THE LYCIDAE OF THE UNITED STATES AND CANADA

I. THE TRIBE LYCINI

(COLEOPTERA)

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(Text-figures)

This study was begun as an attempt to segregate and to identify, as far as it might be possible to do so, our numerous species of the genus *Plateros*. It soon became apparent from an examination of the ample material available that a review of all the Nearctic lycid genera would be advisable. The present paper is the first of a series whose purpose is to make known the new species that have accumulated in collections, and facilitate the recognition of all previously described species by means of revised synoptic tables and descriptions, including with the latter certain interesting and heretofore unrecorded details of morphology.

The *Lycidae* are divided into the following two subfamilies, of which only the second is represented in the American fauna.

Key to Subfamilies

Abdomen with six visible sternites in both sexes; femoral insertion oblique, extending toward base of the trochanter; pronotum not produced over the head.....HOMOLISINAE

Abdomen with eight visible sternites in the male, seven in the female; femora arising apically from the trochanters; pronotum more or less produced over the head.....LYCINAE

The Lycinae may be defined as diurnal soft bodied beetles having the head partly covered by the pronotum, antennae 11-jointed, anterior coxae conical and prominent, middle coxae separated and oblique, posterior coxae contiguous and transverse, metepisterna not sinuate on the inner side, abdomen with eight visible sternites in the male and seven in the female, epipleura wanting, trochanters intervening between coxae and femora, the femoral insertion distal, tarsi 5-jointed, claws simple (except in the oriental *Macrolycus*).

The tarsal structure is quite uniform throughout in the Lycinae. The fourth segment is cordiform but not emarginate, the fifth arising sub-basally from a dorsal excavation of the fourth. The third segment is similar to the fourth but less deeply excavated. The first four segments are provided beneath in both sexes with apical pads of dense short pubescence.

The elytra have normally four discal costae; that nearest the suture is designated the first, and the one nearest the lateral margin the fourth or humeral costa. The costae vary in development and may be in part or entirely obliterated. The costal intervals may have either one or two rows of cells, also varying in development from distinctly quadrangular to irregular punctiform impressions.

As in previous papers, the abdominal sternites are numbered to correspond with their tergites, beginning at the base. The first visible sternite is number 2, tergite 1 having no corresponding sternite. Measurements of the length of the body are taken from the anterior margin of the pronotum to the tip of the elytra. In those species with the head rostrate measurement of the length of the beak is taken from the anterior margin of the eyes to the apex of the clypeus. The ratio between the length of the beak and the distance between the eyes, taken at the mid-point in their length, provides a convenient means for comparison of the rostral structure.

The identification of most of the species of *Plateros* is possible only by an examination of the male genitalia. A technique that has been found satisfactory in the extraction of the genitalia from cabinet specimens of *Lycidae* and *Lampyridae* is here described. If carefully carried out it will result in no visible damage to the specimen.

The implements required are a binocular microscope of low power, about 15 ×, a dissecting needle made by grinding a large needle to a chisel point and mounting in a wooden handle, a small camels hair brush, and a finely pointed forceps. Ten to fifteen hours in a relaxing jar will soften the beetles sufficiently; if relaxed too much they will be found more difficult to manipulate. Under the microscope the abdomen is grasped securely with the forceps and the dissecting needle used to sever the lateral connecting membrane of sternites 6, 7, and 8. It is best to begin the operation at the side of sternite 8, allowing the ninth segment containing the genital apparatus to remain in place. When the three sternites have been completely loosened, but not detached

from sternite 5, they are folded back, exposing the ninth segment which is then split along one side and the genitalia removed. If the integuments are kept moist during the dissecting process there will be little danger of injury. The folded sternites are floated back with an excess of water, and will remain in their natural position because of the adhesive quality of the body contents. The genitalia may be glued to a triangle to be mounted on the same pin as the beetle, using the moistened camels hair brush to pick up and manipulate these small parts. If mounted in an upright position an unobstructed view from three sides may be obtained.

The material on which the present series is based was drawn from the following institutions and individuals, to all of whom the author wishes to express his sincere thanks and appreciation: Academy of Natural Sciences of Philadelphia, American Museum of Natural History, California Academy of Sciences, Cornell University, Emory University, Illinois State Natural History Survey, North Carolina Department of Agriculture, Ohio State University, Oregon State College, Reading Public Museum, South Dakota State College, University of California, University of Idaho, University of Ohio, Carl Cook, W. S. Craig, C. A. Frost, R. R. Dreisbach, S. D. Hicks, E. J. F. Marx, Borys Malkin, A. T. McClay, F. H. Parker, Rev. Bernard Rotger, G. Stace Smith, Bruce Summerville, and F. N. Young.

The author is especially indebted to Mr. J. Balfour-Browne, of the British Museum, for the loan of specimens that were of great value in determining the generic affiliation of certain lygistopterids.

