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To the knowledge of fossil insects from  
Jurassic beds in Turkestan.

A. Martynov.

(Présenté par A. Karpinskij, de l'Académie, le 4 Mars 1925).

2. *Raphidioptera* (continued), *Orthoptera* (s. l.), *Odonata*,  
*Neuroptera*.

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The article contains a continuation of the description of Jurassic fossil insects from Turkestan<sup>1</sup>. Several forms, especially of *Orthoptera*, are very important for the elucidation of evolution of the recent groups, but, unfortunately, the want of place does not permit me to elucidate these questions in a more detailed manner.

I include here also the description of several specimens sent me from the Geological Committee, Leningrad, and collected by Prof. Wl. Muchin and Eng. N. Shabarov in the same locality, near the village Galkino, East Karatau.

Order **Raphidioptera** (continued).

**Mesoraphidia inaequalis**, n. sp.

(Fig. 1—2).

Head large, oval above, nearly as broad as long (fig. 1 *a*); antennae short and slender, composed of about 75 joints; in the basal portion of antenna the joints are broader than long, in the distal as broad as long (fig. 1 *d*); the length of antennae about 8 mm. Pronotum nearly quadrate above and seems to be slightly narrower than the head; its posterior portion is

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<sup>1</sup> First article see this Bulletin, 1925, pp. 1—14.

somewhat elevated. On the surface of the pronotum there are numerous transverse slender streaks (fig. 1 *c*), which are somewhat raised and black, whilst the ground colour is brownish. The surface of the head bears analogous streaks, but there they are somewhat irregular and placed not so closely (fig. 1 *e*). Mesonotum more broad than long; its scutum forming two rounded convexities; scutellum small; posterior thickening and its continua-

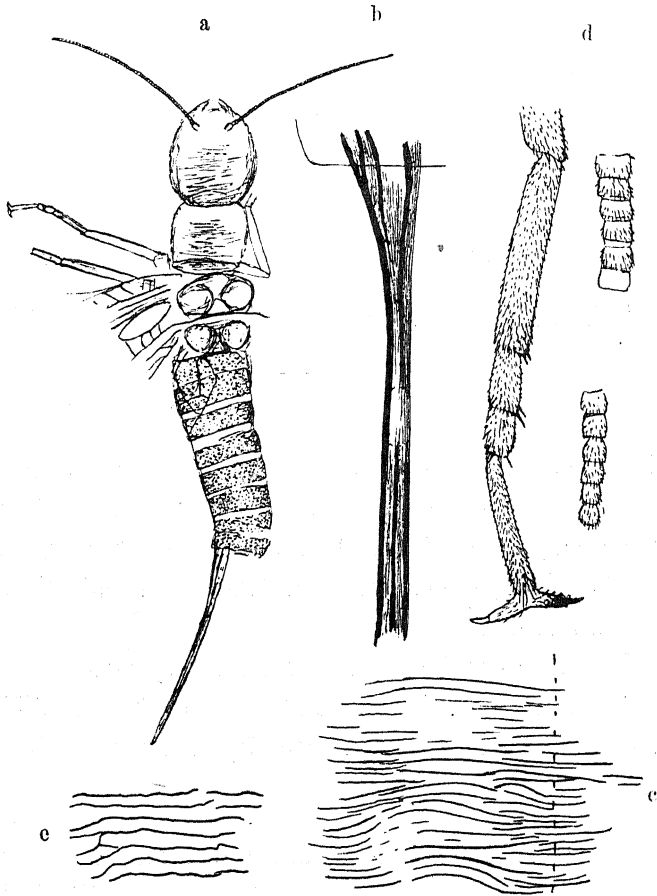


Fig. 1.

tion—axillary cord (Snodgrass)—distinct. Metanotum is also broader than long and has similar structure.

Legs densely clothed with minute hairs; first tarsal joint very long, 2<sup>nd</sup> short, 3<sup>rd</sup> still shorter, 4<sup>th</sup> long, only slightly shorter than the first and bearing two stout and hairy claws (fig. 1 *d*). 2<sup>nd</sup> and 3<sup>rd</sup> joint have, both, simple form, differing from that in the recent *Raphidiidae*.

In the ♀ abdomen one can perceive eight tergites; from the last one an ovipositor arises, about 8,5 mm. in length (fig. 1 a and 1 b).

Anterior wings similar to those of *M. grandis* Mart., but somewhat narrower and longer (fig. 2); costal area with 8 transverse nervules; in the subcostal area there are two distinct transverse nervules, one in the apical portion and one near the end of subcosta; before the apical nervule there is a third one, but very feeble and oblique. *Rs*, *M* and *Cu* as in *M. grandis*; the apical region, behind the anastomosis, somewhat narrower;  $RS_1$  with 4 branches,  $RS_{3+4}$  dividing at the anastomosis;  $M_1$  with a short fork,  $M_2$  simple, anterior branch of  $M_3$  forked, posterior simple;  $M_4$  gives two simple branches; basally from  $M_4$  there is one branch more, forming a small fork and corresponding to  $Cu_1$  of other species; *Cu* simple and

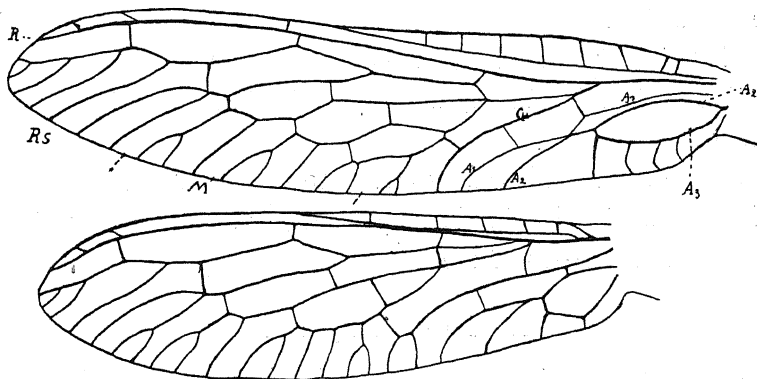


Fig. 2.

curved;  $A_1$  in the form of a slender vein connected with *Cu* by two transverse nervules and confluent with  $A_2$  in one point behind the basal cell; basal halves of  $A_2$  and  $A_3$  form an elliptical basal cell;  $A_1$  and the free portion of  $A_2$  form a *x*-shaped figure;  $A_3$  gives 4 somewhat curved branches directed to the hind margin. Posterior wings considerably (about  $\frac{1}{5}$  of their length) shorter than the anterior. Costal area narrow, with 5 transverse nervules; *R* touching the *SC*, then runs parallel to the costal margin; in the base of the wing *SC* fuses again with the *R*; before its end *R* is connected with the margin by two transverse nervules, the proximal of which is feeble.  $RS_1$  forms distally three branches,  $RS_2$  and  $RS_3$  simple,  $RS_4$  with a fork;  $M_1$  forked,  $M_2$  simple,  $M_3$  giving two branches, an anterior forked and posterior simple; in  $M_4$  anterior branch simple, posterior gives a fork; *Cu* with an apical fork, and  $Cu_1$  connected with  $M_{3+4}$  by a long transverse nervule;

cell  $M_1$  short and triangular, cell  $M_{2+3}$  large;  $RS$  has, proximally from the basal transverse nervule, a continuation nearly to the point of departing of  $M$ . Between this point and  $Cu$  there is a long arcuate transverse nervule; basal part of  $A_1$  disappeared, distal one forming with  $A_2$  a figure similar to that in the anterior wing; basal cell very broad,  $A_3$  with two short branches.

The nervures bear dense rows of short hairs.

Length of the anterior wings 16 mm., of the posterior 14 mm.; their breadth about 3,5 mm.

Well preserved specimen with both pairs of wings, Galkino, East Kara-tau (belongs to the Geological Committee).

This species belongs to the first group of the genus, containing as species *M. grandis* and *M. similis*. It differs from them in somewhat narrower apical region and in some other details of the nervation of the wings. The basal continuation, in the hind wings, of  $RS$  nearly to the base of  $M$  can be marked also in *M. similis*, and thus this feature at least in the first group, is common.

The above mentioned streaky structure of the surface of the pronotum and the head as well as the simple shape of the 2<sup>nd</sup> and 3<sup>rd</sup> tarsal joints must be added to the characters of the genus.

### Superorder **Dermatopteroidea** m.

Primitive insects, in the form of the body and of the appendages much resembling such insects as *Plecoptera* and *Embiodea*, but differing sharply from them, as also from *Orthoptera*, by the peculiar nervuration of the hind wings and the constitution of the elytra, in which features they resemble somewhat *Blattodea* and allied insects. Internal anatomy gives also distinctive features from all the *Orthopteroidea*.

Two orders, *Dermatoptera* and *Hemimeroidea*.

