

RESULTS OF THE YALE PERUVIAN EXPEDITION OF 1911.
ORTHOPTERA (ACRIDIIDÆ—SHORT-HORNED LOCUSTS).

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The insects upon which the present report is based are part of a collection made in Peru, South America, by the Yale expedition of 1911. While not extensive, this collection of locusts is interesting on account of the large percentage of new forms that are contained in it. Only 19 species and subspecies are represented by the 92 specimens at hand. Of these 7 are apparently new, and among these are 2 apparently new genera.

Family PROSCOPIDÆ.

ANCHOTATUS PERUVIANUS Bruner.

A single specimen was taken 7,000 feet above sea level on August 8, at Tincochaca.

CEPHALOCOEMA VITTATA, new species.

Similar in form to *Cephalocoema costulata* Burmeister, but very distinct from that species in its much smaller size and smoother body. In the synoptic table of species by me published in the thirtieth volume of the Proceedings of the United States National Museum this insect runs to section *A* under *bb*.

Head a little longer than the pronotum, the rostrum of the vertex slender, quadrangular, a trifle exceeding the rest of the head in length, its sides nearly parallel, in the male gently bent downwards apically, in the female straight; eyes not prominent; antennæ scarcely one-half (male) or a trifle more than one-half (female) the length of the rostrum. Pronotum a little narrowed in advance of the middle, the median carina rather strong and bordered on either side by a well-defined longitudinal sulcus that extends also across the meso- and meta-thorax as well as most of the abdominal segments. There are two small but fairly conspicuous wart-like raised spots on the disk

of the prothorax just back of its middle, and the anterior margin is very gently expanded and rounded. Hind femora slender, short, the carinæ not conspicuous; hind tibiæ also slender, 8 or 9 spined on both edges. Supra-anal plate of female elongate triangular, its apex reaching one-third the length of the upper valves of the ovipositor; last ventral segment of male abdomen lanceolate, tricarinate, about as long as the rostrum of the vertex, its apex deeply emarginate.

General color pale brunneo-testaceous; in the female longitudinally trivittate with dull olive above, in the male uniformly olivaceous above and testaceous beneath.

Length of body, male, 45 mm., female, 62 mm.; of head, male, 9 mm., female, 11 mm.; of rostrum, male, 5 mm., female, 6 mm.; of pronotum, male, 7 mm., female, 9.5 mm.; of hind femora, male, 15 mm., female, 19 mm.

One male, three females, two nymphs, Cuzco, July 6-12, 11,500 feet altitude; one nymph, Ollantartambo, July 21, 9,000 feet altitude.

Type.—Female, July 6. Cat. No. 15039, U.S.N.M.

Family TRYXALIDÆ.

ORPHULELLA PUNCTATA De Geer.

Several specimens from Santa Anna, at an elevation of 3,000 feet and a single one from Huadquina, the latter at 5,000 feet above sea level.

These insects are somewhat variable, but run to *punctata* by the various synoptic keys.

ORPHULELLA INTRICATA Stål?

Other specimens of an *Orphulella* coming from San Miguel and Paltaybamba fall nearer to Stål's *intricata* which is not distantly removed from *punctata*. The altitude of the latter locality is given as 5,000 and the former as 6,000 feet.

MELOSCIRTUS MONTANUS, new species.

Similar to, but much larger and more robust than, *Meloscirtus australis* Bruner from Paraguay. Possibly quite variable in color, but without fuscous bands or maculation on the hind femora.