Lycinae—Key to Nearctic Tribes

1. Front horizontal, mouth anterior; scutellum not emarginate.....2
   Front deflexed, mouth inferior; scutellum usually emarginate at apex...3
2. Anterior thoracic spiracles prominently tubulate; pronotum without oblique lateral elevations; elytra costate and reticulate with raised lines, the fourth discal costa prominently cariniform at the humerus. Head rostrate. (Contains *Lycus* Fabricius only).....LYCINI
   Anterior thoracic spiracles not prominent; pronotum with an oblique elevation each side, joining the lateral margin near the posterior angle; elytra not reticulate, costae feeble, fourth discal costa obliterated basally.....LYGISTOPTERINI

3. Antennae and legs only moderately compressed; antennal pubescence longer and somewhat bristling, especially in the male, second joint not transverse; anterior thoracic spiracles not prominent; anterior coxae contiguous or nearly so.....PLATERODINI

Antennae and legs strongly compressed; antennae with short decumbent pubescence, second joint transverse, very short and inconspicuous, nearly concealed in the apex of the first joint; anterior thoracic spiracles usually prominent; anterior coxae usually separated.....CALOPTERINI

Tribe LYCINI

LYCUS Fabricius

1787. *Lycus* Fabricius, Mantissa Insectorum, Hafniae, I, p. 163.
1861. *Lycostomus* Motschulsky (subgenus), Bull. Mosc., XXXIV, part I, p. 136.
1881. *Rhyncheros* Leconte, Trans. Amer. Ent. Soc., IX, p. 18.
1883. *Neolycus* Bourgeois (subgenus), Ann. Ent. Soc. France, series 6, III, Bull. p. LXI.

Eyes small, distant; antennae approximate, moderately compressed, less than half as long as the body, rather densely clothed with very short prostrate pubescence, second joint short and transverse, third elongate; front not deflexed, produced in a beak, mouth anterior; mandibles very small, nearly straight, arcuate apically, not or scarcely extending beyond the clypeus, their tips distant when the mandibles are closed; clypeus free, subquadrate or somewhat transverse, apex not emarginate; palpi small, not broadly dilated. Pronotum transverse, widest at base, roughly pentagonal, apex produced in a very short subtriangular lobe, anterior angles variable, extending forward when prominent; sides broadly explanate and reflexed, without oblique elevations, median line briefly carinate at apex, thence more or less distinctly channeled nearly to base; anterior thoracic spiracles prominently tubulate; anterior coxae closely approximate. Elytra with four feebly elevated narrow discal costae, the third less distinct, the fourth very prominent at the humerus; intervals reticulate with irregular and transverse raised lines.

Except in *lateralis,* and to some extent in *lecontei,* the apical angles of all the abdominal sternites but the last are somewhat acutely produced posteriorly in both sexes. The apical angles are very strongly produced in sternite 8 of the male, forming a deep and broad emargination that is usually more deeply angulate medially. Sternite 8 of the female is notched at apex, and has, in all our species except *lateralis,* a strong subapical sinus each side limited anteriorly by an abrupt angulation of the margin. This formation, however, is quite unstable and varies considerably within specific limits. In the males the front and middle tibiae are slightly and obliquely produced at apex in a blunt point, a modification that is prominent in some species, becoming barely perceptible in others, and totally lacking in *lateralis.*

Key to Nearctic Subgenera and Species

1. Prosternum compresso-carinate; mesosternum protuberant; inner angle of metacoxae somewhat prominent posteriorly; trochanters of male unmodified.....2
   Prosternum and mesosternum unmodified; inner angle of metacoxae not produced; trochanters of male spinose.
   Lyconotus new subgenus 13
2. Metatibial spurs dissimilar, the inner acute, the outer slightly broader apically and bluntly rounded; elytra dilated in the male, with apical black spot.....Subgenus **Neolycus** Bourgeois 3
   Metatibial spurs similar, acute; elytra not or scarcely dilated in the male.....Subgenus **Lycostomus** Motschulsky 5
3. Elytra broadly dilated in the male, fulvous.....4
   Elytra moderately dilated in the male, usually rufous or scarlet, rarely fulvous.....**lecontei** new name
4. Maxillary palpi comparatively stout, distinctly wider apically; beak shorter, its length not more than twice the distance between the eyes. Anterior margin of apical elytral spot not notched where the humeral costa enters it; tips of femora black.
   arizonensis new species
   Maxillary palpi slender, not distinctly wider apically; beak longer and more slender, its length more than twice the distance between the eyes. Anterior margin of apical elytral spot usually notched where the humeral costa enters it; femora usually entirely fulvous.....**fernandezi** Duges
5. Elytra bicolored, with apical or basal dark area.....6
   Elytra unicolorous, fulvous or flavate.....7
6. Elytra distinctly pubescent, rufous with a dark scutellar spot.
   sanguinipennis Say
   Elytra virtually glabrous, rufous or scarlet with apical black spot.
   sanguineus Gorham
7. Pronotum pale with median dark spot, disk alutaceous; ventral surface mostly black.....8
   Pronotum entirely pale, shining; ventral surface usually entirely pale, the metasternum rarely black, abdomen sometimes with indistinct dark areas.....9
8. Legs entirely black.....**fulvellus** Leconte
   Femora fulvous.....subspecies **femoratus** Schaeffer
9. Antennae entirely black; pronotum distinctly pubescent.
   rubescens Schaeffer
   Base of antennae pale; pronotum subglabrous or with very sparse inconspicuous hairs.....10

10. Pubescence of prosternal crest and mesosternal protuberance unmodified in the male; elytra of female distinctly, but sparsely and irregularly, pubescent, the hairs suberect and nearly straight. Size small, usually under 10 mm. in length.....**sagittatus** new species
    Pubescence of prosternal crest and mesosternal protuberance longer and denser in the male, the hairs suberect and straight with their tips curved; elytra of female subglabrous, or with very sparse minute hairs that are decumbent and arcuate.....11
11. Beak short and stout.....12
    Beak long and slender.....**loripes** Chevrolat
12. Size small, less than 10 mm. in length; antennae with usually only the first joint entirely pale; aedeagus, viewed from above or below, hastate, with acute lateral barbs.....**minutus** new species
    Size larger, length usually over 10 mm.; antennae with the first three joints entirely pale; aedeagus without lateral barbs.
    simulans Schaeffer
13. Black, sides of pronotum and large humeral area of elytra fulvous.
    lateralis Melsheimer

Lycus arizonensis new species (Fig. 1.)