### Order **Dermatoptera**.

#### Family **Protodiplatyidae**, n. fam.

Antennae 17- or 18- jointed; first joint rather long and thickened at the apex, 2<sup>nd</sup>, 3<sup>d</sup> and 4<sup>th</sup> shorter, the remainder long (nearly as long as the first), somewhat thickened at their apices, several last joints becoming gradually more slender and smaller. Elytra not very broad, elongate, with 4—5 brownish vittae. Legs short, femora thick; at least the last femora

furnished with two carinae; the number of tarsal joints is five in the last pair and, probably, also five in two anterior pairs (fig. 3 and 3a). Abdomen cylindrical, with distinctly separated segments; segments three and four without lateral tubercles. Instead of forceps there are behind the last segment two short and slender segmented appendages, composed, each, of not less than 6 slender joints, the first one being the longest.

Gen. **Protodiplatys**, n. gen.

To the above named features can be added the following. First tibia thickened or dilated gradually to the apex; second and third anterior tarsal joints short, bearing, each, a tuft of black bristles at the end; first joint slightly longer, bearing on the under side two tufts of short bristles; fourth joint slightly longer and more slender. Last tibia slender; first and second tarsal joints bearing, each, a very small tuft of bristles; third joint slightly smaller, fourth still smaller and characteristically emarginate at the end; fifth joint as long as two preceding combined, dilated to the apex and somewhat bulbous, bearing two not very long but thick claws. Elytra elongate, with about five long, thin and elevated, carinate streaks, with 4 or 5 shorter longitudinal brown vittae and with an obliquely transverse spot near the middle. Tergites and sternites very distinct. Cerci slender; second and third joints short, first as long as 2<sup>nd</sup> and 3<sup>rd</sup> combined, 4<sup>th</sup> slightly shorter, 5<sup>th</sup> still shorter, 6<sup>th</sup> very small, rudimental. Size large, length of the body more than 20 mm.

**Protodiplatys fortis**, n. sp.

(Fig. 3).

♀. Joints of antennae brown in their thickened apical portion, pale in the basal one. Head and thorax crushed into a number of separate pieces. Anterior femora very thick, tibiae brownish in the basal, paler in the dilated apical portion; first three tarsal joints short, with very short bristles at the end; posterior legs brownish; the streak between the carinae paler. Elytra seem to become narrower to the apex; there are two distinct longitudinal vittae in the ventral and two similar ones in the dorsal half of elytra, beginning, each, at the base of elytron, running up to the middle, and becoming gradually more feeble in colour; under the first (costal) vitta can still be seen one more feeble brownish stripe.

Abdominal tergites and sternites (fig. 3) reddish-testaceous, each becoming brown near the middle and in the posterior portion; cerci dark brown.

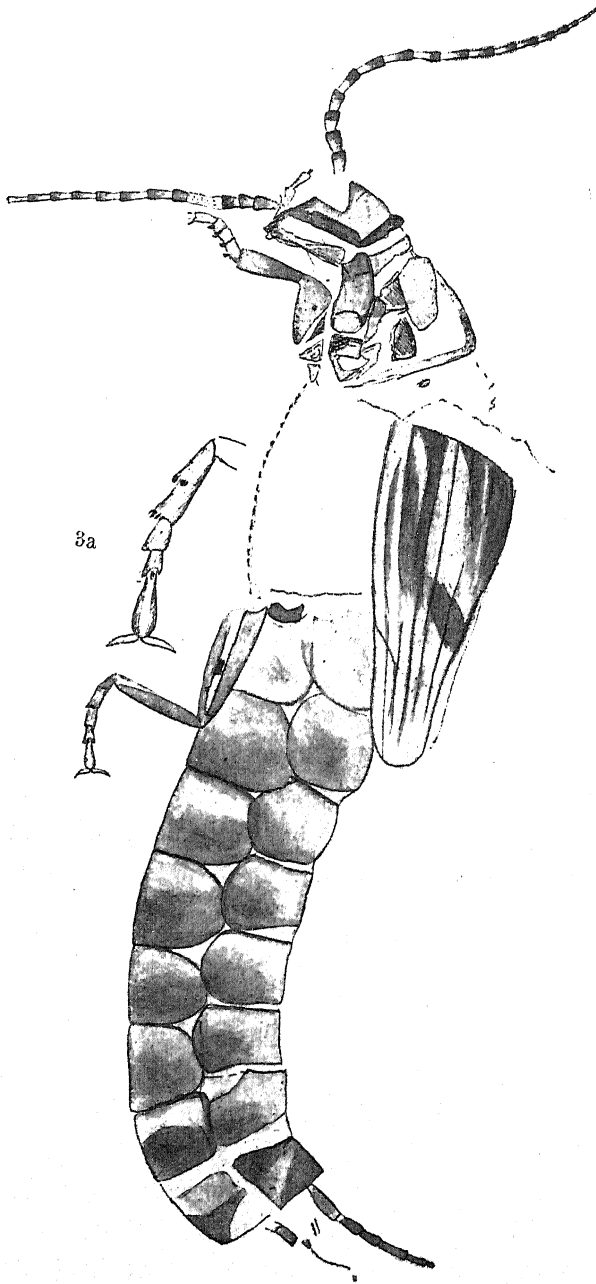


Fig. 3.

Length of the body about 22,5 mm., that of antennae 8 mm., and of cerci 3 mm.

Jurassic slates near the village Galkino. № 1775/5.

Head and prothorax crushed into some separate pieces; one anterior leg also damaged, but the last (5<sup>th</sup>) joint is obvious; left posterior tibia well preserved; right cercus represented with only basal joint.

This form is very interesting. The 17-jointed antennae, striped elytra and carinate femora, at least the posterior, testify its close relation to the families *Pygidicranidae* Burr and *Diplatyidae* Verh. On the other hand, such features as 5-jointed tarsus (at least in the posterior legs) and jointed cerci, range the form in question in a wholly separate position. However, it can hardly be doubted that both these features are archaic, representing the conditions in the ancestors of all recent Forficulids.

The presence of the jointed cerci, moreover, is another extra proof of the near relationship to the *Diplatyidae*, as the latter till now preserve long, jointed cerci in the nymphal phase.

Thus, though from the morphological point of view the described species cannot be ranged even in the frames of the order, genetically it is a form very nearly allied to the ancestors of the present *Diplatyidae*. One cannot consider it to be the direct ancestor of the present *Diplatys*, already from its large size, which exceeds the dimensions of the recent species of *Diplatyidae* not less than twice. Thus, our primitive genus leads to the *Diplatyidae*, but stands in a side-line.

*Dermatopteron*, gen. ? *incerta*, n. sp.

(Fig. 4).

Specimen № 1775/6, Galkino. Only head, thorax and first abdominal segment preserved; all visible from beneath. Head broad posteriorly, then narrowing triangularly forwards; antennae long and slender; judging from their 3 or 4 preserved joints, they were elongated. Prothorax anteriorly narrower than the head, slightly dilated posteriorly; meso- and metathorax rather broad. Legs short; coxae short; posterior coxae placed distantly, median and anterior nearer to each other, but not touching one another; anterior and middle femora somewhat spindle-shaped, tibiae slender, tarsus invisible; posterior femora very

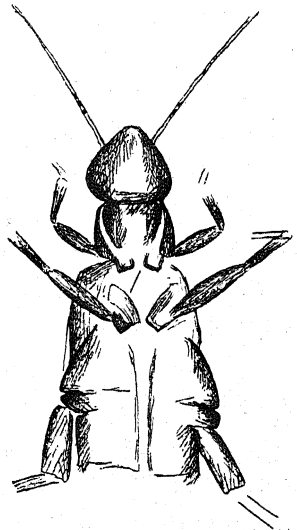


Fig. 4.



broad, with two thin brown stripes or lines (on the right leg); tibiae slender. On the right side, between the middle and the base of posterior femora one can perceive two stripes, probably, vestiges of right elytron. First abdominal sternite broad. In the middle of the 2<sup>nd</sup> and 3<sup>rd</sup> thoracal and first abdominal segments there is a longitudinal pale stripe. Length of preserved portion of the body 10 mm., breadth of abdominal segment about 3,5 mm. Total length of the body must be about 25 — 26 mm.

In the general shape, mode of setting of the legs and the shape and size of the femora and tibiae this new form somewhat resembles those in *Plecoptera*, *Embiodea* and *Dermatoptera*, but comparatively narrow prothorax, which anteriorly is narrower than the head, testifies that it belongs rather to *Dermatoptera*.

#### Superorder Orthopteroidea Handl. (s. emend.).

In this superorder I include orders *Embiodea*, *Plecoptera*, *Phasmatodea*, *Saltatoria*, all *Protorthoptera*, *Chresmodea* and in the same time I exclude from it the orders *Dermatoptera* and *Thysanoptera*. *Dermatoptera* and *Thysanoptera* I refer to separate superorders. *Plecoptera* by the nervuration of the wings and by the structure of the thorax (of the meso and metanotum especially) resemble very much many *Orthoptera* *Saltatoria* and *Protorthoptera*, such as *Spanioderidae*, especially. Thus, they must be undoubtedly included in the same superorder as *Saltatoria*. *Embiodea* are near relations of *Plecoptera*.

Some previous remarks on the homology and terminology of the wing-veins in *Orthopteroidea*.

