the preliminary arrangements. Mr. Kenneth Doult took an active part in supervising the collecting. Mr. Fricke also during April and May was busy there obtaining specimens to be used in the cases sent out by the Section of Education to the schools.

Mr. M. Graham Netting, Curator of Herpetology, devoted a great deal of time from the first of May to the first of September in collecting specimens from various localities in Pennsylvania, West Virginia, and Maryland. He spent two weeks in June teaching on the staff of the Ogleby Nature Training School. His researches resulted in securing many new locality records and in extending the ranges of several species of salamanders and frogs as well as the discovery of a new species of snail in West Virginia.

Mr. William C. Darrah spent over a month in northwestern Virginia and southwestern Pennsylvania engaged in collecting and studying the fossil plants of the Permian formations which he was able to reach.

Mr. Ottmar von Fuehrer went to Mount Rainier National Park and to British Columbia for the purpose of making studies and collecting material for one of the botanical groups now in process of construction.

Mr. Ludwig von Fuehrer visited Montenegro and made a collection of about six hundred specimens of birds, the larger portion of which is designed to come to the Carnegie Museum.

XII. REVISION OF THE SUBFAMILY THYREOCORINÆ
OF THE PENTATOMIDÆ (HEMIPTERA-HETEROPTERA).

BY W. L. McATEE AND J. R. MALLOCH OF THE
UNITED STATES BIOLOGICAL SURVEY.

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INTRODUCTION.

The present revision is based on the study of a large proportion of the *Thyreocorinae* available in the important entomological collections of the world and has had the advantage furthermore of the availability of type-specimens in a high percentage of previously described forms. It has been worked out gradually in our leisure time through several years, and we trust makes a distinct advance in the elucidation of the relationships of this subfamily of bugs. None, however, can be more conscious than the authors, of present defects and shortcomings in the work nor more aware of the future probability that study of additional large collections, particularly from little represented neotropical regions, will call for a revision that will make this one seem elementary.

CHARACTERS OF THE SUBFAMILY

The *Thyreocorinae* are chiefly black bugs of usually ovoid (Figs. 1, 165, 185, 196, and 229)* and gibbous form (Figs. 224-228) with the scutellum covering most, or all, of the abdomen. They have a superficial resemblance to certain beetles and on account of their predominantly black color have been called "negro-bugs." The tarsi, beak, and antennæ are characteristically pale, but sometimes are more or less infuscated. Very little is known of the habits of the species, but we believe that both nymphs and adults are phytophagous, as they may sometimes be swept in numbers from low herbage and we know of no records of their being zoöphagous. Definite feeding records, however, are lacking; these bugs are not known to affect cultivated plants.

The subfamilies *Thyreocorinae* and *Cydninae* are distinguished from other subfamilies of the *Pentatomidæ* by the presence of fringes of closely set, stiff, bristles at the apices of the mid and hind coxæ (Figs. 3-6), and by the spiracles of the second abdominal segment being in a membranous anterior strip of the sternite (Fig. 7), not in the heavily sclerotized portion. Members of these two subfamilies have tri-segmented tarsi, and distinct tibial bristles, and, with the exception of the *Sehirini*, have the trichobothria longitudinally arranged (Figs. 7, 105, 106, 112, and 223) often nearly in line with the spiracles. The trichobothria, or delicate, pale, sensory hairs (which

*All references to figures refer to Plates IV-XVII.

must not be confused with the strong, dark, lateral bristles which are frequently present) are two in number on each side of all sternites and in the other subfamilies of *Pentatomidæ* are arranged transversely, or nearly so, behind the spiracles (Fig. 259).

The *Thyreocorinæ* may be separated from the *Cydninæ* by the very short exposure of the clavus (Figs. 1, 165, 185, 196, and 229), which is briefly triangular and does not extend much beyond the base of the scutellum; in the *Cydninæ*, on the other hand, it is elongate and reaches to, or almost to, the apex of the scutellum, with a corresponding prolongation of the groove in the side of the scutellum in which it rests (Fig. 9).

A noteworthy feature of the hind wing in this group is the small oval aperture in the anal lobe behind the second anal vein (Fig. 10). This aperture, when the wing is folded, overlies the swollen base of Cu_2 and is apparently a development coincident with the enlargement of that portion of the vein. No such aperture is found in *Cydninæ* nor *Canopinæ*, and we have been unable to detect it in *Thyreocoris*, though in the latter the membrane is remarkably fragile and the base of Cu_2 is moderately incrassated. There is no question about this aperture in the New World forms being normal, instead of due to abrasion between the vein and dorsum of the abdomen, many of the species showing a slight thickening of the margin, and in no case seen by us was there any irregularity of the edges such as would be expected were the opening caused by friction.

In the *Thyreocorinæ* there is always an area of smooth chitin behind the eyes on the ventral surface of the head (Fig. 11), while in the *Cydninæ* the faceted surface extends to the hind margin of the head (Fig. 12).

SCOPE OF THE SUBFAMILY.

Lethierry and Severin¹ include in the *Corimelænidæ* the genera *Strombosoma*, *Eucoria*, *Corimelæna*, *Eumetopia*, *Alkindus*, *Cyrtaspis*, *Chlænocoris*, *Canopus*, *Cursula*, and *Cænina*. Horvath² treats the group as a subfamily *Thyreocorinæ* and separates *Cyrtaspis* and *Canopus* (the last four names above cited are synonyms of *Canopus*) as a tribe *Canoparia*. He puts the remaining genera in a tribe *Thy-*

¹Cat. Gen. Hemip., I, 1893, pp. 11-15.

²Ann. Mus. Nat. Hungary, 17, 1919, pp. 205-232.

reocoraria, in which he includes *Thyreocoris*, *Eucoria*, *Galgupha* and seven new genera. McAtee and Malloch³ regard *Megarix* (*Cyrtaspis*) and *Canopus* as each constituting a subfamily coordinate with the *Thyreocorinae*. In the latter group are here included all of the genera previously assigned to the complex, except as follows.

The Old World genera *Strombosoma* Amyot and Serville⁴ (Africa) and *Carrabas* Distant⁵ (India), which resemble *Thyreocorinae* have the trichobothria transversely placed (Fig. 259); they differ also as follows: corium not surpassing third sternite; metapleurum with ostiolar canal, but scarcely any ostiolar area; the remaining surface wholly coarsely punctate. In the *Thyreocorinae*, as restricted for the purposes of this paper, the corium extends to the fourth sternite, or farther; the metapleurum has a well developed ostiolar area; and the remainder of its surface is never wholly coarsely punctate.

Lack of material of the genera *Strombosoma* and *Carrabas*, and of certain other forms, which should be considered in defining relationships among *Pentatomoidea* of similar habitus, prevent us from being more definite as to subfamily relationships and more specific as to the content of the group. In Appendix No. I there is presented further information on *Strombosoma* and *Carrabas*, of which genera several figures also are offered, chiefly through the greatly appreciated cooperation of W. E. China of the British Museum.

The genus *Eumetopia* Westwood,⁶ placed in this group by Lethierry and Severin (Cat. Gen. Hemip., I, 1893, p. 13), has not been seen by us, but the venation indicates it is not thyreocorine. The size of the type species, *E. fissiceps*, is greater than any of the thyreocorine species here included, with one exception, and the head structure differs from anything we have seen, although it would be unique in almost any group.

With the single exception of *Thyreocoris scarabeoides* Linnæus, the species, which we know and accept as belonging to the subfamily, are entirely confined to the New World, and except for a few specimens of the European species, which have been taken by quarantine inspectors, the genus *Thyreocoris* has not been found in America.

³Proc. U. S. Nat. Mus., 72, Art. 25, 1928.

⁴Hist. Nat. Ins., Hemip., 1843, pp. 64-65.

⁵Fauna British India, Rhynchota 4, 1908, pp. 421-422.

⁶Trans. Ent. Soc. Lond., II, 1, 1837, pp. 18-19.

CHARACTERS FOR RECOGNITION OF SPECIES AND GENERA.

Although we have made no special effort to distinguish the species by means of their internal genital parts, it would appear from those which we have dissected that these organs yield in at least some cases good diagnostic characters. In the genus *Thyreocoris* there are both external and internal characters in the female which readily distinguish the genus from all others, the internal portions including two pairs of long slender hooks (Fig. 13) which have no counterparts in the other genera, which we have examined. The bases of the posterior pair of these hooks are visible in unrelaxed examples and divide the subgenital plates, a character which readily distinguishes the genus from all others, these latter having the subgenital plates contiguous or almost so (Figs. 14-16). All the figures above referred to are of partly expanded genitalia to show the internal portions to some extent.

The males present characters in the ventrally exposed portion of the hypopygium, which are frequently sufficient to identify them. The shape of the hind margin is the most important of these, and it will be realized that this may vary with the point of view. To illustrate, hold a sheet of paper in arched form, corresponding to that of a sternite, and look down on the edge. When the axis of the paper at right angles to the arched edge is horizontal, the edge appears straight; by tilting the axis the edge may be made to appear either concave or convex. For this reason descriptions of the venter have been made with the axis of the insect (not necessarily the lower surface of the hypopygium) horizontal. On the other hand the dorsal rim has been described from a point of view perpendicular to its general plane. In some cases the descriptions and figures have been made from slightly different points of view and do not exactly agree.

The conformation of the dorsal rim of the hypopygium is of considerable importance for the recognition of species, and is described in every case. There is always a more or less conspicuous depression in this dorsal surface, or basin, in which lie the tips of the genital organs, usually covered by the central disk, but sometimes projecting to a greater or lesser degree. In order to expose the dorsal rim, it is sometimes necessary to break off the tip of the scutellum, but more often pressure with a fine needle on the upper surface of the abdomen is sufficient to depress it far enough to enable one to view the hypopygial

basin. We have dissected the internal genitalia of a number of the species and the accompanying figures give a fair idea of the specific distinctions. In the male sex also *Thyreocoris* seems to stand out from the others (Figs. 17-18), especially in the nature of the basal parts and the lateral subbasal process on each side, and, though *Allocoris gilletti* and *A. interrupta* (Figs. 24-26) appear to be rather well distinguished from *A. virilis*, *A. cognata*, and *A. extensa* (Figs. 27-32), we have not allowed this to influence us in their generic segregation. These figures and the others representing the same organs are referred to by number in the text under the species to which they belong, and are placed together (Pls. V-VI) merely for purposes of comparison.

The writers did not see Baker's paper⁷ on Pentatomid genitalia until the present was written. He evidently assigned numbers to the abdominal segments after assuming that certain ones were involved in the formation of the genitalia. We count the segments from base of abdomen according to the evidence of the spiracles. Our sixth is his seventh segment. What he terms the "genital cup," we call the hypopygium; other equivalents are our dorsal rim for his "dorsal border," and our central disk for his "proctiger" or "tenth segment."

We have to a much greater extent than has hitherto been the case utilized the venation, or apparent venation, of the hemelytra in generic, subgeneric, and specific differentiations, but in some cases we have attached less importance to the extent of the apical width of the corium than did Dr. G. Horvath in his treatment of the genera in 1919. (See Bibliography).

The genus *Galgupha* Amyot and Serville, and especially its subgenus *Gyrocnemis* McAtee and Malloch, *Amyssonotum* Horvath, and *Alkindus* Distant, have the most complete venation, while *Pruhleria gen. nov.* and *Allocoris nom. nov.* have the greatest reduction. *Allocoris (Corimelæna* of authors) has the costal furrow and exocorial vein obliterated, but peculiarly has the mesocorial vein much better developed than is the case in any other genus (Figs. 68-73). *Pruhleria* on the other hand has the costal furrow present and the exocorial vein faintly indicated, while the mesocorial vein is entirely lacking (Fig. 65). In all cases the cubital vein is present, this being the most constant character of the hemelytra. We figure the hemelytra of

⁷Baker, Alex. D., A study of the male genitalia of Canadian species of Pentatomidæ, Can. Journ. Research, 4, No. 2, Feb. 1931, pp. 148-179, figs. 1-21, and No. 3, March 1931, pp. 182-220, figs. 22-155, Pls. I-II (figs. 156-162).

Carrabas Distant (Fig. 75) and *Strombosoma* Amyot and Serville (Fig. 74) for purposes of comparison. *Cydnoides* Malloch is the only genus in which there are bristles, or other armature, on the wings (Fig. 61) and even in these species the costal bristles often may be rubbed off; the large insertions, however, can still be seen.

We present the various figures of the hemelytra together on the plates as much as possible for comparative purposes and an examination of Figures 39 to 75 and 186 will show more clearly than any discussion the various features, which are cited as distinguishing characters in this paper. The diagram showing the various veins and areas (Fig. 39) is self-explanatory. We figure the hind wing of *Galgupha* (*Gyrocnemis*) *nitens* Breddin, to illustrate the venation of the under wings which is similar throughout the subfamily (Fig. 10).

The legs possess several characters, which have been used to segregate groups and individual species in our keys. The principal of these is the carina or raised line on the posterior, or inner, surface of the hind tibia, present in many species of *Galgupha sens. lat.* (Fig. 173). The ventral armature of the fore femora in the same genus, while of considerable value in distinguishing certain species in North America, is of little value for that purpose in a general consideration of the genus, though the comparative strength of these bristles is of value in distinguishing certain subgenera. Some other features of the tibia, notably, the armature of the fore pair in one segregate of *Galgupha* and in its subgenus *Ctenopoda*, and the conformation of the hind tibiæ, whether sulcate or nonsulcate dorsally, and the posterodorsal armature of the hind pair, we have found of value in our work. Apart from the above mentioned features, the legs are rather uniform throughout the subfamily, and in no case have we depended upon their armature alone for the separation of genera.

One feature of this subfamily, and we found the same in the *Cano-pinæ*, is the frequency of abnormal antennæ. Often one or both of the antennæ in an otherwise normal insect will have only four segments through the fusion of two, or rather the suppression of one of the joints. It is also noteworthy that in few cases can the comparative lengths of the segments be depended upon for specific identifications, and only in the subgenera *Charoda* McAtee and Malloch and *Acrometus* Horvath of *Galgupha* Amyot and Serville is there a sufficient degree of constancy in the matter of a departure from the normal comparative lengths to be utilized in classification.

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The material in the United States National Museum (where one of the authors, W. L. McAtee, was Acting Custodian of Hemiptera) and in the Carnegie Museum of Pittsburgh (received through the kindness of Dr. W. J. Holland) furnished the basis for the preliminary work on the subfamily, but it has been supplemented by generous loans from numerous other sources. We have received for study considerable collections of *Thyreocorinae* from the following additional institutions and individuals, to whom we are glad to record our indebtedness and appreciation: Museo Nacional de Historia Natural, Buenos Aires, Argentina (Dr. Angel Gaillardo); Naturhistorische Museum,* Vienna, Austria (Dr. F. Maidl); Instituto Oswaldo Cruz, Rio de Janeiro, Brazil (Dr. A. Costa Lima); Universitets Zoölogiske Museum,* Copenhagen, Denmark (Dr. Wm. Lundbeck); British Museum (Natural History),* London, England (W. E. China); Zoölogisches Museum, University of Helsingfors,* Helsingfors, Finland (Dr. Hakan Lindberg); Muséum National d'Histoire Naturelle,* Paris, France (Dr. E. L. Bouvier); Universitäts Museum für Naturkunde,* Berlin, Germany (Dr. W. Ramme); Deutsches Entomologisches Institut,* Berlin-Dahlem, Germany (Dr. Walther Horn); Staatliches Museum für Tierkunde und Völkerkunde, Dresden, Germany (Dr. Fritz von Emden); Zoölogische Staatsinstitut und Museum, Hamburg, Germany (Dr. Eduard Wagner); Zoologische Staatssammlung, Munich, Germany (Dr. H. W. Taeuber); Naturhistorisches Museum,* Stettin, Germany (Edmund Schmitt); Rijks Museum van Natuurlijke Historie,* Leiden, Holland (Dr. H. C. Blöte); Maygar Nemzeti Museum,* Budapest, Hungary (Dr. G. Horvath); Officina Federal para la Defense Agricola, Mexico (Dr. Alfonso Dampf); Polskie Panstwowe Museum,* Warsaw, Poland (Dr. T. Jaczewski); Naturhistoriska Riksmuseet,* Stockholm, Sweden (Dr. B. Y. Sjöstedt); Dr. Carl J. Drake, State College, Ames, Iowa; Dr. H. H. Knight, State College, Ames, Iowa; Museum of Comparative Zoölogy, Cambridge, Mass. (Nathan Banks); H. G. Barber, Washington, D. C.; American Museum of Natural History, New York, N. Y. (H. G. Barber); Academy of Natural Sciences, Philadelphia, Pa. (E. T. Cresson, Jr.); and the U. S. Biological Survey, Washington, D. C. (W. L. McAtee).

*Types and other material studied by McAtee in 1927.

Through the cooperation of the United States Bureau of Entomology (Taxonomic Division), one of the writers (McAtee) was enabled during the spring of 1927 to visit for the purpose of studying type and other material the institutions starred in the preceding list and also the following from which no material was borrowed: Museum Christian Albrechts Universität, Kiel, Germany (Dr. A. Schröder), Museum Zoölogical Gardens, Amsterdam, Holland (Dr. A. Corporaal); and Zoölogisches Museum, Johann Kasimir Universität, Lwow, Poland (Dr. Jan Hirschler). The information gained on this trip was indispensable for the revision of a group so uniform in general appearance and with so few color characters as the *Thyreocorinæ*.

We have been further favored with the loan of type or other desirable material in small lots by the following individuals, to whom we are greatly obliged: Dr. T. H. Frison, State Natural History Survey, Urbana, Ill.; Dr. R. F. Hussey, New York University, New York, N. Y.; A. C. Jensen-Haarup, Silkeborg, Denmark; E. P. Van Duzee, Academy of Natural Sciences, San Francisco, Calif.; and R. H. Van Zwaluwenberg, Sugar Planters' Experiment Station, Honolulu, Hawaii. We are glad to express our special appreciation also of Mr. W. E. China's cooperation in furnishing notes and sketches of species in the British Museum.

The location of type and other material studied is indicated by abbreviated designations of the collections, which can be correlated with the fuller references to museums and individuals in the preceding list.

SYSTEMATIC TREATMENT.

In the following synoptic keys to genera and species we have made no attempt to arrange them in what we consider are their systematic relationships, the keys being drawn up on a strictly dichotomous scheme. Both in the case of genera and species we present, following the dichotomous keys, our opinion of the systematic arrangement.

KEY TO THE GENERA.

1. Ostiolar (opaque) surface extending clear to the lateral margin of the metapleurum; all tibiæ sulcate dorsally; prosternal sulcus parallel-sided; propleurum coarsely punctate throughout; tylus enclosed by jugæ; prothorax gibbous anteriorly; subgenital plates quite widely separated in front by the bases of the internal claspers (Figs. 13, 218)..... **Thyreocoris** Schranck.

- Ostiolar (opaque) surface scarcely attaining lateral margin of metapleurum, separated from it by a glossy portion, which varies from truncate to acuminate anteriorly; tibiæ in most cases terete; prosternal sulcus usually flaring anteriorly; propleurum with a considerable portion of its extent impunctate; tylus usually attaining anterior margin of head; prothorax not gibbous anteriorly; subgenital plates contiguous or almost so in front (Figs. 14-16, et al.).....2
2. Spiracles nearer to setigerous punctures (trichobothria) (Figs. 7, 105, 106, 112) than to lateral margin of sternites; mesocorium without, or with, one or more veins (impressed or impressed-punctate lines).....3
- Spiracles nearer to lateral margin than to setigerous punctures on sternites 3-6 (Fig. 223); mesocorium with a vein paralleling scutellum and connivent or nearly so posteriorly, with cubitus (Figs. 67-73); exocorial vein obsolete or almost so.....8
3. Sternites with one or more strong bristles on each side laterad of the setigerous punctures (Figs. 7, 105, 106, 112).....4
- Sternites mostly lacking such bristles (Fig. 223).....7
4. Hind tibiæ flattened or sulcate dorsally.....6
- Hind tibiæ not flattened or sulcate dorsally.....5
5. Sides of pronotum and costal margin of corium (Fig. 61) with long slender bristles; sternites each with more than 2 bristles laterad of the piliferous punctures (Fig. 202).....**Cydnoides** Malloch.
- Sides of pronotum and costa without bristles; sternites each with only one or two bristles laterad of the piliferous punctures (Figs. 7, 105, 106, 112)
- Galgupha** Amyot and Serville.
6. Hind tibia flattened, but scarcely sulcate, dorsally lacking carinate line on posterior surface; ocelli about equidistant from eyes and middle of vertex; (Fig. 204); inner margins of female genital plates forming an acute elevation anteriorly (Figs. 207-208); pronotum not rastrate.....**Alkindus** Distant.
- Hind tibia sulcate dorsally and provided with a carinate line on posterior surface; ocelli nearer to eyes than to middle of vertex (Fig. 209); female genital plates (Fig. 214) without elevation; pronotum decidedly rastrate posteriorly.
- Amyssonotum** Horvath.
7. Corium tumid, inconspicuously punctate, cubital vein deeply impressed, exocorial vein present only as traces (Fig. 65); ocelli about twice as far from middle of vertex as from eyes; inner margins of female genital plates not elevated; ventral exposure of ultimate tergite brief, not one-seventh as long as the large sixth sternite.....**Pruhleria** new genus.
- Corium not tumid, conspicuously punctate, cubital vein less deeply impressed, exocorium with the usual branched vein evident, very deep basally (Fig. 64); ocelli not much farther from middle of vertex than from eyes; inner margins of female genital plates elevated, knife-like, most prominently so anteriorly (Figs. 216-217); ventral exposure of ultimate tergite ample, almost or quite as long as the almost parallel-margined sixth sternite (Fig. 216).
- Pericrepis** Horvath.

8. Costa carinate; each sternite with one or two bristles on each side laterad of piliferous punctures..... **Godmania** Horvath.
 Costa rounded, without carina; sternites without lateral bristles, except rarely on second (Fig. 223)..... **Allocoris** nom. nov.

SYSTEMATIC ARRANGEMENT OF THE GENERA.

- Spiracles nearer to the trichobothria than to the lateral margins of the sternites.
 Metapleurum with lateral glossy area.
 Sternites with bristles laterad of the trichobothria.
 Hind tibia terete.
 Sides of pronotum and costa without bristles..... **Galgupha**.
 Sides of pronotum and costa bristly..... **Cydnoides**.
 Hind tibia flattened or sulcate dorsally.
 Hind tibia without carinate line posteriorly; pronotum not rastrate. **Alkindus**.
 Hind tibia with carinate line posteriorly; pronotum rastrate behind middle..... **Amyssonotum**.
 Sternites mostly lacking such bristles.
 Exocorium with the usual branched vein evident..... **Pericrepis**.
 Exocorium with only traces of veins..... **Pruhleria**.
 Metapleurum without lateral glossy area..... **Thyreocoris**.
 Spiracles nearer to the lateral margins of sternites than to the trichobothria.
 Costa carinate; sternites with lateral bristles..... **Godmania**.
 Costa rounded; sternites usually without lateral bristles..... **Allocoris**.

Genus GALGUPHA Amyot and Serville.

Galgupha Amyot, C. J. B. and Serville, A., Histoire Naturelle des Insectes Hémiptères, 1843, p. 68 (Containing two species *G. atra*, Mexico, and *G. notata*, Cayenne, of which the former was selected as genotype by Horvath in 1919).

Principal characters: Spiracles nearer to trichobothria than to lateral margins of sternites (Figs. 7, 105, 106, and 112); sternites two to six each with one or two strong bristles laterad of the trichobothria (same Figs.); sides of pronotum and costa without bristles; metapleurum with lateral area in part impunctate; prothorax not gibbous anteriorly.

As accepted in this paper, this is by far the largest genus of the subfamily, containing fifteen subgenera, several of which were originally erected as distinct genera, and one hundred and forty-eight species. Of these subgenera six are monobasic while the great bulk of the species are contained in three, namely: *Nothocoris* (26); *Euryscytus* (38); and *Gyrocnemis* (36).

KEY TO THE SUBGENERA.

1. Exocorial vein faint, or lacking, basally, at most represented by a series of weak punctures, not by an impressed line, and never as deeply impressed as the basal portion of cubital vein (Figs. 57, 58, 60, and 186)..... 2

- Exocorial vein always very well defined at base as an impressed line and never less deeply impressed than the basal portion of the cubital vein (Figs. 41-56, 59, 61-75).....5
2. Hind tibia with a well defined carinate line on the entire length of its posterior surface (Fig. 173).....3
 Hind tibia without a well defined carinate line on entire length of its posterior surface.....**Astiroderma** Horvath.
3. Second antennal segment almost as long as third.....**Charoda** subgen. nov.
 Second antennal segment not over one-third as long as third.....4
4. Exocorium with a flat-bottomed groove between costa and cubitus basally (Fig. 186).....**Pteronomos** subgen. nov.
 Exocorium with the area between costa and cubitus basally convex (as usual in the genus).....**Psestophleps** McAtee & Malloch.
5. Hind tibia without a carinate line on entire length of posterior surface.....6
 Hind tibia with a carinate line on entire length of posterior surface (Fig. 173) ..8
6. Fore tibia with a series of strong spines on posteroventral surface, a number of which distally form a comb-like structure (Fig. 137); corium truncate apically (Fig. 48).....**Ctenopoda** subgen. nov.
 Fore tibia not so armed.....7
7. Exocorial vein distinctly furcate at some distance from the base as in most of the subgenera, its base always quite distinct from base of the cubital vein, mesocorial vein distinct, distant from cubital vein apically (Figs. 39, 43-47).
Gyrocnemis McAtee & Malloch.
 Exocorial vein not distinctly furcate, only one branch distinct and that lying very close to base of cubital vein owing to the elevation of the area between exocorial vein and costa, mesocorial vein faint, connivent with cubitus posteriorly (Fig. 59).....**Acritophleps** McAtee & Malloch.
8. Beak much elongated, always extending beyond base of third abdominal sternite and frequently to apex of abdomen, the second segment noticeably curved and extending to or beyond posterior margin of prosternum, third segment about as long as, or even longer than, hind femur; mid tibia without a posterior carinate line; form elliptic, head quite pointed in front; anterior lateral bristle on abdominal sternites almost invariably lacking.
Bonaria subgen. nov.
 Beak normal in length, rarely extending beyond posterior margin of metasternum, second segment usually straight and not extending to posterior margin of prosternum, third shorter than hind femur; mid tibia usually with a distinct posterior carinate line; if the beak is about as long as in *Bonaria*, the form is more ovate, the head less pointed, and the anterior lateral bristle is normally present on sternites three to five.....9
9. Anterior outline of head bluntly angulate each side of tylus, head tumid beneath these angulations, concave between the prominences and eyes; fore tibia with an anterodorsal series of closely placed black spinules (in addition to the usual pale bristles) on almost its entire length (Fig. 146); ocelli situated well behind posterior transocular line.....**Orocoris** subgen. nov.
 Anterior outline of head not angulate each side of tylus nor tumid beneath; fore tibia without spinules in addition to the usual pale bristles.....10

10. Corium broadly rounded or truncate at apex, branches of exocorial vein scarcely connate posteriorly; mesocorium with one or more veins (Figs. 41, 51) 11
 Corium narrowly rounded or pointed at apex, branches of exocorial vein nearly or quite united at apices; mesocorium without veins (Figs. 50, 52-56) 12
11. Second antennal segment fully half as long as third; anterodorsal series of spines about as long as those of posterodorsal series on fore tibia; fore femur with two quite strong bristles on apical half of anteroventral surface.
Acrotmetus Horvath.
 Second antennal segment not more than one-third as long as third; anterodorsal armature of fore tibia weak, the setulæ shorter than those of the posterodorsal series, the whole armature of fore tibia much less developed than in the contrasted group; fore femur with two hair-like bristles on apical half of anteroventral surface. **Euryscytus** Horvath.
12. Hind tibia with a deep longitudinal sulcus just exterior to the carinate line, somewhat sulcate dorsally; scutellum extending to apex of abdomen.
Trepocnemis subgen. nov.
 Hind tibia otherwise. 13
13. Lateral area of metapleurum smooth, impunctate.
Galgupha Amyot and Serville.
 Lateral area of metapleurum distinctly punctured adjacent to the ostiolar surface. 14
14. Scutellum sharply bicolored, black and yellow or reddish (Figs. 162, 166); corium rounded at apex (Fig. 55) **Microcompsus** Horvath.
 Scutellum generally entirely black; only one species with coccinelloid coloration (Fig. 177); corium acute at apex (Fig. 56).
Nothocoris McAtee and Malloch.

SYSTEMATIC ARRANGEMENT OF THE SUBGENERA.

Corium broad apically.

Hind tibia carinate:

1. **Euryscytus**; 2. **Bonaria**.

Hind tibia not carinate:

3. **Gyrocnemis**; 4. **Ctenopoda**.

Corium pointed apically.

Hind tibia sulcate dorsally:

5. **Trepocnemis**.

Hind tibia not sulcate dorsally.

Hind tibia carinate:

Exocorial vein distinct basally:

6. **Orocoris**; 7. **Acrotmetus**; 8. **Microcompsus**; 9. **Nothocoris**;
 10. **Galgupha**.

Exocorial vein obsolete basally:

11. *Psestophleps*; 12. *Pteronomos*; 13. *Charoda*.

Hind tibia not carinate:

14. *Acritophleps*; 15. *Astiroderma*.

Subgenus EURYSCYTUS Horvath.

Euryscytus Horvath, G., Ann. Mus. Nat. Hungary, Vol. XVII, 1919, p. 227 [Subgenotype (orthotype), *Tetyra smidtii* Fabricius].

Principal Characters: Corium rounded or truncate at apex (Fig. 41), exocorial vein distinctly furcate, the branches scarcely connate posteriorly, mesocorial vein almost complete in species with entirely dark corium, evanescent basad of apex of claval suture in those with pale corial mark at base, practically obsolete in *lucretia*; second antennal segment not, or very little, more than one-third as long as third; anterodorsal bristles on fore tibia weak, shorter than those of postero-dorsal series; hind tibia with a carinate line on posterior surface; trichobothria and spiracles in a slightly curved series on each sternite.

It may be noted that the group with apically narrowed corium contained within Captions 2 to 14 of the following key to the species is quite similar to the subgenus *Acrotmetus*, but is distinguished from the latter by the much weaker armature of the anterodorsal surface of the fore tibia and of the anteroventral surface of the fore femur, the latter having two fine, instead of two quite strong, bristles on the apical half; and by the shorter second antennal segment. The reflexed apical margin of the sixth abdominal sternite occurs in the males of both groups (except in that of *lucretia*). The propriety of referring this group to either subgenus, or to a new one, may be considered a matter of opinion, but we prefer to retain it in *Euryscytus*.

KEY TO THE SPECIES OF THE SUBGENUS EURYSCYTUS.

1. Corium more or less narrowed and somewhat rounded apically, mesocorium at narrowest point narrower than corresponding costad portion of corium, as in *Acrotmetus* (Fig. 51)⁸, mesocorial vein never present as a sharply incised

⁸It must be remembered that in estimating the comparative width of the mesocorium and exocorium the hemelytra should be in the normal resting position, which is with its costal margin almost directly in line with the lateral margin of the abdomen. In many specimens the fore wing is slightly extended and thus the inner portion of the corium, usually covered by the lateral edge of the scutellum, is exposed, giving the mesocorium a greater width than when the hemelytra is in its normal position. This fact should be borne in mind when using the diagnostic keys.

- line; abdominal sternites either without distinct pale lateral markings, or if such are present they are narrow, reddish, and continuous (or nearly so) along margins of segments on which they occur; apex of sixth abdominal sternite of male, except in *lucretia*, narrowly reflexed; scutellum always overlapping base of hypopygium in male, and extending to apex of penultimate tergite in most females. 2
- Corium wider, truncate at apex, mesocorium at narrowest point equal to, or broader than, costad portion of corium; abdominal sternites with yellow, semicircular, usually disconnected, lateral spots, usually on from third to sixth in male and from third to seventh in female; sixth abdominal sternite of male not reflexed at apex; scutellum normally falling short of base of hypopygium in male, never distinctly overlapping it, and not extending much beyond base of penultimate tergite of female. 17
2. Females. 3
 Males. 10
3. Corial marking yellow on costa, becoming dark reddish toward claval suture; sixth abdominal sternite narrowly rounded anteriorly; sternites deeply and coarsely punctate; genital and subgenital plates about equally long (Fig. 81).
varipennis sp. nov.
 Corial marking uniformly reddish orange or yellowish. 4
4. Sixth abdominal sternite very broadly rounded anteriorly; genital plates longer than fifth sternite at middle, and nearly half as long as sixth, their inner edges slightly elevated; pale basal mark on corium not extending to the middle. *insula* sp. nov.
 Sixth abdominal sternite narrowly rounded or subangulate anteriorly; genital plates not longer than fifth sternite, and distinctly less than half as long as sixth, their inner edges not elevated. 5
5. Pale basal marking half the length of corium, bordering the scutellum beyond the claval suture; mesocorial vein obsolete. *lucretia* sp. nov.
 Pale marking distinctly less than half as long as corium, not, or scarcely bordering scutellum beyond the claval suture. 6
6. Genital plates almost flat, their posterior margins nearly straight (Fig. 78) . . . 7
 Genital plates more or less elevated along inner margins, their posterior margins noticeably concave. 9
7. Vertex feebly and sparsely punctate; genital plates with sparse small shallow punctures *assimilis* sp. nov.
 Vertex with rather large and deep punctures which are quite close together discally on each side. 8
8. Subgenital plates not over half as long as genital plates on inner margins, genital plates quite coarsely punctured except near inner margins; length of ventral exposure of ultimate tergite about half as great at middle as on lateral margin. *caudata* sp. nov.
 Subgenital plates over half as long as genital plates on inner margins, genital plates with a few small punctures and shallow longitudinal striæ; length of ventral exposure of ultimate tergite about one-fourth as great at middle as on lateral margin. *caudiculata* sp. nov.

9. Both fifth and sixth abdominal sternites subangulate in centre of anterior margin..... **difficilis** Breddin.
Only the sixth sternite noticeably angulate in center of anterior margin (Fig. 80)..... **signatipennis** Germar.
10. Hind margin of hypopygium trisinate, the central emargination angular or subangular..... 11
Hind margin of hypopygium more or less distinctly and evenly emarginate centrally, not subangularly so, lateral emarginations faint or lacking..... 12
11. Sternites with minute punctures, almost impunctate; hypopygium as seen from below as in Figure 83, the rim not at all thickened on each side of the central emargination..... **obesa** sp. nov.
Sternites with deep moderate-sized punctures; hypopygium as in Figure 86, the rim thickened on the inside on each side of the central emargination.
difficilis Breddin.
12. Basal mark on corium extending beyond middle; sixth sternite not reflexed at extreme apex..... **lucretia** sp. nov.
Basal mark on corium not extending to middle, occupying about the basal third; sixth slightly reflexed at extreme apex..... 13
13. Hypopygium with a feeble emargination on each side of the central one..... 14
Hypopygium with only the central emargination..... 15
14. All the emarginations slight (Fig. 88)..... **contracta** sp. nov.
Central emargination much more distinct than the lateral (Fig. 89).
assimilis sp. nov.
15. Ventral exposure of hypopygium distinctly longer than fifth sternite.
regularis sp. nov.
Ventral exposure of hypopygium not longer than fifth sternite..... 16
16. Larger species, averaging at least 5 mm..... **insula** sp. nov.
Smaller species, averaging about 4 mm..... **signatipennis** Germar.
17. Corium entirely dark (general and sometimes other specimens may show more or less indications of basal pale marking); lateral area of metapleurum angulate-narrowed anteriorly, with few, or no, punctures; posterior border of male hypopygium not reflexed, straight or almost so..... 18
Corium with at least one conspicuous pale basal mark which is either reddish or yellowish on a dark ground..... 24
18. Females..... 19
Males..... 21
19. Genital plates twice as long as postventer, inner margins distinctly elevated, the disks depressed..... **sahlbergi** sp. nov.
Genital plates but little longer than postventer, their modelling otherwise... 20
20. Genital plates quite conspicuously depressed on posterior margins, causing them to appear elevated or tumid centrally in profile..... **corvina** Horvath.
Genital plates practically flat in profile..... **laevis** Stål.
21. Hind wall of dorsal rim of hypopygium seen from above thin only centrally..... 22
Hind wall of dorsal rim of hypopygium seen from above thin across most of its width..... 23

22. Dorsal rim of hypopygium flat anteriorly, lateral angles excavated, central depression trapezoidal (Fig. 96)..... **corvina** Horvath.
 Dorsal rim of hypopygium depressed anteriorly, tumid and very wide laterally; central depression nearly circular (Fig. 95)..... **punctata** sp. nov.
23. Entire vertex coarsely and deeply punctured; dorsal rim of hypopygium abruptly declivitous, especially laterally (Fig. 94)..... **opercula** sp. nov.
 Vertex irregularly punctate, nowhere very deeply so, and on some portions almost impunctate; dorsal rim of hypopygium gradually and rather evenly downwardly sloped towards center (Fig. 93)..... **lævis** Stål.
24. Corium sometimes with only a pale line along costa basally, remainder brownish black..... **lævis** Stål.
 Corium at base with a broad yellowish or reddish mark which extends over almost all, or all, of the area between costa and claval suture..... 25
25. Scutellum with a slight, but distinct, raised marginal line round the entire apex..... **vulnerata** Horvath.
 Scutellum without trace of a raised marginal line round apex..... 26
26. Beak extending to apex of third abdominal sternite; male hypopygium with dorsal surface as in Figure 97..... **rostrata** sp. nov.
 Beak seldom extending beyond insertions of hind coxae and never to beyond hind margin of second abdominal sternite..... 27
27. Basal pale mark on corium short, never as long on mesocorium as the dark part of that area beyond it, and rarely extending beyond level of apex of the claval suture..... 28
 Basal pale mark on corium longer, generally as long on mesocorium as the dark part of that area beyond it, and always extending noticeably beyond level of the claval suture..... 47
28. Vertex with large, contiguous, deep punctures on surface except for a small area between each ocellus and eye, and a small subtriangular area on each side of tylus on posterior margin; basal pale mark on corium seldom extending beyond middle of the claval suture; pronotum deeply punctured, except on center of disk; spaces between mesocorial line and exocorium and the exocorium and costa subequal..... **foveolata** Jensen-Haarup.
 Vertex much less deeply and copiously punctured, sometimes almost impunctate, and in all cases with a much greater proportion of the dorsal surface impunctate..... 29
29. Sixth abdominal sternite in both sexes about as long on central line as the preceding four sternites combined at same point, very broadly and evenly rounded in front; fifth sternite very short in center, not over one-third as long there as at lateral margin; vertex microscopically punctured, appearing impunctate, except under a very high power lens, lateral carinæ weak, but evident; lateral glossy metapleural area not linear in front, with some shallow punctures along inner margin anteriorly..... **rasilis** Horvath.
 Sixth abdominal sternite in neither sex nearly as long as the preceding four sternites combined, rarely as long as the three preceding sternites; fifth sternite rarely less than half as long at center as at lateral margin..... 30

30. Yellow basal mark on corium not extending beyond middle of claval suture, and more or less tinged with brown; vertex with rather large deep punctures on central portion of each side, minutely and shallowly punctured behind and along each side in front, the lateral carina almost undeveloped.
valvata sp. nov.
 Yellow basal mark on corium usually extending as far as apex of exposed portion of claval suture, if extending to slightly beyond middle, the vertex differently punctured..... 31
31. Yellow basal mark on corium falling distinctly short of apex of exposed portion of claval suture, its extreme apex centrally about on level with apex of suture; vertex practically impunctate and without distinctly carinate anterior margin; lateral area of metapleurum reduced to a mere line in front, sometimes rather abruptly narrowed at some distance from anterior extremity..... *nitida* sp. nov.
 Yellow basal mark on corium almost invariably extending to apex of exposed portion of claval suture, and exceeding level of its apex in center; if not clearly thus, the vertex is distinctly punctured and with anterior margin carinate, or the lateral area of metapleurum is not less than half the width of reflexed costal portion of corium at its anterior extremity..... 32
32. Males..... 33
 Females..... 39
33. Vertex not highly polished, microscopically shagreened, and quite coarsely and deeply punctured, becoming gradually less so laterally and posteriorly, the lateral carina much more distinct than usual, length in front of anterior transocular line distinctly greater than behind it; eye slightly recessive as seen from above, the outline a little incurved (Fig. 76); central exposure of hypopygium from below distinctly greater than length of fifth abdominal sternite at center..... *opacifrons* sp. nov.
 Vertex distinctly shining, usually highly polished and without shagreening (the punctures neither so deep nor so numerous as stated in the alternative), and shorter in front of than behind anterior transocular line; eye not, or very inconspicuously recessive as seen from above, generally almost in line with lateral margins of vertex..... 34
34. Vertex highly polished and subobsoletely punctured, the punctures visible only with a high power lens (X 32)..... 35
 Vertex quite distinctly punctured at least on central portions of each side... 36
35. Dorsal rim of hypopygium regularly and evenly sloping towards center all around except central part of anterior margin (Fig. 103).. *parallela* sp. nov.
 Dorsal rim of hypopygium not regularly and evenly sloping; with a small elevation on each side opposite lateral angle (Fig. 102)... *smidtii* Fabricius.
36. Hind margin of hypopygium distinctly emarginate (Fig. 99), and consequently shorter at center than fifth sternite..... 37
 Hind margin of hypopygium without pronounced emargination, longer at center than fifth sternite, straight, or transverse (Figs. 100-101)..... 38

37. Hind margin of hypopygium very broadly emarginate (Fig. 99); scutellum falling distinctly short of anterior margin of hypopygium; vertex with quite large deep punctures, the most conspicuous of which are proximad of middle on each side almost up to anterior margin; lateral metapleural area rather broad in front, punctate on inner margin. **australis** sp. nov.
 Hind margin of hypopygium less broadly emarginate; scutellum slightly overlapping anterior margin of hypopygium; vertex with less conspicuous punctures, the deepest on each side behind median transverse line, and the anterior lateral portions almost impunctate; lateral area of metapleurum narrow and impunctate interiorly **curvata** sp. nov.
38. Larger species, not less than 5 mm. in length; hind margin of hypopygium slightly undulated (Fig. 100) **basalis** Germar.
 Smaller species, averaging 4 mm. in length; hind margin of hypopygium almost straight (Fig. 101) **jaczewskii** McAtee & Malloch.
39. Large species, not less than 5 mm. in length; all veins in apical part of hind wings heavily pigmented; apex of corium seen from behind not at all paler than remainder of it. **basalis** Germar.
 Smaller species, less than 5 mm. in length; at most only the anterior one of the veins in apical part of hind wings heavily pigmented. 40
40. Apex of corium when seen from behind and slightly above its level distinctly paler than remainder of the dark part, most noticeably so at outer apical angle. 41
 Apex of corium not noticeably pale. 43
41. Vertex almost impunctate even under a high power lens (X 32); greatest length of pale basal mark on corium not much less than extent of the dark part apicad of it. **parallela** sp. nov.
 Vertex more distinctly punctate; pale basal corial mark not nearly half as long as corium. 42
42. Pale basal mark on corium not extending beyond level of apex of exposed portion of claval suture; vertex with shallow punctures. **romana** sp. nov.
 Pale basal mark on corium extending on mesocorium to beyond level of apex of exposed portion of claval suture; vertex more deeply punctured.
 **australis** sp. nov.
43. Vertex deeply and coarsely punctured. **australis** sp. nov.
 Vertex shallowly and rather finely punctured. 44
44. Sixth sternite subangulate anteriorly 45
 Sixth sternite evenly rounded anteriorly. **curvatula** sp. nov.
45. Genital plates distinctly shorter than postventer. **labrata** sp. nov.
 Genital plates equal in length to postventer. 46
46. Sixth sternite with distinct sublateral undulations anteriorly in addition to the somewhat produced median angulation. **mammula** sp. nov.
 Sixth sternite without sublateral undulations, the median angulation scarcely produced. **curvata** sp. nov.

47. Corium without yellow mark at apex of costa; vertex with rather large and moderately deep punctures centrally on each side; yellow corial mark extending practically as far on costa as on mesocorium. 48
 Corium with a distinct yellow mark at apex of costa; vertex almost impunctate 49
48. Hind margin of male hypopygium convex medially, concave laterally. **cruenta** Horvath.
 Hind margin of male hypopygium concave medially, convex laterally. **contra** sp. nov.
49. Males 50
 Females 51
50. Sixth sternite angulate anteriorly; dorsal rim of hypopygium scooped out almost evenly from side to side. **paræ** sp. nov.
 Sixth sternite rounded to subangulate anteriorly; dorsal rim of hypopygium somewhat tumid within lateral angles, flat anteriorly. **apicata** sp. nov.
aliena sp. nov.
51. Genital plates longer than postventer, their posterior margins more concave; hind margin of ventral exposure of ultimate tergite convex. **apicata** sp. nov.
paræ sp. nov.
 Genital plates scarcely equalling postventer, their posterior margins nearly straight; hind margin of ventral exposure of ultimate tergite slightly concave medially. **aliena** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES*

OF THE SUBGENUS EURYSCYTUS.

Corium narrowed apically, mesocorium at narrowest part not as wide as costad portion of corium.

Mesocorial vein distinct, punctate-striate:

varipennis, obesa, difficilis, contracta, assimilis, caudata, caudiculata, regularis, signatipennis, insula.

Mesocorial vein obsolete:

lucretia.

Corium broader, hardly narrowed apically, mesocorium at narrowest point as broad as, or broader than, costad portion of corium.

Corium without pale markings or with only a pale line on base of costa:

lævis, opercula, punctata, sahlbergi, corvina.

Corium with at least a basal pale mark which extends from costa to claval suture.

*The species in the following descriptive pages are not arranged systematically, but in alphabetical order.

Basal pale mark on corium at longest point not nearly as long as the dark part of mesocorium beyond it, rarely extending much beyond apex of claval suture:

vulnerata, foveolata, rostrata, opacifrons, australis, basalis, jaczewskii, mammula, curvata, labrata, romana, curvatura, valvata, nitida, rasilis, smidtii, parallela.

Basal pale mark extending to or almost to middle of corium:
apicata, aliena, paræ, cruenta, contra.

1. **Galgupha (Euryscytus) aliena** sp. nov.

Black, stramineous elytral marking covering about one-third length of exocorium and about one-half that of mesocorium, corium narrowly pale apically with a moderate-sized pale blotch on outer apical angle; tarsi, antennæ, and beak testaceous, the latter more or less infuscated; lateral pale spots on segments in some cases rather obscure.

Head narrowly rounded anteriorly, produced more than length of an eye beyond anterior transocular line, vertex with only slight traces of wrinkling and puncturing; pronotum highly polished, with only slight traces of puncturing, even laterally; scutellum with rather decided punctures in anterolateral angles, but only faint ones elsewhere; corium sparsely punctured except along veins, which are closely punctate as usual; sternites with scattered, coarse, but not deep punctures, six broadly rounded anteriorly in both sexes, the preceding sternites, however, but slightly constricted medially; ventral exposure of male hypopygium coarsely punctate, transversely channelled, hind border distinctly concave-emarginate medially, convex laterally, dorsal rim broad, nearly flat anteriorly, broader and more sloping laterally, with a tumid area, however, within each lateral angle; hind wall narrow, more abruptly declivitous interiorly; genital plates of female coarsely punctate, less than half as long as sixth sternite, nearly as long as postventer; inner margins narrowly elevated, hind margins slightly concave. Length 3.75.-4 mm

Holotype, and *paratypical* males and *allotype*, female, Rio Caiary-Uaupes, Amazonas, Brazil, Sept. 1906, H. Schmidt (A. M. N. H.). Mosqueiro, Rio de Pará, March 12, 1896, E. E. Austen (British Museum).

2. **Galgupha (Euryscytus) apicata** sp. nov.

Black, shining, the corial markings hyaline to stramineous, the anterior one more than half as long as corium, decidedly longer on meso- than on exo-corium; beak, antennæ, and tarsi stramineous to testaceous; lateral spots on third to sixth segments in both sexes, and also on ultimate tergite of female, pale yellowish.

Surface minutely sculptured, somewhat decreasing the glossiness and obscuring the puncturing. Head narrowly rounded anteriorly, produced about length of eye beyond anterior transocular line; dorsal punctures subobsolete on head and pronotum, a little more obvious toward sides of latter, anterior disk of scutellum nearly impunctate, distinct punctures elsewhere, strongest near antero-lateral angles; corium almost impunctate, except along veins. Lateral area of metapleurum anteriorly rather broad, without punctures; sternites 2-5 shorter at middle than at lateral margins, but none of them so much as half shorter; sixth sternite anteriorly broadly rounded; ventral exposure of male hypopygium punctate, not channeled transversely, hind margin rounded, shallowly concave-emarginate posteriorly; dorsal rim rather flat anteriorly, more sloping laterally, central depression rather abrupt, hind wall high and thin, a little depressed medianly. Genital plates of female punctate, about half as long as sixth sternite, and equal to postventer, inner margin distinctly shorter than posterior, the latter slightly concave. Length 3.2-3.9 mm.

Holotype and *paratype*: males; and *allotype*, female, Guyane, Leprieur, 2-39; paratype female, Maroni, St. Jean, Guyane Français, F. Geay, 1903; Charvein, French Guiana, 1914, R. Benoist (Paris Mus.); Demerara, British Guiana (British Mus.); Paramaribo, Surinam, various months, Heller (Berlin Mus.); Paramaribo, Dutch Guiana, C. Heller (Hamburg Mus.).

Some of the Paramaribo specimens from the Berlin Museum have the country listed on label as Mexico, which is clearly in error. Dutch Guiana should be substituted, as they were collected about the same time as the others and by the same collector.

3. *Galgupha (Euryscytus) assimilis* sp. nov.

Black with æneous reflections, corial patch yellow, lateral margins of sternites 4-6 in both sexes, and more or less of genital region in females dull reddish; tarsi, beak, and antennæ testaceous, segments of the last named infuscated in varying degrees.

Head produced a little more than length of eye beyond anterior transocular line, front margin slightly carinate, almost evenly rounded; vertex with only sparse subobsolete punctures; pronotum shallowly coarse-punctate laterally, almost impunctate elsewhere; scutellum with sparse shallow punctures laterally, finer ones on posterior declivity, the anterior disk almost like disk of pronotum, polished impunctate; lateral area of metapleurum broad, impunctate; sternites with sparse shallow coarse punctures, smoother medially; sixth sternite of male subangulate anteriorly, the projection rounded, the fourth and fifth noticeably constricted medially; ventral exposure of hypopygium faintly punctate, hind margin slightly reflexed, broadly

but shallowly emarginate medially, briefly and faintly so laterally (Fig. 89); dorsal rim distinctly broadest laterally, sloping from exterior border inwardly, most abruptly so anteriorly, hind wall nearly vertical (Fig. 89); sixth sternite of female rounded anteriorly, preceding sternites subparallel in outline, little constricted medially; genital plates (Fig. 78) two-thirds as long as sixth sternite, about equal to postventer, inner margins about two-thirds as long as posterior, the latter almost transverse. Length 4.5 mm.

Holotype, male; *paratype* male; and *allotype* female, Rio Negro, Paran , Reichensperger (Helsingfors Museum).

4. *Galgupha (Euryscytus) australis* sp. nov.

Black, shining usually with æneous, sometimes with purplish reflections; basal spot of corium stramineous to yellowish, about half length of corium on mesocorium, and one-third on exocorium; lateral spots on abdomen yellow; beak, antennæ, and tarsi testaceous.

Head narrowly rounded anteriorly, produced slightly more than length of eye beyond anterior transocular line; eyes slightly set in from margin of vertex; vertex coarsely punctate, except on tylus posteriorly and occipital region; pronotum noticeably punctate laterally, and in extremities of transverse impression, where the punctures are rastrate, finely punctate elsewhere; scutellum numerously punctate, most coarsely so anterolaterally, and most finely so discally; corium moderately punctate anteriorly puncturing obsolete posteriorly, except along veins. Lateral area of metapleurum broad anteriorly, with a row of punctures bordering ostiolar surface. Sternites coarsely punctate, smoother medially; sixth sternite of male subangulate anteriorly, about equal in length to preceding three sternites together, each of which is more or less constricted medially; ventral exposure of hypopygium rather short, punctate, scarcely channelled, hind margin slightly concave medially (this and dorsal rim as in Fig. 99); sixth sternite of female broadly rounded anteriorly, shorter than preceding three sternites together, each of which is moderately constricted medially; genital plates punctate, less than half as long as sixth sternite, about equal in length to postventer, inner margin decidedly shorter than posterior, the latter slightly oblique and concave. Length 3.8-4 mm.

Holotype male, Chapada, Brazil, October; *paratypes* males, same locality, April, October; and Corumba, Brazil, April (Carnegie Museum); *allotype* female, Sapucay, Paraguay, W. T. Foster (U. S. N. M.); *paratypes*, Tucuman, Argentina, Vezenyi, 1906, and Nov. 1905 (Jensen-Haarup); Zuviria and San Antonio, Argentina, Reimoser (Vienna Museum); Yhancaroinza, Chuquaca, Bolivia, G. L. Harrington (U. S. N. M.).

5. *Galgupha (Euryscytus) basalis* Germar.

O.[dontoscelis] basalis Germar, E. F., Zeitschr. f. Ent., I, 1839, p. 41 [Brazil].
Corimelæna proxima Walker, Francis, Catalogue, I, 1867, p. 80 [Brazil].

Black with æneous to purplish reflections; corial patch (somewhat longer on meso- than on exo-corium) and lateral abdominal spots yellow; tarsi, beak, and antennæ testaceous.

Head produced slightly more than length of eye beyond anterior transocular line, narrowly rounded anteriorly, subtruncate medially; vertex slightly carinate-margined, generally punctate in irregular transverse rows, impunctate posteriorly; pronotum with coarse punctures antero-laterally, practically impunctate elsewhere; scutellum moderately punctate, except on anterior disk, which is almost impunctate; corium emarginate apically with scattered punctures basally, scarcely punctate on posterior two-thirds, except along veins; lateral area of metapleurum narrowed and acute anteriorly, impunctate; sternites numerous punctate, smoother medially; sixth sternite in both sexes subangulate anteriorly, fifth and fourth but little constricted medially; ventral exposure of male hypopygium large, punctate, the hind margin (Fig. 100) very slightly reflexed; dorsal rim (Fig. 100) gradually basined, widest at lateral angles, hind wall declivitous; genital plates of female punctate, more than half as long as sixth sternite, a little longer than postventer, hind margin slightly concave. Length 4.5 mm.

Redescribed from the Santa Catharina specimens listed below which agree with notes made from the type material. Four of the five specimens from the Germar Collection, labelled *basalis* appear to be conspecific and are the basis of the concept of the species here adopted. Of three females at Lwow labelled "*basalis* m.[ihi], Brazil," two (one of which is the allotype) are satisfactorily alike, while the third is not certainly of the same species. A male in the Berlin Museum, labelled "Brazil, Sellow," appears to represent the same species and is considered the holotype. Of Walker's species, *proxima*, the holotype female, Petropolis, Brazil, and a paratype, Constançia, Brazil, January 1857, H. Clark (British Museum), have been studied and found to be this species. Other specimens seen are from Cara Pintada, Paraná, Brazil, June 2, 1922 (Warsaw Museum); and Santa Catharina, Brazil, Lüderwaldt (Stettin Museum); São Paulo, Brazil, Espirito Santo, Brazil, and Rio Grande do Sul, Brazil, Breddin Collection (Deutsches Ent. Inst.).

A quite striking feature of this species, and one in which it parallels *insula*, is the dark brown color of the two anterior veins (marked R and S in Fig. 10) of the hind wing. In most species these veins are

almost colorless, or, as in *australis*, only the anterior one (S) is pigmented.

6. *Galgupha (Euryscytus) caudata* sp. nov.

Black, corial patch red; tarsi and beak, testaceous; antennæ with the basal three segments mostly testaceous, and the two apical segments chiefly fuscous.

Head produced about length of eye beyond anterior transocular line, front margin slightly carinate, almost evenly rounded; vertex with anterior submargin, tylus, and occipital portions with fine punctures or none, remaining portions shallowly coarsely punctate; pronotum rastrate in transverse impression, with coarse punctures laterally, and fine ones elsewhere; scutellum numerously punctate, the punctures coarsest antero-laterally, finest antero-discally; mesocorium and veins punctate (except posteriorly); lateral area of metapleurum punctate interiorly; sternites with coarse punctures laterally, punctures finer, or subobsolete, medially; sixth sternite subangulate anteriorly, the preceding sternites little constricted medially; genital plates about two-thirds as long as sixth sternite and about equal in length to postventer; inner margins about two-thirds as long as posterior, the latter straight and transverse. Length, 4.5 mm.

Holotype female, San Antonio, Argentina, Reimoser (Vienna Museum).

7. *Galgupha (Euryscytus) caudiculata* sp. nov.

This form is much like *G. caudata*, but differs as noted in the key and as follows: pronotum practically impunctate, except for the usual lateral group of coarse punctures; genital plates about half as long as sixth sternite, and distinctly longer than postventer. Length 4.5 mm.

Holotype female, San Antonio, Argentina, Reimoser (Vienna Museum).

8. *Galgupha (Euryscytus) contra* sp. nov.

Æneous-black, large corial marking pale yellow, abdominal spots orange-yellow, tarsi testaceous, antennæ and beak fusco-testaceous.

Head produced about length of eye beyond anterior transocular line; anterior margin carinate, subtruncate medially, subsinuate laterally; tylus finely, lateral portions of vertex coarsely, and occipital strip not at all, punctate; pronotum with sparse coarse punctures laterally and in extremities of transverse impression, finely or obsoletely punctate elsewhere; scutellum coarsely punctate antero-laterally, finely so elsewhere except for anterior disk which is polished; lateral area of metapleurum impunctate; sternites copiously punctate,

the punctures more lightly impressed medially, the fourth and fifth moderately constricted medially, the sixth broadly subangulate anteriorly, thrice as long as ventral exposure of hypopygium, the latter coarsely punctate, its hind margin scarcely reflexed, broadly subangulate-emarginate medially, low convex laterally; dorsal rim of hypopygium widest at lateral angles, the exterior half all around nearly flat, the interior sloping, hind wall low, sloping, notched medially. Length 3.5 mm.

Holotype male, Villa Lutecia, near San Ignacio, Misiones, Argentina, 1911, E. R. Wagner (Paris Museum).

9. *Galgupha (Euryscytus) contracta* sp. nov.

Black with æneous reflections, corial patch yellowish to reddish, reaching claval suture, but only about one-third as long as corium; touches of yellow or red about front end of tylus also; lateral spots on abdominal segments yellowish to dull reddish, sometimes nearly obsolete; tarsi, beak, and antennæ testaceous, the latter two organs sometimes subfuscous with the extremities of the segments paler.

Head produced about length of eye beyond anterior transocular line; anterior margin not carinate-reflexed, varying from narrowly to rather broadly rounded; puncturing of vertex varying from a few shallow punctures on each side of the disk, the remainder nearly impunctate, to numerous distinct punctures, or even radiating wrinkles, with only occipital portion smooth; punctures prominent only antero-laterally on pronotum, and but lightly impressed everywhere on scutellum, except in antero-lateral angles; corium only obsoletely punctate, except along veins. Lateral area of metapleurum with a few punctures along inner side. Beak reaching third sternite; sternites shallowly punctate laterally, smoother medially, sixth angulate anteriorly, preceding sternites somewhat constricted medially, fifth most so; ventral exposure of hypopygium lightly punctate, transversely channelled, hind margin as viewed from below, slightly concave medially, convex laterally. (Fig. 88). Dorsal rim broad anteriorly and laterally, sloping from outer edge, somewhat tumid within and anterior to lateral angles, hind wall thinner, more declivate. Length 4-4.5 mm.

Holotype male, Gefe Lagoas, Minas Geraes, Brazil, Dec. 17, 1898 (Stettin Museum); *paratypes*, Rio Negro, Paraná, Brazil, H. Beenke (Hamburg Museum); São Paulo, Breddin Collection (Deutsches Ent. Inst.); Antonio da Barra (near Bahia), Brazil, Ch. Pujol (Paris Museum).

An unsatisfactorily variable complex, apparently agreeing, however, in genital characters.

10. *Galgupha (Euryscytus) corvina* Horvath.

Euryscytus corvinus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 228-229 [Argentina].

Jet-black, shining, lateral abdominal spots pale yellow; beak, antennæ, and tarsi testaceous.

Vertex broader between eyes than long (Fig. 77), produced about length of eye beyond anterior transocular line, truncate medially, inconspicuously carinate-margined, coarsely but shallowly punctate, except posteriorly where impunctate; pronotum coarsely punctate antero-laterally, practically impunctate elsewhere; scutellum with sparse, shallow punctures, impunctate on anterior disk; corium shallowly punctate; lateral area of metapleurum acute, but not linear anteriorly, impunctate (larger in female than in male); sternites with numerous but not deeply impressed punctures, sixth subangulate anteriorly in both sexes, fifth and fourth moderately constricted medially; ventral exposure of hypopygium nearly flat longitudinally (as in other black-winged species), the posterior margin not at all reflexed, very shallowly concave as seen from below (Fig. 96); dorsal rim (Fig. 96) flat anteriorly, this portion below level of lateral angles, where the rim is widest and more declivitous than anteriorly, hind wall rather broad, moderately declivitous; puncturing of sternites more pronounced in female than in male; genital plates half as long as sixth sternite, a little longer than postventer, posterior margin concave. Length 4-4.25 mm.

Holotype female, Tucuman, Argentina, 1906, Arpad Vezenyi (Budapest Museum); other specimens from Quatro, Minas Geraes, Brazil, E. R. Wagner, 1903; Laguna Mamaita, 25 kilometers north of Icano, Chaco de Santiago del Estero, E. R. Wagner, 1904, 1914 (Paris Museum); Catamarca (Argentine Museum); La Merced, and Zuviria, Argentina, Reimoser (Vienna Museum); Petropolis, Brazil, Ohaus (Dresden Museum).

11. *Galgupha (Euryscytus) cruenta* Horvath.

Euryscytus cruentus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 229-230 [Mexico].

Basal red or yellowish spot on corium extending from costa to claval suture and about half as long as corium.

Vertex broadly rounded anteriorly, copiously punctate throughout including tylus and occipital border; pronotum punctate throughout, most decidedly so laterally, semi-obsolete so over most of disk, nearly smooth posteriorly, scutellum punctate throughout, least conspicuously so on anterior disk; lateral metasternal area punctate interiorly; sternites moderately punctate, smoother medially, especi-

ally sixth; narrow exposure of male hypopygium punctate, hind margin moderately reflexed, convex medially, concave each side, dorsal rim widest and highest at lateral angles, depressed elsewhere to or below plane of central disk. Length 3.5-4 mm.

Holotype and *paratypical* males, Ocotlan, Mexico; *paratype* male, Mexico, Procoff (Budapest Museum).

12. *Galgupha (Euryscytus) curvata* sp. nov.

Shining æneous black, scutellum and elytra reddish-brown posteriorly; corial patch and abdominal spots yellow; tarsi, antennæ, and beak testaceous.

Head produced about length of eye beyond anterior transocular line, front margin slightly carinate, subtruncate medially and nearly straight laterally in male, about evenly rounded between eyes in female; vertex punctate, except posteriorly, most coarsely so on lateral portions of disk; pronotum coarsely punctate laterally, subobsoletely so elsewhere, punctures slightly rastrate in extremities of transverse impression; scutellum numerously punctate, the punctures fine on posterior declivity, and nearly obsolete on anterior disk; corium sparsely punctate except along veins; lateral area of metapleurum attenuate anteriorly, impunctate; sternites copiously coarsely punctate laterally, nearly smooth medially; sixth subangulate in both sexes, the preceding sternites, however, not greatly constricted medially; ventral exposure of male hypopygium moderate, punctate, hind margin only slightly reflexed, narrowly concave-emarginate medially, low convex laterally, dorsal rim nearly flat, widest laterally, hind wall thin; genital plates of female distinctly punctate, less than half as long as sixth sternite, and scarcely equal to postventer, inner margins two-thirds as long as posterior, the latter distinctly curved. Length 3.5-4 mm.

Holotype male, South America, Signoret Collection and *allotype* female, Rio Grande do Sul (Vienna Museum).

13. *Galgupha (Euryscytus) curvatula* sp. nov.

Æneous black, corial patch and abdominal spots yellow; beak, antennæ, and tarsi testaceous.

Head produced about length of eye beyond anterior transocular line, front margin slightly carinate, subtruncate medially, low convex laterally; vertex sparsely and shallowly punctate in general, impunctate posteriorly; pronotum coarsely punctate laterally and about extremities of transverse impression, finely punctate along anterior margin, almost impunctate elsewhere; scutellum numerously punctate, the punctures fine on posterior declivity and practically obsolete on anterior disk; corium punctate along veins and on anterior half of mesorium, but impunctate on posterior part of that moiety of

the elytron; lateral area of metapleurum acute anteriorly, impunctate; sternites numerous coarse-punctate laterally, nearly smooth medially; sixth rather broadly rounded anteriorly, fifth and fourth but little constricted medially; genital plates finely punctate, about half as long as sixth sternite and about equal to postventer; inner margins about half as long as posterior, the latter nearly straight and transverse. Length 3.5 mm.

Holotype female, Bahia, Brazil, A. David (Paris Museum).

14. *Galgupha (Euryscytus) difficilis* Breddin.

Thyreocoris difficilis Breddin G., Abh. Senckenberg. Naturf. Gesell., XXXVI, 1, 1914, p. 55 [Brazil].

Black, marking on corium reddish-orange, extending along claval suture until the latter disappears beneath scutellum, but scarcely bordering scutellum (Fig. 41), produced a little farther posteriorly on meso- than on exo-corium; lateral margins of sixth, fifth, and a varying number of anterior sternites reddish.

Head produced about length of eye beyond anterior transocular line, inconspicuously carinate-margined, truncate anteriorly; back of vertex, disk of pronotum, and anterior disk of scutellum nearly impunctate; elsewhere dorsally numerous, distinct punctures are present; lateral area of metapleurum triangular anteriorly with punctures thickly grouped along inner margin; sternites copiously punctate, sixth angulate and fifth to third subangulate anteriorly, little constricted medially; ventral exposure of male hypopygium punctate, transversely channelled, hind margin as in Figs. 86-87; dorsal rim broad anteriorly and laterally, distinctly basined, thinner posteriorly and depressed at median emargination. Sixth sternite of female usually quite angulate anteriorly; genital plates moderately punctate, less than half as long as sixth sternite, slightly shorter than postventer, distinctly shorter on inner than on posterior margin, the latter concave. Length 4-5 mm.

Holotype male and *allotype* female, São Paulo, Brazil, and *paratype* female, Rio Grande do Sul, Brazil, Breddin Collection (Deutsch. Ent. Inst.); specimens labelled *maculipennis* Germar, Brazil, but not type material of that species (Berlin Museum); other specimens from Missiones, Argentina (Argentine Museum), and from São Domingo, Feb. 21, 22, 1922; Rio Putinga, March 4, 1922, Vermelho, June 14, 1922; Therezina, July 11, 1922; Pinheirinhos, April 18, 1923; Foz do Iguassu, March 19, 1923, all localities in Paraná, Brazil (Warsaw Museum); Rio Negro, Paraná, Reichensperger (Helsingfors Museum); Theresopolis, Santa Catharina, Brazil, Fruhstorfer (Berlin Museum); Itu, Brazil, 1901, J. de Joannis; San Ignacio, Argentina,

1911, E. R. Wagner (Paris Museum); São Paulo; Rio Grande do Sul, Brazil, H. Taeuber (Munich Museum); and same locality, Stiegelmayr (Vienna Museum); Tijuco Preto, Rio Negro, Paraná, Brazil, R. Weyl (Hamburg Museum).