Head moderately large, as wide as the front edge of the pronotum. Eyes a little longer than the anterior edge of the cheeks immediately below them, separated above by a space one-half wider than the frontal costa between the antennæ, the fastigium noticeably but shallowly sulcate, its antero-lateral carinæ meeting in front in a right angle, the lateral foveolæ very plainly visible from above, a little more than twice as long as broad, quadrangular. Frontal costa prominent, widening almost evenly downwards and reaching the clypeus, not at all or scarcely sulcate, coarsely punctulate at sides above the

ocellus. Antennæ slightly flattened, only reaching the last transverse sulcus of the pronotum. The latter a little constricted laterally in the middle, the lateral carinæ prominent, continuous strongly arcuate, approaching most closely at the anterior transverse sulcus; median carina prominent throughout, cut at middle by the last sulcus; anterior margin straight, the posterior margin broadly angulate; lateral lobes more or less longitudinally rugose, the hind lobe coarsely punctulate. Tegmina abbreviated, lateral, acuminate, their costal margin roundly expanding on the basal half. Hind femora moderately robust, as long as the abdomen; the tibiæ 10-spined externally, the inner apical spurs much longer than the outer ones, unequal in size.

General color varying from pale green to dull wood brown. Marked on the sides of head, pronotum and tegmina much as is *Meloscirtus australis*. Hind femora without definite fuscous markings across the upper edge and outer disk. The inner disk somewhat varied with piceous, and the upper portion of outer disk evenly embrowned. Tegmina faintly conspersed with fuscous and provided with a lanceolate subcostal pale stripe that extends fully three-fifths the length of the wing. Lower side of body pallid; the hind tibiæ vinaceous red.

Length of body, female, 21–23 mm.; of pronotum, 4.35 mm.; of tegmina, 7 mm.; of hind femora, 13 mm.

Habitat.—There are four female specimens of this locust at hand. They were taken in July at Cuzco, Peru, 11,500 feet above sea level, where the insect fauna undoubtedly is strongly boreal in its make-up.

Type.—Female. Cat. No. 15040, U.S.N.M.

Family LOCUSTIDÆ (OEDIPODINÆ).

TRIMEROTROPIS OCHRACEIPENNIS Blanchard.

The only Oedipodine locust represented in the collection studied is referred to Blanchard's *ochraceipennis*. The nine specimens at hand were taken at Cuzco, where the elevation is recorded as 11,500 feet. Both sexes are represented. They show but little variation in markings and size.

Family OMMEXICHIDÆ.

OMMEXECHA BRUNNERI Bolívar.

Four specimens belonging to this genus are referred to Bolívar's *brunneri*. They were taken, one male at Huadquina, two females at San Miguel, and the fourth at Torontoy, the latter having an elevation of 7,000 feet. All these specimens were taken during the latter part of July.

CUMAINOCLOIDUS, new genus.

The present genus is based on an apterous or subapterous locust with a slightly compressed and rather strongly rugose body, having

the hind margin of the pronotum plainly reflexed and strongly undulate throughout. The hind tibiæ are spined at the apex externally and the prosternum has its anterior margin developed into a fairly strong spine.

While very distinct from all other known forms this insect seems to show affinities with the Ommexichidæ rather than with the Acridiidæ or Cyrtacanthacidæ, as we may be obliged to write it. Its type is the following-described species:

CUMAINOCLOIDUS CORDILLERÆ, new species.

Body robust about the thorax and the base of the abdomen, compressed, the surface of the head, pronotum, meso- and meta-thorax and the basal segment of the abdomen irregularly and strongly rugose. Head moderately large, higher than wide, its sides nearly parallel, set into the thorax almost to the eyes. Lateral eyes small, not prominent, elliptical, separated above by a space equal to their shortest diameter, the front portion of the occiput irregularly rugose, the vertex but little depressed, bounded by strong but sinuose carinæ that converge suddenly in front and unite with the lateral walls of the frontal costa, the sulcation irregularly studded with rugosities; frontal costa moderately prominent, narrow above, evenly and gently expanding below, continuous to the clypeus, profoundly sulcate and also studded below the ocellus with a few rugosities; lateral or facial carinæ somewhat divergent below, somewhat irregular or crenulate; the front rather profusely rugulose, as are also the genæ, the anterior margin of the latter nearly or quite one-half longer than the eyes. Antennæ slender, not quite as long as the head and pronotum combined, most of the joints a little depressed, 16 or 17 in number. Pronotum tectiform, the median carina prominent and notched by all three transverse sulci, giving to it a lobed appearance when viewed laterally, the posterior sulcus alone continuous; lateral carinæ wanting; anterior margin faintly undulate and slightly angulately advanced upon the occiput, but with the apex gently notched; hind margin somewhat thickened or reflexed, lobately undulate throughout with about seven such lobes on each side of the middle. Surface rugose. Tegmina visible only as very minute lateral pads, the apex of which barely show beyond the hind margin of the pronotum. Hind femora moderately robust, evenly tapering toward the apex, the outer and upper carinæ rather distantly and minutely spined or toothed; hind tibiæ robust, 11-spined on both margins including the apical ones, the spines heavy and equal on the two margins, extending from near the base. Prosternum with its anterior margin at center raised so as to form a fairly acute triangular spine. Mesosternal lobes rounded internally, the space between them fully twice as wide as long and wider than the lobes themselves;