Fulvous; elytra in about apical fourth or less, head, antennae, palpi, tips of femora, tibiae and tarsi black; scutellum rarely dark. The anterior margin of the apical elytral spot is arcuately oblique with the convexity forward, approaching nearest to apex at the suture, and is not notched where the humeral costa enters it. The underside of the first antennal joint, ventral surface of the beak, and its dorsal surface toward base are usually more or less rufescent; rarely the head and beak are entirely pale. Rather densely clothed above and beneath with short prostrate fulvous hairs, the elytral pubescence very short. Length 13–18.5 mm.

MALE. Head transversely impressed behind the antennal prominence; beak nearly twice as long as the distance between the eyes; maxillary palpi rather stout, distinctly broader apically; antennae feebly serrate, third joint nearly as long as four and five combined.

Pronotum with the lateral margins subparallel or very feebly converging from base to middle, thence arcuately converging to the triangular apical lobe, the anterior angles sometimes indicated by an abrupt change in curvature; median line strongly compresso-carinate in apical fifth, thence vaguely channeled to basal fifth.

Elytra broadly dilated, widest behind the middle where they are conjointly one-fourth to one-third longer than wide and two and one-half times as wide as the pronotum; surface finely punctate, reticulating lines very sparse or absent basally, becoming rather dense apcially, forming usually a double row of irregular cells on the costal intervals.

Prosternum compresso-carinate; mesosternum very strongly protuberant, the summit concave with the sides prominent; ventral pubescence not sex-

ually modified. Apical angles of abdominal sternites produced posteriorly, more strongly toward apex. Tibiae distinctly arcuate, the posterior less strongly; metatibial spurs dissimilar, the inner acute, the outer slightly broader apically and bluntly rounded.

FEMALE. Differs from the male in having the elytra moderately dilated, at their widest point they are conjointly at least one-half longer than wide; mesosternum less strongly protuberant, the summit broader; tibiae scarcely arcuate.

Holotype.—Male; Pinal Mts., Arizona, July 20, 1947, collected by Frank H. Parker; located in collection of Academy of Natural Sciences of Philadelphia.

Allotype.—Female; same data and location as holotype.

Paratypes.—ARIZONA: Santa Catalina Mts., Sabino and Sycamore Canyons, VII–22 to VIII–20; Santa Rita Mts., VII–4 to 20; Huachuca Mts., Ramsay and Carr Canyons, Apache Camp, VI–23 to VII–25; Pinal Mts., VI–1 to VIII–3; Chiricahua Mts., Cave Creek, VI–29 to VII–20; Sierra Ancha Mts., Gila County; Tucson; Patagonia, VII–5 to 30; Oracle, VI–30 to VII–27; Bonita, VII–12; Harshaw, VIII–17; Palmerlee, VII–20; Nogales, Mt. Washington, 6000 ft., VII–17; Fort Grant, VII–19; Texas Pass, VII–20.

The paratypes (150) are distributed in the collections of Academy of Natural Sciences of Philadelphia, American Museum of Natural History, California Academy of Sciences, Cornell University, Ohio State University, F. H. Parker, C. A. Frost, and the author.

This species has heretofore been confused with the very similar *fernandezi,* occurring in the same territory. It is easily distinguished from Arizona examples of *fernandezi* by the absence of a notch in the anterior margin of the apical elytral spot where the humeral costa enters it, and by having the tips of the femora black. Examples of *fernandezi* from Texas and New Mexico usually simulate *arizonensis* in color pattern by having the notch of the elytral spot indistinct and the tips of the femora fuscous or black, but they may be recognized as *fernandezi* by the more slender beak and palpi. The two species differ quite definitely in the male genitalia. One example of *arizonensis* from "Exerter, Calif." and another from "Mont." were the only specimens seen without Arizona labels, and the records are in all probability erroneous.

Lycus fernandezi Duges (Fig. 2.)

1878. *Lycus fernandezi* Duges, La Naturaleza, IV, p. 175.

Fulvous; elytra in about apical fourth or more, antennae except at extreme base, palpi, clypeus, tibiae and tarsi black; color of head varying to entirely black. Anterior margin of apical elytral spot usually distinctly notched where the humeral costa enters it. Specimens from Texas and New Mexico have the notch of the elytral spot often indistinct or absent, the spot itself sometimes reduced in size, and the tips of the femora dusky or black. Vestiture and sculpture as in *arizonensis;* differing structurally by having the beak longer and more slender, its length about two and one-fourth times the distance between the eyes; maxillary palpi more slender, not distinctly wider apically; lateral margins of pronotum usually arcuately converging from base to apical lobe, the anterior angles obliterated. Elytra broadly dilated in the male, less so in the female; metatibial spurs dissimilar. Length 10–18 mm.

ARIZONA: Globe, VII–13 to VIII–23; Oracle, VII–11; Clifton, VIII–11; Baboquivari Mts., near Kits Peak, VIII–7; Pinal Mts., 4000 ft., VIII 3; Douglas, VIII–1 to 25.

NEW MEXICO: Carlsbad, VII–26; Alamogordo, Otero County, VII–13.

TEXAS: Cameron, IV–27; Austin, V–2 to 21; Kingsville, V–4; San Antonio; El Paso, VI–29; Davis Mts., VII–1; Chisos Mts., Brewster County, VII–4 to 17.

Lycus lecontei new name (Fig. 3.)