In *Orthopteroidea*, *Blattodea*, *Isoptera* there are groups, in which the region of anterior wings (elytra), lying anteriorly from the *R*, happens to be large and containing several nervures, independently going into the base of the wings (*Mylacridae*, some *Dictyomylacridae*, *Mastotermitidae*, some *Protermitidae*, some *Locustodea*, *Gryllacridae*, *Stenopelmatidae*, some *Gryllodea*). These nervures in some *Blattodea* (many *Mylacridae*) are homonomous enough and form a group similar to that of anales. We shall name these nervures as subcostae and count them from *R* to the anterior margin (*SC*<sub>1</sub>, *SC*<sub>2</sub> etc.), in the same manner as we count anales from *Cu* to the posterior margin. When this region of subcostales (or preradial region) is great, the anterior margin is usually membranous, not framed by a special costal nervure. This nervure is generally formed, as I have shown in another place<sup>1</sup>, by the

<sup>1</sup> Martynov. Proc. I. Congr. Russ. Zoolog. etc., in 1922 (8; 1923). Analogical views are expressed in 1893 by I. Comstock (1).

confluence of the elements of primitive net and, besides, of approximated ends of some subcostales and their branches.

In most *Orthopteroidea* (*Acridioidea*, *Locustodea*, many *Protorthoptera*) *RS* gives (in clytra) usually several branches, running parallelly to the distal portion of the hind margin. The number of these branches is somewhat indefinite. This constitution of *R* and *RS*, resembling somewhat that in some *Palaeodictyoptera*, as well as *Neuroptera*, cannot be derived from the well known primitive type of Comstock, which corresponds to the conditions chiefly, in *Trichoptera*, *Lepidoptera* and *Diptera*. *M* divides already in most *Protorthoptera* into two branches, which we name *MA* (*M*. anterior) and *MP* (*M*. posterior)<sup>1</sup>. Anterior branch as a rule still divides, sometimes repeatedly, but oftener into two branches, *M*<sub>1</sub> and *M*<sub>2</sub>. *MP* (or *M*<sub>3</sub>) branches more rarely.

The primary branching of *Cu* is very different. In *Spanioderidae*, *Stenaropodidae*, *Geraridae*, *Omalidae*, *Oedischiidae* and some others *Cu* gives a successive series of similar branches, running to the hind margin. Such a state is preserved (in the anterior wings), partly, in many *Plecoptera*, some *Embiodea* (*Clothoda*) and *Phasmatodea*, but in the living *Acridioidea* and *Locustodea* it is simplified, mostly, to only two main branches, with the vanishing of some intermediate ones. We will name them as *Cu*<sub>1</sub>, *Cu*<sub>2</sub> etc., but we must not forget that *Cu*<sub>2</sub> is not a true *Cu*<sub>2</sub>, some intermediate branches being disappeared<sup>2</sup>.

*Cu*<sub>2</sub> of authors we consider as *A*<sub>1</sub>, *A*<sub>1</sub> and *A*<sub>2</sub> of authors as *A*<sub>2</sub> and *A*<sub>3</sub>. In the more archaic *Protorthoptera* there are still 2 or 3 anal veins, but in most of the recent *Orthoptera* they became only branches of *A*<sub>3</sub>.

## Order Orthoptera Saltatoria.

### Suborder Acridioidea.

#### Family Pamphagopsidae, n. fam.

Posterior wings resembling those of *Locustopsidae* Handl. and of recent *Acridioidea* and differing in following:

- 1) Subcosta long, reaching nearly the end of the wings;
- 2) *R* gives in the distal half several branches, running parallelly;
- 3) *RS* runs at some distance from *R* and gives about 7 branches;

<sup>1</sup> Not anticipating the decision with regard to the homology of these branches with *MA* and *MP* of *Palaeodictyoptera*.

<sup>2</sup> In *Aboilus*, n. g., we name the proximal branch of *Cu* as *Cu*<sub>n</sub>.

4) *M* and *Cu* divide nearly at the point of the departing of *RS*;

5) *Cu*<sub>1</sub> is confluent at some distance with *M*<sub>3</sub>, then separating and running independently, as in anterior wings of *Acridiodea* and, without doubt, in anterior wings of the *Pamphagopsidae*;

6) anal region of ano-jugal fan does not reach the end of the wing and apical free portion of the wing is rather great.

Genus **Pamphagopsis**, n. gen.

With features of the family. The net between the longitudinal veins is represented by rows of transverse nervules, that in the spaces between the branches of *RS* by pentagonal cells in the distal and by transverse nervules in the basal portion. In the anal region there are analogous angulate cells.

Two species known.

1. **Pamphagopsis maculata**, n. sp.

(Fig. 5).

Length of the posterior wings about 50 mm. Between costal margin and *Sc* there is a row of oblique transverse nervules; *R* gives, at acute angles, 5 branches, running parallel to the apical portion of costal margin; *RS* separates from *R* somewhat before the middle of the wing and diverges up to the point of arising of the first branche of *RS*, then gradually approaches *R*. *M*<sub>1+2</sub> divides at the level of the separation of *RS*; free portion of *Cu*<sub>1</sub> is more than twice as long as the confluent one.

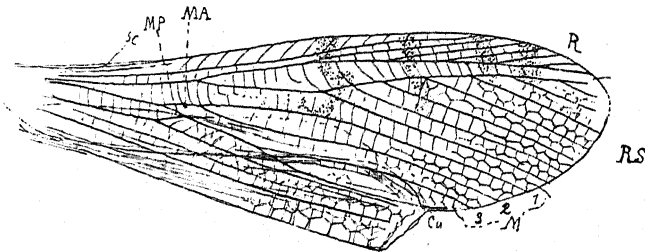


Fig. 5.

In the anterior (costal) part of the wing there are about four transverse brownish spots.

Jurassic slates near Galkino, specimen № 1775/7.

Only one hind wing preserved; ano-jugal fan folded.

2. *Pamphagopsis modesta*, n. sp.

(Fig. 6).

Length of the posterior wing about 28 mm. Nervature similar to that in the preceding species, differing in the following. *RS* does not deviate from *R* near the middle and runs parallelly to it; intermediate (between the branches of *RS*, *M* and *Cu*) longitudinal zigzagged nervures distinct; free portion of *Cu* is only slightly longer than the confluent one.

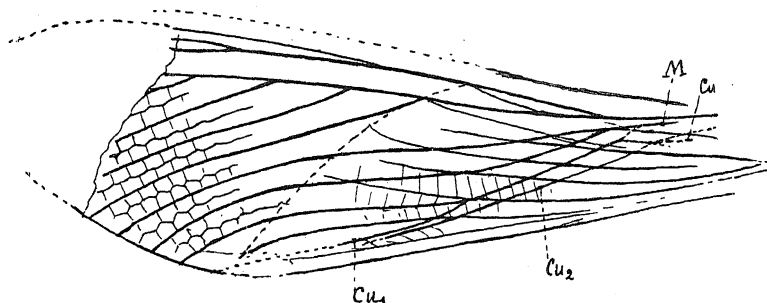


Fig. 6.

Jurassic slates near Galkino, specimen № 1775/8.

One hind wing with folded ano-jugal fan.

Length of the preserved piece is about 24 mm., total length of the wing must be about 28 mm. Transverse nervules invisible, except the areas between some anal longitudinal veins; intermediate longitudinal veins and pentagonal cells in the region of *RS* are distinct.

By the long *Sc*, the shape of *RS* and, especially, by the furcating of *M* and *Cu* at the level of arising of *RS* as well as by the mode of union of *Cu*<sub>1</sub> with *M*<sub>3</sub> the described hind wings resemble much the anterior wings of many *Acridiodea* (not *Locustodea*) and also *Locustopsidae*, except the absence, in the last named insects, of union between *Cu*<sub>1</sub> and *M*<sub>3</sub>. On the other hand, the presence of *M*<sub>3</sub> and *Cu*<sub>1</sub> and their union, the presence of branches on the anterior side of *R* and comparatively large size of the free (projecting) apical portion of the hind wings in the just described genus represent archaic features, which in nothing contradict their above named relations with *Acridiodea*.

In the hind-wings of recent *Acridiodea*, as known, *M* divides into two branches and *Cu* goes to the end as one simple vein. However, it is doubt-

less that such a simplification of the veins *M* and *Cu* in the hind wings resulted in connexion with an enormous dilatation of ano-jugal fan, but formerly, when this fan was smaller, the veins *Cu* and *M*, as also the nervuration of the whole costo-cubital region, must have had much more similarity with those in the anterior wings. The described hind wings of *Pamphagopsidae* exactly represent this transitional state.

But also in the present times there exist such *Acridiodea*, which preserve in the hind wings some traces of the formerly more complete constitution of the veins *M* and *Cu*, similar to that in the anterior wings. Such traces we find, namely, in *Pamphagidae*. In the genus *Porthetis* Serv., in *P. carinata* L. and *P. consobrina* Sauss., for instance, *Cu* divides in the hind wings into two branches and *Cu*<sub>1</sub> is confluent, for some distance, with the yet existing *M*<sub>3</sub>, then separates and runs independently (as in anterior wings). However, in *Pamphagopsidae* the whole configuration of *M* and *Cu* is a more archaic, and we can be convinced, that in their anterior wings the nervuration in the region of *RS*, *M* and *Cu* was very similar.