15. **Galgupha (Euryscytus) foveolata** Jensen-Haarup.

Euryscytus foveolatus Jensen-Haarup, A. C., Ent. Meddel., XVI, 1926, pp. 47-48 [Brazil].

Jet-black, shining; corium and posterior part of scutellum reddish-brown; basal pale marking of corium about one-fourth as long as corium, ill defined, but little longer on meso- than on exo-corium; beak, antennæ, and tarsi, testaceous; legs castaneous; lateral pale spots of abdomen conspicuous both above and below.

Head narrowly rounded, almost subacute anteriorly, produced nearly twice length of eye beyond anterior transocular line, distinctly carinate-margined; tylus expanded subapically, prominent apically; vertex coarsely, subcontiguously punctate, except for narrow occipital margin; pronotum punctate throughout, transverse impression usually deep, and conspicuously rastrate; humeral prominences and situation of lateral margins in front of them a little more developed than in other species; scutellum distinctly punctate throughout, more or less transversely wrinkled; puncturing of corium deeper and more conspicuous than in other species; lateral area of metapleurum acute anteriorly, scarcely punctate; sternites copiously punctate, smoother medially; sixth sternite of male broadly subangulate anteriorly, fifth and fourth slightly constricted medially; ventral exposure of hypopygium large, coarsely punctate, only slightly concave in profile, hind margin nearly straight (or very slightly concave) across median two-thirds; dorsal rim of hypopygium flat, reticulate anteriorly, sloping, punctate, and wider laterally, hind wall thin and steeply declivate; sixth sternite of female broadly rounded anteriorly, fifth and fourth only slightly constricted medially; genital plates coarsely punctate, about half as long as sixth sternite, fully as long as postventer, hind margins very slightly concave; subgenital plates semi-elliptic, about one-fourth the area of genital plates. Length 3.5-3.75 mm.

Holotype male, *allotype* female, and *paratypes* a pair, Lagoa Santa, Brazil, Reinhardt (Copenhagen Museum); Brazil, F. Sahlberg (Stockholm Museum); Brazil, Sellow, Olfers (Berlin Museum); Brazil, Barreto, 1840; Minas Geraes, Brazil, 2100 meters; Montagnes des Orgues, Province of Rio Janeiro, Brazil, E. R. Wagner, 1902 (Paris Museum); Pernambuco (British Museum); Petropolis, Sept. 23, 1891, A. Mueller (Munich Museum).

16. *Galgupha (Euryscytus) insula* sp. nov.

Black, sometimes with æneous or purplish reflections; corial patch pale yellow to orange, extending farther posteriorly on meso- than on exo-corium; tarsi, beak, and three basal segments of antennæ, testaceous, apical segments fuscous; abdomen without pale lateral spots.

Head (slightly deformed in the type) produced a little more than length of an eye beyond anterior transocular line, carinate-margined, truncate anteriorly, sinuate laterally; posterior portion of vertex, median parts of pronotum and anterior disk of scutellum almost impunctate, remainder of upper surface with distinct, chiefly round, punctures. Lateral area of metapleurum broad anteriorly with two to three rows of punctures along inner margin; within the postero-lateral angle of metapleurum is a heavily punctate rounded depression almost imitating the ostiolar field in texture. Sternites copiously punctate medially, all the sutures with sweeping anterior curvatures; sixth sternite of male angulate anteriorly (the apex rounded) sinuate sublaterally, as long as the preceding sternites together, of which the third to the fifth are slightly constricted medially, with slight anterior median convexities; posterior margin of sixth sternite evenly concave, distinctly though slightly reflexed; ventral exposure of hypopygium, punctate, distinctly channelled transversely, the reflexed hind margin, broadly concave medially, convex laterally; dorsal rim of hypopygium broad, most so laterally, slightly sloping inwardly from all sides; sixth sternite of female broadly rounded anteriorly, concave posteriorly, about equal in length to genital plates and post-venter together; genital plates punctate, about equal in length to post-venter, inner margins slightly elevated, about two-thirds as long as posterior, the latter slightly concave. Length 5 mm.

Holotype male and *allotype* female, Hohenau, Alto Paraná, Paraguay, H. Richter (Berlin Museum); *paratypes* Paraguay and Santa Clara, Paraguay, Gosset, 1900 (Paris Museum); and Misiones, Argentina (Argentine Museum).

17. *Galgupha (Euryscytus) jaczewskii* McAtee and Malloch.

Galgupha (Euryscytus) jaczewskii McAtee, W. L. and Malloch, J. R., Ann. Mus. Zool. Poland, VII, 1928, pp. 38-39 [Brazil].

Black with purplish reflections, corial mark pale yellow, about a third as long as corium; third to sixth segments with pale yellow lateral spots both above and below; beak, tarsi, and antennæ testaceous.

Head almost evenly rounded anteriorly, produced about one and one-half times length of eye beyond anterior transocular line, carinate-margined; vertex with a fairly large postero-median area impunctate; punctures elsewhere numerous and coarse but shallow; pronotum with coarse and deep punctures antero-laterally, punctures almost obsolete

discally, most evident in a slender series in transverse impression; scutellum punctate except on anterior disk, most decidedly so near antero-lateral angles; sternites two to five with well marked punctures, fifth sternite only half as long at middle as at lateral margins; sixth sternite with punctures obsolete over most of disk, narrowly rounded anteriorly, about as long as anterior sternites together; ventral exposure of hypopygium large, polished, only faintly punctate, not channelled transversely, posterior margin low convex (Fig. 101), sometimes slightly sinuate laterally; cavity opening postero-dorsally, dorsal rim broad and basined anteriorly and laterally, thin and high posteriorly (Fig. 101). Length 3.5-4 mm.

Holotype and *paratype* males, Rio Jordão, April 22, 1922, and male *paratype* Rio Clara, Serra da Experanca, Feb. 4, 1922, Paraná, Brazil (Polish Museum).

18. *Galgupha (Euryscytus) labrata* sp. nov.

Æneous black, basal third of corium pale yellowish, apical two-thirds fuscous to black; postero-lateral angles of metasternum pale; semi-circular spots on lateral margins of abdominal segments both above and below yellow; tibiæ and beak castaneous, tarsi and antennæ testaceous.

Head narrowly rounded anteriorly, produced about length of eye beyond anterior transocular line, vertex moderately punctate, except posteriorly; pronotum and scutellum glossy, only finely punctate discally, but more distinctly so laterally; corium only sparsely punctured between veins; sternites moderately punctate, a little smoother medially; sixth subangulate anteriorly, the preceding three sternites moderately constricted medially; genital plates punctate, less than half as long as sixth sternite, and slightly shorter than postventer, inner margins about one-third as long as posterior, the latter slightly concave, the former abruptly elevated forming conjointly an oval prominence, highest subapically. Length 3.8 mm.

Holotype female, without data, Fry Collection (British Museum).

A notable character of the species is the presence of but two postero-dorsal bristles on the hind tibia.

19. *Galgupha (Euryscytus) lævis* Stål.

C [orimelæna] lævis Stål, C., Rio Hemip. I, 1862, p. 8 [Brazil].

Corimelæna integra Walker, Francis, Catalogue, I, 1867, p. 80 [Brazil].

Bronzy black, corium more reddish-tinged, especially on base of costa, corial patch sometimes faintly indicated; sternites three to six with yellowish lateral spots; beak, antennæ, and tarsi, testaceous.

Head broadly rounded (sometimes subtruncate) anteriorly, produced less than half length of eye beyond anterior transocular line.

carinate-margined; punctures nearly obsolete on back of vertex, disk of pronotum, and anterior disk of scutellum, numerous and well-marked elsewhere dorsally; lateral area of metapleurum attenuated to a mere line anteriorly, impunctate; sternites copiously punctate, smoother medially; sixth subangulate in males (Fig. 82), narrowly rounded in females (Fig. 79), about as long as preceding three together, each of which is somewhat constricted medially; ventral exposure of male hypopygium, large, punctate, almost flat longitudinally; dorsal rim (Fig. 93) broad anteriorly and laterally (widest here), moderately basined, a little tumid within lateral angles, posterior portion thin, declivate; genital plates of female punctate (Fig. 79), about equal in length to postventer, inner margins somewhat elevated, shorter than posterior, the latter slightly oblique and concave. Length 4-5 mm.

Holotype and *paratypical* males, Brazil, F. Sahlberg (Stockholm Museum); other specimens from Montagnes des Orgues, near La Tijuca, Province of Rio de Janeiro, Brazil, E. R. Wagner, 1902 (Paris Museum); and Rio Grande do Sul, Brazil (Vienna Museum); *holotype* male and *allotype* female of *integra* Walker, Rio de Janeiro (British Museum).

20. *Galgupha (Euryscytus) lucretia* sp. nov.

Black with a steely-blue luster, corial marking orange-red, more than half as long as corium, distinctly longer on meso- than on exocorium, bordering scutellum nearly a millimeter behind claval suture; no lateral pale markings on abdomen; beak, antennæ, and tarsi testaceous.

Head slightly sinuate before eyes and rounded anteriorly, produced about length of eye beyond anterior transocular line, without carinate-margin; puncturing traceable on almost entire dorsal surface but nearly obsolete on discal portions; lateral area of metapleurum fairly broad anteriorly about two-thirds of its width occupied by two irregular rows of punctures. Sternites moderately punctate, smoother medially; sixth angulate anteriorly in male, not reflexed at apex, and slightly convex in center of apical outline; ventral exposure of hypopygium punctate, the posterior margin (Fig. 92) distinctly almost evenly reflexed, though slightly convex, as viewed from above or below, dorsal rim broad anteriorly and laterally rather abruptly declivate to the central basin, posteriorly the rim is slightly depressed and otherwise as described in key. Sixth sternite of female subangulate anteriorly, genital plates coarsely punctate, shorter than fifth sternite at middle, about half as long as sixth and about equal to postventer; inner margin shorter than posterior, the latter straight. Length 5-5.5 mm.

Holotype male, Sta. Lucretia, Sta. Cruz, Mexico, June 22, 1905, F. Knab (U. S. N. M.); *allotype* female, Guatemala (Breddin Collection).

Deutsch. Ent. Inst.); three female *paratypes*, Teapa, Tabasco, Mexico, February, H. H. Smith (British Museum).

21. **Galgupha (Euryscytus) mammula** sp. nov.

Distinctly aneous; corial patch pale yellow; no lateral spots on sternites; beak and antennæ castaneous; tarsi testaceous.

Head produced less than length of eye beyond anterior transocular line; vertex obliquely wrinkled on each side of tylus anteriorly, shallowly punctate almost throughout, anterior margin distinctly reflexed, convex in outline, a little emarginate medially; pronotum coarsely, but shallowly, punctate antero-laterally, more finely and sparsely punctate elsewhere; scutellum numerously punctate peripherally, almost impunctate on anterior disk; clavus extrorsely, meso-corium and veins punctate; lateral area of metapleurum truncate anteriorly, punctate interiorly; sternites numerously coarse-punctate laterally, smoother medially, impunctate on middle of fifth and sixth; anterior margin of sixth sternite subangulate, produced medially, undulate sublaterally, the preceding sternites with parallel, but less pronounced undulations, none of them very much constricted medially, sixth sternite shorter on median line than fifth and fourth combined; genital plates punctate, about two-thirds as long as sixth sternite and about equal to postventer; inner margins about two-thirds as long as posterior, the latter slightly concave, but transverse in position, inner posterior angles slightly elevated. Length, 5 mm.

Holotype female, S. Catarina, Lüderwalt (Stettin Museum).

22. **Galgupha (Euryscytus) nitida** sp. nov.

Black, highly polished, with aneous reflections; corial marking stramineous, only about one-fourth as long as corium, nearly as long on exo- as on meso-corium, bordering claval suture for about three-fourths of its length; sternites three to six with yellowish lateral spots; beak, antennæ, and tarsi testaceous or paler.

Head subtriangular anteriorly, produced more than twice length of eye beyond anterior transocular line, feebly carinate-margined; a few subobsolete punctures discernible on head, whole dorsum of pronotum practically impunctate; scutellum impunctate on anterior disk and apical fourth, moderately punctate elsewhere, the punctures deepest near antero-lateral angles. Lateral area of metapleurum angulate but not linear, anteriorly without punctures. Sixth sternite of male angulate or subangulate anteriorly; ventral exposure of hypopygium punctate, hind margin scarcely reflexed, slightly and shallowly concave as seen from above or below, dorsal rim broad, coarsely pitted, anterior portion almost level, the transversely elliptical basin, excavated from the lateral angles and posterior wall, the latter thin and of nearly uniform height. Sixth sternite of female rounded anteriorly.

and posteriorly, genital plates about half as long as sixth sternite, and about as long as postventer, coarsely punctate, the inner edges distinctly elevated, and inner angles slightly produced, hind margin slightly concave. Length 3-4 mm.

Holotype male, and *allotype* female, Paraiso, Canal Zone, Jan. 17, 1911, Aug. Busck; *paratypes*, same locality, Jan. 20, 1911, E. A. Schwarz, July 17, A. H. Jennings; Porto Bello, Panama, March 12, 1911, Aug. Busck; March 9, 1911, E. A. Schwarz; Tabernilla, Canal Zone, July 31; Cabima, Panama, May 17, 1911, Aug. Busck (U. S. N. M.).

23. *Galgupha (Euryscytus) obesa* sp. nov.

Black, corial patch yellowish near costa, suffused with reddish brown on mesocorium, about half as long as corium; no pale lateral spots on abdomen; beak, antennæ, and tarsi testaceous.

Body thick, short, obovoid; head produced about length of eye beyond anterior transocular line, deflexed, carinate-margined, truncate medially, punctures only slightly impressed on vertex, pronotum (except laterally), and disk of scutellum; broad peripheral region of scutellum with numerous well marked punctures; corium distinctly punctate, except on subcosta anteriorly and mesocorium posteriorly. Sternites with copious fine puncturing, polished medially, sixth extensively so, and with a few coarser punctures laterally, except on second on which they are distributed all the way across; sixth sternite rounded subangulate anteriorly (Fig. 83), fifth, fourth, and third slightly constricted medially; ventral exposure of hypopygium short, punctate, only slightly channelled transversely, hind margin (Fig. 83) most prominent medially, this portion shallowly emarginate, a shallow sinuation also on each side of central lobe, lateral portions convex. Length 3.5 mm.

Holotype male, San Luis, Paraguay, Reimoser (Vienna Museum).

A feature of the type specimen is the minutely shagreened or alutaceous surface of the abdominal sternites, which character is to a lesser extent also noticeable on the vertex.

24. *Galgupha (Euryscytus) opacifrons* sp. nov.

Black, shining, slightly aneous, corial patch and abdominal spots yellow to pale orange; tarsi stramineous, beak and antennæ testaceous.

Head produced about twice length of eye beyond anterior transocular line; front margin slightly carinate, outline between eyes a parabolic curve; eye slightly recessive, the outline a little incurved (Fig. 76); vertex coarsely punctate discally, finely punctate laterally, and impunctate posteriorly; pronotum coarsely punctate laterally, finely punctate elsewhere, the punctures in region of transverse impression

more or less rastrate; scutellum punctate throughout, the punctures coarsest antero-laterally, finest antero-discally; corium punctate along veins and on pale part of mesocorium, the posterior part of mesocorium largely impunctate; lateral area of metapleurum small, acute anteriorly, punctate, if at all, at juncture with ostiolar surface; sternites coarsely punctate laterally, nearly smooth medially; sixth subangulate anteriorly, the preceding sternites, however, but little constricted medially; ventral exposure of hypopygium ample, punctate, scarcely channelled transversely, hind margin (Fig. 98) concave medially, convex laterally; dorsal rim distinctly widest laterally, anterior portion slightly depressed forming a transverse crescentic area, which is not so steeply declivate inferiorly as the lateral and posterior walls, hind wall high, thin at top, central basin deep, capacious. Length 4 mm.

Holotype and *paratypical* males, Chapada, Brazil, October, H. H. Smith (Carnegie Museum).

25. **Galgupha (Euryscytus) opercula** sp. nov.

Dull æneous-black, costa and scutellum posteriorly reddish-brown; beak, antennæ, and tarsi testaceous.

Vertex broad, subtruncate anteriorly, carinate-margined, transversely wrinkled, copiously and coarsely punctate; pronotum plentifully punctate throughout, most coarsely so antero-laterally; scutellum punctate throughout, but not so thickly so as pronotum; corium mostly punctate. Lateral area of metapleurum acute anteriorly, impunctate. Sternites with numerous coarse punctures, somewhat smoother medially; sixth subangulate anteriorly, about equal in length to anterior three together, each of which is noticeably constricted medially; ventral exposure of male hypopygium large, semi-circular, coarsely punctate, all margins raised, the posterior almost straight (Fig. 94); dorsal rim (Fig. 94) narrow anteriorly, declivate inferiorly, lateral angles broad, basined, hind wall thin, steeply sloping within. Length 4.5 mm.

Holotype male, Mexico, 1883, Bilimek (Vienna Museum).

26. **Galgupha (Euryscytus) paræ** sp. nov.

The description of *apicata* will serve in almost every respect for *paræ*, except as noted in key and as follows: lateral area of metapleurum punctate interiorly; ventral exposure of male hypopygium channelled transversely. Length 3-3.5 mm.

Holotype male, Pará, Brazil (Carnegie Museum) and *allotype* female, same locality, Uhler Collection (U. S. N. M.).

27. **Galgupha (Euryscytus) parallela** sp. nov.

Black, highly polished, corial marking pale yellowish, about one-third length of corium; lateral spots on segments yellowish, not joined

along connexivum in specimens seen; beak, antennæ, and tarsi testaceous.

Head narrowly rounded anteriorly, produced about one and one-half times length of eye beyond anterior transocular line; vertex feebly carinate-margined, almost impunctate; numerous punctures traceable on pronotum, but shallow and ill defined; punctures evident on scutellum, except on anterior disk and on apex, deepest, as usual, near antero-lateral angles. Lateral area of metapleurum angulate, but not acuminate anteriorly, more or less punctate on inner margin. Sixth sternite of male subangulate anteriorly, fifth and fourth moderately constricted medially; ventral exposure of hypopygium short, punctate, transversely channelled, hind margin (Fig. 103) almost evenly concave; dorsal rim (Fig. 103) rather flat anteriorly, well basined within lateral angles and hind wall, which is thin, moderately high, and has two indistinct straight, transverse ridges across inner face; sixth sternite of female rounded anteriorly, slightly convex in middle posteriorly; genital plates coarsely punctate, a little less than half as long as sixth sternite, about equal to postventer, inner margin shorter than posterior, slightly elevated, inner posterior angles not at all produced, posterior margin straight. Length 4 mm.

Holotype male and *allotype* female, Santarem, Brazil, June 1919, S. M. Klages (Carnegie Museum); *paratypes*, Coroico, Bolivia, H. Tauber (Munich Museum).

There is a pale yellowish mark at the apex of costa of corium in this species, least noticeable in the male, and in this respect the species resembles *apicata*, but the basal corial yellow mark is much smaller than in that species, and the basin of the male hypopygium is more evenly and extensively excavated.

28. *Galgupha (Euryscytus) punctata* sp. nov.

Black, rather dull anteriorly, more shining posteriorly, corium and scutellum reddish-brown apically; connexivum reddish, connecting the lateral abdominal spots; edge of hypopygium reddish; beak, antennæ, and tarsi testaceous.

Head produced only about half length of eye beyond anterior transocular line, truncate medially, sinuate between eye and truncation, distinctly carinate-margined; vertex broader between eyes than long, with few, shallow, coarse punctures on each side of the middle; a group of large, deep punctures near lateral margin of pronotum, and near anterior angle of scutellum, a band of semi-obsolete punctures across middle of scutellum; corium with normal puncturing; on remainder of dorsum (including apical portions of scutellum and this is unusual) puncturing is obsolete; lateral area of metapleurum broad, impunctate, angulate anteriorly; sternites numerous punctate, smoother medially; sixth subangulate anteriorly, fifth and fourth

moderately constricted medially; ventral exposure of hypopygium, large, punctate, almost flat longitudinally, dorsal rim as in Fig. 95; hind margin (Fig. 95) slightly concave medially, convex laterally. Length 4.5 mm.

Holotype male, Mexico, Uhler Collection (U. S. N. M.).

29. **Galgupha (Euryscytus) rasilis** Horvath.

Euryscytus rasilis Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 230 [Brazil].

Æneous-black, highly polished, apical portions of corium and scutellum more or less reddish-brown; corial patch yellowish, about a third as long as corium; lateral abdominal spots on segments three to six in both sexes; similar spots on ultimate segment of female; beak, antennæ, and tarsi stramineous.

Head narrowly rounded anteriorly, produced about one and one-half times length of eye beyond anterior transocular line; feebly carinate-margined; vertex in general numerously, but shallowly, punctate, impunctate posteriorly; pronotum with only faint traces of punctures, puncturing slightly evident in a broad band behind middle, and well marked near antero-lateral angles of scutellum; corium punctate basally, impunctate apically, except along veins; lateral area of metapleurum, angulate, but not acuminate, anteriorly, with a row of punctures along inner side in male, and two rows in female; sternites sparsely punctate, the sixth in both sexes polished discally and very broadly rounded anteriorly (sometimes with a slight secondary angulation in middle in males), the fifth and fourth much, and the third slightly, constricted medially.

Ventral exposure of hypopygium polished, but with a few semi-obsolete punctures, slightly channelled transversely, the hind margin rounded, broadly and shallowly concave emarginate, over two-thirds of its width, convex laterally; dorsal rim broad and flat anteriorly, a little tumid within lateral angles, the hind wall on account of its emargination, depressed medially almost to level of bottom of basin. Genital plates of female, punctate, about as long on inner as on posterior margin, two-thirds as long as sixth sternite and twice as long as postventer, the inner posterior angles slightly elevated and produced, hind margin slightly concave. Length 3.25-4 mm.

Holotype male and *allotype* female, Brazil (Budapest Museum); other specimens from Chapada, Brazil, various months (A. M. N. H.; Carnegie Museum); Santarem, Brazil (Carnegie Museum); Brazil and Pará, Brazil, Uhler Collection (U. S. N. M.); Bolivia (Argentine Museum); Rio Dagua and Cali, Colombia, W. F. H. Rosenberg; Demerara, Guiana (U. S. N. M.); São Paulo, Brazil, Breddin Collection, and a specimen mislabelled "Eastwood, Toronto, VIII," Breddin Collection (Deutsch. Entomologisches Institut); San Esteban,

March 1888, E. Simon (Helsingfors Museum); Paramaribo, Surinam, October 1908, January, Heller; Obidos, Amazonas, Brazil, H. Rolle (Berlin Museum); Bogota, Lindig (Stockholm Museum); Brazil; Province del Sara, Bolivia, Steinbach (Stettin Museum); St. Jean du Maroni, French Guiana, 1914, R. Benoist; Boura, Rorota, French Guiana, 1909, A. Bonhoure (Paris Museum); Peru, Demerara (British Museum); Paramaribo, Dutch Guiana, C. Heller; Itatiaya, Brazil, 700 meters, Dec. 6, 1926, F. Ohaus (Hamburg Museum); Cauca, Colombia, H. Tæuber; French Guiana (Munich Museum).

30. *Galgupha (Euryscytus) regularis* sp. nov.

Black, shining, with somewhat æneous reflections; corial patch yellow; abdominal spots orange-reddish; ventral appendages missing.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin slightly reflexed, almost evenly rounded; vertex with coarse punctures on disk of each half, finer ones anteriorly, tylus and occipital region almost impunctate; pronotum with some coarse punctures antero-laterally, but with only fine punctures or none elsewhere; scutellum nearly smooth discally, punctate peripherally, the punctures coarse anteriorly, finer posteriorly; lateral area of metapleurum punctate along extreme inner margin; sternites with a moderate number of coarse punctures laterally, fewer and finer ones medially; sixth sternite subangulate anteriorly, longer than the preceding three together; each of these sternites has a secondary rondure at middle of anterior outline; ventral exposure of hypopygium punctate, slightly channelled transversely, hind margin (Fig. 90) shallowly concave almost from side to side; dorsal rim broad and only slightly sloping inwardly all the way round between lateral angles, reticulate and finely striate; hind wall high, steeply declivate. Length 4.5 mm.

Holotype male, La Plata, Breddin Collection (Deutsch. Ent. Inst.).

31. *Galgupha (Euryscytus) romana* sp. nov.

Æneous-black, polished; corial marking, somewhat longer on meso- than on exo-corium, lateral abdominal spots, beak, antennæ, and tarsi sordid reddish yellow.

Head subangulate anteriorly, produced distinctly more than length of eye beyond anterior transocular line, carinate-margined; coarsely but shallowly punctate, except on tylus posteriorly and occipital region, which are impunctate; pronotum without conspicuous punctures, semiobsolete punctures most noticeable about humeral prominences; scutellum nearly impunctate on anterior disk, and posterior third, moderately punctate elsewhere; corium punctate along veins

and with a group of coarse punctures in a slightly depressed area on mesocorium just posterior to color marking, nearly impunctate elsewhere; lateral area of metapleurum acute anteriorly, punctate anteriorly; sternites with a moderate number of coarse punctures; sixth sternite of male broadly subangulate anteriorly; ventral exposure of hypopygium coarsely punctate, slightly channelled transversely, hind margin slightly concave medially, convex laterally; dorsal rim broadest laterally, moderately sloping and reticulate within lateral angles and anteriorly, hind wall thin, almost vertical within; sixth sternite of female rounded anteriorly, longer than the preceding two, but shorter than the preceding three sternites together, these only slightly constricted medially; genital plates coarsely punctate, about half as long as sixth sternite, and equal to postventer; inner margin distinctly shorter than posterior, the latter straight and transverse. Length 4.5 mm.

Holotype female, Brazil, Signoret Collection (Vienna Museum); *paratype* female, Curityba, Brazil, 1912, P. Lombard (Paris Museum); *allotype* male and *paratypes*, Fry Collection (British Museum).

32. *Galgupha (Euryscytus) rostrata* sp. nov.

Black, shining; lateral abdominal spots and corial marking, yellowish, the latter but little longer on meso- than on exo-corium, extending to claval suture, but not to edge of scutellum, about one-third as long as corium; beak, antennæ, and tarsi testaceous.

Head narrowly rounded, almost subangulate anteriorly, produced one and one-half times length of eye beyond anterior transocular line, feebly carinate-margined; vertex with coarse punctures, some of them connected by furrows, an impunctate area posteriorly; pronotum with numerous coarse punctures laterally, and a few shallower ones in transverse impression, otherwise nearly impunctate; anterior disk of scutellum impunctate, a group of coarse punctures near each antero-lateral angle, remainder of surface with numerous shallower punctures; lateral area of metapleurum narrow, finger-like anteriorly, without punctures; sternites copiously punctate, sixth subangulate anteriorly, fifth slightly constricted medially; ventral exposure of hypopygium punctate, hind margin (Fig. 97) scarcely reflexed, almost evenly though slightly convex, dorsal rim (Fig. 97) broad, almost level anteriorly, sloping laterally, however, into the capacious transverse central basin, hind margin not depressed, thin at edge, but thickened submarginally at middle, forming a bridge to central disk. Length 5-6 mm.

Holotype male, Brazil, Gaudichaud, 1883 (Paris Museum).

This species has the beak much as in *Galgupha (Bonaria) longirostris* Berg, but the conspicuous pale yellow lateral spots on sternites, the presence of a quite strong anterior lateral bristle on all sternites from

third to fifth inclusive, and the less elongate form of the insect combine to distinguish it abundantly therefrom. The mid tibiæ are missing in the type specimen so that we are unable to decide whether they are, or are not, carinate on posterior side.

33. *Galgupha (Euryscytus) sahlbergi* sp. nov.

Æneous-black, abdominal spots pale orange, tarsi testaceous, beak and antennæ fusco-testaceous.

Head produced less than length of eye beyond anterior transocular line; anterior margin only slightly carinate, truncate medially, shallowly sinuate laterally; vertex with only scattered shallow punctures; pronotum with a few coarse punctures antero-laterally, almost impunctate elsewhere; scutellum with numerous coarse punctures on anterior half of periphery, polished elsewhere; lateral area of metapleurum acute anteriorly, impunctate; sternites copiously punctate, smoother medially; the sixth broadly subangulate anteriorly, with rounded angulations sublaterally, the outlines of preceding sternites correspondingly sinuate, the fourth and fifth but slightly constricted medially, the sixth broadly smooth medially, broadly convex in middle posteriorly; genital plates inserted at a steep angle to plane of middle of sixth sternite, punctate, inner margins three-fourths as long as posterior, the latter slightly concave, and posteriorly oblique. Length 5 mm.

Holotype female, Petropolis, Brazil, F. Sahlberg (Helsingfors Museum).

34. *Galgupha (Euryscytus) signatipennis* Germar.

O [dontoscelis] signatipennis Germar, E. F., Zeitschr. f. Ent., I, 1839, p. 42 [Brazil].
Acrotmetus cetratus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 226 [Brazil].

Æneous-black, corial patch about one-third length of corium, and about equally long on meso- and exo-corium, varying from pale yellow to clear reddish; connexivum reddish in some specimens, but there are no distinct lateral abdominal spots; tarsi, antennæ, and beak testaceous, the last two organs sometimes much infuscated.

Head varying from narrowly to evenly rounded, or slightly truncate anteriorly, produced about length of eye beyond anterior transocular line, feebly carinate-margined; vertex numerously punctate, except posteriorly; pronotum coarsely punctate laterally, punctures fairly prominent also in extremities of transverse impression, subobsolete elsewhere; scutellum almost impunctate on anterior disk, rather copiously punctate elsewhere; mesocorium and veins punctate; lateral area of metapleurum broad anteriorly, punctate interiorly; sternites with numerous coarse punctures laterally, smoother medially, the sixth

and immediately preceding sternites subangulate anteriorly, the sixth longer than all the preceding sternites together, its posterior margin concave, distinctly reflexed; ventral exposure of hypopygium sparsely punctate, transversely channelled, hind margin broadly (sometimes only shallowly) concave medially (Figs. 91), convex laterally; dorsal rim (Fig. 91) broad, almost evenly basined laterally and anteriorly, more declivate posteriorly; internal genitalia of male as in Fig. 84. Genital plates (Fig. 80) of female sparingly punctate, slightly longer than postventer, inner margin nearly as long as posterior, the latter transverse. Length 4-5 mm.

Except for the subgeneric characters, and average smaller size, this species is a close mimic of *Galgupha (Acrotmetus) schulzi*. Pronotum and scutellum sometimes more or less transversely wrinkled and rastrate. Hind coxæ as in Figs. 2-3.

Holotype in Lwow Museum labelled *signatipennis m.*, Brazil; type material of *Acrotmetus cetratus* Horvath, Espirito Santo, Brazil, Staudinger, 1898 (Budapest Museum); other specimens from Paraguay and Santa Clara, Paraguay, Gosset, 1900 (Paris Museum); Rio Claro, Serra da Esperanza, February 7, 1922; São Domingo, February 7; Rio da Areira, March 18, 19, 1922; Fazenda Durski, March 31, April 5, 6, 1922; Rio Jordão, April 22, 1922; Cara Pintada, June 2, 1922; Salto de Uba, Rio Ivahy, July 30, 1922; Rio Ubasinho, August 17, 1922; Villa Rica, Rio Ivahy, December 25, 1922, all in Paraná, Brazil (Warsaw Museum); Hohenau, Alto Paraná, Paraguay, Richter (Berlin Museum); Est. de Paraná, Rio Negro, M. Witte (Deutsches Ent. Inst.); San Antonio, Argentina, Reimoser (Vienna Museum); Petropolis, Brazil, Ohaus (Dresden Museum); Fry Collection (British Museum).

35. *Galgupha (Euryscytus) smidtii* Fabricius.

T [etya] smidtii Fabricius, J. C., Systema Rhyngotorum, 1803, p. 143 [Amer. merid.].

Æneous-black, corial spot pale yellowish, about half as long as corium, longer on meso- than on exo-corium, and not extending beyond claval suture; beak, antennæ, and tarsi testaceous, legs castaneous to black, abdominal segments three to six with pale lateral spots, connexivum mostly pale.

Vertex of the narrowly, rather than broadly, rounded type, coarsely punctate laterally, more finely punctate on tylus, and impunctate on occiput; pronotum with a group of coarse punctures laterally extending slightly mesad along transverse impression, but with only slight rastration elsewhere, pronotal surface more highly polished in male than in female; scutellum moderately punctate, except on anterior disk;

lateral area of metapleurum acute anteriorly, not punctate; sternites moderately punctate, not smooth medially except sixth; sixth broadly rounded anteriorly in female, fourth and fifth only slightly constricted medially; genital plates decidedly shorter on inner than on posterior margins, coarsely punctate, except on the slightly elevated inner margins, which are only a little produced apically, the posterior margin, therefore, only slightly concave; subgenital plates semi-oval, about half the area of the genital plates; sixth sternite of male subangulate apically, the fifth and fourth therefore somewhat more constricted medially than in the female, but scarcely to half their lateral dimensions; ventral exposure of hypopygium large, sparsely punctate, scarcely concave as seen from the side, hind margin concave medially (Fig. 102); dorsal rim (Fig. 102) coarsely punctate, broadest at lateral angles, anterior portion gently sloping, bounded on inner side by a definite polished line, rim more decidedly sloping within lateral angles, though there are tumid areas there, hind wall steeply declivate. Length 3.5 mm.

Holotype female and *allotype* male, *Amer. mer.* Schmidt, Mus. Tond. Lund (Copenhagen Museum). The specimen at Kiel, labelled "*smidtii*, Mittelamerika" probably is *rasilis* Horvath, but is specifically unidentifiable, because the hypopygium is damaged. Brazil, Sellow, Olfers (Berlin Museum).

36. *Galgupha (Euryscytus) valvata* sp. nov.

Black with æneous reflections, corial mark, about equally long on meso- and exo-corium, less than one-fourth as long as corium, pale yellow, suffused with dusky interiorly; pale yellowish lateral spots on segments not joined along connexivum; beak, antennæ, and tarsi testaceous.

Head narrowly rounded anteriorly, produced about length of eye beyond anterior transocular line, carinate-margined; vertex with numerous deep punctures, a considerable area at back, however, almost impunctate; pronotum with a narrow band of distinct punctures near each margin, but remainder nearly free from punctures; scutellum smooth on anterior disk, lightly punctate over most of the remaining surface, distinctly punctate near antero-lateral angles; corium punctate on basal half, almost impunctate apically, except along veins. Lateral area of metapleurum acute, but not acuminate anteriorly, impunctate; sternites coarsely punctured laterally, smoother medially, the larger punctures more or less rastrate; the sixth sternite subangulate anteriorly, preceding sternites noticeably shorter medially than laterally; genital plates three-fourths as long as the sixth sternite, longer than postventer; they are in a plane of about 45° from the horizontal axis of the insect, posterior margin decidedly concave. Length 4 mm.

Holotype female, Guiana, Leprieur, 2-39 (Paris Museum).

37. *Galgupha (Euryscytus) varipennis* sp. nov.

Black with æneous reflections, elytral marking bicolored, as described in key, scarcely one-fourth as long as corium; corium posteriorly, hind margin of scutellum and edge of abdomen both above and below, reddish; beak, tarsi, and antennæ testaceous, the two apical segments of latter infuscated.

Head almost evenly rounded anteriorly, produced about length of eye beyond anterior transocular line, feebly carinate-margined; vertex transversely rugulose and coarsely punctate, nearly smooth in middle posteriorly; pronotum coarsely punctate laterally, including extremities of transverse impression, nearly impunctate elsewhere; scutellum smooth on anterior disk, numerous punctate elsewhere; the punctures coarsest on antero-lateral angles; mesocorium, discally, and veins punctate; lateral area of metapleurum broad anteriorly with about three rows of punctures along inner side, a triangular, depressed, coarsely punctate area near postero-lateral angle of metapleurum; sternites with numerous distinct punctures, smoother medially; sixth sternite narrowly rounded anteriorly, fifth and fourth noticeably constricted medially; genital plates about a third as long as sixth sternite, scarcely equal in length to the large subgenital plates (Fig. 81) and less than half as long as postventer, punctate, inner margins elevated and smooth, distinctly shorter than posterior margins which are nearly straight and jointly form a slight and very obtuse anterior angulation. Length 5 mm.

Holotype female, Bahia, Brazil, Fruhstorfer, Noualhier Collection (Paris Museum).

38. *Galgupha (Euryscytus) vulnerata* Horvath.

Euryscytus vulneratus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 229 [Brazil].

Black, with æneous, sometimes purplish, reflections, corium and scutellum posteriorly more reddish-brown; corial patch bright reddish in most specimens, yellowish in some, varying from one-third to one-half length of corium; lateral abdominal spots, joined along connexivum, reddish to pale yellowish; beak, tarsi, and antennæ testaceous, the latter more or less infuscated apically.

Head narrowly rounded anteriorly, produced about length of eye beyond anterior transocular line, carinate-margined; vertex with numerous well defined punctures except at back; pronotum with coarse well marked punctures laterally, but only faintly impressed punctures discally, sometimes a little more definite, and sometimes rastrate, in and near transverse impression; scutellum punctate, except on anterior disk, the punctures deepest near antero-lateral angles; corium numerous punctate on basal, sparsely on apical, half, except along veins; lateral area of metapleurum attenuate anteriorly, impunctate;

sternites numerous punctate, smoother medially, sixth sternite of male angulate or subangulate, fifth and fourth sternites noticeably constricted medially; ventral exposure of hypopygium large, punctate, nearly flat longitudinally, hind margin not reflexed, dorsal rim slightly depressed in middle anteriorly, but anterior rim scarcely basined, lateral portions of rim distinctly basined, hind wall thin, high and little, if at all, depressed medially; sixth sternite of female rounded anteriorly, about equal in length to fifth and fourth together, both of which are distinctly constricted medially; genital plates, punctate, about half as long as sixth sternite, and as long as postventer; inner margin decidedly shorter than posterior, the latter concave, inner posterior angles moderately produced. Length 3.8-4.2 mm.

Holotype female, Cuyaba, Matto Grosso, Brazil (Budapest Museum); other specimens from Chapada, Brazil, October, November (Carnegie Museum); Rio Claro, Serra da Esperanza, February 4, 7, 1922; São Domingo, February 21, 1922; Pinheirinhos, April 18, 1923, all in Paraná, Brazil (Warsaw Museum); Paraguay, March 28, May 18, Fiebrig (Berlin Museum); San Bernardino, Paraguay, Fiebrig (Vienna Museum).

Subgenus *BONARIA* subgen. nov.

Principal characters: Corium broad apically, exocorial vein distinctly fuscate, the forks not connate apically; mesocorium with a short vein along claval suture and an outer longer one paralleling margin of scutellum, both veins evanescent basally (Fig. 42); mid tibia without, hind tibia with, longitudinal carinate line; beak unusually long, but variable in length, in some cases reaching middle, in others the apex of abdomen; third segment of beak as long as, or even longer than, hind tibia; tylus prominent anteriorly; third antennal segment about three times as long as second; antero-ventral armature of fore tibia consisting of bristles only.

Subgenotype *Thyreocoris longirostris* Berg.

39. *Galgupha (Bonaria) longirostris* Berg.

T [hyreocoris] longirostris Berg, C., Hemip. Argentina, 1879, pp. 21-22 [Province of Buenos Aires].

Black with æneous reflections, a cuneate spot at base of corium from costa to claval suture yellowish to reddish; connexiva of posterior two abdominal segments each with a similarly colored mark; antennæ subfuscous, the second and third segments paler; beak fuscous, each segment paler apically; tarsi testaceous.

A large species of depressed form, rather more narrowed both anteriorly and posteriorly (especially the former) than is usual in the subfamily. Head broadly triangular produced one and one-half

times length of eye beyond anterior transocular line; vertex obliquely rugulose, copiously and coarsely punctate, except on posterior part of tylus and on an occipital strip. Pronotum and scutellum numerously, but subobsoletely, punctate, so that the surface remains strongly shining; punctures on each of these sclerites most distinct laterally. Corium as in male (Fig. 42) fore tibia with fewer, mid and hind tibiae with more numerous, bristly spines, fewest in the postero-dorsal series. Opaque surface surrounding ostiole extending to anterior margin of mesopleurum and nearly to posterior margin of metapleurum, lateral area impunctate. Venter copiously punctate, little smoother medially in female, but noticeably so in male. Sixth sternite of male subangulate anteriorly, nearly as long as the preceding sternites together, the fifth distinctly constricted medially; ventral exposure of hypopygium punctate, almost flat longitudinally, hind margin varying from almost evenly convex to slightly sinuate medially; dorsal rim very thin at middle posteriorly, deeply excavated interiorly on both sides, gently sloping inwardly at anterior end; widest at lateral angles, distinctly punctate. Sixth sternite of female very bluntly subangulate anteriorly, about equal in length on median line to fifth and fourth together, fifth scarcely constricted medially, hind margin of sixth convex in middle, concave on each side; genital plates, punctate, less than half as long as sixth sternite, about equal in length to postventer, inner margins distinctly elevated, inner posterior angles acutely produced, hind margin oblique and concave; subgenital plates large, pyriform (Fig. 104). Length 5.5-7 mm.

Material: Eight adults including both sexes and one nymph from the Argentine National Museum, without locality labels, a few labelled July; two females from Estancia los Yngleses, Lavalle Ajo, Province of Buenos Aires, Argentina, November 10, 1920, A. Wetmore (Biol. Survey); one specimen with illegible locality label, three unlabelled specimens (Berlin Museum); Rosario, W. Sorensen (Stockholm Museum).

The lack of the anterior lateral bristle on the abdominal sternites is an almost invariable feature of this species, and with it the presence of but a faint reddish mark on the lateral margins of one or two of the sternites of apical half of abdomen appear to connect the species rather closely with some of those in the *signalipennis* group of the preceding subgenus.

Subgenus GYROCNEMIS McAtee and Malloch.

Gyrocnemis McAtee, W. L. and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1928, p. 33. [Subgenotype (orthotype), *Odontoscelis maculipennis* Germar.]

Principal characters: Corium broad at apex (Figs. 40, 43 to 47), one vein in mesocorium, exocorial vein distinctly furcate, the branches

scarcely connate posteriorly; hind tibia terete, without a longitudinal carinate line on posterior surface.

There are several rather well distinguished groups within the present concept of this subgenus. One of these contains species in which the males have a very pronounced transverse depression or groove along the hind margin of the sixth sternite. Several of the species in this group have the third to sixth sternites in the male with very closely placed minute punctures, microscopically piliferous, and in some there are also quite well developed hairs on the central portion of the apex of the sixth sternite. Unfortunately the females of these species are not so readily distinguished from those of other groups, the minute puncturing of the apical sternites of the male being absent, and no hairs present on the sixth sternite, except those found in all species of the genus. We have utilized the comparative distances between the mesocorial and cubital vein and the latter and costa in our key for distinguishing two major segregates of the subgenus, but, while it is of value in separating them into two groups, we realize that these are not what are generally considered 'natural' groups, the one with the narrower mesocorial space containing several undoubtedly distinct groups, apparently derived from different parent stems. Such arbitrary segregations are proper, when the aim is primarily the identification of the species. It may be that some future worker, with more species available and more data upon their life-histories, will arrive at conclusions as to the limits of the subgenus which are not in accord with those here set forth.

* KEY TO THE SPECIES OF THE SUBGENUS GYROCNEMIS.

1. Distance between the mesocorial and cubital veins at narrowest point greater than that between the cubital vein and costa at same level (Figs. 43-46)*; posterior trichobothrium distinctly nearer to lateral margin on sternites three to five than the anterior one (Fig. 106).....2
- Distance between the mesocorial and cubital veins at narrowest point greater than that between the cubital vein and costa at same level (Fig. 47, only slightly so in *guttiger*); in the latter, however, and in all species except *cydnoidea* the posterior trichobothrium is not nearer to lateral margin than the anterior one on at least sternites three and four (Fig. 105).....31
2. Pronotum entirely black.....3
- Pronotum with a submarginal pale line on each side.....5
3. Males.....4
- Females.....9

*See footnote, p. 206

4. Corium entirely black; puncturing on vertex not very coarse, somewhat rugose laterally; sternites without pale lateral marks, sixth quite sharply angulate in center of anterior margin, and with a dense transverse brush-like strip of brownish-black erect hairs close to apex on central third or more (Fig. 117), the extreme apex with a transverse groove on almost its entire extent..... **diminuta** (Van Duzee).
 Corium reddish or yellowish at base; sternites with pale lateral marks, usually absent on first visible one; sixth without brush-like preapical hairs, sometimes with a few sparse microscopic pale hairs centrally near apex..... 5
5. Sixth sternite with a quite deep transverse apical groove; corium largely yellowish, with more or less developed central fuscous marks, sometimes confined to a dark spot on the exocorium and a streak along the mesocorial vein (which may be united) with a broad mesocorial suffusion; vertex finely punctured, ocelli not, or very little behind, posterior transocular line..... 6
 Sixth sternite without a transverse apical groove; corium yellowish at base, and sometimes with a small subapical pale spot on exocorium; vertex coarsely punctate, ocelli at least as far behind posterior transocular line as twice their diameter..... 8
6. Hypopygium with an acute process projecting inward from each apical lateral angle (Fig. 118)..... **bicornis** sp. nov.
 Hypopygium without such processes..... 7
7. Hind margin of hypopygium broadly, and quite deeply emarginate when seen from below, the central portion transverse or almost so (Fig. 129).
dimorpha sp. nov.
 Hind margin of hypopygium not so deeply emarginate when seen from below, the central portion not transverse..... **diversa** sp. nov.
8. Corium with a small subcostal yellow spot near apex in addition to the larger basal mark..... **punctifer** sp. nov.
 Corium with only the yellow basal mark, which is smaller than in *punctifer*.
texana sp. nov.
9. Corium entirely black, or brownish-black, without conspicuous pale yellowish basal mark; sternites brownish on lateral margins, not pale yellow or orange; genital plates fully three-fourths as long on inner margins as sixth sternite in center and distinctly longer than the preceding two sternites together, fifth sternite at center fully two-thirds as long as fourth and half as long as third; vertex moderately deeply punctured, carinate on entire extent in front; vertex with moderately large contiguous punctures, ocelli slightly behind transocular line..... **diminuta** (Van Duzee).
 Corium with at least yellow or orange-yellow basal mark; sternites with conspicuous yellow lateral spots; proportions of sternites not as above..... 10
10. Vertex deeply and coarsely punctured, larger punctures on central portion at least half as large as an ocellus, the carina well developed on entire extent, ocelli behind posterior transocular line about twice their own diameter; corium with a basal mark and a small isolated subcostal spot near apex yellow; genital plates on inner margins a little over two-thirds as long as

sixth sternite in center and distinctly shorter than fourth and fifth together, the sixth equal to fourth and fifth; apex of abdomen not biundulate.

punctifer sp. nov.

Vertex rather finely and shallowly punctured, ocelli not, or very little behind posterior transocular line; corium not marked as above, much more extensively yellow. 11

- 11. Genital plates longer than fourth and fifth sternites together on median line, ultimate tergite biconcave apically. 12

Genital plates not longer than fifth sternite on median line; ultimate tergite not biconcave. *soror* sp. nov.

- 12. Inner margins of genital plates not greatly elevated. 13

Inner margins of genital plates conspicuously elevated in an ovipositor-like process. 14

- 13. Genital plates (Fig. 110) longitudinally wrinkled and indistinctly punctate, not longer than sternites three to five together on median line.

singularis sp. nov.

Genital plates (Fig. 111) not wrinkled, but distinctly punctate, longer than sternites three to five together on median line. *lineata* sp. nov.

- 14. Ovipositor-like process seen from the side is straight on lower margin, and the apex is porrect and bluntly rounded (Figs. 112, 112a) . . . *dimorpha* sp. nov.

Ovipositor-like process seen from the side is concave on lower margin, and the apex is decurved and acute (Fig. 112b) *acuta* sp. nov.

- 15. Males. 16

Females. 23

- 16. Small species, averaging 3 mm. in length; hind margin of hypopygium with a shallow subangular central emargination, on each side of which it is broadly convex (Fig. 128); fore tibia almost invariably with two anterodorsal setulæ on basal half, hind tibia usually with but three posterodorsal setulæ.

parva sp. nov.

Larger species, rarely less than 4 mm. in length; hind margin of hypopygium otherwise; fore tibia with three or more anterodorsal setulæ and the hind tibia with four or more setulæ on the posterodorsal surface. 17

- 17. Hind margin of hypopygium with a deep, rounded, or U-shaped central emargination and very slightly, or not at all emarginate laterally. 18

Hind margin of hypopygium with an angular or rounded central emargination, and with distinct lateral emarginations also. 19

- 18. Ventral surface of hypopygium with shallow but evident furrows paralleling median concavity of hind margin (Fig. 123), the latter more or less pronouncedly U-shaped, the margin yellow and distinctly tumid on inner surface of upper lateral angles of the central emargination. . . *concava* sp. nov.

Ventral surface of hypopygium without evident furrows, sparsely punctate, the median emargination more shallowly rounded (Fig. 126), the margin neither yellow nor tumid at upper lateral angles of emargination.

novella McAtee & Malloch.

- 19. Central and lateral emarginations of hind margin of hypopygium subequal in depth (Fig. 114). *triconcava* sp. nov.

- Central emargination of hind margin of hypopygium much deeper, and usually wider than the lateral ones (Fig. 121)..... 20
20. Hind tibiæ black, dorsal surface pale yellow below..... 21
Hind tibiæ stramineous, rarely pale brownish above..... 22
21. Dorsal rim of hypopygium narrow, flat, widest at lateral angles (Fig. 122).
maculipennis Germar.
Dorsal rim of hypopygium slightly declivitous all around, without flat area, but slightly tumid within lateral angles..... *fossata* McAtee & Malloch.
22. Lateral angles of dorsal rim of hypopygium with a conspicuous yellow mark.
inæqualis sp. nov.
Lateral angles of dorsal rim of hypopygium without yellow marks.
intermedia sp. nov.
23. Small species, averaging about 3 mm. in length; genital plates produced in an ovipositor-like process, which is acute apically and surpasses apex of abdomen (Fig. 108)..... *parva* sp. nov.
Larger species, usually over 4 mm. in length; genital plates otherwise..... 24
24. Tibiæ black or brownish-black, not appreciably paler than the femora nor yellow above; lateral margins of vertex brownish yellow on entire extent from eye to eye..... *morbiloci* sp. nov.
Tibiæ always distinctly paler than femora, usually stramineous, the hind pair sometimes black above and yellow below..... 25
25. Lateral margins of vertex yellowish on entire extent, always conspicuously paler next to eyes and tylus; sixth abdominal sternite narrowly rounded in center, almost subangulate..... *inæqualis* sp. nov.
Lateral margins of vertex not conspicuously yellowish on entire extent, when partly pale, the most evidently pale portions are on each side of tylus and not next to eyes..... 26
26. Submarginal pale lines on pronotum very faint, brownish, at no part pale yellow, and most evident in front, very much darker than the stramineous portions of corium; lateral margins of abdominal sternites but faintly marked with pale color..... *soror* sp. nov.
Submarginal pale lines on pronotum conspicuous, rarely darker than the stramineous portions of corium and on some parts pale yellow; lateral margins of sternites three to seven usually with conspicuous yellow spots..... 27
27. Genital plates almost straight on posterior margin, slightly backwardly produced at inner apical angle, length of either at middle, or at a point just laterad of the bristle on the subgenital plate, at least one and one-half times as great as the distance from the hind margin at that point to extreme margin of abdomen in same line, the length on inner edge over one-fifth of that of fifth sternite in center..... *fossata* McAtee & Malloch.
Genital plates quite distinctly concave on hind margin, their inner apical angles quite pronouncedly produced, length of either at middle not, or almost imperceptibly, longer than distance from the hind margin at that point to the hind margin of abdomen..... 28
28. Sixth abdominal sternite subangulate anteriorly..... 29
Sixth abdominal sternite rounded anteriorly..... 30

29. Hind margin of pronotum distinctly paler than remainder of disk; small species, not over 4 mm. in length; ocelli about two and one-half times their own diameter from nearest point of eye margin. **omissa** sp. nov.
 Hind margin of pronotum not distinctly paler than remainder of disk; large species, about 5 mm. in length; ocelli fully three times their own diameter from nearest point of margin of eye. **geayi** sp. nov.
30. Species deep black in color, the lateral pale line on pronotum bright yellow, contrasting sharply with the general color and more or less distinctly widened posteriorly; genital plates not very conspicuously concave on hind margins, subtransverse. **maculipennis** Germar.
 Species more brownish black in color, the pale lateral line on pronotum not, or very slightly, widened posteriorly; genital plates quite conspicuously concave on posterior margins (Fig. 107). **concava** sp. nov.
triconcava sp. nov.
31. Corium entirely dark. 32
 Corium partly yellow. 34
32. Posterior trichobothrium closer to lateral margin on sternites three and four than the anterior one; fourth and fifth sternites subequal in length at middle, the fifth about one-third as long as sixth, the latter rounded in front; punctures on most of the vertex deep, contiguous, and for the greater part about half as large as an ocellus. **cydnoidea** sp. nov.
 Posterior trichobothrium slightly farther from lateral margin on sternites three and four than the anterior one; fifth sternite shorter than fourth, not over one-fifth as long as sixth, the latter narrowly rounded, or subangulate in front; vertex with smaller and shallower punctures, subobsolete laterally. 33
33. Front margin of vertex reflexed; genital plates slightly raised along inner edges, especially apically, and with a noticeable production of the inner apical angle. **novatra** sp. nov.
 Front margin of vertex not reflexed; genital plates neither elevated along inner edges nor produced on inner apical angle. **nitidipennis** sp. nov.
34. Mesocorial vein evanescent basally 35
 Mesocorial vein evident basally (*i.e.* basad of the apex of clavus) 42
35. General color ochreous. **tabida** Stål.
 General color æneous black, the corium more or less yellowish. 36
36. Tibiæ dark. 37
 Tibiæ pale. 38
37. Lateral angles of dorsal rim of hypopygium distinctly anterior in position; hind margin of ventral exposure convex medially, concave laterally, as seen from below; venter of female with deep, coarse punctures laterally, sixth sternite nearly as long as all of the preceding ones together. . . **guttiger** Stål.
 Lateral angles of dorsal rim of hypopygium median in position, hind margin of ventral exposure broadly concave medially, rounded off laterally, as seen from below; venter of female with only faint punctures, sixth sternite much shorter than those preceding together. **nitens** Breddin.
38. Males 39
 Females 40

39. Hypopygium, when retracted, almost entirely concealed by sixth sternite; hind margin broadly concave; lateral angles of dorsal rim rather anterior in position, tumid. **occulta** sp. nov.
Hypopygium, when retracted, distinctly visible from below; hind margin shallowly triconcave; lateral angles of dorsal rim median in position, abruptly excavated posteriorly. **differentialis** McAtee and Malloch.
40. Sixth sternite rather broadly rounded anteriorly, as long as all the preceding sternites together; subgenital plates more elliptical, about one-third length of genital plates. **differentialis** sp. nov.
Sixth sternite rather subangulate anteriorly, shorter than the preceding sternites together; subgenital plates more triangular, about one-half as long as genital plates. 41
41. Prosternal sulcus broadly V-shaped; a yellow spot shows on underside of head behind eye, when the suture is slightly open. **occulta** sp. nov.
Prosternal sulcus narrowly V-shaped; no yellow spot on underside of head. **unica** sp. nov.
42. Basal pale mark on corium trifurcate at apex, one ramus on costa, one along, but not over, claval suture, and the third along cubitus; hypopygium of male as seen from below with the hind margin very shallowly concave; the hind wall as seen from above high and thin. **basigrapha** Horvath.
Basal pale mark on corium not trifurcate (sometimes present only on costa); hypopygium of male not shallowly concave on hind margin or only so in center. 43
43. Males. 44
Females. 48
44. Hind margin of hypopygium seen from below with a deep V-shaped central emargination, which extends transversely almost or quite half the width of the hind margin and almost to middle of exposed surface discally (Figs. 132-133). 45
Hind margin of hypopygium seen from below shallowly or feebly emarginate (Fig. 130). 46
45. Hind margin of hypopygium with a slight lateral emargination on each side of the deep central one (Fig. 132). **reinhardti** Jensen-Haarup.
Hind margin of hypopygium without lateral emarginations (Fig. 133). **impressa** Horvath.
46. Hind margin of hypopygium with median and lateral emarginations, all three shallow (Fig. 130) (occasionally the central emargination lacking or almost so, var. *taperina*, Fig. 131). **cruralis** Stål.
Hind margin of hypopygium with a more or less evident shallow central emargination, the lateral ones lacking. 47
47. Front margin of vertex distinctly reflexed; corium with a pale yellow line from base to apex of costa, which is as pale apically as the subapical exocorial spot; larger species (4-4.75 mm.). **notha** sp. nov.
Front margin of vertex only faintly and partially reflexed; corium brownish on costa, only noticeably yellowish basally, the apical portion much darker than the yellow subapical exocorial spot; smaller species (3.5-4 mm.) **quadrisignata** Stål.

48. Entire front margin of vertex distinctly reflexed; corium with a narrow continuous costal stripe that is pale yellow and similar in width to the preapical exocorial spot; fourth and fifth sternites about equal in length, two-thirds as long as sixth; species over 4 mm. in length.....**notha** sp. nov.
Front margin of vertex sometimes feebly reflexed near eyes; costa usually without a narrow continuous pale yellow stripe, sometimes yellow basally; fourth and fifth sternites less than two-thirds as long as sixth.....49
49. Corium yellow along entire costa, the pale color extending to claval suture, except for a short portion about middle; sixth sternite rather broadly rounded anteriorly, equal in length to the preceding three sternites together; scutellum scarcely attaining base of sixth tergite.....**cruralis** Stål.
Corium with a rather sharply defined round spot about one-third distance from apex, which is pale yellow in color and is not connected with the brownish costal streak, the latter extending over outer branch of exocorial vein and becoming paler basally; sixth sternite more angulate anteriorly; scutellum in normal position extending to or beyond base of sixth tergite. .50
50. Sixth sternite subangulate anteriorly and distinctly longer than the preceding three sternites together on the median line.....**impressa** Horvath.
Sixth sternite distinctly angulate anteriorly, and not longer in middle than the preceding three sternites together.....**quadrisignata** Stål.

SYSTEMATIC ARRANGEMENT OF SPECIES OF THE
SUBGENUS GYROCNEMIS.

Space between mesocorial and cubital veins at narrowest point not as wide as that between latter and costal margin at same point.

Pronotum with pale submarginal lateral stripe:

(Males known): **intermedia**, **inequalis**, **triconcava**, **maculipennis**, **concava**, **novella**, **fossata**, **parva**.

(Males unknown): **soror**, **morbiloci**, **omissa**, **geayi**.

Pronotum entirely dark;

Vertex coarsely punctate:

diminuta, **punctifer**, **texana**.

Vertex finely punctate:

singularis, **lineata**, **diversa**, **bicornis**, **dimorpha**, **acuta**.

Space between mesocorial and cubital veins at narrowest point as wide as, or wider than that between the latter and costal margin at same point.

Mesocorial vein evident basad of apex of clavus.

Corium partly pale yellow:

cruralis, **notha**, **quadrisignata**, **reinhardti**, **impressa**, **basigrapha**.

Corium entirely dark:

cydnoides, **novatra**, **nitidipennis**.

Mesocorial vein ceasing opposite apex of clavus:

guttiger, **nitens**, **occulta**, **unica**, **differentialis**, **tabida**.

40. *Galgupha (Gyrocnemis) acuta* sp. nov.

Black, corium chiefly orange, costal carina, sections of veins a little beyond middle and suffusion near them, and inner margin from humerus including most of clavus, black; lateral abdominal spots yellow; antennæ stramineous; beak testaceous; tibiæ chiefly yellowish; a pale yellow spot showing behind each eye on lower surface of head when the suture is open.

Head narrowly rounded apically, varying to acute, with the margin of vertex somewhat lamellate and slightly upturned medially, produced more than length of eye beyond anterior transocular line, vertex distinctly punctate, except posteriorly; pronotum coarsely punctate antero-laterally, subobsoletely so elsewhere; scutellum moderately punctate, the punctures deepest antero-laterally, shallowest discally; corium moderately punctate; lateral area of metapleurum with only traces of puncturing along inner side; sternites with scattered coarse punctures laterally and more numerous finer ones discally; sixth sternite much produced anteriorly, as far as antero-lateral angle of fourth sternite, acuminate subangulate, sternites five and four constricted medially to less than half their lateral length, broadly subangulate anteriorly, third less constricted; genital plates wrinkled, only obsoletely punctate, about equilateral, surface somewhat depressed laterally, but inner margins abruptly elevated into a conspicuous acute, decurved, ovipositor-like organ, extending as far posteriorly as apex of abdomen (Fig. 112b). Length 4-5 mm.

Holotype female, Bonito, Province of Pernambuco, Brazil, January 27, 1883 (U. S. N. M.); *paratype* females: Bahia, Brazil, Fruhstorfer (Vienna Museum); Petropolis, Brazil, May 1885, Germain (Paris Museum); Petropolis, Brazil, Ohaus (Dresden Museum); Bahia, Brazil (Fruhstorfer), New Freiburg, Brazil, F. Weingreen (Hamburg Museum); Capite des Mines (Paris Museum); Lagoa Santa, Reinhardt (Copenhagen Museum).

Color and puncturing much as in *bicornis*, of which it may be the female sex.

41. *Galgupha (Gyrocnemis) basigrapha* Horvath.

Euryscytus basigraphus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 231 [Peru].

Corial mark yellowish, tending to be trifurcate, one ramus on costa, one along (but not over) claval suture, and the third intermediate along cubitus.

Head narrowly rounded anteriorly, tylus sub-prominent, vertex with sparse, shallow punctures; pronotum with a group of distinct punctures on each side, almost impunctate elsewhere; scutellum with

sparse fine punctures in general and a group of more pronounced punctures near each basal angle; lateral area of metapleurum almost impunctate; sternites moderately punctate, smoother medially, especially sixth; sixth sternite rounded anteriorly, fifth only slightly constricted medially in both sexes; ventral exposure of male hypopygium polished, with only sparse puncturing, the hind margin very shallowly concave as seen from below, dorsal rim almost flat anteriorly, widest, and moderately sloping laterally, abruptly declivitous posteriorly, the hind wall high and thin; genital plates of female copiously punctate, inner margin slightly elevated, almost as long as posterior, the latter transverse. Length 3.5-3.6 mm.

Holotype male and *allotype* female, Pachitea, Peru (Budapest Museum).

42. *Galgupha (Gyrocnemis) bicornis* sp. nov.

Black, shining, scutellum somewhat reddish apically, basal yellowish patch nearly half as long as corium, extending over claval suture, extreme apex and apical two-fifths costal region also yellowish, an ivory colored spot on each side of lower posterior margin of head, a small yellowish spot near postero-lateral angle of metapleurum, yellowish lateral spots evident both above and below on all abdominal segments, including hypopygium of male; knees and tibiæ stramineous below, fuscous above.

Front of head narrowly rounded; vertex moderately punctate, except posteriorly in middle and between eye and ocellus for a space less than twice width of the latter; pronotum distinctly punctate laterally, subobsoletely rastrate-punctate in a transverse band behind middle, smooth elsewhere; scutellum polished on anterior disk, numerous punctate elsewhere, most deeply so near antero-lateral angles; corium moderately punctate except on subcostal and subapical portions, metapleurum with a band of punctures bordering ostiolar surface posteriorly and extending to lateral margin, lateral area rather broad anteriorly, somewhat punctate or furrowed along inner margin; sternites two to three with coarse, and four to six with copious fine punctures predominating, sixth punctate throughout and not polished as usual in the subfamily; sixth sternite subangulate anteriorly, fifth and fourth distinctly shorter at middle than at lateral margins; hind margin of sixth sternite distinctly carinate-reflexed; ventral exposure of hypopygium scarcely punctate, cut away laterally, so that only a broad convex central portion remains, beyond which at each side are visible the acute processes of the dorsal rim (Fig. 118); the latter broad, flat, punctate, the lateral angles inwardly hooked and fringed interiorly with long pale hairs, an agglomerated tuft of which at apex suggests a spine, posterior rim entirely interrupted as viewed either from above or below, the only species in which we have so seen it. Length 4.5 mm.

Holotype male, Goyaz Province, Brazil, 1847, De Castelnau (Paris Museum); *paratype* males, Bahia, Brazil, Sellow (Berlin Museum); Lagoa Santa, Reinhardt (Copenhagen Museum); Petropolis, Haas (Stettin Museum); Cape Mines (Paris Museum).

43. **Galgupha (Gyrocnemis) concava** McAtee and Malloch.

Galgupha (Gyrocnemis) concava McAtee, W. L. and Malloch, J. R., Ann. Mus. Zool. Poland, VII, 1928, pp. 34-35 [Brazil, Paraguay, Argentina, Bolivia].

Black, shining with purplish reflections, margin of vertex usually yellowish on each side of tylus, rarely pale brownish laterally; narrow submarginal vitta in front of humeral prominence of pronotum whitish to yellowish (this color showing through lower surface also), corium chiefly pale yellowish, a blotch near middle of costa and one near inner posterior angle, besides the punctures, fuscous; beak, antennæ, tibiae, and tarsi stramineous to testaceous; abdominal segments with yellowish lateral spots, visible both above and below. Females are distinctly reddish on posterior half of pronotum and scutellum.

Head evenly rounded anteriorly, produced a little more than length of eye beyond anterior transocular line; vertex carinate-margined with numerous subobsolete punctures, smooth medianly and posteriorly; pronotum with the punctures almost obsolete discally, but well marked, in a band paralleling sublateral pale marking, the latter impunctate; punctures more evident on scutellum than on pronotum, especially laterally, anterior disk nearly smooth; metapleurum punctate along posterior border of ostiolar surface, this band of punctures extending to lateral margin, lateral area slightly punctate along inner margin; sternites moderately punctate, smoothish medianly, sixth subobsoletely punctured except laterally, angulate anteriorly in male slightly constricting fifth sternite; ventral exposure of hypopygium somewhat flattened about emargination, slightly transversely wrinkled, and more or less punctate, hind margin with a deep U-shaped central concavity, the upper edge of which occupies about one-third of the margin, slightly sinuate on each side of the median emargination, the thickened portion of the edge at each extremity of the central concavity yellow, emarginate as described in key and figured (Fig. 123), dorsal (Fig. 124) rim with a median, slightly sloping and transversely wrinkled bridge to central disk anteriorly, narrow and abruptly declivitous on each side of this, widening again toward lateral angles, which are concave, posterior wall in general thin with depressions following the emarginations; sixth sternite of female narrowly rounded anteriorly, twice as long as genital plates which are punctate, obliquely concave posteriorly and distinctly produced at inner apical angles (Fig. 107) [genital plates of female distinctly punctate]. Length 4-5 mm.

Holotype male and *allotype* female, Chapada, Brazil, November, *paratypes* same locality, January to November; Bom Fin, Bahia, Brazil, J. D. Haseman (Carnegie Museum) Sapucay, Paraguay, February, W. T. Foster; San Bernardino, Paraguay, K. Fiebrig (U. S. N. M.); Sierra d'Estrella, Minas Geraes, Brazil, De Castelnau, 1847; Matto Grosso, Brazil, De Castelnau; Paraguay, Gosset, 1900 (Paris Museum); Foz do Iguassu, Paraná, Brazil, March 22, 1923 (Polish Museum); Chaco, Argentina, Dec. 6, 1897, S. Venturi; Catamarca, Buenos Aires, Misiones; Salta Tucuman, Argentina; Bolivia (Argentine Museum); Paraguay, K. Fiebrig (Deutsches Ent. Inst.); Campinas, Brazil, March, 1924, F. X. Williams (Van Zwaluwenberg).