1861. *Lycus cruentus* || Leconte, Proc. Acad. Nat. Sci. Phila., XIII, p. 336.

Rufous or scarlet, rarely fulvous; elytra in about apical third, head, antennae, palpi, tibiae and tarsi black; head and first antennal joint varying to largely rufous; anterior margin of apical elytral spot not notched where the humeral costa enters it. Vestiture and sculpture as in *arizonensis* and *fernandezi;* beak nearly twice as long as the distance between the eyes; palpi slender, not distinctly wider apically; mesosternum of male less strongly protuberant; elytra of male moderately dilated, conjointly about three-fifths longer than wide, of female twice as long as wide; metatibial spurs dissimilar; apical angles of abdominal sternites, except 7 and 8, usually feebly produced, sometimes scarcely so. Length 7–13 mm.

LOWER CALIFORNIA: San Borjas, X–14; San Ignacio, 15 mi. N., IX–29; San Augustine, 20 mi. W., IX–24; San Jose del Cabo; Cape San Lucas.

ARIZONA: Florence, VI–5; Serritas, Black Dike, VII–26; Cave Creek, Maricopa County, IX–7; Tucson, VII–27; San Carlos, IX–3; Catalina Mts., VIII–5; Tempe.

Leconte [1] called attention to the fact that his *cruentus* is a homonym of *Lycus cruentus* Fabricius,[2] described from Sumatra,

[1] Trans. Amer. Ent. Soc., 1881, IX, p. 63.
[2] Syst. Eleuth., 1801, II, p. 114.

without providing a substitute. Although the Fabrician species unaccountably does not appear in recent literature, it nevertheless invalidates any subsequent use of the same combination of names.

Leconte's type of *cruentus* is from Cape San Lucas, Lower California. Specimens examined from that region are mostly of a fulvous color and look quite different in series from those taken in Arizona, and it is possible that two or more species are involved. No genitalic or other characters of a definite nature could be found for splitting this apparent complex. The genitalia of *fernandezi* and *lecontei* are very similar in structure, and it therefore seems likely that any segregation of species based on genitalic characters must be determined by a study of large series that are not at this time available.

Lycus sanguineus Gorham (Fig. 4.)

1884. *Lycostomus sanguineus* Gorham, Biol. Cent. Amer., Coleop., III, pt. 2, p. 226.

Rufous or scarlet; elytra in apical fourth or fifth, antennae except basal joint, palpi, and tarsi black. Head, pronotum, and ventral surface clothed somewhat sparsely with short prostrate hairs; elytra nearly glabrous, pubescence evident at base and on scutellum, elsewhere the hairs are widely distant and inconspicuous; ventral vestiture unmodified in the male. Beak short and stout, its length nearly one and one-half times the distance between the eyes; antennal joints 4 to 11 each with one or more denticles on the inner side, third joint seven-tenths as long as 4 and 5 combined; palpi rather slender; elytra of female abbreviated and narrowed, with the unusually broad abdomen partly visible from above at the sides and apex; mesosternum protuberant except in front; metatibial spurs similar, acute. Length 11.5–14.5 mm.

ARIZONA: Globe, V–6 to 16; Pinal Mts., VI–4; Baboquivari Mts., IV–28, VI–8; Benson, V–12; Huachuca Mts., VI–9; Tucson, V–5; Prescott; Payson, VI–11; Catalina Mts., V–11; Chiricahua Mts., Pinery Canyon, 6000 ft., VI–5.

NEW MEXICO: Organ Mts., Dona Ana County, IV–23.

TEXAS: Alpine, IV–18.

Superficially resembling *lecontei, sanguineus* may be recognized by its subglabrous elytra with smaller apical black spot. It was described from northern Sonora. The short vestiture of the antennae is, in the male, erect along the inner side of joints 4 to 11, a character that has not been noted in any other species except *sanguinipennis*.

Lycus sanguinipennis Say (Fig. 5.)

1823. *Lycus sanguinipennis* Say, Jour. Acad. Nat. Sci. Phila., III, p. 178.

Black; elytra and explanate sides of pronotum rufous, elytra with a small irregular scutellar dark spot. Moderately densely clothed above and beneath with short prostrate hairs, pubescence of the sterna longer and inclined, not modified in the male. Beak short and stout, its length about equal to the distance between the eyes; third antennal joint three-fifths as long as 4 and 5 combined, pubescence of joints 4 to 11 erect but not longer along inner side in the male; palpi somewhat dilated, distinctly wider apically; mesosternum protuberant except in front; metatibial spurs similar, acute. Length 9–13.5 mm.

ARIZONA: Santa Catalina Mts., VI–30 to VII–21, Bear Wallow, 8000 ft., VI–13 to VII–17, Mt. Lemon Sta., VII–11; Graham Mt., VII–27; Huachuca Mts.; Pinal Mts., Gila County, VI–18, VIII; Crown King, VI–28; Sierra Ancha Mts., VII–5 to VIII–5; Lakeside, VI–11; White Mts., VII–25; Santa Rita Mts., VIII–14.

NEW MEXICO: Jemez Mts., VII–4 to VIII–9; Frijoles Canyon near Hot Springs, Las Vegas, 7000 ft., VII; Beulah, VI–29, VIII–17; Cloudcroft, VI–19.

COLORADO: Mineral County, VI–16; Palmer Lake, VI–30; Boulder, Jim Creek, 6400 ft., VII–8; Green Mt. Falls, VI–20; Manitou, 6400 ft., VII–5.

