# Mississippi Agricultural Experiment Station

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### NORTH AMERICAN IPIDAE OF THE SUBFAMILY MICRACINAE, WITH DESCRIPTIONS OF NEW SPECIES AND GENERA

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## North American Ipidae of the Subfamily Micracinae, With Descriptions of New Species and Genera.\*

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#### INTRODUCTION AND ACKNOWLEDGMENTS.

The writer spent the winter and spring of 1919-20 from November 1 to June 1 in collecting and making field studies of the Ipidae (or Scolytidae) of Mississippi, working for the State Plant Board of Mississippi. In the course of this work a number of new species of Micracis and related forms were collected and in working these over it was found that several of these apparently did not belong to described genera. It was also found that some of the new species of previously known genera presented structural characteristics which made it advisable to study the type specimens of previously known forms and to prepare revised descriptions of these along with those of new species. As all of the American species of Micracis Lec. and Thysanoes Lec., which includes all but one of the known forms of these genera, were described by LeConte, the author spent some days studying the type specimens in the Museum of Comparative Zoology at Cambridge, preparing new descriptions from the types or type series. The results of these studies and of work upon specimens in his own collection and in that of Dr. J. M. Swaine, of Canada, are here presented as a contribution toward a revision of the North American Micracinae. The study makes no claim for finality as there are, without doubt, many undescribed American species and perhaps some undescribed genera of this group, and no work upon exotic forms has been attempted-the material not being available. It is hoped, however, that it may stimulate further study of this little known group which has received but scant attention since the time of LeConte.

In this connection I wish to express my heartiest appreciation of the aid given me and the numerous courtesies extended to me by Professor R. W. Harned, Entomologist, and Secretary of the State Plant Board of Mississippi, during the time I was employed in the field studies. I am also under great obligations to other members of his force—especially to Professor R. N. Lobdell, Mr. J. M. Langston and Mr. H. H. Kimball for their kind aid and co-operation. I wish also to acknowledge my gratitude to Mr. Nathan Banks, Curator of Insects in the Museum of Comparative Zoology at Cambridge, Mass., for his kindness in placing the very valuable collections at my disposal; to Dr. J. M. Swaine for sending me for examination his entire collection of this group and for preparing the description of his new species of *Micracis* herein published; and to Mr. E. A. Schwarz for his generosity in sending the series of *Cactopinus hubbardi* Sz. I am also under obligations to Mr. A. R. Janson, employed by the New York State College of Forestry, for the excellent illustrations in Plates IV and V.

<sup>\*</sup>Contribution from the Mississippi State Plant Board and the New York State College of Forestry, Syracuse, N. Y.

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#### HISTORY.

The genus *Micracis* was described by LeConte in 1868 and was included as a genus in the tribe *Tomicini* of the family *Scolytidae*. Eight years later in "The Rhynchophora of America North of Mexico" by LeConte and Horn (1876) LeConte, in revising the scheme of classification of the *Scolytidae*, divided the group into two subfamilies, the *Platypodidae* and the *Scolytidae* genuini. The genus *Micracis* Lec. he grouped with the genus *Thysanoes* Lec., then described for the first time, as a distinct subdivision of the tribe *Tomicini*, of the subfamily *Scolytidae* genuini, under the name *Micracides*. Eichhoff, in his "Ratio Tomicinorum" (1879), elevates the group containing only the genus *Micracis* Lec.—he apparently having no knowledge of the new species of this genus or of the new genus *Thysanoes* described by LeConte (1876, 1878)—to the rank of a subfamily (*Micracidae*) of the family *Tomicini*. Hagedorn (1910, 1910a) places *Micracis* and *Thysanoes* in the tribe *Hylocurinae* of the subfamily *Spinidentalae*, the tribe containing genera of rather diverse habits and structural characteristics.

Hopkins (1915) in his "Preliminary Classification of the Superfamily Scolytoidea" restores the *Micracinae* to the rank of a subfamily in the family *Ipidae*. Hopkins' subfamily includes the three American genera *Micracis* Lec.. *Thysanoes* Lec. and *Cactopinus* Sz., and also contains a number of other genera from various parts of the world which have in common the following characteristics: head concealed from above; pronotum with anterior area rugose; abdominal sternites 5-7 horizontal; anterior tibia not distinctly broader or narrower toward apex, not serrate on outer edge, with a stout apical tooth; antennal club compressed, elytra with scales.

Blatchley and Leng (1916) follow Hopkins' scheme of classification rather closely in the characteristics and arrangement of the groups but assign to these groups different values. Thus the group *Micracini* containing only *Micracis* and *Thysanoes* from North Eastern America is listed as a tribe of the subfamily *Ipinae*, of the family *Scolytidae* which is co-extensive with the Hopkins superfamily *Scolytoidea*.

Swaine (1918) groups the three American genera *Micracis, Thysanoes* and *Cactopinus* in the subfamily *Micracinae* of the family *Ipidae*, it being co-equal with the three other subfamilies *Eccoptogasterinae*, *Hylesininae*, and *Ipinae*.

The writer is inclined to consider the group of subfamily grade, and in this paper will refer to it as the subfamily *Micracinae*. The characterization of the subfamily as given by Hopkins is excellent for the American forms with the exception of the last character listed, "Elytra with scales". In several of the species of *Micracis* the elytra are nearly glabrous, the only vestiture being a few fine short hairs. In *M. suturalis* Lec., the type species of the genus, the female elytra have fine hairs while those of the males are covered with clavate hairs or bristles.

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#### COMPARATIVE NOTES ON THE GENERA OF THE SUBFAMILY MICRACINAE.

The American genera of the *Micracinae* herein treated are very distinctly and readily separated by definite generic characters, although at the same time they present such similarities of structure in the prothorax, antennae, anterior tibia, etc., as to fall readily into the same subfamily. Perhaps the most consistent characters of the subfamily have to do with the shape and structure of the anterior tibia. In all of the group the outer edge is entire or nearly so, without teeth and with no serrations—or with weak ones in several species of *Micracis*; the sides are subparallel, with the distal end but little wider or narrower than the proximal end; the distal end is squarely to obliquely truncate on the outer half and is armed with from two to five submarginal teeth; the inner distal angle is prolonged to form a moderately strong, or a strong terminal mucro. All of these characters vary with the genus and even with the species but the general structural plan holds for the entire subfamily.

In all of the other subfamily characters given by Hopkins (1915) there is more or less variation with the genus. With regard to the degree of normal retraction of the head this varies not only with the genus, but also in *Micracis* Lec. varies considerably with the species within the genus. The head is least retracted in the genus *Erineosinus* n. gen. where it is partly visible from above except when more than usually withdrawn. This shows an approach to the type of structure found in the *Hylesininae* and the same tendency is also shown in some other characteristics.

The anterior area of the pronotum is always more or less asperate in all members of this family. There is, however, considerable variation in the number, size and distribution of the asperities even within a number of the species of the several genera, a decided tendency toward a smoother sculpture of the pronotum in the females being characteristic of most of the species. In the new genus *Erineosinus* described herewith, the prothorax of the female is granulate, not asperate, on the anterior area while the same area in the male has true asperities, relatively few in number but quite evident. The posterior region of the pronotum is always punctate or granulate-punctate, the coarseness or fineness of sculpture being a specific rather than a generic character.

The last three abdominal sternites are usually horizontal or nearly so, and the first two visible segments are typically subequal in length, and each is as long, or nearly as long, as the last three combined. However, in *Erineosinus* n. gen. the abdomen is slightly ascending behind as in some genera of the *Hylesininae*, with the 1st, 2d, and 5th visible sternites subequal in length and each about equal to the 3rd and 4th combined. In *Cryptocleptes* n. gen. the last three segments are slightly elevated but are subequal in length and all short.

The antennae vary considerably with the genus and also with the species, especially in the genus *Micracis* LeConte, as will be pointed out later. However, the antennae of all of the subfamily have certain characters in common. The club is always flattened, more or less ornamented with setae, which may or may not be arranged to form definite sutural lines; the scape is either clubshaped or flattened and more or less expanded at the upper distal angle; and

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is always ornamented with a smaller or larger number of fimbriated hairs, which are often numerous and usually of considerable length. The extremes of variation in the flattening and dilation of the scape and in the number and length of its hairs is found within the genus *Micrasis* LeConte, there being less variation in these characters among the American genera of the *Micracinae* outside of *Micracis* LeConte than there is within this genus.

The number of funicular segments varies in the American members of the subfamily from 4 to 6. In all of the genera except *Erineosinus* n. gen. the funicle has 6 segments while in *Erineosinus* there are four segments in the males and 5 in the females. However, such generic differences are not uncommon in other groups of *Ipidae* and cases of similar secondary sexual differences are by no means unknown. There are certain points of similarity in the funiculi of the various members of the family, but all are subject to considerable generic and specific differences. The pedicel is always at least half as long as the remaining segments and in *Erineosinus* n. gen. is longer than the rest of the funicle. The distal segments are wider, often markedly so, but the degree to which they are widened differs with the species rather than the genus.

The antennal club is always flattened, with the outline varying from short oval to elongated, sub-quadrilateral, the shape being specific rather than generic. In *Micracis* LeConte, *Thysanoes* LeConte and *Pseudothysanoes* new genus, there are definite sutural lines of setigerous punctures on both the outer and inner face of the club, the curvature of which varies with the species. In *Cryptocleptes* new genus and *Erineosinus* new genus the setae are much fewer in number and the punctures are not arranged in definite sutural lines. There is, however, a tendency toward such an arrangement to be seen in balsam mounts of the antennae, although the lines are not complete and are not apparent in ordinary dried specimens.

The general body form varies within the subfamily from moderately stout to slender; the sculpture from fine to coarse; and the vestiture from scanty short hairs to numerous rather long hairs, or hairs and clavate bristles, or hairs and true scales.

The members of the subfamily are readily distinguished by the several characters given above, although as is there pointed out, most of these vary considerably. However, in cases of doubt the structure of the fore tibiae and antennae should serve to place doubtful forms. The new genus *Erineosinus* here described differs from the typical subfamily characteristics more than any of the others and in several respects show a closer relationship to the subfamily *Hylesininae*, whereas, the other genera more nearly approach the *Ipinae* type of structure. However, the similarity of the genera here treated to each other is considerably closer than to any members of the most closely related subfamilies and the writer believes there can be little doubt of their correct position.

After a careful study of a series of *Cactopinus hubbardi* Sz., kindly sent by Mr. E. A. Schwarz, the writer is unable to include it in the subfamily *Micracinae*, it being excluded therefrom not only by the extraordinary structures upon the head and thorax of this very remarkable insect, but more particularly by the very different structure of the antennae and fore tibiae. It is the writer's opinion that the character of the antennae and fore tibiae are by all odds the most important criteria of the group while other characters are more or less variable. In the true

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**Micracinae** the fore tibiae vary from slightly narrower to slightly wider at the distal end. In *Cactopinus* the fore tibia is gradually widened from the base and very abruptly widened at the extreme distal end, so that this end is twice as wide as the proximal end. In all of the true *Micracinae* the terminal mucro is very evidently and often strongly recurved while in *Cactopinus* it is straight. In all of the true *Micracinae* the terminal mucro is very evidently and often strongly recurved while in *Cactopinus* it is straight. In all of the true *Micracinae* there is an evident projection or spur from the inner edge of the tibia near the proximal end. This is entirely lacking in *Cactopinus*. In the true *Micracinae* the antennal club is greatly compressed with the sutures either wanting or faintly or moderately indicated by rows of setigerous punctures. In *Cactopinus* the club of the antenna is only moderately compressed with the sutures strongly indicated by annulations as well as by rows of setae.

#### KEY TO THE NORTH AMERICAN GENERA OF THE SUBFAMILY MICRACINAE.

- A. Antennal club with distinct sutures on the outer face, antennal scape clavate or flattened and subtriangular; antennal funicle 6-jointed.

  - BB. Posterior end of elytra conjointly rounded, without sutural apex.

    - **CC.** Pronotum wider than long, widest posteriorly, the outline approaching a semicircle or triangle in form, summit high, posterior area sloping; fore tibia narrow, with distal end very obliquely truncate; terminal mucro sometimes bifurcated at end...... *Pseudothysanoes* new genus—Page 46
- **AA.** Antennal club without distinct sutures on its outer face; antennal scape clavate, funicle 4-6 jointed.
  - **B.** Antennal funicle 6-jointed, club small; vestiture of body consisting of hairs and clavate bristles; distal end of fore tibia with 3 submarginal teeth...... Cryptocleptes new genus—Page 51

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#### THE GENUS MICRACIS LECONTE.

#### History.

The genus *Micracis* was originally described by LeConte (1868) to contain two species then described for the first time—*M. suturalis* Lec. and *M. aculeatus* Lec. In 1876 the same author described three new species—*M. nanula* Lec., *M. rudis* Lec. and *M. hirtellus* Lec. and accompanied the descriptions with a key to the five species thus far known. Two years later LeConte (1878) described two more species—*M. opacicollis* Lec. and *M. asperulus* Lec.

Eichhoff (1879) in "Ratio Tomicinorum" revised the classification of the "Tomicini" of the world including *M. suturalis* Lec., *M. aculeatus* Lec., and describes a new species from Bahia—*M. acutipennis* Eichhoff.

Chittenden (1893) on the authority of Schwarz states that M. aculeatus Lec. is a synonym of M. suturalis Lec.

Swaine (1909) includes in his catalog *M. asperulus* Lec., *M hirtellus* Lec., *M. nanula* Lec., *M. rudis* Lec., *M. opacicollis* Lec., and *M. suturalis* Lec., placing *M. aculeatus* Lec. as a synonym of *M. suturalis*.

Hagedorn (1910) gives a slightly revised description of the generic characters and lists all of the species described without change or comment.

Blatchley and Leng (1916) include from the eastern United States M. suturalis Lec., M. nanula Lec., M. opacicollis Lec., and M. asperulus Lec. M. aculeatus Lec. is given as a synonym of M. suturalis Lec. and M. asperulus Lec. is listed as doubtfully distinct from M. opacicollis Lec.

Swaine (1918) mentions only three species—M. opacicollis Lec., M. rudis Lec., and an undescribed species breeding in poplar shoots at Ithaca, N. Y. (Described by him in this paper as M. populi Swaine n. sp.)

Other references to the biology of species of this genus will be mentioned in another connection.

#### Original Description of Micracis LeConte.

"The body in this genus is elongate, cylindrical, with the posterior declivity of the elytra convex, and the suture prolonged into an acute point. The club of the antenna is oval, compressed, finely pubescent, with an elongated basal spot (the representative of the basal joint in *Scolytus*), extending for more than half its length; the other sutures form loops parallel with this smooth space; the funiculus is 5-jointed, the 1st joint as long as the others united; the 2-5 are closely connected, gradually becoming shorter and broader, forming a conical mass. The scape of the antennae is broadly dilated and fringed toward the extremity with very long hairs, almost as in some of the genera allied to *Platypus*."

These characteristics as given apply to the type species in all respects except as regards the 5-jointed funicle. This error LeConte corrected in a later publication for, in giving the characteristics of the group *Micracides*, the funicle is described as 6-jointed. However, in several respects LeConte's generic description does not apply to species later described by himself, nor does it apply to several of the new forms herein described for the first time. This is especially true as regards the structure of the antennal scape and club in *M. rudis* Lec., *M. hirtellus* Lec. and in the species allied to these, described in the present paper. Hagedorn (1910) gives a more lengthy description but while the characteristics mentioned apply fairly closely to the *suturalis* and *opacicollis* groups they do not fit the *rudis* and *hirtellus* groups as regards the structure of the antennae, and eyes especially.

The generic description of Blatchley and Leng (1916) follows rather closely that of LeConte and does not apply in its entirety to *rudis*, *hirtellus* and allied forms.

In the following revised description of the genus the writer has attempted to include only characters common to all of the species studied by him, which includes all of the heretofore described species except M. acutipennis Eichh., and also the new forms hereinafter described.

#### Revised Description of the Genus Micracis LeConte.

The **body form** is cylindrical, varying from rather stout to slender, with the declivity of the elytra convex, and prolonged into an acuminate sutural apex. The **color** varies from reddish brown to black, only immature specimens showing the yellowish brown or testaceous coloration.

The **head** in its normal position is not seen from above. The **front** varies from convex to deeply concave and in several species shows marked sexual differences. The antennal scape varies from club-shaped, with the outline approximately circular in section and the outer surface ornamented with only a few moderately short hairs, to a greatly flattened triangular form with the outer face bearing numerous very long fimbriated hairs. The funicle is 6-jointed, of varying proportions, but with the pedicel equal in length to at least two (usually more) of the distal segments, with the distal segments progressively wider and ornamented with a greater or lesser number of short to moderately long hairs. The club is compressed, and varies in shape from a short oval to an elongated, sub-quadrilateral oval; with two distinct sutures indicated on its outer face by rows of setigerous punctures, arranged to form subangulate, narrowly rounded, broadly rounded or sinuate lines, with a possible third suture indicated by rather irregularly arranged hairs near the distal end; with the basal segment comprising from one-third to one-half of the length of the club.

The pronotum is from 1.05 to 1.1 times as long as wide, with the sides subparallel to arcuate on the posterior half; rather narrowly to very broadly rounded in front, with the anterior margin very weakly to rather strongly serrate; anterior portion of the surface weakly to rather strongly asperate; posterior surface reticulate, subopaque to opaque, punctate or granulate-punctate; pubescence scanty or moderate and varying from short fine hairs to clavate bristles; side margins blunt; ventral surface reticulate with few punctures; prosternum short, usually perpendicular or nearly so, more or less pubescent.