The following records are of material seen since the original description was published; these specimens therefore are not *paratypes*. San Ignacio, Misiones, Argentina, Wagner; Petropolis, Brazil, F. Sahlberg (Helsingfors Museum); Paraguay, April 7, Dec. 2, 20, K. F. Fiebrig (Berlin Museum); Province of Sara, Bolivia, Steinbach (Stettin Museum); Puerto Max, Paraguay, Louis des Arts Jr.; Santos, Brazil, Oct. 18, 1893, H. Braun (Hamburg Museum); San Luis, Paraguay, Reimoser; San Bernardino, Paraguay, Fiebrig; Rio Grande do Sul, Stieglmayr (Vienna Museum); Minas Geraes, Brazil, 2100 meters, 1902, E. R. Wagner; San Ignacio, Misiones, Argentina, 1911; Rio Salado, Santiago del Estero, 1909, E. R. Wagner (Paris Museum); Espirito Santo, Aragua, Santa Catherina, Brazil (Munich Museum).

44. *Galgupha (Gyrocnemis) cruralis* Stål.

Corimelæna cruralis Stål, C., Rio Hemip. 1, 1862, p. 8 [Brazil].

Corimelæna invaria Walker, Francis, Catalogue, 1, 1867, p. 81 [Brazil].

T [hyreocoris] circumfusus Berg, C., Hem. Argentina, 1879, p. 20 [Entre-Rios, Argentina].

[Thyreocoris] borellii Montandon, A. L., Viaggio de Dott. A. Borelli nella Republica Argentina e nel Paraguay, XVIII, Hémiptères Héteroptères, Première Liste et Descriptions d'Espèces Nouvelles, Bol. Mus. Zoöl. Anat. Comp. Univ. Torino, N. 219, Dec. 1895, pp. 1-2 [San Pablo, Salta].

Æneous-black, sometimes with purplish reflections, humeral prominences, and periphery of scutellum posteriorly, more or less reddish; corium mostly ochreous, anterior spot and posterior third of mesocorium, veins and adjacent areas more or less infuscated; clavus fuscous; darker specimens vary to a coloration like that of *quadrisignata*; lateral abdominal spots, legs from knees, antennæ and beak, stramineous.

Head produced somewhat more than length of eye beyond anterior

transocular line, subangulate to subtruncate anteriorly, not carinate-margined; vertex copiously punctate, except on narrow posterior strip; pronotum distinctly punctate antero-laterally, subobsoletely punctate elsewhere, scutellum numerously punctate, most coarsely so antero-laterally, most finely on anterior disk; corium distinctly punctate anteriorly and along veins, indistinctly punctate posteriorly; lateral area of metapleurum broad anteriorly, almost impunctate; sternites numerously punctate, more polished medially; puncturing scarcely of a finer and denser type in male except on sternites five and six; sixth sternite of male angulate or subangulate anteriorly, posterior margin somewhat convex medially, concave laterally, the sternite as long as the preceding three together; fifth and fourth sternites moderately constricted medially; ventral exposure of hypopygium ample, nearly flat, except laterally, feebly punctate, hind margin carinate, distinctly although slightly sinuate medially and sublaterally (Fig. 130); dorsal rim broad anteriorly, somewhat broader laterally, everywhere sloping from outer margin, hind wall thin, more declivitous; sixth sternite of female rounded to subangulate anteriorly, concave posteriorly, as long as preceding three sternites together; fifth sternite constricted medially to half its lateral length, fourth less contracted; genital plates (Fig. 113) large, punctate, more than half as long as sixth sternite, twice as long as postventer, inner margin about as long as posterior, the latter oblique, and slightly concave, the inner posterior angles prominent. Length 3.5-5 mm.

Holotype and *paratype* females, Brazil, F. Sahlberg (Stockholm Museum); *holotype* female of *invaria* Walker, Santarem, Brazil (British Museum); other specimens from Manaos, Brazil, Miss H. B. Merrill; Villa Montes to Boyuibe, Bolivia, June 1920; El Quemado, Jujuy, Argentina, G. L. Harrington (U. S. N. M.); Taperina, Corumbà (March), Santarem, Brazil; Tucuman, Argentina, 480 m., Rosenberg (Carnegie Museum); Jujuy, Salta, Gob. Formosa, 1898; Gob. Chaco, Oct. 20, 1897, S. Venturi; also Bolivia, and Matto Grosso, Brazil (Argentine Museum); São Paulo, Brazil; Obidos, Amazonas, H. Rolle, Breddin Collection (Deutsches Ent. Inst.); Tucuman, Argentina, 1906, Vezenyi (Budapest Museum, also Coll. Jensen-Haarup); Rio de Janeiro, Brazil, F. Sahlberg; Pernambuco (Helsingfors Museum); Corityba, São Paulo, Brazil, Lehmann (Berlin Museum); Province of Salta, Argentina, J. Steinbach (Berlin Museum); San Antonio, Argentina, Reimoser (Vienna Museum); Rio las Garzas, Chaco de Santa Fe; Laguna Mamatta, Rio Dulce, Rio Salado, Chaco de Santiago del Estero, Argentina, 1909, E. R. Wagner (Paris Museum); Juruapuca, Rio Jurua, Amazonas, Brazil, Oct. 20, 1874 (British Museum).

A few specimens differing from the typical variety by lacking the median emargination in the hind border of male hypopygium (Fig. 131) may be known as var. *taperina* new variety. Length 4 mm.

Holotype and *paratype* males, *Taperina*, Brazil (Carnegie Museum); San Antonio, Argentina, Reimoser (Vienna Museum).

45. *Galgupha* (*Gyrocnemis*) *cydnoidea* sp. nov.

Fuscous to black, tarsi, beak, and antennæ testaceous.

Head almost evenly convex between eyes, produced about the length of eye beyond anterior transocular line; pronotum with coarse punctures laterally, plentifully but less deeply punctate discally, except at calli, but nevertheless strongly shining; scutellum numerous punctate, the punctures coarser laterally, finer discally, almost obsolete on anterior disk; corium moderately punctate throughout; lateral area of metapleurum truncate anteriorly, impunctate; sternites moderately punctate laterally, almost impunctate discally; sixth narrowly rounded anteriorly, preceding sternites moderately constricted medially; genital plates rugoso-punctate, fully as long on inner as on posterior margin, the latter slightly concave, twice as long as postventer. Length 4 mm.

Holotype female, Caracas (Helsingfors Museum); *paratype* female, Colombia, Moritz (Berlin Museum).

46. *Galgupha* (*Gyrocnemis*) *differentialis* McAtee and Malloch.

Galgupha (*Gyrocnemis*) *differentialis* McAtee, W. L. and Malloch, J. R., Ann. Mus. Zool. Poland, VII, 1928, pp. 36-37 [Brazil, Bolivia].

Black, shining, spot covering basal third of corium (Fig. 47) except for narrow dark bordering, and apical half of exocorium, except for punctate veins and some fuscous suffusion connected with them, stramineous to reddish; nearly or completely connected lateral spots on abdominal segments both dorsad and ventrad of the narrowly dark carinate margin, beak, antennæ, and legs from knees, stramineous.

Head broadly rounded anteriorly, margin not carinate, vertex moderately punctate, except on narrow posterior strip; pronotum with a broad band of rather coarse but not deeply impressed punctures on each side, punctures on disk numerous, fine, and only shallowly impressed; scutellum with the latter type of punctures sparsely distributed, those near antero-lateral angles a little more distinct; corium with moderate puncturing evident on pale portions and along veins, but not on the darker areas. Lateral area of metapleurum scarcely punctate; sternites with both coarse and fine punctures, the former predominating anteriorly and discally and the latter posteriorly and laterally; trichobothria as in Fig. 105; sixth sternite narrowly rounded

anteriorly in male, third, fourth, and fifth shorter medially than laterally, fifth most so, sixth with a posterior subterminal groove, the hind margin itself carinate and black; ventral exposure of hypopygium (Fig. 115) punctate, short, concave both medially and laterally; hypopygium opening almost directly posteriorly, dorsal rim broad, flat, and punctate anteriorly, lateral angles wider, pale, tumid anteriorly, depressed posteriorly, hind wall channeled; anteriorly and laterally the rim closely fits the central disk (Fig. 125); sixth sternite of female narrowly rounded anteriorly, preceding three sternites constricted medially, especially the fifth, genital plates punctate, nearly as long on inner as on posterior margin, the latter slightly oblique and concave. Length 4-5 mm.

Holotype male, *allotype* female, and *paratypes*, Santarem, Brazil, one of the paratypes labelled July 1919, S. M. Klages, also Taperina, Brazil (Carnegie Museum); Pará, Brazil, Uhler Collection; Rio Beni, Huachi, and mouth of Rio Mapiri, Bolivia, September, W. M. Mann, Mulford Biological Expedition (U. S. N. M.); Salto de Uba, Rio Ivahy, Paraná, Brazil, Nov. 7, 13, 1922; Rio Ubasinho, Paraná, Brazil, March 1924 (Polish Museum).

Material examined too late to be made paratypes includes specimens from San Bernardino, Paraguay, K. Fiebrig (Berlin Museum); Rio Grande do Sul, Brazil, Stieglmayr (Vienna Museum); Amazonas, Peru, Breddin Collection (cotype of *nitens* Breddin, Deutsches Ent. Inst.); Peru, Noualhier, 1898; Santa Cruz de la Sierra, 1834, D'Orbigny (Paris Museum).

47. *Galgupha (Gyrocnemis) diminuta* Van Duzee.

Euryscytus diminutus Van Duzee, E. P., Ent. News, XXXIV, No. 10, Dec. 1923, p. 305 [Pasadena, Calif.].

Black, shining, with more or less æneous reflections; lateral margins of abdominal segments without pale spots in two out of the three specimens available.

Vertex shorter than broad between eyes, broadly truncate anteriorly, a considerable area at beak impunctate; punctures of pronotum semi-obsolete discally, more definite laterally; punctures of scutellum semi-obsolete on anterior disk, moderately numerous and developed elsewhere; corium (Fig. 45) punctate basally, smooth apically, except along the veins; metapleurum impunctate posteriorly, except for a row bordering ostiolar surface and a small group of punctures near postero-lateral angle, lateral smooth area acute at apex, with a few punctures along inner margin; sternites copiously punctate, the punctures less evident medianly; sixth sternite of male acute anteriorly and produced so that fifth is only half as long in middle as on lateral mar-

gin; ventral exposure of hypopygium copiously punctate, hind margin only slightly reflexed, deeply biconcave (Fig. 117); in the dorsal aspect the posterior rim of hypopygium on account of its bisinuation is well below the level of the lateral and anterior portions, the latter are moderately broad, with a wide shallow depression in middle of anterior rim, median excavation deep, the lateral walls abruptly declivitous; fifth sternite of female not so much encroached upon medianly as in male, genital plates copiously punctate, fully as long on inner as on posterior margins, the inner apical angles slightly produced, posterior margin very slightly concave. Length 3-3.8 mm.

Huachuca Mts., Ariz., Aug. 6, 1905, H. G. Barber (Barber Collection); Los Angeles Co., Calif., D. W. Coquillett (U. S. N. M.).

These specimens appear to represent Van Duzee's species, as in response to an inquiry he informs us that the lunate patch of hairs is present on fifth sternite of the type; there is some doubt, however, as his phrase "feebly emarginate" relating to the apical margin of male genital segment scarcely is an adequate description for the form before us.

48. *Galgupha (Gyrocnemis) dimorpha* sp. nov.

Black, shining, with steely-bluish reflections, corium chiefly yellowish orange, costal carina, extreme base, subapical-subcostal spot, posterior part of mesorium (these areas sometimes connected), veins in part, and most of clavus, fuscous to black; sharply defined lateral abdominal spots, in both sexes, postero-lateral margin of metapleurum of female, and spot behind each eye, concealed when head is fully retracted, yellow; beak and antennæ, testaceous.

Head about evenly rounded anteriorly, produced only about half length of eye beyond anterior transocular line, carinate-margined, apex of tylus as in Fig. 136; vertex moderately punctate, except posteriorly; pronotum moderately punctate antero-laterally and in extremities of transverse impression, but only subobsoletely so elsewhere; scutellum moderately punctate except on anterior disk which is almost smooth; corium (Fig. 43) punctate; trichobothria as in Fig. 106; sternites two and three of male with only scattered coarse punctures, the fourth with a few similar punctures on each side of the middle; otherwise sternites four to six, except for median smooth strip, are covered with fine reticulate-puncturing; sixth sternite as long as all preceding sternites together, narrowly rounded anteriorly, fifth and fourth constricted medially to half their lateral length; ventral-exposure of hypopygium moderate (longer than in *bicornis*), sparsely punctate, not transversely channeled; hind margin shallowly trisinate (with a median and two sublateral emarginations) (Fig. 129); convex lateral lobes partly pale; dorsal rim flat, broad, punctate, the lateral

angles a little broader and slightly less punctate than anterior portion; the lateral angles are incurved apically although less incurved than in *bicornis*, and due to lack of deep emarginations in the hind wall below them, do not form free fang-like projections as in that species; sixth sternite of female greatly produced anteriorly, one and one-half times as long as preceding sternites together, almost dividing fifth sternite and constricting fourth at middle to half its lateral length (Fig. 112); genital plates punctate, inner and apical margins about equal in length, each longer than basal margin, inner margins elevated and produced in a straight ovipositor-like process, which is bluntly rounded apically (Fig. 112a), posterior margin concave; subgenital plates elongate-pyriform, oblique. Length 4-4.5 mm.

Holotype male, *allotype* female, and *paratypes*, Villarica, Paraguay, October 1923, P. Jorgensen (U. S. N. M.); *paratypes*: Bolivia (Argentine Museum); San Luis, Paraguay, Reimoser (Vienna Museum).

49. *Galgupha (Gyrocnemis) diversa* sp. nov.

Black; narrow anterior margin of head reddish; corium ochraceous-reddish along veins anteriorly, and fuscous posteriorly, inner margin of clavus, costal carina and a subapical subcostal blotch black, and posterior part of mesocorium fuscous; faint postero-lateral margin of metapleurum, sharply defined lateral abdominal spots, and a spot behind each eye on extreme posterior underside of head, yellow; beak, antennæ, and tarsi testaceous.

Head evenly rounded anteriorly, produced less than length of eye beyond anterior transocular line; vertex compressed to a thin margin in front, but not carinate, moderately punctate, except posteriorly; pronotum coarsely punctate laterally, subobsoletely punctate elsewhere; scutellum moderately punctate, smoothest on anterior disk; corium sparsely punctate; lateral area of metapleurum smooth; sternites smooth medially, second, third, and most of fourth with only scattered coarse punctures; an area near each lateral margin posteriorly on fourth and all of fifth and sixth (except the polished median portion) are covered with fine, reticulate puncturing; sixth sternite as long as preceding sternites together, subangulate anteriorly, the fifth and fourth each constricted medially to half their lateral length; ventral exposure of hypopygium moderate, sparsely punctate, not channeled transversely, very shallowly trisinate; dorsal rim flat, as broad anteriorly as at lateral angles, the latter pale, declivate both anteriorly and posteriorly; hind wall thin, steeply declivitous. Length 3.4-4 mm.

Holotype male, Province of Salta, Argentina, J. Steinbach (Berlin Museum); *paratype* male, San Bernardino, Paraguay, Fiebrig (Vienna Museum).

50. *Galgupha (Gyrocnemis) fossata* McAtee and Malloch.

Galgupha (Gyrocnemis) fossata McAtee, W. L. and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1829, pp. 33-34 [Brazil].

Black, front margin of head reddish yellow, most conspicuously so medially; lateral submargin of pronotum, costa and about half of remainder of elytral surface, pale yellowish; the posterior half of meso-corium, an irregular blotch anterior to it, a median subcostal spot, and veins especially posteriorly, fuscous to black; semi-circular lateral spots on abdominal segments, both above and below, contiguous along connexivum, except for the linear lateral carina, reddish yellow; antennæ and beak testaceous, legs from knees chiefly stramineous, the spines and the tibiæ beneath infuscated.

Anterior margin of head smoothly convex in outline, finely carinate, but scarcely reflexed; vertex finely to moderately punctate, except for narrow posterior stripe; pronotum with numerous rather coarse punctures bordering submarginal stripe (which is smooth), finely punctate elsewhere, the punctures from transverse impression posteriorly sometimes faintly rastrate; scutellum densely punctate on antero-lateral angles, moderately punctate elsewhere, except on anterior disk, which is almost smooth; lateral area of metapleurum smooth, sternites of male with moderate punctures, most numerous laterally, sparse discally, sixth sternite almost wholly impunctate; this sternite in male angulate anteriorly, preceding sternites constricted medially; ventral exposure of hypopygium polished, indistinctly punctate, posterior margin with a broad angulate notch medially which traverses about one-third of the ventral surface; on either side of this the margin is essentially convex to extreme lateral angles, but is truncated sufficiently so that from some angles it appears shallowly sinuate; the dorsal aspect of hypopygium is as follows, anterior rim for a distance slightly exceeding width of central disk, broad, wrinkled, and slightly concave; on each side this abruptly descends into a deep fossa bounded by the narrow lateral and posterior walls; the latter is somewhat thickened, calloused, and usually pale near lateral extremities; the sternites are more numerous and coarsely punctate in the female than in the male, the sixth is rounded anteriorly and all the preceding sternites constricted medially; the genital plates are moderately punctate, nearly as long on inner as on posterior margin, the latter nearly straight and transverse, the inner margins slightly elevated and the inner posterior angles briefly produced. Length 3.5-4.25 mm.

Holotype male and *allotype* female, Santa Catherina, and *paratype* female, Espirito Santo, Brazil, Breddin Collection (Deutsches Ent. Inst.); paratypes, Rio Ubasinho, Aug. 15, 17; Salto da Uba, Rio Ivahy, Oct. 31; Salto da Ariaranha, Rio Ivahy, Nov. 26, all dates in 1922, Paraná, Brazil (Polish Museum).

Material studied too late to be made paratypes, includes specimens from: Argentina, Jensen-Haarup (Helsingfors Museum); Hohenau, Alto Paraná, Paraguay, H. Richter (Berlin Museum); Rio Grande do Sul, Stieglmayr (Vienna Museum); Paraguay, 1900, Gosset (Paris Museum); Hohenau, Paraguay (Munich Museum).

51. *Galgupha (Gyrocnemis) geayi* sp. nov.

Æneous-black on head and anterior parts of pronotum and scutellum, reddish-brown on posterior parts of latter two sclerites; submarginal vitta on pronotum, and corium chiefly, sordid yellowish; punctures, veins, median blotch on exocorium, and mesocorium posteriorly, fuscous; lateral abdominal spots faintly yellowish; tibiæ fuscous dorsally, stramineous ventrally; tarsi and antennæ stramineous; beak testaceous.

Head rounded anteriorly (subtruncate medially), produced a little more than length of an eye beyond anterior transocular line; vertex carinate-margined, shallowly but copiously punctate, except on tylus and posteriorly; pronotum coarsely punctate antero-laterally above submarginal vitta, which is smooth, and in extremities of transverse impression where the punctures are distinctly rastrate, subobsoletely punctate elsewhere; scutellum with numerous moderately impressed punctures, anterior disk almost impunctate; corium distinctly punctate anteriorly, indistinctly punctate posteriorly, except along veins; lateral area of metapleurum obliquely striate, but scarcely punctate; sternites moderately punctate, smoother medially; sixth narrowly rounded anteriorly, about equal in length to preceding three together, fifth and fourth slightly constricted medially, paralleling in shape the anterior margin of sixth; genital plates punctate, less than half as long as sixth sternite, but longer than postventer, inner margin distinctly shorter than posterior, the latter concave, inner posterior angles moderately produced. Length 4.2 mm.

Holotype female, Llanos, Venezuela, F. Geay (Paris Museum).

52. *Galgupha (Gyrocnemis) guttiger* Stål.

Thyreocoris guttiger Stål, C., Ent. Zeit. Stettin, XXIII, 1862, p. 94 [Mexico].

Black, shining, sometimes with æneous or purplish reflections; elytral patch stramineous to reddish, about a third as long as corium; abdominal segments with yellowish lateral spots both above and below; legs castaneous to black; tarsi and antennæ stramineous; beak testaceous.

Head rounded to subtruncate anteriorly, produced about length of eye beyond anterior transocular line; tylus usually depressed subapically; vertex copiously shallowly punctate throughout; scutellum, except anterior portion, and pronotum, except posterior part, and disk copiously, but very shallowly, punctate for the most part, the punctures

deeper laterally upon both sclerites; corium sparingly punctate; metapleurum punctate bordering ostiolar field, the series of punctures from posterior margin of ostiolar region extending to lateral edge of the sclerite; tergites as in Fig. 8; arrangement of spiracles, trichobothria and bristles as in Fig. 7; sternites moderately punctate, third to fifth in both sexes shorter at middle than at lateral margin, fifth decidedly shorter; sixth sternite of male (Fig. 119) almost impunctate discally, subangulate anteriorly, slightly carinate-margined posteriorly; ventral exposure of hypopygium much reduced, projecting but little beyond sixth sternite, except for the convex median portion (Fig. 119), as a consequence of reduction of this portion the basin of the hypopygium opens posteriorly rather than dorsally as is usual in the subfamily, and that part of dorsal rim anterior to lateral angles constitutes less than half of the whole instead of two-thirds or more as usual; anterior rim broad, flat, punctate, depressed before level of central disk, lateral angles prominent, tumid, declivitous, posterior rim scarcely elevated above central disk, except at middle; sixth sternite of female narrowly rounded to subangulate anteriorly, as long as preceding three sternites together; genital plates more than half as long as sixth sternite, twice as long as postventer, finely punctate, inner margin nearly as long as posterior, the latter slightly carinate, concave, and oblique; genitalia of female in expanded condition (Fig. 15). Length 3.2-4.2 mm.

Holotype male, Mexico, Sallé (Stockholm Museum); and many other specimens representing the following countries: Bolivia, Colombia, Trinidad, Panama, Venezuela, Nicaragua, Honduras, Costa Rica, Guatemala, Mexico, United States, Cuba, Jamaica, Haiti, and Republic of Dominica. In the United States the species occurs in Texas; the localities thus far known to us being Brownsville, Sharpsburg, and Victoria.

53. *Galgupha (Gyrocnemis) impressa* Horvath.

Euryscytus impressus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 227-228 [Bolivia].

Euryscytus impressus var. *melas* Horvath, G., *op. cit.*, p. 228 [Peru].

Color and puncturing throughout, general form and shape of sternites as in *quadrisignata*; ventral exposure of hypopygium as in *reinhardtii*, posterior margin lacking lateral sinuations (See Fig. 133), dorsal rim (Fig. 134) about the same. Length 3.5-4 mm.

In the typical variety the costa is yellowish for about one-fourth its length at base and the subapical spot is large; in the form *melas* the costa is black at base, and the subapical spot is small.

Holotype and *paratype* males of var. *impressa*, Bolivia; *holotype* male of var. *melas*, Vilcanota, Peru; *allotype* female of var. *melas*,

Callanga, Peru (Budapest Museum); and a male from Huadquina, Peru, 5000 ft., July 30, 1911, Yale Peruvian Expedition; El Quemado, Jujuy, Argentina, G. L. Harrington (U. S. N. M.); Callanga, Peru, Breddin Collection (D. E. S.); Rio Claro, Serra da Esperanza, Feb. 4 to 12, 1922; Therezina, Aug. 11, 1922; Curityba and vicinity, July 30, Aug. 15, October, 1923; Rio Ubasinho, March 1924 (Warsaw Museum); Brazil, Olfers (Berlin Museum); Santa Catherina, Brazil, Lüderwaldt (Stettin Museum); Neu Freiburg, Brazil, F. Wiengreen (Hamburg Museum); Peru; Merida, Venezuela; Yungas de Coroico, Bolivia, Fassel (Vienna Museum); Bahia, Brazil, 1845, E. Mocquerys (Paris Museum); Peru, M. Kirsch (Dresden Museum); Callanga, Vilcanota, Marcapata, Peru; Coroico, Bolivia; H. Taeuber (Munich Museum).

54. *Galgupha (Gyrocnemis) inæqualis* sp. nov.

Similar in form, sculpturing and color to *concava*, but strongly distinguished by the yellow margined vertex, and the well marked genitalic characters described in key (Fig. 120); the punctures towards sides of pronotum average deeper than those of *concava* and there is a more distinct band of punctures across pronotum; the hypopygium is more or less yellowish, the posterior rim showing yellowish from above. Dorsal rim of hypopygium deeply channeled, the inner ring bordering central disk lower than outer, the latter so narrow as to be carinate anteriorly, widening gradually to lateral angles, but everywhere steeply declivate, the channel broad and deep; lateral angles pale, slightly tumid; hind wall thin, high, interrupted by the emarginations. Genitalic plates of female less than half as long as sixth sternite, but longer than postventer, punctate, the inner posterior angles prominent and somewhat produced. Length 4-4.5 mm.

Holotype male, *allotype* female, and *paratypes*, Bonda, Colombia, June, July (Carnegie Museum); paratypes, Llanos, Venezuela, F. Geay (Paris Museum); San Esteban, March 1888, E. Simon; Caracas (Helsingfors Museum); Caracas, Gallmer (Berlin Museum); Colombia, April-June 1908, E. Pehlke (Stettin Museum); Colombia, 1830, Lebas (Paris Museum); Caracas, Venezuela, 1877, O. Thieme (British Museum); Venezuela (Vienna Museum); Coroico, Bolivia (Munich Museum).

55. *Galgupha (Gyrocnemis) intermedia* sp. nov.

Similar to *concava*, but differing from that species as does *inæqualis* in having more rastrate puncturing in extremities of transverse im-

pression of pronotum; the posterior half of pronotum and scutellum in the holotype are reddish; dorsal rim of hypopygium shallowly channeled anteriorly as in *concava*, deeply fossate laterally; hind wall thin, declivate, interrupted by the median emargination. Length about 4 mm.

Holotype male, Taquara, Brazil, October (Carnegie Museum); specimens labelled *maculipennis* Germar, Brazil but not type material of that species (Berlin Museum).

56. *Galgupha (Gyrocnemis) lineata* sp. nov.

Black, corium and narrow portion of adjacent clavus yellowish to reddish, thin costal line, blotch about middle of costa, and sometimes connecting markings obliquely across corium toward inner posterior angle, black; abdominal spots yellowish; legs from knees castaneous, tarsi, antennæ, and beak testaceous.

Vertex moderately rounded, produced about length of eye beyond anterior transocular line, shallowly punctate; punctures subobsolete on pronotum, except antero-laterally; scutellum moderately punctate, except on anterior disk, substrate on declivity; corium generally punctate; sternites with a moderate number of coarse punctures, smoother medially; sixth sternite subangulate anteriorly, longer on median line than anterior sternites together; fifth, fourth, and third constricted medially, the former two to less than half their lateral length; genital plates (Fig. 111) punctate, half as long as sixth sternite, thrice as long as postventer, about as long on inner as on posterior margins, the latter oblique and slightly concave. Length 3.5-4 mm.

Holotype and *paratype* females, San Antonio, Argentina, Reimoser (Vienna Museum); *paratype*, Brazil, Osten Sacken (Berlin Museum).

57. *Galgupha (Gyrocnemis) maculipennis* Germar.

Odontoscelis maculipennis Germar, E. F., Zeitschr. f. Ent., I, 1839, p. 41.

The description of *concava* will answer for this species, except for differences noted in key. Ventral view of male hypopygium as in Fig. 121; dorsal view, Fig. 122. Length 3.5-3.8 mm.

In the Germar Collection, Lwow Museum, are two specimens labelled "*maculipennis* m[ihi], Amer. Mer." of which the first is selected as holotype (the other is a different species, probably *notatipennis* Stål); other specimens examined are labelled, Perico to Embarcación, Argentina, May 19, 1920, G. L. Harrington (U. S. N. M.); Argentina, Jensen-Haarup (Helsingfors Museum); Paraguay, K. Fiebrig (Berlin Museum); San Bernardino, Paraguay, Fiebrig (Vienna Museum).

58. *Galgupha (Gyrocnemis) morbiloci* sp. nov.

General coloration and puncturing as in *concava*, with completely pale-margined vertex as in *inequalis*; distinguished by genitalic characters as noted in key and by larger size; anterior margin of vertex, pronotal submargins, and pronotum and scutellum, posteriorly, reddish; ocelli thrice their own diameter from eyes; sixth sternite about as long as preceding three combined, fifth and fourth slightly constricted medially, their anterior outline paralleling that of sixth medially; genital plates punctate, less than half as long as sixth sternite, longer than postventer, inner margin decidedly shorter than posterior, the latter concave, but only slightly oblique, inner posterior angles prominent, slightly produced. Length 5 mm.

Holotype female, Tehuantepec, Mexico, June 30, F. Knab (U. S. N. M.).

59. *Galgupha (Gyrocnemis) nitens* Breddin.

Thyreocoris nitens Breddin, G., Abh. Senckenberg, Naturforsch. Gesell., XXXVI, 1, 1914, p. 55 [Cumbase, Amazonas, Peru].

Black, polished, with æneous reflections, fore margin of vertex touched with yellowish or reddish near middle, corial patch (Fig. 44) yellowish, about one-third length of corium, not extending over claval suture, a small yellowish subcostal spot about one-fourth from apex of corium, extreme apex also more or less pale; yellowish lateral spots on abdomen evident both above and below on all segments including hypopygium of male; fore tibiæ testaceous above, more or less fuscous beneath in both sexes, other tibiæ concolorous with femora.

Head rounded anteriorly, produced less than length of an eye beyond anterior transocular line (Fig. 135); vertex not carinate-margined, with numerous moderately impressed punctures, occiput smooth, ocelli but slightly more than their own diameter distant from eye; pronotum very glossy with numerous well marked punctures laterally, and fine traces of punctures distinguishable elsewhere; scutellum with numerous punctures, most distinct near antero-lateral angles, nearly obsolete on anterior disk; exposed corium more coarsely punctate basally, more finely apically; venation of hind wing as in Fig. 10; sternites two, three, and four medially with scattered coarse punctures; fourth laterally, fifth and sixth with dense fine punctures; sixth sternite of male narrowly rounded anteriorly, the fifth considerably and the fourth more moderately constricted medianly (Fig. 116); ventral exposure of male hypopygium almost impunctate, transversely channeled, hind margin distinctly thickened, broadly but shallowly concave medianly, convex-laterally (Fig. 116); dorsal rim rather broad, flat and punctate-wrinkled anteriorly, crossed there by a

straight longitudinal furrow, slightly concave immediately within the broad lateral angles, then slightly tumid and gently sloping, hind margin, low, carinate, with a broad bridge interiorly to central disk, venter of female sparsely punctate, smoothish medianly, sixth sternite broadly rounded anteriorly (Fig. 109), equal in length to preceding three sternites together, fifth and fourth somewhat constricted medially, genital plates subobsoletely punctate, third and fourth as long as sixth sternite, twice as long as postventer, almost equilateral, inner margins somewhat tumid, elevated, especially posteriorly, inner posterior angles somewhat produced, posterior margin oblique and slightly concave. Length 4-4.5 mm.

Holotype male, Amazonas, Peru, Breddin Collection (Deutsches Ent. Inst.); other specimens from Cuatra Ojos, Bolivia, Nov. 1913; Las Juntas, Bolivia, December 1913; Inachacha, Bolivia, alt. 2500 m., March 1921, J. Steinbach; Chapada, Brazil, November (Carnegie Museum) December (American Museum); Rurrenabaque, Bolivia, October, November; Santa Helena, Bolivia, August, W. M. Mann, Mulford Biological Expedition (U. S. N. M.); Santa Cruz de la Sierra, D'Orbigny, 1834; Chignitos, Bolivia, 1834, D'Orbigny (Paris Museum); Callanga, Peru, Garlepp (Dresden Museum); Amazonas, Brazil; Cauca, Colombia; Vilcanota, Peru; Pachitea, Peru (Munich Museum).

Two species were confused under the original description of *nitens*; in selecting a holotype we have chosen the specimen conforming most to Breddin's description of the male; the "female" he cites which is a male, is *differentialis* McAtee and Malloch (p. 251).

60. *Galgupha (Gyrocnemis) nitidipennis* sp. nov.

Greenish black, polished; anterior margin of vertex, scutellum posteriorly, and corium, reddish tinged; legs in general castaneous; tarsi, antennæ, and beak stramineous.

Head evenly rounded anteriorly, produced less than length of eye beyond anterior transocular line; vertex not carinate-margined, shorter, less convex and deflexed than in *novatra*, moderately punctate, except along hind margin; pronotum coarsely punctate laterally, obsoletely punctate elsewhere; scutellum moderately punctate in general, the punctures sparser and shallower on anterior disk; corium obsoletely punctate, except along veins; sternites with sparse coarse punctures, smooth medially, sixth about as long as preceding three together; genital plates punctate, half as long as sixth sternite, longer than post-venter. Length 4.5 mm.

Holotype female, Haut Sarare, Venezuela, F. Geay (Paris Museum).

61. *Galgupha (Gyrocnemis) notha* sp. nov.

Of the *quadrisignata* group, much like the typical Central-American form, but distinguished, as noted in key. Length 4-4.5 mm.

Holotype and *paratype* males, San Antonio, Argentina; *allotype* and *paratype* females, Chicoana, Salta; *paratype* male, La Merced, Argentina, Reimoser (Vienna Museum); El Quemado, Jujuy, Argentina, G. L. Harrington (U. S. N. M.).

62. *Galgupha (Gyrocnemis) novatra* sp. nov.

Shining black, margin of abdomen both above and below, and costa obscurely yellowish; antennæ, beak, tibiæ, and tarsi fusco-testaceous.

Head deflexed and narrowly rounded apically; vertex rather obsoletely punctate everywhere, except on posterior part of tylus and hind margin which are smooth; pronotum with a group of well-marked punctures sublaterally on each side, and semiobsolete punctures elsewhere, which, though evident under oblique lighting, do not prevent the surface from appearing highly polished; scutellum with same type of puncturing, coarsest near antero-lateral angles, finest on anterior disk, and moderate elsewhere; corium punctate, less conspicuously so on posterior third; lateral area of metapleurum rounded anteriorly, impunctate; sternites moderately punctate, smoother medially, especially sixth; the latter narrowly rounded and produced anteriorly, as long as preceding sternites together, all of which are shorter medially than laterally, the fifth most constricted (to less than half its lateral length); genital plates moderately punctate, about half as long as sixth sternite and longer than postventer, inner margins elevated, especially posteriorly, where distinctly produced about as long as posterior, the latter slightly concave. Length 5 mm.

Holotype female, Jujuy, Argentina (Argentine Museum).

63. *Galgupha (Gyrocnemis) novella* McAtee and Malloch.

Galgupha (Gyrocnemis) novella McAtee, W. L., and Malloch, J. R., Ann. Mus. Zool. Poland, VII, 1928, pp. 35-36 [Brazil].

Coloration and puncturing as in *G. fossata*, the insect differing in hypopygial structure both from this species and from *G. concava* and its allies. Ventral exposure of hypopygium indistinctly punctate and transversely wrinkled, the wrinkles more or less paralleling posterior emargination, the latter of a concave (not angulate) type and occupying a third of posterior margin, which is convex each side (Fig. 127); dorsal rim punctate anteriorly, where at middle it is moderately sloping, its outer border however gradually merging into the broader antero-lateral portions, which extend almost to lateral angles, and are there abruptly declivate, and have a lobulate appearance; next the

central disk are two deep fossæ; hind wall thin, interrupted corresponding to median emargination, abruptly declivate each side of this, less abrupt where it passes into lateral angles (Fig. 126). Length 3 mm.

A male subsequently found in material from the Dresden Museum has the hypopygium slightly different (Fig. 127) but it is somewhat teneral and this may account for the variation from type. Locality, Curopreto, Ohaus.

Holotype male, Fazenda Durski, Paraná, Brazil, March 31, 1922 (Polish Museum); another male from same locality, with hypopygium missing, is not made a paratype.

64. *Galgupha (Gyrocnemis) occulta* sp. nov.

Æneous black, corium chiefly stramineous, lateral carina, median subcostal spot, median blotch and posterior third of mesocorium and mesocorial vein, black; femora castaneous, tibiæ and beak testaceous, tarsi and antennæ, and lateral abdominal spots, stramineous.

Head evenly rounded anteriorly, produced about half length of eye beyond anterior transocular line; vertex coarsely punctate laterally, but only finely punctate medially and posteriorly, wrinkled transversely on tylus and obliquely on each side; pronotum distinctly punctate laterally, but only subobsoletely punctate elsewhere; scutellum moderately punctate, smoothest on anterior disk; corium moderately punctate; fine puncturing on sternites of male only lateral on third, covering most of fourth, nearly all of fifth, and all of sixth; the second has only coarse puncturing and this type extends posteriorly on disk of third and fourth; all sternites smoother medially; sixth subangulate anteriorly, the fifth greatly and the fourth moderately constricted medially; ventral exposure of hypopygium very small, smooth, crescent-shaped, margin slightly elevated all around; dorsal rim narrow posteriorly, broad anteriorly and much more so laterally, tumid all around, the lateral angles conspicuously tumid and pale. Venter of female coarsely punctured laterally, more finely and sparsely punctate medially; sixth sternite narrowly rounded anteriorly, the fifth and fourth moderately constricted medially; genital plates punctate, as long as fourth and fifth sternites together on median line, more than half as long as sixth, and distinctly longer than postventer, inner margins three-fourths as long as posterior, the latter nearly straight but slightly posteriorly oblique in position.

Holotype male, Bahia, Brazil, Noualhier Collection (Paris Museum); *allotype* female and *paratype* male, Brazil (Dresden Museum).

65. *Galgupha (Gyrocnemis) omissa* sp. nov.

Similar in puncturing and coloration to *concava*; distinguished by the characters noted in key. Sixth sternite as long on median line as the

preceding three sternites together; genital plates punctate, about one-third as long as sixth sternite, and slightly longer than postventer; hind margin moderately concave, inner posterior angles a little produced. Length 3.5 mm.

Holotype and *paratypes* females, Chapada, Brazil, April (Carnegie Museum).

66. *Galgupha (Gyrocnemis) parva* sp. nov.

Reddish brown, infuscated on disk of vertex, anterior half of pronotum, and anterior angles of scutellum; anterior submargin of vertex between eyes, narrow lateral submargin of pronotum before humeral prominence, and most of corium, pale yellowish; the extreme carinate margin of head, pronotum, and corium is dark, and the puncturing and veins chiefly, and a few blotches on corium are of ground-color. Underparts castaneous, lateral spots on segments both below and above pale yellow, tibiae stramineous with fuscous spines.

Head rounded to subtruncate apically, produced more than length of eye beyond anterior transocular line, vertex copiously, but shallowly, punctured, very few punctures on pale submargin, and extreme posterior portions; pronotum copiously but shallowly punctate, except on callosities and pale submargins; scutellum numerously punctate, the punctures semi-obsolete on anterior disk, deepest and largest near antero-lateral angles; corium punctate along veins, but mostly smooth otherwise; metapleurum with a transverse rastrate strip (more marked in female) bordering ostiolar field posteriorly and extending to lateral margin, lateral area angulate anteriorly, impunctate; sternites moderately punctate, third to fifth shorter in middle than on lateral margins in both sexes; sixth subangulate anteriorly in male, ventral exposure of hypopygium half as long as sixth sternite, impunctate, hind margin carinate but not reflexed, ventral aspect as in Fig. 128, dorsal rim broadest laterally, abruptly declivitous all around, central basin deep, hind wall thin, depressed medianly in consequence of the emargination; sixth sternite of female narrowly rounded anteriorly, as long as preceding sternites together; genital plates impunctate, inner posterior angles produced as an acute piercer, surpassing abdomen, only a narrow lunate portion of subgenital plates visible (Fig. 108). Length 2.8-3 mm.

Holotype male and *allotype* female, Chapada, Brazil, April, *paratype* male, May (Carnegie Museum); April (A. M. N. H.); Centurion and San Luis, Paraguay, Reimoser (Vienna Museum).

67. *Galgupha (Gyrocnemis) punctifer* sp. nov.

Black, shining, with pale markings as indicated in key; basal pale mark not more than one-fourth as long as corium, extending just

to claval suture; legs castaneous, tarsi, beak, and antennæ testaceous.

Head evenly rounded to subtruncate anteriorly, produced about length of eye beyond anterior transocular line, distinctly carinate margined; ocelli about two and one-half times their own diameter from eyes; vertex and broad lateral portions of pronotum with large, deeply impressed subcontiguous punctures; small area on back of vertex, and disk of pronotum with finer, shallow punctures; scutellum impunctate on a small area on anterior disk; moderately punctate elsewhere; subcostal pale spot on corium calloused. Lateral area of metapleurum blunt anteriorly, more or less punctate near inner margin; metapleurum posterior to ostiolar field coarsely punctate; sternites moderately punctate, smoother medially; sixth sternite of male distinctly, though broadly angulate anteriorly; ventral exposure of hypopygium short, hind margin distinctly reflexed, shallowly concave from side to side as seen from below; dorsal rim, punctate, broad all around, shallowly basined, even the hind wall broad and of only moderate slope. Sixth sternite of female broadly rounded anteriorly, as long as fifth and fourth together; genital plates coarsely punctate, two-thirds as long as sixth sternite, a little longer than postventer, inner margin somewhat elevated, a little shorter than posterior, inner posterior angles not at all produced, hind margin nearly straight. Length 3.5-4 mm.

Holotype male, Cacao Trece Aguas, Guatemala, April 12; *allotype* female, April 4, E. A. Schwarz and H. S. Barber; paratypes, same locality, March 24 to April 24, Schwarz and Barber; Cordoba, Vera Cruz, Mexico, May 30, June 12, 13, 1908, F. Knab; Paraiso, Canal Zone, Jan. 7, E. A. Schwarz; March 11, 1911, A. H. Jennings; Feb. 8, March 30, 1911, A. Busck; Panama City, Panama, April 12, 15, 1911, Taboga Id., Panama, Feb. 21, 1912, A. H. Jennings; Ancon, Canal Zone, April 13, 1911, E. A. Schwarz; Tabernilla, Canal Zone, A. Busck; Teapa, Tabasco, Mexico, March, H. H. Smith; also Guatemala, Panama, Vera Cruz, without other data (U.S.N.M.); Costa Rica, "Am. bor." (Deutsches Ent. Inst.); Brownsville, Texas, June 1901, H. G. Barber (Barber Collection); Aguas Caliente, Guatemala, Kellerman (M. C. Z.); Bolivia, Wanczewicz (Berlin Museum); Rio Frio, Colombia, June 16, 1925 (Iowa State College); Orizaba, Mexico, May 1871, Bilimek (Vienna Museum); Darien, F. Geay; Guanajuato, Duges, 1889; Teapa, Tabasco, March, H. H. Smith (Paris Museum); Mexico, C. Höge (Hamburg Museum); Turrialba, Costa Rica, H. Taeuber (Munich Museum); Belize, British Honduras, Blancaneaux (Dresden Museum).

68. *Galgupha (Gyrocnemis) quadrisignata* Stål.

Thyreocoris quadrisignatus Stål, C., Ent. Zeit. Stettin, XXIII, 1862, pp. 94-95 [Mexico].

Polished black with æneous reflections, male slightly reddish-brown or paler on costa basally, female more extensively brownish over base of corium, but with no distinct corial patch, a faint subcostal pale spot about one-third distance from apex in both sexes, these pale markings sometimes lacking; lateral pale spots on abdominal segments evident in both sexes, less so in male; knees and tibiæ stramineous.

Head narrowly rounded to subangulate anteriorly, produced about length of eye beyond anterior transocular line, not carinate-margined; tylus depressed subapically, vertex with large, but not deep, subcontiguous punctures, nearly smooth on narrow occipital area; pronotum with numerous distinct punctures laterally, with a broad transverse band of less distinct more or less rastrate punctures behind middle, anterior and posterior discal areas almost impunctate; scutellum with subobsolete punctures on extreme anterior disk, and numerous distinct punctures elsewhere, deepest in antero-lateral angles; corium punctate basally, but almost impunctate on apical half, except along veins; lateral area of metapleurum rather broad anteriorly, impunctate; lateral portions of third sternite posteriorly, and of sternites four to six finely and copiously punctate in male in contrast to sparsely punctate sternite two, sternites of female moderately punctate, those of both sexes broadly polished medially; sixth sternite of both sexes subangulate anteriorly, as long as preceding three sternites together, fifth sternite more constricted than fourth, but both shorter in middle than on lateral margin; ventral exposure of male hypopygium polished, transversely channeled, hind margin shallowly concave medially, convex laterally; dorsal rim relatively broad all around, least so posteriorly, most so laterally, in both of which sections it is distinctly but not abruptly basined; genital plates of female sparsely punctate, two-thirds as long as sixth sternite, longer than postventer, but little shorter on inner than on posterior margin, the latter distinctly oblique; inner apical angles prominent and slightly produced. Length 3.5-4.5 mm.

Type series Mexico, Sallé, Hogberg, and other specimens from Honduras, Hjalmarson (Stockholm Museum); San José, Guatemala, Aug. 6, F. Knab; Quirigua, Guatemala, May 1919; Izabal, Guatemala, June 1919, S. F. Blake; San Salvador, Salvador, Aug. 15; Sonsonate, Salvador, Aug. 26, F. Knab; La Ceiba, Honduras, Aug. 2, 17, 19, 26, 1916; Tegucigalpa, Honduras, March 30, 31, 1917, F. J. Dyer; Ayutla, Guatemala, Aug. 2, 1923, E. G. Smyth; Vera Cruz, Mexico, April 10, Uhler Collection; Mexico, Baker Collection; Jalapa, Mexico (U. S. N. M.); Guatemala, Breddin Collection (Deutsches Ent. Inst.); Los

Amates, Guatemala, Kellerman (M. C. Z.); Frontera, Tabasco, Mexico, June 1897, C. H. T. Townsend (Knight); Vera Cruz, July 29, 1926 (Stettin Museum); Piedras Negras, Costa Rica, P. Schild; San José, Guatemala, November 1907, August, October, November, 1911, R. Paessler; Mexico, C. Höge (Hamburg Museum); Los Amates, Guatemala, February 1905 (Iowa State College); British Honduras, Blancaneau (Dresden Museum, Paris Museum).

69. *Galgupha (Gyrocnemis) reinhardti* Jensen-Haarup.

Euryscytus reinhardti Jensen-Haarup, A. C., Ent. Meddel., XVI, 1926, p. 48 [Brazil].

Form, puncturing and coloration as in *quadrisignata*, except that the general color of corium is reddish-brown, the costa basally, a poorly defined sub-basal and the subapical subcostal spot paler.

Ventral exposure of male hypopygium almost impunctate, depressed over whole area bordering the large central emargination, posterior margin slightly sinuate each side (see Fig. 132), dorsal rim broad and nearly flat anteriorly, much broader at lateral angles, which are somewhat tumid on their outer portions, and distinctly though shallowly basined within, hind margin rather moderately sloping, broadly interrupted medianly. Length 3.2 mm.

Holotype and paratype males, Bahia, Brazil, Galatea Expedition, J. T. Reinhardt (Copenhagen Museum); Merida, Venezuela, Briceno (U. S. N. M.).

70. *Galgupha (Gyrocnemis) singularis* sp. nov.

Black, shining, with slight purplish reflections; corium (Fig. 46) pale, infuscated on inner side near base and apex, and on costa as described in key; pale yellowish spots on margins of segments large, but separated by dark at the incisures and by the thin dark carinate connexivum.

Head narrowly rounded anteriorly produced less than length of eye beyond anterior transocular line; jugæ nearly touching in front of tylus, vertex depressed anteriorly, copiously, if subobsoletely, punctured, except for narrow occipital area; punctures nearly obsolete over whole disk of pronotum, well marked on lateral portions; scutellum moderately punctate, nearly smooth on anterior disk; metapleurum punctate bordering ostiolar surface and from postero-lateral angle of latter to edge, lateral area rather broad anteriorly, impunctate; sternites moderately punctate, smoothish medianly; third to fourth shorter at middle than at lateral margins, and fourth to fifth decidedly constricted; sixth sternite produced and very narrowly rounded anteriorly (Fig. 110), longer than preceding sternites together; genital

plates two-thirds as long as sixth sternite, three times as long as postventer, inner margins as long as posterior, longitudinally wrinkled and punctate, the inner margins somewhat elevated, the inner angles distinctly produced, the posterior margins decidedly concave; subgenital plates narrowly semi-elliptical, finely punctate; ultimate tergite broadly convex medianly, distinctly concave laterally, the concavities being the ends of short trough-like depressions in upper surface (Fig. 110). Length 4 mm.

Holotype female, Perico to Embarcación, Argentina, May 19, 1920, G. L. Harrington (U. S. N. M.).

71. *Galgupha* (*Gyrocnemis*) *soror* sp. nov.

Black, corium yellowish with costal carina, punctures, an oblique blotch from middle of subcosta to posterior part of mesocorium, and an isolated patch on middle of mesocorium, black; parts adjacent to the black markings reddish-brown; clavus mostly black; beak, antennæ, and tarsi stramineous.

Vertex moderately deflexed, almost evenly rounded anteriorly (subtruncate medially), produced less than length of eye beyond anterior transocular line, reflexed margin very low, moderately punctate except posteriorly, and the faintly transversely wrinkled tylus; punctures evident antero-laterally, and about ends of transverse impression, subobsolete elsewhere, on pronotum; corium punctate except on subcostal area; scutellum copiously punctate, except on extreme anterior disk; lateral area of metapleurum impunctate; sternites coarsely punctate, smoother medially, sixth extensively punctate; narrowly rounded anteriorly, about as long on median line as fifth, fourth, and third together, these latter only slightly constricted medially; genital plates a third as long as sixth sternite, about equal in length to post-venter, finely punctate, inner margins decidedly shorter than posterior, the latter concave, the plates slightly depressed discally, the inner posterior angles prominent. Length 4.5 mm.

Holotype female, Mexico, 1883, Bilimek (Vienna Museum).

72. *Galgupha* (*Gyrocnemis*) *tabida* Stål.

C [*orimelana*] *tabida* Stål, C., Rio Hemip., 1, 1862, p. 9 [Brazil].

Eumetopia tabida, Lethierry, L. and Severin, G., Catalogue général des Hémiptères, I, Hétéroptères, Pentatomidæ, 1893, p. 13 ["Female of the preceding?" which was *E. fissiceps* Westwood. See p. 196].

Ochreous, punctures and the following parts brownish to blackish: irregular spots across occiput, pronotal callosities, a large triangular patch on anterior disk of scutellum, basal depressions and three sub-apical markings of scutellum, the lateral ones of which are elliptical and obliquely placed, and the median one sagittate with the anterior

prolongation slender, apical two segments of antennæ, and two indistinct annuli on third, lower surface of head about bases of antennæ and beak, most of pleural surfaces, disk of venter, most of ovipositor, tibial spines, and tarsal claws.

Vertex considerably shorter than broad between eyes, distinctly depressed all around behind anterior margin, coarsely punctate, except on extreme anterior and posterior margins; pronotum almost uniformly punctate, except for callosities; scutellum uniformly punctate, the punctures shallowest on anterior disk; lateral area of metapleurum broad, obliquely truncate anteriorly, punctate interiorly; sternites moderately punctate, smooth medially; the sixth less copiously punctate than the others, broadly rounded anteriorly, fifth to third sternites much shorter medially than laterally; genital plates almost impunctate, triangular, the inner margins elevated into a blunt-tipped, ovipositor-like protuberance, posterior margins almost transverse; subgenital plates fully exposed, sub-triangular, ventral exposure of ultimate tergite unusually ample, as long as genital plates. Length 5.5 mm.

Holotype female, Brazil, F. Sahlberg (Stockholm Museum).

73. *Galgupha (Gyrocnemis) texana* sp. nov.

Similar in color and sculpturing to *punctifer*, differing as noted in key; puncturing on disk of pronotum a little more pronounced and inclining to be rastrate; there is no calloused place at the position of the subcostal pale spot of *punctifer*. Length 4 mm.

Holotype male, La Blanca, Texas, May 8, 1925 (U. S. N. M.).

Additional material may show this to be a subspecies of *punctifer*.

74. *Galgupha (Gyrocnemis) triconcava* sp. nov.

The description of *concava* applies to this species in all respects, except for genitalic details described in key; the ventral exposure of hypopygium is more extensively flattened; external genitalia of female as in Fig. 107. Length 3.5-4.5 mm.

Holotype male, *allotype* female, and *paratypes*, Sapucay, Paraguay, February, W. T. Foster; paratypes San Bernardino, Paraguay, K. Fiebrig (U. S. N. M.); Chapada and Corumbá, Brazil, throughout the year; Bom Fin, Bahia, Brazil, J. D. Haseman (Carnegie Museum); Chapada, Brazil, April (A. M. N. H.); Amazon River, and São Paulo, Brazil, Breddin Collection (Deutsches Ent. Inst.); Bolivia (Argentine Museum); Paraguay, Dec. 7, K. Fiebrig (Berlin Museum); Province del Sara, Bolivia, Steinbach (Stettin Museum); San Luis, Paraguay, and Argentina, Reimoser (Vienna Museum); Buenavista, 450 meters, Santa Cruz, Bolivia, H. Tæuber (Munich Museum).

75. *Galgupha (Gyrocnemis) unica* sp. nov.

Æneous-black, shining; basal corial patch ivory, other pale markings of corium distributed as in *occulta*, brownish-yellow; semicircular, lateral abdominal spots, visible on segments three to six, also blotches on subgenital plates and on ventral exposure of ultimate tergite pale yellow; legs from knees stramineous; beak and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line, front margin of head, slightly reflexed, almost evenly rounded between eyes; vertex coarsely punctate antero-laterally, nearly smooth medially and posteriorly; pronotum with the punctures almost evenly distributed, but only lightly impressed discally; scutellum moderately coarse-punctate on sides, more finely punctate on declivity, and almost impunctate on anterior disk; mesorium and veins punctate; lateral area of metapleurum broad anteriorly, punctate on inner half, which is tumid; sternites with scattered coarse punctures laterally, smoother discally; sixth quite narrowly rounded anteriorly, fifth and fourth distinctly constricted medially; genital plates punctate, about two-thirds as long as sixth sternite, one-third longer than postventer; inner margin three-fourths as long as posterior, the latter slightly concave, transverse in position. Length 4 mm.

Holotype female, Santa Marta, Colombia, Dec. 26, 1910, J. W. Green (U. S. N. M.).

Subgenus CTENOPODA subgen. nov.

Principal characters: Corium of medium breadth, apically meso-corial vein traceable, exocorial vein furcate, the forks connate posteriorly (Fig. 48); fore tibia with a series of strong spines on postero-ventral surface, a number of which distally form a more or less comb-like structure (Fig. 137); hind tibia without carinate line posteriorly; vertex carinate-margined. Subgenotype, *Galgupha (Ctenopoda) castor* sp. nov.

KEY TO THE SPECIES.

1. Vertex and pronotum chiefly dark; scutellum of male reaching apex of abdomen; sixth sternite of male angulate anteriorly; hind margin of hypopygium shallowly emarginate almost from side to side (Fig. 142), with a slight secondary median emargination; dorsal rim as in Fig. 143; female genitalia as in Fig. 138. *pollux* sp. nov.
- Vertex and pronotum chiefly pale; scutellum of male not reaching apex of abdomen; sixth sternite of male subangulate; hind margin of hypopygium shallowly concave medially (Fig. 140) dorsal rim as in Fig. 141; female genitalia as in Fig. 139. *castor* sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES:

pollux; castor.76. **Galgupha (Ctenopoda) castor** sp. nov.

General color stramineous, punctures and the following areas, fuscous to black: tylus and nearby parts, triangle behind eye including ocellus, occiput, anterior disk of pronotum, three basal, three medial, and two apical blotches on scutellum, more or less diffused or connected, middle of costa, subapical spot on inner half of corium, ventral surface in general (except hind margin of head, lateral semi-circular spots on sternites three to six, and genitalia generally), femora, castaneous, tibiæ stramineous, spines black; tarsi, beak, and antennæ testaceous.

Head produced more than twice length of eye beyond anterior transocular line, subtruncate and slightly up-curved anteriorly; entire upper surface with scattered coarse punctures and irregular smooth areas between, the latter largest in region of callosities (where also the punctures are finer), middle of pronotum, and anterior disk of scutellum; corium punctate only along veins posteriorly; lateral area of metapleurum slightly wrinkled, but not punctate; fore tibia of male as in Fig. 137; venter copiously punctate, smoother medially; sixth sternite subangulate anteriorly in male, narrowly rounded in female, nearly as long as preceding sternites together all of which are moderately constricted medially; ventral exposure of male hypopygium (Fig. 140) large, densely punctate in middle posteriorly, sparsely punctate elsewhere; dorsal rim of about equal width all around anteriorly, nearly flat, punctate, much wider and more steeply sloping within lateral angles, hind wall high, most declivitous of all (Fig. 141); genital plates of female (Fig. 139), moderately punctate, about half as long as sixth sternite, the inner margins slightly elevated, inner posterior angles produced, posterior margins slightly convex laterally, concave near inner angles, subgenital plates almost entirely concealed, postventer reduced to a mere line medially. Length 4.25-4.75 mm.

Holotype male, *allotype* female, and *paratypes*, Corumbá, Brazil, April; *paratype* same locality, March (Carnegie Museum).

77. **Galgupha (Ctenopoda) pollux** sp. nov.

Vertex, except anterior submargin, and pronotum, except lateral submargins and a chain of indistinct blotches across posterior disk, dark fuscous; a considerably darker species than *castor*, the scutellar dark markings larger and more confluent.

Head less produced than in *castor*, only about one and one-half times length of eye beyond anterior transocular line, narrowly rounded and slightly upturned anteriorly; puncturing as in *castor*; fore femoral comb less developed than in that species; fifth and fourth sternites more constricted medially, the former to about half its lateral length; ventral exposure of hypopygium (Fig. 142) large, sparsely punctate, the punctures somewhat more densely grouped in middle posteriorly;

dorsal rim (Fig. 143) broader anteriorly than laterally, the lunate anterior third is moderately sloping inwardly, the lateral angles are narrowed and shelf-like from being hollowed out beneath, the hind wall is thin, abruptly and greatly declivitous medially, and rather thickened laterally. Genital characters of female (Fig. 138) similar to those of *castor*. Length 3.5-4 mm.

Holotype male, Corumbá, Brazil, March (Carnegie Museum); *allotype* female, Paraguay, K. Fiebrig (Berlin Museum); *paratype*, lacking abdomen, Paraguay, 1900, Gosset (Paris Museum).

The fore tibia in this species does not have the spines so densely grouped at apex of the postero-dorsal surface as in *castor*, but the armature is quite similar and distinct from that of any other species of the genus in the wide sense.

Subgenus TREPOCNEMIS subgen. nov.

Principal characters: Exocorial vein distinctly furcate, the branches connate apically; corium pointed apically (Fig. 50); hind tibia somewhat flattened dorsally with longitudinal carinate line posteriorly and a sulcus between; lateral area of the metapleurum sparingly punctate interiorly. Subgenotype *Galgupha (Trepocnemis) anomala* sp. nov.

78. *Galgupha (Trepocnemis) anomala* sp. nov.

Dull black; tarsi, beak, and antennæ, testaceous.

Head produced about twice length of eye beyond anterior transocular line, front margin low reflexed, narrowly rounded, subtruncate medially; vertex coarsely punctate, except posteriorly; pronotum punctate throughout, coarsely so antero-laterally and about ends of transverse impression (where more or less rastrate), finely punctate elsewhere; scutellum copiously punctate except on anterior disk, which is subtly transversely wrinkled and subobsoletely punctate, declivity rather rastrate; corium as in Fig. 50; mesocorium and veins distinctly punctate; sternites numerous punctate, a little smoother medially; sixth sternite of female subangulate anteriorly, about as long as the preceding two sternites together, fifth slightly and others scarcely, constricted medially; genital plates punctate, half as long as sixth sternite and about as long as postventer, inner margins two-thirds as long as posterior, the latter nearly straight and transverse. Length 3.5 mm.

Holotype female, General Roca, Rio Negro, Argentina, Dec. 2, 1920, A. Wetmore (U. S. N. M.).

Subgenus OROCORIS subgen. nov.

Principal characters: Corium (Fig. 49) narrowed posteriorly, exocorial vein distinctly furcate, the forks connate apically; mesocorial

vein as a series of distinct separated punctures for its whole length; hind tibia with longitudinal carinate line; anterior outline of head bluntly angulate each side of the tylus, head tumid beneath these angulations; fore tibia with an antero-dorsal series of closely placed black spinules (in addition to the usual pale bristles) on almost its entire length (Fig. 146); ocelli well behind posterior margins of eyes. Subgenotype *Cydnoides arizonensis* Van Duzee.

79. **Galgupha (Orocoris) arizonensis** Van Duzee.

Cydnoides arizonensis Van Duzee, E. P., Ent. News, XXXIV, p. 304, December 1923 [Mt. Lemon, Arizona].

Shining black, beak, antennæ, and tarsi fusco-testaceous.

Head produced less than length of eye beyond anterior transocular line; front margin of vertex truncate anteriorly, angulate laterally as described in key, then sinuate to eyes; vertex coarsely, almost contiguously punctate, except on narrow occipital strip; remainder of dorsal surface copiously punctate, the punctures coarse and distinct laterally, and finer discally; punctures more or less rastrate in lateral portions of the rather conspicuous transverse impression of pronotum; lateral area of metapleurum impunctate; corium as in Fig. 49; sternites copiously punctate, smoother medially; fore tibia and femur as in Fig. 146; sixth sternite angulate anteriorly in male, fifth constricted medially to less than half its lateral length, others noticeably, but less constricted; ventral exposure of male hypopygium (Fig. 144), large, almost semi-circular, the margin raised all around, hind margin slightly reflexed, very shallowly biconcave; dorsal rim (Fig. 145) with the anterior third of about uniform width, flat, much depressed below level of remaining portions, lateral angles broader, tumid, the hind margin thickened, elevated and except for two slight depressions, corresponding to the shallow concavities above noted, about on level with lateral angles; sixth sternite of female subangulate, preceding sternites only slightly constricted medially; genital plates about half as long as sixth sternite, and about equal in length to postventer, punctate, inner margins distinctly shorter than posterior, a little tumid apically, posterior margins transverse in position but slightly concave, inner posterior angles more or less rounded off. Length 4-4.5 mm.

Specimens examined are from Huachuca Mts., Arizona, Chas. F. A. Schæffer (Brooklyn Museum); and same locality July 10-31, 1905, H. G. Barber (Barber Collection).

Subgenus ACROTMETUS Horvath.

Acrotmetus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 223-224 [type species *Corimelena major* Breddin].

Principal characters: Corium truncate apically, but more narrowed than in *Euryscythus* for example, exocorial vein distinctly furcate, the

80. *Galgupha (Acrotmetus) brasilianus* Jensen-Haarup.

Acrotmetus brasilianus Jensen-Haarup, A. C., Ent. Meddel., XVI, 1926, pp. 48-49 [Brazil].

Piceous to black; antennæ, tarsi, and beak usually testaceous, sometimes more or less infuscated; faint yellowish lateral spots on sternites three to six.

Head produced less than length of eye beyond anterior transocular line, narrowly rounded anteriorly, subtruncate medially; punctures scarcely deeply impressed, except on lateral portions of pronotum and scutellum, all discal parts polished, with the punctures nearly obsolete; corium only obsoletely punctate, except along veins; sternites numerous punctate, smoother medially; sixth sternite of male longer than preceding sternites together, subangulate anteriorly, each of sternites three to five also with a slight median anterior convexity, these sternites slightly constricted medially; ventral exposure of male hypopygium polished on anterior disk, sparsely punctate elsewhere, transversely channeled, hind margin varying from convex to slightly emarginate medially; dorsal rim broad, except posteriorly, basined, posterior margin with a depression in specimens having an emargination; sixth sternite of female broadly subangulate anteriorly, as long as the preceding three sternites together, which are slightly constricted medially, convex in middle posteriorly; genital plates obsoletely punctate, scarcely as long as postventer, hind margin concave, inner posterior angles produced. Length 4.5 mm.

Holotype female and *allotype* male, Lagoa Santa, Brazil, Reinhardt (Copenhagen Museum); other specimens from Chapada, Brazil, May, November (A. M. N. H.); April, November; Piedro Blanca, Bolivia, near Corumbá, Brazil (Carnegie Museum); Bolivia (Argentine Museum); Foz do Iguassu, March 19, 1923; Pinheirinhos, April 18, 1923, Paraná, Brazil (Warsaw Museum); Brazil (Berlin Museum); Brazil, Schott (Vienna Museum); Hohenau, Paraguay, H. Taeuber (Munich Museum).

81. *Galgupha (Acrotmetus) crassa* sp. nov.

Color fuscous to black, except for a narrow stramineous costal mark that does not extend inward beyond cubital vein (Fig. 51); there are faint indications of pale lateral abdominal spots in some specimens; beak, tarsi, and antennæ testaceous.

Head narrowly rounded anteriorly, produced about length of eye beyond anterior transocular line; vertex copiously and coarsely punctate, except on middle posteriorly, where even there are traces of punctures; punctures somewhat finer on anterior disk than laterally, on pronotum and scutellum, but still well-marked; corium as in Fig. 51, mesocorium and veins distinctly punctate; sternites numerous and

coarsely punctate, smoother medially; sixth sternite angulate anteriorly in both sexes, fifth and fourth only slightly constricted; ventral exposure of male hypopygium punctate, slightly channeled transversely, the posterior margin varying from concave to shallowly emarginate medially; dorsal rim broad anteriorly and laterally, basin trapezoidal, broadest anteriorly, posterior wall narrow, depressed medially; genital plates of female, punctate, half as long as sixth sternite, about as long as postventer, inner margins distinctly elevated, somewhat shorter than posterior, the latter transverse in position, but slightly concave. Length 5-5.5 mm.

Holotype male, *allotype* and two other females, Chapada, Brazil, December (Carnegie Museum); *paratype* male, same date (A. M. N. H.).

82. **Galgupha (Acrotmetus) grossa** McAtee and Malloch.

Galgupha (Acrotmetus) grossa McAtee, W. L., and Malloch, J. R., Ann. Mus. Pol. Zoöl., VII, 1928, pp. 39-40 [Brazil, Guiana].

Black, costa more or less reddish at base; tarsi, beak, and basal three segments of antenna testaceous, apical two segments of antenna fuscous.

Head narrowly rounded anteriorly, produced twice length of eye in front of anterior transocular line; vertex except smoother occipital strip, disk of pronotum, and anterior disk of scutellum with fine, subobsolete, punctures, lateral areas of pronotum and scutellum with coarser and more distinct punctures; corium punctate on anterior, but not on posterior half, except along veins; sternites moderately punctate, smoother medially, especially the sixth; sixth sternite of male subangulate anteriorly, the preceding sternites slightly constricted medially, ventral exposure of hypopygium nearly flat, punctate, hind margin nearly evenly convex as seen from below; dorsal rim gradually sloping inferiorly from all sides, with rather conspicuous pale hairs; sixth sternite of female subangulate anteriorly, about thrice as long as genital plates, the latter punctate, about half as long on inner as on posterior margin, the disk in part lower than margins. Length 5.5-6.5 mm.

Holotype female, *allotype* male, and *paratypes*, Salto Guayra, Rio Paraná, Jan. 27, 1923, *paratypes*, same locality (in Paraná, Brazil) Jan. 29 and Feb. 8, 1923 (Polish Museum); Cayenne, Noualhier, 1898 (Paris Museum).

83. **Galgupha (Acrotmetus) minuenda** McAtee and Malloch.

Galgupha (Acrotmetus) minuenda McAtee, W. L., and Malloch, J. R., Ann. Mus. Pol. Zoöl., VII, 1928, p. 40 [Brazil].