metasternal lobes also quite widely separated. Valves of the ovipositor short but strong, the apical hooks short. Auditory apparatus minute or missing.

General color variable, possibly depending upon the kind of soil upon which the insect is found, in the type-specimen brunneo-testaceous, with a ferruginous tinge on its pronotum and the outer disk of the hind femora. The latter with a basal, median, and subapical fuscous patch on the upper margin; the genicular lunules piceous, as are also the carinal teeth; lower sulcus bright carmine; hind tibiæ pale cinereous varied with fuscous flecks and blotches. The second specimen is quite uniformly cinereo-fuscous, showing a tinge of ferruginous only on the lower part of the thorax about the base of its anterior and middle legs. The antennæ in both specimens are ashy gray apically.

Length of body, female 25 mm.; of pronotum, 5.75 mm.; greatest width of latter, 6.5 mm.; length of hind femora, 13 mm.; of antennæ, 6.5 mm.

Two females, Ollantaytambo, Peru, July 21, at an elevation of approximately 9,000 feet above sea level.

Judging from the general appearance of the two specimens before me, this insect must be confined in its distribution to more or less arid localities.

Type.—Cat. No. 15041, U.S.N.M.

Family CYRTACANTHACRIDÆ (ACRIDIIDÆ).

DIEDRONOTUS ANGULATUS Stål.

Only a single specimen of this extensive South American genus is at hand. It was taken on the Pampaconas River during the month of August. While the present insect is rather longer winged than usual, it is referred, nevertheless, to Stål's *angulatus*.

PRIONOLOPHA SERRATA Linnæus.

Two females of this magnificent locust are at hand from Huadquina. They are typical specimens.

URUBAMBA, new genus.¹

Related to *Jivarus* Giglio-Tos and *Platyphyma* Fieber. A genus of inconspicuous South American locusts of small size, the species of which are either apterous or subapterous, and have apical spines on both margins of the hind tibiæ and a much shorter hind lobe of the pronotum than the anterior one. The posterior margin of the former is broadly emarginate. So far as known the representatives of this genus are confined in their distribution to the Andean regions of

¹ Urubamba is a geographical name in the region which is the habitat of these small locusts. It has been chosen on account of its euphony.

Peru and possibly of Bolivia and Ecuador also. *Platyphyma* is found only in the Old World, and hence need not be compared with *Urubamba*, which latter genus may be separated from *Jivarus* by the following table:

Key for separating the South American Platyphymata.

Body subfusiform; front strongly oblique. Antennæ 16-jointed. Last ventral segment of male abdomen conical, somewhat acute; the cerci compressed and with the apex spatulate, truncate. Hind tibiæ 8-spined on both margins.

Jivarus Giglio-Tos.

Body robust anteriorly, but tapering caudad. Front normal, only perceptibly oblique. Antennæ 18-jointed. Last ventral segment short, the apex rounded; the cerci long and slender, the apex pointed. Hind tibiæ 9-spined on both margins *Urubamba*, new genus.

Two distinct species of the genus are at hand, and both seem to be undescribed. They may be separated by the characters given in the subjoined synoptic key.