Leconte erected the genus *Rhyncheros* for this species because of its very short beak, none of the other species with similarly short beaks being known to him at the time. Apparently there is nothing to warrant the retention of *Rhyncheros* as a subdivision of *Lycus*.

Lycus fulvellus Leconte (Fig. 6.)

1881. *Lycostomus fulvellus* Leconte, Trans. Amer. Ent. Soc., IX, p. 18.

Black; sides and apex of pronotum, elytra, and sides and apex of abdomen fulvous or flavate; scutellum black; black area of pronotum covering nearly all of the central convex surface. Dorsal surface, except head, subglabrous; ventral surface pubescent, prosternal crest and mesosternal protuberance clothed with suberect arcuate hairs, these longer and denser in the male. Beak short and stout, its length about one and one-half times the distance between the eyes; third antennal joint five-sixths as long as 4 and 5 combined; palpi somewhat dilated, distinctly wider apically; pronotum alutaceous, anterior angles prominent, apical lobe rounded; mesosternum protuberant except in front, protuberance strongly convex in the male, lower and flat in the female; metatibial spurs similar, acute. Length 13 mm.

COLORADO: Cascade, VII–9.

NEW MEXICO: Gallinas Creek, Sante Fe National Forest, 7500 ft., VI–16; Las Vegas.

ARIZONA: Alpine, White Mts., 8400 ft., VI–23.

Lycus fulvellus subspecies **femoratus** Schaeffer

1911. *Lycostomus femoratus* Schaeffer, Jour. N. Y. Ent. Soc., XIX, p. 120.

Agrees closely with *fulvellus,* differing in color by having the pronotal dark spot much reduced and usually confined to the median channel; trochanters and femora fulvous, the latter tipped with black; and the three basal antennal joints more or less pale beneath. Length 11–14 mm.

ARIZONA: Huachuca Mts.; Chiricahua Mts., 8600 ft., VII–16; Santa Rita Mts., VI–14, VIII–8; Sierra Ancha Mts., VIII–5; Pinal Mts., V, VI–15, VII–20; Miami, VI–27; Santa Catalina Mts., VI–30, VII–20, Bear Wallow, 8000 ft., VII–12, Mud Springs, 6500 ft., VII–17, Mt. Lemon, VI–30, VII–24; Fort Grant, VII–15; Patagonia, VII–6; Fort Apache, VI–16.

Schaeffer stated that *femoratus* differs from *fulvellus,* in addition to the above mentioned color characters, by having the hind tibiae less arcuate, the thorax wider and more distinctly trisinuate in front, and the alternate elytral costae distinctly more elevated than the others, especially in apical half. These differences are all variable and would apply only to selected specimens. The male genitalia of the two forms are identical and *femoratus* is therefore reduced to subspecific rank. Its habitat in the United States seems to be limited to southern Arizona.

Lycus rubescens Schaeffer (Fig. 7.)

1908. *Lycostomus rubescens* Schaeffer, Jour. N. Y. Ent. Soc., XVI, p. 63.

Fulvous or rufous; head, antennae, palpi, femora apically, tibiae and tarsi black. The head varies in color to fuscous with the beak paler, and the metasternum and abdomen may be slightly dusky medially. Head and pronotum distinctly pubescent; elytra subglabrous, the pubescence evident narrowly at base, more broadly at apex, and along the sides exterior to the humeral costa. Ventral surface pubescent, vestiture unmodified in the male. Beak short and stout, its length about one and one-fifth times the distance between the eyes; third antennal joint two-thirds as long as 4 and 5 combined; palpi somewhat dilated, wider apically; mesosternum distinctly protuberant, more strongly in the male, the summit feebly concave in both sexes; metatibial spurs similar, acute. Length 10–13 mm.

ARIZONA: Huachuca Mts.; Florence; Phoenix; Douglas, VII–1; Chiricahua Mts., 7000 ft., VI–24.

Lycus sagittatus new species (Fig. 8.)

Flavate; palpi more or less and last two joints of tarsi darker, antennae black except three basal joints, the fourth and fifth sometimes partly pale, tibiae entirely pale or darker apically. Dorsal surface moderately shining, virtually glabrous in the male with only the head very sparsely pubescent,

distinctly but sparsely and irregularly pubescent throughout in the female; ventral surface sparsely pubescent in both sexes, vestiture of prosternal crest and mesosternal protuberance unmodified in the male. Length 7–10 mm.

MALE. Head nearly flat between the eyes, not impressed behind the antennal prominence; beak stout, elongate triangular, its length one and three-fourths times the distance between the eyes; maxillary palpi slender, not wider apically; third antennal joint slightly shorter than 4 and 5 combined, its upper surface finely reticulate and sparsely pubescent.

Pronotum about one-fourth wider than long; lateral margins nearly straight, converging from hind angles to the evident but not prominent anterior angles; surface smooth medially, anterior border and explanate sides obscurely punctate; median line not carinate apically, thence rather strongly channeled to base, the channel narrower posteriorly.

Elytra widest behind the middle where they are conjointly two-thirds wider than the pronotum and four-fifths longer than wide; costae not prominent, the intervals with rather coarse and dense irregular punctiform impressions, without distinct reticulating lines.

Prosternum compresso-carinate; mesosternum rather strongly protuberant, the summit concave; apical angles of abdominal sternites produced posteriorly, more strongly toward apex. Tibiae rather slender, arcuate; metatibial spurs similar, acute.

FEMALE. Differs from the male in being more slender, the elytra conjointly less than one-half wider than the pronotum and more than twice as long as wide. Pronotum very sparsely pubescent, the hairs fine and prostrate; elytra sparsely pubescent throughout, the hairs longer and nearly straight, rather coarse, denser and inclined on the costae and margins, sparse and suberect on the intervals; mesosternum less strongly protuberant, the summit broader and nearly flat; tibiae feebly arcuate.