The elytra have the basal margin not elevated, the sides sub-parallel, moderately narrowly to broadly rounded behind with the ends drawn out to form a moderate to very prominent sutural apex. The surface varies from shining to opaque, the sculpture from rough and coarse to fine, and the vestiture from a few fine short hairs, to longer fine hairs or to scale-like bristles. The declivital sculpture varies from granulate-punctate, but little coarser than that on the disc, to coarsely granulate or tuberculate, with or without larger definite teeth. The first and second visible abdominal sternites are subequal, and each is as long or nearly as long as the 3d, 4th and 5th, combined. The legs are rather short and usually hairy, with the front coxae apparently nearly contiguous. The anterior femora are rather short, broad and compressed. The fore tibiae are compressed, very little or not at all widened distally, with sides sub-parallel, straight or slightly sinuate, the outer edge entire or very slightly serrate; the distal end truncate and with a row of 3 to 5 submarginal teeth, and with the inner angle prolonged to form a distinct, well developed, recurved hook or mucro. The tibiae of the 2d and 3d legs are much wider toward the distal end, and the outer edge is distinctly serrate. The tarsi have the first three segments cylindrical and subequal, the fourth being much smaller but plainly visible.

The genotype is Micracis suturalis Lec.

#### Comparative Notes on the Species of Micracis LeConte

Size and Proportions. The adults of the genus *Micracis* LeConte vary considerably in size and proportions. The smallest species is *M. nanula* Lec., the type of which measures 1.63 mm., while the type of *M. hirtellus* Lec., which represents the maximum length, is 3 mm. long. The proportions vary from slender as in *M. opacicollis* Lec., which is 3.28 times as long as wide, to a moderately stout form as in *M. langstoni* n. sp. the males of which are 2.58 times as long as wide. There is considerable variation in length within the limits of the various species and to a less extent within the sexes of the same species. However, variation in proportions within the species is largely of a secondary sexual character and will be mentioned later in that connection.

**Color.** In color the variation within the genus is from a fairly light reddish brown as seen in M. suturalis Lec. and its allies to a true black as shown by many individuals of M. langstoni n. sp. Specimens of several of the species are often seen which are testaceous or yellowish-brown in color but these are individuals which have never attained their mature coloration. The tibiae, the summit of the pronotum, and other parts show a lighter coloration than the rest of the body.

Sculpture. Sculpture is always variable to a greater or less extent within most genera of *Ipidae* and to some extent within the species. The range of difference within the genus *Micracis* is considerable but perhaps not greater than that found in some other genera. The extremes within this genus as at present known are represented by *M. swainei* n. sp. and *M. langstoni* n. sp. In all of the species the surface of the integument is seen to be reticulate wherever this is not obscured by coarser sculpture. In *M. swainei* n. sp. which is the most weakly sculptured species of the genus, the tendency toward a smooth, finely punctured surface is evident, while in *M. langstoni* n. sp., representing the other extreme, an equally strong tendency toward a coarsely granulate or coarsely punctured and rugose surface is found. Intervening grades are shown by *M. suturalis* Lec., *M. rudis* Lec., and *M. bicornus* n. sp. The sculpture of the frons, pronotum, elytral declivity and fore tibiae, is of considerable importance in distinguishing the larger subdivisions of the genus and in determining the species.

Vestiture. The genus *Micracis* shows rather striking differences in the amount and character of the vestiture in the different species. In *M. rudis* Lec.

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the upper surfaces of both pronotum and elytra are nearly devoid of vestiture only a few, very fine, short hairs being present and these becoming more numerous and longer on the declivity. *M. bicornus* n. sp., *M. biorbis* n. sp., *M. harnedi* n. sp. and *M. langstoni* n. sp. exhibit a similar condition in so far as the pronotal and elytral vestiture is concerned. In *M. swainei* n. sp., *M. populi* n. sp. (Swaine), and in the females of *M. suturalis* Lec. and *M. meridianus* n. sp., the vestiture consists of very numerous fine, moderately short, cinereous hairs, while in *M. hirtellus* Lec. the hairs are yellow, somewhat coarser, much longer and equally plentiful. In the males of *M. suturalis* Lec. and *M. meridianus* n. sp. the hairs from the interspaces of the elytra and some of those from the pronotal punctures are clavate, presenting a very striking secondary sexual characteristic. In *M. opacicollis* Lec. and *M. nanula* Lec. the greater part of the rather plentiful vestiture of the dorsal surface consists of true scales of a cinereous color.

The vestiture of the frons varies in amount from the scanty, fine pubescence of M. rudis Lec. and its close allies, to the very coarse and dense pubescence of M. langstoni n. sp. In quality the range is from very fine, short hairs as in M. rudis Lec. through the abundant and longer but still rather fine pubescence of M. hirtellus Lec. and the dense frontal brush of coarse bristles in M. langstoni n. sp., to the rather sparse flattened hairs and scales in M. opacicollis Lec.

The ventral surface is moderately hairy in all of the species. In the subgenus *Micracisoides* the hairs are rather coarse and long, especially on the fore coxae, the middle and hind legs and the posterior segments of the abdomen. In the subgenus *Micracis*, the hairs are much finer and somewhat shorter, while in the subgenus *Pseudomicracis* they are again longer and coarser and are here more or less intermixed with true scales.

The Frons. The front of the head shows a very interesting range of variation within the genus. Perhaps the simplest condition is exhibited by the head of *M. harnedi* n. sp. where the frons is convex and only slightly depressed just above the epistoma. In *M. opacicollis* Lec., *M. swainei* n. sp., *M. populi* n. sp., *M. meridianus* n. sp., and *M. suturalis* Lec. the depression extends as a flattening or slight concavity farther up on the frons, while in *M. langstoni* n. sp. the frons is plano-concave. The greatest modification is exhibited by *M. rudis* Lec., *M. biorbis* n. sp. and *M. bicornus* n. sp. where a deep, nearly hemispherical concavity extends nearly from eye to eye, the concavity being ornamented either by two slightly raised spongy areas, as in *M. rudis* Lec. and *M. biorbis* n. sp., or by two strongly elevated horn-like projections as in *bicornus*. The differences in vestiture have already been mentioned.

The width of the frons varies with the shape of the eyes. In the subgenus *Micracisoides*, including *M. rudis* Lec. and its allies, the eyes are short and the space between the upper angles is greater. In the true *Micracis* this is somewhat lessened while in *Pseudomicracis* the frons is markedly narrower.

The Eyes. The size, structure, and position of the eyes present what the writer considers one of the most important differences in the group. The range is from the small, broadly oval, rather finely granulate eyes, with the inner margin entire and widely separated both above and below, as shown by *M. rudis* Lec. and its allies; to the very large, narrow, coarsely granulate, emarginate eyes contiguous beneath and much more narrowly separated above as seen in

*M. nanulus* Lec. An intermediate condition is shown in *M. suturalis* Lec. and its allies in which the eyes are much larger than in the *rudis* group, rather coarsely granulate, with the inner margin entire, rather widely separated above and moderately separated beneath. A much nearer approach to the condition in *M. nanula* Lec. is that seen in *M. opacicollis* Lec. where the only differences consist in a narrow separation of the eyes beneath and a slightly wider separation above. There is a rather sharp break in the series between the subgenera *Micracisoides* and *Pseudomicracis* and although the true *Micracis* show a tendency toward the conditions in *Pseudomicracis*, the latter are readily separated by such important characters as long, narrow, very coarsely granulate eyes, emarginate in front, narrowly separated or contiguous beneath and more narrowly separated above.

**The Antennae.** The variation in the antennae of *Micracis* have to do with the shape and vestiture of the scape, the shape and proportions of the club and its divisions and sutures, the relative size of the funicle and the shape and relative proportions of its various parts.

Perhaps the greatest range of variation is in the shape and ornamentation of the scape. In *M. rudis* Lec., *M. bicornus* n. sp., and *M. harnedi* n. sp., the scape is moderately clavate toward the distal end (Figs. 1, 3, 4), and circular in cross section. In *M. langstoni* n. sp., (Fig. 5) and *M. hirtellus* Lec. the free end is somewhat more dilated with a tendency toward a flattening of the outer surface. In *M. opacicollis* Lec. (Fig. 11) the upper angle of the distal end is slightly more dilated and greatly flattened while in *M. suturalis* Lec. (Fig. 6), *M. populi* n. sp. (Fig. 9), *M. meridianus* n. sp. (Figs. 7, 8), and *M. swainei* n. sp. (Fig. 10), the expansion of the upper angle is carried still farther and the flat form is retained.

A parallel progressive modification is shown in the vestiture of the scape which varies both as regards the length and the abundance of the hairs. In *M. rudis* Lec. and its allies the hairs are few in number and moderately short. They are progressively more numerous and longer in *M. langstoni* n. sp. and *M. opacicollis* and reach their greatest abundance and greatest length in *M. swainei* n. sp. and in the females of *M. suturalis* Lec., *M. meridianus* n. sp. and *M. populi* n. sp.

The funicle is always 6-jointed in this genus and in all species except M. suturalis Lec. and its allies (subgenus Micracis) is considerably longer than either the club or the shaft of the scape. The first segment, or pedicel, is always longer than any of the other segments but varies in the series of species from .33 of the entire length of the funicle in M. opacicollis Lec. to .44 of the funicle in M. swainei n. sp. It is always cup-shaped but varies considerably as regards its proportions. In M. opacicollis Lec. the form is short and broad, the two dimensions being pearly equal and it is more constricted at the base than in M. swainei n. sp., representing the other extreme where the length is nearly exactly twice the width.

The remaining funicular segments are progressively shorter toward the distal end and in all the species in the subgenus *Micracisoides* are progressively broader, although there is considerable difference in the latter respect. In the *M. suturalis* group the widening of the distal segments is more pronounced and in most of the species the upper side of each of the distal segments is more widened than the lower side, this being most pronounced in *M. suturalis* Lec. and

least so in *M. populi* n. sp. In *M. opacicollis* Lec. the 2d, 3d and 4th funicular segments are subequal in width and only the last one is materially wider. The funicular hairs vary from rather short and scanty, as in some of the species of the *rudis* group, to longer and more plentiful in *M. suturalis* Lec. and its allies. Those on the distal segment are usually longer.

The club of the antenna varies in outline from a short oval as in M. langstoni n. sp. and M. biorbis n. sp. and others of the rudis group, to an elongated, subquadrilateral oval, 1.73 times as long as wide, as seen in the females of M. meridianus n. sp. It is always compressed and has upon its outer face two distinct sutures indicated by multiple rows (usually double) of punctures each of which bears a seta, these varying somewhat in length in the different species. What is probably a third suture is indicated by a group of more or less irregularly arranged setegerous punctures near the distal margin of the club. No distinct septum is present in any of the sutures.

The relative size of the segments of the club and the shape of the sutures vary considerably within the genus, and furnish valuable subdivisional and specific characters. The proportionate length of the first segment ranges from slightly more than one-third of the length of the entire club in *M. rudis* Lec. and its allies to nearly exactly one-half in *M. suturalis* Lec. and its allies. The shape of the first suture varies with the length of the first segment from a broadly curved (forming less than a semi-circle) or sinuate course as in the subgenus *Micracisoides* (Figs. 1, 2, 3, 4, 5) to a narrowly curved form, (forming more than a semi-circle) in the subgenus *Pseudomicracis* (Fig. 11), or a sub-angulate form in the true *Micracis* (Figs. 6-10). The specific differences within the subdivisions are naturally smaller and can be better appreciated by a comparison of the accompanying illustrations than by descriptions. The second suture is subparallel to the first, similar to it but usually more broadly curved.

The sutures on the inner or posterior face of the club are two in number and are more narrowly curved, the first segment on this side comprising a greater proportion of the club.

Perhaps it should be pointed out that the range of modification in the club is parallel to that in the scape. A comparison of the accompanying figures will show clearly that the greater the length of the 1st segment and the more narrow the curvature of the 1st suture of the club, the greater is the flattening of the scape, the expansion of its upper angle and the length and abundance of its vestiture.

The Pronotum. The shape of the pronotum is fairly uniform within the genus *Micracis*. There is, however, some range of variation in the proportionate length, the degree of curvature of the anterior declivity, the shape of the lateral outlines, the character of the lateral margin, and especially the shape of the anterior margin. The range in the proportions of the pronotum is from 1.05 times as long as wide in *M. nanula* Lec. and in some specimens of *M. rudis* Lec. to 1.2 in *M. swainei* n. sp. It is rather peculiar that forms like *M. rudis* Lec. and *M. nanula* Lec. which represent the extremes of variation within the genus in most structural characters are practically identical in these proportions but this is evidently correlated with the shape of the anterior margin which in *M. nanula* Lec. is narrowly rounded and somewhat extended and in *M. rudis* Lec. is broadly, subtruncately rounded.

The relative height of the pronotum and the steepness of the anterior declivity or arch is greatest in *M. langstoni* n. sp. and least in *M. opacicollis* Lec. and *M. nanula* Lec. In the latter species the anterior margin as seen from the side extends somewhat beyond the convex front of the head, while in *M. langstoni* n. sp. the margin is not extended and the space left by the plano-concave frons is filled by the frontal brush. In *M. suturalis* Lec. and its close allies the space between the moderately or rather narrowly rounded, anterior frontal margin and the flattened, slightly concave frons is considerably more than in *M. rudis* Lec., *M. biorbis* n. sp. and *M. bicornus* n. sp., where the very broadly rounded margin fits the margins of the deep concavity snugly.

The pronotum is widest at or near the middle, the lateral outline behind being subparallel or very slightly convergent and the posterior angles being more or less rounded. In *M. bicornus* n. sp., *M. biorbis* n. sp. and *M. rudis* Lec. the sides are subparallel behind from a point well in front of the middle, in *M. langstoni* n. sp., *M. harnedi* n. sp., and *M. swainei* n. sp. from just beyond the middle, while in *M. suturalis* Lec., *M. opacicollis* Lec. and *M. nanula* Lec. a widening near the middle is evident, with the sides slightly converging posteriorly. In *M. suturalis* Lec., *M. swainei* n. sp., *M. populi* n. sp. and to a less extent in *M. opacicollis* Lec. and *M. nanula* Lec. a slight constriction in front of the middle is evident.

The anterior outline varies from a very broadly rounded (M. bicornus n. sp.) or even subtruncate (M. rudis Lec.) form to a rather narrowly rounded one as in M. swainei n. sp. and M. nanula Lec., the other species being intermediate in this respect. The lateral margins of the pronotum are usually blunt in this genus but in a few of the species the posterior portion is rather angulate.

The Prosternum. The prosternal area is not large in the genus Micracis, most of it being occupied by the rather large coxal cavities. The coxal cavities are entirely enclosed, being bordered both anteriorly and posteriorly by rather narrow strips of chitin of about equal width. They are separated by an intercoxal plate which varies from rather broad and flat in M. langstoni n. sp. to moderate in M. bicornus n. sp., narrow in M. suturalis Lec. and very narrow in M. opacicollis Lec. In dried, mounted specimens the coxae seem close or nearly contiguous. The portion of the prosternum in front of the coxae while always short varies in length to some extent. In Division A this region ascends anteriorly showing a tendency to a perpendicular position which is perhaps most marked in M. langstoni n. sp., while in Division AA the position is nearly horizontal.

The Elytra. The relative length and width of the elytra varies considerably within the genus. The extremes are represented by M. langstoni n. sp. in which the elytra are but 1.6 times as long as wide and M. opacicollis Lec. in which they are 2.2 times as long as wide. The steps in the lengthening of the elytra are gradual and are in the following sequence: M. langstoni n. sp. 1.6; M. rudis Lec. and M. bicornus n. sp., 1.77; M. harnedi n. sp., and M. biorbis n. sp., 1.8; M. suturalis Lec. Q, 1.9; M. swainei n. sp., and M. meridianus n. sp., 2.0; M. hirtellus Lec., 2.06; M. nanula Lec., 2.11; M. opacicollis Lec., 2.2. There is considerable sexual variation in this respect in some of the species, and the above applies only to the series of females, the secondary sexual modifications being considered at another place.

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As seen from above the sides of the elvtra are subparallel to the level of the origin of the declivity. They are slightly arcuate in M. bicornus n. sp., slightly convergent behind in the males of *M. suturalis* Lec. and slightly divergent in the males of *M. langstoni* n. sp. The posterior curvature varies from rather narrow in M. opacicollis Lec. and M. nanula Lec. to broad in the M. rudis group or very broad in the males of *M. langstoni* n. sp. The degree of elevation—or the lack of it—in the 9th interspace is largely responsible for the degree of curvature. In the narrowly rounded elytra this interspace is not at all, or only very slightly, elevated while in the broadly rounded forms it is elevated to form a distinct, prominent, more or less serrate ridge which forms the posterior lateral outline as seen from above. In species in which the ridge is not present, the outline of the posterior lateral angles is continued unbroken into that of the sutural apex. This is true of the species of true Micracis and of those of Pseudomicracis. In the species of *Micracisoides*, however, the base of the sutural apex is separated from the posterior lateral outline by a more or less distinct notch, the depth of which is dependent upon the degree of elevation in the 9th interspace.