Black, tarsi, beak, and antennæ testaceous, the latter two appendages somewhat infuscated.

Head narrowly rounded, produced about the length of an eye beyond anterior transocular line; distribution of puncturing about as in *grossa*, the whole dorsal surface, however, more or less alutaceous, not shining, as it is in most specimens of *grossa*. Sternites with scattered punctures, subobsolete medially; sixth sternite rounded anteriorly, the preceding ones but little constricted medially, genital plates about one-third as long as sixth sternite, punctate, inner margin less than half as long as posterior, the latter concave. Length 5 mm.

Holotype female, Pinheirinhos, Paraná, Brazil, April 16, 1923 (Polish Museum).

84. *Galgupha (Acrotmetus) schulzii* Fabricius.

[*Cimex*] *schulzii* Fabricius, J. C., Species Insectorum exhibentes eorum differentias Specifica, Synonyma, Auctorum, Loca Natalia, Metamorposin, adiectis Observationibus, Descriptionibus, II, 1781, p. 340 [Cayenne].

C[*imex*] *schulzii*, Fabricius, J. C., Entomologica systematica, IV, 1794, p. 83 [Cayenne].

T[*etyra*] *schulzii*, Fabricius, J. C., Systema Rhyngotorum, 1803, p. 143 [Cayenne].

T[*hyreocoris*] *setiger* Berg, C., Hemip. Argentina, 1879, p. 19 [Buenos Aires].

Corimelæna major Breddin, G., Neue Rhynchotenausbeute aus Süd-Amerika, Societas Entomologica, XIX, No. 7, July 1, 1904, p. 49 [Brazil].

Acrotmetus sphaeridioides Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 224-225 [Panama].

Black, usually with æneous reflections, corial marking varying considerably in extent, yellowish to reddish (northern specimens having it decidedly longer on mesocorium, two-thirds as long as entire corium, than on costa, may be known as subspecies *sphaeridioides* Horvath); yellowish to reddish lateral spots usually discernible on each of segments three to six; tarsi testaceous, beak usually castaneous, antennæ with the basal three segments usually paler than the apical second.

Head produced more than length of eye beyond anterior transocular line, narrowly rounded anteriorly, more or less truncate medially; back of vertex, most of dorsum of pronotum, and anterior disk of scutellum with the punctures mostly obsolete, punctures on more lateral areas numerous but few of them deeply impressed; mesocorium and veins punctate; sternites coarsely punctate, smoother medially; sixth sternite angulate anteriorly in male, about as long as all preceding sternites together, third to sixth distinctly constricted medially; ventral exposure of hypopygium punctate, slightly channeled transversely, hind margin normally transverse medially for three-fourths of its width (Fig. 147), sometimes slightly sinuate; dorsal rim broad anteriorly and laterally, hind wall broad, depressed almost to level of central disk; sixth sternite of female rounded to subangulate anteriorly, about as long as three preceding sternites together, which are only slightly constricted medially; genital plates punctate, nearly

half as long as sixth sternite, and slightly longer than postventer, inner posterior angles distinctly produced, hind margin oblique and slightly concave. Length 4.5-6 mm.

Holotype and *paratype* males of *schulzii* Fabricius, Cayenne (Kiel Museum) have been examined, and also the type series of *major* Breddin, including both males and females from Espirito Santo, Brazil, Fruhstorfer (Deutsches Ent. Inst.); the type series of *sphaeridioides* Horvath, Volcan de Chiriqui, 2-3000 ft., G. C. Champion (Budapest Museum); we have studied many others of this same lot in the British, the U. S. National, and other museums. We also place here specimens from the Argentine Museum labelled *setiger* Berg and agreeing in all respects with the original description of that species; these include some from Argentina without further data, and others more definitely labelled as, Misiones, March 7, 25, 1897; Buenos Aires, Nov. 2, 14, 15, 1896, S. Venturi.

Schulzii evidently is one of the most common species of the subfamily and it is also widespread; it seems to occur throughout South America east of the Andes. The most northern localities we have for it are Colima and Tabasco, Mexico.

85. *Galgupha (Acrotmetus) tucumanus* Horvath.

Acrotmetus tucumanus Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 225 [Argentina], female.

Acrotmetus persimilis Horvath, G., *op. cit.* pp. 225-226 [Brazil], male.

Following is a comparative description with *schulzii* drawn from the female holotype. Black, corial marking reddish, half as long as corium, third antennal segment pale apically; tarsi pale.

Head broader, more rounded anteriorly, and less truncate medially, and ocelli noticeably farther apart than in *schulzii*; lateral patch of coarse punctures on pronotum larger than in that species; sternites more copiously punctate than in *schulzii*, in which species they are smoothish medially, especially the sixth; the genital plates are decidedly more transverse than in *schulzii*, the posterior margins but little concave and scarcely oblique (both of which characteristics are distinct in *schulzii*), the inner angles but little produced posteriorly, and having only a small portion smooth (in *schulzii* they are much produced and have large smooth areas); the subgenital plates differ in the two species corresponding to the differing encroachment of the genital plates. Length 5.5 mm.

The male is practically indistinguishable from *schulzii*, except for the undulation of hind margin of hypopygium (Fig. 148) mentioned in the key, and would have been placed as a variant of that species, had

not specimens turned up collected at the same time and place with females, which are distinct from those of *schulzii* and which we believe are *tucumanus*. The species has about the same range in size as *schulzii*. The corial marking varies from yellowish to reddish.

The material examined includes the *holotype* female of *tucumanus*, Tucuman, Argentina, Jan. 1906, Arpad Vezenyi (Budapest Museum); the *holotype* and *paratype* males of *persimilis* (the paratype is *schulzii*), Cuyabá, Matto Grosso, Brazil (Budapest Museum); other males from Argentina, one of them from Buenos Aires, Nov. 2, 1896 (Argentine Museum); Chacras de Coria, Mendoza, Feb. 11, 1906, Jensen-Haarup (Collection Jensen-Haarup); and Rio Salado, Province of Santiago del Estero, Argentina, 1909, E. R. Wagner (Paris Museum).

In the last listed lot both sexes are represented, and in them the pale color of the corium extends well beyond the petiole of the exocorial vein, while in typical *schulzii* it ceases at or almost at the furcation.

Subgenus GALGUPHA Amyot and Serville.

Bibliographic reference as under the genus (p. 203).

Principal characters: Corium pointed apically (Figs. 52 to 54), exocorial vein distinctly furcate, the branches connate apically; lateral area of metapleurum impunctate; hind tibia with a longitudinal carinate line; fore femur with several short stout antero-ventral bristles on apical half (Figs. 158, 159). Subgenotype *Galgupha* (*Galgupha*) *atra* Amyot and Serville.

A group of uniformly black species, which is more strictly northern in distribution than any other in the genus, but one of the included species occurring south of the United States in Mexico. Several of the species are fairly common in the eastern United States, where they may be swept from low vegetation; no details of food-habits or transformations, however, are available.

KEY TO THE SPECIES.

1. Antero-dorsal series of spines on fore tibia (Fig. 158) terminating distally in two decidedly weaker spines or bristles or a hiatus, when these have been lost; puncturing mostly obsolete on discal portions of pronotum and scutellum.....2
- Antero-dorsal armature of fore tibia (Fig. 159) usually almost uniformly spinose, without two distal ones bristle-like and rarely with subapical hiatus; puncturing more evident on discal portions of pronotum and scutellum... 5

2. Scutellum angulate apically (Fig. 153); dorsal rim of male hypopygium broad with three distinct depressions, one anteriorly and two postero-laterally; genital plates of female decidedly shorter on inner than on posterior margin. **denudata** Uhler.
Scutellum normally broadly rounded apically; genitalia otherwise 3
3. Inner margin of genital plates of female distinctly shorter than the posterior, the latter but little oblique or concave. **monostira** Horvath.
Inner margins of genital plates of female almost as long as the posterior, the latter decidedly oblique and concave. 4
4. Outline as seen from above noticeably more narrowly rounded posteriorly (Fig. 152) than anteriorly; dorsal rim of male hypopygium with a conspicuous carinate elevation on each inner side anteriorly (Fig. 161). **carinata** sp. nov.
Outline as seen from above scarcely more narrowly rounded posteriorly (Fig. 151) than anteriorly; dorsal rim of male hypopygium (Fig. 160) without carinæ, broadly basin-like, the anterior margin medianly (usually) excepted. **atra** Amyot and Serville.
5. Branches of exocorial vein subparallel (Fig. 53); scutellum as viewed from side more abruptly declivate apically (Fig. 150); dorsal rim of male hypopygium basin-like, more extensively excavated interiorly. 6
Branches of exocorial vein noticeably divergent (Fig. 54); scutellum as viewed from side usually rounded apically (Fig. 149); male hypopygium without fringe of hairs, dorsally with broad and flat rim all around, less extensively excavated interiorly. **ovalis** Hussey.
6. Hind border of hypopygium as seen from below shallowly concave for most of its width (Fig. 154), dorsal rim narrow and abruptly declivate anteriorly, with unusually long hairs (when unrubbed) forming a conspicuous posterior fringe; sixth sternite of female nearly twice as long as genital plates. **aterrima** Malloch.
Hind border of hypopygium abruptly concave at middle; dorsal rim broad and flat anteriorly, lacking long hairs. **hesperia** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Bracket 1'' of key:

ovalis, aterrima, hesperia.

Bracket 1' of key:

monostira, atra, carinata, denudata.86. *Galgupha* (*Galgupha*) **aterrima** Malloch.

Galgupha aterrima Malloch, J. R., in Hart: C. A., Pentatomoidea of Illinois, Bul. Ill. Nat. Hist. Survey, XIII, Art. 7, June 1919 [Illinois, Maryland]

Black, shining, sometimes with æneous reflections; tarsi, beak, and antennæ testaceous.

Head produced somewhat more than length of eye beyond anterior transocular line, front margin truncate medially, nearly straight, or slightly sinuate between truncation and eye; vertex numerous and distinctly punctate, except on occipital strip; pronotum smooth on humeral prominences and posterior declivity, coarsely punctate antero-laterally, moderately punctate in transverse impression and lightly punctate elsewhere; scutellum (outline from side Fig. 150) numerous punctate, the punctures deepest in antero-lateral angles, shallowest on anterior disk; corium as in Fig. 53, mesocorium and veins punctate; sternites numerous punctate, smoother medially, sixth of male angulate anteriorly, fifth distinctly constricted medially, fourth and third less so; ventral exposure of hypopygium short, punctate, transversely channeled, hind margin concave almost from side to side (Fig. 154); dorsal rim more than twice as broad at lateral angles as anteriorly, moderately sloping within former, abruptly declivate at the latter position; sixth sternite of female, in general, narrowly rounded anteriorly, but more irregular than in any other species of the subfamily we have examined, varying from rounded to angulate medially, and being variously sinuate laterally. Genital plates distinctly punctate, somewhat more than half as long as sixth sternite, about as long as postventer, inner margins short, two-thirds as long as posterior, the latter slightly oblique and concave. Length 4-5 mm.

Specimens are at hand from Canada, Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Maryland, South Carolina, Alabama, Mississippi, Louisiana, Oklahoma, Missouri, Illinois, Wisconsin, and Michigan.

Through the kindness of Dr. T. H. Frison we have been able to re-examine the holotype from Illinois.

87. *Galgupha (Galgupha) atra* Amyot and Serville.

Galgupha atra Amyot, C. J. B., and Serville, A., Hist. Nat. Ins. Hemip., 1843, p. 68 [Mexico; North America].

In a group of species so uniform in appearance as those of the subgenus *Galgupha*, there is little to be gained by giving a detailed description of each. In contrast to *aterrima*, *atra* is distinguished otherwise than as noted in key, by the head being produced less than length of eye beyond anterior transocular line; by the puncturing being even less evident than in that species on the discal portions of pronotum and scutellum, by its larger size on the average; and slightly more oblong outline (Fig. 151). The branches of the exocorial vein are not so nearly parallel (Fig. 52). Fore tibia as in Fig. 158.

Sixth sternite of male bluntly subangulate anteriorly, preceding

sternites scarcely constricted medially; ventral exposure of hypopygium, large, punctate, slightly transversely channeled; hind margin convex (Fig. 155); dorsal rim (Fig. 160) broadest laterally with an abrupt, transversely oblong basin, hind wall steeply declivate; sixth sternite of female rounded anteriorly, preceding sternites scarcely constricted medially; genital plates punctate, more than half as long as sixth sternite, about as long as postventer, inner margins three-fourths as long as posterior, the latter oblique and concave. Length 4.5-6 mm.

A specimen in the Signoret Collection (Vienna Museum) labelled "typus col. Serv., Amerika" in the absence of one of equal claims labelled Mexico, must be regarded as the type. Fortunately it appears to represent the species that has commonly been identified as *atra*. Specimens from the following political divisions have been examined: Mexico; Texas; Louisiana; Alabama; Florida; Georgia; North Carolina; Virginia; District of Columbia; Maryland; Pennsylvania; New York; Connecticut; Rhode Island; Massachusetts; Vermont; New Hampshire; Tennessee; Missouri; Iowa; Illinois; Wisconsin; Michigan; Ohio; Ontario; Kansas; South Dakota; Arizona; Colorado; Montana; and Washington.

88. *Galgupha (Galgupha) carinata* sp. nov.

Referring back to the description of *aterrima* again, all that needs to be noted of *carinata* besides the points mentioned in the key is that, as in *atra*, the puncturing is less evident on disk or pronotum and scutellum; the head is produced less than length of eye beyond anterior transocular line, and the front margin varies from truncate medially and slightly sinuate laterally to almost evenly rounded; as in *atra* the average size is considerably larger than in *aterrima*. The branches of the exocorial vein are not so nearly parallel. Posterior outline of scutellum as in Fig. 152.

The sternites have scattered coarse punctures laterally and are nearly smooth medially; the sixth of male is rounded subangulate anteriorly, and is about as long as the preceding three together, each of which is slightly constricted medially and has at the middle of anterior margin a rounded subangulation similar to that of the sixth; ventral exposure of male hypopygium large, punctate, slightly transversely channeled, hind margin slightly concave medially, convex laterally (Fig. 156); dorsal rim of about uniform width from lateral angles anteriorly, depressed in middle anteriorly, with a conspicuous curved elevation on each side between anterior depression and lateral

angles (Fig. 161); hind wall thin, steeply declivate; central basin large, abrupt, and trapezoidal in shape; internal genitalia of male as in Figs. 21-22; sixth sternite of female rounded anteriorly about as long as the preceding two sternites together, each of which is moderately constricted medially; genital plates of female, punctate, two-thirds as long as sixth sternite, slightly longer than postventer; inner margins nearly as long as posterior, the latter slightly concave and strongly oblique. Length 4.5-6 mm.

Holotype male and *allotype* female, Louisiana, Baker Collection (U. S. N. M.); paratypes with the same data and also the following:

TEXAS: Galveston Island, Uhler Collection; Brownsville, H. F. Wickham; Victoria, April 16, 1907, W. A. Hooker; March 24, 1913, July 15, 1907, July 16, 1911, J. D. Mitchell; April 16, 1908, May 16, 1907, C. E. Hood; June 22, 1906, W. E. Hinds; Beeville, June 5, 1906, C. R. Jones; Nov. 6, E. A. Schwarz; Gainesville, Jan. 12, 1922, in hibernation 5 Sept. 1923 on oats, E. E. Russell; Dallas, May 5, 11, 1906, on *Sitilia grandiflora*, W. D. Pierce; May 16, 1907, C. E. Hood; May 7, 1908, May 19, 1911, E. S. Tucker; April 24, 1908, on *Lepidium*, C. R. Jones and C. E. Hood; Cuero, April 25, 1907, R. A. Cushman; Goliad Co., July 22, 1915, on *Amphiachyris dracunculoides*, J. D. Mitchell; Paris, March 14, 1904, C. T. Brues; Corpus Christi, March 18, 1908, C. R. Jones and F. H. Pratt (U. S. N. M.); Dallas, Bollman; Galveston Island (M. C. Z.).

OKLAHOMA: Kingfisher, Oct. 7, 1907 (U. S. N. M.).

LOUISIANA: Opelousas, G. R. Pilate (U. S. N. M.); Tallulah, June 9-July 4, E. R. Kalmbach (Biol. Survey); Keatchie, June 14, 1905 (U. S. N. M.); Baker Collection (Acad. Nat. Sci. Phila.).

MISSISSIPPI: Natchez, May 29, 1909, E. S. Tucker (U. S. N. M.).

ALABAMA: Barachias, June 17, 1924, E. G. Holt (McAtee).

GEORGIA: Uhler Collection (U. S. N. M.).

VIRGINIA: Mt. Vernon, June 19, 1906, D. H. Clemons (U. S. N. M.).

MARYLAND: Plum Point, June 20, 1914, W. L. McAtee (McAtee); Lakeland, June 25, 1906, D. H. Clemons; near Plummers Island, June 29, 1913, R. C. Shannon; Marlboro, May 13, H. S. Barber (U. S. N. M.).

TENNESSEE: Knoxville, April 19, 1889, June 6, 8, 1890, H. E. Summers (Iowa State College).

The outline of abdomen, as seen from above, is noticeably more narrowed posteriorly than in *atra*, and in occasional specimens is subangulate as in *denudata*.

89 *Galgupha (Galgupha) denudata* Uhler.

C[orimelæna] denudata Uhler, P. R., Proc. Ent. Soc. Phila., II, p. 157, Sept. 1863 [Louisiana].

This species agrees with *atra* and *carinata* in being less decidedly punctate above; in fact it is the most polished of the three, the punctures on vertex being quite shallow, and much larger areas on disk of pronotum and scutellum, being only faintly punctate. The head is produced about length of eye beyond anterior transocular line, and the front margin varies from truncate anteriorly and slightly sinuate laterally to nearly evenly rounded. The declivity of scutellum usually is faintly transversely wrinkled, but the scabrous area near tip, mentioned in original description, is not a constant character. Posterior outline of scutellum as in Fig. 153.

Venter numerously punctate laterally, smoother medially; sixth sternite of male subangulate anteriorly, preceding sternites but little constricted medially; ventral exposure of male hypopygium small, punctate, slightly channeled transversely, hind margin almost evenly low convex (sometimes slightly concave medially); dorsal rim broad and of about even moderate slope from lateral angles anteriorly, a little more depressed across each lateral angle and middle of anterior rim, hind wall narrow and more steeply declivate; internal genitalia of male as in Fig. 23; sixth sternite of female rounded subangulate anteriorly, longer than the preceding two sternites, but shorter than the preceding three sternites together, all of which are only slightly constricted medially; genital plates punctate, less than half as long as sixth sternite, about as long as postventer; inner margins decidedly shorter than posterior, the latter somewhat concave, but about transverse in position, inner posterior angles briefly but abruptly produced. Length 4-5.5 mm.

Holotype male, Louisiana, Uhler Collection (U. S. N. M.) and other specimens from Mexico (Orizaba), Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, Virginia, and the District of Columbia.

90. *Galgupha (Galgupha) hesperia* sp. nov.

Very much like *aterrima*, differing chiefly in genitalic characters. Head of female more broadly rounded; scutellum more abruptly declivate posteriorly than in *aterrima*; sixth sternite of male more rounded anteriorly; dorsal rim of hypopygium of about equal width and only moderately sloping from lateral angles anteriorly; hind wall narrower, more steeply declivate. Sixth sternite of female broadly rounded anteriorly, with traces of a median and two sublateral angulations, sternites five and four moderately constricted medially; genital plates, punctate, two-thirds as long as sixth sternite, longer than

postventer, inner margins nearly as long as posterior, the latter nearly straight, but moderately oblique in position. Length 4.5-5.5 mm.

Holotype male, Eureka, Calif., June 7, H. S. Barber; *allotype* female, California, Uhler Collection (U. S. N. M.); *paratype* female, California (A. M. N. H.).

91. *Galgupha (Galgupha) monostira* Horvath.

Galgupha monostira Horvath, G. Ann. Mus. Nat. Hung., XVII, 1919, p. 216 [Mexico].

Vertex slightly truncate medially, copiously punctate, except on occiput; pronotum copiously punctate, the punctures coarser laterally, finer discally, and tending to be rastrate on posterior half; scutellum copiously punctate, the punctures rastrate-confluent in sublateral slightly depressed areas, posterior declivity with a few transverse wrinkles; sternites moderately punctate, sixth broadly rounded anteriorly; genital plates distinctly punctate, about a third longer than subgenital plates. Length 4.25 mm.

Holotype female, Mexico (Budapest Museum).

92. *Galgupha (Galgupha) ovalis* Hussey.

Galgupha ovalis Hussey, R. F. Journ. N. Y. Ent. Soc., XXXIII, pp. 62-63, June 1925 [Georgia].

A species agreeing with *aterrima* in having perceptible puncturing on discal portions of pronotum and scutellum; head produced not more than length of eye beyond anterior transocular line, front margin more or less truncate medially and sinuate laterally; contrasts with *aterrima* as noted in key. Outline of scutellum as in Fig. 149; corium as in Fig. 54; fore tibia as in Fig. 159.

Sternites coarsely punctate laterally, nearly smooth on a broad median strip in male and on a much narrower one in female; sixth sternite rounded anteriorly in both sexes, preceding sternites but little constricted medially; sixth sternite of male nearly as long as the preceding three together, tumid posteriorly; ventral exposure of hypopygium only lightly punctate, slightly transversely channeled, its width between lateral angles noticeably less than in related species, sometimes not exceeding length of lateral margin of sixth sternite; hind margin reflexed, convex in outline as viewed from below, sometimes slightly concave medially (Fig. 157); dorsal rim as described in key, interior basin transversely elliptical; sixth sternite of female scarcely equal in length to the preceding two sternites together, genital plates punctate, about half as long as sixth sternite and about equal to postventer, inner margins about two-thirds as long as posterior, the latter slightly concave. Length 4-6 mm.

Paratype males, Macon, Ga., April 6, 1923, T. H. Hubbell (Hussey

Collection); and other specimens from Guatemala, Mexico, Texas, Louisiana, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia, District of Columbia, Maryland, Pennsylvania, Delaware, New Jersey, New York, Massachusetts, Oklahoma, Missouri, Iowa, Kentucky, Indiana, Kansas, Nebraska, Colorado, Arizona, New Mexico, Wyoming, and Montana.

There is a considerable range in size in the material examined and some variation in outline, and in the proportions of the antennal segments, but not to the extent or constancy that we consider worth recognizing nomenclatorially. Hussey evidently thought there were two forms in this group, which is that most frequently identified as *nitiduloides* Wolff, but we apply the new name he proposed to the whole complex without further subdivision. Wolff's species, upon examination of the type proves to be a *Nothocoris* (See p. 305).

Subgenus MICROCOMPSUS Horvath.

Microcompsus Horvath, G. Ann. Mus. Nat. Hung., XVII, 1919, p. 224 [type species, *Tetyra daldorfii* Fabricius].

Principal characters: Corium (Fig. 55) rounded apically, exocorial vein distinctly furcate, the branches connate posteriorly, mesocorium without veins; lateral area of metapleurum more or less punctate bordering ostiolar surface; hind tibia with longitudinal carinate line; vertex produced twice, or more than twice, length of eye beyond anterior transocular line, coarsely punctate; coloration "coccinelloid" (Figs. 162, 166). Subgenotype *Galgupha (Microcompsus) daldorfii* Fabricius.

KEY TO THE SPECIES.

1. Ventral exposure of male hypopygium distinctly more than half as long as sixth sternite, almost straight in profile (Fig. 163), posterior margin subtruncate medially (Fig. 168); genital plates of female half as long as sixth sternite, with sparse, small punctures. *daldorfii* Fabricius.
- Ventral exposure of male hypopygium distinctly less than half as long as sixth sternite, noticeably concave in profile (Fig. 164), posterior margin shallowly emarginate medially (Fig. 167); genital plates of female about one-third as long as sixth sternite, coarsely punctate. *vinculata* Germar.

Systematic arrangement of the species the reverse of that in key.

KEY TO THE COLOR-VARIETIES.

1. With a submarginal pale vitta each side of pronotum (Fig. 162).
var. *fabricii* var. nov.
- Without such vittæ. var. *daldorfii* Fabricius.

93. *Galgupha (Microcompsus) daldorfii* Fabricius.

T[etyra] daldorfii Fabricius, J. C., *Systema Rhyngotorum*, 1803, p. 144 (*Amer. merid.*).

93a. *Galgupha (Microcompsus) daldorfii* var. *daldorfii* Fabricius.

Bibliographical reference as under specific name.

Like the following fully described new variety, except as noted in key to color-varieties, corium as in Fig. 55; apex of venter from side as in Fig. 163.

Holotype without abdomen, labelled "Schmidt, Mus. de Sebestedt" (Copenhagen Museum).

93b. *Galgupha (Microcompsus) daldorfii* var. *fabricii* var. nov.

Castaneous to black, a narrow vitta just within lateral carina of pronotum, a trilobate mark across posterior third of this sclerite, the lateral extremities of which rest on the humeral prominences; three large spots on posterior half of scutellum (Fig. 162), apical margin of this sclerite, corium with the exception of a subapical dark vitta and transverse shading, and spots on margins of sternites three to six, yellowish to reddish; beak and antennæ chiefly testaceous; legs castaneous, tibiæ with a narrow, longitudinal, yellowish stripe posteriorly, tarsi yellowish. In females the ultimate segment is largely yellowish, and there is a touch of yellow on the genital plates laterally, and on the subgenital plates posteriorly.

Head triangularly produced, narrowly rounded apically, tylus a little upturned, vertex coarsely punctate, except in middle posteriorly, where the punctures are sparse and subobsolete, tylus transversely wrinkled; pronotum coarsely and more or less rastrate sublaterally and about extremities of transverse impression; submarginal vittæ and discal regions, especially where pale colored, inconspicuously punctate; scutellum numerously punctate, finely so on anterior disk and on pale markings, more coarsely and often rastrately so, elsewhere; mesocorium and veins punctate; lateral area of metapleurum broad anteriorly; venter coarsely punctate laterally, more finely and sparsely so medially; sixth sternite of male angulate anteriorly as long as the preceding sternites together, all of which are constricted medially, fifth and fourth conspicuously so; ventral exposure of hypopygium, large, sparsely punctate, concentrically wrinkled basally, hind margin subtruncate medially; dorsal rim narrow and slightly, roundly-elevated anteriorly, between this rim and central declivity there is a narrow finely-haired terrace; lateral angles flat, smooth and broad; hind margin thin, abruptly declivate (Fig. 168); sixth sternite of female rounded, subangulate anteriorly, as long as the preceding three sternites together, each of which is noticeably constricted medi-

ally; genital plates about equal in length to postventer, posterior margins almost transverse, meeting inner, in 90° angles. Length 3.25-3.75 mm.

Holotype male, Chapada, Brazil, April; *allotype* female same locality, October; *paratypes* same locality, July, October (Carnegie Museum); April (A. M. N. H.); female, Taquara, Brazil, October (Carnegie Museum).

94. *Galgupha (Microcompsus) vinculata* Germar.

O[dontoscelis] vinculatus Germar, E. F., Zeitschr. f. Ent., I, 1839, p. 42 [Cayenne].

General habitus as in Fig. 165; apex of venter from the side, as in Fig. 164.

KEY TO THE COLOR-VARIETIES.

1. Hind margin of pronotum pale.....2
Pronotum entirely dark.....4
2. Pronotum with submarginal pale vittæ; peripheral band of scutellum more or less infuscated, spots near apex rarely isolated and distinct.
var. *insularis* var. nov.
Pronotum lacking submarginal pale vittæ.....3
3. Peripheral band of scutellum pale, with the apical pair of dark spots usually isolated and distinct..... var. *pictula* Walker.
Peripheral band of scutellum infuscated, posterior margin and three subdiscal more or less connected spots, pale..... var. *surinamensis* var. nov.
4. Peripheral band of scutellum more or less infuscated, spots near apex rarely isolated and distinct..... var. *vinculata* Germar.
Peripheral band of scutellum pale, with the apical pair of dark spots isolated and distinct (Fig. 166)..... var. *scymnoides* Jensen-Haarup.

94a. *Galgupha (Microcompsus) vinculata* var. *vinculata* Germar.

Bibliographic reference same as for the species.

Black, shining, the corium, except for a marginal subapical blotch of ground-color, a broad peripheral band more or less obscured by the ground color on scutellum, lateral spots on fifth and sixth sternites, ultimate tergite, and a spot on each subgenital plate of female, yellowish to reddish; antennæ and beak testaceous to fuscous, legs castaneous, tarsi testaceous.

Head triangularly produced, truncate apically; puncturing of dorsal surface throughout as in *daldorfii*, but finer, the central anterior portion of scutellum almost impunctate; sternites with coarse, shallow punctures laterally, smoother medially; sixth sternite of male angulate anteriorly, as long as the preceding sternites together, fifth distinctly, others moderately, constricted medially; ventral exposure of hypopygium obscurely punctate; dorsal rim much as in *daldorfii*, the

polished ring-like anterior portion narrower (Fig. 167); sixth sternite of female subangulate anteriorly, longer than the preceding two, but scarcely as long as the preceding three sternites together, all of which are somewhat constricted medially; genital plates shorter than posterior, posterior margin slightly concave, and a little anteriorly oblique in position. Length 3.5-4 mm.

Merida, Venezuela, S. Briceno (U. S. N. M.); Llanos, Venezuela, F. Geay (Paris Museum); Venezuela (Stettin Museum); Colombia, Rolle (Berlin Museum); Cayenne, French Guiana, 1902, F. Geay; 1914, R. Benoist; Boura, French Guiana, March, A. Bonhoure (Paris Museum); Cayenne, Pillault (Vienna Museum); Coroica, Bolivia; French Guiana; St. Laurent, Guiana; Cauca, Colombia, H. Taeuber (Munich Museum).

94b. **Galgupha (Microcompsus) vinculata** var. **insularis** var. nov.

Similar to the typical variety, except as pointed out in key; intergrades with var. *pictula*. Length 3.25-3.75 mm.

Holotype male, *allotype* female, and *paratypes*, Aripo Savana, Trinidad, Oct. 26, 1918, Harold Morrison; paratypes: Caroni River, October 12; Caranage, Oct. 14; D'Abadie, Oct. 15; River Estate, Oct. 16; Savana St. Clair, Oct. 24, all in Trinidad, 1918, Harold Morrison (U. S. N. M.); La Cruz Ruviera, Guarico, Venezuela, 1925, M. Grisol; Sarare, Venezuela, 1899; Llanos, Venezuela, F. Geay, (Paris Museum).

94c. **Galgupha (Microcompsus) vinculata** var. **pictula** Walker.

Corimelaena pictula Walker, Francis, Catalogue, 1, 1867, pp. 80-81 [Brazil].

Like the typical variety, except as described in key. Length 3.25-3.75 mm.

Holotype male, Rio Janeiro (British Museum); other specimens seen are from Bahia, Brazil, J. D. Haseman; Rio de Janeiro (Carnegie Museum); Bahia, Uhler Collection (U. S. N. M.); Brazil, Pippinsk. (Helsingfors Museum); La Cruz, Ruviera, Guarico, Venezuela, 1925, M. Grisol; Llanos, Venezuela, F. Geay; Rio de Janeiro; I. Taituba, Amazonas, Brazil, Noualhier, 1898 (Paris Museum).

94d. **Galgupha (Microcompsus) vinculata** var. **scymnoides**

Jensen-Haarup.

Galgupha scymnoides Jensen-Haarup, A. C., Ent. Meddel., XVI, 1926, pp. 46-47 [Brazil].

Parallels the typical variety, but distinguishable as noted in key. Color pattern of dorsum as indicated in Fig. 166. Length 3.25-4 mm.

Holotype male, Bahia, Brazil, Kjellerup, *paratype* male, Lagoa Santa, Brazil, Reinhardt (Copenhagen Museum); other specimens from Merida, Venezuela, S. Briceno; Manaos, Brazil, H. B. Merrill; Huachi, Rio Beni, Bolivia, September, W. M. Mann (U. S. N. M.); Chapada, and Corumba, Brazil; Bonda, Colombia (Carnegie Museum); Chapada, Brazil (American Museum); Bolivia (Argentine Museum; Stettin Museum); Chaco de Santa Fe, 1904, E. R. Wagner; Brazil, 1840, Barreto; Boura, French Guiana, March 1909, A. Bonhoure; Cayenne, French Guiana, September, 1914, R. Benoist; Montagnes des Orgues, Tijuca, Brazil, 1902, E. R. Wagner; Paraguay, 1900, Gosset; French Guiana, 1898, Noualhier (Paris Museum); Rio de Janeiro, Brazil, January 1924, F. X. Williams (Van Zwaluwenberg); Caracas (Helsingfors Museum); Cordilleras of Colombia, T. Wieme; San Bernardino, Paraguay, K. Fiebrig (Berlin Museum); Colombia, Rolle; Province del Sara, Bolivia, Steinbach (Stettin Museum); San Antonio, Zuviria, Argentina; Centurion, Paraguay, Reimoser; Minas Geraes, Brazil, 1897, Fruhstorfer; San Bernardino, Paraguay, Fiebrig (Vienna Museum); Coroico, Bolivia (H. G. Barber).

94e. ***Galgupha (Microcompsus) vinculata* var. *surinamensis* var. nov.**

Distinguished as noted in key. Length 3-4 mm.

Holotype male and *allotype* female, Paramaribo, Surinam, C. Heller (Hamburg Museum); St. Laurent, Guiana, H. Taeuber (Munich Museum).

Subgenus **NOTHOCORIS** McAtee and Malloch.

Nothocoris McAtee, W. L. and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1928, pp. 40-41 [type species *Odontoscelis brunnipennis* Germar].

Principal characters: Corium pointed apically (Figs. 53-54), exocorial vein distinctly furcate, the branches connate apically; lateral area of metapleurum punctate interiorly; hind tibia with a longitudinal carinate line (Fig. 173); coloration in most species not "coccinelloid." Subgenotype *Galgupha (Nothocoris) brunnipennis* Germar.

This subgenus contains several groups with quite different color characters and within each the species are frequently very difficult to distinguish from each other. The common species *nitiduloides* Wolff is either very variable or else the forms herein accepted as subspecies are extremely closely related species, a question which may well be

left to subsequent investigators with opportunity for studying the forms in life.

KEY TO THE SPECIES.

1. Vertex produced two or more times length of eye beyond anterior transocular line, coarsely punctate; corium chiefly stramineous; scutellum more or less pale-margined posteriorly; some of the sternites with pale lateral spots. 2
 Vertex neither so much produced nor so coarsely punctate; corium seldom chiefly stramineous; scutellum usually entirely dark, in one species chiefly reddish; sternites in most species without pale lateral spots. 12
2. Males. 3
 Females. 8
3. Scutellum with a widely separated pair of pale yellow spots on the disk and a larger subtriangular mark of same color on each side beyond apex of corium; ventral exposure of hypopygium longer than fourth and fifth sternites together, hind margin slightly reflexed and almost evenly low convex.

oculata sp. nov.

 Scutellum without pale discal spots and with or without pale apical marking. . . 4
4. Sixth abdominal sternite not, or very little, longer than the three preceding segments combined at center. 5
 Sixth abdominal sternite decidedly longer than the three preceding segments combined at center. 6
5. Vertex in front of the anterior transocular line three times as long as eye; the scutellum with but faint indications of the yellow peripheral marking, only a trace of it beyond level of apex of corium. . . *microphthalma* sp. nov.
 Vertex in front of the anterior transocular line hardly more than twice as long as eye; the yellow peripheral marking of scutellum complete, at least as wide at anterior extremity, near apex of corium, as corium at its base, more narrowed apically. *semilimbata* Horvath.
6. Vertex in front of anterior transocular line three times as long as eye; hypopygium with the margin slightly convex. *stramineipennis* sp. nov.
 Vertex in front of anterior transocular line less than three times as long as eye; hypopygium with the margin slightly concave centrally. 7
7. Ventral exposure of hypopygium almost straight in profile. *marginalis* sp. nov.
 Ventral exposure of hypopygium concave in profile. *caracasana* sp. nov.
8. Scutellum with a widely separated pair of pale yellow spots on the disk and a larger subtriangular mark of the same color on each side beyond apex of corium. *oculata* sp. nov.
 Scutellum without pale yellow discal marks, usually with yellow marks from beyond apex of corium around the apical periphery. 9
9. Length of genital plates on inner margin as great as that of fourth and fifth sternites combined at center, their posterior margins sinuate; scutellum with a very narrow, almost linear, pale yellow margin; sixth sternite at middle as long as the preceding three sternites combined. *inornata* sp. nov.

- Length of genital plates distinctly less on inner margin than that of fourth and fifth sternites combined at same point, their posterior margins straight or almost so; scutellum with a distinct yellow apical marginal border which is rather broad just beyond the apices of the coria. 10
10. Sixth abdominal sternite evenly and broadly rounded in front; pale peripheral marking of scutellum at its widest point not as wide as widest portion of corium. *grenadensis* sp. nov.
- Sixth abdominal sternite angulate in center of anterior margin; pale peripheral marking of scutellum at least as wide as widest portion of corium. 11
11. Widest part of the pale peripheral marking of scutellum wider than the widest part of corium. *semilimbata* Horvath
- Widest part of the pale peripheral marking of scutellum about as wide as the widest part of corium. *caracasana* sp. nov.
12. Pronotum with yellowish laterally submarginal impunctate vittæ.
marginicollis Horvath.
 Pronotum without such vittæ. 13
13. Scutellum vermilion red, with a black basal fascia which is extended backward as a moderately broad central vitta to, or a little beyond, middle, and at or beyond the apex of the fascia and on each side of it large black spots (Fig. 177); corium vermilion-red, narrowly blackish along the inner margin of the exposed portion on apical half. *coccinelloides* Horvath.
- Scutellum black, rarely slightly paler on the periphery apically. 14
14. Corium with a large orange or yellow mark at base, which covers all of the area to apex of clavus, except the clavus itself. 15
- Corium either entirely black or mostly reddish, sometimes merely reddish at base, never with a large basal pale mark as described above. 19
15. Corium æneous-black, with a basal and an apical pale yellow mark; lateral area of metapleurum much narrowed anteriorly. *terminalis* Walker.
- Corium pale yellow or orange-yellow at base only, the entire apex dark. . . 16
16. Petiole of exocorial vein shallower than usual in the subgenus (vein represented by a series of punctures). 17
- Petiole of exocorial vein deeply impressed. 18
17. Pale spot about one-half length of corium. *surda* sp. nov.
- Pale spot distinctly less than one-half length of corium. *repetita* sp. nov.
18. Hypopygium of male seen from below with a broad shallow central emargination of the posterior edge, the disk of exposed area elevated and impunctate on each side (Fig. 169); lateral area of metapleurum much narrowed anteriorly. *chrostowskii* McAtee and Malloch.
- Hypopygium of male seen from below without a distinct central emargination of the upper rim, the entire extent of exposed area quite deeply punctate and without noticeable lateral elevated areas; subgenital plates of female with four or five rather short stout bristles instead of but one hair-like bristle; lateral areas of metapleurum broader than usual.
chilocoroides sp. nov.

19. Corium brick-red, usually with a narrow fuscous suffusion along the inner margin on apical half, rarely more extensively infuscated, and, if mostly dark, the reflexed costal margin is always brick-red below.

brunnipennis Germar.

Corium black or fuscous, rarely with a brownish tinge at base of costa, but never conspicuously brick-red.....20

20. Females.....21
Males.....29

21. Genital plates on inner margins not longer, sometimes distinctly shorter, than fifth sternite at center.....22

Genital plates on inner margins distinctly longer than fifth sternite in center. 23

22. Prosternal sulcus not attaining anterior edge of fore coxal cavity, V-shaped, quite shallow posteriorly; anterior margin of sixth abdominal sternite moderately broadly rounded centrally and without a distinct arcuation on each side midway between center and lateral extremity of suture.

brevis sp. nov.

Prosternal sulcus nearly, or quite, attaining anterior extremity of fore coxal cavity, almost parallel-sided, and much deeper, the lateral ridges carried well up to posterior extremity of sulcus; anterior margin of sixth abdominal sternite angulate in center and usually with a distinct arcuation or subangulation on each side about midway between center and lateral extremity.....**nitiduloides** Wolff.

23. Genital plates not over one and a half as long as fifth abdominal sternite at center.....24

Genital plates distinctly over one and a half as long as fifth abdominal sternite at center.....27

24. Genital plates less than one and a half as long as fifth sternite, and not half as long as sixth at center, the latter narrowly rounded or subangulate in center of anterior margin; scutellum alutaceous on entire surface, appearing satiny, the punctures small and deep, and the apex rather densely rastrate; vertex rather sparsely and shallowly punctate.....**alutacea** sp. nov.

Genital plates almost or quite one and a half as long as fifth sternite and over half as long as sixth at middle, the latter broadly and evenly rounded on anterior margin; scutellum not alutaceous; vertex with deep contiguous punctures.....26

25. Length 4 mm. or more; scutellum dull, crowded punctate, more or less rugose and rastrate peripherally; mesocorium punctate posteriorly.

anomala sp. nov.

Length 3.5 mm.; scutellum polished, only moderately punctate; mesocorium impunctate posteriorly.....**eas** sp. nov.

26. Genital plates two-thirds or more than two-thirds as long as sixth sternite, the latter narrowly rounded or subangulate anteriorly.....27

Genital plates one-half or a little more than one-half as long as sixth sternite, the latter more broadly rounded anteriorly.....28

27. Length 5 mm.; sixth sternite distinctly longer than the fourth and fifth together on median line..... **juno** sp. nov.
 Length 3.5 mm.; sixth sternite but little longer than the fourth and fifth together on median line..... **fossula** sp. nov.
28. Sixth sternite very broadly rounded in center of anterior margin; fourth and fifth sternites of about the same width medially for an appreciable proportion of their extent..... **akarna** sp. nov.
 Sixth sternite moderately broadly rounded in center of anterior margin; fourth and fifth sternites most constricted at middle, not of nearly uniform width over a median moiety..... **boliviana** sp. nov.
29. Small species, 3.5 mm. in length..... **parvula** Horvath.
 Larger species, 4 mm. or over in length..... 30
30. Vertex with rather large deep punctures, which are contiguous on anterior half or more, and there give it the appearance of being reticulate; hypopygium with or without a slight central emargination of the hind margin.
nitiduloides Wolff.
 Vertex with smaller, shallower, and more widely separated punctures which are not contiguous anteriorly..... 31
31. Hypopygium low convex on hind margin; scutellum microscopically alutaceous, appearing satiny under a lens..... **alutacea** sp. nov.
 Hypopygium more or less concave on the hind margin; scutellum not so noticeably alutaceous, more distinctly shining..... 32
32. Dorsal rim of hypopygium with a raised line on outer portion of anterior rim (Fig. 172), declivate interiorly..... **boliviana** sp. nov.
 Dorsal rim of hypopygium nearly flat anteriorly..... **akarna** sp. nov.

SYSTEMATIC ARRANGEMENT OF SPECIES.

Head produced less than twice the length of eye beyond anterior transocular line.

Prosternal sulcus reaching fore coxæ.

Prosternal sulcus deep posteriorly:

nitiduloides, eas, anomala.

Prosternal sulcus shallow posteriorly.

Corium pale or with pale marking:

terminalis, chrostowskii, chilocoroides, repetita, surda.

Corium entirely or almost entirely dark:

boliviana, akarna, juno, fossula, alutacea, parvula.

Prosternal sulcus not definitely reaching fore coxæ.

coccinelloides, marginicollis, brunnipennis, brevis.

Head produced at least twice the length of eye beyond anterior transocular line.

oculata, semilimbata, marginalis, caracasana, grenadensis, stramineipennis, microphthalma, inornata.

95. *Galgupha* (*Nothocoris*) *akarna* sp. nov.

Black, sometimes with æneous reflections, more shining than in *alutacea*; tarsi, beak, and antennæ, testaceous; beak apically, apical two segments, sometimes all of the antennæ more or less infuscated.

Form more decidedly narrowed posteriorly than in related species; head produced about length of eye beyond anterior transocular line, front margin truncate medially, slightly sinuate between truncation and eye; vertex depressed subapically, closely and somewhat rastrate-punctate and alutaceous, except on tylus posteriorly and occipital strip; pronotum nearly impunctate on anterior disk, with numerous deep round punctures antero-laterally, and with more or less rastrate punctures in transverse impression, especially the extremities, becoming finer or obsolete posteriorly; scutellum alutaceous, copiously punctate, except on anterior disk, which is nearly smooth, punctures nearly round in antero-lateral angles, more or less rastrate elsewhere, most decidedly so on posterior declivity; mesocorium and veins punctate; sternites moderately punctate laterally, smoother, even polished medially; sixth sternite of male subangulate anteriorly, nearly as long as all of the preceding sternites together, all of which are moderately constricted medially; ventral exposure of hypopygium, punctate, transversely channeled, hind margin distinctly reflexed, low concave medially, low convex laterally, dorsal rim punctate, broadest laterally, nearly flat anteriorly, moderately sloping laterally; sixth sternite of female about as long as preceding three sternites together, each of which is distinctly constricted medially; genital plates sparsely punctate, half as long as sixth sternite, equal in length to postventer, one and one-half times as broad as long, the inner margins somewhat elevated, the inner angles slightly produced, the posterior margin nearly straight. Length 3.8-4.2 mm.

Holotype male, Argentina, K. Schuel, 1910 (Vienna Museum); *allotype* female, Province of Salta, Argentina, August 1, 1897, S. Venturi (labelled *Thyreocoris pampeanus* Berg) (Argentine Museum); *paratypes*: Argentine, Jensen-Haarup (Helsingfors Museum); Sierra de Cordoba, Capello del Monte, 2000 m., 1888, J. Frenzel (Berlin Museum); same locality, Hosseus (Munich Museum).

96. *Galgupha* (*Nothocoris*) *alutacea* sp. nov.

Dull black; tarsi, antennæ, and beak testaceous. Head produced more than length of eye beyond anterior transocular line, rounded anteriorly, truncate or submarginate medially; vertex with subobsolete punctures, least marked posteriorly; pronotum with coarse punctures laterally, and no more than slight traces discally; scutellum punctate or rastrate everywhere, except on anterior disk, the sculpturing of posterior declivity decidedly rastrate, obliterating puncturing; hind tibia as in Fig. 173; sternites copiously punctate, somewhat

smoother medially; sixth in male angulate anteriorly, fifth and fourth however, only slightly shortened; ventral exposure of hypopygium punctate, posterior margin slightly reflexed, low convex (almost straight) in outline as viewed from below; dorsal rim fairly broad anteriorly twice as broad at lateral angles, almost flat, punctate, central depression of only moderate size, posterior wall thin at top, moderately sloping within; sixth sternite of female subangulate anteriorly, fifth and fourth slightly constricted medially; genital plates punctate, about twice as broad as long, posterior margin transverse in position and slightly concave, plates less than half as long as sixth sternite, equal to postventer. Length 4.25-5 mm.

Holotype male and *allotype* female, Chapada, Brazil, May; *paratypes* same locality, May, June (Carnegie Museum; American Museum of Natural History).

97. *Galgupha (Nothocoris) anomala* sp. nov.

Castaneous to black, paler on posterior half of pronotum and peripherally; tarsi, beak, and antennæ, stramineous. One paratype is chiefly ochreous; and probably is not fully colored.

Head produced about length of eye beyond anterior transocular line, vertex distinctly reflex-margined, subtruncate medially, slightly sinuate antero-laterally, contiguously deep punctate, except postero-medially, where the punctures are sparse and shallower; pronotum copiously punctate everywhere, except callosities, lateral punctures coarse and subcontiguous, those in transverse impression rastrate; scutellum copiously punctate even on anterior disk, punctures over most of its surface rastrate; mesocorium and veins punctate; sternites copiously punctate, smoother medially; sixth sternite of male subangulate anteriorly, preceding sternites, however, but little constricted medially; ventral exposure of hypopygium ample, punctate, hind margin slightly reflexed almost evenly convex; dorsal rim punctate, not greatly wider laterally than anteriorly, anterior portion somewhat depressed, lateral slightly tumid, posterior rather broad moderately declivitous; sixth sternite of female broadly rounded, but in some specimens showing traces of median and sublateral angulations; genital plates copiously punctate two-thirds as long as sixth sternite, longer than either fifth sternite or postventer, inner margins slightly elevated, posterior nearly straight. Length 4-4.5 mm.

Holotype female, Colorado, Riley Collection, *allotype* male, Colorado, No. 1565 Baker Collection; *paratypes*, females, Colorado, Nos. 1563, 1636, Baker Collection (U. S. N. M.).

98. *Galgupha (Nothocoris) boliviana* sp. nov.

Black, usually somewhat æneous, shining; tarsi, beak, and antennæ testaceous, the last two organs more or less infuscated distally.

Head produced less than length of eye beyond anterior transocular line; front margin almost evenly convex from eye to eye, sometimes a little truncate or emarginate medially; vertex coarsely punctate, except on tylus posteriorly and on narrow occipital margin; pronotum coarsely punctate laterally, obsoletely punctate elsewhere; scutellum copiously punctate, except on anterior disk, posterior margin sometimes slightly crinkled and declivity with obscure transverse wrinkles; mesorium and veins punctate; sternites copiously punctate, smoother medially; sixth sternite of male subangulate anteriorly, nearly as long as preceding sternites together, all of which are shorter medially than laterally; ventral exposure of male hypopygium large, punctate, posterior margin distinctly reflexed, broadly and shallowly concave medially, rounded off laterally with a short fringe of pale hairs; dorsal rim rather flat, anterior wall but little above level of central disk, lateral angles slightly tumid, posterior wall thin, gently sloping within (Fig. 171); sixth sternite of female rounded anteriorly, fifth and fourth decidedly, the others less, constricted medially; sixth a little angulate projecting at middle posteriorly; genital plates punctate, less than half as long as sixth sternite, equal to postventer, broader than long, inner margins distinctly elevated posteriorly, hind margin slightly concave, but almost transverse in position. Length 4-4.5 mm.

Holotype male and *allotype* female, Province del Sara, Bolivia, Steinbach, February, 1913 (Carnegie Museum); *paratypes*, Santa Cruz de la Sierra, Bolivia, 450 m., November, 1910, J. Steinbach; Chapada, Brazil, November (Carnegie Museum); Bolivia (Argentine Museum); Province del Sara, Bolivia, J. Steinbach (Berlin Museum); Bahia, Brazil, A. David (Paris Museum); Buenavista, 450 meters, Santa Cruz, Bolivia, H. Taeuber (Munich Museum).

99. *Galgupha (Nothocoris) brevis* sp. nov.

Black, shining, corium and peripheral parts of scutellum reddish-tinged; tarsi and antennæ testaceous.

Head produced a little more than length of eye beyond anterior transocular line; jugæ arcuate anteriorly, projecting a little beyond tylus and nearly enclosing its apex, the anterior margin of vertex, therefore, a little re-entrant medianly; vertex moderately to coarsely punctate, except posteriorly; pronotum coarsely round-punctate laterally, decidedly rastrate about extremities of transverse impression, and obsoletely rastrate or punctate elsewhere; scutellum copiously punctate, except on anterior disk, declivity decidedly rastrate, intervening surface on peripheral portions of scutellum somewhat alutaceous; mesorium and veins punctate; sternites moderately punctate, smoothish medially; sixth rounded anteriorly, a little produced in middle posteriorly, shorter than the preceding three sternites

together, fourth and fifth only slightly constricted medially; genital plates coarsely punctate, decidedly shorter on inner margin than either fourth and fifth sternite at middle, and less than half as long as sixth sternite; inner margin slightly elevated, only half as long as posterior, the latter transverse, very slightly concave. Length 4.5 mm.

Holotype female, Chapada, Brazil, October (Carnegie Museum).

100. **Galgupha (Nothocoris) brunnipennis** Germar.

O[dontoscelis] brunnipennis Germar, E. F., Zeitschr. f. Ent., I, 1839, pp. 38-39 [Brazil].

Black, shining; eyes reddish; tarsi, beak, and antennæ, testaceous, the latter two appendages more or less infuscated distally.

Head produced more than length of eye beyond anterior transocular line, front margin narrowly rounded, subtruncate medially; vertex moderately punctate, except posteriorly, there obsolete punctate; pronotum coarsely punctate laterally, more or less rastrate in transverse impression, obsolete punctate elsewhere; scutellum copiously punctate, except on anterior disk, conspicuously rastrate on posterior declivity; mesocorium and veins punctate; sternites copiously punctate, smoother medially, sixth anteriorly subangulate in male, narrowly rounded in female, fifth and fourth both shorter medially than laterally, but not decidedly constricted; ventral exposure of hypopygium coarsely punctate, as long as fourth and fifth sternites together, nearly a semi-circle in shape, hind margin slightly reflexed, a little emarginate medianly, dorsal rim rather flat, twice as broad laterally as anteriorly, transition to central basin very gradual anteriorly, more steeply sloping posteriorly, and abruptly declivate laterally; genital plates of female coarsely punctate, less than half as long as sixth sternite, about equal in length to postventer; inner edge about a third shorter than posterior, inner posterior angles but little less than a right angle, hind margin nearly transverse in position, but slightly concave; subgenital plates pyriform, large, having more than half as great an area as the genital plates. Length 4.8-5.2 mm.

There is a series of three females and two males in the Berlin Museum, from Salto Grande (Sellow), which are authentic, if not the original material representing this species. Other specimens seen during the progress of our study are from Chapada, Brazil, throughout the year (Carnegie Museum); same date (A. M. N. H.); one specimen without locality (Argentine Museum); Paraguay, Breddin Collection (Deutsches Ent. Inst.); Paraguay, Fiebrig (Berlin Museum); Matto Grosso, Brazil, De Castelnau; Paraguay, Gosset, 1900; East Cape Mines; Campos Geraes, Brazil (Paris Museum); Paraguay, H. Tæuber (Munich Museum).

101. *Galgupha* (*Nothocoris*) *caracasana* sp. nov.

Dull black; corium except for a mark along cubitus posteriorly, and periphery of scutellum between these markings at its widest, wider than corium, yellowish; punctures on these pale areas mostly fuscous; lateral spots on sternites five and six in both sexes and ventral exposure of ultimate tergite of female, yellowish; tarsi, antennæ, and beak, testaceous.

Anterior margin of head truncate and slightly emarginate medially; puncturing of dorsal surface as in *marginalis*; venter rather sparsely punctured, except laterally, broadly smoother medially; sixth sternite subangulate in both sexes; ventral exposure of hypopygium sparsely punctate, hind margin slightly reflexed; dorsal rim much as in *marginalis*; genital plates of female faintly punctate, more than half as long as sixth sternite, slightly longer than postventer, inner margins slightly elevated posteriorly. Length 3.3.1 mm.

Holotype male and *allotype* female, Caracas, Venezuela, May-June, 1877, O. Thieme (British Museum).

102. *Galgupha* (*Nothocoris*) *chilocoroides* Walker.

Corimelæna chilocoroides Walker, Francis, Catalogue, I, 1867, p. 79 [Brazil].

Black, with æneous, or in some cases with purplish reflections, corial patch nearly one-half the length of corium, yellowish to reddish; abdomen without lateral pale spots, but sometimes faintly reddish submarginally; tarsi, beak, and antennæ, testaceous.

Outline as in Fig. 1; head produced more than length of eye beyond anterior transocular line, vertex narrowly rounded anteriorly, coarsely punctate, except on tylus posteriorly and occipital strip, where nearly impunctate; pronotum coarsely punctate, antero-laterally, somewhat rastrate in extremities of transverse impression, nearly impunctate elsewhere; scutellum moderately punctate peripherally, nearly smooth on anterior disk, sometimes rastrate on declivity; mesocorium and veins punctate; sternites moderately punctate, smoother medially; sixth sternite of male angulate anteriorly, fifth and fourth not greatly constricted, however; ventral exposure of hypopygium with a few coarse punctures, hind margin distinctly reflexed, slightly concave medianly, dorsal rim broad, nearly flat laterally and anteriorly, hind wall more steeply declivate; sixth sternite of female narrowly rounded to subangulate anteriorly, whole genital region rather protruding, genital plates nearly half as long as sixth sternite and about equal to postventer, moderately punctate, tumid, twice as wide as long, inner margins elevated, and inner posterior angles slightly produced, subgenital plates as described in key (Fig. 175). Length 3.2-4 mm.

Holotype male and *allotype* female, Constancia, Rio Janeiro, January, 1857, H. Clark (British Museum); other specimens from Bonito,

Pernambuco Province, Brazil, January, February, 1883 (U. S. N. M.); Chapada, Brazil, April (Carnegie Museum); Minas Geraes, Drenis (?); Petropolis, Brazil, Ohaus (Stettin Museum); Guiana, Leprieur; Bahia, Brazil, A. David; Goyaz, Brazil, Castelnau; Minas Geraes, Brazil, 2100 meters, E. R. Wagner, 1902; Boura, French Guiana, March, 1909, A. Bonhoure; Cayenne, R. Benoist, September, October, 1914; Mexico, Collection Signoret (Paris Museum).

103. **Galgupha (Nothocoris) chrostowskii** McAtee and Malloch.

Galgupha (Nothocoris) chrostowskii McAtee, W. L. and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1928, p. 41 [Brazil].

The *holotype*, evidently not fully colored, is castaneous above and fuliginous below; the basal third of corium (excluding clavus) yellowish; tarsi, beak, and antennæ slightly paler than legs and undersurface.

Head broadly rounded and notably deflected anteriorly, produced about length of eye in front of anterior transocular line, vertex moderately punctate; pronotum and scutellum with rather coarse punctures laterally, and finer subobsolete punctures discally; mesocorium and the elytral veins punctate, clavus smooth; prosternal sulcus of a flaring type, shallowing posteriorly just reaching anterior coxæ; lateral area of metapleurum, narrow anteriorly, distinctly punctate interiorly; sternites moderately coarse-punctate, smoother medially; sixth sternite subangulate anteriorly (Fig. 174), fifth and fourth moderately constricted medially; ventral exposure of hypopygium large, moderately inflated medially at base and discally toward each end, punctate on middle third, hind margin slightly reflexed, emarginate over about half its width, bottom of emargination nearly straight (Fig. 169), convex each side of median emargination. Length 4 mm.

Holotype male, Rio Claro, Serra da Esperanza, Paraná, Brazil, Feb. 4, 1922 (Polish Museum).

104. **Galgupha (Nothocoris) coccinelloides** Horvath.

Galgupha coccinelloides Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 217 [São Paulo, Brazil].

Black, highly polished, with color markings as described in key (Fig. 177); black portions of upper surface sometimes with purplish reflections; connexivum red above; basal three segments of antennæ testaceous, the apical two more or less infuscated, beak also infuscated apically; front margin of head near middle, and sometimes spots near coxæ and on metapleura, reddish.

Head produced less than length of eye beyond anterior transocular line, vertex more or less truncate, or even slightly emarginate an-

teriorly, with numerous moderate-sized punctures, except on posterior disk; pronotum coarsely punctate laterally, punctures more or less evident in a transverse band behind middle, remaining surface nearly smooth; scutellum with deep punctures near antero-lateral angles, moderately punctate elsewhere, except for the anterior disk; venter rather coarsely punctate, somewhat smoother medianly; sixth sternite subangulate anteriorly in male, narrowly rounded in female, fifth sternite notably, others less, constricted medially; ventral exposure of male hypopygium coarsely punctate, slightly channeled transversely, the hind margin roundly carinate, slightly concave medianly; dorsal rim strongly punctate and hirsute, rather flat, narrow anteriorly and posteriorly, broader laterally, posterior margin somewhat depressed medianly, inner basin nearly circular; genital plates of female punctate, less than half as long as sixth sternite, shorter on inner than on posterior margin, the latter concave, inner margins distinctly elevated, and inner posterior angles somewhat produced. Length 4.5-5 mm.

Specimens examined include the *holotype* male, São Paulo, Brazil (Budapest Museum), and others from Chapada, Brazil, April, October (Carnegie Museum), March (A. M. N. H.); Foz do Iguassu, March 19, 1923; Pinheirinhos, Paraná, Brazil, April 18, 1923 (Polish Museum); Bolivia (Argentine Museum); San Ignacio, Misiones, Argentina, Wagner (Helsingfors Museum); Paraguay; Cayenne, Noualhier, 1898; San Ignacio, Misiones, Argentina, 1911, E. R. Wagner (Paris Museum).

Nymphs in the last instar are even more highly colored than the adults, but easily recognizable as of this species; the pronotum is vermilion with narrow margins, a complete longitudinal, and an incomplete transverse fascia black; the scutellum is black with two large red spots on disk; the sternites and tergites have long black markings on middle and squarish black blotches laterally.

105. *Galgupha (Nothocoris) eas* sp. nov.

Black with æneous reflections, corium somewhat rubiginous; underside and legs castaneous, tarsi, beak, and antennæ, testaceous.

Head produced about length of eye beyond anterior transocular line, front margin narrowly rounded, subtruncate medially, vertex coarsely, almost contiguously punctate, except in middle posteriorly where nearly smooth; pronotum more or less punctate everywhere, except on callosities, punctures coarsest antero-laterally, finer discally, more or less rastrate on posterior half; scutellum punctate throughout, coarser laterally, finer discally; mesocorium and veins punctate; sternites copiously punctate in a broad band peripherally, nearly smooth discally; sixth sternite rounded anteriorly, fifth and fourth moderately constricted medially; genital plates coarsely punctate, more than half

as long as sixth sternite, and a little longer than postventer, inner margins slightly elevated. Length 3.5 mm.

Holotype female, San Diego, Texas, June 5, E. A. Schwarz (U. S. N. M.).

106. **Galgupha (Nothocoris) fossula** sp. nov.

Black with æneous reflections; beak, antennæ, and tarsi testaceous.

Head produced less than length of eye beyond anterior transocular line; front margin truncate anteriorly, slightly sinuate between truncation and eyes; vertex with sparse coarse punctures laterally, broadly impunctate over tylus and occipital region; pronotum with coarse punctures antero-laterally, somewhat rastrate in extremities of transverse impression, subobsoletely punctate elsewhere; scutellum smooth on anterior disk, numerous punctate elsewhere, punctures coarsest peripherally where the inter-punctural surface is more or less alutaceous; sternites with scattered coarse punctures, somewhat smoother medially; sixth subangulate anteriorly, fifth constricted medially to less than half its lateral length, others less conspicuously constricted; genital plates almost equilaterally triangular, sparsely punctate, longer than postventer, hind margins somewhat oblique; inner margins slightly elevated anteriorly, depressed posteriorly, this depression continued and emphasized between subgenital plates. Length 3.5 mm.

Holotype female, Chilpancingo, Guerrero, Mexico, 4000 ft., June, H. H. Smith (Paris Museum).

107. **Galgupha (Nothocoris) grenadensis** sp. nov.

Black, pale markings above as in *marginalis*; sternites four to six and ventral exposure of ultimate tergite of female with yellowish-margined spots; antennæ and tarsi testaceous.

Anterior margin of head narrowly rounded, slightly emarginate medially; puncturing above as in *marginalis*; venter coarsely punctate laterally, smoother medially; sixth sternite longer than the preceding two, but not the preceding three sternites together; fifth and fourth moderately constricted medially; genital plates punctate; slightly less than half as long as sixth sternite, about as long as postventer, inner margins slightly elevated. Length 3.5 mm.

Holotype female, Honda, New Grenada, August-September, 1877, Otto Thieme (British Museum).

108. **Galgupha (Nothocoris) inornata** sp. nov.

Black, shining, scutellum castaneous posteriorly, corium, except for a transverse castaneous marking about middle, and narrow irregular margin of scutellum posterior to these marks, stramineous; lateral

abdominal spots, ventral exposure of ultimate tergite of female, beak, antennæ, and tarsi, stramineous.

Head rather broadly arcuate in front of eyes, truncate medially; vertex mostly coarsely punctate, polished from hind part of tylus to ocelli and posteriorly; pronotal callosities polished, antero-lateral portions coarsely round-punctate, remainder rastrate, conspicuously so in transverse impression, fully so, elsewhere; scutellum moderately punctate in general, smoother on anterior disk; mesocorium, sparsely, and veins, punctate; sternites with scattered coarse, but shallow, punctures, smoother medially; sixth subangulate anteriorly, nearly as long as the preceding three sternites together, each of which is moderately constricted medially; genital plates punctate, rather more than half as long as sixth sternite, equalling postventer; inner two-thirds of hind margin concave, outer third straight and oblique. Length 3.8 mm.

Holotype female, Province of Salta, Argentina, J. Steinbach (Berlin Museum).

109. *Galgupha (Nothocoris) juno* sp. nov.

Dull black; appendages missing, so usual details as to color cannot be given.

Head produced about length of eye beyond anterior transocular line, front margin convex medially, slightly concave towards eye; vertex coarsely punctate laterally, finely so on back of tylus, smooth on occipital strip; pronotum coarsely punctate laterally; obsolete so elsewhere; scutellum copiously punctate, scarcely rastrate, smooth on anterior disk; elytra missing; sternites numerous punctate, smoother medially; sixth sternite about as long as the preceding three together; genital plates more than half as long as sixth sternite, inner margins about two-thirds as long as posterior, the latter somewhat oblique and concave. Length 5 mm.

Holotype female, Province of Salta, Argentina, 2500 m., J. Steinbach (Berlin Museum).

110. *Galgupha (Nothocoris) marginalis* sp. nov.

Bronzy black, corium, except mark along cubitus posteriorly and margin of scutellum between apices of elytra, stramineous; punctures on this portion dark; sixth sternite pale laterally.

Head narrowly rounded, or subtruncate anteriorly; tylus and vertex smooth posteriorly; pronotum more or less punctate everywhere, except on callosities, punctures coarsest laterally, more or less rastrate in and behind transverse impression; scutellum rather closely punctate, punctures coarsest antero-laterally, finest antero-discally, scutellum sometimes transversely wrinkled, the punctures in the depressions

more or less rastrate; mesocorium and veins punctate; sternites moderately punctate laterally, smooth medially; sixth angulate anteriorly, longer than the preceding three together, all of which are constricted medially, the fifth most constricted; ventral exposure of hypopygium punctate, hind margin not at all reflexed, dorsal rim narrow anteriorly, lateral angles rather flat, interior basin large, moderately declivate anteriorly and laterally, abruptly so posteriorly. Length 3.1 mm.

Holotype and *paratype* males, Bobista (?) Colombia, T. Wieme (Berlin Museum).

III. *Galgupha (Nothocoris) marginicollis* Horvath.

Galgupha marginicollis Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 219-220 [Baranquilla, Colombia].

Galgupha meinerti Jensen-Haarup, A. C., Ent. Meddel., XVI, 1926, pp. 45-46 [Venezuela].

Vertex, except anterior margin, anterior half of pronotum, and region about basal depressions of scutellum black, other portions of these sclerites except as hereafter specified yellow-brown in female, reddish-brown in male; sublateral vitta on pronotum anterior to humeral prominence, and large basal patch on corium pale yellowish, as are also apex and most of costal margin; transverse marking on corium (Fig. 56) varying from a squarish blotch to a broad band, fuscous; pale lateral markings both above and below on all abdominal segments from third to and including genital ones.

Head produced about length of eye beyond anterior transocular line; front margin rounded anteriorly, sometimes truncate medially; vertex coarsely punctate except posteriorly; sublateral vitta of pronotum impunctate, within it are numerous distinct punctures tapering off in an interrupted transverse band, remainder of pronotal surface with only faint punctures; scutellum copiously punctate, except on anterior disk; mesocorium and veins punctate; venter moderately punctate, smoothish medianly, especially on sixth sternite, the latter angulate-produced in male, sternites three to five constricted, so that they are distinctly shorter on median line than on lateral margin; ventral exposure of male hypopygium ample, sparsely punctate, scarcely channeled, hind margin slightly reflexed, almost transverse on median two-thirds (Fig. 170); dorsal rim but little broader within lateral angles than anteriorly, depressed anteriorly, so that there is a broad bridge to central disk, abruptly declivate laterally, hind wall thin, steeply inclined. Sixth sternite of female broadly rounded anteriorly; genital plates lightly punctate, less than half as long as sixth sternite, about as long as postventer; moderately tumid, shorter on inner than on posterior margin, the latter nearly straight. Length 3-3.5 mm.