Holotype.—Male; Chisos Mts., Texas, June 9, 1939, collected by D. J. and J. N. Knull; located in Ohio State University collection.

Allotype.—Female; same data and location as holotype.

Paratypes.—TEXAS: Chisos Mts., VI–9; El Paso, 15 mi. E., VI–22; "Tex." (Horn collection).

The paratypes (11) are distributed in the collections of Academy of Natural Sciences of Philadelphia, Ohio State University, California Academy of Sciences, and the author.

This species closely resembles a very small *simulans* or *loripes*. The beak is intermediate in length between the two extremes found in those species. It is unique thus far among the uniformly pallid *Lycus* occurring in our fauna because of the comparatively conspicuous elytral pubescence of the female.

Lycus minutus new species (Fig. 9.)

Flavate; antennae except basal joint, palpi, tibiae and tarsi black; second and third antennal joints beneath, and sometimes above also, pale or fuscous; scutellum pale, the mesonotum each side dark. Varies with the tibiae and tarsi partly pale, and the metathorax beneath dark each side. Dorsal surface, except head, shining and nearly glabrous, the elytra of female with sparse minute hairs on the costae; ventral surface pubescent, the vestiture longer, suberect, and apically curved on the prosternal crest and mesosternal protuberance of the male. Length 7–9 mm.

MALE. Head feebly concave between the eyes, not distinctly impressed behind antennal prominence; beak short and stout, its length less than one and one-half times the distance between the eyes; maxillary palpi rather slender, not distinctly wider apically; third antennal joint four-fifths as long as 4 and 5 combined, its upper surface finely reticulate and sparsely pubescent.

Pronotum one-fourth wider than long; lateral margins nearly straight and converging from base to the usually very prominent anterior angles; surface smooth and shining medially, anterior border and explanate sides irregularly and rather coarsely punctate; median line feebly carinate at apex, thence strongly channeled to base, the channel narrower posteriorly.

Elytra widest behind the middle where they are conjointly seven-tenths wider than the pronotum and three-fourths longer than wide; surface shining, costae distinct, reticulating lines poorly defined, forming an irregular double row of cells between the costae, the cells punctiform basally, sometimes throughout.

Prosternum compresso-carinate; mesosternum protuberant except in front, the summit nearly flat; apical angles of abdominal sternites produced posteriorly, more strongly toward apex. Tibiae rather slender, arcuate, the metatibiae less strongly; metatibial spurs similar, acute.

FEMALE. Differs from the male in being more slender, the elytra conjointly one-half wider than the pronotum and twice as long as wide; elytral costae with very sparse minute decumbent arcuate hairs; ventral pubescence unmodified; tibiae nearly straight.

Holotype.—Male; Sabina Basin, Santa Catalina Mts., Arizona, July 8 to 20, 1916; located in collection of American Museum of Natural History.

Allotype.—Female; Durango City, Mexico, collected by H. F. Wickham; located in collection of Academy of Natural Sciences of Philadelphia.

Paratypes.—ARIZONA: Same data as holotype; Texas Pass, VII–20; Pinal Mts., VII–22; Huachuca Mts., Ramsey Can., VII–10. MEXICO: Durango City.

The paratypes (19), all males, are distributed in the collections of Academy of Natural Sciences of Philadelphia, American Mu-

seum of Natural History, California Academy of Sciences, Cornell University, and the author.

This species is of the same size and appearance as *sagittatus,* and considerably smaller than the closely similar *loripes* and *simulans.* Because of its very short and stout beak, exactly as in *simulans, minutus* could not be mistaken for either *sagittatus* or *loripes.* In all the Arizona specimens of *minutus* that have been examined, only the first antennal joint is entirely pale, and this character alone is sufficient to separate it from our other flavate species. The antennal color character, however, does not hold satisfactorily for examples of *minutus* from Durango City, Mexico. Males of *simulans* may be distinguished from these by their much longer, denser, and more erect pubescence of the mesosternal protuberance; and the females by their more nearly glabrous elytra.

Lycus simulans Schaeffer (Fig. 10.)

1911. *Lycostomus simulans* Schaeffer, Jour. N. Y. Ent. Soc., XIX, p. 121.

Flavate; antennae except first three joints, palpi, and tarsi black; tibiae varying from entirely black to entirely pale, usually darker in the female. Varies with head posteriorly, scutellum, and ventral surface of metathorax black. Dorsal surface, except head, nearly glabrous; ventral surface pubescent. Beak short and stout, its length less than one and one-half times the distance between the eyes; third antennal joint four-fifths as long as 4 and 5 combined; palpi rather slender, slightly wider apically. Pronotum smooth and shining medially, the sparse pubescence somewhat denser and more conspicuous in the female. Male with mesosternum rather strongly protuberant, the summit flat; prosternal crest, mesosternal protuberance, and adjacent parts of metasternum densely clothed with rather long erect pubescence, the hairs straight with their tips curved. Female with mesosternum less protuberant, the sternal vestiture shorter, arcuate and inclined. All tibiae strongly arcuate in the male, feebly in the female; metatibial spurs similar, acute. Length 10–12 mm.

ARIZONA: Huachuca Mts., VII–18, Carr Canyon, VII–12, Montezuma Pass, VII–20, Miller and Ramsey Canyons; Pinal Mts., VII–3 and 24; Santa Catalina Mts., Mud Springs, 6500 ft., VII–12; Santa Rita Mts., Madero Canyon, VIII–16; Prescott, VII–23; Fort Grant, VII–13; Yuma, VI; Palmerlee, 7500 ft., VI–18.