The presence of a sutural apex, formed by the extension of the two elytra in the sutural region to form a common, more or less acuminate point, is one of the most striking characteristics of the genus *Micracis*. This structure is unmistakably present in all members of the genus but the degree of extension varies considerably, as does also the broadness of the base and to a less degree the sharpness of the angle formed by the sides. It is least developed in *M. opacicollis* Lec. where but little more than the suture is extended and is best developed in the subgenus *Micracisoides* where the base is broad, involving from one-third to one-half of the posterior end of the elytra. (Figs. 45-48.) The sharpness of the angle formed by the meeting of the two sides varies with the width of the base, from about 90 degrees in *M. rudis* Lec. and its allies to considerably less in the true *Micracis* and *Pseudomicracis*. The surface of the sutural apex varies from rather finely granulate in the more finely sculptured species in which it is largest.

The variation in sculpture, within the genus *Micracis* has already been mentioned in a general way but it might perhaps be well to consider the elytral sculpture somewhat more in detail. In general the surface of the elytral disc varies from a finely punctured, moderately smooth surface, with the striae not impressed and the interspaces very slightly rugulose as in *M. swainei* n. sp. to the coarsely punctured, rugose surface, with the striae strongly and roughly impressed as in *M. langstoni* n. sp. and to only a slightly less extent in *M. rudus* Lec., *M. biorbis* n. sp., *M. bicornus* n. sp., *M. harnedi* n. sp., and *M. hirtellus* Lec. The conditions in *M. nanula* Lec., *M. opacicollis* Lec., and in *M. suturalis* Lec., and its allies are intermediate between these extremes. In all species there is a decided tendency for the interspaces to become more roughly sculptured and often to become granulate or tuberculate toward and upon the declivity.

The declivity varies within the genus as regards the abruptness of the slope, the degree of convexity of the posterior face and the sculpture. The height of the arch varies with the degree of cylindricity of the body form, the declivity being most abrupt in *M. langstoni* n. sp., where the height and width of the body in the elytral region is almost equal, and most gradual, in *M. opacicollis* Lec. and *M. nanula* Lec., where the width slightly exceeds the height. In *Micracis*oides the tendency is toward a more abrupt declivity and in the true *Micracis* toward a more gradual slope. The degree of convexity is more or less parallel with the gradualness of the descent.

The sculpture of the declivity varies in general with the sculpture of the rest of the body being coarser in the subgenus *Micracisoides* and finer in the true *Micracis* and in *Pseudomicracis*. Usually the species of *Micracis* can be determined by a careful study of the declivital sculpture alone. In *Micracisoides* especially there is a tendency toward specific modifications of the various interspaces and in some cases of the striae, while in the other two subgenera the tendency is toward a more uniform sculpture. For details you are referred to the key and the descriptions of the various species.

The Abdominal Sternites. The 1st and 2d visible abdominal sternites are subequal in length and each is equal or nearly equal to the last three combined. There is but little variation in these characters. The relative length and width of the sternites varies with the proportions of the body in the various species.

The Anterior Tibia. The shape and structure of the fore tibiae show a considerable range of variation within the genus *Micracis* and furnish data of much taxonomic value. By the character of the fore tibiae the genus is divided into three groups more readily than on the basis of any other single structure. In general terms the fore tibiae of the entire genus may be described as compressed, with the two sides subparallel, with a strong terminal mucro arising from the inner distal angle, and with the outer portion of the distal end truncate. However, there is a considerable range of variation in a number of anatomical details.

In the subgenus *Micracisoides* the fore tibiae are always more or less broader at the distal end, the sides are sinuate, and the outer edge more or less (but never strongly) serrate (Figs. 12-17). In the true *Micracis* the distal end may be either slightly wider or narrower, with the side margins nearly straight and the outer edge not at all serrate (Figs. 18-21). In the subgenus *Pseudomicracis* the distal end is slightly wider, the inner margin sinuate as in *Micracisoides* and the outer margin nearly straight with the edge slightly irregular but not serrate (Fig. 22).

The terminal mucro varies in proportions in the various subdivisions. It is most slender in the *Pseudomicracis* and stoutest in several of the true *Micracis*. It is strongly developed in all of the species of the genus and is always more or less recurved toward the end.

The portion of the distal end not occupied by the base of the terminal hook is more or less obliquely truncate with the outer distal angle rather prominent in *M. rudis* Lec. and its allies, slightly rounded in *M. suturalis* and its allies and distinctly rounded in the *Pseudomicracis*. Parallel with this distal truncate end is a submarginal row of teeth which vary in number from three to five. In *M. rudis* Lec. (Fig. 12), *M. biorbis* n. sp. (Fig. 13), and the females of *M. bicornus* n. sp. (Fig. 14), but three of these submarginal teeth occur. In *M. harnedi* n. sp. (Fig. 16), *M. langstoni* n. sp. (Fig. 17) and the males of *M. bicornis* n. sp. (Fig. 15) there are four while in all of the others five are present (Figs. 18-22). It should be noted that the subgenus *Micracisoides* has three or four submarginal teeth, while the other two subgenera have five. The greatest divergence from the typical arrangement is seen in *M. opacicollis* Lec. where the outermost tooth is born not on the truncate distal end, but arises from the outer edge well past the outer distal angle. It is probable that the same is true of *M. nanula* Lec. which seems very closely allied to *opacicollis* but the type specimen of this species lacks the fore tibia and this point was not determined.

Summary. In summarizing the foregoing comparative notes on the species of *Micracis* Lec. the conclusion is apparent that in some respects there is a rather gradual transition between *M. opacicollis* Lec., representing one extreme of the series and *M. langstoni* n. sp., representing the other extreme. This holds in a general way for: body proportions, sculpture, vestiture, shape, structure and position of the eyes, character of the antennae, structure of the prosternum, proportions and shape of the elytra, degree of development of the sutural apex and structure of the fore tibiae. The two species do not invariably represent the extremes of difference in all of the structural characters, but are always near the extreme at least. However, in spite of this rather gradual range of variation in many of the structural characters, there are two very sharp breaks in the series which sharply separate the group into three subdivisions which to the writer seem to be of at least subgeneric value.

Of these the *rudis* group which I have designated as the subgenus *Micracis*oides is characterized by the rougher sculpture; with but few hairs on the dorsal surface (except in *M. hirtellus* Lec.); by the small, short, oval finely granulate eyes which are very widely separated both above and below; by the antennae which have a clavate scape ornamented by a few, moderate hairs, and a short oval club with broadly curved or sinuate sutures; by the fore tibiae which are wider distally with the sides sinuate, the outer edge weakly serrate and the distal end with three or four submarginal teeth; and by the wider separation of the anterior coxae.

The suturalis group which I have called the subgenus *Micracis* is characterized by the finer sculpture, with more numerous hairs (or bristles in certain males); by the large, elongate oval, rather coarsely granulate eyes which are moderately separated beneath; by the antennae which have a flattened, greatly dilated scape ornamented by numerous, very long hairs and a more elongate oval or subquadrilateral club, with the sutures narrowly curved or subangulate; by the fore tibiae having the sides straight, subparallel, the outer edge entire and the distal end with five submarginal teeth; and by the narrower separation of the fore coxae.

The subgenus *Pseudomicracis*, which includes *M. opacicollis* Lec. and *M. nanula* Lec., is characterized by the presence of true scales; by the very elongate, very coarsely granulate eyes which are contiguous or very narrowly separated beneath and have their inner margins emarginate; by the antennae which have the scape flattened and moderately dilated with fairly numerous, moderately long hairs and the club oval with rather narrowly rounded (but not subangulate) sutures; by the fore tibiae with the inner outline sinuate and the outer nearly straight and entire, with five submarginal teeth, the outermost of which arises not from the distal end but from the outer edge of the tibiae; and by the fore coxae being separated only by a septum.

Secondary Sexual Characters. The secondary sexual differences vary in character and degree in the various species of *Micracis*. The principal characters

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of value in determining the sex are: the relative size and proportions of the body; the sculpture and vestiture of the frons; the shape and vestiture of the antennal scape; the degree of curvature of the sutures of the antennal club; the shape of the pronotum and the character of the serrations on its anterior border; the difference in the sculpture and vestiture of the elytra and especially of the elytral declivity. In none of these characters is there a conspicuous sexual difference in all of the species, but in all species the sexes can be distinguished more or less readily—in some by a difference in a certain character, or group of characters, and in others by an entirely different group.

In *M. rudis* Lec., *M. biorbis* n. sp., *M. bicornus* n. sp. and *M. harnedi* n. sp. there are no marked sexual differences within the species in the body form and proportions. In *M. biorbis* n. sp. and *M. bicornus* n. sp. the most striking secondary sexual characters are in the structure of the frons (Figs. 37-41) the coarser sculpture of the elytra and especially of the elytral declivity in the males. In *M. harnedi* n. sp. the differences in the declivity is sufficient to distinguish the sexes (Figs. 47, 48). In *M. langstoni* n. sp. (Figs. 45, 46) the males are distinctly broader, especially through the declivital region; the declivity is more abrupt, with the summit and sides subangulate (distinctly rounded in the females); and the sculpture and armature coarser and more pronounced, especially as regards the elevation of the 9th interspace.

In *M. hirtellus* Lec. the frons of the male differs in its coarser and rougher sculpture and in the absence of the frontal tuft of hairs, characteristic of the other sex. In other respects the sexual differences in this species are similar to those in *M. suturalis* Lec. and *M. swainei* n. sp. where the males are characterized by a shorter, broader form, by the smaller degree of dilation of the upper distal angle of the antennal scape, by the few and shorter hairs on the scape, by the shorter prothorax with much stronger serrations on the anterior margin and by the rougher sculpture throughout. In *M. suturalis* Lec. and *M. meridianus* n. sp., the sexes are still further distinguished by the differences in the shape of the antennal club and by the replacing of the fine interspacial hairs of the female with coarser clavate hairs or bristles in the male. Indeed in these species the sexes are so different that there is little wonder that LeConte should have described the male of *suturalis* as a separate species under the name of *M. aculeatus*.

In *M. opacicollis* Lec. the secondary sexual differences are not so apparent as in most of the other species. The male here has a slightly coarser sculpture on the frons and pronotum, the scape of the antenna is less dilated and the elytra are slightly more slender behind. But two specimens of *M. nanula* Lec. have been seen by the writer and no sexual differences were noted in these.

The following key to the known North American species of the genus *Micracis* was prepared primarily for convenience and ease in determining the species rather than for the purpose of showing the natural relationship of the various species of the genus. However, the writer believes the relationships are very well shown.

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#### Key to the Known North American Species of the Genus Micracis Lec.

- A. Eyes widely separated beneath, inner margin entire.
  - **B.** Antennal scape club shaped, not triangular, with a few short to moderately long hairs, club with first suture broadly curved; elytra shining, sculpture coarser, sutural apex coarse; eyes small very widely separated beneath; fore tibia slightly wider distally with the sides sinuate, outer edge weakly serrate, distal end with 3 or 4 submarginal teeth.

#### Subgenus Micracisoides—New Subgenus.

- C. Front of head deeply concave.
  - **D.** Frontal concavity with 2 circular spongy areas; larger and stouter body form.
    - **E.** Spongy areas of frontal concavity small, hemispherical, arising from the side walls of the concavity, antennal club oval in outline; declivity with a slight elevation in 1st stria.....rudis Lec.—Page....20
    - EE. Spongy areas of frontal concavity larger, flatter, arising from bottom of concavity; antennal club nearly circular; declivity without an elevation in the 1st stria.....biorbis n. sp.—Page....22
- CC. Front of the head not deeply concave.
  - D. Front of head granulate, not densely pubescent; declivity with sutural interspace smooth, with a large tooth at each side......*harnedi* n. sp.—Page....24
  - **DD.** Front of head at least in the female ornamented with a brush of short hairs; declivity with the sutural interspace strongly granulate.
    - E. Frontal brush of short stout hairs in both sexes; elytra with fewer, shorter hairs; declivity with 2nd interspace smooth; shorter (2.4 - 2.7 mm.) and stouter.....langstoni n. sp.—Page....26
    - EE. Frontal brush of fine short hairs in female only; elytra with numerous rather long hairs; declivity with all interspaces strongly, coarsely granulate; larger (3mm.) and more slender.

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**BB.** Antennal scape triangular, flattened, with numerous very long hairs; club with first suture angulate or narrowly curved; elytra sub-opaque, sculpture finer, sutural apex less prominent; eyes larger, more coarsely granulate, moderately widely separated beneath; fore tibia with sides subparallel, nearly straight, outer edge entire, distal end with 5 submarginal teeth.

#### Subgenus Micracis

- C. Antennal club more than  $1\frac{1}{2}$  times as long as wide.
  - **D.** Fore tibia widest toward the distal end; sculpture of elytra coarser; elytra of the males with clavate bristles.
    - E. Larger, less than 3 times as long as wide; sculpture coarser; pubescence finer and less abundant; fore tibia wider and heavier....suturalis Lec.—Page. 28
    - **EE.** Smaller, more than 3 times as long as wide; sculpture finer; pubescence coarser and more abundant; fore tibia much narrower.

.....meridianus n. sp.—Page....29

- **DD.** Fore tibia widest near proximal end; elytral sculpture fine, elytra of both males and females with fine pubescence......*populi* n. sp. (Swaine)—Page...31
- **CC.** Antennal club less than 1½ times as long as wide; elytral sculpture finer, pubescence fine and abundant and similar in both sexes; fore tibia wide, heavy, narrower toward the distal end......swainei n. sp.—Page....32
- **AA.** Eyes very large, very coarsely granulate, not widely separated beneath, inner margin emarginate.

#### Subgenus Pseudomicracis—New Subgenus

- **BB.** Eyes contiguous beneath; front of head with a distinct longitudinal carina; elytral striae not impressed; slightly smaller.

.....nanula Lec.—Page....34

#### Micracis rudis Lec.

**Description of the Adult.**—Very dark reddish brown, almost black; 2.2 mm. long, 2.85 times as long as wide.

Front of head (Fig. 37) deeply concave, with the concavity sub-opaque, aciculate and impunctate, with a small hemispherical elevation arising from each side of the concavity opposite the upper angle of the eye, with the surface of each appearing velvety under low magnification, spongy when more highly magnified; upper part and sides of frons aciculate, very finely and rather sparsely

punctured, devoid of pubescence except for a sparse fringe on the epistomal margin. **Eyes** small, short oval, very widely separated above and below, inner margin entire, rather finely granulate. **Antennae** large (Fig. 1), scape rather short, swollen distally but not compressed or greatly dilated, outer face with a few moderate hairs; funicle but little longer than scape; pedicel a little more than one-half as long as the five distal segments combined, distal segments with a few moderately long hairs, progressively wider toward distal end; club short oval, 1.3 times as long as wide, first segment comprising but little more than onethird of the length of the club, sutures broadly curved, first suture sinuate, second suture similar.

**Pronotum 1.07** times as long as wide; widest a little in front of middle, with the sides subparallel, slightly converging posteriorly, very broadly rounded, subtruncate in front; anterior margin weakly serrate; asperities of the anterior area, numerous, broad and flat; posterior area, dully shining, reticulate, granulatepunctate; pubescence very scanty, short, fine and inconspicuous. Lateral margin of thorax not sharp; ventral surface finely reticulate, sparsely punctured and pubescent in the anterior angle.

Elytra as wide as thorax, not wider, 1.77 times as long as wide; sides subparallel, very slightly narrowed toward the rear; broadly rounded posteriorly, with a prominent sutural apex the sides of which form slightly less than a right angle; surface shining, slightly rugose; striae scarcely impressed, roughly, coarsely and rather closely punctured; interspaces narrow, rugose, much more sparsely and finely punctured, becoming coarsely granulate or tuberculate behind. **Declivity** rather abrupt, convex, tuberculate or very coarsely granulate; sutural interspaces not elevated, coarsely granulate above, nearly smooth toward apex; third, seventh, and ninth interspaces slightly elevated and more strongly tuberculate, the ninth especially is elevated posteriorly to form a serrate ridge; first stria with a small inconspicuous elevation midway on the declivity; sutural apex prominent with the sides forming an angle of slightly less than 90 degrees, roughly tuberculate. Vestiture very scanty, short, fine and inconspicuous; slightly longer and more abundant on the declivity.

Fore tibia slightly broader distally (Fig. 12) with the two lateral outlines sinuate; outer edge with a few weak serrations; terminal hook long, moderately slender, with the end slightly curved; distal end obliquely truncate, armed with 3 submarginal teeth.

The above description of what is believed to be the female of this species was prepared nearly entirely from LeConte's type in the museum of Comparative Zoology at Cambridge, Mass. However, the head of the type is partially retracted so that little can be seen of its nature other than that it is deeply excavated and has a small elevated area at each side. For the characteristics of the frons recourse was had to the two specimens of this species in my own collection and a single specimen in the Swaine collection. Only four specimens have been seen; LeConte's type collected by Hubbard and Schwarz at Detroit, Mich., a single specimen in the Swaine collection from Clarkesville, Ga., bearing the date August 1, 1909, and two specimens collected by the writer, December 3, 1919, at Electric Mills. Miss. No certain sexual differences were noted in the small series studied. However, the sculpture of the two specimens in the writer's collection is very slightly coarser and the elevation in the first stria of the declivity is apparent while it is nearly lacking in the other two specimens. It is possible that the Mississippi specimens are both males and the others females.

There are perhaps a number of species confused with this in collections. It has been recorded from Detroit, Mich. (Hubbard and Schwarz, '78), the host not being given; in hackberry (Packard, '90), the locality not given; from Washington, D. C. (Schwarz, '91), in black locust; from S. W. Pennsylvania (Hamilton, '95), in hickory. My own specimens were cut from a limb of hickory.