Thus, we can be sure, that *Pamphagopsidae* belong to the *Acridiodea*, but they are more archaic than the present families of that suborder. Such a primitiveness induces us to suppose that they had, perhaps, long antennae, like those of *Locustopsidae*.

In the configuration of *R* and *RS* and, especially, in the nearness of *RS* to *R*, *Locustopsidae* Handl. are still more similar to the present *Acridiodea*, but differ (in the wings), chiefly, by the absence of confluence between *Cu*<sub>1</sub> and *M*<sub>3</sub>.

In the branching of *R*, as well as in the position of *RS*, *Pamphagopsidae* remind also the *Gryllacridae*, but these features are archaic, and such a resemblance cannot prove the proximity of our genus to *Gryllacridae*.

Similar character of *R* and *RS* we find also in *Pseudohumbertiella* Br., Redt., Ganglb., but here the *M* branches too distally, and, therefore, this genus cannot be ranked in our family.

The character of *R* and *RS* in *Zalmonites geinitzi* Handl. (Lias) is still more similar to that in *Pamphagopsis*, but the fragment of the wing of *Zalmonites* is too small.

At last, one can notice some similarity with the wing of *Eospilopteron ornatum* Cockerell (Lias of England), but here the *Cu* does not even approach the *M*<sub>3</sub> and, according to Cockerell, is simple («cubitus, apparently, simple») <sup>1</sup>.

<sup>1</sup> Cockerell. British fossil Insects. Proc. U. S. Nat. Mus., vol. 49, 1915, p. 472.

Suborder **Aboilodea**, nov.

Locustoid insects with long antennae and well developed musical apparatus in the males. In the elytra *R* has several branches in the apical region; *RS* departs mostly before the middle of the wing and gives several (4) branches; *M* furcates before the point of separation of *RS* and gives three very long branches, running to the distal part of the dorsal margin; *M*<sub>3</sub> fuses at a short distance with *Cu*, then runs independently; the stem of *Cu*, up to the connection with *M*, is rather feeble; *Cu* divides into several branches directed to the distal part of the dorsal margin and running parallelly to the branches of *M*. Musical apparatus rather large, occupying about half of the length of the elytron.

Between longitudinal nervures there are rows of numerous parallel cross-nervules, and similar, but very long cross-nervules can be observed in the musical apparatus, between *Cu*<sub>n</sub><sup>1</sup>, *A*<sub>1</sub> and *A*<sub>2</sub>.

With one

Family **Aboilidae**, n. fam.

With features of the suborder.

Genus **Aboilus**, n. gen.

Elytra broad and, probably, rounded at the apical margin. *R* gives 3 or 4 long branches, *RS* separates slightly before the middle of the wing and gives 4 or 5 branches; *M* divides earlier and gives, as in *Acridiodea*, three branches, but very long, ending nearly in the apical margin; *M*<sub>3</sub> is connected, at the beginning, with *Cu*, then it separates and runs independently. The branches of *M*, *RS* and *Cu* bow-shaped, parallel and running to the apical and distal portion of the dorsal margin. *Cu* after the separation of *M*<sub>3</sub> divides into 4—6 arched branches and after some interval gives still one branch, *Cu*<sub>n</sub>, connected with *A*<sub>1</sub> and with the preceding last branch of *Cu* by several long and parallel nervules. Musical apparatus large and divided into three portions by the veins *Cu*<sub>n</sub> and *A*<sub>1</sub>.

**Aboilus fasciatus**, n. sp.

(Fig. 7).

♂. In the distal portion of the praeradial area one can observe the rests of 4 longitudinal veins, probably, the branches of *Sc*. *R* gives not less

<sup>1</sup> *Cu*<sub>n</sub> is one of the proximal branches, preserved in the genus *Aboilus*.

than 4, *RS*—4 or 5 branches. The stem of *M* deviates from *R*, then divides into three branches, lower of which (*M*<sub>3</sub>) goes obliquely to the *Cu* and then separates. The stem of *Cu* is feeble on the left and invisible on the right elytron, *A*<sub>1</sub> is a distinct nervule, connected to *A*<sub>2</sub> with about 12 long ner-

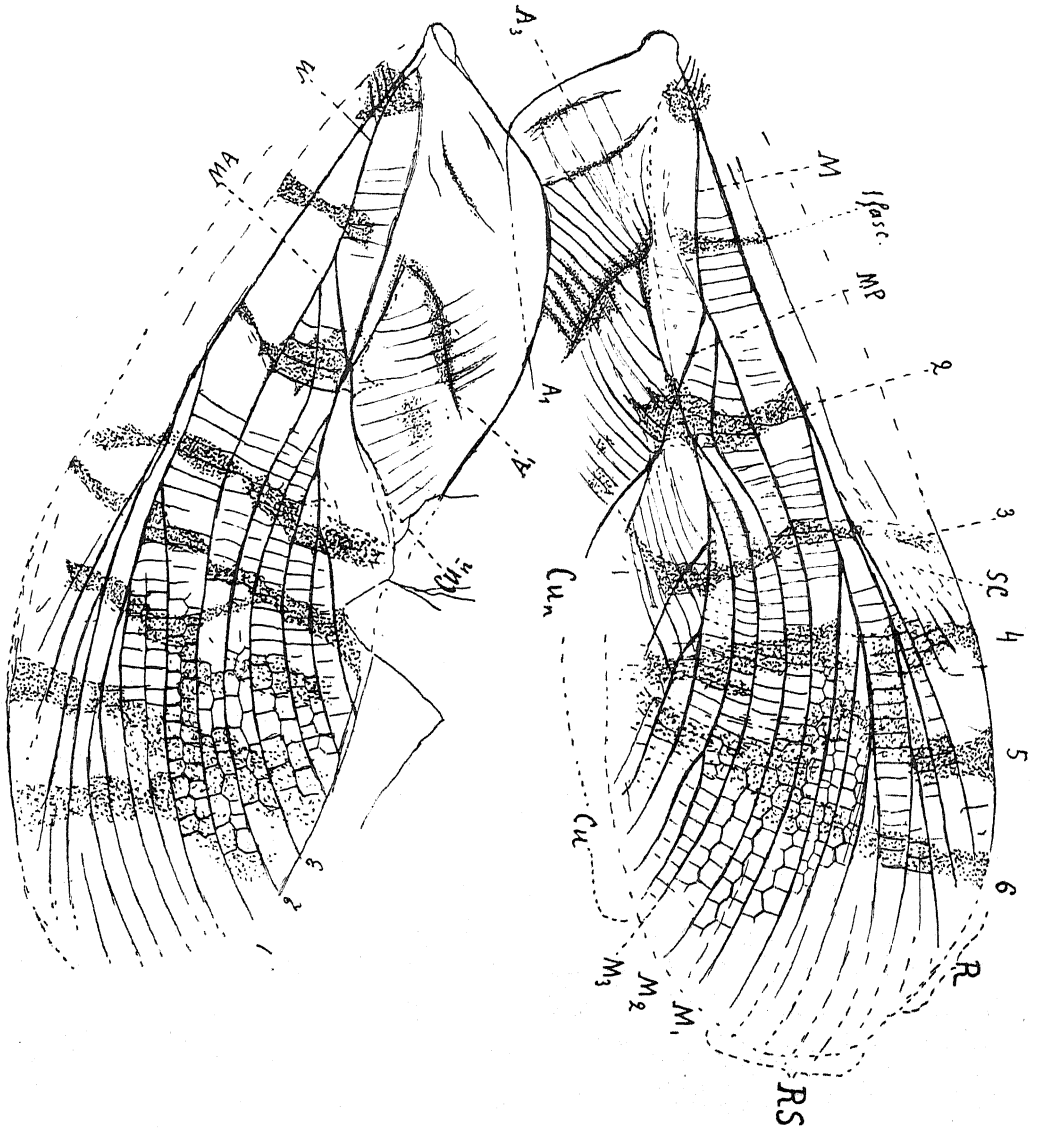


Fig. 7.

vules; the nervules between *A*<sub>1</sub>, *Cu*<sub>n</sub> and the last branch of *Cu* feeble. In the areas between the branches of *RS*, *M* and *Cu* there are rows of pentagonal cells, but in their proximal portion we find the same parallel transverse ner-

vules as in basal part of elytron. About six fuscous fasciae stretch across the elytron; first and second of them are short, the remainder long and, partly, anastomosing.

The length of the preserved portion is about 40 mm.; the total length of the elytron must be about 45—46 mm.; the breadth (on the 4<sup>th</sup> fascia) about 14—15 mm.

Galkino. Specimen belongs to the Geological Committee. Only a pair of elytra preserved.