TEXAS: Davis Mts., VI–28, VII–2; Sierra Blanca, VII–4; El Paso, VII–1.

Lycus loripes Chevrolat (Fig. 11.)

1835. *Lycostomus loripes* Chevrolat, Col. Mexique, fasc. 6, p. 148.

Color, vestiture, and sculpture as in male *simulans,* the pronotal pubescence not appreciably differing in the sexes. Structure as in *simulans* except as follows: beak long and slender, its length about two and one-fifth times the distance between the eyes; third antennal joint as long as 4 and 5 combined; palpi slender, not wider apically. Length 10–13 mm.

ARIZONA: Huachuca Mts., Carr and Miller Canyons, VII–10 to 18; Baboquivari Mts., Kits Peak, 4050 ft., VIII–1; Santa Catalina Mts., Sabino Basin and Mud Springs, VII–2 to 20; Chiricahua Mts., Pinery Canyon, 5200 ft., VII–15; Dragoon Mts., Texas Pass, VII–20; Fort Grant, VII–15; Coyote Mts., 3500 ft., VIII–4; Yuma County, VI; Nogales, VII–15; Bisbee, VII–12 to 17; San Carlos, VII–12; Wilcox, VIII–8; Gleason, VII–16; Palmerlee; Santa Rita Mts., VII–21.

TEXAS: Chisos Mts., VII–9.

Lyconotus new subgenus

Form and structure similar to *Lycostomus* except as follows: prosternum not longitudinally compressed; mesosternum not protuberant; inner angle of metacoxae not produced posteriorly; tibial spurs minute, acute and similar throughout; male with trochanters spinose, metafemora and metatibiae strongly arcuate, and aedeagus and sternite 9 both abruptly bent downward medially. Elytra, as in *Lycostomus,* not broadly dilated in the male.

TYPE. *Lycus lateralis* Melsheimer.

Lycus lateralis Melsheimer (Fig. 12.)

1846. *Lygistopterus lateralis* Melsheimer, Proc. Acad. Nat. Sci. Phila., II, p. 302.

Black; humeri and sides and apex of pronotum fulvous; black area of pronotum occupying nearly all of median convex surface; fulvous humeral spot variable, usually broad at base, not reaching the suture, and narrowing posteriorly to about middle of elytra. Body clothed above and beneath with short decumbent pubescence, similar in the sexes. Beak slender, rather long, its length more than one and one-half times the distance between the eyes; third antennal joint only slightly longer than fourth, about three-fifths as long as 4 and 5 combined; palpi slender, slightly wider apically. Pronotum with apical lobe rounded, limited each side by a feeble sinuation, the anterior angles lacking; median channel obliterated. Prosternum not compresso-carinate; mesosternum not protuberant; apical angles of abdominal sternites acutely produced posteriorly only in 7 and 8 of male. Tibial spurs small, but little longer than the apical setae. Male with posterior femora and tibiae strongly arcuate, all trochanters spinose; sternite 9 with basal part broad, abruptly concave throughout its width, bottom of concavity flat, smooth and shining, glabrous; apical part of sternite 9 convex, narrowly

triangular, sparsely pubescent, bent abruptly downward at right angles to basal part; aedeagus similarly bent to conform to sternite 9. Length 9–10 mm.

Distribution.—Ranges from Maine south to Florida and west to Illinois, Missouri, Kansas, and Texas. A male in the collection of the California Academy of Sciences was collected at Fort Clayton, Panama Canal Zone.

Explanation of Figures

The letters a, b, and c signify, respectively, dorsal, lateral, and ventral aspects.

Fig. 1.—*Lycus arizonensis* new species, male genitalia and maxillary palpus. Pinal Mts., Arizona, VII–20–47, F. H. Parker.

Fig. 2.—*Lycus fernandezi* Duges, male genitalia and maxillary palpus. Globe, Arizona, VIII–2–47, F. H. Parker.

Fig. 3.—*Lycus lecontei* new name, male genitalia. 20 mi. W. San Augustine, Lower California, IX–24–41, Ross and Bohart.

Fig. 4.—*Lycus sanguineus* Gorham, male genitalia. Globe, Arizona, V–8–48, F. H. Parker.

Fig. 5.—*Lycus sanguinipennis* Say, male genitalia. Catalina Mts., Arizona, VII–1936, E. S. Ross.

Fig. 6.—*Lycus fulvellus* Leconte, male genitalia. Sante Fe National Forest, New Mexico, VI–16–47, C. P. Alexander.

Fig. 7.—*Lycus rubescens* Schaeffer, male genitalia. Cave Creek, Cochise County, Chiricahua Mts., Arizona, VI–24–27, J. A. Kusche.