This species is typical of the subgenus Micracisoides, new subgenus.

#### Micracis biorbis n. sp.

**Description of the Adult Male.** Very dark reddish brown; 2.14 mm. long, 2.88 times as long as wide.

Front of head deeply concave (Fig. 38), concavity opaque, with a circular area at each side larger than in *rudis*, the surface of which is flat and slightly spongy, median line sulcate below, slightly elevated above; sides and upper part of frons finely but distinctly aciculate, finely and sparsely punctured with a few very short hairs; epistomal fringe sparse and short. **Eyes** small, short oval, very widely separated above and below, inner margin entire, finely granulate. **Antennal** scape rather short (Fig. 2), club-shaped, not compressed, with a few moderately long hairs; funicle longer than in *rudis* due largely to the greater relative length of the pedicel; club very short oval, of same length as in *rudis* but considerably wider, 1st segment one-third of the length of the club, 1st suture sinuate, 2d broadly curved.

**Pronotum 1.08** times as long as wide; widest in front of the middle, with the sides slightly converging posteriorly, very broadly rounded in front; anterior margin very weakly serrate, anterior area with numerous, rather strong, broad asperities; posterior area reticulate, feebly shining, punctate and with broad, flat, shining granules; pubescence very sparse, fine and inconspicuous. Lateral margin rather sharp posteriorly, rounded anteriorly; ventral surface shining, reticulate, with punctures and sparse pubescence evident only in the anterior angle.

Elytra slightly wider than thorax, 1.8 times as long as wide; with the sides subparallel to level of declivity; broadly rounded behind, with a prominent sutural apex, the sides of which form a right angle. Surface moderately shining, strongly rugose; striae scarcely impressed, roughly, rather coarsely and closely punctured; interspaces narrow, moderately rugose, very sparsely and finely punctured. Declivity convex, tuberculate; sutural interspace slightly depressed, irregularly granulate, 2d interspace slightly elevated above, flat toward apex, strongly granulate, 3d and 9th interspaces more strongly elevated and tuberculate, the 9th forming a slightly elevated serrate ridge posteriorly; the other interspaces coarsely granulate or tuberculate. The sutural apex is prominent with the surface strongly tuberculate and the sides meeting at an angle of 90 degrees. The elytral vestiture is very scanty, fine short hairs being seen only at the sides and on the declivity. The fore tibiae (Fig. 13) are very similar to those of *rudis* but are widened slightly more toward the distal end and the terminal mucro is apparently slightly stouter.

The **female** is of the same size and proportions, with the sculpture similar but slightly weaker especially upon the pronotum; the **frons** (Fig. 39) differs in being more deeply excavated and by having the lateral circular areas more lateral in position, less elevated, more widely separated and with their surfaces velvety; the anterior margin of the pronotum is without servations or nearly so.

The above species is very close to *M. rudis* Lec. and was originally included by the writer in that species. It, however, differs from *rudis* in the frontal and antennal characteristics, in the absence of the slight elevation upon the 1st stria of the elytral declivity, and in a number of other characters brought out in the descriptions.

Described from two specimens—the type a male cut from hickory, by Mr. H. H. Stage at Syracuse, N. Y., May 12, 1916, and in the author's collection, and a single female in the Swaine collection from Allegheny Co., Pa.

#### Micracis bicornus n. sp.

**Description of the Adult Female.** Dark reddish brown to almost black; 1.82 mm. long, 2.91 times as long as wide.

Front (Fig. 41) with a very deep, nearly hemispherical, glabrous, dully shining, finely reticulate, concavity, extending nearly from eye to eye and bordered by a sharp margin; with a prominence arising from a cordate base at the center of the concavity, extending cephalad to beyond the level of the margin and ending in two rounded knobs which are reddish in color with their surfaces apparently spongy (formed by the lateral fusion of two blunt horns); the rest of the front finely aciculate, finely, sparsely punctured and with very fine short hairs on the area above the eyes and between the eyes and the margin of the excavation. Eyes small, oval, widely separated above and below, inner margin entire, rather finely granulate. Antennae (Fig. 3) lighter in color; scape short, swollen distally, not compressed nor greatly dilated, outer face with a few rather short hairs (shorter than in M. rudis Lec.); funicle  $1\frac{1}{2}$  times as long as scape, pedicel more than one-third of funicle, distal segments a little wider, club short oval, 1.35 times as long as wide, first segment about one-third the length of club, first suture sinuate, second more broadly curved, not parallel.

**Pronotum** 1.19 times as long as wide; sides subparallel on the posterior two-thirds; very broadly rounded in front; anterior margin weakly serrate, with broad low serrations at the lateral angles, nearly lacking near the median line; anterior area with broad low asperities fairly numerous; summit low, transversely strigate-asperate; posterior region dully shining, reticulate, granulatepunctate, pubescence sparse and very fine. Lateral margin of thorax blunt; ventral surface reticulate, finely sparsely punctured in the anterior angle.

**Eiytra** slightly wider than the prothorax; 1.77 times as long as wide; sides subparallel to level of the declivity; rather broadly rounded posteriorly (slightly

less so than in rudis), with a prominent sutural apex the sides of which meet at an angle of 90 degrees; surface dully shining, striae scarcely impressed, moderately coarsely and closely, somewhat rugosely punctured; interspaces narrow, very finely and sparsely punctured, becoming granulate toward the declivity. Declivity abrupt, steep, convex; sutural interspaces very slightly elevated above, with the rudiment of a tooth (little more than a scar) about one-third of the distance from the summit; second interspace narrow, flat without granules on the face of the declivity; third interspace broader, slightly elevated and armed with several small, blunt tubercles arranged uniserially; ninth interspace elevated posteriorly to form a low ridge, armed with a row of tooth-like tubercles becoming progressively larger posteriorly to the level of the base of the sutural apex (as viewed from above this ridge forms the posterior-lateral outline of the elytra and is apparently continuous with the base of the sutural apex); sutural apex slightly less prominent than in M. rudis and not so coarsely tuberculate. Vestiture scanty consisting of very fine short hairs, slightly longer and more abundant on the declivity.

Fore tibia (Fig. 14) slightly broader distally, with the two lateral outlines sinuate; outer edge with a few weak serrations; terminal hook rather broad, curved toward the end; distal edge obliquely truncate, with the outer angle somewhat rounded, armed with 3 teeth.

**Males** larger, varying in length from 1.9 mm. (type) to 2.14 mm.; 2.9 times as long as wide; front of head deeply excavated as in female, but with two blunt horns entirely separate arising from below the center of the cavernous, hemispherical excavation, the ends being reddish brown and with the surfaces spongy (Fig. 40); declivity more roughly tuberculate, with the tubercles especially pronounced in the third and ninth interspaces; sutural interspaces each with a small but distinct tooth about one-third of the distance from the summit; fore tibia (Fig. 15) with 4 submarginal teeth.

*M. bicornus* shows the same general type of structure as *M. rudis* Lec. It is very readily separated from LeConte's species, however, by its smaller size, finer sculpture, duller lustre and especially by the differences in the structure of the frons, and by the differences in the declivity and sutural apex. Other differences are brought out in the descriptions.

The type series consists of 38 specimens cut from the wood of dead hickory limbs obtained by the author at Mendenhall, Miss., December 26, 1919. The types are in the author's collection; paratypes in the collection of the New York State College of Forestry at Syracuse, and that of the Mississippi Agricultural College.

#### Micracis harnedi n. sp.

**Description of the Adult Female.** Dark reddish brown to black in color; 2.06 mm. long; 2.9 times as long as wide.

**Front** of head convex, shallowly transversely depressed just above the epistomal margin, coarsely granulate above, more finely granulate-punctate below, sparsely publicent, sides aciculate. **Eyes** small, oval, very widely sepa-

rated above and beneath, inner margin entire, rather finely granulate. Antennae (Fig. 4) lighter in color, scape but slightly swollen, not dilated or flattened, with a few rather short (for this genus) hairs on the outer side; funicle nearly one and one-half times as long as scape, pedicel about one-third of entire funicle, distal segments moderately widened, with a few short hairs; club short oval, one and one-fourth times as long as wide, first joint about one-third of entire length, sutures broadly sinuate, subparallel.

**Pronotum 1.1** times as long as wide; widest at about the middle; sides subparallel behind; broadly rounded in front; anterior margin somewhat irregularly serrate, rather more strongly than usual for females of this genus; anterior area rather strongly asperate; posterior area with surface subopaque or feebly shining, reticulate, granulate-punctate; pubescence short, fine and sparse, rather longer in the slight depression just posterior to the summit. Side margins of thorax blunt; ventral surface reticulate, feebly shining, with fairly numerous punctures in the anterior lateral angle.

Elytra little wider than thorax; 1.8 times as long as wide; with the sides subparallel to slightly beyond the origin of the declivity; broadly rounded posteriorly, with a strongly developed sutural apex; striae impressed, rugose, punctures moderately coarse and rather closely placed, interspaces rather narrow, much more finely and sparsely, but distinctly punctured, becoming tuberculate toward the declivity. Declivity fairly abrupt (Fig. 48), armed with tubercles above, at the sides and at the apex; shallowly sulcate on the upper portion at each side of the narrow, slightly elevated suture, distinctly but finely and sparsely punctured; with a large, conical tooth at each side on the face of the declivity, about one-third of the distance from the summit, and lying in line with the second stria but probably originating from the third interspace; ninth interspace elevated posteriorly to form a toothed ridge which forms the posterior-lateral outline of the elytron as seen from above, and separated by a distinct notch from the base of the sutural point; sutural apex very prominent, the sides of which meet at an angle slightly less than 90 degrees, with the sides densely granulatetuberculate and the extreme tip slightly prolonged and truncate. Disc of elytra rather feebly shining, pubescence short and sparse on the disc and sides, longer posteriorly and on the rugose border of the declivity.

Fore tible (Fig. 16) slightly wider toward the distal end; sides sinuate, subparallel; outer edge weakly serrate; terminal hook stout, slightly curved; distal end oblique, armed with 4 teeth.

**Male** of similar size and proportions; readily distinguished by a long, slender slightly club-shaped tooth or horn arising from each first (sutural) interspace near the summit of the declivity (Fig. 47); suture posterior to this tooth strongly elevated to the base of the sutural apex, which is similar to that in the other sex; with a weak sulcus at each side bordered laterally by the elevated third interspace which is armed with a row of distinct, blunt teeth; ninth interspace as in the female.

Described from a series of 7 females and 2 males cut from the wood of dead hickory limbs, obtained by the author near Mendenhall, Miss., December 26, 1919. The species is named for Professor R. W. Harned, State Entomologist of Mississippi. The types are in the author's collection; paratypes at Mississippi Agricultural College and New York State College of Forestry.

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#### Micracis lungstoni n. sp

**Description of the Adult Female.** Very dark reddish brown to black in color; 2.4 to 2.7 mm. long (type 2.46 mm.); 2.68 times as long as wide.

Front of head, plano-concave on a circular area extending from eye to eye, covered with a dense brush of rather coarse, light yellow hairs of moderate, nearly equal length (Fig. 42); sides of head aciculate, finely, sparsely punctured and pubescent. Eyes small, short oval, widely separated above and beneath, inner margin entire, moderately finely granulate. Antennae (Fig. 5) lighter in color, with the scape swollen toward the distal end but not flattened nor triangular, ornamented with moderately long hairs; funicle longer than the scape, pedicel comprising about one-third of its length, segments becoming wider distally, with hairs of moderate length; club large, broad oval, first segment but little more than one-third of length of club, sutures parallel, similarly, broadly and sinuately curved.

**Pronotum 1.07** times as long as wide; widest posteriorly with the sides subparallel on the posterior half; moderately broadly rounded in front; anterior margin with low, blunt, serrations; asperities on the anterior area moderately coarse, blunt and fairly numerous; summit transversely strigate asperate, reddish brown; posterior area sub-opaque, finely reticulate, granulate-punctate, with very fine, short, sparse, inconspicuous hairs.

Elytra as broad (not broader) as thorax; 1.6 times as long as wide; with the sides subparallel as far as the level of the declivity; broadly rounded behind with a very prominent sutural apex; surface shining; striae impressed, roughly, moderately coarsely and closely punctured, with the punctures becoming coarser posteriorly; interspaces, rugose, sparsely and much more finely punctured, becoming coarsely granulate toward the declivity. Declivity (Fig. 45) abrupt with the summit rounded and the declivital face convex, striae punctured; sutural interspace elevated slightly and distinctly granulate, second interspace flat, narrow, without granules or punctures; third and seventh interspaces elevated, each with several conspicuous conical teeth; ninth interspace elevated to form a ridge, serrate, with blunt rounded teeth and forming, as seen from above the posterior lateral outline of the elytra, apparently (though not actually) continuous with the base of the sutural apex; sutural apex prominent, the sides forming a right angle, surface coarsely granulate or tuberculate with several conical teeth near the base, apex with the extreme tip prolonged and squarely truncate. Disc and sides of the elytra shining, nearly glabrous but with a few fine, short, inconspicuous hairs; hairs on the declivity more numerous and longer.

Fore tibia (Fig. 17) slightly wider toward the free end, sides sinuate, subparallel, outer edge with a few rather weak serrations, terminal hook stout and curved, distal end slightly oblique, armed with four teeth.

Male with the body form slightly shorter and broader; 2.37 mm. long; 2.58 times as long as wide; front of head as in female; elytra more roughly sculptured, with the strial punctures coarser and the interspaces narrower; declivity (Fig. 46) with the margin at the summit and sides subangulate; more coarsely and roughly punctured, with larger coarser teeth on t he interspaces;

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ninth interspace more strongly elevated, with the teeth more or less fused posteriorly to form a roughened plate-like posterior-lateral margin, which as seen from above is evidently and sharply separated from the base of the sutural apex by a distinct notch.

Described from a series of ninety specimens collected by the author at Agricultural College, Mississippi, February 9, March 23, 24, and May 12, 1920. These were cut from the wood of honey locust, hackberry, slippery elm, and mulberry. The species is named for Mr. J. M. Langston, assistant entomologist of Mississippi, who aided me in obtaining many of the specimens. The types are in the author's collection. Paratypes deposited at the Mississippi Agricultural College and the New York State College of Forestry.

#### Micracis hirtellus Lec.

**Description of the Adult Female.** Dark reddish brown; 3 mm. long; 3.15 times as long as wide.

Front of head flat, slightly concave at the center, with a smooth, dully shining area just above the epistomal margin which is finely and sparsely punctured; rest of front densely, more coarsely but still rather finely punctured, with a small slightly depressed area at the center from which arises a tuft of moderately fine, short hairs. **Eyes** oval, widely separated beneath, inner margin entire, moderately granulate. **Antennae** with the scape somewhat dilated distally but little, if any, flattened, not triangular, ornamented with rather long hair; funicle apparently one and one-half times as long as scape, pedicel comprising one-third of entire funicle, distal segments progressively wider with moderately long hairs; club rather long oval, with the distal end wider, first segment considerably less than half of length, first suture broadly curved, sinuate, second suture similar but more broadly curved.

**Pronotum 1.1** times as long as wide; wider at the middle, with the sides slightly convergent behind, broadly rounded in front; anterior margin weakly serrate (sometimes nearly entire); asperities of anterior area broad and rather low; posterior area with a depression at each side back of summit, not depressed at median line, densely granulate-punctate, punctures deep but of moderate size; pubescence moderate, directed toward summit, longer and more abundant in the posterior lateral depressions. Lateral margin of thorax blunt; ventral surface reticulate, impunctate toward the side, coarsely punctured midway between lateral margin and base of leg.

Elytra slightly wider than thorax; 2.06 times as long as wide; sides subparallel for three-fourths of their length; moderately rounded behind with a prominent sutural apex; striae impressed, rather coarsely and closely punctured; interspaces rugose, closely and more finely punctured; becoming granulate toward the declivity. Declivity convex; with all the interspaces strongly, coarsely granulate; second narrowed toward the apex, third slightly elevated and somewhat more coarsely granulate, ninth slightly elevated posteriorly; sutural apex rather roughly tuberculate, acute, with the sides meeting at an angle of less than 90 degrees. Vestiture longer and more apparent than usual, consisting of short, fine inconspicuous hairs from the strial punctures and much longer, yellow hairs from the interspaces; longer on the declivity.

Fore tibia wide with the sides subparallel; outer edge sharp, entire; terminal hook large, curved at the end; distal end oblique, armed with 4 (possibly 5) teeth.

Male shorter and stouter in proportion; 2.68 mm. long; 3.03 times as long as wide; front of head plano-convex with a smooth, shining area above the epistomal margin as in the female, transversely elevated between the eyes, slightly flattened above, all of front except the smooth, shining area strongly, roughly, deeply and rather coarsely punctured and finely granulate, with fine, slender scanty pubescence, not forming a tuft or brush; antennal scape slightly less expanded, with sparser, shorter hairs; prothorax slightly wider in proportion, 1.07 times as long as wide, strongly serrate on the anterior margin; elytra shorter, with coarser sculpture and longer pubescence.

*M. hirtellus* Lec. was described from a single specimen collected in Southern California by Mr. Hardy, but LeConte's series in the Museum of Comparative Zoology at Cambridge, Mass., comprises eleven specimens all bearing the label "Calif." Of these, I believe, Nos. 1 (type), 3, 5, 7, 9, and 11 to be females and Nos. 2, 4, 6, 8 and 10 to be males, although they are all, with the exception of the type which is unmarked, labeled just the opposite in the collection.