Holotype female, Baranquilla, Colombia, March 1912, Josef Ujhelyi (Budapest Museum); type material (three males) of *Galgupha meinerti* Jensen-Haarup, La Moka, and Caracas, Venezuela, Fr. Meinert (Copenhagen Museum); and other specimens from Bonda, Colombia, June (Carnegie Museum); Colombia, Lebas, 1830 (Paris Museum); Grenada, West Indies, Sept. 6, A. Busck (U. S. N. M.); Caracas (Helsingfors Museum); Venezuela (Stettin Museum); Cartagena, Colombia, July 1920, Rehn and Hebard (Ac. Nat. Sci. Phila.); Cartagena, Colombia, June 1905, C. Gazzo (Hamburg Museum).

112. *Galgupha* (*Nothocoris*) *microphthalma* sp. nov.

Color as in *stramineipennis*, except that the dark mark on corium forms an almost complete cross-band, and the pale edging of scutellum is much less distinct and extensive.

Puncturing of the same type as in *stramineipennis*, but coarser throughout dorsum, about the same on venter; sixth sternite subangulate anteriorly, fifth not quite so much constricted as fourth, both, however, shorter at middle than at lateral margin; hypopygium about as in *stramineipennis*. The type specimen has a very short impressed line in center of anterior margin of sixth sternite, which is similar to, but not as deep or conspicuous, as the one on fourth, fifth and basal half of sixth sternite in *stramineipennis*. Possibly this impressed line is not always present in either of these species. Length 3.2 mm.

Holotype male, Chapada, Brazil, April (Carnegie Museum).

113. *Galgupha* (*Nothocoris*) *nitiduloides* Wolff.

Cimex nitiduloides Wolff, J. F., Icones Cimicum, III, 1802, p. 98, Pl. 10, fig. 92a, b. [Lancaster, Pa.].

Thyreocoris cærulescens Stål, C., Ent. Zeit. Stettin, XXIII, 1862, p. 94 [Mexico].
C[orimelæna] cyanea Uhler, P. R., Proc. Ent. Soc. Phila., II, 1863, pp. 157-158 [California].

Corimelæna cyaneonigra Walker, Francis, Catalogue, I, 1867, p. 78 [Mexico].

Galgupha violacea Jensen-Haarup, J. C., Ent. Meddel., XVI, 1926, p. 46 [Brazil].

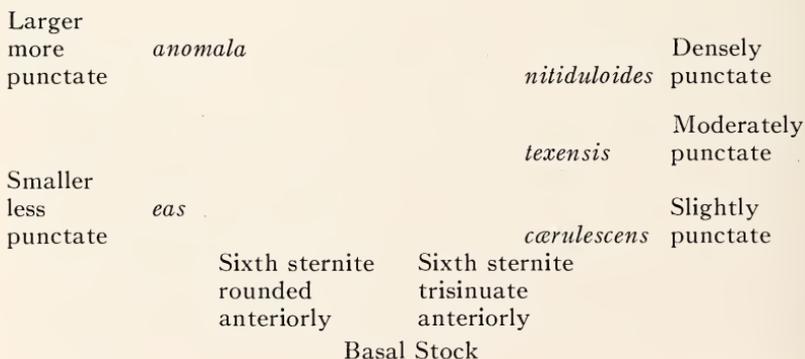
We group under the earliest of the preceding names a complex of forms, which we have tried to analyze on various characters, but each time have found that, considering all intergrades, variants could not be definitely separated. The variability of the group is well attested by the number of names that have been used for the material we have

studied. These include nine different published and three manuscript designations. In our opinion the best treatment for the complex is to regard it as a variable species, the variants having a geographical correlation being ranked as subspecies. The species is one that has spread apparently from the tropics and in some directions has varied directly with the distance from the central stock; the ultimate variants are not yet, however, definitely separable as species.

The head is broad and distinctly truncate anteriorly, but varies from slightly concave to slightly convex between truncation and eye; the puncturing of dorsal surface increases in density and in tendency to rastration from south to north; the prosternal sulcus usually deep and parallel-sided, is somewhat flaring anteriorly in some specimens; the scutellum varies from smoothly curving to abruptly declivitous posteriorly; the hind margin of male hypopygium is distinctly concave in southern specimens but is less and less so in specimens from more northern points, becoming at last convex; the anterior margin of sixth sternite of female usually is very characteristically shaped, being subangulate both medially and sublaterally, but in some specimens tends to be rounded; the posterior margins of the genital plates usually are slightly concave and more or less oblique; in northern specimens again these become almost straight and transverse.

The forms *anomala* and *eas* treated as species seem certainly related to the *nitiduloides* complex. The anterior margin of the sixth sternite, while rounded, has traces of the sublateral angulations so characteristic of the *nitiduloides* group, but the genital plates being proportionately longer, the forms are regarded as separate species. The same tendency is shown to increased density of puncturing in northern specimens; *anomala* is the most profusely punctate form in the entire genus.

A phyletic diagram of these various forms could be sketched as follows:



KEY TO THE SUBSPECIES.

1. Less numerous punctate; postero-median part of vertex, disk of pronotum, and anterior disk of scutellum, indistinctly, if at all, punctate; punctures rastrate, if at all, only in transverse impression of pronotum; hind margin of male hypopygium varying from distinctly to shallowly concave medially..... 2
 More numerous punctate; the areas mentioned with more distinct, sometimes well-marked punctures; punctures on posterior half of pronotum and sometimes elsewhere, more or less rastrate; hind margin of male hypopygium varying from slightly concave to convex; hind margins of genital plates of female transverse or nearly so..... **nitiduloides** Wolff.
2. Hind margin of male hypopygium usually distinctly concave; genital plates of female usually as long as or longer than postventer; their hind margins more or less oblique and concave; color usually metallic bluish; range from Texas to California and southward..... **cærulescens** Stål.
 Hind margin of male hypopygium only slightly concave; genital plates of female usually shorter than postventer, their hind margins more nearly straight and transverse; color usually black; known range Texas and Mississippi..... **texasensis** new subspecies.

113a. **Galgupha (Nothocoris) nitiduloides** subsp. **cærulescens** Stål.

Bibliographic reference as under the species.

Black, usually with distinct metallic bluish reflections from most of the dorsal surface; tarsi, beak, and antennæ testaceous, the latter two organs more or less infuscated distally.

Head produced about length of eye beyond anterior transocular line, front margin more or less broadly truncate medially, varying from slightly concave to slightly convex between truncation and eye; vertex coarsely, but shallowly, punctate, except on tylus posteriorly and occipital strip, where puncturing is only faintly indicated; pronotum coarsely, but shallowly, punctate antero-laterally, with only faint puncturing elsewhere; scutellum numerous punctate peripherally, nearly smooth discally; mesocorium and veins punctate, sternites numerous punctate, sometimes but little smoother medially; sixth sternite in both sexes subangulate antero-medially, usually also sublaterally, preceding sternites scarcely constricted medially; ventral exposure of male hypopygium punctate, hind margin distinctly reflexed, varying from broadly and deeply to narrowly and shallowly concave, a fringe of pale hairs from dorsal surface visible in the concavity; dorsal rim (Fig. 171); flat anteriorly, broad all around, most so at lateral angles, hind wall more or less depressed and declivate, corresponding to the degree of emargination; internal genitalia of male as in Figs. 19-20; genital plates of female punctate, more than half as long as sixth sternite, as long as or longer than postventer, hind margins more or less oblique and concave. Length 4-5.8 mm.

Holotype male and *allotype* female, Mexico, Sallé (Stockholm Museum); *holotype* male and *allotype* female of *cyaneonigra* Walker, Mt. Orizaba, Mexico, Sallé (British Museum); *holotype* female of *violacea* Jensen-Haarup, Brazil⁸ (Copenhagen Museum); type of *Corimelæna cyanea* Uhler, California, Horn, and other specimens from Cacao Trece Aguas, Alta Vera Paz, Guatemala, March 24, April 2, 11, 22, 1906, E. A. Schwarz and H. S. Barber; October, 1905, G. P. Goll; Secanquin, Guatemala, April 1, 12, 1905, cotton fields, A. McLachlen; Mexico, Signoret Collection; Orizaba, Mexico, Lower California, Uhler Collection; Colima Volcano, Mexico, L. Conrad; District Federal, Mexico, L. Conrad; Tepic, Mexico, Uhler Collection; Tlalpam, Mexico, July 15, R. H. Hay; Orizaba, Mexico, September, 1923, E. G. Smyth; Durango, Mexico, Nov. 26, E. A. Schwarz; others labelled Mexico only; Victoria, Texas, May 3, 1907, J. D. Mitchell; Beeville, Texas, October 10, E. A. Schwarz; Arizona, C. U. Lot No. 34, also Uhler 1874; Huachucha Mts., Arizona; Catalina Mts., Arizona; Santa Rita Mts., Arizona, May 20; California, Horn (U. S. N. M.); Mexico (A. M. N. H.); Morelia, Mexico (Ac. Nat. Sci. Phila.); Huejotitan, Jalisco, 1700 meters, 1913; Guadalajara, Jalisco, 1914, L. Diguët; Mexico, Sallé; Guanajuato, Duges, 1889 (Paris Museum); Orizaba, Mexico, February, 1883, and other Mexican specimens, Bilimek (Vienna Museum); Colima; La Borca, Jalisco; District Federal; Coatepec, Vera Cruz; Mexico (Mex. Dept. Agr.); Mazatlan, Mexico, Sept. 23, 1909, R. Paessler; South Mexico, C. Höge (Hamburg Museum); Calderas, Guatemala, G. C. Champion (British Museum); Durango City, Mexico (Deutsches Ent. Inst.); Mexico; Nogales, Arizona, July 15, 1903, Oslar; Durango, Mexico, H. F. Wickham; Huachucha Mts., Arizona, July 20, 1905, H. G. Barber (Barber); San Juan, Teotihuacan, Mexico, Aug. 17, 1926 (Stettin Museum); Colima Volcano, Mexico, J. Laue; Turrialba, Costa Rica, H. Taeuber (Munich Museum).

113b. **Galgupha (Nothocoris) nitiduloides** subsp. **texensis** subsp. nov.

Distinguished as noted in key; the bluish reflections tend to disappear, and the insect to be shining blackish or even slightly æneous; the puncturing is somewhat more pronounced; and the dorsal rim of male hypopygium in conformity with the lesser emargination of hind margin is more completely flat. Length 4-5 mm.

⁸This locality may be erroneous.

Holotype male and *allotype* female, Dallas, Texas, June 17, 1912, in cotton field, A. Rutherford; *paratypes*, Dallas, Texas, Bay City, Texas, July 21, 1917, W. D. Pierce; Brownsville, Texas, March 2, 1895, C. H. T. Townsend; June, C. F. Wickham; Calvert, Texas, July 25, S. Goes; Tivoli, Texas, Sept. 11, 1908, on sugar cane, J. D. Mitchell; Victoria, Texas, May 28, 1910, J. D. Mitchell; Oct. 10, 1902; Austin, Texas, 1903, A. W. Morrill; Mexia, Texas, July 15, 1905, S. Goes; Corpus Christi, Texas, March 18, 1908, Jones and Pratt; Aug. 5, E. A. Schwarz; Farmerville, Texas, on *Helenium*, F. C. Bishopp; Texas, Uhler Collection; Sharpsburg, Texas, May 9, E. A. Schwarz; Dorsey, Mississippi, Aug. 16, 1916, on cotton, W. D. Pierce (U. S. N. M.); a specimen with flaring prosternal sulcus, and only 3.5 mm. long, not made a *paratype*, San Diego, Texas, May 6, Uhler Collection (U. S. N. M.).

113c. **Galgupha (Nothocoris) nitiduloides** subsp. **nitiduloides** Wolff.

Bibliographic reference same as for the species.

Distinguished as noted in key; a decidedly punctate form, without bluish, but usually with æneous reflections. Length 4-5 mm.

Holotype male, labelled "Lancaster, M., Sturm Collection" (Munich Museum); other specimens from: Colorado, Baker Collection; Oracle, Arizona, July 4; Montana, Missouri, Uhler Collection; Oregon, Horn; Illinois, Uhler Collection; Idaho, Kansas, Indiana, Michigan, Massachusetts, Connecticut, New Jersey, Pennsylvania, District of Columbia, and North Carolina (U. S. N. M.); Colorado Springs, Colorado, August, Jack; Crawford Co., Iowa (M. C. Z.); Buena Vista, Colorado, 8000 ft., July 1896, H. F. Wickham; Cold Spring Harbour, N. Y., Aug. 5, 1902 (H. G. Barber); Ames, Iowa; St. Paul, Minnesota, June 28, 1921, Arthur Hertig; Trail Co., N. Dakota, Aug. 4, 1923, A. A. Nichol; Three Forks, Montana, Aug. 14, 1914 (H. H. Knight); Crown City, Gallia Co., Ohio, Aug. 23, 1915, C. J. Drake (Iowa State College); Iowa City, Iowa, Oct. 29, 1915, L. L. Buchanan; Boulder, Colorado, June 27, 1922, L. O. Jackson (McAtee); Colorado Springs, Colorado, August, Jack; Crawford Co., Iowa (M. C. Z.).

114. **Galgupha (Nothocoris) oculata** sp. nov.

Dull or shining black, corium, except for a marking along cubitus posteriorly, discal spots (as described in key) and U-shaped marking on posterior margin of scutellum, stramineous. This marking lies

between tips of elytra and its anterior ends are more or less expanded. Sixth sternite of male, sixth and sometimes fifth sternites, and ventral exposure of ultimate tergite of female yellowish; tarsi and antennæ stramineous; beak testaceous.

Anterior margin of head truncate, slightly emarginate medially, slightly sinuate between truncation and eye; tylus and vertex smooth posteriorly; pronotum coarsely punctate laterally, finely elsewhere, punctures in transverse impression more or less rastrate; scutellum with punctures almost evenly distributed throughout, coarsest within antero-lateral angles, finest on anterior disk; mesocorium and veins punctate; venter with scattered coarse punctures laterally, broadly smoother medially; sixth sternite of male subangulate anteriorly, longer than preceding three sternites together, all of which are constricted medially, fifth nearly to half its lateral length; ventral exposure of hypopygium, ample, punctate; dorsal rim punctate, of moderate width anteriorly, narrower between there and lateral angles, which are the widest portions, abruptly declivate anteriorly and posteriorly, moderately so within lateral angles; sixth sternite of female subangulate anteriorly, not so long as the preceding three sternites together, each of which is moderately constricted medially; genital plates punctate, less than half as long as sixth sternite, a little longer than postventer, inner posterior angles slightly elevated. Length 2.75-3 mm.

Holotype male, Paraguay, May, Fiebrig (Berlin Museum); *allotype* and *paratype* females, San Bernardino, Paraguay, Fiebrig; *paratype* male, San Luis, Paraguay, Reimoser (Vienna Museum).

115. *Galgupha* (*Nothocoris*) *parvula* Horvath.

Galgupha parvula Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 218-219 [Peru].

Shining black; tarsi, beak, and antennæ testaceous.

Sides somewhat more arcuate than in *Galgupha* (*Pteronomos*) *oblonga*; vertex produced in front of transocular line about one and one-half times length of eye, narrowly rounded anteriorly, densely punctate except on occipital strip; pronotum coarsely punctate laterally, subobsoletely so elsewhere; scutellum copiously punctate except on anterior disk, which has a few fine punctures and some transverse wrinkles; sternites moderately punctate, a little smoother medially, the sixth subangulate anteriorly, the fifth and fourth slightly constricted medially; ventral exposure of male hypopygium copiously punctate, the hind margin conspicuously reflexed, almost evenly convex as seen from below, dorsal rim about twice as wide anteriorly as posteriorly, the lateral angles a little wider, a slight median depression in both anterior and posterior parts of rim; rim abruptly and deeply excavated, without long hairs. Length 3.5 mm.

Holotype male, Lake Titicaca, Peru (Budapest Museum).

Discovery of characters for subgenera unknown to us when the work in Budapest was done now make us uncertain of the subgeneric assignment of *parvula*. It may possibly belong to the segregate herein described as *Pteronomos*.

116. *Galgupha* (*Nothocoris*) *repetita* sp. nov.

Black with æneous reflections, corial patch yellowish, grading through brownish into the bordering areas of the ground-color; margin of center dull reddish; tarsi, beak, and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line; front margin truncate medially, low convex from truncation to eye; vertex numerous punctate, except posteriorly, where nearly smooth; pronotum coarsely punctate antero-laterally, with only traces of puncturing elsewhere, most evident in the transverse impression; scutellum wrinkled transversely, numerous punctate, except on anterior disk, which is almost impunctate; mesocorium and veins punctate; sternites numerous punctate, smoother medially, sixth angulate anteriorly as long as the preceding three sternites together, each of which is slightly constricted medially; ventral exposure of hypopygium punctate, hind margin reflexed, almost straight on median three-fourths, rounded off laterally; dorsal rim nearly flat, but little wider laterally than elsewhere, hind wall only moderately sloping. Length 4 mm.

Holotype male, Casanova, Sellow (Berlin Museum).

Possibly *repetita* and *surda* are the sexes of one species.

117. *Galgupha* (*Nothocoris*) *semilimbata* Horvath.

Galgupha semilimbata Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 219 [Paraguay].

The following descriptive notes were made from the type material:

Fusco-castaneous, head darkest; corium stramineous except for a short, faint, castaneous mark from middle posteriorly along inner margin; scutellum with large lateral pale areas connected around posterior margin; antennæ chiefly pale.

Vertex coarsely, almost confluent, punctate, tylus wrinkled, occiput smooth; pronotum coarsely punctate laterally, subobsoletely punctate on anterior half, finely rastrate on posterior half; scutellum copiously punctate, the punctures on anterior half, especially near basal angles, semi-rastrate, the surrounding surface more or less alutaceous, punctures large and round apically; characters of venter, including those of male genitalia, scarcely distinguishable from those of *microphthalmia*. Venter of female copiously punctate, sixth sternite smoother, subangulate anteriorly, about as long as the preceding three

sternites together; fifth decidedly, and fourth slightly constricted medially; genital plates punctate, hind margin nearly straight and transverse, about one and one-half times as long as inner margin. Length 3.25-3.45 mm.

To the above account may be added the characters cited in key and the following notes from material subsequently examined: Front margin of head narrowly rounded, sometimes slightly truncate or emarginate medially; punctures on pale parts of scutellum fuscous; genital plates about half as long as sixth sternite varying from slightly less than to about equal to, length of postventer.

Holotype male, Asunción, Paraguay, Oct. 16, 1904; *allotype* female, Villa Morra, Asunción, Paraguay, Arpad Vezényi (Budapest Museum); other specimens from San Bernardino, Paraguay, Fiebrig (Vienna Museum); Corumbá, Matto Grosso, Brazil (Barber).

118. *Galgupha (Nothocoris) stramineipennis* sp. nov.

General color above reddish-brown, head, except narrow front margin and basal depressions of scutellum, blackish; corium stramineous, except for a fuscous patch along inner side at middle; scutellum narrowly stramineous-margined between corial apices; lateral spots on sternites three to six, and connexivum above pale yellow.

Apex of head rounded, slightly upturned, vertex coarsely and numerous punctate except on area across occiput of such an extent as to barely enclose the ocelli; pronotum punctate everywhere, except on callosities, coarsely and deeply so laterally, with finer rastrate punctures in transverse impression, anterior and posterior disk with fairly numerous lightly impressed round punctures; scutellum copiously punctate everywhere but on the transversely wrinkled anterior disk, punctures coarsest within antero-lateral angles; sternites moderately punctate, smoothish medianly, especially the sixth; sixth sternite angulate anteriorly, fifth about one-half as long at middle as on lateral margin, fourth not so much constricted; ventral exposure of male hypopygium ample, wrinkled and punctate, slightly transversely channeled, hind margin almost evenly convex; dorsal rim essentially flat, narrow posteriorly, twice as broad anteriorly, and broadest within lateral angles, basin transversely elliptical, abruptly declivitous posteriorly, more gradually so elsewhere. A peculiar character in the type specimen consists of a quite deep longitudinal impressed line on the central apical portions of sternites four and five, and on almost the basal half of sternite six. This may be merely an individual variation or aberration, which is less prominent in the type of *microphthalma*, but without a series of specimens of the two species, we have no means of determining if it is so. Length 3.5 mm.

Holotype male, Chapada, Brazil, April (Carnegie Museum).

119. *Galgupha* (*Nothocoris*) *surda* sp. nov.

Black, corial marking dull yellow, margin of venter obscurely reddish; beak, antennæ, and tarsi testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin narrowly rounded, subtruncate medially; vertex with shallow punctures, except on extreme posterior portion; pronotum with coarse punctures antero-laterally, and in ends of transverse impression where they are more or less rastrate, sub-obsolete punctate elsewhere; scutellum moderately punctate on a broad peripheral band, subobsolete so on disk; corium punctate; sternites moderately punctate, smoother medially, sixth subangulate anteriorly, fifth and fourth slightly constricted medially; genital plates punctate, less than half as long as sixth sternite, shorter than postventer, inner margin less than half as long as posterior, the latter concave, but transverse in position. Length 4 mm.

Holotype and *paratype* females, Iguassu (British Museum).

Possibly *surda* and *repetita* are the sexes of one species.

120. *Galgupha* (*Nothocoris*) *terminalis* Walker.

[orimelæna] notatipennis Stål, C., Rio Hemip., 1, 1862, p. 8. A name without description based on *Odontoscelis schmidtii* Germar. A secondary reference to Herrich-Schaeffer, Wanz. Ins., V, p. 35, fig. 483 (exclus. syn. *fabricii*) is of no consequence, as the name must stand or fall by the first citation. We have no means of knowing what Germar's *schmidtii* really was, so drop the name *notatipennis* Stål based upon it. At the same time we have examined specimens of the present species identified by Stål as *notatipennis*, which, if he had described them as he did those upon which other new names in the Rio Hemiptera were based, would be type material.

Corimelæna terminalis Walker, Francis, Catalogue, 1, 1867, p. 80 [Brazil].

This is the same species represented by Stål's material, and in view of the uncertain applicability of his name we use Walker's, although of course it may not be identical with *notatipennis* Stål, *i.e.*, *Schmidtii* Germar.

Black polished, with æneous reflections, apex of corium and large basal spot not crossing claval suture, but reaching scutellum for some distance posterior to it, yellowish (the apical spot rarely obsolete); pale lateral spots or edging of venter often obscure; tibiæ concolorous, tarsi, beak, and antennæ pale.

Head rounded anteriorly, produced less than length of eye beyond anterior transocular line; vertex with large scattered punctures, except on posterior disk; pronotum with numerous similar punctures laterally, remaining surface with only traces of puncturing; scutellum coarsely punctured near antero-lateral angles, with numerous fine punctures elsewhere, almost obsolete on anterior disk, venter copiously and dis-

tinctly punctate, smoother medianly; sixth sternite subangulate anteriorly in both sexes, a little more pointed in male; ventral exposure of male hypopygium sparsely punctate, all margins slightly carinate-elevated, posterior broadly, but shallowly, emarginate; dorsal rim broad and nearly flat within lateral angles, narrower and moderately sloping anteriorly, hind margin depressed medianly to level of central disk; genital plates of female sparsely punctate, less than half as long as sixth sternite, about as long as postventer, shorter on inner than on posterior margin, the latter slightly concave, but transverse in position. Length 3-3.5 mm.

Holotype female, Constanca, Brazil, January 1857, *allotype* male, same locality, February 1857, H. Clark (British Museum); Brazil, F. Sahlberg (Westerman), Rio de Janeiro (Stockholm Museum; Stål's material of *notatipennis*); Rio de Janeiro, Brazil, October; *paratypes* with same data, and Montevideo, Uruguay (Carnegie Museum); Bahia, Brazil, Uhler Collection (U. S. N. M.); Marechal Mallet, Jan. 18, 20, 1922; Cara Pintada, Jan. 20, 1922; Rio Claro, Serra da Esperanza, Feb. 4, 7, 1922; São Domingo, Feb. 24, 25, 1922; Fazenda Durski, March 30, April 5, 1922; Rio Ubasinho, Aug. 15-27, Sept. 17-26, 1922; Salto de Uba, Rio Ivahy, Oct. 22, Nov. 13, 1922; all localities in Paraná, Brazil (Warsaw Museum); Bolivia (Argentine Museum); Brazil, Blumenau; Petropolis, Brazil, F. Sahlberg (Helsingfors Museum); Pará, Brazil, Sieber; San Bernardino, Paraguay, and others labelled Paraguay only, K. Fiebrig; Brazil, v. Langsdorf; La Guayra, Otto (Berlin Museum); Est. de Paraná, Rio Negro, Dec. 23, M. Witte (Deutsches Ent. Inst.); Santa Catharina, Brazil, Friedreich, Lüderwaldt; Petropolis, Ohaus (Stettin Museum); Santos, Brazil, Oct. 17, 1893, H. Brauns (Hamburg Museum); Rio Grande do Sul, Brazil, Stieglmayr (Vienna Museum); Rio de Janeiro, Brazil, 1815, A. Saint-Hilaire; East Cape Mines (Paris Museum); Theresopolis, Brazil, Ohaus (Dresden Museum); Santos, Brazil, March 29, 1841; São Paulo, Brazil, A. Mueller; Buenavista, 450 meters, Santa Cruz, Bolivia, H. Taeuber (Munich Museum).

A female specimen forming part of the type material of *Odontoscelis maculipennis* Germar, *Amer. Mer.* (Lwow Museum) probably is this species.

Subgenus PSESTOPHLEPS McAtee and Malloch.

Psestophleps McAtee, W. L. and Malloch, J. R., *Ann. Mus. Zoöl. Poland*, vol. VII, 1928, pp. 41-42 (Monobasic, type species, *Galgupha (Psestophleps) neobisignata* sp. nov.).

Principal characters: Corium pointed at apex (Fig. 57), exocorial vein normally obsolete at base, sometimes represented by a line of separated faint punctures from fork to base, and never as deep on that portion as the same section of cubital vein, distinct from fork apically, the branches connate distally; mesocorial vein faint or lacking (except in *mexicana*); hind tibia with a longitudinal carinate line on posterior surface; lateral area of metapleurum punctured along inner margin. Subgenotype *Galgupha* (*Psestophleps*) *neobisignata* McAtee and Malloch.

This seems strictly a southern group, none of the known species occurring north of Mexico.

KEY TO THE SPECIES.

1. Females.....2
 Males.....16
2. Corium entirely black or sometimes reddish-brown on costa basally.....3
 Corium otherwise.....6
3. Genital plates concave posteriorly, distinctly shorter than postventer, inner margin about one-half as long as posterior.....4
 Genital plates transverse posteriorly, nearly as long as postventer; inner margin about two-thirds as long as posterior.....*casta* sp. nov.
4. Sixth sternite about equal in length to fifth and fourth together; area of subgenital about half that of genital plates; scutellum densely rastrate apically.....*carbonata* sp. nov.
 Sixth sternite distinctly longer than fifth and fourth together, area of subgenital, much more than half that of genital plates; scutellum less densely or not at all rastrate.....5
5. Smaller species, averaging 4 mm. in length, corium frequently reddish-brown at base along costa.....*porcata* Horvath.
 Larger species, averaging 5 mm. in length, corium black.....*obovata* sp. nov.
6. Corium with a yellowish or reddish spot at base which does not extend to the claval suture.....7
 Corium either almost entirely stramineous to reddish, or with a reddish or yellowish basal spot, which extends to the claval suture and generally along margin of scutellum for some distance beyond apex of suture.....9
7. Posterior trichobothrium on sternites three to five not closer to the lateral margin than is the anterior one.....8
 Posterior trichobothrium on all sternites distinctly nearer to the lateral margin than is the anterior one.....*imitans* sp. nov.
8. Genital plates about as long as fifth sternite at middle and half as long as sixth sternite.....*altera* sp. nov.
 Genital plates shorter than fifth sternite at middle and less than one-third as long as sixth sternite.....*costomaculata* sp. nov.
9. Corium chiefly pale.....10
 Corium black, with a reddish or yellowish basal spot (Fig. 57).....11

10. Corium stramineous, slightly infuscated bordering scutellum; genital plates about two-thirds as long as wide, about equal to postventer.
pallipennis sp. nov.
 Corium reddish-orange, sometimes with a dark streak along cubitus posteriorly; genital plates nearly as long as wide, distinctly longer than postventer.
tabellula sp. nov.
11. Genital plates on inner margin about twice as long as fifth sternite in center and fully half as long as sixth sternite at same point.
neobisignata McAtee and Malloch.
 Genital plates on inner margin not, or very slightly, longer than fifth sternite in center and not half as long as sixth sternite at same point. 12
12. Large robust species (5 x 3.5 mm.); genital plates distinctly elevated along inner margins, scutellum highly polished, not alutaceous. *mexicana* sp. nov.
 Smaller, more slender species (4 x 2.5 mm.); genital plates flat; scutellum not highly polished apically, generally quite noticeably alutaceous. 13
13. Genital plates over twice as wide on posterior margins as long on inner margin. 15
 Genital plates less than twice as wide on posterior margins as long on inner margin. 14
14. Hind margins of genital plates straight. *bergiana* sp. nov.
 Hind margins of genital plates concave. *inops* sp. nov.
15. Vertex almost contiguously coarse-punctate. *bisignata* sp. nov.
 Vertex more sparsely punctate. *media* sp. nov.
16. Corium æneous black, sometimes slightly brownish at base of costa, but nowhere yellow or reddish; scutellum not noticeably rastrate apically. . . . 17
 Corium reddish or yellowish on base of costa or more extensively. 18
17. Exposed portion of hypopygium distinctly shorter than fifth sternite at center, the hind margin evenly low concave on almost its entire width (Fig. 184).
porcata Horvath.
 Exposed portion of hypopygium not shorter than fifth sternite at center, the rim slightly concave medially (Fig. 182). *obovata* sp. nov.
18. Corium reddish, sometimes with a dark streak along cubitus.
tabellula sp. nov.
 Corium with basal pale spot only. 19
19. Basal pale marking of corium invading mesocorium, but not reaching claval suture. *costomaculata* sp. nov.
 Basal pale marking of corium reaching claval suture. 20
20. Ventral exposure of hypopygium not over half as great as length of fifth sternite at center, the latter half as long as sixth at same point; large, robust species, with the scutellum highly polished to apex. *mexicana* sp. nov.
 Ventral exposure of hypopygium at least as great as length of fifth sternite at center, the latter much less than half as long as sixth sternite at same point; smaller and more slender species, the scutellum generally more or less evidently alutaceous apically. 21

21. Ventral surface of hypopygium about as long as fourth and fifth sternites combined on central line (Fig. 180), the surface slightly convex and impunctate on each side of a central punctate area, the dorsal rim glossy and impunctate on the greater portion of the lateral angles.
neobisignata McAtee and Malloch.
 Ventral surface of hypopygium much shorter than sternites four and five combined on central line, usually rather evenly punctured and not noticeably convex on each side of middle, the lateral angles of dorsal rim granulose or punctate.....22
22. Hind margin of hypopygium straight or low convex, without median emargination.....23
 Hind margin of hypopygium with a shallow emargination.....25
23. Sixth sternite with numerous, evenly distributed punctures; sternites four to six with conspicuous reddish lateral margins.....*mayana* sp. nov.
 Sixth sternite with fewer punctures, which are coarser and closer together laterally, finer and farther apart medially; sternites four to six not pale-margined.....24
24. Dorsal rim of hypopygium nearly flat.....*inops* sp. nov.
 Dorsal rim of hypopygium distinctly sloping inwardly.....*bergiana* sp. nov.
25. Hind margin of hypopygium evenly and very slightly emarginated from side to side (Fig. 183); dorsal rim declivitous from anterior margin...*media* sp. nov.
 Hind margin of hypopygium with a central emargination distinctly differentiated from a convex portion each side (Fig. 176); dorsal rim with a flat portion of noticeable width anteriorly.....26
26. Vertex produced more than length of eye beyond anterior transocular line, copiously, coarse-punctate, except posteriorly.....*bisignata* sp. nov.
 Vertex produced less than length of eye beyond anterior transocular line, with fewer and shallower punctures.....*fimbriata* sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Corium maculate; puncturing less pronounced:
pallipennis, *tabellula*, *bisignata*, *bergiana*, *inops*, *neobisignata*,
fimbriata, *media*, *mayana*, *mexicana*, *altera*, *costomaculata*,
imitans.

Corium concolorous; puncturing more pronounced:
porcata, *casta*, *carbonata*, *obovata*.

121. *Galgupha (Psestophleps) altera* sp. nov.

Black, corial patch yellow, bordered interiorly by brownish, about half as long as corium not reaching claval suture; antennæ, beak, and tarsi testaceous; margin of venter reddish-tinged.

Head produced about one and one-half times length of eye beyond anterior transocular line, truncate anteriorly, margins nearly straight from eye to truncation; vertex obsoletely punctate discally each side

of tylus, smooth elsewhere. Pronotum with a group of coarse but shallow punctures laterally, a few about ends of transverse impression somewhat rastrate, nearly impunctate elsewhere. Scutellum alutaceous, almost impunctate on anterior disk, moderately punctate elsewhere, punctures tending to be in irregular rows, declivity somewhat wrinkled transversely. Venter numerously punctate, somewhat smoother medially; sixth sternite rounded anteriorly, nearly as long as preceding three together, fifth and fourth only a little constricted medially; genital plates punctate, less than half as long as sixth sternite; slightly shorter than postventer, distinctly shorter on inner than on posterior margin, the latter transverse, but slightly concave. Length 4 mm.

Holotype female, Brazil, Pippingskoeld (Helsingfors Museum).

122. **Galgupha (Psestophleps) bergiana** sp. nov.

Black, shining, corial patch pale yellowish; tarsi, beak, and antennæ testaceous, the last two organs sometimes more or less infuscated.

Head produced less than length of eye beyond anterior transocular line, front margin carinate-edged, but scarcely reflexed, broadly subtruncate anteriorly, slightly concave between truncation and eye; vertex coarsely punctate on discal portions, almost smooth near margins, tylus transversely wrinkled anteriorly, lightly punctate posteriorly; pronotum coarsely punctate antero-laterally, lightly rastrate in extremities of transverse impression, almost impunctate elsewhere; scutellum almost smooth on anterior disk, numerously punctate elsewhere, more or less transversely wrinkled and alutaceous on declivity; mesorium and veins apically densely punctate; venter moderately coarse-punctate laterally, smoother medially; sternite six of male narrowly rounded (scarcely subangulate) anteriorly, about as long as preceding three sternites together, each of which is slightly constricted medially, and a little rounded, prominent in middle anteriorly; ventral exposure of hypopygium punctate, nearly flat longitudinally, hind margin scarcely reflexed, almost evenly convex (Fig. 181); dorsal rim widest and flattest laterally, anterior wall narrower more declivitous, posterior narrowest and steepest of all; sixth sternite of female rounded anteriorly, a little produced at middle posteriorly, greater in median length than the preceding two, but not the three sternites together, the latter moderately constricted medially; genital plates punctate, less than half as long as sixth sternite, and shorter than postventer; inner margin two-thirds as long as posterior, the latter slightly concave and oblique. Length 3.5-4 mm.

Holotype male and *allotype* female, Bahia, Brazil, A. David (Paris Museum); *paratypes* Santarem, Brazil; Taperina, Brazil, September (Carnegie Museum); Hohenau, Alto Paraná, Paraguay, H. Richter; Province of Salta, Argentina, J. Steinbach (Berlin Museum); Puerto

Max, Paraguay, Louis des Arts Jr., (Hamburg Museum); Castilla del Monte, Cordoba, Argentina, Hosseus (Munich Museum); Peru, M. Kirsch (locality correct?) (Dresden Museum).

This species is dedicated to C. Berg, the Argentine Entomologist, who described several species of Thyreocorids from his country.

123. *Galgupha (Psestophleps) bisignata* sp. nov.

So similar in general is this species to *bergiana* that it is scarcely worth while describing any but the genital characters. Outline of head and pronotum as in Fig. 178; corium as in Fig. 57. Sixth sternite subangulate in male, nearly as long as the preceding three sternites together, of which the fifth and fourth are moderately constricted medially; ventral exposure of hypopygium ample, punctate, slightly transversely channeled, hind margin broadly concave medially, convex laterally (Fig. 176); dorsal rim broad laterally, and moderately sloping, half as wide anteriorly and more steeply declivate, posterior wall depressed corresponding to the emargination; sternites of female but little smoother medially than laterally; sixth rounded anteriorly, a little subangulately produced in the middle posteriorly, longer than the preceding two, but shorter than the preceding three sternites together, of which the fifth is distinctly constricted medially; genital plates, punctate, scarcely half as long as sixth sternite, decidedly shorter than postventer; inner margins less than half as long as posterior, the latter concave, but transverse in position. Length 3.75-4 mm.

Holotype male, Province Salte, Argentina, Jan. 2, 1897; *allotype* female, Province Tucuman, Argentina, Nov. 14, 1897, S. Venturi (Argentine Museum) Rio Salado, Santiago del Estero, Argentina, 1909, E. R. Wagner (Paris Museum); Brazil (Stettin Museum); Rio de Janeiro, Kinberg (Stockholm Museum); Ledesma, Argentina, Feb. 19, 1929, H. A. Jaynes (U. S. N. M.).

One of the species of this group probably is *Thyreocoris flavobisignatus* Berg (Hem. Arg., 1879, pp. 17-18) but the original description does not mention genital characters, and the type does not seem to be extant.

124. *Galgupha (Psestophleps) carbonata* sp. nov.

Deep black, shining; tarsi, beak, and antennæ testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin truncate medially, slightly sinuate between truncation and eyes; vertex coarsely, mostly rastrate punctate everywhere, except on posterior part of tylus and occipital

strip; pronotum coarsely punctate laterally, the punctures being round anteriorly and more or less rastrate posteriorly and about extremities of transverse impression, remainder of dorsal surface with fine puncturing; scutellum finely punctate discally, densely and coarsely so peripherally, posteriorly the punctures become rastrate, and the interspaces between punctures alutaceous, so that on the declivity the appearance suggests that of combed steel wool; mesocorium and veins posteriorly numerous punctate; sternites copiously and coarsely punctate, laterally, smoother medially, sixth sternite of female rounded anteriorly, a little convex produced in middle posteriorly, about as long as the preceding two sternites together, each of which is slightly constricted medially; genital plates punctate, about half as long as sixth sternite, and a little shorter than postventer, inner portions somewhat elevated, inner margins about half length of posterior, the latter slightly concave, but transverse in position. Length 5 mm.

Holotype female, Gobierno Chaco, Argentina, Nov. 20, 1897, S. Venturi (Argentine Museum).

The hind tibiæ are missing, so it is possible, although not probable, that this species pertains to another group.

125. *Galgupha (Psestophleps) casta* sp. nov.

Black, with æneous reflections; tarsi, beak, and antennæ testaceous.

Head produced more than length of eye beyond anterior transocular line, front margin reflexed, truncate medially, slightly sinuate laterally; vertex coarsely punctate discally, finely so peripherally and on tylus; pronotum coarsely punctate antero-laterally, finely so elsewhere; scutellum numerous punctate peripherally, most coarsely so anteriorly, and more sparsely and finely punctate discally; mesocorium and veins punctate; lateral area of metapleurum punctate along inner-side; sternites copiously coarse-punctate laterally, smoother medially, especially the sixth; the latter broadly rounded anteriorly, nearly as long as the preceding three together, all of which are moderately constricted medially; genital plates copiously punctate, nearly half as long as sixth sternite, about as long as postventer, inner margins about two-thirds as long as posterior, the latter straight and transverse. Length 4 mm.

Holotype female, Villa Ana, F. C. S. Fe, Argentina, September, 1925, K. J. Hayward (British Museum).

126. *Galgupha (Psestophleps) costumaculata* sp. nov.

The corial patch, which varies from yellowish to reddish, is markedly restricted, invading the mesocorium but little; it is more or less infuscated peripherally; the general color is a deeper black than in *bergiana* and *bisignata*.

Head produced about length of eye beyond anterior transocular line; distribution of puncturing about as in *bergiana* and *bisignata*, but the larger punctures are much coarser and more deeply impressed; declivity of scutellum more or less rastrate, decidedly so in females; sternites copiously punctate, nearly smooth medially in males, but punctate there in females, although to a less degree than laterally; sixth sternite of male subangulate anteriorly, distinctly convex produced in middle posteriorly, longer than the preceding three sternites together, all of which are moderately constricted medially, and each of which has the anterior margin a little produced at the middle; ventral exposure of hypopygium sparsely punctate, hind margin distinctly reflexed, shallowly concave medially, convex laterally, surpassed by a fringe of pale hairs; dorsal rim broadest laterally, about equally broad anteriorly and posteriorly, moderately sloping on all sides; sixth sternite of female rounded anteriorly, a little produced in middle posteriorly, as long as preceding three sternites together, none of which are more than moderately constricted medially; genital plates punctate, disk in general depressed below level of anterior and inner margins, less than half as long as sixth sternite, and distinctly shorter than postventer, inner margin not more than half as long as posterior, the latter distinctly concave, but almost transverse in position; subgenital plates pyriform, almost as large as the genital plates. Length 4.5-5 mm.

Holotype male, Paraguay, Sept. 10, Fiebrig (Berlin Museum); *allotype* female Sapucay, Paraguay, W. T. Foster (U. S. N. M.); *paratypes*, Brazil (Hamburg Museum); San Luis, Paraguay, Reimoser; San Salvador (probably a town, not the country of that name), Signoret Collection (Vienna Museum).

127. *Galgupha* (*Psestophleps*) *fimbriata* sp. nov.

Black, corial patch yellowish-orange; margin of venter faintly reddish; tarsi, beak, and antennæ testaceous.

Head produced less than length of eye beyond anterior transocular line, front margin of vertex truncate medially, slightly sinuate between truncation and eye; vertex coarsely punctate medially each side of tylus, almost impunctate, anteriorly, posteriorly, and on tylus; pronotum coarsely punctate antero-laterally, more or less finely rastrate in transverse impression, nearly impunctate elsewhere; scutellum almost impunctate on anterior disk, numerous punctate elsewhere, most coarsely so in antero-lateral angles; mesocorium and veins punctate; sternites coarsely, although rather sparsely punctate, little smoother medially except sixth; sixth sternite of male subangulate medially, as long as preceding sternites together, all of which are moderately constricted medially, ventral exposure of hypopygium punctate, slightly channeled transversely, hind margin slightly con-

cave medially, convex laterally, surpassed in unworn specimens by a fringe of cilia from the dorsal rim, the latter with the hind wall sloping, the remainder nearly flat, much the broadest at lateral angles; sixth sternite of female broadly rounded anteriorly, slightly produced in middle posteriorly, preceding sternites moderately constricted; genital plates punctate, less than half as long as sixth sternite, a little shorter than postventer; inner margin less than half as long as posterior, the latter slightly concave, transverse in position. Length 3.5 mm.

Holotype and *paratype* males, La Guayra, Otto (Berlin Museum); *paratype* male, Macuto, near La Guayra, C. Cageo, Aug. 17, 1906; *allotype* female and *paratype* male, Paramaribo, Dutch Guiana, C. Heller (Hamburg Museum).

128. *Galgupha (Psestophleps) imitans* sp. nov.

Like *costomaculata* except as noted in key. Female genitalia as follows: sixth sternite broadly rounded anteriorly; genital plates punctate, about as long as fifth sternite and about one-third as long as sixth, distinctly shorter than postventer, hind margins concave, but nearly transverse in position. Length 5 mm.

Holotype female, Rio de Janeiro, Brazil, December (Carnegie Museum).

129. *Galgupha (Psestophleps) inops* sp. nov.

Æneous-black, corial patch about half as long as corium, pale orange; tarsi, beak, and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line; front margin reflexed, emarginate truncate medially, slightly sinuate laterally; vertex with shallow coarse punctures laterally, anterior part of tylus transversely rugulose, broad occipital region nearly impunctate; pronotum coarsely punctate antero-laterally, a little rastrate in transverse impression, nearly smooth elsewhere; scutellum finely punctate on disk, coarsely so laterally, rastrate on declivity; mesocorium and veins punctate; lateral area of metapleurum punctate along inner side; sternites coarsely punctate laterally, more finely so medially in male, more evenly distributed and more nearly uniform in size in female; sixth sternite of male subangulate anteriorly, about as long as the preceding three sternites together; ventral exposure of hypopygium coarsely punctate, hind margin distinctly reflexed, almost evenly low convex from side to side; dorsal rim granulate, broadest laterally, almost evenly though slightly concave from side to side; sixth sternite of female rounded anteriorly; genital plates punctate, less than one-half as long as sixth sternite, distinctly shorter than postventer, inner margins about two-thirds

as long as posterior, the latter distinctly concave, but transverse in position; subgenital plates subpyriform in outline, of about three-fourths the area of genital plates. Length 4 mm.

Holotype male and *allotype* female, Brazil (Dresden Museum).

130. **Galgupha (Psestophleps) mayana** sp. nov.

Black, corial patch and lateral margins of sternites four to six reddish-orange; tarsi and antennæ testaceous, beak more infuscated.

Head produced about length of eye beyond anterior transocular line; front margin feebly carinate, truncate anteriorly, nearly straight between eye and truncation; vertex with scattered coarse punctures except posteriorly; pronotum almost impunctate except antero-laterally; scutellum numerously punctate peripherally, smooth discally; mesocorium with scattered punctures; sternites densely punctate laterally, smoother medially, but punctures more obvious discally than usual, especially on sternite six; the latter angulate anteriorly, the fifth, however, only slightly constricted medially; ventral exposure of hypopygium punctate, with a triangular depressed area based cephalad, the apex of which touches hind margin; the latter distinctly reflexed, nearly straight; dorsal rim broad, most so laterally, moderately sloping inwardly. Length 3.5 mm.

Holotype male, Honduras, Hjalmarson (Stockholm Museum).

131. **Galgupha (Psestophleps) media** sp. nov.

Black, corial patch, which is less than half as long as corium, pale yellow; posterior sternites faintly reddish laterally; beak, antennæ, and tarsi testaceous.

Head produced about length of eye beyond anterior transocular line, front margin more or less truncate anteriorly and sinuate laterally, vertex coarsely punctate, discally, tylus and periphery in general nearly smooth; pronotum coarsely punctate antero-laterally including extremities of transverse impression, nearly smooth elsewhere; scutellum alutaceous, moderately punctate peripherally, anterior disk nearly impunctate; corium with a few indistinct punctures besides those along veins; sternites with numerous rather coarse punctures, smoother medially, sixth mostly smooth; sixth sternite of male subangulate anteriorly, slightly convex posteriorly in male; somewhat longer than preceding three sternites together, each of which is moderately constricted medially; ventral exposure of hypopygium rather large, sparsely and irregularly punctate, hind margin slightly reflexed and a little concave medially as viewed from below (Fig. 183); dorsal rim widest laterally, about equally wide anteriorly and posteriorly, distinctly, though not abruptly, basined; sixth sternite of female rounded anteriorly, almost evenly concave posteriorly; genital plates of female with subobsolete punctures less than half as long as

sixth sternite and distinctly shorter than postventer, inner margin less than half length of posterior, the latter slightly concave, transverse in position. Length 3-3.5 mm.

Holotype male and *allotype* female, Demerara, British Guiana, March 19, 1901, R. J. Crew (British Museum); *paratype* female, near Paramaribo, Surinam, March 1908, C. Heller (Berlin Museum).

132. **Galgupha (Psestophleps) mexicana** sp. nov.

Black, shining, with slight æneous reflections; corial patch yellow.

Outline of head and pronotum as in Fig. 179. Head produced not more than length of eye in male, and less in female, beyond anterior transocular line; puncturing about as in *bergiana*, but less evident in ends of transverse impression, a larger discal area on the pronotum, therefore, nearly smooth; the same is true of the scutellum; meso-corial vein more evident than in the other species.

Venter densely punctate with more tendency to be smooth medially in the female, than in male, which is unusual; sixth sternite of male subangulate both medially and laterally on anterior margin; no longer than the preceding two sternites together, neither of which is notably constricted; ventral exposure of hypopygium brief, sparingly punctate, hind margin broadly smooth and distinctly reflexed, slightly concave medially, convex laterally, surpassed by an inconspicuous fringe of hairs; dorsal rim about equally broad from lateral angle to lateral angle around anterior side, this part very moderately sloping, hind wall narrower, more declivate; sixth sternite of female broadly rounded anteriorly with indications of lateral subangulations, slightly convex-produced posteriorly, about as long as preceding two sternites together, neither of which is much constricted medially; genital plates punctate, disk in general depressed below level of anterior and inner margins, scarcely half as long as sixth sternite, nor quite as long as postventer, inner margin about half as long as posterior, the latter slightly concave but transverse in position. Length 4.5 mm.

Holotype male and *allotype* female, Colima Vulcano, Mexico, L. Conrad (U. S. N. M.); *paratypes* same locality, 1918, J. Laue (Munich Museum); Cachahuamilpa, Mexico, Aug. 19, 1926 (Stettin Museum); Mexico (Vienna Museum); Manzanilla, Mexico, September, 1907, R. Pressler (Hamburg Museum).

133. **Galgupha (Psestophleps) neobisignata** McAtee and Malloch.

Galgupha (Psestophleps) neobisignata McAtee, W. L., and Malloch, J. R., Ann. Mus., Zool. Poland, VII, 1928, p. 42 [Brazil, Argentina, Paraguay, Uruguay].

Black, basal third of corium pale yellowish, the marking extending to claval suture, and along edge of scutellum posterior to claval suture;

tarsi, beak, and antennæ testaceous, the latter two appendages sometimes considerably infuscated.

Head produced about length of eye beyond anterior transocular line, front margin more or less truncate medially and sumate laterally, vertex sparsely provided with moderately impressed punctures; pronotum laterally and scutellum peripherally with rather coarse punctures, becoming fine and subobsolete on disks of these sclerites, the discal punctures on pronotum tending to be astrate; veins thickly, and mesocorium and clavus sparsely, punctate; sternites moderately punctate, smoother medially, sixth subangulate in male, narrowly rounded in female, fifth and fourth, distinctly constricted medially in both sexes; ventral exposure of male hypopygium ample, sparingly punctate, hind margin slightly reflexed, noticeably concave medially and convex laterally, as viewed from below (Fig. 180); dorsal rim nearly flat and polished, widest, but not greatly so, laterally, the lateral angles and parts anterior much like a capital U in outline, posterior rim thin, steeply declivate, depressed medially, somewhat carinate-elevated laterally; sixth sternite of female longer than the preceding two but not so long as the preceding three sternites together, a little produced in middle posteriorly; genital plates of female punctate, two-thirds as long as sixth sternite, and longer than postventer, inner margin three-fourths as long as posterior, the latter, slightly concave, and oblique. Length 3.5-4.5 mm.

Holotype male, Chaco de Santiago del Estero, bords du Rio Salado, environs d'Icano, E. H. Wagner, 1904; *paratype* male, Province de Minas Geraes, Brazil, 2100 meters, E. R. Wagner, 1902; *allotype* female, Province de Corrientes, Argentina, D'Orbigny, 1834 (Paris Museum); *paratypes*, Chapada, Brazil, April; St. Helena, Paraguay (Carnegie Museum); Corrientes and Ppa. Ctl., Argentina (Argentine Museum); Marechal Mallet, Jan. 19, 29, 1922; Rio Claro, Serra da Esperanza, Feb. 4, 6, 12, 1922; São Domingo, Feb. 21, 22, 25, 1922; Rio da Areira, March 6, 1922; Fazenda Durski, March 31, April 4, 5, 6, 1922; Cara Pintado, May 19, 20, 1922, all in Paraná, Brazil, (Polish Museum); Rio Grande do Sul, Brazil; Montevideo, Uruguay, Breddin Collection (Deutsches Ent. Inst.).

The following specimens were received too late for listing in connection with the original description and therefore are not *paratypes*: America, Sellow; Hohenau, Alto Paraná, Paraguay, H. Richter; Province of Salta, Argentina, 2500 m., J. Steinbach (Berlin Museum); La Merced, Argentina, Reimoser; Rio Grande do Sul, Brazil, Stieglmayr (Vienna Museum); San Ignacio, Misiones, Argentina, 1910, 1911, E. R. Wagner (Paris Museum); Tucuman, Argentina; Rio Grande, Iguarassu (British Museum); Guiana, Leprieur (locality

correct?) (Paris Museum); Porto Allegre, Brazil; Asunción, Paraguay, H. Taeuber (Munich Museum).

134. *Galgupha (Psestophleps) obovata* sp. nov.

Black, moderately shining; tarsi, beak, and antennæ testaceous, apical two segments of antenna more or less infuscated.

Head produced a little more than length of eye beyond anterior transocular line; front margin truncate medially, slightly convex from truncation to eye; vertex coarsely punctate discally, nearly impunctate peripherally; pronotum coarsely punctate laterally, nearly impunctate discally; scutellum numerously punctate, except on anterior disk which is nearly smooth, declivity more or less rastrate; mesocorium and veins punctate; sternites numerously punctate, smoother medially; sixth sternite of male subangulate anteriorly, as long as all of the preceding sternites combined; ventral exposure of male hypopygium (Fig. 182) coarsely punctate, its hind margin distinctly reflexed, broadly concave, surpassed by a fringe of pale hairs; dorsal rim moderately sloping anteriorly and posteriorly, broadest and somewhat tumid laterally; sixth sternite of female narrowly rounded anteriorly, about as long as the preceding three sternites together, all of which are distinctly constricted medially; genital plates, punctate, less than half as long as sixth sternite, shorter than postventer; hind margins concave, and somewhat anteriorly oblique. Length 4.5-5 mm.

Holotype and *paratype* females, Province of Salta, Argentina, 2500 m., J. Steinbach (Berlin Museum); *allotype* male, Chicoana, Salta; *paratypes*, La Merced, Zuviria, and San Antonio, Argentina (Vienna Museum); Guemes, Argentina, Feb. 18, 1929, on cane, H. A. Jaynes (U. S. N. M.).

135. *Galgupha (Psestophleps) pallipennis* sp. nov.

Æneous-black anteriorly, reddish brown posteriorly; corium chiefly pale as described in key; underside and legs chiefly castaneous, tarsi, beak, and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line; front margin slightly reflexed, subtruncate anteriorly, slightly sinuate laterally; vertex finely punctate near anterior margin and on most of tylus, nearly impunctate posteriorly, coarsely punctate elsewhere; pronotum coarsely punctate antero-laterally, somewhat rastrate in extremities of transverse impression, finely punctate elsewhere; scutellum finely punctate in general, rather coarsely punctate antero-laterally; mesocorium and veins punctate; lateral area of metapleurum impunctate; sternites copiously punctate laterally, nearly smooth medially, sixth sternite broadly polished discally, rounded anteriorly, a little longer on median line than fifth and fourth together, neither of

which is much constricted medially; genital plates punctate; less than half as long as sixth sternite, and about equal to postventer; inner margins three-fourths as long as posterior, the latter slightly concave. Length 3.25 mm.

Holotype female, Brazil, 1840, Barreto (Paris Museum).

136. **Galgupha (Psestophleps) porcata** Horvath.

Galgupha porcata Horvath, G., Am. Mus. Nat. Hung., VII, 1919, pp. 217-218 [Argentina].

Galgupha lugubris Horvath, G., *l.c.*, p. 218 [Argentina, Paraguay].

Black, antennæ, beak, and tarsi, testaceous.

Head produced about length of eye beyond anterior transocular line, front margin truncate anteriorly, then slightly concave to eyes; vertex copiously punctate except on extreme rear margin; pronotum coarsely punctate near lateral margins anteriorly, finely subobsoletely punctate elsewhere; scutellum finely punctate on anterior disk, copiously and more coarsely so elsewhere; sternites as described in key, sixth of male angulate anteriorly, the preceding three more or less constricted medially, fifth and fourth distinctly so; ventral exposure of hypopygium (Fig. 184) short, punctate, hind margin slightly reflexed very broadly, but also very shallowly, emarginate, dorsal rim flat and broad anteriorly, broader and somewhat sloping laterally, hind wall thin and more declivitous within; sternite six of female broadly rounded anteriorly, fifth considerably, and fourth slightly constricted medially; genital plates sparsely punctate, almost flat, hind margin nearly straight and transverse; area of genital, not more than a third greater than that of the subgenital plates. Length 3.75-4.5 mm.

Holotype male of *porcata*, Tucuman, Argentina, 1906, Vezenyi; *paratype* male, Metan, Salta, Argentina, 1906, Vezenyi; *holotype* female of *lugubris*, Mendoza, Argentina; *paratype*, Puerto Max, Paraguay, 1905, Vezenyi (Budapest Museum); other specimens from Corumbá, Brazil, March (Carnegie Museum); Provinces of Salta and Jujuy, Argentina (Argentine Museum); Provincia Mendoza, Argentina (Jensen-Haarup); Rio Salado, Chaco de Santiago, February (Helsingfors Museum); Argentina, Grüning (Hamburg Museum); Chaco, Paraguay, Fiebrig; Bahia, Brazil (Vienna Museum); Bolivia (British Museum).

137. **Galgupha (Psestophleps) tabellula** sp. nov.

Black, entire exposed corium pale reddish, except in some cases for a slight infuscation basally, and a dark marking behind middle bordering scutellum; clavus black, tarsi, beak, and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line, front margin slightly sinuate before eye, apex subtruncate; vertex with coarse, but not deep, punctures except on hind part of tylus and occipital strip; punctures of pronotum and scutellum well marked only laterally, nearly obsolete discally; mesocorium and veins punctate. Lateral area of metapleurum acute anteriorly; sternites with large but sparse and lightly impressed punctures subdiscally, only obsoletely punctate elsewhere; sixth subangulate anteriorly in male, fifth and fourth distinctly constricted medially; ventral exposure of hypopygium semi-elliptical, indistinctly punctate, hind margin slightly reflexed, almost evenly convex as seen from below, dorsal surface shallowly basined, rim much the widest laterally, top of hind wall almost as broad as anterior rim; sixth sternite broadly rounded in female, fifth and fourth only slightly constricted medially; genital plates faintly punctate, more than half as long as sixth sternite, about equal in length to postventer, inner margin decidedly shorter than posterior, the latter transverse and slightly concave. Length 3-3.5 mm.

Holotype male and *allotype* female, Paramaribo, Surinam, April 20, 1908, Heller; another female with genital plates a little longer, possibly not the same species, same locality, September 1907 (Berlin Museum).

Subgenus PTERONOMOS subgen. nov.

Principal characters: Strip between costal carina and base of cubital vein depressed and flattened (Fig. 186), stem of exocorial vein obsolete or nearly so; corium pointed apically, the branches of exocorial vein connate apically; lateral area of metapleurum punctate bordering ostiolar surface; hind tibia with longitudinal carinate line posteriorly; second antennal segment not more than one-third as long as third; outline (Fig. 185) more oblong than usual in the genus. Subgenotype *Galgupha* (*Pteronomos*) *oblonga* sp. nov.

This subgenus differs from all the other divisions of the genus in having a depressed and flattened, instead of convex area, between base of cubitus and costa.

KEY TO THE SPECIES.

1. Males.....2
Females.....7
2. Sixth sternite with a shallow subapical sulcus; hind margin of hypopygium (Fig. 188) shallowly concave, medially, convex laterally; apex of corium usually yellowish; tylus with as distinct punctures on posterior as on anterior half; vertex not sinuate on sides.....*ruficornis* Dallas.
Sixth sternite lacking submarginal sulcus, although the apical margin in some cases may be microscopically reflexed; hind margin of hypopygium varying from nearly straight to distinctly convex.....3

3. Tylus with distinct punctures on posterior as well as on anterior half; margin of vertex decidedly sinuate before eyes. 4
 Tylus less evidently punctate on posterior than on anterior half; margin of vertex before eyes varying from slightly concave to convex. 5
4. Punctures on posterior part of tylus in a definite median band, paralleled by a polished vitta on each side; dorsal rim of hypopygium deeply excavated (Fig. 189) **vittifrons** sp. nov.
 Punctures on posterior part of tylus irregularly arranged, no polished vittæ; dorsal rim of hypopygium shallowly excavated (Fig. 190).
 **punctifrons** sp. nov.
5. Vertex finely and closely punctate laterally; hind margin of hypopygium regularly convex as seen from below (Fig. 192) **china** sp. nov.
 Vertex more coarsely and irregularly punctate laterally; hind margin of hypopygium otherwise 6
6. Hind margin of hypopygium almost transverse as seen from below (Fig. 191); apex of corium not distinctly yellow, sometimes brownish. . **oblonga** sp. nov.
 Hind margin of hypopygium slightly concave as seen from below (Fig. 191); apex of corium conspicuously yellow. **australis** sp. nov.
7. Genital plates much less than half as long as sixth sternite; third segment of antenna about six times as long as second; vertex shallowly and sparsely punctate, the tylus practically impunctate. **amitta** sp. nov.
 Genital plates at least half as long as sixth sternite; third segment of antenna not more than four times as long as second; vertex more conspicuously punctate, the tylus punctate on at least its anterior half. 8
8. Genital plates fully two-thirds as long as sixth sternite; vertex closely and finely punctate. **china** sp. nov.
 Genital plates less than two-thirds as long as sixth sternite; vertex rather coarsely punctate. 9
9. Sixth sternite broadly rounded anteriorly (Fig. 187); apex of corium yellow.
 **ruficornis** Dallas.
 Sixth sternite more or less angulate anteriorly. 10
10. Apex of corium conspicuously yellowish; sixth sternite sharply angulate anteriorly, longer than posterior portion of venter. **australis** sp. nov.
 Apex of corium usually dark, sometimes inconspicuously yellowish; sixth sternite subangulate anteriorly, shorter than posterior portion of venter.
 **oblonga** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Vertex less densely punctate posteriorly:

china, oblonga, australis, amitta.

Vertex more densely punctate posteriorly:

vittifrons, punctifrons, ruficornis.

138. **Galgupha (Pteronomos) amitta** sp. nov.

This is a more robust (4.8 x 3 mm.) species than *oblonga*. The description of the latter, however, applies, except that the vertex of

amitta is produced only about the length of eye beyond anterior transocular line, and except for differences in genitalia pointed out in the key. Sixth sternite of female subangulate anteriorly, longer than the preceding two segments together, which are only slightly constricted medially; genital plates coarsely rugose-punctate, shorter than the fifth sternite and postventer, and less than half as long as sixth sternite, inner margins about two-thirds as long as posterior, the latter slightly concave. Length 4.8 mm.

Holotype female, Province of Buenos Aires, Argentina, Jan. 10, 1896, S. Venturi (Argentine Museum).

139. ***Galgupha (Pteronomos) australis*** sp. nov.

Like *oblonga*, except as noted in key. Ventral and dorsal views of male hypopygium as in Fig. 191. Length 3.5 mm.

Holotype male and *allotype* female, Hohenau, Paraguay, H. Taeuber (Munich Museum); *paratype* Alemania, Argentina, Reimoser (Vienna Museum).

140. ***Galgupha (Pteronomos) china***¹⁰ sp. nov.

Black; tarsi, antennæ, and beak testaceous to subfuscous; sometimes the basal three segments of antennæ are pale, the apical two darker.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin low carinate, varying from almost evenly rounded to slightly emarginate both medially and laterally; vertex with numerous coarse punctures, except on upper part of tylus and posteriorly, where the punctures are small or subobsolete; puncturing of pronotum coarse laterally, finer or subobsolete elsewhere; scutellum copiously punctate peripherally, almost impunctate discally; mesocorium and veins punctate; sternites with scattered coarse punctures, smoother medially than laterally; sternite six of male angulate anteriorly; fifth and fourth varying in degree of constriction medially; ventral exposure of hypopygium (Fig. 192) punctate, hind margin slightly reflexed, evenly convex; dorsal rim (Fig. 192) narrow, widest at lateral angles, abruptly and deeply declivitous all around; sixth sternite of female less angulate anteriorly than that of male, sternites five and four distinctly constricted medially; genital plates densely punctate, three-fourths as long as sixth sternite and nearly twice as long as postventer; inner margins about four-fifths as long as posterior, the latter nearly straight, slightly posteriorly oblique in position. Length 3.5-4 mm.

¹⁰Named for W. E. China of the British Museum, who has assisted us with notes on various species in connection with this revision, and especially on *G. ruficornis* of the present subgenus.

Holotype male and *allotype* female, Pachitea, Peru, H. Taeuber (Munich Museum); *paratypes*, Sajama, Bolivia, 4000 meters (Munich Museum); Villa Ana, F. C. S. Fe, Argentina, January, February, 1925, K. J. Hayward (British Museum); Brazil (Stettin Museum).

141. **Galgupha (Pteronomos) oblonga** sp. nov.

Black, shining, apices of coria sometimes reddish-brown; antennæ, beak, and tarsi testaceous.

Outline as in Fig. 185. Head almost evenly rounded anteriorly, sometimes slightly emarginate medially or laterally, produced about one and one-half times length of eye beyond anterior transocular line; vertex moderately coarse-punctate except posteriorly; pronotum with a broad band of coarse punctures on each side, more or less rastrate in transverse impression, but with only traces of puncturing elsewhere; scutellum numerous punctate, except on anterior disk, which is practically smooth; mesocorium and veins punctate; sternites coarsely punctate laterally, a little smoother medially; sixth in male angulate anteriorly, fifth and fourth a little shorter medially than laterally; sixth shorter on median line than preceding sternites together; ventral exposure of hypopygium punctate, almost straight (Fig. 191) on posterior margin, which is slightly reflexed, the lateral angles rounded off; dorsal rim pale hirsute, narrow anteriorly with a large transversely elliptical excavation, rather abruptly declivitous both anteriorly and posteriorly, but gradually sloping from lateral angles; posterior wall thin, concave within; sixth sternite less angulate anteriorly in female than in male, and more amply emarginate posteriorly for reception of the genitalia, about as long as the preceding two sternites together; genital plates punctate, as long as fifth sternite, more than half as long as sixth sternite and somewhat exceeding postventer, inner margins three-fourths as long as posterior, the latter almost straight. Length 3.5-4.5 mm.

Holotype male, Alto Itatiaya, 7100 ft., Brazil, Feb. 21, 1922, E. G. Holt (McAtee); *allotype* female, Villarica, Paraguay, P. Jörgensen, October 1923; *paratypes* Chapada, Brazil, October (Carnegie Museum); Paraguay, Dr. Bohls (U. S. N. M.); Florencia, Gran Chaco, 1903; Las Garzas, Santa Fe, 1903; Rio Salado, Santiago del Estero, 1909; all the preceding by E. R. Wagner; Corrientes, D'Orbigny, 1834 (Paris Museum); Gobierno Chaco, Argentina, Nov. 24, 1897, S. Venturi (Argentine Museum). The last specimen as well as the type of *amitta* sp. nov. are labelled *Thyreocoris pampeanus* Berg, but we are unable to reconcile the characters of either with the original description; they are certainly not "ubique grosse denseque" punctate, Hohenau, Paraguay, H. Taeuber (Munich Museum).

142. *Galgupha (Pteronomos) punctifrons* sp. nov.

Black (dull in two specimens, shining in one); tarsi, antennæ, and beak testaceous.

Head produced one and one-half times length of eye beyond anterior transocular line, front margin reflexed, rounded, slightly emarginate anteriorly, slightly sinuate laterally; vertex coarsely punctate throughout, punctures a little more widely spaced, and the interspaces polished in region of tylus, especially posteriorly; puncturing of remainder of dorsal, and of ventral surface and form of genitalia from below as in *vittifrons*; dorsal rim of hypopygium, however, only moderately excavate, widest at, and more gently sloping within, lateral angles. Ventral and dorsal views of hypopygium as in Fig. 190. Length 3.5-4 mm.