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By the great musical apparatus and the large dimensions of *Cu* with its branches the described genus reminds more one of *Gryllodea* than *Locustodea*. On the other hand, three-branched *M* and the mode of connection of *M*<sub>3</sub> with *Cu* resembles somewhat *Acridiodea*. The character of the nervuration of elytra does not permit to refer our form to *Gryllodea* or *Locustodea*; one cannot refer it also to *Gryllacridae* and, therefore, it seems to be more correct to create a new suborder for this genus and also for *Cyrtophyllites* and *Pycnophlebia*.

The genus *Cyrtophyllites* Opp., from the lithographical slates of Bavaria, seems to me to be allied to *Aboilus*, *C. musicus* Handl. especially. Comparing the nervuration of the elytron in *C. musicus* with that in our form, we find a great similarity in the configuration of the basal halves of *M*, *Cu* and of long cross-veins between *Cu* and *A*<sub>1</sub>. *M*, apparently, is here also three-branched, and *M*<sub>3</sub> (*MP*) also united, for a short distance, with a distal branch of *Cu*. The stem of *Cu* is also connected with *M* and *A*<sub>1</sub> by numerous long and parallel transverse nervures.

Such a disposition of the cross-nervures between *Cu* and *M*, that we find in the fig. 9, Pl. XLIV of the great Handlirsch's work, suggests, that *Cu* is here, probably, not simple and that some branch (*Cu*<sub>1</sub>?) is (or was) also confluent, for some distance, with *M*. Consequently, the number of *M*'s own branches is, probably, not five, but smaller (perhaps three).

Gen. *Pycnophlebia* Deichm. seems to belong also here.

Thus, both these genera belong, probably, to the same family *Aboilidae*.

It can be noticed here, that in their elytra *Aboilidae* resemble palaeozoic *Omalidae* Handl.



Order **Phasmatodea.**Suborder **Necrophasmatodea, n.**

Anterior wings narrow and long, with only few transverse nervules; costo-radial area rather narrow; *R* reaching the end of wing; *RS* simple and parallel to the *R*; *M* dividing in the basal portion into two simple subparallel branches, the lower one (*Mp*) being feeble and colourless in the basal half; *Cu* plecopteroid, with several free branches; *A*<sub>1</sub> and *A*<sub>2</sub> simple, *A*<sub>3</sub> giving about 4 branches. Posterior wings must be no longer than the anterior ones. Medium-sized insects.

Contains one

Family **Necrophasmidae, n. fam.**

With features of the suborder.

**Necrophasma shabarovi, n. gen., n. sp.**

(Fig. 8).

Anterior wings straight, with nearly parallel anterior and posterior margins, elliptical at the apex. The area between costa and radius is comparatively narrow and contains in its basal half two subcostae. *SC*<sub>2</sub> is nearest to the costal margin; it occupies the basal third of area and is simple, without transverse nervules. *Sc*<sub>1</sub> is placed between *SC*<sub>2</sub> and *R*; its distal part, after

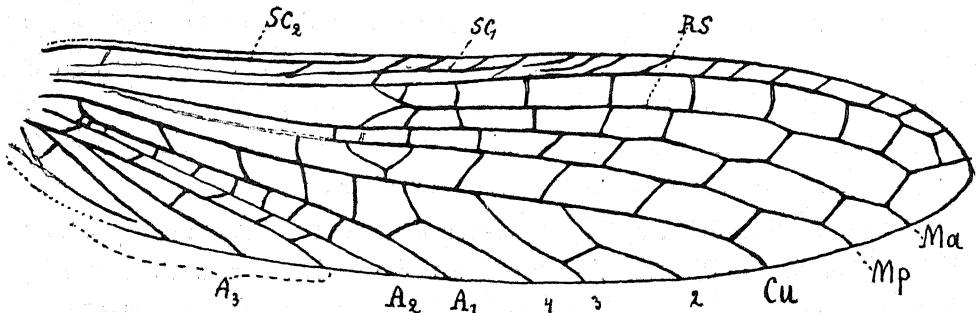


Fig. 8.

the end of *SC*<sub>2</sub>, is connected with *C* by four oblique transverse nervules, its basal part is feeble and soon disappears, but thereupon obtains a continuation in another short nervule, connected with *SC*<sub>2</sub> by an oblique nervule.

In the distal part there are, between *C* and *R*, 9 transverse nervules and two very oblique basal nervules, not reaching the *R*. *RS* separates from *R* slightly before the middle of the wing and runs, as also *R*, parallel to

costal margin. Between *RS* and *R* there are 9, between *RS* and *Ma*—8 transverse nervules, basal cross-nervule *RS*—*M* being very oblique and symmetrical with the base of *RS*. *Ma* is a conspicuous vein, *Mp* in the basal portion becomes feeble and colourless and gradually comes nearer to *Ma*; the point of separation is indistinct; between *Ma* and *Mp* there are seven, between *Mp* and *Cu* about 6—7 transverse nervules. *Cu* is a conspicuous and slightly curved vein, connected with *A*<sub>1</sub> by 4 transverse nervules; the fourth free branch of *Cu* is also connected with *A*<sub>1</sub> by a transverse nervule. *A*<sub>1</sub> not reaching the base of wing; *A*<sub>2</sub> is a straight and slender nervule, connected with *A*<sub>1</sub> by 7, with *A*<sub>3</sub> by 5 transverse nervules. *A*<sub>3</sub> divides into three branches, and in the extreme base still one vein can be seen, which, probably, also pertains to *A*<sub>3</sub>.

Length of the anterior wing 21,5 mm.; breadth 4,7 mm.

Jurassic slates near Galkino, East Karatau. Collection of the Geological Committee.

The described anterior wing is well preserved, posterior wing unknown.

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In the recent *Phasmatodea* anterior wings are mostly shortened or even rudimentary and coriaceous, furnished with a dense, but irregular primitive net of veinlets («archedictyon»); the region of subcostae (between costal margin and *R*) is always very broad, and the nervuration in the region of *M* is somewhat destroyed. And nevertheless there are some traits of doubtless similarity in the disposition of the main nervures in our form and in such genera, as *Peloria* Redt., *Megacramia* Kaup. *RS* in these genera is similar and separates from *R* as in *Necrophasma*; as to *M*, here only *Mp* is developed, *Ma* is reduced, but I have seen a specimen of *Megacramia alpheus* Westw. (in the coll. of the Zool. Mus. Russ. Acad. Sc.), in which the traces of *Ma* are also preserved. *Cu* is strong and in *Peloria* Redt. has the configuration similar to that in our form, but instead of its branches there is an irregular net of veins. The nervuration of the anterior wing in *Necrophasma* is still more similar to that of elytra in *Prisopus berosus* Westw., in which *M*<sub>1</sub> consists of two long branches, *Cu* and anales have the same aspect, except the presence of an irregular net.

The nervuration of the anterior wings in *Necrophasma* is also similar to that in the costo-cubital region of posterior wings of many recent Phasmids, for instance, of *Peloria*, *Megacramia*, *Xeroderus*. Configuration of *R*, *RS* and *M* resembles much that in *Necrophasma*; *Cu* and anales, of course, are

stretched. In *Megacramia alpheus* Mp, in its base, becomes also feeble and colourless, as in *Necrophasma*. The net in the posterior wings in the recent Phasmids also often obtains the character of analogous transverse nervules. For these reasons our genus must be referred to the order *Phasmatodea*, but it differs sharply from all the recent Phasmids, in which the elytra have a quite unlike aspect and structure, even in such form, as *Phylliidae*, in which they are large. *Necrophasma*, on the contrary, reduced the net in its elytra to a few transverse nervules, reduced also its praeradial region, and thus mechanized the elytra, which obtained some resemblance with many present *Acridiodea*. Thus, anterior wings in *Necrophasma* were not functionless and in all probability were not shorter than the posterior ones.

The described suborder is extinct having no descendants among the recent forms.

### Order Odonata.

The orders *Odonata* and *Agnatha* are only living representatives of such a group of Pterygotan Insects which consists, chiefly, of the following extinct palaeozoic orders: *Palaeodictyoptera*, *Megasecoptera*, *Protephemeroidea* (Handl.), *Protodonata* (Handl.) and, I think, *Protohemiptera* (Handl.).

This complex, our «divisio» *Palaeoptera*<sup>1</sup>, is rather sharply defined and differs from the remainder Pterygotan orders, constituting our «divisio» *Neoptera*, for they cannot fold their wings on the dorsal side in the state of rest.

In connection with that they have no jugal regions and, consequently, could not obtain, in the hind wings, their derivatives, i. e., the nealae.

All *Palaeoptera* constitute a complex of rather closely related orders.

I apply to the nervuration of the wings of *Odonata* an interpretation, much differing from that is accepted by other entomologists<sup>2</sup>. However, I consider it to be more correct and more corresponding to the genetic relations of *Odonata* with *Protodonata* and more archaic groups of *Palaeodictyoptera*, for instance, such as *Dictyoneuridae*. This interpretation can easily be understood from the letterings on the fig. 9.

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<sup>1</sup> A. Martynov. On the two principal types of the wings of insects etc. (5, 1925, 6, 1923).

<sup>2</sup> For the foundation of this interpretation see my last paper in Rev. Russe d'Entom. (1924, 7).

## Suborder Anisozygoptera Handl.

## Family Archithemidae Handl.

Genus *Karatawia*, n. gen.