In preparing the description of the female the type was used in so far as possible but for the description of the antennae and fore tibia No. 9 of LeConte's series was used. For the male characteristics specimens No. 2 and 10 were used. I have seen no other specimens of this species than those in the LeConte collection

#### Micracis suturalis Lec.

**Description of Adult Female.** Body form elongate cylindrical, reddish brown; 2.51 mm. long; 2.98 times as long as wide.

Front plano-concave, opaque, punctate granulate above, more finely punctured below, with a small shining depression in the median line just above the epistoma, clothed with hairs which are fine and short below and at center, coarser and longer above and at the sides. Eyes elongate oval, rather coarsely granulate with the inner line entire, moderately widely separated beneath. Antennae (Fig. 6) lighter in color; with the scape flattened and broadly dilated distally, sub-triangular, entire outer surface covered with long light yellow hairs, those from the upper margin being very long and directed mesiad so as to meet in the median line and veil the front of the head; funicle longer than scape, with the pedicel more than half as long as the rest of funicle, distal segments progressively wider and more widened on the upper side, with a few moderately long hairs: club one and three-fourths times as long as wide, subquadrilateral in shape, 1st segment about half the length of club, sutures narrowly curved, first one subangulate.

**Pronotum 1.1** times as long as wide, widest near the middle, with the sides slightly convergent behind, slightly constricted in front of the middle and moderately rounded in front; front margin very weakly serrate; anterior area not

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strongly asperate; entire surface subopaque, reticulate; posterior region granulate-punctate, pubescence nearly uniform but slightly longer in the depression just posterior to the summit. Prothorax with the lateral margins blunt; ventral surface reticulate, with a few punctures only near the lateral border.

Elytra slightly wider than the thorax; nearly two (1.9) times as long as wide; sides subparallel to level of declivity, moderately rounded posteriorly, with an acuminate sutural apex; surface dully shining; striae slightly impressed, strial punctures regular, of moderate size; interspaces slightly rugose, very finely and rather closely, uniserially punctured, becoming granulate-punctate toward the declivity. Declivity convex, with the interspaces distinctly granulate-punctate, more abundantly (not uniserially) than on the disc; third and ninth interspaces more elevated and coarser in sculpture; sutural apex fairly prominent, moderately granulate. Vestiture consisting of very fine, short, appressed hairs arising from the strial punctures and of slightly longer and coarser, more erect ones from the interspaces, slightly longer, coarser and more numerous on the declivity.

Fore tibia (Fig. 18) widest near the distal end, with the sides straight and sub-parallel, outer edge entire; terminal hook rather stout, curved at the end, distal end nearly squarely truncate and armed with five teeth.

**Male** shorter and broader; 2.14 mm. long, 2.7 times as long as wide; frons plano-convex, more roughly sculptured, with coarse hairs; antennae with the scape less dilated and with fewer, shorter hairs, club slightly shorter and broader; prothorax with front margin strongly serrate; elytra 1.7 times as long as wide, more broadly rounded posteriorly, sculpture coarser, hairs of the interspaces distinctly clavate upon and near the declivity.

The above description was prepared from LeConte's series in the Museum of Comparative Zoology at Cambridge, Mass. Specimen Nos. 1 and 2 were used for the description of the female and specimen No. 6 and the type of M. *aculeatus* Lec. for the description of the male.

There are seven specimens in the LeConte series of suturalis. Of these the first three designated as types are all females and were collected by Dr. Shimer in Illinois. Number 4 is also a female and bears the label "Ioa"; numbers 5 and 6 are from Grand Ledge, Michigan, No. 5 being a female and No. 6 a male. No. 7 is a female and the locality is not given. The type of *M. aculeatus* Lec. is from Virginia and is a male of *M. suturalis* Lec.

The writer has also studied four specimens of this species in the collection of J. M. Swaine. This series consists of two females from Allegheny County, Pa., and two males from the District of Columbia.

This species is typical of the subgenus Micracis.

#### Micracis meridianus n. sp.

**Description of Adult Female.** Color reddish brown; 2.43 mm. long; 3.14 times as long as wide.

**Front** of head (Fig. 43) plano-concave, sub-opaque, granulate-punctate above, rather finely punctured below, with a shallow, shining depression in the median line (not so deep or large as in *suturalis*); clothed with moderately fine short hairs. Eyes elongate oval, moderately widely separated beneath with the inner line entire, coarsely granulate. Antennae similar to suturalis, but with the scape slightly more dilated. (Fig. 7).

**Pronotum 1.19** times as long as wide; widest in front of the middle, with the sides slightly convergent behind, the posterior angles rounded, slightly constricted in front of the middle and moderately broadly rounded in front; front margin very weakly serrate; anterior area weakly asperate; surface very feebly shining or sub-opaque, finely but distinctly reticulate; posterior area weakly granulate-punctate; pubescence very fine, short and inconspicuous. The lateral margin is rounded in front, angulate behind; the ventral surface very finely reticulate, with only a few punctures near the anterior border.

Elytra slightly wider than pronotum; 2 times as long as wide; sides subparallel, moderately rounded behind with a rather acute sutural apex; surface feebly shining; striae scarcely impressed, strial punctures moderately fine and close, regular; interspaces very faintly rugose, rather closely, very finely puncttured, becoming finely granulate toward declivity. Declivity convex, not abrupt, with all of the interspaces granulate-punctate; 3d and 9th interspaces very slightly elevated (less so than in *suturalis*); sutural apex fairly prominent, rather acute, with the surface granulate; vestiture as in *suturalis* but slightly coarser and more abundant.

Fore tibia (Fig. 19) of the same general type as in *suturalis* but more slender, distal end not wider, sides straight, subparallel, outer edge entire, terminal mucro rather long and slender, curved toward the end, distal end obliquely truncate, with 5 submarginal teeth.

Male shorter and broader, 2.28 mm. long; 2.85 times as long as wide; front of head plano-convex, slightly depressed at center, more roughly sculptured, with slightly coarser and longer hairs; antennal scape (Fig. 8) less dilated and with fewer and shorter hairs, club shorter and broader; pronotum with anterior margin strongly serrate and anterior area more strongly asperate; pronotal and elytral sculpture coarser; hairs of elytral interspaces clavate, especially on and near the declivity.

This species is very closely allied to M. suturalis Lec. but can be readily distinguished by the finer sculpture, slightly coarser vestiture, smaller and more slender form, by the frontal differences and by others mentioned in the description.

Described from a series of 68 specimens collected at Corinth, Ripley, Wallerville, and Agricultural College, Miss., by the author, during the early months of 1920. The host plant is redbud and all stages were found in the wood of limbs from one-half to three inches in diameter. The identity of the sexes was established by a study of the insects in newly started burrows, the male being always at the entrance while from one to three females were found in the egggalleries.

Types in the author's collection; paratypes in the collection of the Mississippi Agricultural College and in that of the New York State College of Forestry at Syracuse.

#### Micracis populi Swaine n. sp.

Length 2 mm. Of the form of suturalis to which it is evidently closely allied. The head is strongly retracted. In the type Q the front is broadly concave, with the concavity granulate-punctate, and rather distinctly covered with rather stout, yellow hairs. The epistoma bears two dense brushes of longer vellow hairs, which are directed cephalomesad and meet on the middle line completely covering the epistomal margin. The antennal scape in this sex is fringed with denser and longer hairs. In the other sex, the front is nearly flat, slightly concave. strongly granulate, less pubescent, with the epistoma with fewer, shorter hairs and a distinct, smooth median space extending caudad as a short This latter sex was found at the opening of the burrow, and is probably sulcus. the male. The antennae are of the Micracis type with long hairs from the enlarged and peculiar scape. In both sexes the scape is pedunculate at the proximal end and much widened and flattened distally. In the male (?) the scape is widened dorsally into a broad, flattened lobe which bears the long hairs from near the margin of the outer side. In the other sex this lobe is narrower and very elongate, so that the widened portion of the scape is much wider than long; the more numerous and longer hairs arise from the outer face and are sparse except about the edge.

In my specimens of *suturalis* the hairs from the scape are much denser, and in the male the whole outer surface of the flatter portion of the scape is densely hairy and the lobe is quite different in shape.

The pronotum is longer than wide, truncate behind; with the hind angles rounded; the sides parallel on the caudal half, then suddenly but only moderately narrowed, and rounded in front; the sides acutely margined on the caudal half; the cephalic opening strongly oblique and produced over the head so that the front margin of the pronotum viewed from the side is strongly crenate as in *suturalis*; the cephalic half of the pronotum rather strongly tuberculate, the tubercles elongate in the male on the front margin above, elsewhere wide, lunar; in the female these tubercles distinctly smaller and almost obsolete on the front margin, the posterior half sparsely and finely, but distinctly granulate in the male and usually almost smooth, sparsely, finely punctured in the female; the pronotum is sparsely pubescent with short pale hairs.

The elytra are elongate, with the sides parallel as far as the level of the top of the declivity, then rounded and acutely narrowed to the acuminate and serrate tip, which is less produced than in *suturalis*; the striae not impressed on the disc, slightly so near the lateral margin; the strial punctures smaller than in *suturalis*, and closely placed; the interspaces wider and marked by small granules, more or less confused towards the base, on the declivity, and on the sutural interspaces, the granules distinctly larger on the declivity; the interspaces less roughened than in *suturalis*. The elytra are distinctly pubescent with rather short, fine, pale hairs which become distinctly longer and denser on the declivity. This character at once distinguishes this species from any examples of *suturalis* that I have seen. In the male the hairs of the declivity are shorter than in the female but still distinctly longer than elsewhere on the elytra. The fore tibia is very wide with the sides parallel, the apical mucro very large and recurved, and with a transverse row of five, large recurved teeth at the distal margin. The tarsus is slender, with the fourth segment very small.

Taken in shoots of Populus at Ithaca, N.Y.

Type No. 154, Ithaca, N. Y., *Populus*, J. M. S. Coll., a female; 10 paratypes. (Described by J. M. Swaine.)

#### Micracis swainei n. sp.

**Description of the Adult Female.** Reddish brown in color; 2.14 mm. long; 3.15 times as long as wide.

Front plano-concave, sub-opaque, reticulate and finely granulate-punctate above, shining and very finely punctate below, faintly sulcate in the median line below, with fine short hairs directed upward, longer and coarser above, with the epistomal hairs light yellow in color and directed cephalomesad and forming a triangle. Eyes elongate oval, rather coarsely granulate, with the inner margin slightly sinuate, moderately widely separated beneath (somewhat closer than in *suturalis*). Antennae (Fig 10) with the scape flattened and very broadly dilated distally (more so than in *suturalis*) with very long hairs; funicle subequal in length to scape, pedicel more than one-third of total length, distal segments progressively wider but not so wide as in *suturalis* and ornamented with fewer, shorter hairs; club broad oval, 1.3 times as long as wide, first segment less than half the length of club; sutures narrowly curved but more broadly than in *suturalis*, 1st subangulate.

**Pronotum 1.2** times as long as wide; with sides subparallel behind the middle, slightly constricted just in front of the middle, rather narrowly rounded in front; front margin very weakly or not at all serrate; anterior area rather feebly asperate, sub-opaque; posterior area dully shining, rather finely, not sparsely punctate, with fine short pubescence directed toward the summit. Prothorax not sharply margined at the sides (but more sharply than in *suturalis*); ventral surface dully shining, very finely reticulate, with a few fine punctures and hairs in the anterior and posterior lateral angles.

Elytra very slightly wider than the thorax; twice as long as wide; with the sides subparallel to the level of the declivity, moderately rounded behind, with a distinct, though short, acuminate sutural apex; surface dully shining; striae not impressed, strial punctures fine, arranged in definite regular rows; interspaces very slightly rugulose, closely and very finely, uniserially punctured on the disc and sides, becoming punctate-granulate toward the declivity. Declivity fairly steep, convex; finely, densely, granulate-punctate on the interspaces, striae obscure but distinguishable; sutural apex distinct but not strongly developed, more coarsely granulate. Vestiture consisting of short, fine, appressed strial hairs and longer, more erect, but fine hairs from the interspaces, longer and more abundant on the declivity, and longer, finer and more conspicuous than in suturalis.

Fore tibia (Fig. 21) with the sides subparallel, very broad and flat, widest near the base, outer edge entire, terminal hook broad, stout and strongly curved,

distal end nearly squarely truncate with the outer angle somewhat rounded, armed with five teeth.

Male shorter and broader; 2.03 mm. long, 2.9 times as long as wide; frons slightly coarser in sculpture; pronotum 1.1 times as long as wide, widest near the middle with the sides slightly arcuate, and the front more narrowly rounded, anterior margin strongly serrate at the center; elytra shorter, 1.8 times as long as wide, punctures and sculpture coarser, pubescence abraded in the specimens at hand, sutural apex broader and blunter.

While closely allied to M. suturalis Lec. and especially to M. meridianus n. sp., M. swainei can be readily separated by a number of characteristics such as the smaller, more slender form of the body, the difference in shape of the antennal scape, the more broadly oval club, and the more broadly curved sutures, the sharper lateral margin to the thorax, the finer sculpture of both thorax and elytra, the finer, longer and more abundant elytral vestiture, the broader and flatter fore tibia, etc.

Described from a series of 21 specimens obtained by the author from the wood of a small dead willow at Iuka, Miss., April 26, 1920. Types in the author's collection. Paratypes at Mississippi Agricultural College and the New York State College of Forestry at Syracuse.

This species is named in honor of Dr. J. M. Swaine, the well known authority on the *Ipidae*.

#### Micracis opacicollis Lec.

**Description of the Adult Female.** Very dark brown, almost black, 1.8 mm. long, 3.28 times as long as wide.

Front narrow, convex, opaque, granulate-punctate above, with rather sparse, flattened hairs or scales, directed upward; below, depressed at the center, dully shining, very finely punctate, nearly devoid of hairs, epistomal margin with rather long yellow hairs interrupted at the median line. Eyes very elongate oval, coarsely granulate, distinctly emarginate, very narrowly but distinctly separated beneath. Antennae (Fig. 11) with scape dilated and somewhat flattened distally, approaching the triangular, fringed with long hairs; funicle slightly longer than scape, pedicel half as long as the 5 distal segments combined, pedicel and last segment of funicle wider than the others; club oval, one and onethird times as long as wide, first and second sutures narrowly but not angulately curved.

**Pronotum 1.1** times as long as wide with the sides subparallel, slightly convergent behind the middle; moderately narrowly rounded in front; anterior margin with from 4 to 6 small but usually distinct serrations; asperities of anterior area fairly well developed, larger in front; gradually becoming smaller toward summit which is about the middle; surface of thorax opaque in front, sub-opaque behind; posterior area, reticulate, granulate-punctate, with the tops of the granules dully shining; vestiture consisting of short, stout, bristle-like hairs intermixed with scales, all directed toward the summit. Lateral margins of thorax moderately blunt; ventral surface reticulate, sub-opaque, nearly devoid of punctures and pubescence.

Elytra slightly wider than thorax; 2.2 times as long as wide; sides subparallel for three-fourths of length; narrowly rounded behind and drawn out at the suture into a short sutural apex; striae scarcely impressed, strial punctures regular, fine, shallow and rather close; interspaces narrow, rugulose, very finely punctategranulate. Declivity convex, finely granulate-punctate on the interspaces; sutural apex short rather finely granulate. Vestiture consisting of fine, short appressed hairs from the striae and rather numerous, cinereous scales from the interspaces.

Fore tibia (Fig. 22) moderately slender, a little wider toward the distal end; outer edge without serrations; terminal hook rather long, slender and only slightly curved; distal end truncate, slightly oblique and slightly rounded at the outer angle, with 5 teeth the outermost one of which arises from the outer edge well past the outer angle.

Male. Front more coarsely sculptured, with the depression below much less pronounced, sub-opaque, granulate-punctate; antennal scape less dilated, and with fewer and shorter hairs; prothorax with the asperities and serrations somewhat coarser; elytra with the sides converging slightly posteriorly, sutural apex narrower and more abrupt.

The above description was prepared from the type series of *M. opacicollis* Lec. and *M. asperulus* Lec. in the LeConte collection at Cambridge and from numerous specimens in the writer's collection. *M. opacicollis* is represented in LeConte's collection by a single specimen—the type—from Detroit, Michigan. This is apparently a female and is an immature specimen as shown by its color— "Dirty testaceous". The type series of *M. asperulus* consists of 4 specimens, No. 1 being a male and the rest apparently females. All are fully matured in coloration but are evidently otherwise identical with, and should be considered as belonging to, *opacicollis*.

Numerous specimens in my own collection from various localities in Mississippi—Corinth, Ripley, Trimcane Swamp and Natchez—agree in having the serrations on the anterior margin of the thorax never more than four in number, while in the LeConte series the serrations vary from four to six. Otherwise the southern forms are practically identical with the type series although there is, of course, some variation in size and apparent variation in vestiture due to abrasion, etc.

This insect breeds in oak twigs (LeConte 1878), chestnut and witch-hazel (Swaine 1918), and I have taken it in twigs of red oak, white oak, water oak and redbud. The habits will be discussed in a later publication.

This species is typical of the subgenus Pseudomicracis, new subgenus.