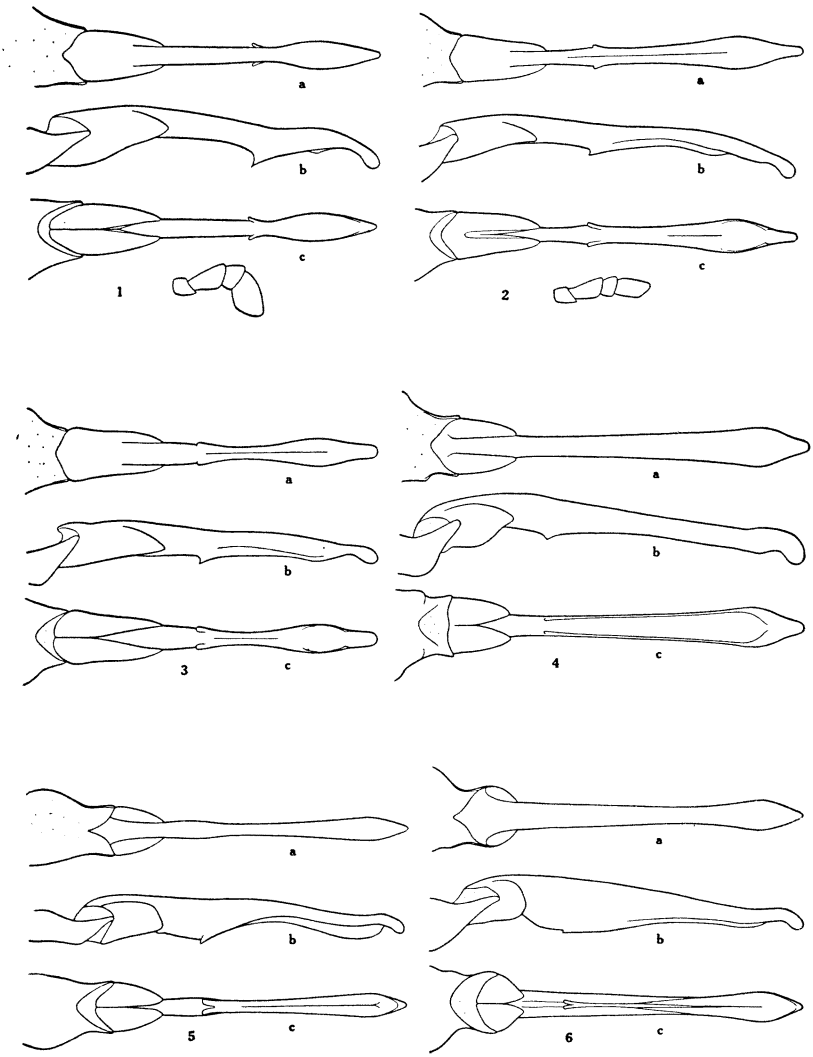
Fig. 8.—*Lycus sagittatus* new species, male genitalia. Chisos Mts., Texas, VI–9–39, D. J. and J. N. Knull.

Fig. 9.—*Lycus minutus* new species, male genitalia. Sabino Basin, Santa Catalina Mts., Arizona, VII–8 to 20–16.

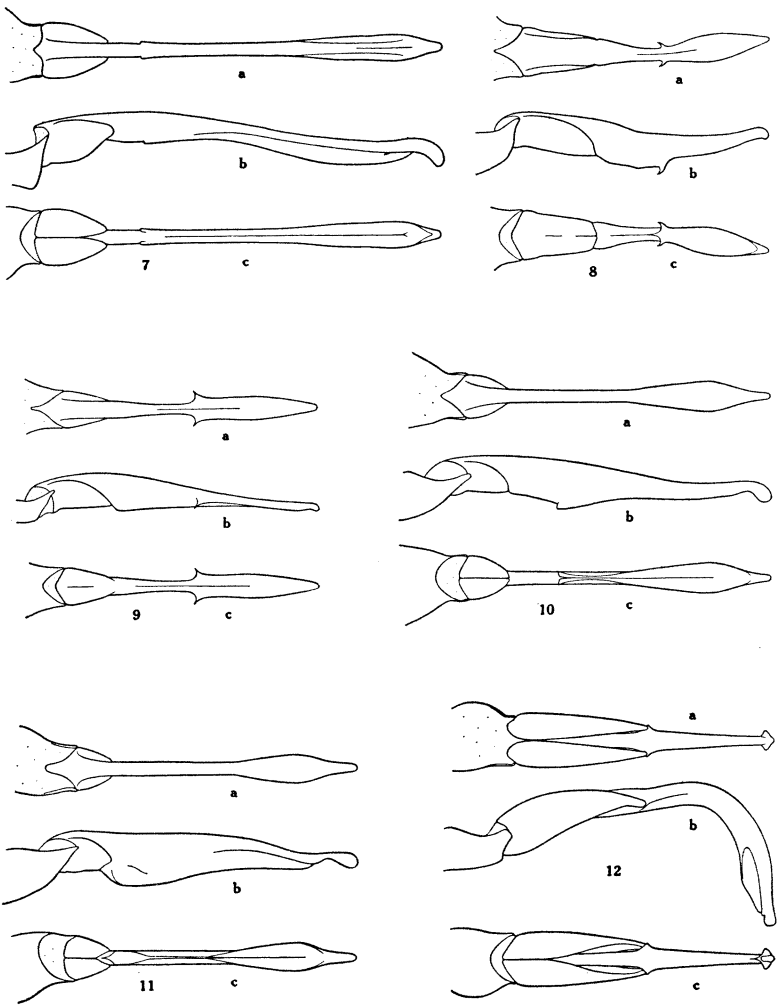
Fig. 10.—*Lycus simulans* Schaeffer, male genitalia. Pinal Mts., Arizona, VII–24–41, F. H. Parker.

Fig. 11.—*Lycus loripes* Chevrolat, male genitalia. Pinal Mts., Arizona, VII–10–48, F. H. Parker.

Fig. 12.—*Lycus lateralis* Melsheimer, male genitalia. Lake Placid, Florida, IV–24–47, J. G. Needham.



FIGURES 1–6



FIGURES 7–12

Transactions of the American Entomological Society, Vol. LXXV.
Pages 53–70 Issued July 29, 1949 1167.45