Holotype and *paratype* males, Colon del Saoram, Sellow (Berlin Museum); *paratype* male, Buenos Aires, Signoret Collection (Vienna Museum).

143. *Galgupha (Pteronomos) ruficornis* Dallas.

Corimelæna ruficornis Dallas, W. S., List, I, 1851, p. 58 [Colombia].

Black, with æneous reflections, scutellum posteriorly more brownish; more or less of the apex of corium usually yellowish; tarsi, antennæ, and beak testaceous or darker.

Head produced somewhat more than length of eye beyond anterior transocular line; front margin carinate, rounded anteriorly, slightly emarginate laterally; vertex copiously, coarse-punctate except posteriorly; pronotum with coarse puncturing laterally and also extending thence more up on the disk than usual, with fine punctures along anterior margin, almost impunctate elsewhere; corium as in Fig. 186; mesocorium and veins punctate; sternites numerous punctate laterally, broadly smoother medially, especially sixth; the latter in male angulate anteriorly, fifth and fourth moderately constricted medially; ventral exposure of hypopygium punctate, hind margin distinctly reflexed, slightly concave medially, convex laterally (Fig. 188); the fringe of hair from dorsal surface of hypopygium visible from below is sometimes matted, the longer hairs at postero-lateral angles giving a toothed appearance; dorsal rim (Fig. 188) narrow, steeply sloping from almost the outer margin on all sides, central excavation deep; sixth sternite of female broadly rounded anteriorly; genital plates as in Fig. 187. Length 3.5-4 mm.

Holotype female, Magdalena, Colombia, May 6 (British Museum); males which we hope are properly associated are from Bogotá, Lindig (Stockholm Museum), and Colombia (Paris Museum).

144. *Galgupha (Pteronomos) vittifrons* sp. nov.

Scutellum mostly fuscous, corium reddish-brown, remaining upper parts black, tarsi, beak, and antennæ testaceous.

Head produced about length of eye beyond anterior transocular line, front margin reflexed, rounded and a little emarginate medially, distinctly sinuate laterally; vertex densely punctate everywhere, except for a polished streak (a little widened posteriorly) on each side of tylus; pronotum coarsely punctate antero-laterally and about extremities of transverse impression, finely punctate elsewhere; scutellum copiously coarse-punctate except on anterior disk, where the punctures are finer and sparser; mesocorium and veins punctate; lateral area of metapleurum partly faint-punctate; sternites sparsely coarse-punctate laterally, polished medially; sixth sternite subangulate anteriorly as long as the preceding three sternites together, the fifth and fourth of which are distinctly constricted medially; ventral exposure of hypopygium copiously punctate, about as long as fifth sternite medially, and scarcely one-third as long as sixth, hind margin reflexed, almost low concave; this and dorsal rim of hypopygium as in Fig. 189. Length 3 mm.

Holotype male, Mendoza, Argentina, Dec. 24, 1904, Jensen-Haarup (Berlin Museum); *paratype* male, Bolivia, Signoret Collection (Vienna Museum).

Subgenus CHARODA¹¹ new subgenus.

Principal characters: Corium (Fig. 58) pointed apically, exocorial vein not distinctly furcate, the remnant of inner branch paralleling cubitus posteriorly, the outer branch represented by a series of faint punctures, mesocorium without vein; hind tibia with carinate line; second antennal segment almost as long as third. Subgenotype, *Galgupha (Charoda) simplex* sp. nov.

145. *Galgupha (Charoda) simplex* sp. nov.

Black; tarsi, beak, and antennæ testaceous.

Outline of head and pronotum as in Fig. 193. Head produced about length of eye beyond anterior transocular line; front margin distinctly carinate, concave-truncate medially, sinuate to eyes, where the margin distinctly protrudes beyond line of eyes; vertex depressed subapically, coarsely punctate, except posteriorly. Pronotum shouldered anteriorly so that lateral margins are subparallel; punctate throughout, most coarsely so antero-laterally, obsoletely so distally, punctures in extremities of transverse impression more or less rastrate; scutellum copiously punctate, the punctures shallowest on

¹¹Named for Charles Robert Darwin.

anterior disk; corium as in Fig. 58; mesocorium and veins lightly punctate; lateral area of metapleurum impunctate; fore femur as in Fig. 194; sternites numerous punctate, somewhat smoother medially; sixth sternite of male subangulate anteriorly, as long as the preceding three sternites together, each of which is moderately constricted medially; ventral exposure of male hypopygium, large, semicircular, nearly flat, and almost vertical in position, sparsely punctate, and with undulating transverse wrinkles, hind margin distinctly round-carinate, shallowly concave just at middle; dorsal rim widest at lateral angles, smoothly rounded, anterior rim with a transverse crescentic carina, hind wall thin, central depression, abrupt, deep, hoof-shaped; sternites of female more coarsely punctate than in male, but smooth medially; sixth subangulate anteriorly, about as long as the preceding two sternites together, each of which (as well as sternite three) is moderately constricted medially, and slightly subangulate on anterior margin; genital plates punctate, more than half as long as sixth sternite, and about equal in length to postventer; inner margins slightly elevated, about two-thirds as long as posterior, which are nearly straight and transverse. Length 3-3.5 mm.

Holotype male, *allotype*, and *paratype* females, Chili, Gay (Paris Museum); *paratype* female, Valparaiso, Chili, Charles Darwin (British Museum); Brazil, "Alte Sammlung" [locality wrong?] (Hamburg Museum).

Subgenus ACRITOPHLEPS McAtee and Malloch.

Acritophleps McAtee, W. L., and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1928, p. 37 [Subgenotype *Galgupha* (*Acritophleps*) *luteomarginata* sp. nov.].

Principal characters: Corium (Fig. 59) pointed apically, exocorial vein not distinctly furcate, mesocorium with a vein (punctate line) paralleling scutellum, approaching cubitus and paralleling it posteriorly; hind tibia terete, without carinate line.

146. *Galgupha* (*Acritophleps*) *luteomarginata* McAtee and Malloch.

Galgupha (*Acritophleps*) *luteomarginata* McAtee, W. L., and Malloch, J. R., *loc. supra cit.*, pp. 37-38 [Brazil, Bolivia].

Æneous black, shining; corium castaneous to black; front margin of head, medially, costa (except carina), narrow hind margin of scutellum, connexivum, and legs from knees, luteous; antennæ and beak, testaceous.

Head broadly rounded anteriorly, more or less truncate medially, produced about one and one-half times length of eye beyond anterior transocular line; vertex carinate-margined, copiously and coarsely punctate, except on narrow occipital strip; pronotum and scutellum copiously punctate with coarse punctures laterally and finer ones

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

The reverse of that in the key.

147. *Galgupha (Astiroderma) albipennis* Eschscholtz.

Scutellera albipennis Eschscholtz, J. F., Entomographien, 1, 1822, pp. 103-104 [Concepción, Chile].

Odontoscelis marginipennis [Spinola, M.], in Gay, C., Historia física y política de Chile, Zoöl. VII, 1852, p. 117 [Santiago, Concepción, and various parts of the republic].

The oblong form with bluntly rounded extremities (Fig. 196), the shining piceous color, and pale exocorium (sometimes mesocorium in part) are characteristic; tarsi, beak, and antennæ testaceous.

Head produced about one to one and one-half times length of eye beyond anterior transocular line; front margin low-reflexed, varying from almost evenly rounded to more or less truncate medially, and straightish or subsinuate laterally; vertex copiously punctate, except posteriorly; pronotum coarsely punctate laterally, more or less rastrate in transverse impression, finely punctate elsewhere; scutellum copiously punctate peripherally, finely so even on anterior disk, more or less rugulose on declivity; mesocorium and veins punctate; outline of abdomen from side as in Fig. 200; sternites numerous punctate, sixth subangulate anteriorly in both sexes, sternites five to three each somewhat constricted medially, and with a slight secondary emargination anteriorly, paralleling angulation of sixth; the median area transversing these emarginations is almost impunctate, and usually also more or less flattened or depressed; ventral exposure of male hypopygium punctate throughout, hind margin slightly reflexed, and moderately, almost evenly convex as seen from below; dorsal rim broad and sloping from lateral angles, narrow and declivitous anteriorly where there are a median and two nearby flanking, rounded, elevations (Fig. 198); genital plates of female, punctate, short only about one-fourth as long as sixth sternite, and distinctly shorter than postventer, inner margins less than half as long as posterior, the latter concave, but transverse in position; genital, scarcely exceeding in area the subgenital, plates (Fig. 197). Length 3.5-4 mm.

KEY TO THE SUBSPECIES.

1. Mesocorium dark like the clavus, only the exocorium pale (Fig. 60); known range from Chili, north and east. **albipennis** Eschscholtz.
- Mesocorium (in addition to exocorium) in part or wholly pale; known range southern Brazil, Uruguay, and Argentina. **ampliata** subsp. nov.

147a. *Galgupha (Astiroderma) albipennis*
 subspecies *albipennis* Eschscholtz.

Bibliographic reference as under the species.

Chile, Uhler Collection (U. S. N. M.); Chile, Gay; Guiana, Leprieur (Paris Museum); Concepción, Chile, Feb. 10, 1904, P. Herbst (Deutsches Ent. Inst.); Chile, Phillipi (Berlin Museum); Cayenne, Deyroll (Leiden Museum); Guatemala (Berlin Museum); Chile (Stettin Museum); Valparaiso, Chile, 1921, 1923, R. Martin; Province of Aconcagua, Chile, Jose N. Thomas (Paris Museum); Valparaiso, Chile, C. Darwin (British Museum).

147b. *Galgupha (Astiroderma) albipennis*
 subspecies *ampliata* subsp. nov.

Brazil, Barreto, 1840 (Paris Museum); Bahia, Brazil; Province of Buenos Aires, Argentina, Jan. 1, 4, Nov. 6, 1896, Nov. 8, 1898, S. Venturi; Bahia Blanca (Argentine Museum); Lavalle, Ajo, Buenos Aires, Nov. 9, 1920, Alexander Wetmore (U. S. N. M.); Montevideo, Uruguay (Carnegie Museum); Brazil, Sellow (Berlin Museum); La Plata City, Argentina, May 30, 1896, Oldfield Thomas (British Museum).

148. *Galgupha (Astiroderma) breddini* sp. nov.

Like *albipennis*, except as noted in key and as follows; exposed corium pale except for disk of mesocorium and a streak along inner margin of cubital vein posteriorly, which are fuscous; outline of abdomen from side as in Fig. 201; ventral exposure of male hypopygium shorter, transversely channeled; dorsal rim almost as declivitous at lateral angles as antero-laterally, middle portion of anterior rim less declivitous forming a broad bridge to central disk, coarsely punctate (Fig. 199); genital plates of female punctate, about one-third as long as sixth sternite, and nearly as long as postventer, inner margins about half as long as posterior, the latter straight and transverse. Length 3.5-4.5 mm.

Holotype male, Rio Grande do Sul, Brazil, Breddin Collection (Deutsches Ent. Inst.); Rio Grande, January 1907, Ohaus (Dresden Museum).

Genus CYDNOIDES Malloch.

Cydnoides Malloch, J. R., in Hart, C. A., The Pentatomoidea of Illinois with Keys to the Nearctic Genera, Bull. Ill., State Nat. Hist. Survey, Vol. XIII, art. 7, June 1919, p. 208 (Genotype, *Corimelana ciliata* Uhler).

Principal characters: Spiracles nearer to the trichobothria than to the lateral margins of the sternites (Fig. 202); sternites with two or more moderately strong long bristles laterad of the trichobothria (Fig. 202); corium (Fig. 61) rounded or subacute at apex; mesocorium without a vein; sides of pronotum and the costa with long fine bristles (Fig. 61); lateral area of metapleurum punctate on inner margin; prothorax not gibbous in front.

We have divided the available material of this genus into subgenera as shown in the appended key. Unfortunately the South American species are represented in two cases by single examples and in a third by only two specimens; it is highly probably, however, that with careful collecting some of these will be found in greater numbers, as the fourth species is represented by a number of specimens. Only one of the North American species has been found east of the Mississippi River and that not north of North Carolina. In our experience the species occur usually in sandy regions and in such situations they frequently burrow at the roots of plants.

KEY TO THE SUBGENERA.

1. Hind tibia without a carinate line on posterior surface; exposed corium about as wide at apex as at base.....**Sayocoris** subgen. nov.
Hind tibia with a definite carinate line on posterior surface; exposed corium not nearly as wide at apex as at base (Fig. 61).....2
2. Prosternal sulcus shallow, much widened in front; corium rounded at apex.
Cydnoides Malloch.
Prosternal sulcus deep, the sides much elevated and not, or very slightly divergent in front; corium subacute at apex (Fig. 61).
Cosmarioides subgen. nov.

Subgenus CYDNOIDES Malloch.

Bibliographical reference as under the genus.

Principal characters: As given in the key to subgenera, and in addition with the mesopleurum with its outer posterior angle opaque, an oblique glossy stripe extending from anterior lateral angle backward in line with the elongate metapleural ostiolar canal, which reaches to the anterior edge of metapleurum, the two forming a continuous glossy stripe. Subgenotype: *Cydnoides* (*Cydnoides*) *ciliatus* Uhler.

KEY TO THE SPECIES.

1. Corium entirely fuscous to black, no part whitish; hind tibia with at least five posterodorsal bristles..... **ciliatus** Uhler.
 Corium partly white or cream-colored; hind tibia with not more than four posterodorsal bristles..... 2
2. Corium immaculate cream-colored, except on inner margin near middle, where there is a fuscous mark; clavus fuscous on inner margin only; scutellum in profile evenly rounded subapically..... **confusus** sp. nov.
 Corium cream-colored basally, fuscous apically, the intermediate area sometimes with dark punctures; clavus entirely fuscous; scutellum rather angularly declivitous subapically..... **renormatus** Uhler.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Same sequence as in the key.

149. **Cydnoides (Cydnoides) ciliatus** Uhler.

C(ormelæna) ciliata Uhler, P. R., Hemipterological Contributions, No. 1, Proc. Ent. Soc. Philadelphia, September, 1863, pp. 156-157 [San Francisco].

C(ormelæna) ciliata Uhler, P. R., List of Hemiptera of the Region West of the Mississippi River, Including those Collected during the Hayden Explorations of 1873, U. S. Geol. and Geogr. Survey Terr., Second Series 1876, Bul. No. 5, Article V, p. 270 [California, Oregon].

KEY TO THE SUBSPECIES.

1. Dorsum of thorax and scutellum more or less rastrate, these two sclerites when viewed from the side, forming an almost evenly curved outline, never more than slightly depressed at their juncture; color usually metallic greenish or bluish..... **orientis** subsp. nov.
 Dorsum of thorax and scutellum usually not rastrate, the two, when viewed from the side, usually showing a deep depression at their juncture; color castaneous to black usually without decided metallic reflections.
ciliatus Uhler.

149a. **Cydnoides (Cydnoides) ciliatus**, subsp. **ciliatus** Uhler.

Bibliographic reference as under the species.

Color as noted in key and as modified here; the corium, and margins of pronotum and head even in black specimens are reddish brown; underside castaneous, some times darker; tarsi, beak, and antennæ testaceous to castaneous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin varying from almost evenly rounded to more or less truncate medially and sinuate laterally; vertex

coarsely round-punctate in irregular oblique rows, except for a quad-rilobate posterior strip (as described for *albipennis*); pronotum punctate everywhere, except callosities, coarsely round-punctate laterally, more or less rastrate in transverse impression, finely round-punctate elsewhere; scutellum numerously punctate throughout, most coarsely so antero-laterally, most finely so on anterior disk; pronotum and scutellum typically without transverse wrinkles; corium punctate; venter, polished, rather lightly and sparsely punctate, broadly smooth medially; sixth sternite broadly subangulate anteriorly and less distinctly so laterally, convex in middle posteriorly in both sexes; sternites five and four distinctly constricted in female, but only slightly so in male; ventral exposure of hypopygium coarsely punctate, slightly channeled transversely, hind margin distinctly reflexed, slightly concave medially, convex laterally; dorsal rim moderately sloping all around, widest laterally, but almost as wide posteriorly as anteriorly; internal genitalia as in Figs. 35, 36; genital plates of female punctate, about one-half as long as sixth sternite and as long as postventer, inner margins slightly elevated, two-thirds as long as posterior, the latter nearly straight and slightly oblique. Length 4-5 mm.

In the Uhler collection only one specimen, a male, bears the label "St. Fran.," and this, supposedly is the holotype (U. S. N. M.); other specimens examined are from Oregon, California, southwestern Mexico; Las Cruz (Mexico?), Thieme (Berlin Museum); Nevada, New Mexico, and Utah.

149b. *Cydnoides (Cydnoides) ciliatus* subsp. *orientis* subsp. nov.

Differing from *ciliatus* as noted in key; color fuscous to piceous, most often, however, distinctly metallic bluish or greenish, the corium usually, more fuscous, the veins showing a testaceous cast; underside, and legs chiefly castaneous; antennæ and beak, chiefly, and tarsi testaceous.

More copiously and more decidedly punctate than *ciliatus*, the posterior half of pronotum and declivity of scutellum distinctly rastrate; pronotum usually with one or two transverse wrinkles anterior to the callosities and three or four posterior to them; scutellum also with indistinct transverse wrinkles. Length 4-4.5 mm.

Holotype male, Miami Beach, Fla., May 1922, H. R. Bailey; *paratypes*; Lake Worth, Fla., N. C., Mineola, Tex., July 19, 1906, Bishopp and Homes (U. S. N. M.); Scott Co., Minn., July 29, 1923, C. E. Mickel (Knight); Garden City, Kansas, June 1896, N. W. Menke (Iowa State College); Miami, Fla., Sept. 23, 1913, Wm. T. Davis (Barber); specimens from Missouri, Nebraska, and Colorado (U. S. N. M.) are intermediate.

150. *Cydnoides (Cydnoides) confusus* sp. nov.

Ground-color changing from black anteriorly to yellowish brown posteriorly, greenish reflections most decided on head, gradually reducing posteriorly, and disappearing on base of scutellum; corium whitish and a fuscous mark between cubitus and scutellum posteriorly; underside castaneous; sternites with pale lateral spots; legs from knees, and beak and antennæ, testaceous.

Head produced about length of eye beyond anterior transocular line; front margin distinctly reflexed, subtruncate medially, subsinuate laterally, vertex coarsely, almost contiguously punctate except on occipital strip; pronotum punctate everywhere except on and about callosities, punctures coarse and round antero-laterally, coarse and rastrate in ends of transverse impression, finer elsewhere; scutellum with numerous fine punctures throughout, those in antero-lateral angles coarse; corium moderately punctate; venter polished, sparsely punctate laterally, almost impunctate medially; sixth sternite rounded anteriorly, with no more than faint suggestions of subangulations, slightly convex in middle posteriorly, as long as the preceding two sternites combined, each of which is moderately constricted medially; genital plates coarsely but shallowly punctate, two-thirds as long as sixth sternite, longer than postventer, inner margins three-fourths as long as posterior, the latter nearly straight, and slightly oblique. Length 4 mm.

Holotype female, Mesilla Park, New Mexico, April 28, amongst *Euphorbia*, Cockerell; *paratype* female, Ft. Yuma, Arizona, H. G. Hubbard (U. S. N. M.); Colima, Mexico (Mex. Dept. Agr.); Texas (U. S. N. M.).

151. *Cydnoides (Cydnoides) renormatus* Uhler.

Corimelana renormata Uhler, P. R., in Gillette, C. P. and Baker, C. F., A Preliminary List of the Hemiptera of Colorado, Bull. No. 31 (Tech. Ser. No. 1), Colo. Agr. Exp. Sta., 1895, p. 11 [Rist Cañon, Colorado].

General color shining brownish-black, varying from reddish-brown posteriorly to piceous anteriorly; corium with a yellowish basal mark, not involving clavus, which in general extends over about one-third length of corium but is more or less trifurcate produced posteriorly, the costal branch sometimes traversing the entire costa; venter dark and legs paler castaneous, sternites slightly paler laterally; tarsi, beak, and antennæ stramineous.

Head produced about length of eye beyond anterior transocular line in female, somewhat more so in male; front margin distinctly reflexed, varying from narrowly rounded to more or less truncate or even concave medially, and more or less sinuate laterally; vertex numerous and coarsely punctate except on tylus posteriorly and on occipital

strip, where the punctures are sparse or lacking; pronotum numerously punctate except about callosities, the punctures largest antero-laterally and in ends of transverse impression, where more or less rastrate; scutellum numerously and almost uniformly punctate (punctures somewhat more emphasized in antero-lateral angles); corium moderately punctate, tending to be smooth bordering scutellum; venter moderately punctate laterally with a broad smooth median area which is almost impunctate; sixth sternite subangulate in middle anteriorly in both sexes, and with suggestions of lateral subangulations; fifth and fourth sternites moderately constricted medially; ventral exposure of male hypopygium, punctate, hind margin distinctly reflexed, shallowly concave-emarginate on the middle, nearly straight on the lateral, thirds, junctures of the portions subangulate; dorsal rim broadest laterally, nearly flat, central depression small, shallow, hind wall, thin, steep, depressed medially; genital plates of female punctate, two-thirds as long as sixth sternite, longer than postventer, inner margins two-thirds as long as posterior, the latter nearly straight, but slightly oblique in position. Length 3.25-4.25 mm.

Two females labelled Colo. 1858, and 2024, one of which probably is the *holotype*; a male labelled Colo. 1858, and another from Arizona, Cornell University Lot. No. 34; Torrance Co., N. Mexico, J. R. Douglass; Alamo Alto Sta., Texas, Aug. 22, 1930 (U. S. N. M.); Denver, Colo., July, (Barber); Lake Moraine, Pike's Peak, Colo., 10,000 ft., July 26, 1906, P. P. Calvert (Ac. Nat. Sci. Phila.).

SAYOCORIS Subgen. nov.

This subgenus is similar to *Cydnoides* in all characters, except that it lacks the hind tibial carina, and the apex of the corium is rather more bluntly rounded. Subgenotype, *Thyreocoris albipennis* Say.

KEY TO THE SPECIES.

1. Pronotum pale yellow on lateral margins, the anterior discal part varying from yellowish brown to piceous, posterior margin and scutellum testaceous.

albipennis (Say).

 Pronotum dark on lateral margins, the disc and scutellum testaceous to piceous. 2
2. Form more narrowed anteriorly; head produced about one and one-half the length of eye beyond anterior transocular line; hind margins of genital plates almost straight and transverse; general color above piceous.

peregrinus sp. nov.

 Form less narrowed anteriorly; head produced about the length of eye beyond anterior transocular line; hind margins of genital plates more or less concave and oblique; color above piceous anteriorly, castaneous or paler posteriorly.

obtusus (Uhler).

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

The same as in the key.

152. *Cydnoides (Sayocoris) albipennis* (Say).

T[hyreocoris] albipennis Say, Thomas, Descriptions of New Species of Heteropterous Hemiptera of North America, 1831, Complete Writings, 1859, Vol. 1, p. 311 [Missouri River].

Corimelana sayi Van Duzee, E. P., Annotated List of the Pentatomidæ Recorded from America North of Mexico, with Descriptions of Some New Species, Trans. Am. Ent. Soc., Vol. XXX, No. 1, 1904, p. 10 [New name for *Thyreocoris albipennis* Say supposed to be, but obviously not, preoccupied by *Scutellera albipennis* Eschscholtz, originally described in, and now assigned to a different genus].

Head, anterior half of pronotum discally, and anterior disk of scutellum fuscous, deepest on head; pronotum just behind transverse impression, and most of scutellum, pale yellowish; broad lateral margins and hind margin medially, of pronotum, and corium, except for a reddish to fuscous mark along cubitus, posteriorly, pale flesh-color (livid) to stramineous; venter and legs to knees castaneous; sternites with pale lateral semicircular spots; tibiæ, tarsi, antennæ, and beak, stramineous to testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin distinctly reflexed, subtruncate medially, subsinuate laterally; vertex coarsely reticulate-punctate, except on tylus posteriorly, and an occipital strip which is quadrilobate anteriorly, one to be along each eye, and one each side of median line; pronotum coarsely punctate laterally, coarsely rastrate in transverse impression except medially, sparingly punctate anteriorly except for callosities, almost impunctate on posterior disk; scutellum numerous punctate, the punctures most deeply impressed antero-laterally, least so on anterior disk which is almost smooth; corium moderately punctate; sternites moderately punctate laterally, broadly smooth medially; fore margin of sixth bluntly subangulate medially and laterally, and hind margin slightly convex in middle, as long as the preceding two sternites together, neither of which is much constricted medially; ventral exposure of hypopygium almost impunctate, hind margin distinctly reflexed, concave medially, convex laterally; dorsal rim widest laterally and almost flat all around anteriorly between lateral angles, hind wall narrow, depressed medially to level of central disk, central basin, small, shallow; internal genitalia as in Figs. 37, 38; genital plates of female, punctate, about half as long as sixth sternite, and a little longer than postventer, inner margins two-thirds as long as posterior, the latter somewhat sinuate, but nearly transverse in position; genitalia of female in expanded condition, Fig. 16. Length 3.5-4 mm.

Fort Collins, Colo., on *Glycyrrhiza lepidota*, Aug. 11, 1892, C. F. Baker (this is the specimen determined as *Corimelana renormata* by Van Duzee, *op. cit.*); Clark County, Kansas, March 2, 1922, Aug. 7, 1904, E. A. Popenoe (U. S. N. M.); Wray, Colo., Aug. 4, 1925, H. H. Knight (Knight Collection); C. J. Drake (Iowa State College).

153. *Cydnoides (Sayocoris) obtusus* Uhler.

Corimelana obtusa Uhler, P. R., Observations upon the Heteropterous Hemiptera of Lower California, with Descriptions of New Species, Proc. Calif. Acad. Sci., Ser. 2, Vol. IV, June 1894, pp. 225-226 [San Jorge, L. California].

Color above merging from yellowish-brown posteriorly to fusco-castaneous on head; corium to claval suture stramineous with a fuscous blotch between cubitus and scutellum posteriorly; venter castaneous, with indistinct pale lateral spots on sternites; tibiæ and tarsi stramineous, legs otherwise, antennæ, and beak, testaceous.

Form and sculpturing above as described for *peregrinus*, but punctures not so conspicuous on pronotum and scutellum; venter polished, only sparsely punctate laterally, broadly smooth (almost impunctate) medially; sixth sternite broadly rounded anteriorly, about as long as the preceding two sternites together, each of which is noticeably constricted medially; genital plates punctate, about two-thirds as long as sixth sternite. Length 3.5 mm.

San Jorge, L. Calif., March 1889, Chas. D. Haines (U. S. N. M.). This specimen, one of two from which the original description was drawn, may be regarded as a neotype, since the holotype in the California Academy of Sciences was destroyed in the catastrophe of 1906.

154. *Cydnoides (Sayocoris) peregrinus* sp. nov.

Black verging to fuscous on posterior part of scutellum; corium pale yellowish with a fuscous mark posteriorly between cubitus and scutellum; venter castaneous, large lateral spots on sternites, and connexivum yellow; tibiæ and tarsi stramineous; antennæ and beak testaceous.

Both pronotum and head more narrowed anteriorly than in *obtusus*; front margin of head distinctly reflexed, narrowly rounded medially, subsinuate laterally; vertex coarsely punctate in irregular transverse rows, except on occipital strip; pronotum more or less punctate everywhere except about callosities and humeral prominences, coarsely round-punctate antero-laterally, rastrate in transverse impression, less decidedly punctate elsewhere; pronotum numerously punctate, showing some tendency to rastration, punctures deepest in antero-lateral angles, and, what is unusual, more pronounced on anterior

disk than on declivity; mesocorium and veins punctate; venter sparsely punctate laterally, broadly smooth medially, sixth sternite broadly rounded (with hints of median and lateral subangulations) anteriorly, fifth and fourth slightly constricted medially; genital plates punctate, two-thirds as long as sixth sternite, a little longer than postventer; inner margins about two-thirds as long as posterior. Length 3 mm.

Holotype female, Lower California, S. Beyer (Barber Collection).

Subgenus *COSMARIOIDES* subgen. nov.

Principal characters: as noted in the key to subgenera. Subgenotype: *Cydnoides* (*Cosmarioides*) *setiventris* sp. nov.

KEY TO THE SPECIES.

1. Abdomen with a transverse series of erect bristly hairs on each sternite from second to fifth inclusive, subgenital plates of female more or less angulate on apical margins (Fig. 202); mid and hind coxæ separated by a space less than half the width of one coxal cavity. **setiventris** sp. nov.
Abdomen without transverse series of hairs on sternites two to five, the erect hairs confined to lateral margins. 2
2. Mid and hind coxæ separated by a space fully as wide as either coxal cavity; dorsum but slightly shining, margin of head straight for a short distance in front of each eye. **reticulatus** sp. nov.
Mid and hind coxæ separated by a space not as wide as either coxal cavity; dorsum glossy; margin of head almost evenly rounded from front of eye. **nitens** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

The reverse of that in the key.

155. *Cydnoides* (*Cosmarioides*) **nitens** sp. nov.

Anterior half of pronotum and head castaneo-piceous, posterior parts of pronotum and scutellum castaneous; corium, except clavus, yellowish; underparts castaneous; beak and antennæ stramineous.

Head produced one and one-half times length of eye beyond anterior transocular line, rounded anteriorly; vertex densely coarse-punctate except on occipital strip; pronotum rather numerous and coarsely punctate throughout except for callosities, punctures deepest anterolaterally, rastrate in transverse impression; scutellum copiously punctate, but little smoother on anterior disk, punctures deepest in antero-lateral angles; corium sparsely punctate; venter numerous punctate laterally, broadly smoother medially; sixth sternite angulate anteriorly, with a conspicuous pit just within the angulation; ventral exposure of hypopygium ample, polished, sparsely punctate, hind

margin distinctly reflexed, evenly convex from side to side; dorsal rim nearly flat, widest laterally, interior basin small, shallow, hind wall most sloping of all. Length 3 mm.

Holotype male Bintó, Pernambuco Province, Brazil (U. S. N. M.).

156. *Cydnoides (Cosmarioides) reticulatus* sp. nov.

Dull black, brownish from middle of pronotum posteriorly in female; corium (but not clavus) pale yellowish, with more or less brownish suffusion at base, and about apex of cubital vein; in male a brownish transverse band at this point; underside castaneous to black, tarsi, beak, and antennæ stramineous.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin reflexed, distinctly produced beyond anterior margin of eye, rounded medially, slightly sinuate laterally; vertex coarsely reticulate-punctate, except on occipital strip; pronotum punctate throughout, except for small areas at the callosities, reticulate-punctate antero-laterally, more shallowly so elsewhere; scutellum copiously coarse-punctate throughout in male, the punctures a little shallower on anterior disk; in female the puncturing of this sclerite is less marked, the anterior disk having only fine punctures; surface between coarse punctures in both sexes itself finely reticulate; mesocorium and veins sparsely punctate; venter numerously punctate laterally, broadly smoother medially; sixth sternite of male subangulate anteriorly, as long as all the preceding sternites together, of which third to fifth are distinctly constricted medially; ventral exposure of hypopygium ample, sparsely punctate, slightly channeled transversely, hind margin slightly reflexed, convex as viewed from below; dorsal rim nearly flat, distinctly broadest at lateral angles, interior basin, small, shallow, hind wall moderately declivate; sixth sternite of female broadly rounded anteriorly, longer than all the preceding sternites together, each of which is distinctly constricted medially, fifth and fourth to less than half their lateral length; genital plates punctate, less than half as long as sixth sternite, about equal in length to postventer, inner margins a little more than half length of posterior, the latter slightly concave but transverse in position. Length 3 mm.

Holotype male and *allotype* female, Chapada, Brazil, May and September respectively (Carnegie Museum).

157. *Cydnoides (Cosmarioides) setiventris* sp. nov.

Head, pronotum, clavus, and anterior part of scutellum piceous; posterior part of scutellum fuscous; corium cream-colored, lateral carina piceous, and a stripe along cubital vein posteriorly brownish; underside and legs castaneous; tarsi, antennæ, and beak testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin distinctly reflexed, produced

anteriorly beyond fore edge of eye, rounded medially, slightly sinuate laterally; vertex coarsely punctate, except for a considerable area from back of tylus posteriorly, which like the remainder of dorsal surface (between large punctures) is finely reticulate; pronotum with large callosities smooth, copiously punctate elsewhere, the part behind transverse impression conspicuously rastrate; scutellum numerous punctate throughout, punctures fewer on anterior disk, but even this part due to combination of puncturing and shagreening appears rugulose (an unusual condition throughout the whole subfamily); corium as in Fig. 61; mesocorium sparsely and veins more densely punctate; venter polished, sparsely punctate laterally, broadly smooth medially; sixth sternite of male less broadly rounded than in female, nearly as long as all the preceding sternites together, of which third to fifth are distinctly constricted medially, although fourth to fifth are not so much constricted as in female; ventral exposure of hypopygium large, sparsely punctate, transversely channeled, hind margin, slightly reflexed, almost evenly convex; dorsal rim nearly flat, distinctly widest at lateral angles which are a little beveled off exteriorly, interior basin of moderate width and depth, hind wall declivate at angle of about 45° ; sixth sternite (Fig. 202) of female broadly rounded anteriorly, as long as the preceding three sternites together, each of which is conspicuously constricted medially; genital plates punctate, large, about three-fourths as long as sixth sternite and equal to postventer, inner margins about two-thirds as long as posterior, the latter slightly convex posteriorly and oblique (the inner ends anterior), both unusual characters; subgenital plates, large, subangulate posteriorly. Length 3.5-3.75 mm.

Holotype female, Sapucay, Paraguay, March, W. T. Foster; *paratype* female, Lagnillas, Dep. Sta. Cruz, Bolivia, G. L. Harrington (U. S. N. M.); *allotype* male, *paratypes*, and a nymph, Paraguay, Feb. 20, K. Fiebrig (Berlin Museum); San Bernardino, Paraguay (Vienna Museum).

Genus ALKINDUS Distant.

Alkindus Distant, W. L., *Biologia Centrali-Americana*, Insecta, Rhynchota, Heteroptera, I, Suppl. p. 309, Pl. 30, fig. 2, 1889 [Monobasic, genotype *A. atratus* sp. nov., Panama].

Principal characters: Spiracles nearer to the trichobothria than to the lateral margins of sternites; sternites with one or more strong bristles laterad of the trichobothria; metapleurum with lateral area impunctate; prothorax not gibbous anteriorly; hind tibia flattened dorsally, lacking carinate line on posterior surface; ocelli about equidistant from eyes and middle of vertex (Fig. 204).

It may also be noted that the genotype has the scutellum, when seen in profile, very evenly rounded. The area between the exocorial vein

and the costa is gradually elevated to inner edge, which is rather sharp, causing the depressed exocorial vein to be much deeper than in the genus *Galgupha*. This last feature is met with, however, in the subgenus *Ctenopoda* also, but in less pronounced form.

KEY TO THE SPECIES.

1. Smaller (4 mm.); subcostal smooth area of corium broader throughout, and distinctly widened medially, the branches of exocorial vein more crowded together and subparallel; ocelli about equidistant from middle of vertex and from eyes. **crassicosta** Horvath.
- Larger (4.5-5.5 mm.); subcostal area of corium (Fig. 62) narrower, parallel-sided, branches of exocorial vein divergent in middle part of their course; ocelli nearer middle of vertex than to eyes (Fig. 204). **atratus** Distant.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Same as in the key.

158. *Alkindus atratus* Distant.

Bibliographic reference as under genus.

Black, shining; tarsi, antennæ, and beak testaceous.

Head (Fig. 204) produced about one to one and a half times length of eye beyond anterior transocular line; front margin reflexed, convex, more or less emarginate medially; vertex coarsely punctate in irregular oblique rows, tylus and occipital strip nearly smooth; pronotum coarsely punctate antero-laterally, only finely or subobsoletely so elsewhere; scutellum numerously punctate peripherally, nearly smooth on anterior disk; corium as in Fig. 62; clavus and corium coarsely punctate; lateral area of metapleurum large, with slightly impressed longitudinal lines, but scarcely punctate; metasternum as in Fig. 203; sternites copiously punctate, broadly smoother medially, sixth broadly rounded anteriorly in female, narrowly rounded in male, all preceding sternites distinctly constricted medially, fifth and fourth to half their length at sides; sixth sternite of male longer than all preceding sternites together; ventral exposure of male hypopygium (Fig. 205) definitely punctate laterally, smoother discally, hind margin, not at all reflexed, with two lateral oblique emarginations, and two submedian less oblique ones, leaving three prominences of which the median is slightly concave apically, and the lateral ones obliquely truncate; dorsal rim narrow anteriorly, somewhat broader laterally and moderately sloping extrorsely (the reverse of what is usual in the subfamily), with thin carina all around within bordering the nearly circular abrupt central depression, hind margin higher than remainder with depressions corresponding to the emarginations above described, with a broad foveate

bridge medially to central disk; the Figure No. 207 is from a somewhat different point of view than the description; sixth sternite of female (Fig. 208) about as long in middle as the preceding three sternites together, greatly emarginate posteriorly; genital plates sparingly punctate, longer than sixth sternite at middle, and twice as long as postventer, their inner margins longer than posterior, the former prominently elevated anteriorly, the latter distinctly concave, although almost transverse in position; subgenital plates large, nearly equilaterally triangular, ventral exposure of ultimate tergite much constricted medially. Length 4.5-5.5 mm.

Holotype male and *paratype* female, Talé, Panama, Champion; Tierra Colorado, Guerrero, 2,000 ft., October, H. H. Smith (British Museum); other specimens from: Ancon, Canal Zone, A. H. Jennings; Taboga Island; Panama, A. H. Jennings; July 1907, August Busck; Panama, June 16, 1911, Yale Peruvian Expedition; Aruba, D. W. I., Sept. 18, 1929, Bartsch-Hoffman Exp.; San Domingo, Costa Rica, Sept. 19, F. Knab; San Lucas, Costa Rica, Jan. 15, 1930, M. Valerio (U. S. N. M.); Colima Volcano, Mex., L. Conrad; Culebra, Costa Rica, July 14, 1911, L. G. Ruether, and another specimen collected July 11, 1911, by same collector, therefore nearby, labelled Chibe (not Chili as it at first appears); Bogota, Lindig (Stockholm Museum); Mexico, Breddin Collection (Deutsches Ent. Inst.); Las Sabanas, Panama, July 2, 7, 1924, N. Banks (M. C. Z.); Cordilleras of Colombia, T. Wieme; Colombia, Moritz (Berlin Museum); Bogota, 1921, E. Pehlke (Stettin Museum); Culebra, Costa Rica; Aracataca, Magdalena, Colombia, Aug. 3, 6, 1920, J. A. G. Rehn (Acad. Nat. Sci. Phila.); La Cruz Ruviera, Guarico, Venezuela, Dec. 1921, M. Grisol (Paris Museum); Curaçao, C. G. de Haseth; Corinto, Nicaragua, July 1911; Culebra, Costa Rica, July 14, 1911, R. Paessler (Hamburg Museum); Colima, Mexico (Mex. Dept. Agr.); Colima Volcano, J. Laue; Turrialba, Costa Rica, H. Taeuber (Munich Museum).

159. **Alkindus crassica** Horvath.

Alkindus crassica Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 232 [S. Paulo, Brazil].

Black, eyes reddish; antennæ and tarsi testaceous.

Decidedly shorter and narrower than *atratus*; head of about the same shape and with the same character of puncturing; lateral group of coarse punctures on pronotum smaller than in *atratus*, disk of pronotum with the punctures more nearly obsolete; sternites more copiously punctate than in *atratus* and more distinctly so medially; genital

plates of female more plentifully punctate than those of *atratus*, the elevation of inner margins more prominent from the beginning (*i.e.* posteriorly). Length 4 mm.

Holotype female, São Paulo, Brazil (Budapest Museum).

Genus AMYSSONOTUM Horvath.

Amyssonotum Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 212 [Monobasic, genotype *Corimelæna rastrata* Stål].

Principal characters: Spiracles nearer to the trichobothria than to lateral margins of sternites; sternites with one or more bristles laterad of the trichobothria; metapleurum with lateral impunctate area; prothorax not gibbous anteriorly; hind tibia sulcate dorsally and provided with a carinate line on posterior surface; ocelli well behind posterior transocular line and as far from eye as from tylus (Fig. 209); similar in form to *Thyreocoris*.

Horvath's key (*op. cit.*, p. 206) errs in classing *Amyssonotum* as without sulcate tibiæ. The hind tibiæ deserve the description sulcate as much as do those of *Thyreocoris*, and the other pairs are at least flattened above. The rastration, a character more or less developed in species of the other genera, is not considered of generic significance.

160. *Amyssonotum rastratum* Stål.

Corimelæna rastrata Stål, C., Bidrag till Rio Janeiro-Traktens Hemipter-Fauna, 1, 1862, p. 8 [Brazil].

Sooty black, almost without reflections, eyes reddish; beak, antennæ, and tarsi testaceous.

Outline of head as in Fig. 209; head produced about one and one-half times length of eye beyond anterior transocular line in most females, to twice that length in some males (Fig. 209); front margin varying from rounded to subangulate medially and from sinuate to convex laterally, the more pointed form characteristic of males; vertex contiguously coarse-punctate, except on a narrow smooth occipital strip with four anterior lobations; pronotum contiguously coarse-punctate antero-laterally, with smaller punctures, more or less connected by transverse furrows anterior to callosities; behind these the surface is conspicuously lineate-rastrate; scutellum with anterior disk moderately fine punctate, and peripheral regions copiously, more coarsely, and largely rastrate punctate; corium as in Fig. 63; clavus with a single row of punctures, mesocorium and veins coarsely punctate; metasternum as in Fig. 210; lateral area of metapleurum acute anteriorly, impunctate; sternites densely punctate laterally, more lightly and sparsely punctate and polished medially; sixth sternite of male broadly subangulate anteriorly, as long as the preceding three sternites together, each of which is moderately constricted medially;

ventral exposure of hypopygium punctate clear to the margin, somewhat transversely channeled, hind margin scarcely reflexed, varying from evenly convex to convex medially, and slightly concave laterally, as seen from below (Fig. 213); dorsal rim simple, flat, of moderate width anteriorly, broader at lateral angles, narrower posteriorly, inner basin abrupt, squarish; sixth sternite of female also broadly rounded to subangulate anteriorly (Fig. 214), longer than the preceding three sternites together, each of which is constricted medially to half or less of its lateral length; genital plates copiously and coarsely punctate, two-thirds as long as sixth sternite and decidedly longer than posterior, inner margins nearly as long as posterior, the latter slightly concave, but almost transverse in position. Length 3-3.5 mm.

Holotype female, Brazil, F. Sahlberg, other specimens from Bogota, and Panama (Stockholm Museum); also specimens in various collections from Brazil, Peru, Bolivia, Colombia, British Guiana, Surinam, Trinidad, Panama, Guatemala, Costa Rica, Mexico, and Texas (Brownsville).

Southern examples have the pronotum more decidedly shouldered than northern, but we are unable to correlate genital or other characters with this difference. We therefore treat the two forms as subspecies.

KEY TO THE SUBSPECIES.

- 1. Pronotum with a distinctly shouldered appearance (Fig. 211); known range Peru, Guiana, Trinidad, and Surinam to Brazil.....**rastratum** Stål.
Pronotum more rounded antero-laterally, not shouldered (Fig. 212); known range Colombia, and Panama to southern Texas.....**flexum** subsp. nov.

160a. **Amyssonotum rastratum** subsp. **flexum** subsp. nov.

Holotype male, *allotype* male, and *paratypes*, Volcan de Chiriqui, Panama, Champion (U. S. N. M.). Topotypic material exists in numerous museums. Other *paratypes* from Colombia, Canal Zone, Costa Rica, Guatemala, Mexico, and Texas (U. S. N. M., Deutsches Entomologisches Institut, and the Museums of Dresden, Munich, Vienna, and the Dept. of Agriculture of Mexico).

Genus PERICREPIS Horvath.

Pericrepis Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 221 [Monobasic, genotype, *P. callosula* sp. nov., Argentina].

Principal characters: Spiracles nearer to the trichobothria than to the lateral margins of the sternites; sternites mostly lacking lateral bristles; prothorax not gibbous anteriorly; exocorial vein evident

(Fig. 64), of the same type as in *Alkindus*, i.e. the outer branch very deep, owing to the elevation of inner edge of the area between it and costa; ocelli not much farther from middle of vertex than from eyes.

It seems likely that the *Galgupha notata* Amyot and Serville (Hist. Nat. Ins. Hemip. 1843, pp. 68-69, Pl. 2, Fig. 5) is a *Pericrepis* with color pattern similar to that of *callosula*; from the locality, Cayenne, however, we should expect it to be a distinct species.

KEY TO THE SPECIES.

- Dorsum fuscous to black, with testaceous markings of variable extent, the apex of scutellum usually broadly pale and the corium preponderantly so; exocorial vein simple, the inner branch obsolete; pronotum without pronounced shoulders.....**callosula** Horvath.
- Dorsum including corium entirely glossy black; exocorial vein with the outer branch very deep owing to the elevation of the inner edge of area between it and costa, the inner branch faintly discernible; pronotum with very pronounced shoulders at anterior angles.....**afer** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

The reverse of that in key.

161. *Pericrepis afer* sp. nov.

Black, shining, apex of head, corium, and periphery of scutellum often reddish brown; legs from knees, antennæ, and beak yellowish, and later organ usually more or less infuscated.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin somewhat reflexed, broadly rounded, subtruncate, or a little emarginate medially (tylus almost enclosed), slightly sinuate laterally; vertex chiefly coarsely punctate, the punctures in irregular oblique rows each side of tylus, the latter more or less transversely wrinkled, occipital strip smooth; pronotum chiefly coarse-punctate, except callosities; anterior and posterior margins, and especially the humeral prominences smoother; scutellum numerous punctate, the punctures finer and sparser on anterior disk than elsewhere; clavus, mesocorium, and veins punctate; metapleurum punctate bordering ostiolar surface; venter coarsely punctate laterally, smoother medially, especially in male which has a broad polished area traversing all sternites; sixth sternite of male nearly as long as all of the preceding sternites together (all of which are constricted medially), its narrowly rounded anterior margin extending almost as far forward as to the lateral juncture of third and fourth sternites; ventral exposure of hypopygium almost vertical in position, sparsely punctate, hind margin slightly reflexed, broadly angulate-emarginate medially

and sublaterally; dorsal rim almost a semicircle in shape, broadest at lateral angles, the portion within and anterior to these gently sloping, hind wall low, with elevations and depressions corresponding to the emarginations above described; sixth sternite of female narrowly rounded anteriorly, profoundly and acutely angulate-excavate posteriorly, all preceding sternites constricted medially, the incisures between them much more forwardly inclined than in most Thyreocorinæ; genital plates, faintly punctate, one and one-half times as long as sixth sternite on middle line, and equal in length to the unusually long postventer; inner margins considerably elevated, and longer than the posterior, the latter slightly oblique in position (inner extremities farthest anterior); subgenital plates large, subtriangular; ventral exposure of ultimate tergite of female unusually large for the subfamily. Length 3.8-4.5 mm; width 2-2.5 mm.

Holotype male, *allotype* female, and *paratypes*, Province of Salta, Argentina, 2,500 m., J. Steinbach (Berlin Museum); *paratypes*; Maldonado, D'Orbigny, 1834; Rio Salado, Santiago del Estero, Argentina, 1909, E. R. Wagner (Paris Museum); Zuviria, and La Merced, Argentina, Reimoser (Vienna Museum).

162. *Pericrepis callosula* Horvath.

Pericrepis callosula Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 221-222 [Ledesma, Jujuy, Argentina].

General color above fuscous to black, solidly black on head and pronotum, except that the latter usually is paler paralleling the posterior margin; corium yellowish, except extreme base and a marking covering terminal portions of veins and an adjoining area toward edge of scutellum; the latter with the posterior declivity and an irregular vitta on each side from declivity obliquely forward to claval suture, yellowish; tibiæ stramineous dorsally, fuscous ventrally; tarsi, antennæ, and beak, testaceous, the latter more or less infuscated; connexivum usually paler tinged, the lateral margins of sixth sternite, and posterior margin of ultimate tergite of female, yellowish to reddish.

Head produced one to one and one-half times length of eye beyond anterior transocular line; front margin slightly reflexed, varying from somewhat pointed to truncate or even slightly emarginate medially, and from slightly concave to slightly convex laterally; vertex coarsely punctate, except on occipital region; pronotum and scutellum plentifully punctate, the punctures coarser laterally, but by no means inconspicuous discally, callosities and posterior submargin of pronotum smoothest; corium as in Fig. 64; clavus and mesocorium punctate, exocorium smooth; lateral area of metapleurum broad, impunctate, but obliquely wrinkled; venter with sparse coarse punctures laterally,

smoother medially; sixth sternite of male rounded subangulate anteriorly, the preceding three sternites more or less the same shape anteriorly, all shorter medially than laterally; ventral exposure of hypopygium, moderate in size, coarsely punctate, hind margin thickened, somewhat reflexed, distinctly subangulately triconcave (Fig. 215); dorsal rim nearly flat, widest at lateral angles, posterior portion elevated above remainder with depressions corresponding to the concavities seen from below; sixth sternite of female (Fig. 216) narrowly rounded anteriorly, the preceding three much constricted medially, profoundly angulate-emarginate posteriorly; genital plates finely punctate, inner margins elevated (Figs. 216, 217), distinctly longer than posterior, the latter straight, oblique, meeting in an anteriorly directed moderate angle; subgenital plates subtriangular, longer than broad; ventral exposure of ultimate tergite of female large. Length 3.5-4 mm.

Holotype male, Province of Jujuy, Ledesma, Argentina, Arpad Vezenyi (Budapest Museum); other material from Corrientes, Argentina; Salta Province, Argentina, 1897, S. Venturi (Argentine Museum); Santarem, Corumbá, March, April, May; Chapada, August; Uacaryzal, Matto Grosso, February, Brazil, H. H. Smith (Carnegie Museum); Corumbá, Brazil, March (A. M. N. H.); Obidos, Amazonas, H. Rille (Deutsches Ent. Inst.); La Merced, Argentina, Reimoser (Vienna Museum); Formosa, Argentina (Munich Museum); Guemes, Argentina, Feb. 2, 1929, on cane, H. A. Jaynes; El Quemado, Jujuy, Argentina, May 26, G. L. Harrington (U. S. N. M.).

Genus PRUHLERIA gen. nov.

Principal characters: Spiracles nearer to the trichobothria than to the lateral margins of the sternites; sternites mostly lacking lateral bristles; corium (Fig. 65) tumid, apex subacute, cubital vein deeply impressed apically, exocorium with only traces of both branches of the vein, costa carinate; metapleurum with lateral area punctate interiorly; prothorax not gibbous anteriorly; legs as in *Allocoris*. Genotype *Corimelana incerta* Uhler.

The only known species of the genus appears to be confined to Cuba.

163. *Pruhleria incerta* Uhler.

C. [orimelana] incerta Uhler, P. R., Proc. Ent. Soc. Phila., II, p. 156, September, 1863 [Cuba].

Black, shining; corium orange-yellow with extreme base, posterior third of cubital vein, area between this and scutellum, and a blotch between its basal end and costa, of the ground-color; apex of head and lateral spots on segments from fourth, posteriorly, yellow to orange;

tarsi, antennæ, and beak testaceous, the beak more or less infuscated.

Head produced less than length of eye beyond anterior transocular line, front margin scarcely carinate, subtruncate medially, subsinuate laterally; vertex coarsely, but shallowly, punctate except on the polished occipital strip; pronotum with coarse shallow punctures laterally, the punctures elsewhere fine; scutellum punctate peripherally, most coarsely so antero-laterally, nearly smooth on anterior disk; corium (Fig. 65) with only sparse faint punctures; lateral area of metapleurum, broad, but pointed anteriorly, punctate bordering ostiolar surface; venter plentifully punctate laterally, broadly smoother medially; sixth sternite subangulate anteriorly in both sexes, preceding sternites constricted medially, fifth sternite to much less than half of its lateral length; ventral exposure of male hypopygium with only a few punctures, hind margin not at all reflexed, convex medially, concave sublaterally; hypopygium (Fig. 220) opening almost directly posteriorly; dorsal rim broad all around anteriorly, lateral angles but little wider, tumid exteriorly, declivate interiorly, hind margin narrow, rounded, little above level of central disk; genital plates of female, punctate nearly vertical in position, two-thirds as long as sixth sternite, and distinctly longer than postventer, inner margins nearly as long as posterior, the latter slightly concave, but nearly transverse in position. Length 2.75-3 mm.

Paratype female, Cuba, Uhler Collection; other specimens with the following data: on banana from Baracao, Cuba, Fed. Hort. Bd., N. Y. No. 791 (U. S. N. M.); Santiago de las Vegas, Cuba, S. C. Bruner (Barber); Aug. 20, 1917, P. Corden (Bruner); Guantanamo, Cuba, Oct. 4-8, 1913 (A. M. N. H.); Cuba (Ac. Nat. Sci. Phila.).

Genus THYREOCORIS Schrank.

Thyreocoris Schrank, Franz von Paula, Fauna Boica, durchgedachte Geschichte der in Baiern einheimischen und zahmen Thiere, II, 1, 1801, p. 46 [without species here; on pp. 67-69, five species are included, of which the last *scarabæoides* was selected as genotype by Oshanin, Kat. Pal. Hemip., 1912, p. 1].

Coreomelas Amyot, C. J. B. and Serville, A., Hist. Nat. des Insectes, Hémiptères, 1843, p. 69. These authors state: "M. White then created the name *Corimelæna* for this latter genus [containing *scarabæoides*, *schulzii*, *unicolor*, etc.] but later corrected it in manuscript, substituting for it *Coreomelas*, which we adopt." Amyot and Serville as well as Mulsant and Rey use *Coreomelas* for the European species *scarabæoides*, which is here, if it has not elsewhere been definitely named as the genotype of *Coreomelas* Amyot and Serville.

Principal characters: Spiracles nearer to the trichobothria than to the lateral margins of sternites; sternites with lateral bristles; ostiolar surface extending to lateral margin of metapleurum; propleurum coarsely punctate throughout; prothorax gibbous anteriorly; tibiæ flattened or sulcate dorsally.

164. *Thyreocoris scarabæoides* (Linnæus).

- Cimex scarabæoides* Linnæus, C., Systema Natura, Ed. 10, 1758, p. 441 [no locality].
- [*Cimex*] *sphaericus* Goeze, J. A. E., Entomologische Beyträge zu des Ritter Linné zwölften Ausgabe des Natursystems, 2, 1778, pp. 276-277 [Schæff. Icon. t. 210, f. 3a, b].
- [*Cimex*] *testudinarius* Fourcroy, A. F. de., Entomologia Parisiensis, sive Catalogus Insectorum quæ in Agri. Parisiensi reperiuntur; secundum methodum Geofræanam in sectiones, genera et species distributus; cui eddita sunt nomina trivialis et fere trecentæ novæ species, 1, 1785, p. 195 [France].
- [*Cimex*] *tuberculatus* Rossi, Peter, Fauna Etrusca sistens Insecta quæ in Provinciis Florentina et Pisana præsertim collegit, 2, 1807, pp. 365-366 [Italy].
- Corimelæna fulvipennis* Dallas, W. S., List, 1, 1851, pp. 58-59 [Demerara?]. The queried locality undoubtedly incorrect.
- Corimelæna puncticollis* Dallas, W. S., List, 1, 1851, p. 58 (Europe?).
- [*Oreomelas*] *nigritarsis* Garbiglietti, Antonio, Catalogus methodicus et synonymicus Hemipterorum Eteropterorum (*Rhyngotha* Fabr.) Italiæ indigenarum, Bul. Soc. Ent. Ital., 1869, p. 43. [*Italia B(oreale)*].
- Corimelæna fulvinervis* Scott, John, Neue europäische Hemiptera, Ent. Zeit. (Stettin), XXXI, 1870, p. 98 [Spain].
- Thyreocoris balcanicus* Schumacher, F., Beiträge zur Kenntnis der Hemipteren-fauna Mazedoniens, Sitzungsberichte Gesell. naturforschender Freunde Berlin, 1918, p. 86 [Üsküb].
- "*Thyreocoris fulvicornis* Scott," Schumacher, F., *loc. cit.*, emendation by error.

Æneous black, antennæ, tarsi, and beak testaceous. Some of the numerous synonyms listed were inspired by variations in color, probably due to killing of the specimens before they were fully colored. Thus *fulvinervis* Scott has the corium reddish (though the punctures are dark), and *fulvipennis* Dallas has the corium ochraceous and the scutellum reddish peripherally, states which might be recognized as nameable color-varieties, if based on fully mature, but not if exemplified only by more or less immature specimens.

Head (Fig. 219) produced from one to one and one-half times length of eye beyond anterior transocular line; front margin distinctly reflexed, broadly truncate anteriorly, a little emarginate in front of tylus, lateral margins somewhat concave to eyes; vertex coarsely, almost contiguously punctate throughout; remainder of dorsal surface copiously punctate, the punctures coarser laterally than discally, those on corium more or less elongate: corium as in Fig. 66; propleurum densely punctate anteriorly, posteriorly the propleurum and most of the non-ostiolar surface of the meso- and metapleura, is more sparsely punctured, a smooth area adjoining postero lateral angles of ostiolar surface, the lateral prolongation of which is quite narrow. Sternites numerous punctate smoother medially, sixth sternite of male subangulate anteriorly, distinctly longer than preceding sternites together, the latter constricted medially, the fifth most so and those anterior successively less; ventral exposure of hypopygium

short, densely punctate, hind margin distinctly reflexed, and shallowly rounded-emarginate medially, dorsal rim broad anteriorly, broader laterally, gently sloping inwardly, hind wall not obvious from above due to the median emargination; sixth sternite of female narrowly rounded anteriorly (other sternites as in male), liberally emarginate posteriorly for reception of the relatively large genitalia; genital plates (Fig. 218), punctate, as long as wide, equal in length to postventer and nearly as long as sixth sternite, the inner margins prominently, and abruptly elevated, highest posteriorly; subgenital plates, punctate, subtriangular, large, each about half the area of one of the genital plates, distinctly separated medially by a sclerite intervening from rear; genitalia of female in expanded state, Fig. 13; internal genitalia of male as in Figs. 17, 18. Length 2.5-3.5 mm.

This species is distributed practically throughout Europe and Asia Minor; we have examined, besides many specimens determined simply as *scarabæoides*, the *holotypes* of *fulvinervis* Scott, *fulvipennis* Dallas, and *puncticollis* Dallas (British Museum).

Genus GODMANIA Horvath.

Godmania Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 222-223 [Monobasic, genotype, *G. aterrima* Horvath, Guatemala].

Principal characters: Spiracles nearer to lateral margins of sternites than to the trichobothria on segments three to six; sternites with lateral bristles; metapleurum with lateral area punctate interiorly; prothorax not gibbous anteriorly; costa carinate, mesocorium (Fig. 67) with a vein paralleling scutellum and connivent, or nearly so, posteriorly with cubitus.

165. *Godmania aterrima* Horvath.

Bibliographic reference as under genus, p. 223 [Duenas, Guatemala].

Black, shining, with bluish reflections; tarsi testaceous, sometimes infuscated apically; beak and antennæ chiefly fuscous.

Head (Fig. 221) produced two to two and one-half times length of eye beyond anterior transocular line, front margin distinctly reflexed, except apically, rounded or truncate medially, slightly concave, or nearly straight laterally; vertex copiously coarse-punctate, except on an occipital strip with four anterior lobations; pronotum copiously punctate, except about callosities, punctures coarsest antero-laterally, those in extremities of transverse impression rastrate, others of ordinary type and much smaller; scutellum numerously punctate throughout, punctures on anterior disk fine, those on periphery coarser, mostly rastrate, often conspicuously so on declivity, which may be transversely

wrinkled; clavus with a single row, and corium with numerous coarse punctures; lateral area of metapleurum punctate near ostiolar surface; venter of male numerous punctate laterally, broadly polished and almost impunctate medially; sixth sternite subangulate anteriorly, transverse posteriorly, longer than all the preceding sternites together, of which the fifth and fourth are moderately constricted medially; ventral exposure of male hypopygium short, punctate to edge, hind margin not reflexed, slightly concave medially, very low-convex laterally; dorsal rim of nearly equal width all around anteriorly between lateral angles, moderately sloping inwardly, hind wall thin, abruptly declivate, central basin rather deep. Venter of female copiously coarse-punctate laterally, and although smoother medially, by no means so much so as in male; sixth sternite (Fig. 222) rounded or subangulate anteriorly, concave posteriorly, as long as the preceding three sternites together, of which fifth and fourth are slightly constricted medially; genital plates coarsely punctate, more than half as long as sixth sternite and nearly twice as long as postventer; inner margins slightly elevated and calloused on posterior two-thirds, about two-thirds as long as posterior, the latter slightly convex and oblique. Length 4.5-5 mm.

Holotype female, Duenas, Guatemala, G. C. Champion (Budapest Museum), specimens with same data (U. S. N. M., Paris Museum, these under the name *Thyreocoris nitiduloides* as noted by Horvath), and others with data as follows: Guatemala, Angrand (Paris Museum); Guatemala, Breddin Collection (Deutsches Ent. Inst.); Calderas, Guatemala, G. C. Champion; Mexico; Santa Cruz Id; Gulf of California (U. S. N. M.); Sierra Mixteca, Mex., C. A. Purpus (Berlin Museum); Guadalajara, McConnell (Carnegie Museum).

Genus ALLOCORIS nom. nov.

Principal characters: Spiracles nearer to lateral margins of sternites than to trichobothria on segments three to six; (Fig. 223); sternites mostly without lateral bristles; metapleurum with lateral glossy area; prothorax not gibbous anteriorly, costa rounded; mesocorium (Figs. 68-73) with a vein paralleling scutellum and connivent or nearly so posteriorly with cubitus. Genotype *Corimelæna gillettii* Van Duzee.

We propose the foregoing new name for the genus long known as *Corimelæna*, original reference, *Corimelæna* White, Adam, Descriptions of two Hemipterous Insects, Mag. Nat. Hist., N. S., 3, 1839, p. 539 [Genotype by original designation, *Tetyra lateralis* Fabr].

The prime reason for dropping the name *Corimelæna* is that the genotype is unidentifiable. The type of *Tetyra lateralis* Fabricius seems to be lost and no other material named by Fabricius could be

found in European museums. The brief original description of *lateralis* does not suffice for recognition of the species, a belief in which we are not alone, as indicated by Van Duzee's renaming in 1904 what had passed for this form. The principal point in the Fabrician diagnosis "elytra white, broad vitta black" could not seem to apply to a form characterized by extreme narrowness, and even obsolescence of the pale marking on costa. Fabricius' generic assignment leaves a vast range of possibilities as to what the species might be, as his *Tetyra* included Scutellerids, Coptosomatids, Cydnids, etc.; finally the locality (Carolina) may be erroneous.

All things considered, we prefer to start off with a new name rather than continue usage, however long, on the strength of probabilities. Taxonomic work should be based on verified data, and we should be false to our principles in this regard, if we made an exception of the present case.

For comment on the name *Eucoria* Mulsant and Rey, used for this group by Horvath, see Bibliography.

KEY TO THE SUBGENERA

- 1. Spiracles of segments three to six below the lateral carina (Fig. 223).
Allocoris nom. nov.
 - Spiracles of some of segments three to six in or above the lateral carina. 2
- 2. Three alternatives:
 - Spiracles of segments five to six in, those of three to four below, the carina.
Termapora subgen. nov.
 - Spiracles of segments three to six in the carina (Figs. 231, 232).
Parapora subgen. nov.
 - Spiracles of segments four to six in, that of three above carina; mesosternum with a low median ridge on anterior half. **Epipora** subgen. nov.

Subgenus ALLOCORIS nom. nov.

Characters as given in the key.

Subgenotype *Corimelæna gillettii* Van Duzee.

KEY TO THE SPECIES.

- 1. Apex of corium acute (Figs. 68-71) 19
- Apex of corium rounded or obtusely pointed (Fig. 72) 2
- 2. Corium entirely dark, distinctly punctured to edge of costa; margins of vertex slightly but distinctly reflexed. **nigra** Dallas.
- Corium more or less pale and almost or quite impunctate along costa; margins of vertex usually not reflexed. 3

3. Pale marking of corium of almost uniform width (Fig. 69), not extending over the cubital vein at any point; species averaging 4 mm. in length. 4
 Pale marking of corium widened basally (Figs. 68, 71), extending over cubital vein and almost filling cell between the latter and claval suture (sometimes with a broad median interruption); species averaging less than 4 mm. in length. 15
4. Females; ultimate tergite in nearly all cases more or less pale-margined. 5
 Males; ultimate tergite not pale-margined. 10
5. Genital plates with widely separated, small, shallow punctures; punctures on disk and apex of scutellum minute; head broad, the vertex rather short, its sides distinctly emarginate (Fig. 233). *limata* sp. nov.
 Genital plates with large deep punctures. 6
6. Subgenital half as long as genital plates; ultimate tergite without pale margin. *feminea* sp. nov.
 Subgenital not more than a third as long as genital plates; ultimate tergite more or less pale-margined. 7
7. Costa pale on entire ventral exposure. *corallina* sp. nov.
 Costa black on inner portion of ventral exposure. 8
8. Genital plates distinctly shorter on inner than on posterior margin; disk of dorsum only obsoletely punctured. 9
 Genital plates nearly as long on inner as on posterior margin (Fig. 238); disk of dorsum distinctly punctured. *gillettii* Van Duzee.
9. Pale lateral edges of fifth and sixth sternites broader (appearing somewhat tumid), embracing the spiracles. *polita* Malloch.
 Pale lateral edges of fifth and sixth sternites narrower (appearing distinctly carinate), not embracing the spiracles. *palmeri* sp. nov.
10. Dorsal rim of hypopygium obviously broadest at the lateral angles. 11
 Dorsal rim of hypopygium as broad or broader anteriorly as at lateral angles. 12
11. Costal stripe broader posteriorly, extending to cubitus and equalling mesocorium, ventrally extending over entire exposure of corium; sternites broadly polished medially. *corallina* sp. nov.
 Costal stripe (Fig. 69) narrower posteriorly sometimes obsolete, not extending to cubitus and not as wide as mesocorium, costa black on inner portion of ventral exposure; sternites less broadly polished medially. *gillettii* Van Duzee.
12. Pronotum and scutellum almost evenly punctate. 13
 Disk of pronotum and scutellum polished, punctures almost obsolete. 14
13. Rim of hypopygium with a lunate depression on inner side anteriorly; channeling of ventral surface of hypopygium very deep, the reflected flange as high at middle (viewed from side) as length of the remaining exposed surface. *alticola* Horvath.
 Anterior rim of hypopygium nearly flat; ventral exposed surface much less deeply channeled, the flange much lower. *contrastata* sp. nov.
14. Dorsal basin of hypopygium squarish, central disk oblong, lateral angles somewhat tumid; ventral exposure of hypopygium chiefly pale. *micans* sp. nov.