#### Micracis nanula Lec.

**Description of the Adult.** Dark brown, slender, 1.63 mm. long, 3.16 times as long as wide.

Front plano-convex, very narrow (*i. e.* eyes close together above); opaque, granulate-punctate above with very fine pubescence, dully shining and smooth below, with a distinct longitudinal carina; sides finely punctate. Eyes very large, very coarsely granulate, elongate oval, contiguous beneath and more narrowly separated above than in any other member of the genus, inner margin slightly

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#### MISSISSIPPI EXPERIMENT STATION

emarginate. Antennae similar to those of *opacicollis*; scape swollen and somewhat flattened distally with moderately long hairs; funicle slightly longer than scape, with pedicel and last distal segments wider than the others, with hairs few in number and rather short; club oval, nearly one and one-third times as long as wide; first suture narrowly curved, second suture similar but broader.

**Pronotum 1.05** times as long as wide, widest just in front of middle, with the sides slightly convergent behind, moderately narrowly rounded in front (more narrowly than in *opacicollis*); anterior margin with four rather strong serrations; asperities on anterior portion fairly numerous and well developed for this genus; posterior area sub-opaque, reticulate, granulate-punctate; pubescence sparse, consisting of recumbent, light-colored hairs. Lateral margin blunt; ventral surface of thorax reticulate, sub-opaque, nearly impunctate.

Elytra as wide (not wider) as thorax, 2.11 times as long as wide; sides subparallel, posterior end narrowly rounded; striae not impressed, punctures moderately fine, shallow; interspaces rugulose, more finely punctured with short pale bristle-like hairs or scales. Declivity convex, with sutural apex not strongly developed but rather more strongly than in *opacicollis*.

Fore tibia lost from type specimen.

The description was prepared from LeConte's type in the Museum of Comparative Zoology at Harvard. The LeConte collection includes but the one (type) specimen, but the Museum has at least one other specimen in the Deitz collection which was studied in confirming some doubtful points. I have seen only the two specimens of this species.

The LeConte (type) specimen is from Haulover, Florida, collected by Hubbard and Schwarz in February, while the Deitz specimen is from Biscayne, Florida, and bears the date "23-5"; no collector is given.

#### TECHNICAL BULLETIN NUMBER NINE

#### THE GENUS THYSANOES LECONTE.

#### History.

The genus *Thysanoes* was described by LeConte (1876) to contain the single new species *T. fimbricornis* Lec. He placed it next to the genus *Micracis* Le-Conte in his Group V. (*Micracides*) of the tribe *Tomicini* of the subfamily *Scolytidae*. The type specimens are from Lancaster County, Pennsylvania and, from twigs of hickory.

Schwarz (1889) mentions T. fibricornis as associated with Leptostylus maculata and Hyperplatys aspersus in the bark of hickory twigs.

Packard (1890) states that "Mr. Harrington of Ottawa has found the beetles issuing from dead trees (hickory) in June". His description following, however, certainly does not apply to *T. fimbricornis* Lec. but was probably intended for *Dorcaschema nigrum* Say which immediately precedes it in his list.

Felt (1906) lists T. fimbricornis Lec. among the hickory borers on the authority of Packard.

Swaine (1909) catalogues T. fimbricornis Lec., giving Pennsylvania as the habitat, and *Hicoria* as the food plant.

Smith (1909) reports this species from "Westville VI, 16 and Clews Landing VI, 9 (N. J.) on hickory and just leaving the wood". He also lists T. quercus Hopkins mss. from the bark of dead oak and chestnut twigs at Eagle Rock, N. J. This species has apparently never been described.

Blatchley & Leng (1916) report T. fimbricornis Lec. from New Jersey, Pennsylvania and District of Columbia, giving the food plant as hickory. They also include in this genus Thysanoes rigidus described by LeConte (1876) as Cryphalus rigidus from Canada and Michigan and T. quercus Hopk. mss. from New Jersey.

Swaine (1918) gives in brief some of the characteristics of T. fimbricornis Lec., cites the habitat as "Pennsylvania, not known from Canada" and the host as "Hickory, in twigs". He also redescribes T. rigidus from the LeConte type series of Cryphalus rigidus and leaves it "Provisionally in Thysanoes".

#### Original Description of Thysanoes LeConte.

LeConte's original description of the genus *Thysanoes* appeared in "The Rhynchophora of America North of Mexico" (1876) page 369. It is given below:

"This genus is allied to *Micracis*; the front tibiae are of the same parallel form, as wide at base as at tip, and not serrate on the outer edge; the antennae are, however, quite different; the scape is fringed as in *Micracis*; the first joint of the funicle is longer than wide; thicker at the extremity; the remaining five joints are very distinctly separated, and become rapidly wider and transverse, by being prolonged at the upper side; they are also fringed with very long hair; the club is elliptical, compressed, rather shining, sparsely hairy, without distinct sensitive surface; without sutures on the inner face, with two indistinct sutures on the outer face, of which the lower one seems straight, and the distal one curved. The eyes are large, transverse, coarsely

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granulated, and not emarginate; they are separated beneath by a wide gular space. The first and second ventral segments are very large, the others short."

The above description was prepared from the single species T. fimbricornis Lec. and naturally does not apply in its entirety to the new species here described. The description of the sutures of the antennal club, however, do not apply to the type species as the second suture on the inner face of the club is strongly developed, but lies rather near the distal end and the first suture is wanting in the center but represented by a rudiment at each side (Fig. 23a).

Blatchley and Leng (1916) give a more general description of the genus which they extend to include *T. rigidus* Lec. and *T. quercus* Hopk. mss. an undescribed form. They, however, make the same misstatement regarding the absence of sutures on the inner face. It would, therefore, seem proper to redescribe the genus taking into account the new forms herein described for the first time.

## Revised Description on the Genus Thysano: S LeConte.

The **body form** is cylindrical varying from moderately slender to slender, with the declivity rather strongly convex and without much modification. The **color** varies from yellowish brown to dark reddish-brown, almost black.

The **head** is not seen from above. The frons in the females is flattened and slightly concave; in the males convex above and transversely impressed below. The antennal scape is club-shaped, slightly flattened on its outer face and is ornamented with long hairs, varying in length and abundance with the species and sex. The funicle is 6-jointed; the pedicel longer than wide; the distal segments rather loosely jointed, progressively widened to a greater or less degree distally and ornamented with hairs varying in abundance and length with the species. The club is flattened, varying in shape from a rather short to a long oval or sub-quadrilateral form with two evident sutures on the outer face, indicated by rows of setigerous punctures and varying with the species; and one complete suture on the inner face near the distal margin.

The pronotum is slightly longer than wide with the sides subparallel behind and the front rounded. The anterior margin is rather weakly or not at all serrate. The anterior portion of the dorsal surface is sparsely to mcderately asperate; the posterior portion fincly punctured. The vestiture consists of hairs or bristles, or both (with true scales in some species) the bristles on the asperate area usually being especially coarse. The lateral margins are rounded anteriorly but more angulate behind. The ventral surface is reticulate, more or less shining with the punctures few in number and confined to the anterior angle or to a narrow area near the lateral margin.

The elytra have the basal margins simple or slightly depressed near the scutellum, are slightly wider than the pronotum, with the sides subparallel and are narrowly to moderately rounded behind. The surface is more or less shining and the sculpture varies from rather fine to moderate. The elytral vestiture consists of fine, short strial hairs and longer coarser bristles from the interspaces; these latter varying in abundance and character with the species but usually being more strongly developed on the declivity. The declivity is more or less strongly granulate but shows no striking structural characteristics.

The first and second visible abdominal sternites are large, subequal and each is at least as long as the last three combined. The front coxae are nearly contiguous with their cavities separated by a very narrow septum. The prosternum in front of the coxae is short and nearly perpendicular.

The fore tibiae are compressed, with the sides subparallel and the outre edge entire. The distal end is obliquely to squarely truncate, with three submarginal teeth and with the inner distal angle prolonged to form a rather long, strongly recurved mucro. The tibiae of the second and third legs are much wider toward the distal end and the outer edge is more or less serrate. The first, second and third tarsal segments are subequal in length, their diameters increasing progressively; the fourth is much smaller but plainly visible, the fifth is nearly equal in length to the others combined.

The genotype is Thysanoes fimbricornis Lec.

## Comparative Notes on the Species of Thysanoes LeConte.

Size and Proportions. The species of the genus *Thysanoes* Lec. as here limited, comprise a very compact group as regards their size and general proportions. The group is characterized by a rather elongated form and includes *T. fimbricornis* Lec., *T. lobdelli* n. sp. and *T. berschemiae* n. sp. The adults of which vary from 1.5 to 1.9 mm. in body length and in proportions from 2.59 to 3 times as long as wide. The variation in length is, however, largely a sexual characteristic as the extremes given represent the sexual variation within the species *T. fimbricornis* Lec. The females of the three species given above vary from 1.71 mm. to 1.9 mm. long and from 2.85 to 3 times as long as wide.

**Color.** The range of color variation within the genus is from a yellowish brown as exemplified by T. fimbricornis Lec. to very dark brown, almost black in the fully mature specimens of the other species. In T. berschemiae n. sp. the summit of the pronotum shows a lighter reddish-brown coloration, and in all of the species the antennae, tarsi and to a less degree the tibiae are lighter in color.

Sculpture. The variation in sculpture within the genus is by no means so marked as in the genus *Micracis*. The extremes are represented by *T. fimbricornis* Lec., which is rather finely punctured throughout with the declivity finely granulate, and *T. lobdelli* n. sp. where the punctures are considerably coarser. *T. berschemiae* n. sp. is intermediate in type but more like *T. fimbricornis* Lec.

**Vestiture.** The character of the vestiture varies but little within the genus. In all species both hairs and bristles are present and the specific differences consist in the relative abundance, coarseness and length of these on the various regions of the body. On the prothorax the coarser bristles are found in the asperate region and in T. *fimbricornis* Lec. they are numerous and coarse enough, partly to conceal the asperities. On the elytra the finer shorter hairs are nearly confined to the striae while the interspaces give rise in all species to longer, more erect and coarser bristles. These are fewer, shorter and much finer anteriorly on the elytra and become progressively longer and coarser posteriorly, being best developed on the declivity in all species. T. *fimbricornis* Lec. offers the extreme example of this within the genus For details regarding the specific differences of the vestiture of the various regions you are referred to the descriptions.

The ventral surface is moderately hairy, the hairs being somewhat longer on the posterior abdominal segments and upon and between the fore coxae. Those on the abdominal segments are longest in T. berschemiae n. sp. where they are slender. In T. fimbricornis Lec., however, the vestiture of the three posterior segments consists largely of clavate bristle-like hairs or scales.

**The Frons.** The front of the head in *Thysanoes* typically has the lower part flattened and slightly concave. The width of the area flattened and the degree of concavity varies with the species. It is more deeply concave in the female of *T. berschemiae* n. sp. and *T. lobdelli* n. sp. than in *T. fimbricornis* Lec. In all of the species the frons is shining below and more or less opaque above. In *T. fimbricornis* Lec. there is a distinct pit or fovea at the center between the eyes, this being replaced in *T. berschemiae* n. sp. by a distinct longitudinal sulcus bisecting the ventral shining area. In *T. lobdelli* n. sp. (Fig. 44) no such definite depression is present, but the upper portion of the concavity is divided by a narrow, distinctly elevated carina. The vestiture of the upper portion of the frons is bristle-like in *T. fimbricornis* Lec. and in the other species consists of more or less fine hairs. In *T. lobdelli* n. sp. a lock of longer hairs extends downward over the edge of the concavity.

The above comparison applies only to the females of the species discussed. In the males the front of the head is less flattened—usually being transversely depressed and shining below, and convex or plano-convex and granulate above. The specific differences are included in the descriptions.

**The Eyes.** In this genus the eyes are always rather broadly oval, being wider above than below. They are rather coarsely granulate in T. fimbricornis Lec., moderately granulate in T. berschemiae n. sp., and finer in the other species. The inner margin is entire, the nearest approach to an emargination being found in T. fimbricornis Lec. where the inner line is distinctly sinuate

The Antennae. While the antennae show distinct specific differences in this genus, they by no means show such extreme differences as between the species of Micracis. The scape is always club-shaped and of rather clumsy form. The outer face is somewhat flattened but never distinctly so. The upper distal angle is more or less swollen but never extremely dilated as in some species of Micracis. The scape is ornamented with long hairs which vary in length and number with the species. The funicle has six segments distinctly separated and giving the impression of being loosely joined together. The first segment or pedicel is longer than wide. The five remaining segments are progressively wider distally but vary with the species in the degree to which they are widened. In T. fimbricornis Lec. (Fig. 23) this is carried to the extreme, the last funicular segment being nearly as wide as the base of the club. In this species and also in T. lobdelli n. sp. (Fig. 25) the funicular segments are widened more on the upper than on the lower side, while in T. berschemiae n. sp. (Fig. 26) the widening is nearly equal on the two sides. The funicular segments, especially the more distal ones, are ornamented with more or less long hairs which vary in number and length with the species-the females of T. fimbricornis Lec. showing the extreme in this characteristic.

The antennal club is flattened and varies in outline from a rather short oval as in T. berschemiae n. sp. to a longer, subquadrilateral oval as in T. fimbricornis

Lec. In all of the species it is shorter than either the scape or the funicle. The sutures are not septate but are indicated by rows of setigerous punctures. On the outer face of the club two sutures are thus indicated by usually multiple rows of punctures while a few more or less irregularly arranged setae near the distal end probably represent a rudimentary third suture.

The relative size of the segments of the club varies considerably within the genus and is of some value in determining the subdivisions of the genus as will be seen by consulting the key. The shape of the sutures is also of considerable taxonomic value. In all of the species the first suture is more or less broadly curved, or broadly curved at the center and sinuate at the sides. The second suture varies more with the species and is of more value. In *T. berschemiae* n. sp. the two sutures are subparallel, while in *T. lobelli* n. sp. and *T. fimbricornis* Lec. the second suture is more narrowly curved. There is but one complete suture on the inner or posterior face of the antennal club (Fig. 23a). This is near the distal margin and is subparallel to it. It is the second suture, the first being incomplete at the center for about three-fourths of its course and represented only by a small rudiment at each side near the base. There is enough present, however, to indicate that it would represent considerably more than a semicircle and would lie subparallel to the second suture.

The Pronotum. In the species of the genus *Thysanoes* the pronotum is always slightly longer than wide in the females, widest near the middle, with the sides subparallel behind. The three species differ in the curvature of the anterior outline as noted in the description of species. The summit is only slightly higher than the dorsal surface posterior to it which is horizontal in position.

The Prosternum. The prosternum is short both in front and behind the fairly large, entirely enclosed coxal cavities. The anterior narrow strip is nearly perpendicular and ornamented with a few rather long hairs. The coxae are nearly contiguous, their cavities being separated by a narrow strip of chitin, difficult to distinguish in dried specimens but readily seen in dissected ones. There is little appreciable difference in any of these characters in the genus.

**The Elytra.** The elytra of the three species of *Thysanoes* vary but little in general proportions. In the females of *T. lobdelli* n. sp. and *T. berschemiae* n. sp. they are 1.8 times as long as wide while in *T. fimbricornis* Lec. the elytra are 1.95 times as long as wide. In all species they are slightly wider than the thorax with the sides subparallel to the origin of the declivity. The curvature of the posterior outline is moderate in all of the species but is slightly broader in *T. lobdelli* n. sp. than in the others and slightly narrower in *T. fimbricornis* Lec. than in *T. berschemiae* n. sp. The elytra of the males are usually considerably shorter and always proportionately broader than those of the females.

The Abdominal Sternites. The first two visible abdominal segments are convex and somewhat swollen, subequal in length and each as long or longer than the last three combined. There are but small specific differences shown in the genus and these are likely to be variable, due to unequal drying of different specimens, and are of little taxonomic value.

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The Anterior Tibiae. The anterior tibiae have the sides subparallel, little or not at all widened distally, the outer edge entire, with a rather long, broad, flattened and recurved terminal mucro arising from the inner distal angle, and with the outer half of the distal end truncate and armed with three submarginal teeth. The fore tibiae are very similar in general characters and the most consistent specific differences have to do with the degree of obliquity of the distal end and the character of the outer distal angle. In *T. fimbricornis* Lec. (Fig. 27) the outer part of the distal end is nearly squarely truncate and the outer distal angle prominent, while in *T. lobdelli* n. sp. (Fig. 28), and *T. berschemiae* n. sp. (Fig. 29), the truncation is more oblique and the angle somewhat rounded.

Summary. The genus *Thysanoes*, as here limited, is a very compact group and the three species included are quite closely related. However, they are readily separated not only by comparative data regarding the sculpture, vestitures, color, and body proportions, but also by differences in the structure of such important elements as the frons, the antennae and the fore tibiae which are certainly of specific value.

Secondary Sexual Characters. The secondary sexual differences in the various species of the genus *Thysanoes* are fairly uniform. The males are always stouter than the females and are usually shorter with the pronotum as broad or broader than long. The front of the head is not so distinctly flattened and excavated as in the females, but is usually transversely depressed below and distinctly convex and granulate-punctate above. The antennae are usually shorter and the club more rounded in outline. The sculpture of both prothorax and elytra is coarser. In a series containing both sexes the males can be readily distinguished by the shorter broader form and the more convex frons.

## Key to the Species of Thysanoes.

A. Mature color yellowish brown; elytral vestiture more abundant and longer, punctures finer; eyes coarsely granulate; front of head with a small pit or fovea at the center; club of antenna narrower, first segment more than one-fourth of the length of the club.