Body more slender, entirely apterous; the pronotum very strongly rugulose; the lateral carinæ not prominent and much interrupted; the transverse sulci not especially profound. Prosternal spine, coarse, short, and blunt. Hind femora, at least in the female, provided with fuscous bands, the genicular area not infuscated. Insect, especially the legs, strongly hirsute. *aptera*, new species.

Body more robust; the pronotum rugose only at the sides of the anterior lobe, the hind lobe coarsely and closely pitted or punctulate; lateral carinæ prominent, but little interrupted; transverse sulci profound. Prosternal spine robust and transverse at its base, acuminate. Hind femora without fuscous bands, the genicular portion prominently infuscated. Insect scarcely hirsute, even on the legs *inconspicua*, new species.

The species *aptera*, which is represented by both sexes, may be considered as the type of the genus.

URUBAMBA APTERA, new species.

General color pallid, more or less varied on the head back of the eyes, on the upper half of the sides of the pronotum, and on the sides of the basal abdominal segments with brown or piceous. Possibly varying from testaceous to olivaceous in life according to habitat and age. Hind femora in the female with traces of fuscous bands above and on the outer disk. Lower sulcus reddish purple; hind tibiæ also likewise tinged.

Body rather profusely hirsute throughout; especially is this true with reference to the legs and the hind tibiæ and tarsi in particular, which are clothed with a long pale pile. Head of moderate size, as wide above as below, the eyes rather prominent, rounded behind, narrowest above, the anterior margin straight, separated at the vertex above by a space a little less than the greatest width of the frontal costa above the ocellus; the fastigium of the vertex pro-

foundly sulcate and angulately separated from the shallow sulcation of the frontal costa; latter fairly prominent and gently constricted at its sides just below the ocellus, reaching the clypeus; the lateral or facial carinæ divergent below, prominent. Antennæ filiform, in the female not quite as long as, in the male a little longer than, the combined length of the head and the pronotum. Pronotum short, but little (female) or not at all (male) expanded posteriorly, the disk gently tectate, the median carina fairly prominent in front and behind, but obliterated at middle; lateral carinæ interrupted and inconspicuous; anterior margin broadly rounded and gently advanced upon the occiput; hind margin very widely and angulately emarginate. Hind femora slender, reaching (female) or slightly surpassing (male) the apex of the abdomen; the hind tibiæ 9-spined on both margins. Apical portion of male abdomen gently clavate, a slight constriction at the base of the last segment giving this portion a bilobed appearance. Supra-anal plate moderately large, the basal width a little greater than the median length, sides gently approaching apically, near the apex squarely docked but with a small central triangular apical projection; basal half with a triangular sulcation bordered by moderately prominent carinæ; marginal apophyses of preceding segment prominent, triangular and widely separated; male cerci about as long as the supra-anal plate, the basal three-fifths heavy, directed gently to the rear, apical two-fifths slenderer, directed upward, acuminate. Mesosternal lobes separated by a space equal in width to the lobes themselves. Prosternal spine robust, short and very blunt.

Length of body, male, 11 mm., female, 16 mm.; of pronotum, male, 2.5 mm., female, 3 mm.; of hind femora, male, 7 mm., female, 8.5 mm.

Habitat.—The female type comes from San Miguel, Peru, where it was collected September 1, at an elevation of 5,000 feet above sea level; the allotype was taken on August 9, at Tincochaca, at 7,000 feet elevation. Other specimens, immature males and females, are at hand from the last-named locality.

Type and allotype.—Cat. No. 15042, U.S.N.M.

URUBAMBA INCONSPICUA, new species.

A little larger and more robust than the preceding and provided with coarsely punctulate, small, lateral, spatulate tegmina that reach the apex of the first abdominal segment. This insect has a smoother pronotum than *U. aptera* and also has strong lateral carinæ on the pronotum. Its hind femora are much more robust and lack the fuscous bands that characterize the species with which compared, but these members have their genicular area strongly infuscated instead.