- Dorsal basin of hypopygium and central disk trapezoidal, manifestly broadest posteriorly, lateral angles sloping (Fig. 253); ventral exposure of hypopygium dark. **palmeri** sp. nov.
15. Pale marking of corium broadly interrupted by black near middle (Figs. 70-71); hind tibia with two or three postero-dorsal bristles; disk of pronotum and scutellum glossy, almost impunctate. 16
- Pale marking of corium not interrupted. 17
16. Hind margin of hypopygium distinctly convex medially (Fig. 249); the corial mark usually yellowish, not sharply margined internally, and scarcely attaining the mesocorial vein basad of the central black interruption (Fig. 70). **interrupta** Malloch.
- Hind margin of hypopygium transverse, sometimes low convex medially (Fig. 248); the corial mark usually reddish, sharply margined internally and attaining mesocorial vein on the greater portion of its extent basad of the black central interruption (Fig. 71). **elegans** sp. nov.
17. Hind tibia without postero-dorsal bristles; sides of head in front of eyes slightly emarginate. **alpina** sp. nov.
- Hind tibia with one to three short postero-dorsal bristles; sides of head in front of eyes distinctly emarginate, especially in males. 18
18. Male hypopygium with two longitudinal, convergent carinæ, or vestiges of them (bounding a portion like the keystone of an arch; although in reversed position) across anterior rim (Fig. 245). **pulicaria** Germar.
- Male hypopygium with a transverse tubercle at middle of anterior rim. **championi** Distant.
19. Pale marking of corium widened near base, extending over cubital vein and almost filling cell between the latter and claval suture. 20
- Pale marking of corium not extending over cubital vein at any point. 25
20. Males. 21
- Females. 23
21. Entire upper surface with uniform, large, deep punctures, with narrow ridges between giving a honey-combed effect; hind margin of hypopygium deeply concave-emarginate. **minuta** Uhler.
- Disk of pronotum and scutellum with sparse punctures, or almost impunctate; emargination of hind margin of hypopygium transverse at bottom. 22
22. Hypopygium with the yellow margin much narrower than the exposed black portion below it (Fig. 250); tibiæ dark. **barberi** sp. nov.
- Hypopygium with the yellow margin not narrower in center than the black portion below it (Fig. 251); tibiæ pale. **tibialis** Fabricius.
23. Entire upper surface with uniform large deep punctures. **minuta** Uhler.
- Disk of pronotum and scutellum sparsely and shallowly punctured. 24
24. Sixth sternite distinctly longer than preceding sternites together; tibiæ dark. **barberi** sp. nov.
- Sixth sternite shorter than preceding sternites together; tibiæ pale. **tibialis** Fabricius.
25. Inner margin of pale costal stripe slightly angulated near middle; margin of male hypopygium broadly yellow; species not less than 3.5 mm. in length, the body very robust (Fig. 225). **agrella** McAtee.

- Inner margin of pale costal stripe straight (Fig. 72); margin of male hypopygium not broadly yellow; species not over 3 mm. in length. 26
26. Male hypopygium almost entirely concealed from below by sixth sternite, its hind margin slightly concave; sides of vertex distinctly emarginate before eyes. **marginella** Dallas.
Male hypopygium broadly exposed, its hind margin convex medially, concave sublaterally; sides of vertex only slightly sinuate. 27
27. Dorsal rim of male hypopygium shallowly basined, smooth. **harti** Malloch.
Dorsal rim of male hypopygium with two incurved carinæ anteriorly, between the ends of which is a narrow deep depression. **digitata** sp. nov.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Apex of corium obtuse:

nigra, limata, feminea, gillettii, polita, palmeri, corallina, alticola, contrasta, micans, alpina, interrupta, elegans, pulicaria, championi.

Apex of corium acute:

minuta, barberi, tibialis, agrella, marginella, harti, digitata.

166. **Allocoris (Allocoris) agrella** McAtee.

Corimelæna agrella McAtee, W. L., in Hart, C. A., Pentatomoidea of Illinois, Bul. Ill. State Nat. Hist. Survey, XIII, Art. 7, June 1919, p. 216 [Plummers Id., Maryland; other localities in Maryland, Virginia, and Kentucky].

Shining greenish black; apex of tylus and corial stripe ivory-colored, lateral margins of fifth and sixth sternites (the former commonly more deeply colored, the latter somewhat tumid), swollen posterior margin of male hypopygium, and equally tumid posterior margin of ultimate tergite of female, ivory to reddish; tarsi (sometimes knees, and tibiæ also), antennæ, and beak, testaceous. Outline of body as seen from side as in Fig. 225.

Head moderately pointed, produced about one and one-half times length of eye beyond anterior transocular line, only slightly sinuate before eyes in females, but decidedly so in males; vertex not carinate-margined, coarsely punctate in irregular transverse rows, occipital strip smooth; pronotum punctate except about callosities, copiously and coarsely punctate laterally, sparsely so on posterior disk, more or less rastrate in transverse impression; scutellum numerously punctate peripherally, sparsely so on anterior disk, unusually broad posteriorly and highly arched; mesocorium sparsely punctate, clavus and exocorium impunctate; venter copiously coarse-punctate, sternites, except sixth, smoother medially; sixth sternite subangulate anteriorly in both sexes, as long as all the preceding sternites in male, and the preceding three in female, all of which are distinctly constricted medially; sixth sternite of male with a narrow lunate polished area before posterior margin, the latter slightly convex medially; ventral exposure

of hypopygium moderate, punctate, scarcely channeled, the posterior margin thickened and rounded but not reflexed, convex medially, concave sub-laterally; dorsal rim of a rather narrow type, nearly flat, but little amplified at lateral angles; genital plates of female punctate, about two-thirds as long as sixth sternite, inner margins about two-thirds as long as posterior, the latter nearly straight but oblique in position the outer extremities farthest posteriorly. Length 3-4 mm.

Holotype male, *allotype* female, Plummers Id., Md., dates May 18, 1913, June 17, 1913, respectively; *paratypes* from same locality, April 26, 1908, May 4, 9, 1913, May 17, 1907, May 24, 1914, June 7, 1914, June 8, 17, 1913, Aug. 19, 1906; Maryland near Plummers Id., May 9, 18, 1913, May 10, 1916, May 23, 1915, May 24, 1914; Great Falls, Va., May 19, 1915; Maywood, Va., May 21, 1922, all the preceding collected by W. L. McAtee (Coll. McAtee, Biol. Survey, U. S. N. M.); Plummers Id., Md., July 30, 1914, specimen just emerged from last nymphal skin, E. A. Schwarz and H. S. Barber; May, 1908 (U. S. N. M.); Glen Echo, Md., May 14, 1922, J. R. Malloch (Coll. McAtee); Marlboro, Md., May 13, Washington, D. C., May 14, H. S. Barber; Great Falls, Va., May 25, 1906, D. H. Clemons; May 30, 1907; Kerrville, Tex., April 11, 1907, F. C. Pratt; Dallas, Tex., May 16, 1907, C. E. Hood (U. S. N. M.); Plummers Id., Md., Aug. 6, 14, 1922, H. G. Barber (Barber).

167. *Allocoris (Allocoris) alpina* sp. nov.

Black with æneous reflections, mesocorium in part and exocorium chiefly, pale yellowish, lateral margins of fifth and sixth sternites (which appear slightly tumid) and of ultimate tergite of female, yellowish to pale reddish; tarsi, basal segments of antennæ, and incisures of beak, testaceous.

Form somewhat more elongate and less robust than in *gillettii*, outline as seen from side as in Fig. 224; beak reaching third sternite; head produced one and one-fourth to one and one-half times length of the rather large eyes beyond anterior transocular line, front margin scarcely carinate, narrowly rounded medially, the tylus prominent, slightly sinuate laterally in females, decidedly so in males; vertex numerously and moderately punctate, except on occipital strip; pronotum coarsely and densely punctate antero-laterally, more sparsely and finely punctate elsewhere, except in the transverse impression which is distinctly foveate at the extremities, and its puncturing more or less rastrate; scutellum numerously punctate, coarsest and densest antero-laterally, finest and sparsest on anterior disk; clavus with only a few, and mesocorium with numerous punctures, exocorium, except for veins, almost impunctate; venter in male more

numerously and finely, in female, more sparsely and coarsely, punctate, smoother medially in both sexes, sixth sternite angulate anteriorly in male, fifth greatly constricted medially; ventral exposure of hypopygium punctate, hind margin reflexed, low convex from side to side, as seen directly from below, more or less concave medially, if a more posterior view is taken; dorsal rim (Fig. 244) granulate, almost as wide anteriorly as at lateral angles, slightly sloping interiorly, and with two convergent carinæ or vestiges of them across anterior rim as in *pulicaria*, posterior rim narrow, depressed medially below central disk; sixth sternite of female subangulate anteriorly, fifth considerably, fourth and third less constricted medially; sixth sternite shorter than the preceding three together; genital plates rather indistinctly punctate, about half as long as sixth sternite, inner margins slightly elevated, about two-thirds as long as posterior, the latter slightly concave and oblique. Length 3-3.5 mm.

Holotype male, *allotype* female, and *paratypes* of both sexes, top of Whiteface Mountain, N. Y., July 7, 1922, J. M. Aldrich (U. S. N. M.).

168. *Allocoris* (*Allocoris*) *alticola* Horvath.

Eucoria alticola Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, p. 214 [Mexico].

Black, costal stripe strict, pale yellowish; lateral margins of fifth and sixth sternites pale (carinate and not tumid); tarsi testaceous; each segment of beak pale basally, elsewhere fuscous; apex of tylus pale yellowish; antennæ more or less infuscated, third segment palest.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin not reflexed, narrowly rounded medially, slightly sinuate laterally; vertex densely coarse-punctate, except on occipital strip; pronotum punctate everywhere, except on callosities, coarsely punctate antero-laterally, finely so posteriorly, more or less restrate in transverse impression; scutellum numerous punctate peripherally, sparsely so on anterior disk; clavus with a few, mesocorium with numerous, punctures; exocorium, except for veins, almost impunctate; venter numerous punctate, smoother medially; sixth sternite subangulate anteriorly, preceding sternites slightly constricted medially; ventral exposure of hypopygium brief, punctate, hind margin greatly reflexed, convex, a little flattened medially as seen from below; dorsal rim flat laterally, a little broader there than anteriorly, anterior portion with a conspicuous lunate beveling within, the outer margin of which is continuous with the sides of the central depression. Length 3.75-4 mm.

Holotype and *paratype* males, Chilpancingo, Guerrero, Mexico, 4,000 ft., June, H. H. Smith (Budapest Museum); another specimen from Santa Cruz Island, Gulf of California, Uhler Collection (U. S. N. M.).

The preceding description, which agrees with notes made from the holotype is drawn from the second specimen which is a *homotype*.

169. *Allocoris (Allocoris) barberi* sp. nov.

Black, with bluish or æneous reflections, apex of tylus pale, elytra except for clavus and a narrow line posteriorly bordering scutellum, ivory-colored; somewhat tumid connexivum of fifth and sixth segments, and hind margin of hypopygium somewhat more deeply yellow; tibiæ castaneous, tarsi, beak, and antennæ testaceous.

Head narrowly rounded anteriorly, produced one and one-half times length of eye beyond anterior transocular line, sinuate in front of eyes, vertex coarsely punctate, except posteriorly; pronotum coarsely punctate laterally and in sublateral portions of transverse impression, moderately punctate along front margin, more or less rastrate-punctate in transverse impression, nearly smooth elsewhere on disk; punctures of scutellum deepest near basal angles, moderately impressed peripherally, and almost obsolete, over a large discal area; corium impunctate, except along veins; sternites coarsely punctate laterally, nearly smooth medially, sixth sternite subangulate anteriorly in both sexes, the preceding three considerably constricted medially, hind margin of sixth in male rather thickened, convex medially, concave sublaterally; ventral exposure of hypopygium rather large, punctate, nearly vertical in position, hind margin callosed, thickened, squarish-emarginate (Fig. 250); dorsal rim flat, but little wider laterally than anteriorly, narrower posteriorly where depressed below level of central disk; genital plates of female punctate, two-thirds as long as sixth sternite and distinctly longer than post-venter, inner margins three-fourths as long as posterior the latter slightly concave, but nearly transverse in position. Length 2.8-3.1 mm.

Holotype male, Esperanza Ranch, Brownsville, Texas, H. G. Barber (Barber); *allotype* female, Costa Rica, H. Schmidt (Stettin Museum); *paratypes*, Mexico, Carl Höge (Hamburg Museum).

170. *Allocoris (Allocoris) championi* Distant.

Thyreocoris championi Distant, W. L., Biologia Centrali-Americana, Insecta. Rhynchota, Hemiptera-Heteroptera, I, p. 11, 1880 [Guatemala, Honduras].

Æneous black, corium yellowish to reddish with æneous black clavus and a streak therefrom along cubital vein; antennæ, beak, and legs from knees yellowish to reddish.

A species close to *pulicaria*, differing as stated in key, and from both *pulicaria* and *intermedia* in having the punctures less deeply impressed on disk of pronotum and scutellum.

Vertex copiously and coarsely punctate, except on occipital portion; pronotum coarsely punctate laterally and more or less so in the transverse impression, punctures elsewhere subobsolete; lateral area of metapleurum punctate along inner side; venter moderately punctate with median smoother area broad; male hypopygium almost entirely concealed by sixth sternite as viewed from below, dorsal rim not so flat as in *pulicaria*, sloping interiorly, wrinkled, but scarcely punctate, depressed anteriorly, with a transverse tubercle; female genitalia as in *pulicaria*. Length 2.5-2.75 mm.

Holotype female, Duenas, Guatemala, G. C. Champion; *paratypes* of both sexes with same data; also Rio Hondo, British Honduras, Blancaneau (British Museum).

171. ***Allocoris (Allocoris) contrasta*** sp. nov.

Black, shining, with more or less æneous reflections; costal stripe and somewhat tumid connexivum of fifth and sixth segments ivory-colored; beak, antennæ, and tarsi testaceous, the last infuscated apically.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin scarcely carinate, rounded medially, slightly sinuate laterally; vertex copiously coarse-punctate except on occipital strip; pronotum numerously punctate, except on callosities, the punctures coarsest laterally, those in ends of transverse impression somewhat rastrate; scutellum numerously fine-punctate throughout, the punctures most lightly impressed on anterior disk; mesocorium and veins punctate, exocorium chiefly impunctate; lateral area of metapleurum with a row of punctures along inner side; venter copiously punctate, smoothest medially; sixth sternite subangulate anteriorly, as long as the preceding three sternites together of which the fifth and fourth are distinctly constricted medially; ventral exposure of hypopygium ample, punctate, hind margin not reflexed, a little flattened or sinuate in middle and on each side; dorsal rim about as wide anteriorly as laterally, central depression bell-shaped, abrupt, hind wall thin, steeply declivitous. Length 3.5-4 mm.

Holotype male, Arizona, No. 2340 Baker Collection (U. S. N. M.); *paratype* males, Mexico, Sallé (Stockholm Museum).

172. ***Allocoris (Allocoris) corallina*** sp. nov.

Black, shining, scarcely æneous; costal stripe which is almost twice as broad posteriorly as anteriorly, usually coral-red; apex of tylus (somewhat tumid), connexivum of fifth and sixth segments (sometimes stramineous), and postventer of female, reddish-yellow; tarsi and third segment of antenna, testaceous; remaining segments of antenna, and the beak, castaneous.

Head produced about length of eye beyond anterior transocular line, front margin scarcely carinate, rounded anteriorly, sinuate laterally; vertex coarsely punctate except on occipital strip; pronotum more or less transversely rugulose, coarsely punctate antero-laterally and in and about extremities of transverse impression, where more or less rastrate, finely punctate across anterior margin, sparsely so elsewhere; scutellum finely and numerously punctate peripherally, sparsely coarse-punctate discally, mesocorium and veins punctate, exocorium impunctate; lateral area of metapleurum punctate along inner side; venter coarsely punctate laterally, broadly polished medially; sixth sternite of male subangulate anteriorly about as long as all of the preceding sternites together, of which the fifth and fourth are distinctly constricted medially; ventral exposure of hypopygium punctate, hind margin scarcely reflexed, concave medially, convex laterally; dorsal rim narrow anteriorly, where rather abruptly beveled off on inner side, wider laterally, central depression bell-shaped, abrupt, hind wall thin, upright, almost overhanging in a forward direction, depressed medially; sixth sternite of female more broadly subangulate than that of male, but little longer than the preceding two sternites together, each of which is distinctly constricted medially; genital plates punctate, about two-thirds as long as sixth sternite, inner margins less punctate and slightly elevated, nearly as long as posterior margin and twice as long as postventer, hind margin nearly straight and transverse. Length 4.5 mm.

Holotype male, and *allotype* female, Guatemala, Boucard (Stockholm Museum); *paratypes*, La Borca, Jalisco, and District Federal, Mexico (Mexican Dept. Agr.), District Federal, Mexico, L. Conrad (U. S. N. M.); Deserto de los Leones, Mexico, Aug. 9, 1926; Tlalpam, Mexico, Aug. 19, 1926 (Stettin Museum); Huejotitan, Jalisco, 1700 meters, 1913, L. Diguët (Paris Museum).

173. *Allocoris (Allocoris) digitata* sp. nov.

Distinctly æneous, costal stripe and part of lateral margins of sixth sternite red; tarsi, beak, and antennæ testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin slightly carinate, rounded or truncate medially, slightly sinuate laterally; vertex coarsely punctate, except on occipital strip; pronotum coarsely punctate, except on callosities and tops of humeral prominences; scutellum truncate posteriorly, numerously punctate throughout, the punctures finest on anterior disk; mesocorium distinctly, exocorium indistinctly, punctate; lateral area of metapleurum punctate, except for a polished disk-like area; sternites moderately punctate laterally, smoother medially, sixth angulate anteriorly, as long as all preceding sternites together, of which the fifth and fourth are greatly, and third less constricted medi-

ally; ventral exposure of hypopygium punctate, slightly channeled transversely, hind margin slightly rounded carinate, convex medially, concave laterally; dorsal rim broadest laterally, moderately sloping, with a deep triangular depression anteriorly separating the apices of the finger-like ridges described in key, central depression squarish, not very deep; hind wall fairly broad and moderately declivate. Length 3 mm.

Holotype and *paratype* males, Sierra Mixteca, Mexico, O. A. Purpus (Berlin Museum).

174. ***Allocoris (Allocoris) elegans*** sp. nov.

The description of *interrupta* applies to this form in practically every respect except as pointed out in key. The division between the pale and dark portions of the corium is clean-cut (Fig. 71), not nebulous, as in that species and the lighter portions are reddish-orange instead of pale yellowish. There are no appreciable differences in the female genitalia. The male genitalia (Fig. 248) differ as noted in the key, but one specimen from Guatemala with typical coloration of *elegans* has the hypopygium as in *interrupta*. The forms may hybridize or otherwise intergrade. Length 3-3.5 mm.

Holotype male, Juan Mina Citrus Plantation, Panama, Aug. 24, 1918, H. F. Dietz and J. Zetek; *allotype* female, Botanical Garden, Port-of-Spain, Trinidad, Oct. 13, 1918, Harold Morrison; *paratypes*, Limon, Chagres River, Panama, July 14, Oct. 14, 1918, H. F. Dietz and J. Zetek; Guatemala, Uhler Collection (U. S. N. M.); Turrialba, Costa Rica, H. Taeuber (Munich Museum); Guatemala (M. C. Z.); Mexico, C. Höge (Hamburg Museum).

175. ***Allocoris (Allocoris) feminea*** sp. nov.

Black, shining (not æneous), costal stripe strict, stramineous; tarsi testaceous, antennæ and beak castaneous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin scarcely carinate, rather broadly angulate anteriorly, apex of tylus subprominent, slightly sinuate in front of eyes; vertex coarsely, but rather shallowly punctate, except for the smooth occipital strip; pronotum similarly punctured almost throughout, punctures finest discally, with partial furrows paralleling transverse impression; scutellum with numerous shallow punctures, least marked on anterior disk; corium punctate, the costal stripe almost smooth; lateral area of metapleurum with a few punctures along inner side; venter coarsely punctured laterally, nearly smooth medially; sixth sternite broadly rounded anteriorly about as long as the preceding two sternites together, each of which is moderately constricted medially; genital plates two-thirds as long as sixth sternite, nearly

equal in length to postventer, punctate, the inner and anterior margins notably elevated above the disk, inner margins about two-thirds as long as posterior, the latter strongly concave for the reception of the unusually large subgenital plates; these are ovate in shape (acute laterally) instead of narrowly lanceolate as usual in the subgenus. Length 4 mm.

Holotype female, Cotulla, Texas, April 18, 1906, F. C. Pratt, (U. S. N. M.).

176. *Allocoris (Allocoris) gillettii* Van Duzee.

Corimelæna gillettii Van Duzee, E. P., Annotated List of the Pentatomidæ recorded from America North of Mexico, with Descriptions of Some New Species, Trans. Am. Ent. Soc. XXX, p. 8, January, 1904 [N. J., Md., D. C., Ohio, Ind., Okla.].

?*T[etyra] lateralis* Fabricius, J. C., Systema Rhyngotorum, 1803, p. 142 [Carolina].

?*Odontoscelis lateralis* Germar, E. F., Zeitschr. f. Ent., 1. 1839, p. 39.

Corimelæna lateralis Auctorum.

Thyreocoris lateralis Auctorum.

Amplifying our remarks (p. 358) on the status of *Tetyra lateralis* Fabricius, we may say that in the original description Fabricius states "elytra white; broad vitta black" and "body smooth, black, shining, elytra alone white; a broad black vitta which scarcely attains apex." Germar had a similar conception of the species, writing, "Elytra white, median vitta black" and "Elytra white, with broad longitudinal vitta narrowed toward base." He describes *pulicaria* as "very similar, but scarcely half so large," with "elytra white, a longitudinal line black."

How Fabricius' description of a form having pale elytra with a black vitta came to be applied to one characterized by chiefly black elytra with the pale vitta strictly confined to the costa would make a long and probably unprofitable story. It is obvious, however, that there has been a misidentification, and, as there is no Fabrician material of *lateralis* extant, it seems best to drop the name, which possibly may be a prior term for *pulicaria*.

KEY TO THE SUBSPECIES.

1. Head broader apically, the sides more or less emarginate in front of eyes; lateral margins of sternites five and six pale; anterior part of dorsal rim of male hypopygium less abruptly declivate; hind margin more or less flattened or emarginate medially. *mexicana* subsp. nov.
- Head more pointed apically, the sides varying from slightly emarginate to more or less convex in front of eyes; often margins of only sixth sternite pale; anterior part of dorsal rim of male hypopygium more abruptly declivate; hind margin convex medially. *gillettii* Van Duzee.

176a. *Allocoris (Allocoris) gillettii* subsp. *gillettii* Van Duzee.

Bibliographic reference as under species.

Black, usually with æneous, sometimes with bluish reflections, the costal stripe (Fig. 69) strict, pale yellowish, in numerous specimens more or less obscured, sometimes so as to leave only the extremities, or even only the posterior one, pale; lateral margins of the sixth (sometimes also the fifth) sternites, and of the ultimate tergite of female, yellowish; tarsi testaceous, beak and antennæ testaceous to castaneous or even fuscous.

Outline as seen from side as in Fig. 226. Head produced about twice length of eye beyond anterior transocular line, front margin not carinate, narrowly rounded anteriorly, the tylus prominent, sinuate sublaterally, usually decidedly arcuate in front of eyes; vertex coarsely punctate except on occipital strip; pronotum punctate almost everywhere except callosities, coarsely so antero-laterally and in extremities of transverse impression, finely so elsewhere; scutellum numerous punctate peripherally, the punctures less distinct on declivity than anteriorly, more sparsely and finely punctate discally; corium distinctly punctate except on costal stripe; lateral area of metapleurum punctate interiorly; venter numerous punctate laterally, smoother medially; sixth sternite of male angulate anteriorly as long as all the preceding sternites together of which the fifth and fourth are distinctly constricted medially; ventral exposure of hypopygium punctate, hind margin slightly elevated, almost evenly convex, dorsal rim (Fig. 243) much wider laterally than anteriorly, the anterior rim narrow, rounded, abruptly declivate into the large and deep central depression, posterior wall thin; internal genitalia of male as in Figs. 24, 25; sixth sternite of female rounded or subangulate anteriorly, longer than the preceding two sternites together, each of which is moderately constricted medially; genital plates (Fig. 238) punctate, two-thirds as long as sixth sternite and nearly twice as long as postventer, inner margins about three-fourths as long as posterior, the latter nearly straight and transverse; subgenital plates narrow acuminate laterally; genitalia of female in expanded condition, Fig. 14. Length 3-4.5 mm.

Range from New York to North Dakota and south to Florida and Texas.

176b. *Allocoris (Allocoris) gillettii* subsp. *mexicana* subsp. nov.

A larger and somewhat broader form than the typical subspecies, the latter feature particularly noticeable in head and anterior part of pronotum; puncturing as in *gillettii*, possibly more pronounced on the average; more tangible differences as noted in the key. Length 4-5 mm.

Holotype and *paratype* males, Chilpancingo Guerrero (4600 ft.),

June, H. H. Smith; *paratype* males, Omilteme, Guerrero (8000 ft.), July, H. H. Smith; females, District Federal, Colima Volcano, Mexico, L. Conrad (U. S. N. M.); Guadalajara, McConnell (Carnegie Museum); Santa Rosalia Springs, Chihuahua (4000 ft.), Aug. 19, 20, 1906, P. P. Calvert (Acad. Nat. Sci. Phila.); *allotype* female, Guanajuato, Breddin (Deutsches Ent. Inst.); Huejotitan, Jalisco, 1700 meters, 1913, L. Diguët; Omilteme, Guerrero, 8,000 ft., July, H. H. Smith (Paris Museum); Mexico, Sallé also Chilpancingo lot as in U. S. N. M. (Dresden Museum); Mexico, C. Höge (Hamburg Museum); Colima Volcano, J. Laue (Munich Museum). A very similar insect is represented by a single female labelled Brazil, Signoret Collection (Vienna Museum); the locality may be wrong and the specimen is left unclassified.

177. *Allocoris (Allocoris) harti* Malloch.

Corimelæna harti Malloch, J. R., Bull. Ill. State Nat. Hist. Survey, XIII, Art. 7, June, 1919, pp. 215-216 [Makanda, Ill., also Md., and Va.].

Black, shining, usually with æneous reflections; apex of tylus ivory to reddish; costal stripe (Fig. 72), strict, yellowish; lateral margins of sixth sternite in both sexes, and posterior margin of ultimate tergite of female yellowish (margins of fifth sternite sometimes dull reddish); knees and tibiæ castaneous; tarsi testaceous; antennæ and beak stramineous to subfuscous.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin scarcely carinate, narrowly rounded anteriorly, sinuate laterally; vertex coarsely punctate except on occipital strip; pronotum numerous punctate except about callosities, punctures of disk not greatly contrasted in size with those on lateral portions; scutellum more or less truncate apically especially in males, thickly punctate peripherally, sparsely and more finely so discally; mesocorium with a few coarse punctures, exocorium with the punctures barely distinguishable; lateral area of metapleurum punctate interiorly; venter copiously coarse-punctate laterally, broadly smoother medially; sixth sternite subangulate anteriorly in both sexes, fifth and fourth sternites distinctly constricted medially; ventral exposure of male hypopygium brief, punctate, posterior margin slightly reflexed, convex medially, concave sublaterally; dorsal rim broad, general contour concave, central disk prominent, lateral angles wider, slightly elevated, the elevations continuous with the somewhat thickened, and rounded hind wall, which scarcely rises above level of central disk; genital plates (Fig. 236) of female punctate, about two-thirds as long as sixth sternite and twice as long as postventer, inner margins about two-thirds as long as posterior the latter slightly con-

cave and oblique in position, the inner ends most anterior. Length 2.5-3 mm.

Paratypes Plummers Id., Md., June 10, 1906, W. L. McAtee; June 30, 1907, A. K. Fisher; Virginia near Plummers Id., Md., July 20, 1913, W. D. Appel (McAtee); other specimens: Plummers Id., Md., June 6, 1905, D. H. Clemons; June 28, 1905, H. S. Barber; Virginia near Plummers Id., Md., July 24, 1902, E. A. Schwarz and H. S. Barber; Forest Glen, Md., O. Heidemann; Great Falls, Va., June 10, 1906, F. Knab; D. C., Black Mts., N. C., June 5, 1904, Uhler Collection (U. S. N. M.); Niagara, N. Y., June 30, 1906, Geo. P. Engelhardt (Barber); Belmont, Miss., July 5, 8, 1921, Pascagowla, Miss., Aug. 8, 1921, C. J. Drake (Iowa State College).

178. *Allocoris (Allocoris) interrupta* Malloch.

Corimelana interrupta Malloch, J. R., Bull. Ill. State Nat. Hist. Survey, XIII, Art. 7, June, 1919, p. 214 [Brownsville, Texas].

Black, dorsum mostly highly polished, usually with bluish reflections; pale marking of corium (Fig. 70) extending more or less onto disk of mesocorium, pale yellowish, broadly but sometimes not completely interrupted medially by the general color; somewhat tumid lateral margins of fifth and sixth sternites, and posterior margin of ultimate tergite of female stramineous; legs castaneous to black, the knees paler; tarsi yellowish, beak and antennæ testaceous to subfuscous.

Head produced one and one-half times length of eye beyond anterior transocular line, front margin scarcely carinate, narrowly rounded medially, slightly sinuate laterally; vertex copiously and coarsely but not deeply punctate, occipital strip smooth; pronotum with some coarse punctures laterally and in end of transverse impression, otherwise impunctate; scutellum sparsely and shallowly punctate peripherally, polished discally; mesocorium and veins punctate, punctures usually ill-defined on pale portions, puncturing of corium most pronounced in males; lateral area of metapleurum punctate along inner side, much broader in female than in male; venter punctate laterally, broadly polished medially especially in male; sixth sternite of male subangulate anteriorly, about as long as the preceding three sternites together of which the fifth and fourth are distinctly constricted medially; ventral exposure of hypopygium (Fig. 249) brief, punctate, hind margin thickened, slightly reflexed, convex medially, concave sublaterally; dorsal rim slightly tumid; scarcely wider laterally than anteriorly, about on level with central disk, hind wall narrow, depressed laterally; internal genitalia as in Fig. 26; sixth sternite of female rounded to subangulate anteriorly longer than the preceding two, but shorter than the preceding three sternites together, of which the fifth and fourth

are constricted medially; genital plates punctate, about half as long as sixth sternite, and twice as long as postventer at middle, inner margins slightly elevated, about two-thirds as long as posterior, the latter slightly concave and oblique. Length 3-3.5 mm.

Brownsville, Tex., May 10, 18, 28, 1904, H. S. Barber; without date, Beyer (U. S. N. M.); July 27, 1906, A. B. Wolcott (Coll. H. G. Barber); La Ceiba, Honduras, Aug. 19, 1916, F. J. Dyer; Guatemala, Uhler Collection (U. S. N. M.); Santa Rosa de Copan, Honduras, April 1923 (S. C. Bruner); Vera Cruz, July, 29, Orizaba, Aug. 2; Cordoba, Mexico Aug. 4 (Stettin Museum); Mexico, C. Höge (Hamburg Museum); San José, Costa Rica (Munich Museum); Costa Rica, Jan. 1926, Paul Serre (Paris Museum).

179. *Allocoris (Allocoris) limata* sp. nov.

Black with æneous reflections, mesocorium fuscous, exocorium ivory-colored; apex of head, pale lateral margins of fifth and sixth sternites (broad, embracing the spiracles), posterior margin of ultimate tergite, and irregular spot on each subgenital plate, yellowish; legs from knees testaceous; antennæ and beak castaneous, some of the segments paler basally.

Head produced about length of eye beyond anterior transocular line, front margin scarcely carinate, subtruncate medially, decidedly sinuate laterally (Fig. 233), vertex numerous punctate, except on occipital strip; pronotum shallowly punctate anteriorly and laterally, almost impunctate elsewhere; scutellum finely punctate peripherally, polished discally; mesocorium moderately, and exocorium finely punctate; lateral area of metapleurum with a few punctures along inner edge; sternites finely punctate laterally, broadly polished medially; sixth sternite broadly subangulate anteriorly, about as long as the preceding three together, of which the fifth and fourth are slightly constricted medially; genital plates shallowly punctate, about one-half as long as sixth sternite, and one and one-third times as long as post-venter, inner margins two-thirds as long as posterior, the latter nearly straight and transverse. Length 4 mm.

Holotype female, without data, Uhler Collection (U. S. N. M.).

180. *Allocoris (Allocoris) marginella* Dallas.

Corimelæna marginella Dallas, W. S., List 1, 1851, pp. 59-60 [New York].

Corimelæna nanella McAtee, W. L., in Hart, C. A., Bull. Ill. State Nat. Hist. Survey, XIII, Art. 7, June, 1919, p. 216 [Plummers Id., and other localities in Maryland].

Black, often with æneous reflections, apex of tylus and strict costal stripe, yellowish; lateral margins of sixth sternite plainly, of fifth

faintly, yellowish to reddish, posterior margin of male hypopygium faintly, and of ultimate tergite of female distinctly, similarly colored. Tarsi, beak, and antennæ testaceous to subfuscous; in some specimens the knees and tibiæ are reddish brown.

Lateral outline as in Fig. 227; head (Fig. 234) produced about one and one-half times length of eye beyond anterior transocular line; front margin scarcely carinate, rounded medially, tylus subprominent, distinctly sinuate laterally in both sexes, giving median part almost the appearance of a rostrum; vertex coarsely punctate, except on occipital strip; pronotum numerous punctate throughout, except on callosities, the punctures coarsest antero-laterally and in ends of transverse impression, where more or less rastrate; scutellum punctate throughout, the punctures coarsest peripherally, finest on anterior disk; mesocorium with a few coarse punctures, exocorium practically impunctate; lateral area of metapleurum punctate along inner side, venter copiously punctate laterally, smoother medially; sixth sternite angulate anteriorly in male, fifth distinctly constricted medially; only the swollen, slightly concave posterior margin of male hypopygium exposed beyond sixth sternite; dorsal rim about as broad anteriorly as laterally, gradually and shallowly basined, hind wall rounded, about on level with central disk; sixth sternite of female rounded to subangulate anteriorly, as long as the preceding three sternites together of which the fifth and fourth are moderately constricted medially; genital plates punctate, two-thirds as long as sixth sternite and longer than postventer; inner margins slightly elevated, about half as long as posterior, which are concave and slightly oblique, the inner ends most anterior (Fig. 239). Length 2-3 mm.

Holotype male, North America (British Museum); type material of *C. nanella* McAtee (McAtee Collection); and numerous specimens indicating the range of the species to be from Rhode Island to Kansas, Florida and Texas.

181. *Allocoris* (*Allocoris*) *micans* sp. nov.

Æneous-black, highly polished, narrow corial stripe, connexivum of segments five and six, and exposed parts of hypopygium, orange, in the last organ more or less infuscated; beak, tarsi, and antennæ testaceous.

Head produced twice length of eye beyond anterior transocular line, narrowly rounded anteriorly, sinuate between tylus and eye, vertex coarsely punctate, except posteriorly; pronotum with a small group of well impressed punctures antero-laterally, and in extremities of transverse impression, otherwise highly polished with punctures only faintly indicated; scutellum polished, punctures subobsolete, except antero-laterally; corium sparsely punctate. Lateral area of metapleurum with a row of punctures along inner side; sternites highly

polished, scarcely punctate except on the disk of each laterally and along incisures; sixth broadly rounded anteriorly, as long as those anterior together, fifth and fourth distinctly constricted medially; ventral exposure of hypopygium punctate, hind margin only slightly reflexed, shallowly concave medially and convex laterally as viewed from below; dorsal rim about as wide anteriorly as laterally, wrinkled, and punctate where beveled off on inner side anteriorly, a little swollen and somewhat smoother laterally, hind wall thin, arcuate, perpendicular within, central depression abrupt all around. Length 4 mm.

Holotype male, Purula, Guatemala, G. C. Champion [British Museum].

182. *Allocoris (Allocoris) minuta* Uhler.

C(ormelæna) minuta Uhler, P. R., Hemipterological Contributions, No. 1, Proc. Ent. Soc. Phila., II, p. 155, September, 1863 [Cuba].

Dull black, most of exposed corium stramineous to reddish, in paler examples there is usually a reddish streak parallel to costa; thin costal edge, clavus, and a streak posterior along inner side of heavily chitinized part of corium, black; lateral margins of fifth and sixth sternites, and posterior margin of intervening sclerites, stramineous to reddish; tarsi, antennæ, and beak, testaceous.

Head produced about twice length of eye beyond anterior transocular line, front margin not at all carinate, narrowly rounded anteriorly, apex of tylus more or less prominent, sinuate laterally; puncturing of dorsum as described in key, only the callosities being impunctate; apex of scutellum varying from rounded to truncate or even emarginate; corium sparsely and shallowly punctate; lateral area of metapleurum scarcely distinctly punctate; venter copiously punctate, smoother medially in female from fifth sternite anteriorly, and in male on all sternites; sixth sternite of male subangulate anteriorly, as long as the preceding three sternites together, all of which are distinctly constricted medially; hypopygium almost concealed by sixth sternite from below, the hind margin slightly concave; dorsal rim broad, moderately sloping, a little the widest at lateral angles, hind wall rounded, very low, even below level of central disk; sixth sternite of female broadly subangulate anteriorly, longer than the preceding three but shorter than the preceding two sternites, each of which is slightly constricted medially; genital plates punctate, half as long as sixth sternite, twice as long as postventer, inner margins only about half as long as posterior, the latter nearly straight, but slightly oblique in position, the inner ends anterior; subgenital plates small, lanceolate. Length 1.8-2.25 mm.

Cuba, Uhler Collection; Baraçao, Cuba, August, September, A. Busck; Cayamas, Cuba, Jan. 12, June, 5, E. A. Schwarz; Baragua, Cuba, Jan. 24, 1928, L. C. Scaramuzza; Portland, Jamaica, Uhler

Collection; St. Anne's Parish, Jamaica, Sept. 13, 14, 1917, Harold Morrison; San Francisco Mts., Santo Domingo, Sept. 4, A. Busck; Santo Domingo, Aug. 7, Sept. 1, 1905, A. Busck; San Christobal, Republic Dominica, July 26, 1917, Harold Morrison; Ft. Cangrejos, Porto Rico, 1920, G. N. Wolcott (U. S. N. M.); Montego Bay, Jamaica, March 2, 1911, H. G. Barber; Clarendon, Jamaica, Dec. 15-18, 1919; Mandeville, Jamaica, Jan. 12, 1920 (Am. Mus. Nat. Hist.); Portland, Jamaica (Knight); Cuba (Berlin Museum); Haiti, E. D. Ball (Iowa State College); Guantanamo, Cuba, May 7, 1914, C. T. Ramsden; Jamaica (Ac. Nat. Sci. Phila); Santiago de las Vegas, Cuba, April 12, 1921, B. T. Banta; Camaguey, Cuba, July 30, 1923, J. Acuna; El Fraile, Cuba, April 6, 1924 (S. C. Bruner).

183. *Allocoris (Allocoris) nigra* Dallas.

Corimelæna nigra Dallas, W. S., List, 1, 1851, pp. 57-58 [Hudson Bay].

C[orimelæna] anthracina Uhler, P. R., List of Hemiptera of the Region West of the Mississippi River, including Those Collected during the Hayden Explorations of 1873, U. S. Geol. and Geogr. Survey Terr., Second Ser., Bull. 5, 1876, pp. 270-271 [California].

Black, moderately shining, fading to brownish in old specimens; tarsi, antennæ, and beak testaceous to fuscous; in specimens, probably not fully colored, the corium, margins of abdomen, and legs are more or less reddish-brown.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin distinctly reflexed, broadly rounded to truncate medially, sinuate laterally, distinctly prominent before anterior angle of eye; vertex uniformly and coarsely punctate, except on occipital strip; pronotum punctate throughout, except on callosities; punctures coarsest laterally, more or less rastrate about ends of transverse impression; scutellum copiously punctate, the punctures finest on anterior disk and on declivity; corium punctate throughout, punctures least distinct on exocorium; lateral area of metapleurum broad, more or less punctate along inner side; arrangement of spinacles and trichobothria as in Fig. 223; venter polished, numerous but shallowly punctate, more sparsely so medially; sixth sternite of male about as long as the preceding three together, with an abrupt angulation in middle of anterior margin, fifth sternite much, others less, constricted medially; ventral exposure of hypopygium, moderate in size, copiously punctate, hind margin slightly reflexed, almost evenly convex; dorsal rim broadest, and nearly flat laterally, narrower and moderately sloping anteriorly, hind wall, thin, arcuate, steep; sixth sternite of female about as long as the preceding two sternites together, which are slightly constricted medially, rounded to faintly and broadly

subangulate anteriorly; genital plates two-thirds as long as sixth sternite, one-third longer than postventer, copiously punctate, inner margins slightly elevated, two-thirds as long as posterior, the latter straight and transverse (Fig. 235). Length 4-4.75 mm.

Holotype female, Hudson Bay (British Museum); type material of *anthracina* labelled California, and San Francisco, Calif. (Uhler Collection); and other specimens with the following data: San Francisco Co., Calif., June; Alameda Co., Calif., E. C. Van Dyke; Eureka, Calif., May 22, June 3, H. S. Barber; Sausalito, Marin Co., Calif., Jan. 13, J. C. Thompson; Oregon; Seattle, Wash.; Easton, Wash.; Kaslo, B. C., June 26, R. P. Curre; Kokanee Mt., B. C. on snow, 9000 ft., A. N. Caudell; Whitehorse, Yukon Territory, May 28, 1916, J. A. Kusche; Oxbow, Sask., May 11, 1907, F. Knab; Nevada, Uhler Collection; Colo., Baker and Uhler Collections; West Cliff, Colo.; Lookout Mt., Colo., 7000 feet, July 3, 1927; Veta Pass, Colo.; Custer Co., Colo., T. D. A. Cockerell; Top of Las Vegas Range (11,000 ft.), N. Mexico, June 26, 1901, T. D. A. Cockerell; also a specimen labelled N. Y. possibly erroneously, and another bearing a similar numerical label to last, Uhler Collection (U. S. N. M.); Tolland, Colo., July 28, D. Stoner (Deutsches Ent. Inst.); Electra Lake, Comet Creek, Aspen, and Tennessee Pass, Colo., 8,400-10,800 ft., June-August 1919 (A. M. N. H.); California; Summit of Mary's Peak, Ore., Sept. 16, 1897, A. P. Morse; Denver, Colo., July (M. C. Z.); Marquette, Mich.; Dille, Ore.; Huachuca Mts., Ariz. (Barber); Trinidad, Colo., 8,500 ft., Aug. 7, 1925; Fort Garland, Colo., Aug. 11, 1925; Pingree Park, Colo., Aug. 15-22, various years, nymphs as well as adults, C. J. Drake; North Park, Colo., July-August, 1926, F. C. Hottes; Lum County, Ore., June (Iowa State College); Ciudad, Mexico, Forrer (Paris Museum); Guajuco, Nuevo Leon, Dr. Palmer (British Museum) Mexico, Sallé (Dresden Museum).

184. *Allocoris (Allocoris) palmeri* sp. nov.

Piceous, shining, the costal stripe narrow, pale yellowish; lateral margins of fifth and sixth sternites, in both sexes, and posterior margin of ultimate tergite of female, the same color; tarsi testaceous, beak and antennæ varying to castaneous, more or less infuscated.

Head produced one and one-half (female) to two (male) times length of eye beyond anterior transocular line; front margin scarcely carinate, narrowly rounded medially, tylus subprominent, slightly sinuate laterally in male, more conspicuously so in female; vertex numerous coarse-punctate, except on occipital strip; pronotum

coarsely shallow-punctate laterally, more or less rastrate in extremities of transverse impression, finely shallow-punctate along anterior margin, sparsely so elsewhere; scutellum moderately punctate peripherally, sparsely so discally; mesocorium punctate, dark portions of exocorium numerous fine-punctate and pale portions sparsely coarse-punctate; lateral area of metapleurum punctate along inner edge; venter numerous punctate laterally, somewhat smoother medially in female, broadly polished there in male; sixth sternite in both sexes longer than the preceding two, but shorter than the preceding three sternites together, none of which are much constricted medially; in male the sixth sternite is subangulate anteriorly, ventral exposure of hypopygium punctate, hind margin not at all reflexed, slightly concave medially and very slightly so sublaterally, dorsal rim (Fig. 253) as wide or even wider anteriorly than laterally, anterior rim rather flattened and finely transversely wrinkled, hind wall narrow, almost vertical, central depression abrupt, except anteriorly; sixth sternite of female rounded anteriorly; genital plates punctate, two-thirds as long as sixth sternite, twice as long as postventer, inner margins two-thirds as long as posterior, the latter, nearly straight, slightly oblique, inner angles farthest posterior (Fig. 237). Length 4-4.25 mm.

Holotype male and *allotype* female, Saltillo, Mexico, E. Palmer (M. C. Z.); *paratypes*, Morelia, E. Duges, 1892 (Helsingfors Museum).

185. *Allocoris (Allocoris) polita* Malloch.

Corimelana polita Malloch, J. R., Bull. Ill. State Nat. Hist. Survey, XIII, Art. VII, June, 1919, p. 213 [Brownsville, Texas].

Black with æneous and purplish reflections, the costal stripe, edges of fifth and sixth sternites and of ultimate tergite pale yellow; tarsi, antennæ, and beak testaceous. Head rather acute anteriorly, margin slightly sinuate in front of eyes, distinctly punctate, except for usual smooth area on back of vertex; pronotum punctate near margins and in a narrow band across disk, otherwise nearly smooth; scutellum with the punctures subobsolete discally. Length 4 mm.

Holotype female, Brownsville, Tex., July 10, 1908, C. A. Hart (Ill. State Nat. Hist. Survey).

186. *Allocoris (Allocoris) pulicaria* Germar.

O(dontoscelis) pulicarius Germar, E. F., Zeitschr. f. Ent., I, 1839, p. 39 [Pennsylvania, Martinique].

Galgupha flavo-marginata, Thomas, Cyrus, Insects Injurious to Vegetation in Illinois, Trans. Ill. State Agr. Soc., V (1861-1864) 1865, p. 455 [Illinois].

Black with æneous reflections, apex of tylus, disk of mesocorium and all of exocorium (Fig. 68), stramineous to yellow; lateral margins of fifth and sixth sternites, sometimes part of fourth, and posterior

border of genitalic segments stramineous to orange; legs castaneous to black, tarsi testaceous; antennæ and beak testaceous to fuscous.

Head produced about length of eye beyond anterior transocular line; front margin scarcely carinate, narrowly rounded anteriorly, tylus subprominent, more or less sinuate laterally. Vertex, except narrow occipital strip, pronotum, except callosities, and scutellum copiously and coarsely punctured in female, more finely so in male, the punctures also sparser discally in the latter sex; corium sparsely punctate; lateral area of metapleurum slightly punctate along inner side; venter copiously punctate laterally, smoother medially, sixth sternite angulate anteriorly in male, subangulate in female, fifth and fourth distinctly constricted medially in both sexes; ventral exposure of male hypopygium brief, punctate, hind margin slightly reflexed, slightly concave medially as viewed from below (Fig. 252), dorsal rim (Fig. 245) broad all around between lateral angles and only slightly sloping, hind wall thin, low, genital plates of female punctate, half as long as sixth sternite, longer than postventer, inner margins about two-thirds as long as posterior, the latter nearly straight and transverse; subgenital plates short, lanceolate. Length 2.25-3.5 mm.

In the Germar Collection (Lwow Museum) are six specimens labelled "*Odontoscelis pulicaria* m., Pennsylvania," of which the uppermost, a male, of a set of three specimens on one pin is selected as *holotype*;¹² the Germar material in Berlin Museum, consisting of a male and a female, labelled "Carolina, Bosc" is conspecific; other specimens examined indicate a range for the species that extends from Massachusetts, Ontario, and British Columbia south to Oregon, Arkansas, Texas, Florida, and Guatemala.

187. *Allocoris (Allocoris) tibialis* Fabricius.

T(etyra) tibialis Fabricius, J. C., Systema Rhyngotorum, 1803, p. 144 [*Amer. merid.*].

Æneous-black, polished, apex of tylus, corium (except for a line on inner side) rather tumid lateral margins of sternites five and six, and posterior margin of genitalic segments, stramineous to yellow; legs from knees, antennæ, and beak, varying from stramineous to subfuscous.

Head produced about one and one-half times length of eye beyond anterior transocular line, front margin scarcely reflexed, narrowly rounded anteriorly, tylus subprominent, slightly sinuate laterally. Vertex coarsely punctate, except for occipital strip; pronotum coarsely punctate antero-laterally, and in extremities of transverse impression, where more or less rastrate, more finely and sparsely punctate else-

¹²The specimen from Martinique, labelled "var." is *tibialis* Fabricius.

where; scutellum moderately punctate peripherally, sparsely so distally; corium almost impunctate; lateral area of metapleurum punctate along inner side; venter copiously punctate laterally, more or less polished medially; sixth sternite subangulate in both sexes, more broadly so in female, fifth and fourth sternites distinctly constricted medially; only the tumid posterior margin of male hypopygium visible from below; it is slightly convex medially, concave sublaterally; posterior aspect as in Fig. 251; dorsal rim but little wider laterally than anteriorly, moderately sloping, inner basin shallow, hind wall low, thickened and rounded; genital plates of female punctate, three-fourths as long as sixth sternite, nearly twice as long as postventer, inner margins two-thirds as long as posterior, the latter nearly straight and slightly oblique (inner ends most anterior); subgenital plates brief, lanceolate. (There is considerable variation in the size of the subgenital plates, which we are unable so far to correlate with any other characters of specific value.) Length 2-3 mm.

Holotype female and *allotype* male, "Amer. mer., Schmidt," Mus. Lund (Copenhagen Museum); Mittelamerika, Fabrician Collection (Kiel Museum); other specimens from Panama City, Panama, E. A. Schwarz; same locality, April 23, 1911, A. H. Jennings; Panama City, Panama, E. A. Schwarz; Borracho Plantation, Canal Zone, July 10, 1918, H. F. Dietz and J. Zetek; San José, Costa Rica, April, 1928, J. F. Tristan; Rio Frio, Colombia, July 8, 1927, G. Salt; St. Vincent, W. I., H. H. Smith; Balthazar, Grenada, W. I.; Mirabeau Estate, Grenada, W. I., H. H. Smith, Uhler Coll.; Caliveny Estate, Grenada, W. I., H. H. Smith (Barber); Grenada, W. I., June, A. Busck; San Fernando, Trinidad, Oct. 19, 1918; Aripo Savanna, Trinidad, Oct. 26, 1918; Georgetown, British Guiana, Sept. 22, 26, 1918, Harold Morrison; Merida, Venezuela, S. Briceno (U. S. N. M.); Colombia, Lebas, 1830; Llanos, Venezuela, F. Geay (Paris Museum); Obidos, Amazonas, H. Rolle; Yungas, Bolivia, Kraatz (Deutsches Ent. Inst.); New Amsterdam, July, Blairmont, October, British Guiana, 1923, F. Williams (Van Zwaluwenberg); Mexico, Deyrolle (Leiden Museum); Paramaribo, Surinam, Heller; Bolivia, Wanczewicz (Berlin Museum); Bogotá, Lindig; Colombia (Stockholm Museum); Venezuela (Stettin Museum); Loja, Ecuador, Ernesto Will; vicinity of Paramaribo, Surinam, March 1909, C. Heller (Hamburg Museum); Rio Frio, Colombia, June 16, 1925 (Iowa State College); New Granada, Schauf (Vienna Museum); Edvarton, Jamaica, T. D. A. Cockerell; Becquia Id., Grenadines, West Indies, H. H. Smith (British Museum); Colima Volcano, Mex. (Munich Museum); Cauca, Colombia; St. Laurent,

Guiana; Turrialba, Costa Rica; Jalapa, Mexico, H. Taeuber (Munich Museum).

Subgenus *TERMAPORA* subgen. nov.

Characters as given in the key, p. 359. Subgenotype *Corimelana minutissima* Malloch.

Only a single species is known, *Allocoris (Termapora) minutissima* Malloch.

188. *Allocoris (Termapora) minutissima* (Malloch).

Corimelana minutissima Malloch, J. R., Bull. Ill. Nat. Hist. Survey, XIII, Art. 7, June, 1919, pp. 214-215 [Sarita, Texas].

Greenish-black, the corium stramineous to testaceous, narrowly bordered by a stripe of the ground-color along edge of scutellum; lateral margins of sternites four to six in both sexes, and posterior margin of ultimate segment of female, reddish-yellow; femora castaneous to black; knees, tibiæ, tarsi, and antennæ testaceous.

Outline of body from side as in Fig. 228. Head produced about one and one-half times length of eye beyond anterior transocular line; front margin scarcely carinate, rather pointed anteriorly and slightly sinuate laterally; vertex coarsely punctate, except on occipital strip; pronotum coarsely punctate laterally and in extremities of transverse impression; the punctures here and the more shallowly impressed ones in median part of transverse impression more or less rastrate; anterior and posterior margins broadly smoother, with only shallow, sparse puncturing; scutellum with numerous distinct punctures peripherally, the disk with considerable smooth areas between the punctures, which are in irregular transverse rows; corium finely punctate; lateral area of metapleurum punctate interiorly; venter numerous punctate laterally, smoother medially, sixth sternite rather angulate anteriorly in both sexes, fifth and fourth distinctly constricted medially; sixth sternite of male as long as the preceding sternites combined, almost completely concealing the hypopygium, the distinctly reflexed hind margin of which, appears slightly concave viewed from below; dorsal rim distinctly broader laterally than anteriorly, on the latter section there is a low crescentic carina which fades out posterolaterally; except for this the lateral and anterior portions slope gradually to the central disk; hind wall more declivitous, convex; sixth sternite of female longer than the preceding two, but shorter than the preceding three sternites together; genital plates punctate, two-thirds as long as sixth sternite, and nearly twice as long as postventer, inner margins two-thirds as long as posterior, the latter straight and transverse. Length 2.5-3 mm.

Holotype male, Sarita, Texas (Sand Hills), Dec. 1, 1911, C. A. Hart (Ill. Nat. Hist. Survey); Brownsville, Texas, April 15, 1910, R. A.

Vickery, Webster No. 6479; Texas, Uhler Coll. (U. S. N. M.); Pascagoula, Miss., Aug. 8, 1921, Carl J. Drake (Drake); Frontera, Tabasco, Mexico, June 1897, C. H. T. Townend (Iowa State College).

Subgenus PARAPORA subgen. nov.

Characters as given in the key, p. 359. Subgenotype *Corimelana extensa* Uhler.

KEY TO THE SPECIES.

1. Males.....2
Females.....7
2. Corium with a dark mark on costa beyond middle....**californica** Van Duzee.
Corium entirely yellow on costa.....3
3. Dorsal rim of hypopygium (Fig. 256) essentially flat, neither decidedly sloping
nor excavated interiorly.....**cognata** Van Duzee.
Dorsal rim of hypopygium decidedly sloping or excavated interiorly.....4
4. Sides of pronotum nearly straight, lateral edge of sternites tumid, without
carina; the marginal spots and posterior margin of hypopygium yellow,
conspicuous; vertex behind eye impunctate; hypopygium as in Figs. 246, 247.
parana McAtee and Malloch.
Sides of pronotum rounded; lateral margins of sternites, except sixth, distinctly
carinate; inconspicuously, and posterior margin of hypopygium not at all,
yellow; vertex behind eye punctate.....5
5. Anterior rim of hypopygium sloping inwardly, a rounded carina following its
inner side.....**extensa** Uhler.
Anterior rim of hypopygium depressed or beveled off cephalad, forming a nearly
straight carina across its inner side (Fig. 255).....6
6. This carina with a more or less pronounced setulose elevation on each side
posteriorly (Fig. 254).....**virilis** sp. nov.
Carina without lateral elevations (Fig. 255).....**incognita** sp. nov.
7. Corium with a dark mark on costa beyond middle; form robust (Fig. 230).
californica Van Duzee.
Corium entirely yellow on costa beyond base, form more slender (Fig. 229) .. 8
8. Genital plates decidedly shorter on inner than on posterior margins (Fig.
241).....9
Genital plates nearly as long on inner as on posterior margins (Fig. 240).
incognita sp. nov.
9. Hind tibia without evident posterodorsal bristles; greatest width of opaque
area behind ostiole barely exceeding that of ostiole, and not half as wide
as glossy portion of metapleurum behind it.....**cognata** Van Duzee.
Hind tibia with two or more posterodorsal bristles, which are about as long as
tibial diameter; greatest width of opaque area behind ostiole much greater
than that of ostiole, and about equal to that of the glossy portion of meta-
pleurum behind it.....**extensa** Uhler.

SYSTEMATIC ARRANGEMENT OF THE SPECIES.

Hind tibia with two or more posterodorsal bristles:
virilis, extensa, parana.

Hind tibia without distinct posterodorsal bristles:
incognita, cognata, californica.

189. *Allocoris* (*Parapora*) *californica* Van Duzee.

Corimelæna californica Van Duzee, E. P., A new *Corimelæna* (Hemiptera), Pan-Pacific Ent., VI, No. 1, July, 1929, p. 10 [California].

Æneous-black, part of disk of mesocorium and basal half and apex of exocorium yellowish; sixth sternite and postventer with a dull yellowish spot on each side; beak, antennæ, and tarsi dark honey-colored.

Outline as in Fig. 230; head produced nearly twice length of eye beyond anterior transocular line; front margin distinctly reflexed, truncate medially, slightly sinuate laterally; vertex numerous and coarsely punctate, except on occipital strip and the two connected discal areas; pronotum coarsely punctate laterally and anteriorly, slightly rastrate in the inconspicuous transverse impression, and more sparsely and shallowly punctate anteriorly; scutellum coarsely punctate antero-laterally, finely punctate elsewhere, sparsely so anteriorly, copiously laterally, somewhat rastrate on declivity; mesocorium coarsely punctate on dark, sparsely and less coarsely so on pale, areas, exocorium feebly punctate; lateral area of metapleurum broad anteriorly, coarsely punctate, except near outer margin anteriorly; venter copiously punctate, sixth sternite subangulate anteriorly, fifth and fourth definitely constricted medially; genital plates (Fig. 242) punctate, two-thirds as long as sixth sternite, more than twice as long as postventer; inner margin nearly as long as posterior; the latter slightly convex and oblique posteriorly. Length 3 mm.

Paratype female, GuerneWood Park, Sonoma Co., Calif., July 21, 1929, Paul Baldwin (U. S. N. M.).

We give the labels literally and assume that this is the same locality as Guernville cited by Van Duzee in connection with the original description of the species. The only other recorded locality is Paraiso Springs, Monterey Co., Calif. (L. S. Slevin). Lacking the male we have had to depend upon a color character alone for the location of that sex in the key. The more robust form of the species, which we assume is characteristic of both sexes, causes it to superficially resemble typical species of the preceding subgenus, but the arrangement of the abdominal spiracles, coarser punctation, venation of the corium, and the sharp and slightly undulated apical margin of the abdomen

unquestionably place it in *Parapora*. No other species of this subgenus known to us has the corium with a black preapical mark, which is reminiscent of the species *interrupta* in the preceding subgenus, while the robust form (Fig. 230) and larger genital plates (Fig. 242) serve at once to distinguish it from *incognita* with which it agrees in size. There is a very striking difference in the lateral outline of the pronotum of this from that of any of the other species, none of the latter possessing so obvious a shoulder anteriorly.

190. *Allocoris (Parapora) cognata* Van Duzee.

Thyreocoris cognatus Van Duzee, E. P., Notes on Jamaican Hemiptera, Bull. Buffalo Soc. Nat. Sci., VIII, 1907, p. 6 [Rock Fort, Jamaica].

Eucoria placata Horvath, G., Ann. Mus. Nat. Hung., XVII, 1919, pp. 213-214, [Colombia].

Æneous-black, exocorium and disk of mesocorium stramineous to orange; lateral spots on sternites four to six and more or less of posterior margin of genitalic segments yellowish to orange; apex of tylus and legs chiefly castaneous; legs distally, antennæ, and beak, stramineous to testaceous.

Head produced nearly twice length of eye beyond anterior transocular line; front margin scarcely carinate, narrowly rounded medially, more or less sinuate laterally; vertex, except occipital strip, pronotum, except callosities, and most of scutellum, numerous and rather coarsely punctate, punctures sparser on anterior disk of scutellum; corium punctate; lateral area of metapleurum broad, punctate over more than half of its width; venter numerous punctate, slightly smoother medially; sixth sternite subangulate anteriorly in both sexes, more acutely so in male, fifth and fourth sternites distinctly constricted medially; ventral exposure of male hypopygium punctate, hind margin scarcely reflexed, shallowly emarginate medially, and also sublaterally, as seen from below; dorsal rim (Fig. 256) more or less depressed anteriorly, and nearly as broad there as laterally, hind wall low, arcuate; internal male genitalia as in Figs. 29, 30; genital plates of female, punctate, less than half as long as sixth sternite and about equal in length to postventer, inner margins about two-thirds as long as posterior, the latter straight and transverse; hind margin of ultimate tergite of female subangulate medially, slightly sinuate laterally. Length 2.25-3.25 mm.

Male and female *paratypes*, Kingston, Jamaica, April 1906, E. P. Van Duzee (U. S. N. M. Type No. 12,286); Kingston, Jamaica, April 16, 1898 (Carnegie Museum); Nicaragua (U. S. N. M., A. M. N. H.); Pennela, Vera Cruz, Mex., April 22, 1908; Cordoba, Vera Cruz, Mex., March 20 to May 8, F. Knab; Nicaragua, Uhler Collection (U. S.

N. M.); Soledad, Cuba, Feb. 14, 1925, J. G. Myers (M. C. Z.); *holotype* male of *placata* Horvath, Baranquilla, Colombia, March 1912, J. Ujhelyi (Budapest Museum); Huachuca Mts., Ariz., H. G. Barber (Barber); Mexico; Jamaica (Ac. Nat. Sci. Phila.); Mexico, C. Höge (Hamburg Museum).

191. *Allocoris* (*Parapora*) *extensa* Uhler.

C(orimelæna) extensa Uhler, P. R., Hemipterological Contributions, Proc. Ent. Soc. Philadelphia, September, 1863, pp. 155-156 [near Fort Benton].

Thyreocoris montanus Van Duzee, E. P., North American Heteroptera, Ent. News, Vol. XX, No. 5, May, 1909, pp. 231-232 [Ogden, Utah, type locality; also Washington, California, and Wyoming].

Shining black, sometimes with æneous or bluish reflections; exocorium and outer disk of mesocorium (Fig. 73) yellowish; lateral spots on sixth sternite in both sexes, and more or less of posterior margin of ultimate tergite of female yellowish to reddish; apex of tylus, tarsi (sometimes apices of tibiæ), beak, and antennæ, stramineous to testaceous.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin scarcely carinate, rounded to subtruncate medially, more or less sinuate laterally; dorsum (except for the smooth occipital strip, and the callosities) numerous and almost uniformly punctate with punctures of moderate size; corium more sparsely punctate especially on pale portion; lateral area of metapleurum broad, punctate inferiorly; arrangement of spiracles and trichobothria as in Fig. 232; venter moderately punctate laterally, broadly smooth medially in male, less so in female, in which the sixth sternite especially is more punctate; sixth sternite narrowly subangulate in male, more broadly so in female, fifth and fourth sternites distinctly constricted medially in both sexes; ventral exposure of male hypopygium closely punctate, hind margin scarcely reflexed, decidedly concave medially, sloping or convex laterally, as seen from below; dorsal rim little narrower anteriorly than laterally, depressed and smoother anteriorly, the inner margin somewhat rounded-carinate; posterior portion rather broad, low, depressed medially; internal genitalia of male as in Figs. 31-32; genital plates of female (Fig. 241) closely punctate, less than half as long as sixth sternite and one-third longer than postventer, inner margins two-thirds as long as posterior, the latter nearly straight and somewhat oblique (inner ends farthest posterior); ventral exposure of ultimate tergite a little rounded-prominent medially, slightly concave sublaterally. Length 3.5-4 mm.

Holotype labelled "Ft. B[enton], '72," Uhler Collection; *paratypes* of *Thyreocoris montanus* Van Duzee, Ogden, Utah, July 1900, Van Duzee (U. S. N. M.), and numerous other specimens from a range extending from South Dakota and Iowa to Washington and California.

Females which probably include both the present species and *C. virilis*, sp. nov., but which cannot be separated at present, represent the states of Washington, Oregon, California, Idaho, Montana, Nevada, Utah, and Arizona.

192. *Allocoris* (*Parapora*) *incognita* sp. nov.

[*Corimelæna*] *cognatus* (sic) Van Duzee, E. P., Ent. News. XXXIV, 1923, pp. 303-304, in part.

Æneous-black, outer part of disk of mesocorium, exocorium, lateral spots (sometimes faint) on sixth sternite in both sexes and more or less of ultimate tergite of female yellowish to bright red; apex of tylus (usually), tarsi, sometimes more or less of tibiæ distally, antennæ, and beak, stramineous to testaceous.

Outline as in Fig. 229; head produced about one and one-half times length of eye beyond anterior transocular line, front margin slightly carinate, rounded or truncate medially, slightly sinuate laterally; vertex, except occipital strip, pronotum, except callosities, and scutellum numerous punctate with punctures of moderate size; corium punctate, the punctures less conspicuous on the pale than on the dark portions; lateral area of metapleurum broad, punctate over its inner half; venter numerous punctate peripherally, nearly smooth discally; sixth sternite angulate anteriorly in male, subangulate in female, fifth and fourth sternites constricted medially, most so in male; ventral exposure of male hypopygium punctate, hind margin slightly reflexed, a little concave medially, convex laterally, as seen from below; dorsal rim (Fig. 255) almost as broad anteriorly as laterally, gradually basined, depressed or bevelled off on forward half of anterior rim forming a transverse pseudo-carina, which curves and evanesces laterally, posterior part of rim of moderate width and slope; internal genitalia of male as in Figs. 33, 34; female genital plates punctate, three-fourths as long as sixth sternite, and about four times as long as postventer, inner margins nearly as long as posterior, the latter nearly straight but oblique in position (inner extremities farthest posterior); post-venter only about one-third as long medially as laterally. Length 2.75-3.5 mm.

Holotype male, *allotype* female, and *paratypes*, Fort Yuma, Ariz., Jan. 20, H. G. Hubbard (U. S. N. M.) and other specimens from various collections, mostly made *paratypes*, representing a range extending from Colorado and British Columbia south to Texas, California, and Michoacan, Mexico. Two males of this species from the C. V. Riley Collection are labelled only N. C. If this means Northern California, all is well, but if it has the more usual meaning of North Carolina, it seems that a mistake has been made.

193. *Allocoris* (*Parapora*) *parana* McAtee and Malloch.

Corimelæna parana McAtee, W. L., and Malloch, J. R., Ann. Mus. Zoöl. Poland, VII, 1928, pp. 42-43 [Paraná, Brazil].

Most of head and pronotum, and disk of scutellum æneous-black; apex of head yellowish to reddish; margin of pronotum below lateral carina ivory; humeral prominences and closely adjacent areas, and broad periphery of scutellum (excepting punctures) yellowish; clavus castaneous to black, mesocorium testaceous, exocorium stramineous, cubital vein sometimes fuscous, deepest on apical half; connexivum and lateral spots on sternites yellowish, venter castaneous to black, more or less æneous; legs from knees, beak, and antennæ, stramineous to testaceous.

Head produced about twice length of eye beyond anterior trans-ocular line; front margin scarcely carinate, subangulate medially, sinuate laterally; vertex coarsely punctate, except on the wrinkled tylus and smoothish occipital strip, the punctures more or less in transverse rows; pronotum moderately punctate, except on callosities and humeral prominences; scutellum rather thickly and coarsely punctate everywhere, except on anterior disk, where the punctures are sparser and finer, declivity rugulose; clavus and corium sparingly punctate, the punctures much finer on the exocorium; lateral area of metapleurum broad, sparingly punctate along inner side; sternites finely punctate laterally, smoother medially, especially the sixth; the latter angulate anteriorly, sternites five, four, and three, constricted medially; ventral exposure of hypopygium punctate, channeled transversely, hind margin convex, as seen from below, with a slight median indentation (Fig. 247), dorsal rim (Fig. 246) broad, granular, and gently sloping anteriorly, broader at lateral angles, hind wall thin, with a broad bridge at bottom to central disk, central excavation almost pentagonal in outline, large, and deep. Length 3 mm.