- **AA.** Mature color dark brown to black; elytral vestiture shorter, punctures coarser; eyes more finely granulate; front of head without fovea; club of antenna broader, first segment less than one-fourth of the length of the club.
  - **B.** Front of head in female longitudinally carinate and punctate above; summit of pronotum much lighter in color, asperities stronger and more numerous; fore tibia with the distal end only slightly oblique and the outer angle fairly prominent.

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**BB.** Front of head in female longitudinally sulcate below, granulatepunctate above; summit of pronotum little if any lighter in color, asperities weaker and less numerous; fore tibia with the distal end more oblique and the outer angle rounded.

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# Thysanoes fimbricornis Lec.

**Description of the Adult Female.** Yellowish brown; 1.7 to 1.9 mm. long (Type 1.89 mm.); 3 times as long as wide.

Front of head with a wide rather shallow concavity below, extending nearly from type to eye, with a small pit at the center, concavity shining below, subopaque above; upper part of the front convex, subopaque, granulate-punctate, with short, stout, appressed hairs or bristles. Eyes rather broadly oval, wider above, narrower below, coarsely granulate with the inner margin scarcely sinuate. Antennae (Fig. 23) with the scape club-shaped, slightly flattened, ornamented with numerous long light-yellow hairs which extend cephalad and dorsad; funicle 6-jointed, the joints loosely united, ornamented with long hairs and much wider distally, more widened on the upper side than on the ventral, the last segment nearly as wide as the club; club flattened, subangulate at the base, with the sides subparallel, sinuate and the free end rounded, 1st suture broadly rounded, second more narrowly rounded.

**Pronotum** widest near the middle; 1.13 times as long as wide; with the sides sub-parallel behind; rather narrowly rounded in front; anterior margin weakly serrate; anterior area rather sparsely asperate; posterior area weakly reticulate, feebly shining, with the disc and sides finely punctured, sparsely behind, more densely near the center just posterior to the summit; with a slightly elevated, median, impunctate line; vestiture consisting of fine, short, appressed hairs interspersed with more erect, clavate ones, the latter especially in the asperate region. Sides rounded, without side margins; ventral surface reticulate, moderately shining, with a few moderate punctures in the anterior angle.

Elytra slightly wider than the thorax; 1.95 times as long as wide; with the sides subparallel for three-fourths of their length; rather narrowly rounded behind; striae not impressed; strial punctures moderately fine and close, in definite rows; interspaces with fewer, finer, punctures, weakly rugulose near base and near declivity. Declivity regularly and strongly convex; striae punctured as on the disc; interspaces finely granulate-punctate. The elytral vestiture consisting of fine, short, appressed yellow hairs from the strial punctures, which are similar throughout; and thicker, sub-erect, longer bristles which are rather short and not much thickened distally on the anterior part of the elytra, but which become progressively longer and more clavate posteriorly and especially on the declivity.

Fore tibia (Fig. 27) with the sides sub-parallel and nearly straight, very slightly narrowed distally, outer edge entirely devoid of serrations, terminal mucro large, flattened and strongly recurved, distal end nearly squarely truncate, with the outer distal angle prominent, and with three rather large submarginal teeth; ornamented with hairs, with a few scale intermixed on the outer edge.

The males are shorter and broader; 1.5 mm. long; 2.6 times as long as wide; frons slightly flattened and concave below, granulate above, more pubescent and less shining; scape and club of antennae shorter and stouter (Fig. 24); pronotum slightly wider than long (1.05 times); widest just behind the middle; arcuate at the sides behind, constricted in front of middle, moderately rounded in front; anterior margin rather weakly serrate but more strongly than in the female; elytra shorter and stouter than in the female; more broadly rounded behind; sculpture and vestiture somewhat better developed.

In preparing the above description LeConte's type series consisting of 10 specimens was studied and most of the description taken from them, but these were supplemented by my own series consisting of 79 specimens and by balsam mounts of the antennae and legs. LeConte's type series are all from Pennsylvania and all but Nos. 2, 3, 4 and 5, are labelled from hickory. My own specimens were collected by myself at Iuka, Corinth and Trimcane Swamp, Miss., from hickory and red oak. The dates of collection are March 29, April 25, 26, and May 19 and 23, 1920. In LeConte's series specimens 1, 5, 7, 9, and 10 are females, the others males.

## Thysanoes lobdelli n. sp

**Description of the Adult Female.** Dark reddish-brown, almost black in color; 1.78 mm. long; 2.89 times as long as wide.

Front of the head widely and rather shallowly concave (Fig. 44), bordered by a rather definite raised margin, shining below on a nearly square area of which the epistomal margin forms the lower angle, sides and upper portion of the concavity feebly shining, finely punctured, with fine pubescence directed dorsad; upper half of concavity divided by a narrow but distinct carina extending dorsally from the upper angle of the shining, square area; frons above concavity more densely punctured, with more numerous, longer and coarser, light yellow hairs directed downward and towards the center. **Eyes** rather broadly oval, wider above, narrower below, moderately finely granulate (more finely than in T. fimbricornis Lec.), with the inner margin entire. Antennal scape (Fig. 25) longer than any of the other divisions, club-shaped, with the outer surface scarcely flattened and ornamented with long hairs (shorter and fewer in number than in fimbricornis); funicle similar to that in fimbricornis, not so hairy; club oval, considerably longer than wide, sutures broadly curved; first segment less than one-fourth of length of club.

**Pronotum** slightly wider near the middle; 1.09 times as long as wide; with the sides sub-parallel behind, very slightly constricted in front of the middle and moderately broadly rounded in front; anterior margin scarcely serrate; anterior area rather sparsely asperate; posterior area reticulate, feebly shining; finely and rather uniformly punctured on the disc and sides, except on a small oval area at each side just back of the summit, with no impunctate median longitudinal line; vestiture rather scanty, consisting of fine appressed hairs, intermixed with a few short bristles on the disc and sides, bristles finer, shorter and sparser in the asperate region than in *fimbricornis*. Side margins of pronotum subacute behind, rounded anteriorly, ventral surface reticulate, moderately shining, impunctate except in the anterior angle.

Elytra slightly wider than pronotum; 1.8 times as long as wide; with the sides sub-parallel for three-fourths of their length; moderately rounded behind;

striae scarcely impressed, strial punctures of moderate size (coarser than in *fimbricornis*) and rather closely placed; interspaces narrow, rugulose near base and declivity, with fine punctures rather sparsely placed. **Declivity** strongly convex; the striae more finely punctured than on the disc; all of the interspaces granulate-punctate. The vestiture consists of very fine short, yellowish, strial hairs and thicker, rather short bristles, larger and much more plentiful on the declivity.

Fore tibia (Fig. 28) with the sides straight and sub-parallel, slightly narrowed distally; outer edge entire; terminal mucro large, flattened, rather strongly recurved; distal end truncate, very slightly oblique, with rather large, sub-marginal teeth; outer angle fairly prominent, slightly rounded; ornamented with hairs, with a few scales on the outer edge.

The males are slightly broader proportionately than the females; 2.7 times as long as wide; usually shorter but varying from 1.54 mm. to 1.82 mm. in length; frons with the concavity less marked, confined to the region between the eyes, with the shining area below not definitely outlined; rather coarsely granulate above and at the sides, with fairly numerous, rather coarse, short bristles directed upwards; without longitudinal carina; antennal club broader than in the female; prothorax wider, asperities slightly coarser; elytral sculpture slightly coarser.

This species is rather closely allied to *Thysanoes fimbricornis* Lec. but can readily be distinguished from it by the much darker color, the slightly wider form, the shorter and less abundant vestiture, the finer granulation of the eyes, the coarser elytral punctures, and by the frontal characteristics given in the descriptions.

Described from a series of 70 specimens collected by the author at Vicksburg and Trimcane Swamp, Miss., March 5, 27, 29, 30, April 24, and May 19 1920. The beetles were obtained from the smaller limbs and twigs of water oak, red oak, white oak and red maple. In red maple it was associated with Lymanter decipiens Lec., in red oak with Micracis opacicollis Lec. and Thysanoes fimbricornis Lec.; and in white oak with M. opacicollis Lec., Stephanoderes decipiens Lin. and Stephanoderes sp. Additional biological notes will appear in a later paper. The species is named in honor of Professor R. N. Lobdell, Agricultural College, Mississippi.

## Thysanoes berschemiae n. sp.

Description of the Adult Female. Very dark reddish brown, almost black except the summit of the pronotum which is lighter; 1.71 mm. long; 2.85 times as long as wide.

The front of the head is flattened and shallowly concave, with a small diamond shaped shining area below, with a short but distinct longitudinal sulcus just above the epistomal margin; upper part of the concavity distinctly granulate-punctate, with a moderate number of short, fine, appressed and upwardly directed hairs; reticulate-aciculate and sparsely punctured above the concavity. The eyes are broadly oval, wider above than below, moderately granulate, with the inner margin entire. The antennal scape is club-shaped (Fig. 26), slightly

flattened on the outer surface, with a few moderately long hairs; the funicle is slightly shorter than the scape, with the pedicel equal in length to the next three segments combined, the distal segments wider, not unequally widened on the two sides, ornamented with a few rather short hairs; the club is flattened, 1.4 times as long as wide, considerably wider at the base than the last funicular segment, with the sutures sinuate and broadly curved at the center.

The pronotum is widest behind the middle; 1.1 times as long as wide; with the sides sub-parallel behind, slightly constricted just in front of the middle; broadly rounded in front; anterior margin without serrations; asperities of the anterior area, sparse, low and rather broad; summit lighter in color, yellowish brown to light reddish brown; posterior area feebly shining, reticulate with fine punctures, quite numerous just back of the summit, moderately numerous farther back and on the sides; vestiture consisting of fine short hairs behind and at the sides, stouter ones in the region just behind the summit, and coarse bristles from the asperate area. The side margins are rounded, becoming slightly more angulate behind; the ventral surface is reticulate, shining, punctured in the anterior angle and near the lateral margin.

The elytra are wider than the thorax; 1.8 times as long as wide; with the sides subparallel to the level of the declivity; moderately rounded behind with the surface rather feebly shining; first and second striae slightly impressed; strial punctures intermediate in size between those of *fimbricornis* and *lobdelli*, fairly closely placed; interspaces slightly rugulose especially near the base, the first two punctured as closely as the striae, the others more sparsely, punctures finer than in striae. The declivity is strongly convex, with the striae more finely punctured than on the disc and the interspaces strongly granulate-punctate. The vestiture consists of fine, short, appressed, cinereous hairs, from the strial punctures; and longer sub-erect clavate bristles from the interspaces, the latter being more numerous on the declivity and on the first and second interspaces.

The fore tibiae (Fig. 29) have the sides nearly straight and sub-parallel, very slightly narrowed distally, with the outer edge entire; the terminal mucro is large, somewhat flattened and strongly recurved; the distal end is obliquely truncate, with three large submarginal teeth; the outer angle is distinctly rounded; the vestiture consists of hairs.

The **males** are shorter and broader; 1.55 mm. long; 2.59 times as long as wide; the front of the head is convex, transversely excavated, bare and feebly shining just above the epistoma, strongly convex and rather coarsely granulate above with a few short, fairly coarse hairs directed upward; the prothorax is nearly exactly as broad as long, with the front margin weakly serrate and the asperities stronger; the elytra are shorter and broader, 1.69 times as long as wide, the sculpture and vestiture being similar.

This species is readily distinguished from the others by the characters given but is closely allied to both T. *fimbricornis* Lec. and T. *lobdelli* n. sp. being intermediate in some characteristics.

Described from a series of 44 specimens taken by the author from the wood of "supple-jack" *Berschemia scandans* at Vicksburg, Durant and Agricultural College, Miss., February 20, March 1, and 6, and April 10, 1920.

## THE GENUS PSEUDOTHYSANOES-NEW GENUS.

The **body** form is cylindrical, moderately stout, with the declivity of the elytra convex and the ends conjointly rounded behind. The color is a very dark brown, nearly black, with the vestiture consisting of light colored hairs and clavate bristles.

The **head** is not visible from above, with the frons varying from planoconvex to plano-concave. The **antennal** scape is clavate or slightly flattened and dilated and is ornamented with a moderate number of rather long fimbriated hairs. The funicle is 6-jointed, with the distal segments widened. The club is flattened, oval, with the first suture broadly curved, the second one variable with the species and with the third, when visible, parallel to and very near to the distal margin. The **eyes** are finely granulate, broadly oval in outline and with the inner margin entire.

The **pronotum** is slightly wider than long with the outline sub-triangular or sub-semicircular. The anterior margin is weakly to strongly serrate in the males and the anterior area more or less strongly asperate in both sexes. The summit is high with the posterior area sloping from it and distinctly punctate or granulate-punctate.

The elytra are slightly wider than the thorax, with the sides sub-parallel as far as the level of the declivity, and narrowly to broadly rounded behind. The striae are slightly impressed, moderately to coarsely punctured with fine, short appressed hairs. The interspaces are punctate or granulate-punctate with longer, rather coarse, conspicuous, clavate bristles. The declivity is convex with coarser granules but without especial modification.

The fore tibiae are slender, with the sides sub-parallel, with the terminal hook strongly developed and often having the end bifurcated. The distal end has 2 or 3 sub-marginal teeth. The first and second visible abdominal segments are subequal in length and each is as long as the last three combined.

This genus has been erected to include the form originally described by LeConte (1876) as Cryphalus rigidus and two new, closely related species described for the first time in this paper. Cryphalus rigidus Lec. was later placed in the genus Thysanoes by Blatchley and Leng (1916), and was left provisionally in that genus by Swaine (1916). However, it shows considerable divergence in several important structural characteristics from Thysanoes fimbricornis Lec. the genotype and from the two other species of this genus described in this article, -T. berschemiae n. sp. and T. lobdelli n. sp. These differences are brought out in the descriptions and keys and need not be repeated here. As only the male of Pseudolhysanoes rigidus Lec. is known, P. drakei n. sp. is designated as the geno-type.

## Key to the Species of Pseudothysanoes

A. Body form stouter, little more than twice as long as wide in the males; antennal club with 1st suture broadly curved, 2d narrowly curved or sub-angulate; pronotum of males with outline sub-triangular, anterior margin with 4 or 5 sharp serrations.

- B. Pronotum with anterior area sparsely asperate; posterior area closely and rather coarsely punctured; elytral declivity of males more oblique with the summit near the middle of elytra; elytral striae more coarsely and closely punctured....rigidus Lec.—Page....47
- **BB.** Pronotum with anterior area more strongly asperate, posterior area finely granulate-punctate; elytral declivity of males more convex, with the summit behind the middle of elytra; elytral striae less coarsely and closely punctured......drakei n. sp.—Page....48

Pseudothysanoes rigidus Lec.

**Description of the Adult.** Very dark brown, nearly black except the summit of the pronotum which is reddish brown; 1.4 mm. long; 2.13 times as long as wide.

Front of the head flattened, excavated and shining at the center just above the epistomal margin; opaque, granulate-punctate and with short, fine pubescence above and at the sides. Eyes small, short oval, inner margin entire, rather finely granulate. Antennal scape club-shaped, not greatly dilated, with fairly long hairs; funicle and scape sub-equal in length; club rather large, 1st suture rather broadly curved, 2nd sub-angulate.

**Pronotum** slightly wider than long (20:19); sub-triangular in form; widest near the posterior border, broadly rounded behind, constricted before the middle, narrowly rounded in front; anterior margin with 4 or 5 small sharp serrations; asperities of the anterior area small, sharp, not numerous; summit high, reddish brown; posterior area of pronotum closely, roughly and rather coarsely punctured; pubescence consisting of rather short, thick, light colored bristles, directed toward the summit.

Elytra a little wider than the thorax; 1.36 times as long as wide; broadly rounded behind; striae impressed, rather coarsely, closely punctured; interspaces rugulose, granulate-punctate especially toward the declivity, punctures sparser and finer. Declivity convex, oblique, with the summit near the middle of the elytra. Vestiture consisting of fine, short strial hairs and longer, coarser, clavate bristles from the interspaces.

Fore tibia slender, but little wider distally; outer margin sharp, entire; terminal hook rather long, slender; distal end obliquely truncate, with apparently three sub-marginal teeth.

The foregoing description was prepared from the LeConte series of Cryphalus rigidus Lec., consisting of three specimens designated as types from Canada. There was formerly another specimen, not designated as type, from Detroit, Mich., but at the time the series was examined this had been lost from the pin and was not found in the box. The specimens in the type series are all of this species seen by the writer. No sexual differences were noted and from comparison with other species of the genus it is believed that the forms studied and here described are males.

# Pseudothysanoes drakei n. sp.

**Description of the Adult Male.** Black or very dark reddish brown with the summit of the pronotum sometimes lighter; 1.38 mm. long; 2.18 times as long as wide.

Front of the head flattened, shining below; and slightly excavated at the center, distinctly punctured; sides and upper portions sub-opaque, strongly granulate-punctate, with rather numerous, coarse, cinereous hairs of moderate length, directed upwards. Eyes moderately small, short oval, rather finely granulate, with the inner margin entire. Antennal scape (Fig. 35) club-shaped, not dilated, with fairly numerous, moderately long hairs; funicle slightly longer, pedicel half as long as the five distal segments combined, distal segments progressively widened especially on the upper side; club flattened, oval in outline; first suture broadly, second more narrowly curved, third suture near distal margin and parallel to it.