Anterior wings dilated in the middle region; nodus placed a little before the middle of anterior margin; *RS* dividing nearer to the arculus, than to the nodus; triangle wholly as in *Tarsophlebia* Hagen, i. e., open and not separated from the basal cell (between *R* + *M* and *Cu*); *RS*<sub>1</sub> and *RS*<sub>3</sub> somewhat converging at the end, containing between them several rows of cells; *RS*<sub>4</sub> running parallelly and close to the *RS*<sub>3</sub> and *RS*<sub>5</sub>, especially to *RS*<sub>3</sub>, both long areas (between *RS*<sub>3</sub>, *RS*<sub>4</sub> and *RS*<sub>5</sub>) containing, each, a row of cross-nervules and rectangular cells, forming near the margin 2—3 short rows of smaller cells; *M* approaching in the distal half to *Cu* and diverging from *RS*<sub>5</sub>, thus forming between distal parts of *RS*<sub>5</sub> and *Cu* an apically broadening space, filled out with rather numerous rows of small cells; *CuP* long, giving to the hind margin numerous not distinctly developed branches, containing between them several rows of rather irregular cells; *A* short, connected with *Cu* by about 5 cross-nervules and forming then a rather stretched subtriangular cell, somewhat similar to a row of 7 high cells between the *Cu* and *A*; the distal half of the *A* running near to the hind-margin and soon ending under the seventh cell (between *Cu* and *A*).

Length of the wing about 48 mm.

*Karatawia turanica*, n. sp.

(Fig. 9).

Anterior wings broad, narrowed in the basal half; costal margin conspicuously convex in the basal portion; pterostigma indistinct and, perhaps, absent (?); between *RS*<sub>1</sub> and *RS*<sub>3</sub> there is a feeble *RS*<sub>2</sub>, not reaching basally the *RS*<sub>1</sub>; in the triangular basal space between *RS*<sub>1+2</sub> and *RS*<sub>3</sub> there are 5 long cross-nervules; both areas between *RS*<sub>3</sub>, *RS*<sub>4</sub> and *RS*<sub>5</sub> narrow and forming, each, 2—3 rows of smaller cells only in their distal portions; *M* connected, in its two basal thirds, by rows of straight cross-nervules with adjacent *RS*<sub>3</sub> and *Cu*, then it approaches nearly the *Cu*; *A* in its basal half is parallel to *Cu*, in its distal half to the hind margin of the wing, both portions being equal in the length; behind the subtriangular cell there is a broad cell, closed from behind by a nervure, parallel to the margin of the wing; between the basal portion of *A* and the margin of the

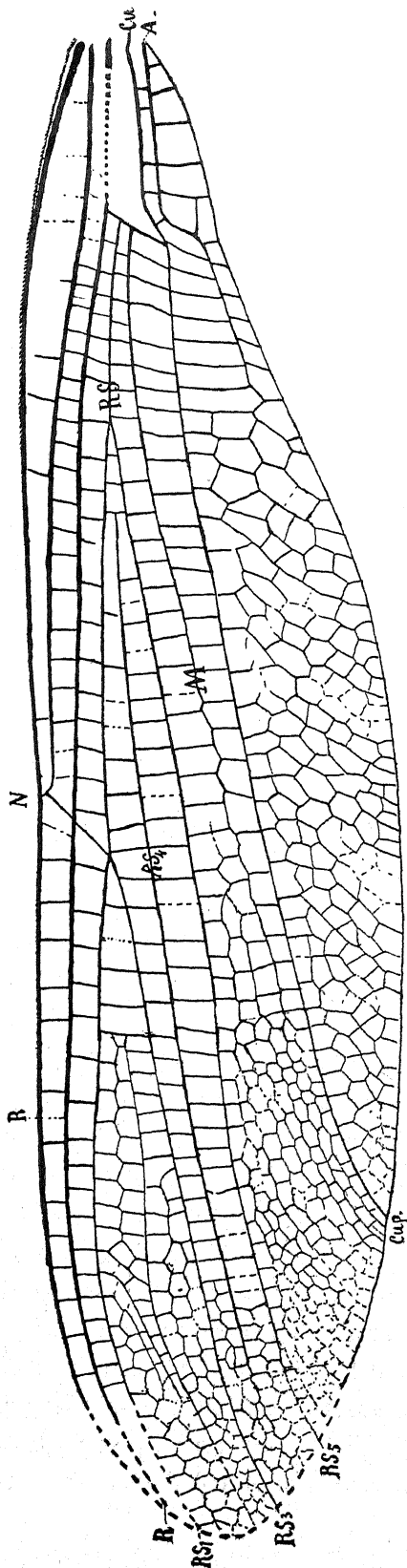


Fig. 9.

wing there are, totally, five perpendicular nervures; basal cell without cross-nervules.

Jurassic paper-slates near Gal-  
kino, № 1775/10.

One wing in excellent preser-  
vation except the apical portion.  
Judging on the narrow basal part  
I think that it is an anterior wing.

The comparison of our genus  
with other mesozoic and kenozoic  
forms of *Anisozygoptera* convinced  
me that, though its wings have some  
resemblance with those of the genus  
*Tarsophlebia* (for instance, *T. eximia*  
Hag.), especially in the structure  
of basal portion, this similarity is  
a rather superficial one. In all  
essential characters the wings of  
*Karatawia* agree more with those  
of liassic *Archithemidae* Handl. and,  
especially, with those of *Archithemis*  
*brodiei* Geinitz. We can notice only  
three more important characters,  
separating our genus from the upper-  
liassic genera *Archithemis* Handl.  
and *Selenothemis* Handl., namely:

- 1) open triangle, fused with the  
basal cell;
- 2) elongated and narrow subtri-  
angular cell;
- 3) very short, reduced and so-  
mewhat gradate or fractured analis.

*Selenothemis* is nearly allied to  
*Archithemis* and, probably, is not  
more than a distinct species of  
*Archithemis*. Lower-liassic *Diasta-*

*tommites* Handl. differs much more and in the absence of nodus bears a very archaic feature. Our genus is, on the contrary, in the structure of nervuration in the basal portion of the wing in one degree more specialized, more advanced than the genus *Archithemis*, with which it is, after all, closely allied. I consider to be practical to subdivide the family *Archithemidae* into three following subfamilies:

1) *Diastatommitinae*, m. Nodus still not formed, pterostigma very long; triangle not typical, although separated from the basal cell; subtriangular cell large, irregular; analis curved; between *A* and hind margin (in the posterior wings) there are 3—4 rows of cells.

Lower Lias of England. *Diastatommites* Handl.

2) *Archithemitinae*, m. (nec Till.). Nodus formed and placed before the middle of the anterior margin; triangle not typical, although separated from the basal cell; subtriangular cell large, subovoid; analis curved and somewhat longer than in the preceding subfamily; between *A* and the hind margin there are several rows of various cells (2—3 in *Archithemis*, still more in *Selenothemis*).

Upper Lias of Mecklenburg. Two genera.

3) *Karatawiinae*, m. Nodus present and placed before the middle of the anterior margin; triangle not typical, open into the basal cell; subtriangular cell not large, elongate, somewhat similar to the neighbouring cells in the space *Cu* — *A*; analis very short and can be subdivided into two straight parts; its distal part is parallel to the hind margin; between both there is only one row of few low cells.

Upper Jura of Turkestan. *Karatawia* Mart.

These three subfamilies form three grades of a well marked phylogenetic row, starting with archaic *Diastatommites* and ending, in the Jura-formation at least, with *Karatawia*, in which already, though wholly independently, some features of *Tarsophlebia* developed.

I must add that to this row is allied and, apparently, forms a continuation of it, the genus *Siebloisia* Hag. (*S. jucunda* Hag.) from the Middle-Oligocaen in Bavaria, which was ranked by Handlirsch in a separate family *Sieblosiidae*.

Everybody who will compare attentively the nervuration of the wings in *Siebloisia* with that of *Karatawia* and *Archithemis*, will agree with me, I think, in that it is closely allied to both just named Jurassic genera, from

which it differs, chiefly, in the shortening of the praenodal portions of *C* and *Sc* and in the shifting basalwards of the point of dividing of *RS*. In the length of analis *Sieblisia* resembles more *Archithemis*, but in the grade of reduction of the space between the basal portion of *A* and the hind margin (in the fore wings) it is more advanced than *Karatawia*. In the nervuration of the remainder, greatest part of the wing (anterior) the genus *Sieblisia* is very similar namely to our genus. Consequently it seems to me probable that this family forms the last tertiary grade of the same extinct phylogenetic row.

### Holometabolous insects.

## Order Neuroptera.

Some notices on the nervuration of the wings.

Although to the *Raphidioptera* we have applied, for the sake of convenience, the customary interpretation of their nervuration, I consider impossible to apply it also to *Neuroptera*.