The specimens of this insect so far as represented in the material before me appear to have been preserved in spirits which have left left them rather uniformly dark vinaceous in color. In life they were possibly olivaceous, with the tegmina flavous and the tibiæ tinged with red. No indications remain of a possible paler lower border on the lateral lobes of the pronotum which are strongly so marked in the species *aptera*.

Length of body, female, 17 mm.; of pronotum, 3.5 mm.; of hind femora, 10 mm.

Habitat.—Three specimens, females, are at hand from Pampaconas River, Peru. They were taken during August.

Type—Cat. No. 15043, U.S.N.M.

PROCTOLABUS BULLATUS Rehn.

There is a male specimen of *Proctolabus* contained in the material taken at Paltaybamba on August 27. Although collected in spirits it still shows the characteristic color patterns. Its antennæ are long and slender, being distinctly longer than the slender hind femora. The latter are olive green with an infuscated genicular area, and the hind tibiæ are reddish with 6 to 8 spines in the outer row. The cerci are a trifle heavier at the point where they bend upward than shown in Rehn's figure.¹

It is barely possible that the insect described by the present writer under the name of *Poecilocloeus ornatus*² is the other sex of this species. The pallid apical joints of the antennæ of that insect would seem, however, sufficient ground to preclude such a surmise, as would also the difference in the arrangement of the thoracic orange markings.

PARALEUAS MINOR Bruner.

On August 6, 1911, a single male specimen of this small locust was secured. It bears the locality label "Paltaybamba" and also 5,000 feet.

DICHOPLUS PERUVIANUS AURIVENTRIS, new variety.

Specimens of a *Dichroplus* are at hand from several localities in the Peruvian Andes that come quite close to *D. peruvianus*, but which are sufficiently distinct in several respects to constitute a separate or distinct variety. Only one of these is in color, the others having been immersed in spirits for longer or shorter periods. The male under consideration has the venter and anal segments of the abdomen brightly tinged with orange, and the sexual characters are simpler than in typical *peruvianus*. The cerci are slenderer and not spatulate at the apex as there, but slightly flattened, acuminate, and bent inwards instead of gently sulcate externally and directed upwards.

¹ Proc. U. S. Nat. Mus., vol. 25, p. 397, fig. 3.

² Tire des Horæ Societatis Entomologicæ Rossicæ, vol. 29, p. 474, Dec., 1910.

The last ventral segment of the abdomen in the variety is shorter than in the typical form.

Length of body, male, 14.5 mm., female, 22 mm.; of pronotum, male, 3.9 mm., female, 5.15 mm.; of tegmina, male, 4 mm., female, 6 mm.; of hind femora, male, 10 mm., female, 12 mm.

Habitat.—Huadquina, in July, at an elevation of 5,000 feet, also at Tincochaca, 7,000 feet, during August.

Type.—Male from Huadquina. Cat. No. 15044, U.S.N.M.

Specimens of the species coming from an elevation of about 4,000 feet are in the writer's collection. These latter are typical as to size, but some have fully developed wings that extend beyond the apex of the abdomen and tips of the hind femora in the male.

DICHIROPLUS PUNCTULATUS Thunberg.

Two males, two females, Huadquina, July, 5,000 feet altitude; one male, Paltaybamba, August 21, 5,000 feet altitude; one female, Santa Ana, August 3, 3,000 feet altitude.

DICHIROPLUS, species.

The collection also contains two mutilated females of a *Dichroplus* that were collected on the Pampaconas River during the month of August. These may belong to *D. peruvianus* also, in which case the species under consideration shows a still wider variation than is usual in the majority of species forming the genus. One feature of these last specimens is the coarseness and paucity of the veins of the elytra.

PARADICHIROPLUS ANDEANUS, new species.

A medium sized, variable insect with distinctly fuscous banded hind femora and red-tinted tibiae. Pronotum expanding strongly posteriorly; the dorsum of the abdomen linearly longitudinally pallid at middle and with a row of fuscous dots on each side near the middle of each segment. Antennæ rather robust, short, and gently flattened. Inner face and lower sulcus of the hind femora bright reddish orange in color. Possibly somewhat related to *P. bilobus* Giglio-Tos, which insect has not been examined by the writer.