**Pronotum 1.1** times as wide as long; widest posteriorly, with the outline sub-triangular; anterior margin smooth except near the median line where there are four rather distinct but small serrations; asperities of the anterior region moderately numerous and fairly well-developed; summit high, sometimes lighter in color, sometimes concolorous with the rest of the pronotum; posterior area and sides obliquely descending, dully shining, finely reticulate, finely but distinctly granulate-punctate; vestiture consisting of short, fine hairs and longer, coarser cinereous bristles. Side margins rounded; ventral surface opaque, finely reticulate, impunctate or nearly so.

Elytra wider than the thorax; 1.36 times as long as wide; with the sides subparallel to beyond the level of the declivity; broadly rounded behind; striae slightly impressed, with punctures of moderate size, closely arranged anteriorly, more sparsely posteriorly; interspaces distinctly granulate, with fine punctures rather more numerous than on the striae. **Declivity** convex, originating well behind the middle of elytra, with the strial punctures finer and all of the interspaces strongly granulate. Elytral vestiture consisting of very fine short strial hairs, with longer, coarser, strongly clavate bristles from the interspaces, the latter being longer posteriorly and especially upon the declivity.

Fore tibia slender (Fig. 36), narrower toward the distal end, outer margin not serrate; terminal mucro very broad with the base occupying three-fourths of the distal end, distinctly bifurcated at the end and the ends strongly recurved; with two small sub-marginal teeth.

Female larger, 1.51 mm. long; 2.52 times as long as wide; with the pronotum slightly longer in proportion and not sub-triangular; anterior outline not so narrowly rounded; anterior margin devoid of serrations; asperities not so strongly developed; vestiture of the elytra slightly finer.

Described from a series of 59 specimens collected from the bark of basswood at Syracuse, N. Y., Oct. 6, 1920, by Prof. C. J. Drake and the writer. The species is named in honor of Professor Drake.

# Pseudothysanoes lecontei n. sp.

**Description of the Adult Male.** Very dark brown, almost black; 1.25 mm. long; 2.51 times as long as wide.

**Front** of the head plano-convex, feebly shining, moderately coarsely punctured, apparently granulate-punctate above, with short, fine, cinereous pubescence, longer above and at the sides. **Eyes** broadly oval, inner margin entire, rather finely granulate. **Antennal** scape somewhat dilated and flattened toward the distal end, with a moderate number of rather long hairs; funicle longer than scape with the pedicel nearly equal in length to the distal segments combined; club longer than funicle, elongate oval, about one and two-thirds times as long as wide; 1st suture broadly curved, 2nd nearly straight.

**Pronotum 1.17** times as wide as long; widest in the posterior third, with the lateral angles rounded behind; sides arcuate, broadly rounded in front; the sides and front forming a little more than a semicircle; anterior margin scarcely serrate; asperities of the anterior area fairly numerous, small and partly obscured by the large clavate bristles of this region; summit high, at the center; posterior area sloping rather sharply from the summit, with rather coarse rough punctures; vestiture of posterior area finer, all directed toward the summit.

**Elytra** very slightly wider than the thorax; 1.91 times as long as wide; sides sub-parallel, slightly arcuate for two-thirds of their length; narrowly rounded behind; striae very slightly impressed, rather coarsely, closely and roughly punctured; interspaces of nearly equal width, finely punctured, granulatepunctate toward the declivity. **Declivity** rather strongly convex, with the summit well behind the middle of the elytra; 1st, 3rd and 9th interspaces more strongly granulate and slightly elevated, the 3rd with double row of clavate bristles. Vestiture consisting of fine, appressed, strial hairs and much coarser, sub-erect, clavate bristles from the interspaces.

Fore tibia slender, but little wider toward the distal end; outer margin entire; with a strong terminal mucro, quite wide toward the free end, curved and in some of the type series apparently bifurcated at the end; distal end very obliquely truncate, with three sub-marginal teeth.

**Females** larger; 1.43 mm. long; 2.56 times as long as wide; with front of head not so hairy; antennal scape more widened distally and with longer more numerous hairs; pronotum and elytra similar but with finer sculpture.

Described from a series of 6 specimens in the LeConte collection, labeled *Thysanoes* n. sp. All bear labels reading "D. C." and the first of the series, No. 128 is labeled "Oak twigs". Nos. 128, 129, 132, and 134 are believed to be males, while Nos. 130 and 131 are females. The description of the male was

prepared from No. 128 and of the female from No. 131. The Blanchard collection at Harvard also contains 6 specimens of this species with identical locality labels. These are incorrectly identified as *Thysanoes fimbricornis* Lec. on the authority of Ulke. It is likely that both of the series were collected by Ulke near Washington, D. C.

It is possible that the species here described is the same as *Thysanoes quercus* Hopk. mss. listed by Smith as infesting the bark of dead oak and chestnut trees. However, description of this manuscript species has not as yet appeared and none of its characteristics are known to the writer, so that it is impossible to connect it with any of the species herein treated.

## THE GENUS CRYPTOCLEPTES-NEW GENUS.

The **body** form is cylindrical, the female slender, the male stouter, the head sub-globose and concealed from above. The front of the head is flattened and concave below. The eyes are rather small with the inner margin entire. The **antenna** (Fig. 30) has the scape clavate, ornamented with long hairs; the funicle is 6-jointed, with the pedicel longer than broad and wider than any of the other segments; the club is small, flattened, broadest near the base, subtriangular in form with the outer surface shining, but with a few setae not arranged to form definite sutural lines.

The **pronotum** is slightly wider than long, the sides arcuate, asperate in front, with the summit high, the surface posterior to it sloping and the lateral margins rounded. The prosternum is short in front of the coxae, perpendicular, and the coxal cavities are separated by a narrow septum.

The elytra are slightly depressed at the base, the sides are sub-parallel, the surface shining, rather weakly sculptured, the declivity convex, sloping and without special modifications.

The first and second visible abdominal sternites are subequal, the second slightly longer and as long as the last three combined.

The anterior tibia (Fig. 31) have the sides sub-parallel, the outer edge entire, the outer half of the distal end very obliquely truncate and with 3 sub-marginal teeth, the inner half of the distal end prolonged to form a rather stout, long, strongly recurved, terminal mucro.

The type of the genus is Cryptocleptes dislocatus n. sp., described below.

# Cryptocleptes dislocatus n. sp.

**Description of the Adult Female.** Yellowish brown to nearly black in color, with the summit of the pronotum lighter; 1.3 mm. long; 2.84 times as long as wide.

The front of the head is flattened below, concave and shining, with a pit or fovea at the center on a level with the upper inner angle of the eye; the epistomal margin is prolonged into a triangular process; the upper part of the front is convex, sub-opaque, aciculate, rather roughly and deeply but not coarsely punctured, with very fine short hairs. The eyes are rather small, oval, rather finely granulate, with the inner margin entire. The antennae (Fig. 30), are lighter in color; the scape is clavate, ornamented with a moderate number of long hairs; the funicle is 6-jointed, the pedicel cup-shaped, longer than wide and as long as the next three segments combined, the three distal segments are progressively widened but none are so wide as the pedicel; the club is small, considerably shorter than either scape or funicle, flattened, widest near the base, sub-triangular, with the outer face shining, with a few setae not arranged in regular sutural lines, inner face smooth and shining.

The pronotum is 1.06 times as wide as long; widest near the middle, with the sides arcuate behind, slightly constricted in front of the middle, rather broadly

rounded in front; front margin not serrate; asperities small, confined to a small area just in front of the middle and lacking at the sides and for some distance back from the front margin; the summit is high and lighter in color; the posterior area is sloping, very finely, not densely punctured, with fine, short cinereous pubescence directed toward the summit; the region in front of asperate area is more coarsely punctured and slightly granulate, with similar, but longer pubescence; pubescence on the asperate area consisting of short, coarse, clavate bristles.

The elytra are very slightly narrower than the pronotum; 1.9 times as long as wide; with the sides sub-parallel for two-thirds of their length; narrowly rounded behind; depressed near the base; the surface is shining; the striae are indicated by regular rows of moderately fine punctures; the interspaces are very slightly rugulose, with finer punctures, sparse on the disc except in the sutural interspace. The declivity is convex, moderately sloping, the summit at about two-thirds of the distance from base to apex; the striae are punctured as on the disc; the interspaces are granulate-punctate with the punctures numerous. The elytral vestiture consists of very fine, short, appressed hairs from the strial punctures, and coarser, more erect, clavate bristles from the interspaces. the latter being more numerous on the declivity and in the first interspace.

The fore tibia (Fig. 31) has the sides sub-parallel; the outer edge entire: with a strong, rather long, strongly recurved terminal mucro arising from the inner distal angle; and with the distal end very obliquely truncate and armed with three submarginal teeth.

The **males** have a shorter and stouter body form; 1.1 mm. long; 2.45 times as long as wide; the color is usually lighter; the front margin of the pronotum is serrate and the asperities better developed and extending to the front margin; the summit of the elytral declivity is just back of the middle of the elytra.

The above species is described from a series of 129 specimens all taken from the bark of hickory and pecan limbs and twigs by the writer. They were all collected in Mississippi at the places and dates given: Agricultural College, Jan. 9, 21, 22, April 10, 1920; Electric Mills, Nov. 12, 13, 1919; Durant, March I, 1920; Maxie, Dec. 24, 1919, May 23, 1920; Natchez, March 16, 1920; Fort Adams, Dec. 30, 1919. It is a very common form in the small broken limbs and twigs of all species of the genus *Hicoria*.

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## THE GENUS ERINEOSINUS-NEW GENUS.

The **body** is cylindrical, rather stout, the head sub-globose, and concealed from above when retracted. The front of the head is flattened; the **eyes** are of moderate size with inner margin entire. The **antennae** are lighter in color, with the scape clavate and ornamented with a very few long hairs; the funicle 4 or 5jointed, with the pedicel longer than the distal segments combined and twice as wide as any of them; the club is large, flattened, oval with surface shining, ornamented with a few setae which are not arranged to form definite sutural lines on either the outer or inner face.

The **pronotum** is slightly wider than long; widest posteriorly, with the sides arcuate; the anterior margin is weakly or not at all serrate; the anterior area is granulate or weakly asperate; the disc is evenly and rather weakly convex; the surface is finely, but densely granulate and ornamented with hairs and scales; the side margin is rounded.

The elytra are wider than the thorax; the base is elevated and toothed; the sides are sub-parallel, moderately narrowly rounded behind; the surface is sub-opaque; the striae are impressed, with very coarse, closely placed punctures; the interspaces are very narrow and ornamented with scales; the declivity is convex and moderately steep.

The first, second, and fifth visible abdominal sternites are sub-equal and each is as long as the third and fourth combined. The anterior tibiae are but little widened distally, with the outer edge entire, the distal end very obliquely truncate and armed with two sub-marginal teeth, and with a long, rather slender, slightly recurved terminal mucro.

The genotype is Erineosinus squamosus n. sp. described herewith.

## Erineosinus squamosus n. sp.

**Description of the Adult Female.** Leathery brown in color; stout cylindrical in form; 1.08 mm. long; 2.37 times as long as wide.

The front of the head is flattened and slightly concave below, shining, finely punctured and with rather coarse yellow hairs; above feebly shining, reticulateaciculate. The eyes are finely granulate, of moderate size, elongate oval, with the inner margin entire. The antennae (Fig. 32) are lighter in color; the scape is clavate, with a very few long hairs; the funicle is 5-jointed, with the pedicel large, sub-globose, nearly as broad as long and longer than the four distal segments combined; the club is large, flattened, oval, 1.4 times as long as wide, with both the outer and inner faces shining, ornamented with a few setae not arranged in definite sutural lines.

The **pronotum** is 1.07 times as wide as long; widest posteriorly, with the posterior angles rounded and the posterior margin bisinuate; the sides are strongly arcuate and the anterior outline narrowly curved; the front margin is not serrate; the anterior area of thorax is granulate, not asperate; the summit is low; the posterior area is finely and densely punctured and more finely granulate; the vestiture consists of rather numerous appressed yellow hairs, with a smaller number of short wide scales intermixed.

The elytra are wider than the thorax; 1.5 times as long as wide; the base is slightly elevated with a toothed margin; the sides are sub-parallel (slightly convergent) to behind the middle, and moderately rounded behind; the surface is opaque and strongly sculptured; the striae are distinctly impressed, the punctures very coarse and close, with stout yellow hairs; the interspaces are very narrow, finely and rather closely punctured, with hairs and short, broad scales alternating except upon the sutural interspace where there is a median row of hairs and a lateral row of scales. The declivity is convex and evenly arched with little or no modification of sculpture or vestiture.

The fore tibia (Fig. 34) and abdominal sternites are as described for the genus.

The male is shorter (0.88 mm. long) and stouter (2.17 times as long as wide); the front of the head is slightly flattened, not concave, opaque, with very fine, rather short pubescence; the antennal funicle is 4-jointed, the anterior margin of the pronotum is weakly but evidently serrate; the anterior area sparsely asperate; the elytra are shorter than in the female but otherwise similar.

Described from a series of 16 specimens collected by the author from the inner bark of osage orange, *Toxylon pomiferum* Raf., near Agricultural College, Mississippi, February 20, 21, and May 19, 1920. It is apparently far from common.

New York State College of Forestry, Syracuse, New York. November 17, 1920.

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# EXPLANATION OF PLATE:

## PLATE I.

Antennae of various species of *Micracis* LeConte; all magnified 145 diameters.

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Fig. 1. M. rudis Lec. 9
Fig. 2. M. biorbis n. sp. 9
Fig. 3. M. bicornus n. sp. 9
Fig. 4. M. harnedi n. sp. 9
Fig. 5. M. langstoni n. sp. 9
Fig. 6. M. suturalis Lec. 9
Fig. 7. M. meridianus n. sp. 9
Fig. 8. M. meridianus n. sp. 5
Fig. 9. M. populi (Swaine) n. sp. 9
Fig. 10. M. swainei n. sp. 9
Fig. 11. M. opacicollis Lec. 9







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# EXPLANATION OF PLATE PLATE II.

Anterior tibiae of various species of *Micracis* LeConte; all magnified 145 diameters.

Fig. 12. M. rudis Lec. 9

Fig. 13. M. biorbis n. sp. 9

Fig. 14. M. bicornus n. sp. 9

Fig. 15. M. bicornus n. sp. 5 15 a. tarsus of same.

Fig. 16. M. harnedi n. sp. 9

Fig. 17. M. langstoni n. sp. ♀

Fig. 18. M. suturalis Lec. 9

Fig. 19. M. meridianus n. sp. 9

Fig. 20.—M. populi (Swaine) n. sp. ♀

Fig. 21. M. swainei n. sp. 2 21 a. tarsus of same.

Fig. 22. M. opacicollis Lec. ♀

#### **EXPLANATION OF PLATE:**

#### PLATE III.

Fig. 23 Antenna of Thysanoes Ambricornis Lec. 9; magnified 145 diameters. 23a inner face of antennal club.

Fig. 24. Antenna of Thysanoes furbricornis Lec. 5; magnified 145 diameters.

Fig. 25. Antenna of Thysanoes lobdelli n. sp. Q; magnified 145 diameters.

Fig. 26. Antenna of Thysanoes berschemiae n. sp. 9; magnified 145 diameters.

Fig. 27. Anterior tibia of Thysanoes fimbriconis Lec.; magnified 145 diameters.

Fig. 28. Anterior tibla of *Thysanoes lobdelli* n. sp.; magnified 145 diameters.

Fig. 29. Anterior tibia of *Thysanoes berschemiae* n. sp.; 29a, tarsus of same; magnified 145 diameters.

Fig. 30 Antenna of Cryptocleptes dislocatus new genus and n. sp.  $\mathcal{Q}$ ; magnified 165 diameters.

Fig. 31. Anterior tibia and tarsus of *Cryptocleptes dislocatus* new genus and n. sp. Q; magnified 165 diameters.

Fig. 32. Antenna of *Erineosinus squamosus* new genus and n. sp. 9; magnified 330 diameters.

Fig. 33. Antenna of *Erineosinus squamosus* new genus and n. sp. 5; magnified 330 diameters.

Fig. 34. Anterior tibia and tarsus of *Erineosinus squamosus* new genus and n. sp.; magnified 330 diameters.

Fig. 35. Antenna of *Pseudothysanoes drakei* new genus and n. sp. 9; magnified 145 diameters.

Fig. 36. Fore tibia of *Pseudothysanoes drakei* new genus and n. sp. 9; magnified 145 diameters.

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# EXPLANATION OF PLATE PLATE V.

Fig. 43. Anterior view of *Micracis meridianus* n. sp. Q, showing something of the character of the frons and the manner in which this is veiled by the long hairs of the antennal scape. Magnified about 45 diameters.

Fig. 44. Anterior view of *Thysanoes lobdelli* n. sp.  $\mathcal{Q}$ , showing particularly the structure of the frons. Note the concavity, with a square, smooth. shining area below, with a longitudinal carina above and bordered above by longer hairs. Magnified about 45 diameters.

Fig. 45. Posterior-dorsal view of the declivity of *Micracis langstoni* n. sp.  $\Omega$ ; magnified about 45 diameters.

Fig. 46. Posterior-dorsal view of the declivity of M. langstoni n. sp.  $\dot{c}$  magnified about 45 diameters. This and the preceding are intended to show the secondary sexual differences.

Fig. 47. Posterior-dorsal view of the declivity of M. harnedi n. sp.  $\overset{\circ}{c}$  magnified about 45 diameters.

Fig. 48. Posterior-dorsal view of M. harnedi n. sp.  $\mathfrak{P}$ ; magnified about 45 diameters. This and the preceding figure show the secondary sexual differences.

## PLATE V.



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