Monotonous, though many-branched *RS* of *Neuroptera* cannot be esteemed as derivative from such a type, which Comstock and many others consider as being the most primitive among all the *Pterygota*, but which in reality is no more than a somewhat generalized scheme of *RS* in *Trichoptera*, *Lepidoptera* and, partly, *Diptera*. In the *Neuroptera*, as also in *Orthoptera*, *Blattodea* etc., various models of *RS* developed from the archaic reticular state (in the very remote ancestors) wholly independently, adapting to various needs of flight, and therefore even in the various families of *Neuroptera* some branches of *RS* must be homologized with great caution. The processes of reduction are not rare, but, on the contrary, if in any group the form of *RS* with few branches is established, its alteration by the addition, by the origin of new branches in the membrane, could hardly take place. Each nervule develops as a change of its foregoing state (in the nearest ancestors), and its formation immediately in the membrane I consider impossible.

As the proximal branches of *RS* are more constant and, probably, are formed earlier than the distal ones, it would be more correct to count them from the basal branch to the distal one, but for the sake of the least divergence from the usual terminology, I shall designate them beginning with the distal branch, i. e., from the end to the base.

Nearly in all *Neuroptera* *M* divides, nearly at the base, in two branches, which I denominate as *MA* and *MP* (*M. posterior*)<sup>1</sup>. Each branch gives variable number of apical branchlets. *Cu* and anales (usually, *A*<sub>1</sub>, *A*<sub>2</sub> and *A*<sub>3</sub>) give also similar apical branchlets. *Cu*<sub>2</sub> of authors I consider, as in previous pages, for *A*<sub>1</sub>, which, however, not infrequently adopts such an aspect as being the branch of *Cu*, but this connection is always established by one of the proximal cross-veins. For the apical branches of *Cu* and anales one can apply what was said on the branches of *RS*, but for the same sake of convenience I denominate them from the distal to proximal branch.

The nervuration in the *Raphidioptera* (as also in *Sisyridae*) thanks to its simplicity somewhat resembles that in *Trichoptera* and more archaic *Lepidoptera*, but in reality is nearer to the nervuration of *Neuroptera*.

### Family Prohemerobiidae Handl.

#### *Chrysoleonites*, n. gen.

Head somewhat elongate, eyes large; antennae composed of rather transverse joints. The shape of the wings and the general construction of their nervuration resemble those in *Nymphites* Haase, but the nervuration is somewhat more primitive. Subcosta (or *Sc* + *R*) in the apical portion is rather sharply bent backwards; cross-nervules between *C* and *Sc*, up to its junction with *R*, are not very dense, and the cells are rather as broad as long, but in the apical portion the cross-nervules are very numerous, dense and, partly, furcating at their ends. *R* united at the end with *Sc*; the area between *SC* and *R* without cross-veins; *RS* connected with *R* by several cross-veins and giving about 11 branches, which are connected by a zigzagged line of cross-veins, nearly parallel to the hind margin; between some basal branches there is a second row of cross-nervules, placed more proximally. *M* divides basally into two long and subparallel branches, *MA* and *MP*, of which *MP* gives several branches; *Cu* gives about 5 branches; *A*<sub>1</sub> and *A*<sub>2</sub> also with branches; *A*<sub>3</sub> and *A*<sub>4</sub> very small. Posterior wings somewhat narrower, but their nervuration resembles that in anterior wings, except *Cu*, which is united with *MP* and bears only two branches (*Cu*<sub>1</sub> and *Cu*<sub>2</sub>), and *A*<sub>1</sub>, which bears, instead of *Cu*, a row of about 5 branches.

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<sup>1</sup> Not anticipating the decision with regard to their homology with *MA* and *MP* of *Palaodictyoptera*.



*Chrysoleonites ocellatus*, n. sp.

(Fig. 10).

Head somewhat broadening anteriorly; antennae long, about 10 mm. in the length, with transverse joints; eyes large, black, the colour of the head yellow; (body not preserved). The length of anterior wings about 15 mm.; costal area narrowing up to the point of union of *SC* and *R* and bearing about 21—22 slightly oblique cross-nervules; *R* parallel to *SC* and united at the end with *SC*, which is sharply bent backwards; the apical portion of costal area, on the contrary, somewhat broadened backwards and bears a dense row of about 20—22 somewhat curved nervules; subradial

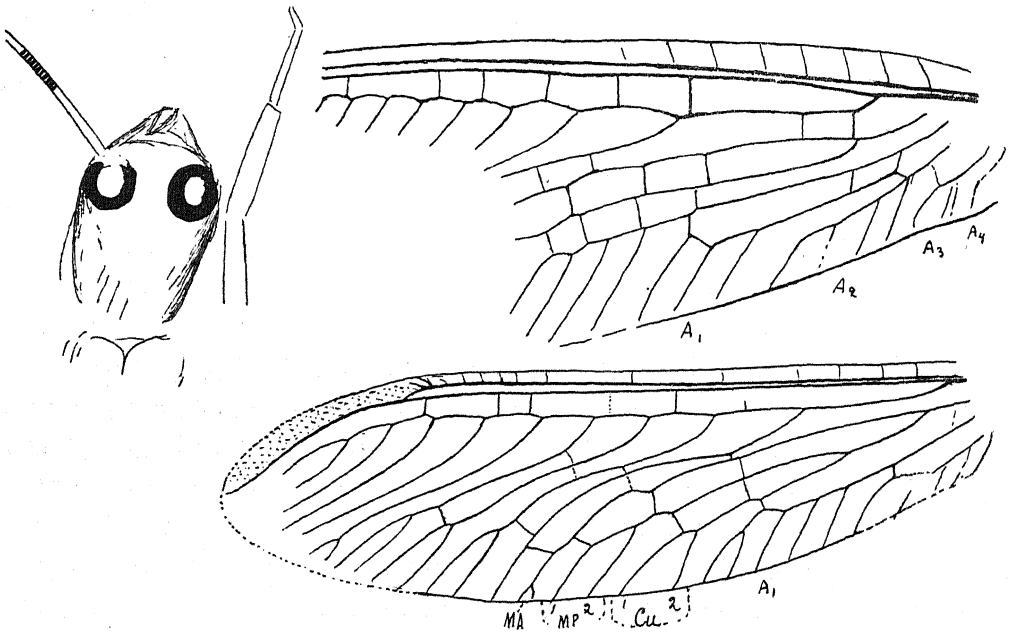


Fig. 10 a—b.

area is rather broad, containing 9 cross-veins; *RS* separates basally and gives 11 branches, proximal five branches at the end of the first third are approximated and connected by short cross-nervules; distal row of cross-nervules is rather regular. *MA* connected with *RS*<sub>11</sub> by 4, with *MP* by 7 cross-veins; *MP* gives in the apical portion 6 parallel branches and is connected with *Cu* by 4 cross-veins; *Cu* with about 5 branches; *A*<sub>1</sub> does not reach the base of the wing and is connected at its commencement with *Cu* as with *A*<sub>2</sub>; *A*<sub>1</sub> has 3, *A*<sub>2</sub>—4, *A*<sub>3</sub>, apparently, 2 branches; *A*<sub>4</sub> seems to be simple. In the posterior wings the costal area, up to the point of union of *Sc*

and *R*, is narrow, containing analogous row of cross-veins; apical portion of this area is also broader and bears a dense row of similar 20—22 nervules; *RS* gives 9—10 branches; in the proximal row there are three cross-nervules, distal row is not as regular as in the fore wings; *RS*<sub>7</sub>, *RS*<sub>8</sub> and *RS*<sub>9</sub> giving, each, a rather long apical fork; *MP* with two apical branches and is connected with *MA* by three cross-veins; *Cu* united with *MP* in the basal half of the last nervure and gives a simple fork; *A*<sub>1</sub> bears about 5 branches; *A*<sub>2</sub> and *A*<sub>3</sub>, apparently, united together and bear few branches. Length of posterior wings 14 mm.

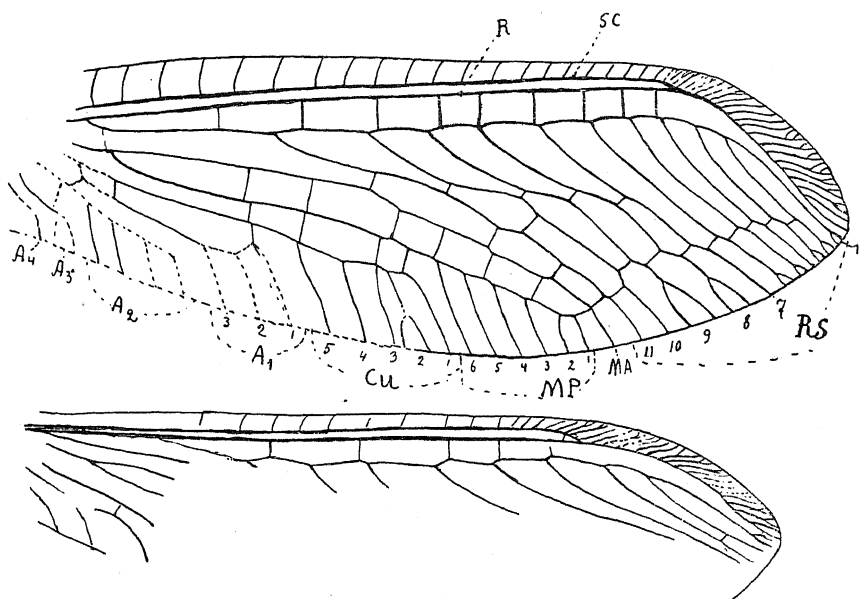


Fig. 10c.