Surface of the body rather smooth and appearing polished or glabrous. Head of moderate size, a little wider than (male) or not quite as wide (female) as the anterior edge of the pronotum; vertex a little narrower than the prominent frontal costa at the ocellus, its bounding walls prominent, the sulcus fairly profound; frontal costa provided with several coarse punctures above, most noticeably sulcate in the vicinity of the ocellus; continued to the base of the clypeus. Eyes large and fairly prominent in the male, not much longer than wide, their anterior edge but little arcuate, in the female less prominent and with the anterior margin straight; cheeks below the eyes in the

female about four-fifths, in the male scarcely more than one-half, the length of the greater diameter of the eyes. Antennæ short, comparatively heavy, their joints somewhat depressed so as to give to these members a flattened appearance. Pronotum evenly widening posteriorly, its surface only gently longitudinally rugose and sparsely punctured on the hind lobe; the median carina visible throughout but most prominent on the posterior lobe and near the front edge of the anterior lobe; lateral carinæ present on the hind lobe of both sexes and to a limited extent also on the anterior one; front margin straight, the hind margin truncate with the middle gently emarginate. Tegmina lateral, nearly twice (female) or a trifle more than twice as long as broad (male), their apex somewhat acuminate, their upper edges distant, but little if any surpassing the hind margin of the first abdominal segment. Abdomen evenly tapering caudal in the female, gently clavate in the male, the dorsum prominently carinated; last ventral segment of male elongate, its apex scarcely notched; supra-anal plate roundly triangulate with raised lateral margins and a heavy raised longitudinal ridge extending from the base to its apex and narrowly sulcate throughout, midway between the base and middle on each side of the plate is an inwardly directed short spur or tooth of the lateral carina; cerci heavy at base but rapidly narrowing toward the middle, curved gently upward and strongly inward, so that their apices almost meet just beyond the apex of the supra-anal plate; marginal apophyses of the preceding segment small and slender, projecting into the basal portion of the plate's median sulcus. Valves of the ovipositor well developed, strong, the apices gently curved. Prosternal spine coarse, pyramidal, transverse at base, the apex blunt. Hind femora normal, in the males a little surpassing, in the females not quite reaching the apex of the abdomen. Hind tibiæ 9-spined externally; anterior and middle femora gently arcuate, a little (female) or decidedly (male) enlarged or inflated. Interspace between the mesosternal lobes as wide as long (male) or noticeably wider than long (female).

General color varying from dark apple-green to a pale brownish-olive, more or less varied with ferruginous and fuscous. In the darker specimens there is a well-defined post-ocular band that is continued across the upper half of the sides of the pronotum, also a ferruginous triangle that continues backward across the disk of the pronotum bordered laterally by a pallid line above the carinæ. The tegmina of all color phases are ferruginous to dull brown; the dorsal carina of the abdomen is pallid, with an approximate fuscous dot on either side near the middle of the segments; the latter are largely piceous laterally, and especially so on those nearest the base. Below the insect varies from bright yellow to pale testaceous; the hind femora are obliquely banded with pallid and fuscous externally, while

below and internally they are largely bright reddish orange. The tibiæ vary from pink to deep purplish red.

Length of body, male, 16 mm., female 21 mm.; of pronotum, male, 3.3 mm., female 4 mm.; of tegmina, male and female, 3.5 mm.; of hind femora, male 9 mm., female 11 mm.; of antennæ male and female, 4-5 mm.

Habitat.—Cuzco, Peru, at an elevation of 11,500 feet, and at Urubamba, Peru, 9,500 feet above sea level.

Type.—A male, Cuzco, July 10. Cat. No. 15045, U.S.N.M.

OSMILIA CÆLESTIS Burmeister,

A single *Osmilia* coming from the Pampaconas River is referred to *coelestis* Burmeister, which seems to be distinct from the *violacea* of Thunberg.