Holotype male, São Domingo, Paraná, Brazil, Feb. 25, 1922 (Polish Museum); another male received after publication of the original description is from Santos, Brazil, Oct. 17, 1898, H. Brauns (Hamburg Museum).

194. *Allocoris* (*Parapora*) *virilis* sp. nov.

The description of *C. extensa* applies to this species in all particulars except sculpturing of dorsal rim of hypopygium which is described in key.

Posterior sternites of male as in Fig. 231; dorsal rim of hypopygium as in Fig. 254; internal genitalia of male, Figs. 27-28.

Holotype and *paratypes*, Cedar Ranch, Ariz., 7.6; *paratypes*: Spokane, Wash., Aug. 4, C. V. Piper; California, Baker Collection; Placer Co.,

Calif., September, Riley Collection; Lindsay, Calif., June 24, 1909, W. A. Davidson; Los Angeles, Calif., D. W. Coquillett, also Uhler Collection; Mojave, Calif., Uhler Collection; Camas Prairie, Idaho, L. Bruner; Weiser, Idaho, July 21, 1913, on *Antirrhinum*, Woliston (U. S. N. M.); Buckskin Valley, Iron Co., Utah; June 29 (Barber); Seligman, Ariz. (Knight); Caliente, Calif., April 19, 1907 (Ac. Nat. Sci. Phila.).

Subgenus *EPIPORA* subgen. nov.

Characters as given in the key, p. 359.

In addition it is worth noting that because of the deep and close puncturing of the scutellum the submarginal impressed line usually very evident in most species in the family is entirely obliterated. Subgenotype *Allocoris signoretii* sp. nov.

195. *Allocoris (Epipora) signoretii* sp. nov.

Æneous-black, exocorium and most of mesocorium stramineous; lateral spots on sternite six, and submargin of ultimate tergite, yellowish; legs chiefly castaneous; apices of tibiæ, tarsi, antennæ, beak, and apex of tylus, testaceous.

Head produced twice length of eye beyond anterior transocular line, front margin subcarinate, narrowly rounded medially, slightly sinuate laterally; whole dorsal surface, except occipital strip of vertex, and callosities of pronotum copiously punctate, the punctures chiefly of moderate size; lateral area of metapleurum broad, punctate on inner half; venter copiously punctate peripherally, somewhat smoother discally; sixth sternite subangulate anteriorly, a little convex in middle posteriorly, nearly as long as all the preceding sternites together, of which five, four, and three are distinctly constricted medially, five most so; genital plates densely punctate, less than half as long as sixth sternite, longer than postventer, inner margins about three-fifths as long as posterior, the latter slightly concave, and nearly transverse in position. Length 4.5 mm.

Holotype female, Brazil, Signoret Collection (Vienna Museum).

BIBLIOGRAPHY

The bibliography contains full references to papers, which are frequently cited in briefer form in the text, in addition to a few which are not at all mentioned in the systematic account, for the reason that they treat forms, which we have been unable to identify. All references to identified species described singly and to genera set up in papers not included in the bibliography are given in full in the text.

BERG, C. *Hemiptera Argentina enumeravit speciesque novas descripsit*. Buenos Aires, 1879. Reprint from An. Soc. Cien. Arg., Vol. V-IX. The genus *Thyreocoris* is treated on pp. 16-22, and 277-278, ten species being listed of which six are described as new. We are able to identify only one of these, namely *longirostris*; the unidentified are *circumfusa*, *flavo-bisignata*, *pampeana*, *setigera*, and *xanthopus* all described from Buenos Aires. We are informed that the types of Berg are destroyed.

BERG, C. *Addenda et Emendanda ad Hemiptera Argentina*. Reprinted from An. Soc. Cien. Arg., Vol. XV-XVII, Buenos Aires, 1884.

Thyreocoris xanthocnemis sp. nov. (Corrientes) is described on pp. 16-17, and "*T. schmidtii* Fabr." recorded. We are unable to identify these names.

BREDDIN, G. *Neue oder wenig gekannte neotropische Hemiptera*. Abhandl. der Senckenberg. naturforsch. Gesellsch., XXXVI, 1, 1914, pp. 53-59.

Original descriptions of *Thyreocoris nitens* and *T. difficilis*, types of both of which have been seen.

DALLAS, W. S. *List of the Specimens of Hemipterous Insects in the Collection of the British Museum*, Part I, 1851, pp. 56-60.

Cites sixteen species in *Corimelana*, of which five are described as new; we have seen the types of all of these.

FABRICIUS, J. C. *Systema Rhyngotorum secundum ordines, genera, species adiectis synonymis, locis, observationibus, descriptionibus*, 1803.

In the genus *Tetyra* (pp. 128-145) he includes six species now ranged in *Thyreocorinæ* of which four are described as new. Three of the latter have been identified by examination of type material, while the fourth, *lateralis*, is left unidentified.

- GERMAR, ERNST FRIEDRICH. *Beiträge zu einer Monographie der Schildwanzen*. Zeitschrift für die Entomologie, 1, 1839.
Odontoscelis, pp. 36-43, includes fifteen species, five of which are described as new; all the latter have been accounted for from examination of type material.
- HORVATH, G. *Analecta ad Cognitionem Cydnidarum*. Ann. Mus. Nat. Hung., XVII, 1919, pp. 209-232.
 A key is given to nine genera, six of them new. Twenty-two species and one variety are described as new. Types of all have been studied.
- JENSEN-HAARUP, A. C. *Hemipterological Notes and Descriptions*, IV, 27. *Preliminary Descriptions of new Hemiptera in the Collections of the Zoölogical Museum of Copenhagen*. Ent. Meddel. XVI, 1926.
 On pp. 45-49 are described as new six *Thyreocorinæ*, the type material of all of which has been seen.
- MALLOCH, J. R. *Thyreocorinæ* in Hart, C. A., *The Pentatomoidea of Illinois with keys to the Nearctic Genera*. Bull. Ill. State Nat. Hist. Survey, XIII, Art. 7, June 1919, pp. 206-216, various figs. The genus *Cydnoides*, one species of *Galgupha*, and four species of *Corimelena* are described as new by this author; two species of the last-named genus also are described as new by W. L. McAtee. Typical or paratypical material of all of these forms has been studied.
- MCATEE, W. L., and MALLOCH, J. R. *Thyreocorinæ from the State of Paraná, Brazil*. Annales Musei Zoologici Polonici, VII, pp. 32-44. April 1928 (July).
 A report on twenty species, eleven of which besides four subgenera are described as new. The paper has a summary in Polish prepared by Dr. T. Jaczewski.
- MONTANDON, A. L., *Viaggio del Dott. A. Borelli nella Republica Argentina e nel Paraguay*, XVIII. Hémiptères Hétero-ptères. Première liste et descriptions d'espèces nouvelles. Boll. Mus. Zool. Anat. Comp. Univ. Torino, No. 219, Dec. 1895.
Thyreocoris borellii (pp. 1-2) [Salta, San Pablo] seems to be a *Gyrocnemis*, but in the absence of authentic specimens we cannot identify it.
- MULSANT, ETIENNE, and REY, CLAUDIUS. *Histoire naturelle des Punaies de France*. Scutellèrides, 1865.

The group here treated as *Thyreocorinæ* are included in the family *Eucoriaræ* (pp. 12-13) under two genera *Coreomelas* (= *Thyreocoris*) and *Eucoria* new. The type of the latter genus is a new species, *E. marginipennis*, based on a single specimen collected near Marseilles, which Horvath (Ann. Mus. Nat. Hung. 17, 1919, p. 213) says is almost certainly imported. Horvath tentatively identified this species with *Odontoscelis pulicarius* Germ., with which the description does for the most part agree. The tibiæ are described as unarmed or nearly so, however, which does not agree, and tibia not spined is one of the principal characters of the new genus. The type specimen has not been examined by any other than the original authorities, and is not even known to be extant. Under the circumstances we consider *Eucoria* unidentifiable.

PALISOT DE BEAUVOIS, A. M. F. J. *Insects recueillis en Afrique et en Amerique, 1805.*

Scutellera unicolor (pp. 32-33, Pl. V, fig. 5) [San Domingo and United States] is unidentifiable from the description and figure, the species no doubt was composite, and the type probably has been destroyed.

SAY, THOMAS. *Descriptions of new species of Heteropterous Hemiptera of North America, 1831; Complete Writings, 1859, p. 311.*

Thyreocoris histeroides of this work is unidentifiable; the second species described as *T. albipennis* is treated on p. 343, of the foregoing monograph.

STÅL, CARL. *Hemiptera mexicana enumeravit speciesque novas descripsit, Ent. Zeit. (Stettin), 23, 1862.*

On pp. 94-95 are four species described in the genus *Thyreocoris* of which three are new; types of all seen.

STÅL, CARL. *Bidrag till Rio-Janeiro-Traktens Hemipter-Fauna, 1, Kgl. Svenska Vet. Akad. Handl., 2, No. 7, 1862.*

On pp. 8-9 are listed eight species of *Corimelæna*, four of which are here first described; types of all of them have been studied.

UHLER, P. R. *Hemipterological Contributions—No. 1, Proc. Ent. Soc., Philadelphia, 2, pp. 155-162, Sept. 1863.*

Six species are described in the genus *Corimelæna*; type material of all has been examined.

VAN DUZEE, E. P. *A Rearrangement of our North American Thyrocorinae (Hemip.)*. Entomological News, 34, No. 10, Dec. 1923, pp. 302-305.

Incorporation of the findings of Horvath (1919), and of Malloch (1919) in a check list of nearctic species; description of two new species, both identified in the present paper.

WALKER, FRANCIS. *Catalogue of the Specimens of Heteropterous Hemiptera in the Collection of the British Museum*, 1, 1867.

The genus *Corimelana*, pp. 77-81, with thirty-one species, includes seven described as new, the types of all of which have been examined.

WESTWOOD, J. O. *Descriptions of several new species of exotic Hemipterous Insects*. Trans. Ent. Soc. London II, 1, 1837, pp. 18-24, Pl. II (in part).

Eumetopia fissiceps (p. 19, Pl. II, fig. 4) [Middle America] placed in the *Corimelænidae* by Lethierry and Severin is of unknown affinities so far as the present authors are concerned. See also p. 196.

WOLFF, JOHANN FRIEDRICH. *Icones Cimicum descriptionibus illustratae*, 214 pp., 20 pls. 1800-1811.

Cimex nitiduloides, p. 98, Pl. 10, Fig. 92 is here (p. 205) identified, as we have seen the type; *Tetyra helopioides*, p. 174, Pl. 27, Fig. 168 is unidentifiable from the description and illustration and the type has not been seen.

196. *Strombosoma unipunctatum* Amyot and Serville.

Strombosoma unipunctatum Amyot, C. J. B., and Serville, A., Histoire Naturelle des Insectes Hémiptères, 1843, p. 65 [Senegal].

Black with the exceptions noted in key, and the testaceous tarsi, antennæ, and beak.

Head produced about one and one-half times length of eye beyond anterior transocular line; front margin distinctly reflexed, gently rounded medially, slightly concave laterally; vertex coarsely punctate throughout; pronotum punctate, except on the small callosities, the punctures coarsest antero-laterally, least conspicuous discally, especially at the color-marking, those on posterior half more or less rastrate; scutellum copiously punctate the punctures sparse, but scarcely less coarse on anterior disk; corium as in Fig. 74; all divisions of exposed elytra punctate, mesocorium most coarsely so; metapleurum, except ostiolar surface, wholly punctate; sternites coarsely punctate but little smoother medially (in female, no male available at this writing); sixth sternite of male subangulate anteriorly, nearly as long at middle as the preceding sternites together (all of which are constricted medially); ventral exposure of hypopygium about a half-circle, coarsely punctured, posterior margin deeply emarginate medially so that central disk is visible from behind, a small angulate process in middle of emargination; dorsal rim broadest at lateral angles, nearly flat, sloping inwardly only slightly, closely fitting central disk. Sixth sternite of female subangulate anteriorly, about as long as the preceding three sternites together, all of which are more or less constricted medially, the fifth and fourth greatly so, deeply rounded-emarginate posteriorly for reception of the genital plates, which with the subgenital and anal plates form an almost circular figure; genital plates longitudinally wrinkled on inner two-thirds of area, punctate on outer third; genital plates about three-fourths as long as sixth sternite and about equal in length to postventer; inner margins slightly elevated, about equal in length to posterior, the latter somewhat concave, but nearly transverse in position; subgenital and anal plates all punctate, subtriangular and of about equal area; hind coxa as in Fig. 5. Length 3 mm.

Holotype male, Senegal, Signoret Collection (Vienna Museum), and a female, possibly a *paratype*, Senegal (Paris Museum).

197. *Strombosoma impictum* Stål.

Corimelæna impicta Stål, C., Nya Hemiptera fran Cafferlandet, Öfv. Kgl. Vet. Akad. Förh., 10, 1853, p. 212 [Caffraria].

Like the preceding species, except as noted in key, and in size. Length 3-3.75 mm.

Holotype male, Caffraria, J. Wahlberg (Stockholm Museum), and a female from Djibouti, H. Coutiere, 1897 (Paris Museum).

Genus CARRABAS Distant.

Carrabas Distant, W. L., Fauna of British India, Rhynchota IV, 1908, pp. 421-422 [Monobasic, genotype *C. maurus* sp. nov., India]. Described in the *Plataspidinæ*.

Agrees with *Thyreocoris* in gibbous form, sulcate tibiæ, and simple venation; jugæ connivent in front of tylus, forming an anteriorly furcate process (Figs. 258, 260), which in male is longer than remainder of head; ocelli far back on occiput and nearer to eyes than to median line; antennæ five-segmented (not four-segmented as described) the second segment being short, about one-third length of third, the others of about equal length, the fourth clavate and the fifth fusiform.

198. *Carrabas maurus* Distant.

Bibliographic reference as under genus, p. 422 [Madras].

Black, apex of corium yellow in female, reddish in male; antennæ testaceous basally, castaneous apically; tarsi testaceous.

Vertex coarsely punctate, the process also in female, that of male smoother; dorsum of prothorax and scutellum copiously punctate, only the small calli being smooth; pleura coarsely punctate, including lateral area of metapleurum; venter coarsely punctate, smoother medianly in male; sixth sternite of male subangulate anteriorly, convex posteriorly, hypopygium only narrowly exposed as viewed from below, ventral surface, vertical, punctate with a small elliptical posteriorly directed opening at upper border, dorsal rim not visible; female genitalia not seen by authors in carded specimen, but later sketched by W. E. China (Fig. 257); corium as in Fig. 75; arrangement of spiracles and trichobothria as in Fig. 259; hind coxæ as in Fig. 6; head of female from above, Fig. 258, and of male Fig. 260. Measurements kindly furnished by W. E. China; Length ♀, 3.34 mm., breadth 2.64 mm; length ♂ 3.67 mm. (cephalic process 0.96 mm.), breadth 2.23 mm.

Holotype female, Walton, Madras, on *Casuarinia*, July 6, 1903, E. P. Stebbing; male, Colombo, Ceylon, Aug. 27, 1923 (British Museum).

APPENDIX 2.

SUMMARY OF GENERA AND SPECIES.

Genus, subgenera indented	Described		Total
	species seen	New Species	
GALGUPHA			
<i>Euryscytus</i>	11	27	38
<i>Bonaria</i>	1	..	1
<i>Gyrocnemis</i>	14	22	36

Genus, subgenera indented	Described		Total
	species seen	New Species	
<i>Ctenopoda</i>.....	..	2	2
<i>Trepocnemis</i>.....	..	1	1
<i>Orocoris</i>	1	..	1
<i>Acrotmetus</i>	5	1	6
<i>Galgupha</i>	5	2	7
<i>Microcompsus</i>	2	..	2
<i>Nothocoris</i>	9	17	26
<i>Psestophleps</i>	2	15	17
<i>Pteronomos</i>	1	6	7
<i>Charoda</i>.....	..	1	1
<i>Acritophleps</i>	1	..	1
<i>Astiroderma</i>	1	1	2
CYDNOIDES			
<i>Cydnoides</i>	2	1	3
<i>Sayocoris</i>	2	1	3
<i>Cosmarioides</i>.....	..	3	3
ALKINDUS.....	2	..	2
AMYSSONOTUM.....	1	..	1
PERICREPIS.....	1	1	2
PRUHLERIA.....	1	..	1
THYREOCORIS.....	1	..	1
GODMANIA.....	1	..	1
ALLOCORIS			
<i>Allocoris</i>	12	10	22
<i>Termapora</i>	1	..	1
<i>Parapora</i>	4	2	6
<i>Epipora</i>.....	..	1	1
Total.....	81	114	195

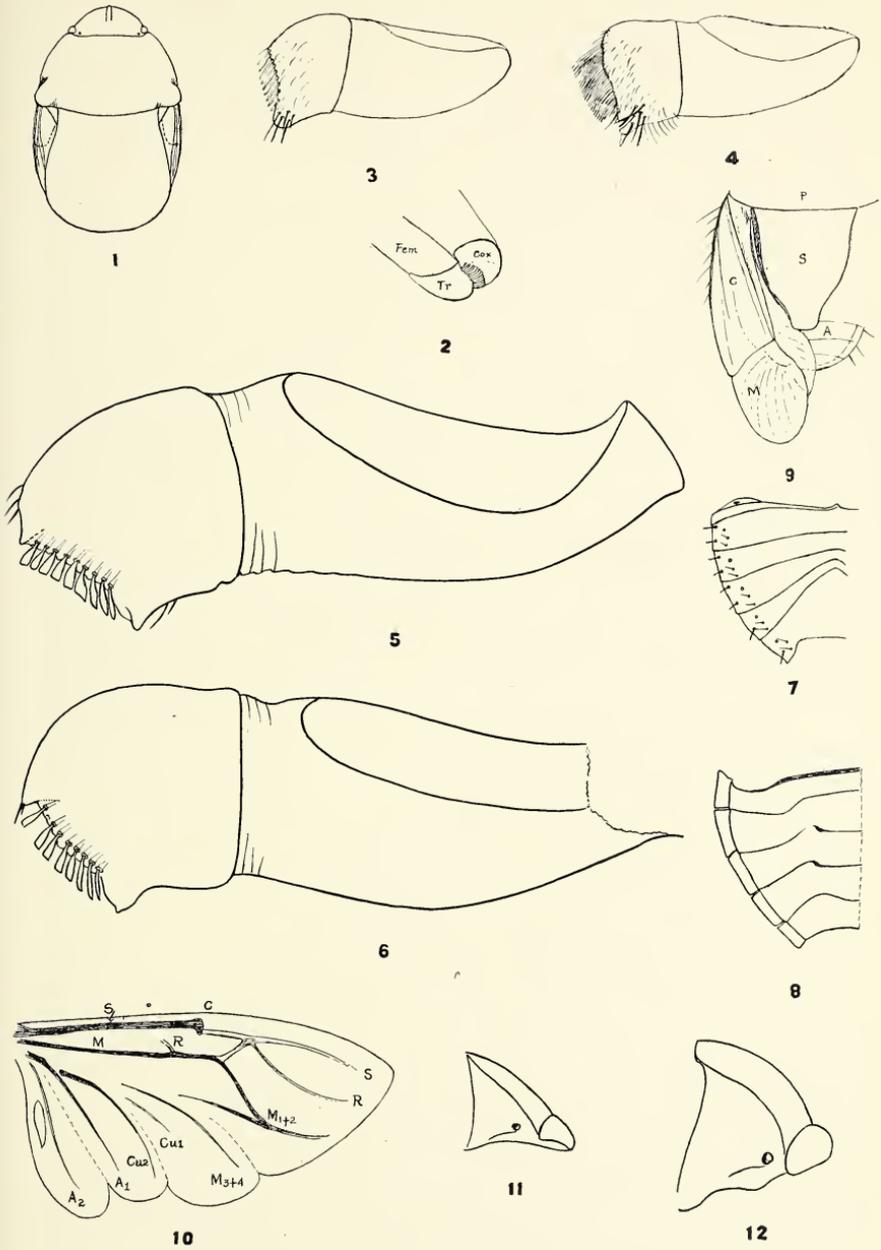
One genus and ten of the subgenera above listed, as well as five subspecies and five varieties are described as new in the present paper. McAtee and Malloch have described in previous papers one genus, four subgenera, and six species here accepted as valid.

In the bibliography mention is made of nine species probably correctly assigned to the subfamily and of three, which may or may not belong to it, that remain unidentified. In Appendix 1 are treated two previously described genera containing three species of the Old World, assignment of which to subfamily is not made.

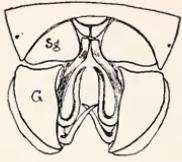
EXPLANATION OF PLATE IV.

- FIG. 1. *Galgupha (Nothocoris) chilocoroides*, dorsal outline.
FIG. 2. *Galgupha (Euryscytus) signatipennis*, hind coxa undissected.
FIG. 3. *Galgupha (Euryscytus)* sp., hind coxa extracted.
FIG. 4. *Cyrtomenis* sp., hind coxa extracted.
FIG. 5. *Strombosoma* sp., hind coxa extracted.*
FIG. 6. *Carrabas maurus*, hind coxa extracted.*
FIG. 7. *Galgupha (Gyrocnemis) guttiger*, ventral view of abdomen of male, right side, showing bristles and trichobothria.
FIG. 8. *Galgupha (Gyrocnemis) guttiger*, dorsal view of abdomen of male, left side.
FIG. 9. *Cyrtomenis mirabilis*, dorsal view of scutellum and left hemelytron, P = pronotum, C = corium, M = membrane, A = abdomen, S = scutellum.
FIG. 10. *Galgupha (Gyrocnemis) nitens*, hind wing. Veins designated.
FIG. 11. *Galgupha (Euryscytus)* sp., ventral aspect of left side of head.
FIG. 12. *Pangæus* sp., ventral aspect of left side of head.

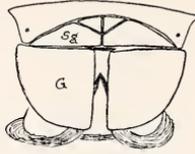
*Figs. 5 and 6 are drawings by W. E. China.



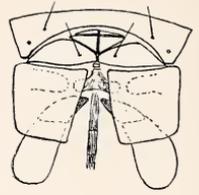
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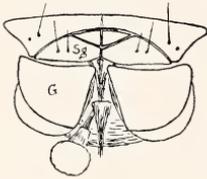
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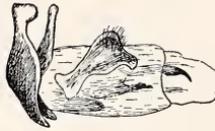
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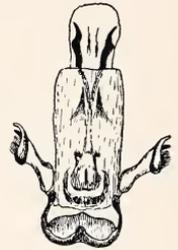
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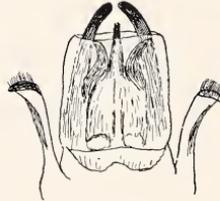
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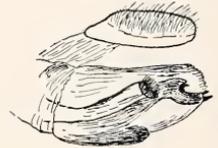
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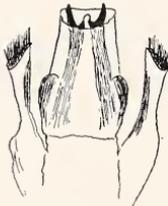
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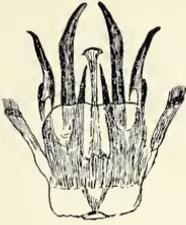
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EXPLANATION OF PLATE V.

- FIG. 13. *Thyreocoris scarabæoides*, genitalia of female from below, with genital and subgenital plates separated to show the two pairs of hooks.
- FIG. 14. *Allocoris (Allocoris) gillettii*, genitalia of female from below, with genital and subgenital plates slightly separated.
- FIG. 15. *Galgupha (Euryscytus) guttiger*, genitalia of female from below, with genital and subgenital plates slightly separated.
- FIG. 16. *Cydnoides (Sayocoris) albipennis*, genitalia of female from below, with genital and subgenital plates slightly separated.
- FIG. 17. *Thyreocoris scarabæoides*, internal genitalia of male, side view.
- FIG. 18. *Thyreocoris scarabæoides*, internal genitalia of male, dorsal view.
- FIG. 19. *Galgupha (Nothocoris) nitiduloides* subspecies *caerulescens*, internal genitalia of male, side view.
- FIG. 20. *Galgupha (Nothocoris) nitiduloides* subspecies *caerulescens*, internal genitalia of male, dorsal view.
- FIG. 21. *Galgupha (Galgupha) carinata*, internal genitalia of male, side view.
- FIG. 22. *Galgupha (Galgupha) carinata*, internal genitalia of male, dorsal view.
- FIG. 23. *Galgupha (Galgupha) denudata*, internal genitalia of male, dorsal view.
- FIG. 24. *Allocoris (Allocoris) gillettii*, internal genitalia of male, side view.
- FIG. 25. *Allocoris (Allocoris) gillettii*, internal genitalia of male, dorsal view.
- FIG. 26. *Allocoris (Allocoris) interrupta*, internal genitalia of male, dorsal view of apex.
- FIG. 27. *Allocoris (Parapora) virilis*, internal genitalia of male, side view.

EXPLANATION OF PLATE VI.

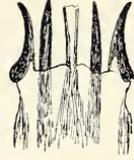
- FIG. 28. *Allocoris* (*Parapora*) *virilis*, internal genitalia of male, dorsal view.
- FIG. 29. *Allocoris* (*Parapora*) *cognata*, internal genitalia of male, lateral view of apex.
- FIG. 30. *Allocoris* (*Parapora*) *cognata*, internal genitalia of male, dorsal view of apex.
- FIG. 31. *Allocoris* (*Parapora*) *extensa*, internal genitalia of male, lateral view of apex.
- FIG. 32. *Allocoris* (*Parapora*) *extensa*, internal genitalia of male, dorsal view of apex.
- FIG. 33. *Allocoris* (*Parapora*) *incognita*, internal genitalia of male, lateral view of apex.
- FIG. 34. *Allocoris* (*Parapora*) *incognita*, internal genitalia of male, dorsal view.
- FIG. 35. *Cydnoides* (*Cydnoides*) *ciliatus*, internal genitalia of male, lateral view.
- FIG. 36. *Cydnoides* (*Cydnoides*) *ciliatus*, internal genitalia of male, dorsal view.
- FIG. 37. *Cydnoides* (*Sayocoris*) *albipennis*, internal genitalia of male, lateral view.
- FIG. 38. *Cydnoides* (*Sayocoris*) *albipennis*, internal genitalia of male, dorsal view.
- FIG. 39. *Galgupha* (*Gyrocnemis*) sp., corium showing names of areas and veins.
- FIG. 40. *Galgupha* (*Gyrocnemis*) *nitens*, hemelytron, markings omitted.
- FIG. 41. *Galgupha* (*Euryscytus*) *difficilis*, corium.
- FIG. 42. *Galgupha* (*Bonaria*) *longirostris*, corium.
- FIG. 43. *Galgupha* (*Gyrocnemis*) *dimorphus*, corium.
- FIG. 44. *Galgupha* (*Gyrocnemis*) *nitens*, corium.



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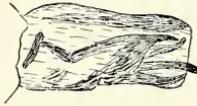
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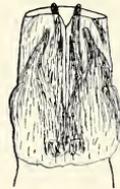
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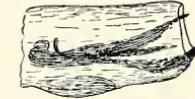
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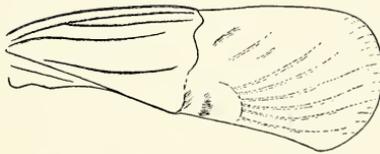
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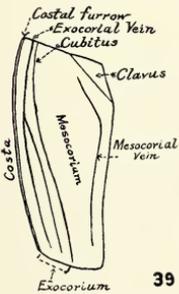
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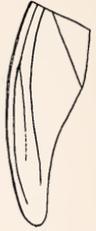
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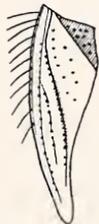
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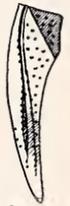
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For explanation see opposite page.

EXPLANATION OF PLATE VII.

- FIG. 45. *Galgupha* (*Gyrocnemis*) *diminuta*, corium (entirely black).
 FIG. 46. *Galgupha* (*Gyrocnemis*) *singularis*, corium.
 FIG. 47. *Galgupha* (*Gyrocnemis*) *differentialis*, corium.
 FIG. 48. *Galgupha* (*Ctenopoda*) sp., corium.
 FIG. 49. *Galgupha* (*Orocoris*) *arizonensis*, corium.
 FIG. 50. *Galgupha* (*Trepocnemis*) *anomala*, corium.
 FIG. 51. *Galgupha* (*Acrotmetus*) *crassa*, corium.
 FIG. 52. *Galgupha* (*Galgupha*) *atra*, corium.
 FIG. 53. *Galgupha* (*Galgupha*) *aterrima*, corium.
 FIG. 54. *Galgupha* (*Galgupha*) *ovalis*, corium.
 FIG. 55. *Galgupha* (*Microcompsus*) *daldorfi*, corium.
 FIG. 56. *Galgupha* (*Nothocoris*) *marginicollis*, corium.
 FIG. 57. *Galgupha* (*Psestophleps*) *bisignata*, corium.
 FIG. 58. *Galgupha* (*Charoda*) *simplex*, corium.
 FIG. 59. *Galgupha* (*Acritophleps*) *luteomarginata*, corium.
 FIG. 60. *Galgupha* (*Astiroderma*) *albipennis*, corium.
 FIG. 61. *Cydnoides* (*Cosmarioides*) *setiventris*, corium.
 FIG. 62. *Alkindus atratus*, corium.
 FIG. 63. *Amyssonotum rastratum*, corium.
 FIG. 64. *Pericrepis callosula*, corium.

EXPLANATION OF PLATE VIII.

- FIG. 65. *Pruhleria incerta*, corium.
FIG. 66. *Thyreocoris scarabaeoides*, corium.
FIG. 67. *Godmania aterrima*, corium (punctures omitted).
FIG. 68. *Allocoris* (*Allocoris*) *pulicaria*, corium.
FIG. 69. *Allocoris* (*Allocoris*) *gilletti*, corium.
FIG. 70. *Allocoris* (*Allocoris*) *interrupta*, corium.
FIG. 71. *Allocoris* (*Allocoris*) *elegans*, corium.
FIG. 72. *Allocoris* (*Allocoris*) *harti*, corium.
FIG. 73. *Allocoris* (*Parapora*) *extensa*, corium.
FIG. 74. *Strombosoma unipunctatum*, corium.
FIG. 75. *Carrabas maurus*, corium.
FIG. 76. *Galgupha* (*Euryscytus*) *opacifrons*, head from above, punctures shown on one side only.
FIG. 77. *Galgupha* (*Euryscytus*) *corvina*, head from above, punctures omitted.
FIG. 78. *Galgupha* (*Euryscytus*) *assimilis*, external genitalia of female.
FIG. 79. *Galgupha* (*Euryscytus*) *laevis*, 5th and 6th sternites and external genitalia of female.*
FIG. 80. *Galgupha* (*Euryscytus*) *signatipennis*, 6th sternite and external genitalia of female.
FIG. 81. *Galgupha* (*Euryscytus*) *variipennis*, external genitalia of female.
FIG. 82. *Galgupha* (*Euryscytus*) *laevis*, apex of venter of male type.*
FIG. 83. *Galgupha* (*Euryscytus*) *obesa*, apex of venter of male and, below on right, hypopygium from the side.
FIG. 84. *Galgupha* (*Euryscytus*) *signatipennis*, internal genitalia of male.
FIG. 85. *Galgupha* (*Euryscytus*) *difficilis*, internal genitalia of male.

*Figs. 79 and 82, drawings from sketches by W. E. China.



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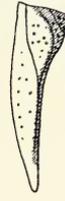
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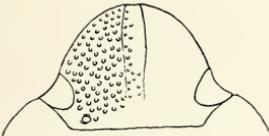
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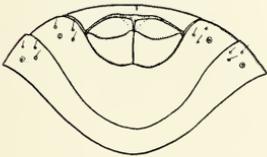
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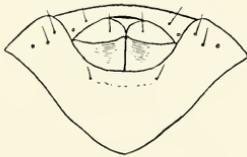
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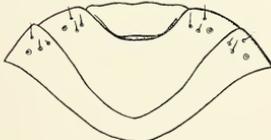
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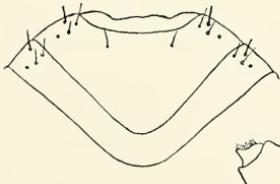
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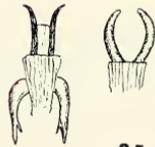
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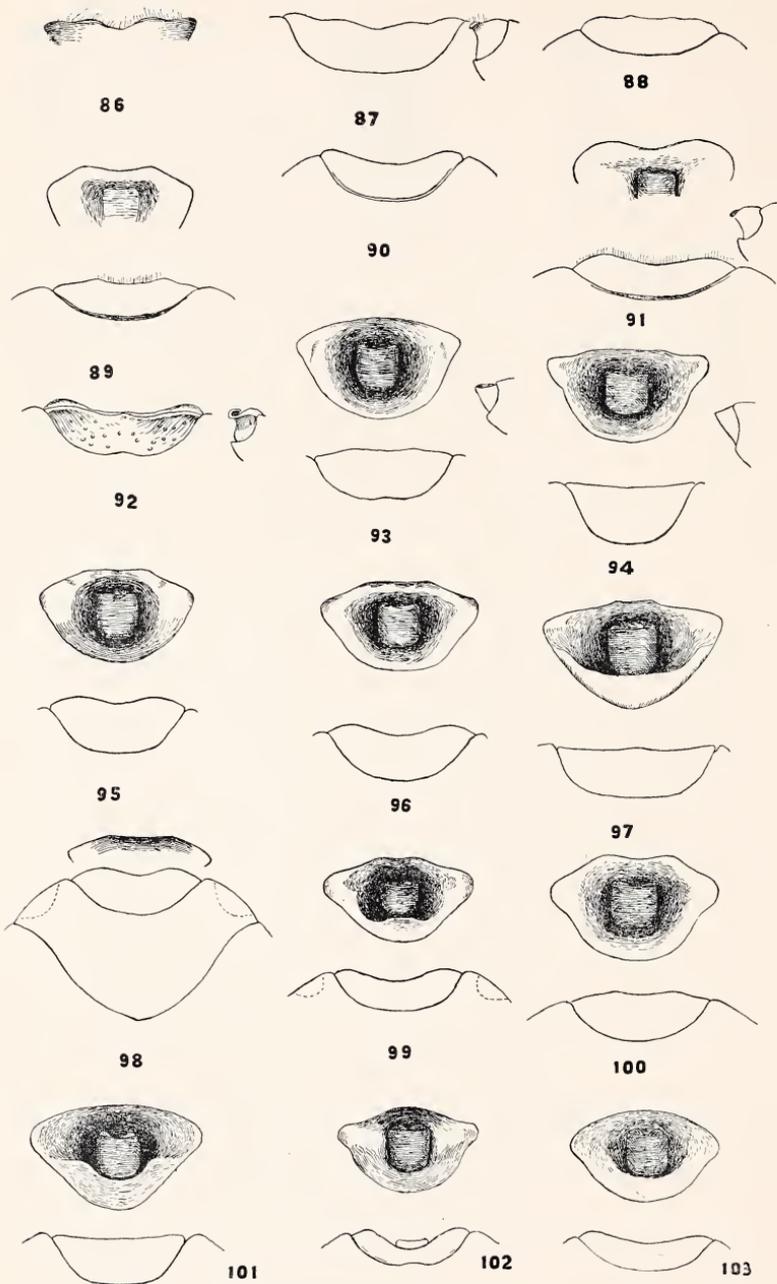
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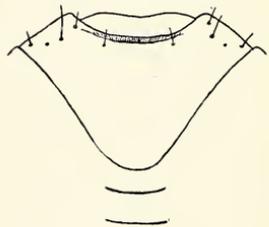
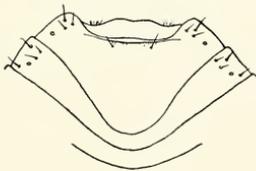
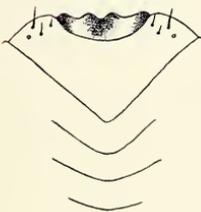
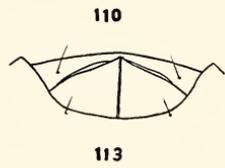
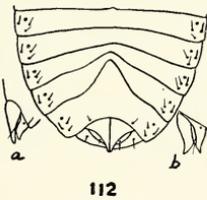
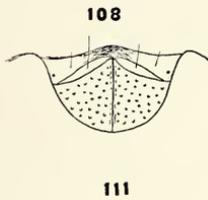
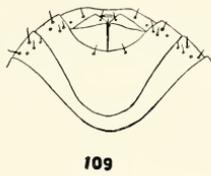
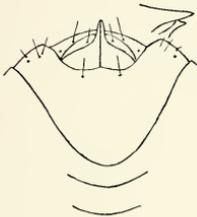
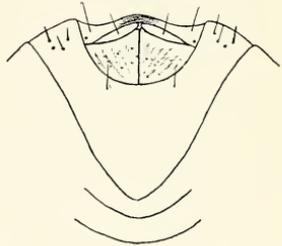
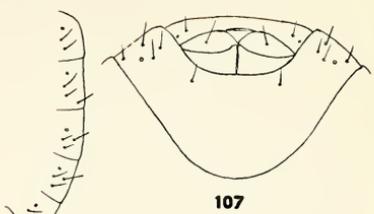
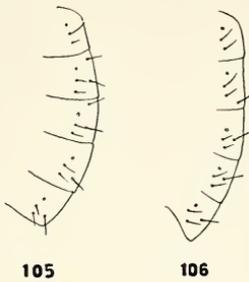
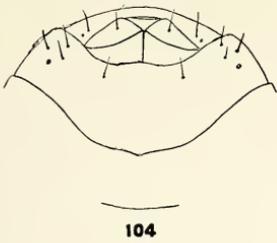
For explanation see opposite page.

EXPLANATION OF PLATE IX.

- FIG. 86. *Galgupha (Euryscytus) difficilis*, hind margin of male hypopygium from below.
- FIG. 87. *Galgupha (Euryscytus) difficilis*, male hypopygium from below, and, on right, apex of same in profile.
- FIG. 88. *Galgupha (Euryscytus) contracta*, male hypopygium from below.
- FIG. 89. *Galgupha (Euryscytus) assimilis*, top, apical portion of hypopygium of male, dorsal view, and below, entire ventral view.
- FIG. 90. *Galgupha (Euryscytus) regularis*, male hypopygium from below.
- FIG. 91. *Galgupha (Euryscytus) signatipennis*, top, apical portion of hypopygium of male, dorsal view, and bottom, entire ventral view; at right, in profile.
- FIG. 92. *Galgupha (Euryscytus) lucretia*, left, male hypopygium from below; right, in profile.
- FIG. 93. *Galgupha (Euryscytus) laevis*, top, dorsal view of male hypopygium; bottom, ventral view; right, profile.
- FIG. 94. *Galgupha (Euryscytus) opercula*, top, dorsal view of male hypopygium; bottom, ventral view; right, profile.
- FIG. 95. *Galgupha (Euryscytus) punctata*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 96. *Galgupha (Euryscytus) corvina*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 97. *Galgupha (Euryscytus) rostrata*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 98. *Galgupha (Euryscytus) opacifrons*, bottom, apex of male abdomen from below; top, variation in hind margin of hypopygium.
- FIG. 99. *Galgupha (Euryscytus) australis*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 100. *Galgupha (Euryscytus) basalis*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 101. *Galgupha (Euryscytus) jaczewskii*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 102. *Galgupha (Euryscytus) smidtii*, above, hypopygium of male, dorsal view; below, ventral view.
- FIG. 103. *Galgupha (Euryscytus) parallela*, above, hypopygium of male, dorsal view; below, ventral view.

EXPLANATION OF PLATE X.

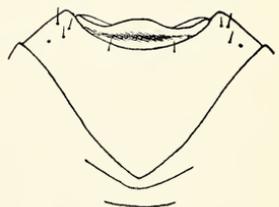
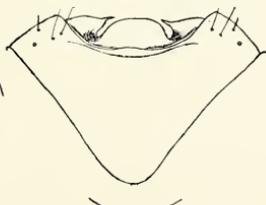
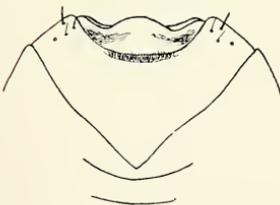
- FIG. 104. *Galgupha* (*Bonaria*) *longirostris*, external genitalia of female.
FIG. 105. *Galgupha* (*Gyrocnemis*) *differentialis*, arrangement of trichobothria.
FIG. 106. *Galgupha* (*Gyrocnemis*) *dimorpha*, arrangement of trichobothria.
FIG. 107. *Galgupha* (*Gyrocnemis*) *triconcava*, external genitalia of female.
FIG. 108. *Galgupha* (*Gyrocnemis*) *parva*, external genitalia of female, and above on right, apex in profile.
FIG. 109. *Galgupha* (*Gyrocnemis*) *nitens*, external genitalia of female.
FIG. 110. *Galgupha* (*Gyrocnemis*) *singularis*, external genitalia of female.
FIG. 111. *Galgupha* (*Gyrocnemis*) *lineata*, external genitalia of female.
FIG. 112. *Galgupha* (*Gyrocnemis*) *dimorpha*, venter of female; a, apex of same in profile; b, apex of venter of female of *Galgupha* (*Gyrocnemis*) *acuta* in profile.
FIG. 113. *Galgupha* (*Gyrocnemis*) *cruralis*, external genitalia of female.
FIG. 114. *Galgupha* (*Gyrocnemis*) *triconcava*, apex of venter of male.
FIG. 115. *Galgupha* (*Gyrocnemis*) *differentialis*, apex of venter of male.
FIG. 116. *Galgupha* (*Gyrocnemis*) *nitens*, apex of venter of male.
FIG. 117. *Galgupha* (*Gyrocnemis*) *diminuta*, apex of venter of male.
FIG. 118. *Galgupha* (*Gyrocnemis*) *bicornis*, apex of venter of male.
FIG. 119. *Galgupha* (*Gyrocnemis*) *guttiger*, apex of venter of male.



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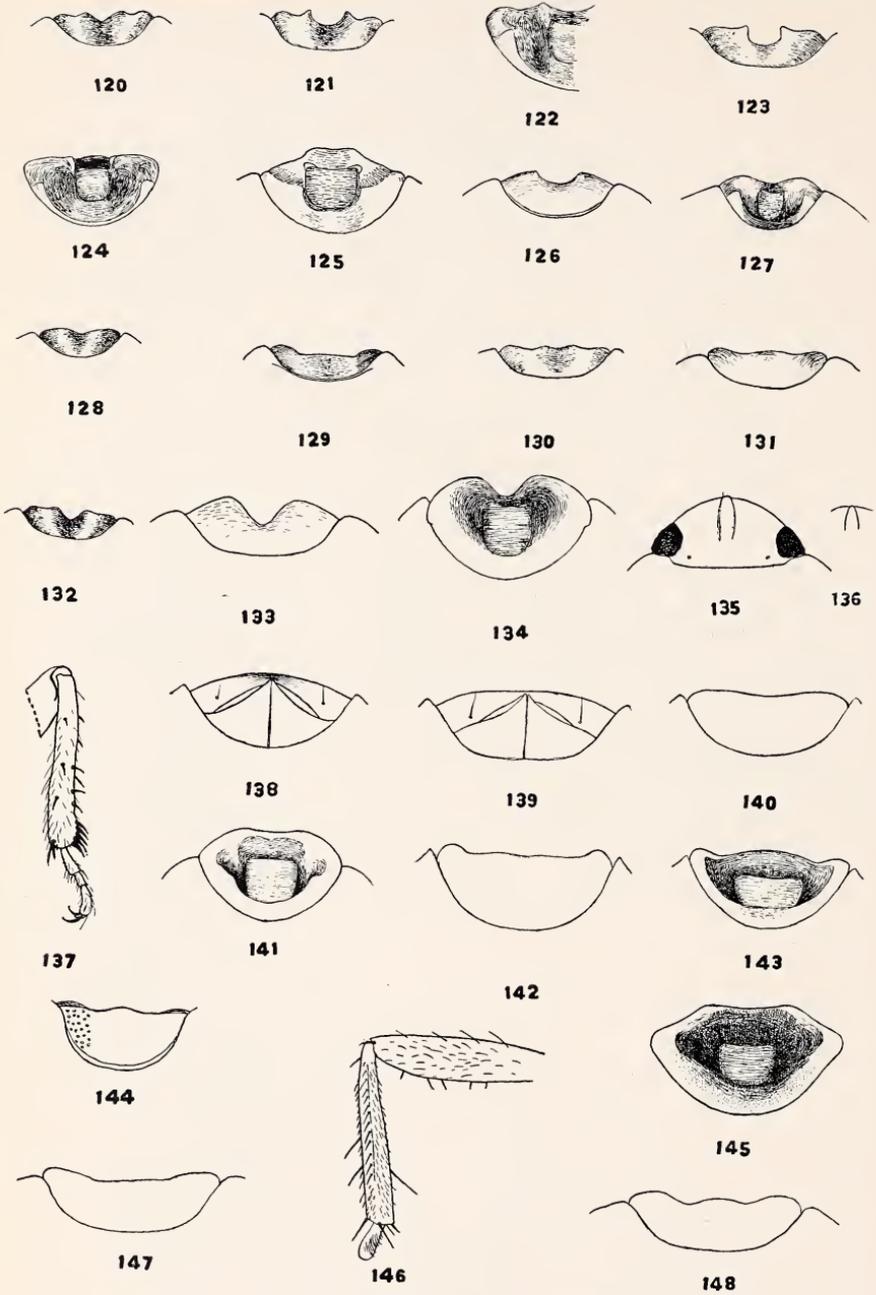


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For explanation see opposite page.



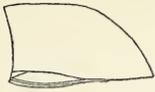
For explanation see opposite page.

EXPLANATION OF PLATE XI.

- FIG. 120. *Galgupha* (*Gyrocnemis*) *inaequalis*, hypopygium of male from below.
 FIG. 121. *Galgupha* (*Gyrocnemis*) *maculipennis*, hypopygium of male from below.
 FIG. 122. *Galgupha* (*Gyrocnemis*) *maculipennis*, hypopygium of male, one half, dorsal view.
 FIG. 123. *Galgupha* (*Gyrocnemis*) *concava*, hypopygium of male from below.
 FIG. 124. *Galgupha* (*Gyrocnemis*) *concava*, hypopygium of male, dorsal view.
 FIG. 125. *Galgupha* (*Gyrocnemis*) *differentialis*, hypopygium of male, dorsal view.
 FIG. 126. *Galgupha* (*Gyrocnemis*) *novella*, hypopygium of male from below.
 FIG. 127. *Galgupha* (*Gyrocnemis*) *novella*, hypopygium of male, dorsal view.
 FIG. 128. *Galgupha* (*Gyrocnemis*) *parva*, hypopygium of male from below.
 FIG. 129. *Galgupha* (*Gyrocnemis*) *dimorpha*, hypopygium of male from below.
 FIG. 130. *Galgupha* (*Gyrocnemis*) *cruralis*, hypopygium of male from below.
 FIG. 131. *Galgupha* (*Gyrocnemis*) *cruralis* var. *taperina*, hypopygium of male from below.
 FIG. 132. *Galgupha* (*Gyrocnemis*) *reinhardti*, hypopygium of male from below.
 FIG. 133. *Galgupha* (*Gyrocnemis*) *impressa*, hypopygium of male from below.
 FIG. 134. *Galgupha* (*Gyrocnemis*) *impressa*, hypopygium of male, dorsal view.
 FIG. 135. *Galgupha* (*Gyrocnemis*) *nitens*, head of male, dorsal view.
 FIG. 136. *Galgupha* (*Gyrocnemis*) *dimorpha*, apex of tylus of male.
 FIG. 137. *Galgupha* (*Ctenopoda*) *castor*, fore tibia of male.
 FIG. 138. *Galgupha* (*Ctenopoda*) *pollux*, external genitalia of female.
 FIG. 139. *Galgupha* (*Ctenopoda*) *castor*, external genitalia of female.
 FIG. 140. *Galgupha* (*Ctenopoda*) *castor*, hypopygium of male from below.
 FIG. 141. *Galgupha* (*Ctenopoda*) *castor*, hypopygium of male, dorsal view.
 FIG. 142. *Galgupha* (*Ctenopoda*) *pollux*, hypopygium of male from below.
 FIG. 143. *Galgupha* (*Ctenopoda*) *pollux*, hypopygium of male, dorsal view.
 FIG. 144. *Galgupha* (*Orocoris*) *arizonensis*, hypopygium of male from below.
 FIG. 145. *Galgupha* (*Orocoris*) *arizonensis*, hypopygium of male, dorsal view.
 FIG. 146. *Galgupha* (*Orocoris*) *arizonensis*, fore tibia and femur, anterior view.
 FIG. 147. *Galgupha* (*Acrotmetus*) *schulzii*, hypopygium of male from below.
 FIG. 148. *Galgupha* (*Acrotmetus*) *tucumanus*, hypopygium of male from below.

EXPLANATION OF PLATE XII.

- FIG. 149. *Galgupha (Galgupha) ovalis*, scutellum in profile.
FIG. 150. *Galgupha (Galgupha) aterrima*, scutellum in profile.
FIG. 151. *Galgupha (Galgupha) atra*, apex of scutellum from above.
FIG. 152. *Galgupha (Galgupha) carinata*, apex of scutellum from above.
FIG. 153. *Galgupha (Galgupha) denudata*, apex of scutellum from above.
FIG. 154. *Galgupha (Galgupha) aterrima*, apex of scutellum and abdomen of male from below.
FIG. 155. *Galgupha (Galgupha) atra*, apex of scutellum and abdomen of male from below.
FIG. 156. *Galgupha (Galgupha) carinata*, apex of scutellum and abdomen of male from below.
FIG. 157. *Galgupha (Galgupha) ovalis*, apex of venter of male.
FIG. 158. *Galgupha (Galgupha) atra*, fore tibia, anterior view.
FIG. 159. *Galgupha (Galgupha) ovalis*, fore tibia, anterior view.
FIG. 160. *Galgupha (Galgupha) atra*, male hypopygium, dorsal view.
FIG. 161. *Galgupha (Galgupha) carinata*, male hypopygium, dorsal view.
FIG. 162. *Galgupha (Microcompsus) daldorfii* var. *fabricii*, hind margin of pronotum, the scutellum and hemelytra, dorsal view, to show markings.
FIG. 163. *Galgupha (Microcompsus) daldorfii*, apex of abdomen of male in profile.
FIG. 164. *Galgupha (Microcompsus) vinculata*, apex of abdomen of male in profile.
FIG. 165. *Galgupha (Microcompsus) vinculata*, dorsal view.
FIG. 166. *Galgupha (Microcompsus) vinculata*, var. *scymnoides*, scutellum and hemelytra, dorsal view, to show markings.
FIG. 167. *Galgupha (Microcompsus) vinculata*, top, male hypopygium, dorsal view; bottom, hind margin of hypopygium from below.
FIG. 168. *Galgupha (Microcompsus) daldorfii*, top, male hypopygium, dorsal view; bottom, hind margin of hypopygium from below.



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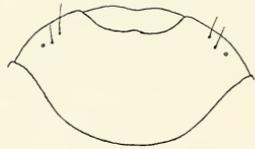
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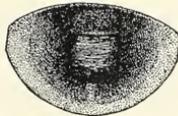
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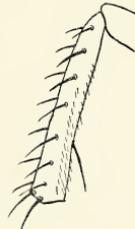
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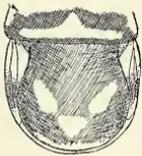
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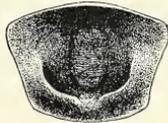
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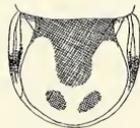
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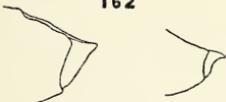
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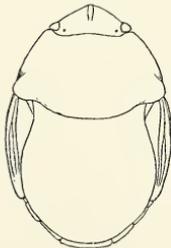
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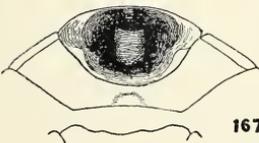
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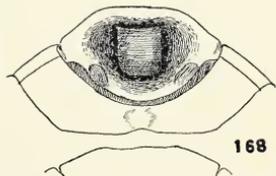
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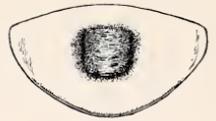
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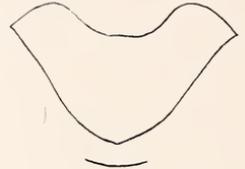
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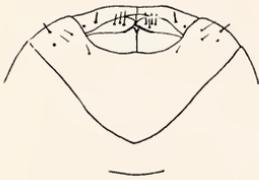
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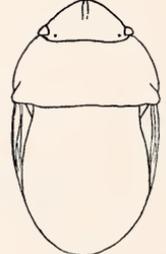
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For explanation see opposite page.

EXPLANATION OF PLATE XIII.

- FIG. 169. *Galgupha* (*Nothocoris*) *chrostowskii*, hypopygium of male from below.
 FIG. 170. *Galgupha* (*Nothocoris*) *marginicollis*, hypopygium of male from below.
 FIG. 171. *Galgupha* (*Nothocoris*) *nitiduloides*, hypopygium of male, dorsal view.
 FIG. 172. *Galgupha* (*Nothocoris*) *boliviana*, hypopygium of male, dorsal view.
 FIG. 173. *Galgupha* (*Nothocoris*) *alutacea*, hind tibia, posterior view.
 FIG. 174. *Galgupha* (*Nothocoris*) *chrostowskii*, sixth sternite of male.
 FIG. 175. *Galgupha* (*Nothocoris*) *chilocoroides*, external genitalia of female.
 FIG. 176. *Galgupha* (*Psestophleps*) *bisignata*, hypopygium of male from below.
 FIG. 177. *Galgupha* (*Nothocoris*) *coccinelloides*, scutellum and hemelytron, to show markings.
 FIG. 178. *Galgupha* (*Psestophleps*) *bisignata*, head and pronotum, dorsal view, one half.
 FIG. 179. *Galgupha* (*Psestophleps*) *mexicana*, head and pronotum, dorsal view, one half.
 FIG. 180. *Galgupha* (*Psestophleps*) *neobisignata*, hypopygium of male from below.
 FIG. 181. *Galgupha* (*Psestophleps*) *bergiana*, hypopygium of male from below.
 FIG. 182. *Galgupha* (*Psestophleps*) *obovata*, hypopygium of male from below.
 FIG. 183. *Galgupha* (*Psestophleps*) *media*, hypopygium of male from below.
 FIG. 184. *Galgupha* (*Psestophleps*) *porcata*, hypopygium of male from below.
 FIG. 185. *Galgupha* (*Pteronomos*) *oblonga*, dorsal view.

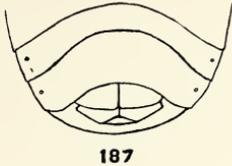
EXPLANATION OF PLATE XIV.

- FIG. 186. *Galgupha (Pteronomos) ruficornis*, corium, and on right above, cross section of same at base to show the flat depressed subcostal area.
- FIG. 187. *Galgupha (Pteronomos) ruficornis*, external genitalia of female type.*
- FIG. 188. *Galgupha (Pteronomos) ruficornis*, hypopygium of male; top, ventral view; bottom, dorsal view.
- FIG. 189. *Galgupha (Pteronomos) vittifrons*, hypopygium of male; top, dorsal view; bottom, ventral view.
- FIG. 190. *Galgupha (Pteronomos) punctifrons*, hypopygium of male; top, ventral view; bottom, dorsal view.
- FIG. 191. *Galgupha (Pteronomos) australis*, hypopygium of male; top, ventral view; bottom, dorsal view, with figure in center showing hind margin in *Galgupha (Pteronomos) oblonga*.
- FIG. 192. *Galgupha (Pteronomos) china*, top, ventral view of male hypopygium; center, apical margin with abdomen more nearly on flat plane, and bottom, dorsal view.
- FIG. 193. *Galgupha (Charoda) simplex*, head and pronotum, left side, dorsal view.
- FIG. 194. *Galgupha (Charoda) simplex*, fore femur.
- FIG. 195. *Galgupha (Acritophleps) luteomarginata*, male hypopygium from below.
- FIG. 196. *Galgupha (Astiroderma) albipennis*, dorsal outline.
- FIG. 197. *Galgupha (Astiroderma) albipennis*, external genitalia of female.
- FIG. 198. *Galgupha (Astiroderma) albipennis*, hypopygium of male, one side, dorsal view.
- FIG. 199. *Galgupha (Astiroderma) breddini*, hypopygium of male, one side, dorsal view.
- FIG. 200. *Galgupha (Astiroderma) albipennis*, scutellum and abdomen of female, lateral view.
- FIG. 201. *Galgupha (Astiroderma) breddini*, scutellum and abdomen of female, lateral view.
- FIG. 202. *Cydnooides (Cosmariooides) setiventris*, external genitalia of female.
- FIG. 203. *Alkindus atratus*, metasternum.
- FIG. 204. *Alkindus atratus*, head, dorsal view.
- FIG. 205. *Alkindus atratus*, hypopygium of male from below.
- FIG. 206. *Alkindus atratus*, hypopygium of male, dorsal view.
- FIG. 207. *Alkindus atratus*, apex of abdomen of female in profile.
- FIG. 208. *Alkindus atratus*, apex of abdomen of female from below.
- FIG. 209. *Amyssonotum rastratum*, head, dorsal view.
- FIG. 210. *Amyssonotum rastratum*, metasternum.

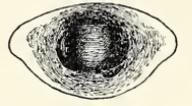
*After sketch by W. E. China.



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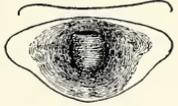
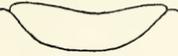
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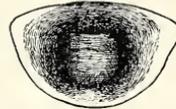
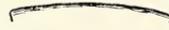
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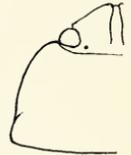
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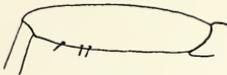
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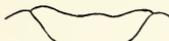
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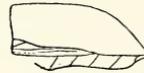
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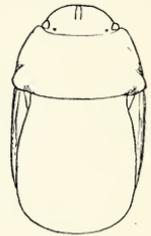
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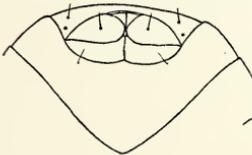
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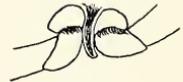
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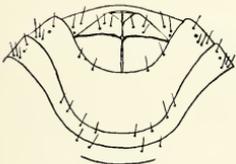
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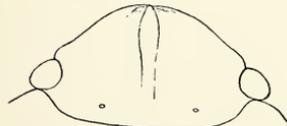
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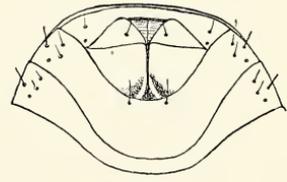
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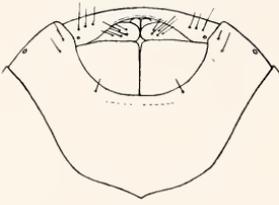
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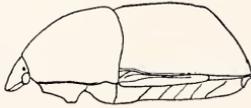
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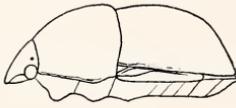
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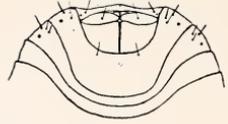
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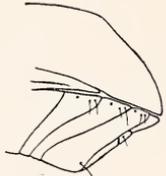
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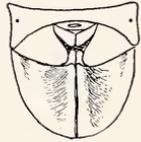
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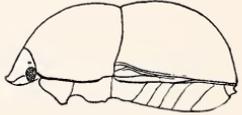
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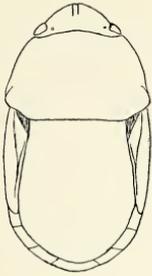
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EXPLANATION OF PLATE XV.

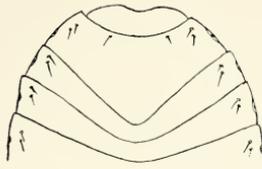
- FIG. 211. *Amyssonotum rastratum rastratum*, head and pronotum, dorsal view, left side.
- FIG. 212. *Amyssonotum rastratum flexum*, head and pronotum, dorsal view, left side.
- FIG. 213. *Amyssonotum rastratum rastratum*, male hypopygium from below.
- FIG. 214. *Amyssonotum rastratum rastratum*, external genitalia of female from below.
- FIG. 215. *Pericrepis callosula*, male hypopygium from below.
- FIG. 216. *Pericrepis callosula*, external genitalia of female from below.
- FIG. 217. *Pericrepis callosula*, apex of abdomen of female in profile.
- FIG. 218. *Thyreocoris scarabaeoides*, external genitalia of female.
- FIG. 219. *Thyreocoris scarabaeoides*, head, dorsal view, punctures represented only in part.
- FIG. 220. *Pruhleria incerta*, hypopygium of male from above and behind.
- FIG. 221. *Godmania aterrima*, head, dorsal view.
- FIG. 222. *Godmania aterrima*, external genitalia of female.
- FIG. 223. *Allocoris (Allocoris) nigra*, one side of venter.
- FIG. 224. *Allocoris (Allocoris) alpina*, lateral view, legs omitted.
- FIG. 225. *Allocoris (Allocoris) agrella*, lateral view, legs omitted.
- FIG. 226. *Allocoris (Allocoris) gillettii*, lateral view, legs omitted.
- FIG. 227. *Allocoris (Allocoris) marginella*, lateral view, legs omitted.
- FIG. 228. *Allocoris (Termapora) minutissima*, lateral view, legs omitted.

EXPLANATION OF PLATE XVI.

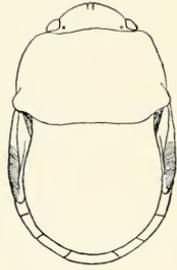
- FIG. 229. *Allocoris (Parapora) incognita*, dorsal view.
FIG. 230. *Allocoris (Parapora) californica*, dorsal view.
FIG. 231. *Allocoris (Parapora) virilis*, apex of venter of male.
FIG. 232. *Allocoris (Parapora) extensa*, apex of venter of male.
FIG. 233. *Allocoris (Allocoris) limata*, head, dorsal view.
FIG. 234. *Allocoris (Allocoris) marginella*, head, dorsal view.
FIG. 235. *Allocoris (Allocoris) nigra*, external genitalia of female.
FIG. 236. *Allocoris (Allocoris) harti*, external genitalia of female.
FIG. 237. *Allocoris (Allocoris) palmeri*, external genitalia of female.
FIG. 238. *Allocoris (Allocoris) gilletti*, external genitalia of female.
FIG. 239. *Allocoris (Allocoris) marginella*, external genitalia of female.
FIG. 240. *Allocoris (Parapora) incognita*, external genitalia of female.
FIG. 241. *Allocoris (Parapora) extensa*, external genitalia of female.
FIG. 242. *Allocoris (Parapora) californica*, genital plates of female.



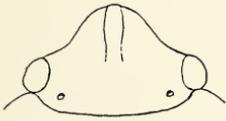
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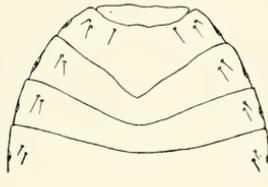
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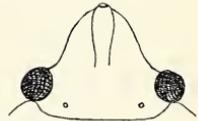
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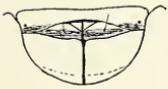
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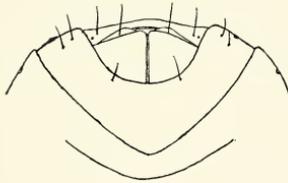
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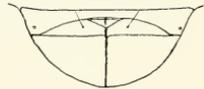
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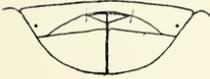
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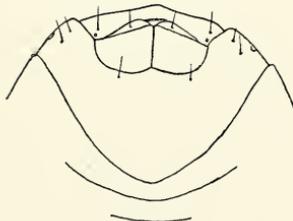
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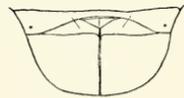
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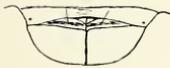
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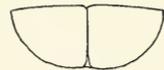
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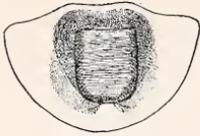


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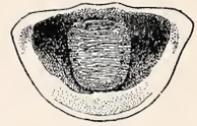
For explanation see opposite page.



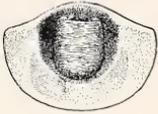
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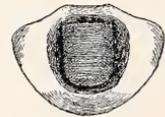
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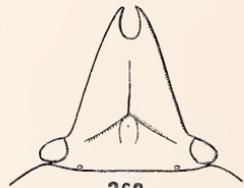
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For explanation see opposite page.

EXPLANATION OF PLATE XVII.

- FIG. 243. *Allocoris (Allocoris) gillettii*, hypopygium of male, dorsal view.
 FIG. 244. *Allocoris (Allocoris) alpina*, hypopygium of male, dorsal view.
 FIG. 245. *Allocoris (Allocoris) pulicaria*, hypopygium of male, dorsal view.
 FIG. 246. *Allocoris (Parapora) parana*, hypopygium of male, dorsal view.
 FIG. 247. *Allocoris (Parapora) parana*, hypopygium of male from behind.
 FIG. 248. *Allocoris (Allocoris) elegans*, hypopygium of male from behind.
 FIG. 249. *Allocoris (Allocoris) interrupta*, hypopygium of male from behind.
 FIG. 250. *Allocoris (Allocoris) barberi*, hypopygium of male from behind, and with lower margin of scutellum indicated by a line.
 FIG. 251. *Allocoris (Allocoris) tibialis*, hypopygium of male from behind.
 FIG. 252. *Allocoris (Allocoris) pulicaria*, hypopygium of male from behind.
 FIG. 253. *Allocoris (Allocoris) palmeri*, male hypopygium, dorsal view.
 FIG. 254. *Allocoris (Parapora) virilis*, male hypopygium, dorsal view.
 FIG. 255. *Allocoris (Parapora) incognita*, male hypopygium, dorsal view.
 FIG. 256. *Allocoris (Parapora) cognata*, male hypopygium, dorsal view.
 FIG. 257. *Carrabas maurus*, external genitalia of female.*
 FIG. 258. *Carrabas maurus*, head of female, dorsal view.*
 FIG. 259. *Carrabas maurus*, right side of venter of male.*
 FIG. 260. *Carrabas maurus*, head of male, dorsal view.*

*Figs. 257 to 260 are drawings by W. E. China.

XIII. NATICA SANCTI-VINCENTII, sp. nov.

BY STANLEY T. BROOKS.

Shell globosely ovate, thin; four and one-half whorls, flattened, translucent white, shining, overlaid by a thin deciduous orange-brown epidermis; umbilicus narrow and deep, partially covered by the columellar callus. Aperture semicircular; peristome simple.

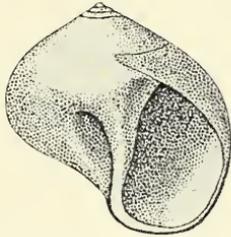


FIG. 1. *Natica sancti-vincentii* Brooks, sp. nov.
(Magnified seven diameters)

Described from three specimens, the largest of which is 7 mm. high, the other two 6 mm. high. The aperture in all three specimens is 5 mm. long and 3 mm. wide.

Habitat: the west coast of St. Vincent, British West Indies.

The shells (types) described were collected by Mr. H. H. Smith in dredging at ten fathoms, and are contained in the collection of recent invertebrates in the Carnegie Museum. Catalog No. 62.3369.

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