Jurassic shales near Galkino, № 1775/11. Only head, prothorax, right fore leg and both paires of wings are preserved; the nervuration distinct.

The described wings remind us among fossil forms those of *Nymphites* Haase, but differ chiefly in that the *M* in *Chrysoleonites* is two-branched, *Cu* and anales are separate independent nervules. For these reasons I consider it more correct to refer our genus to the family *Prohemerobiidae*. On the other hand, the disposition of cross-nervules in the region of *RS* is more regular, resembling somewhat the state in *Mesochrysopidae* Handl. and many recent genera. As to the recent groups, the greatest simi-

larities with our genus reveal *Myrmeleonidae* and, then, *Nymphidae* and some *Osmylidae*.

Though the wings of *Myrmeleonidae* and *Nymphidae* are more specialized than those of *Osmylidae*, they are nearer to *Chrysoleonites* than those of *Osmylidae*. The very dense row of cross-nervules in costal area, and the whole nervuration in cubitoanal region in *Osmylidae* discriminate them rather sharply from our genus. *Myrmeleonidae* differ from our form chiefly in: 1) *RS* separating farther from the base of *R*, 2) *MP* being united with *Cu*, and 3)  $A_1$  being united with  $A_2$ . However, supposing in *Ch. ocellatus* (fore-wings) *MP* united with *Cu* and  $A_1$  with  $A_2$ , we shall obtain a nervuration, very similar to that of many *Myrmeleonidae*, except, principally, the place of the separation of *RS*, but it seems probable, that this nervure could be shifted distad in the phylogeny. However, there is still one interesting feature, which rather sharply discriminates our genus (as also *Nymphites*) from all the recent *Myrmeleonidae* and *Nymphidae*. This is a network of numerous cross nervules, which disappeared in *Chrysoleonites*.

I think that, once disappeared, this network could not reappear again. Consequently, *Myrmeleonidae* and *Nymphidae* could not develop from such forms as *Chrysoleonites*. Their ancestors were bound to possess a network, which disappeared already in *Chrysoleonites*. This genus, thus, is allied to the ancestors of *Myrmeleonidae* and *Nymphidae*, but it is an extinct genus, having no descendants among the recent forms.

### Kirgisella, n. gen.

Anterior wings broad, nearly elliptical, but the costal margin is not as convex as the hind one. Costal area broad in the basal half and in the apical portion of the wing, being narrower in distal half; apical portion furnished with a very dense row of thin nervules, partly furcating at their ends; in the remainder part cross-veins are more scarce and indistinct; subcostal area without cross-nervules, the radial one with only 3 — 4; *R* slightly bends, at its end, parallelly to *Sc*, but soon fuses with it. *RS* with 20 parallel branches, still furcating in the second third of their length and thus forming a broad apical band of very densely placed apical nervules. *RS* separates at some distance from the base of the wing. *M* divides, apparently, near the base into two main branches, *MA* and *MP*; *Cu* seems also to divide and produces in the distal region numerous apical branchlets;  $A_1$  distinct and also furcating; (other anales are invisible).

The wing has a well developed brownish colour-pattern, composed of several large marginal spots, partly confluent. Length of the anterior wings 20 mm.

*Kirgisella ornata*, n. sp.

(Fig. 11).

Along the hind margin there are several large, pale brownish spots, bordered, each, by dark brown; beginning from the base, we have: 1) a little basal mark (*a*); 2) a spot in the shape of a short bordered column (*b*); 3) a complex spot, composed of a large and irregularly margined from the

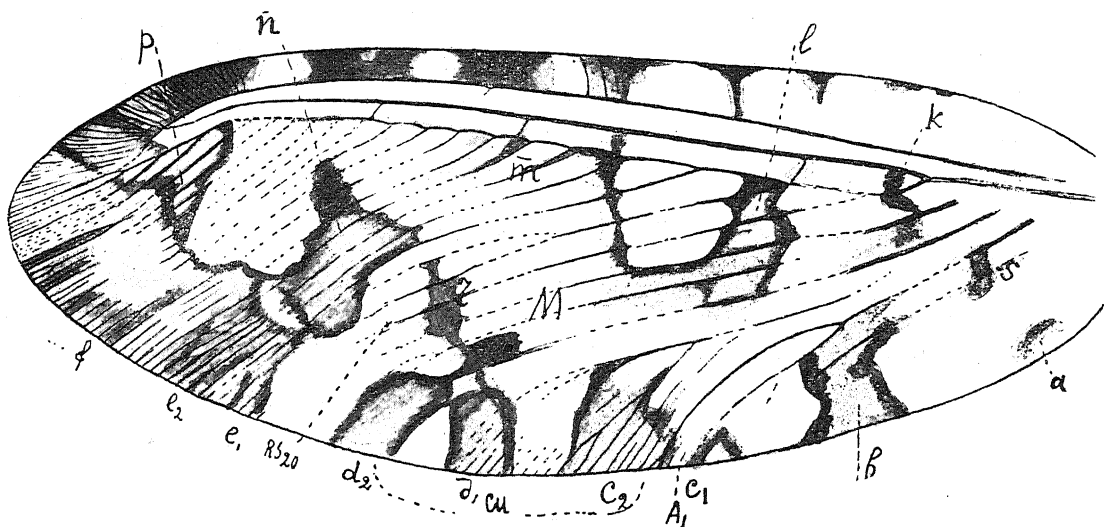


Fig. 11.

inner side distal (*c*<sub>2</sub>) and a small proximal spot (*c*<sub>1</sub>), also bordered; 4) two symmetrical column-shaped spots (*d*<sub>1</sub> and *d*<sub>2</sub>); 5) a small column-shaped spot (*e*<sub>1</sub>) and then 6) a row of more or less fused (analogous) spots, bordered together with dark brown at their inner side. In the middle region of the wing we find two similarly bordered spots, *l* and *n*, and the traces of partly disappeared analogous spots *k*, *m*, *p*, *r*, *s*; the spot *m* is very indistinct, bordered only on the proximal side, and between *m* and *l* there is a wholly colourless space. In the costal area there are 3 broad spots in the apical half and only 3 narrow transverse bands in the proximal half.

Length of the anterior wing 20 mm.

Jurassic slates near Galkino, № 1775/12.

Only one anterior wing is preserved, on a hard grey piece.

The wings of just described genus resemble chiefly those of *Creagoptera* Handl. (lithographic stone, in Bavaria) and, in a lesser degree, those of some liassic *Prohemerobiidae*. They resemble also the anterior wings of *Kalligramma* Walther, which differ, chiefly, in having everywhere numerous cross-veinlets. I suppose that the well known and interesting circular spot on the wings of *Kalligramma* could be developed in such a way, that several two-bordered spots, similar to those in *Kirgisella*, fused into a ring. Some tendency to the formation of such a ring we observe in *Kirgisella* (by fusion in the region of *M* of spots *l* and *m*).

Genus **Dilarites**, n. gen.

Costal area uniformly broad, with rather dense row of oblique and somewhat curved cross-nervules; *R* runs nearly to the *SO*; *RS* is connected with *R* by several transverse nervules and gives, apparently, not more than 15 branches, which, partly, furcate; in the distal part of the wing the branches run nearly longitudinally.

**Dilarites incertus**, n. sp.

(Fig. 12).

Length of the preserved portion of the (anterior) wing 10,5 mm., total length of the wing must have about 13 mm. The branches of *RS* separate

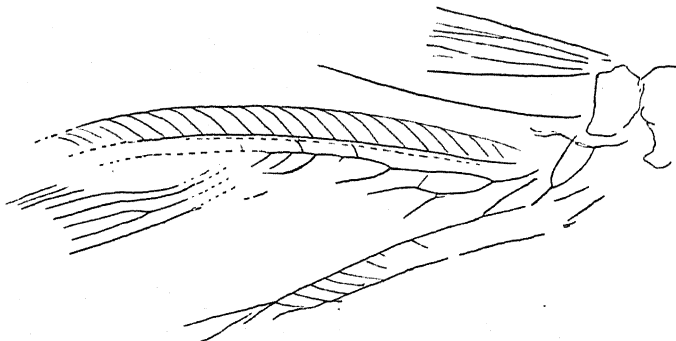


Fig. 12.

not very regularly; in the distal portion the branches of *RS* form a rather dense row of parallel veins. The branching of *RS* begins, apparently, early.

Jurassic slates near Galkino, № 1775/13.

Only the anterior portion of the wing is preserved.

The dense row of costal cross-veins, the proximity of *R* to *Sc* and the character of direction of the branches of *RS* in the distal part of the wing remind us somewhat *Dilaridae* and *Osmylidae*, but the fragment is too small, and it is useless meanwhile to speculate on the affinities of this form.

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## Explanations of the figures.

Fig. 1 a—c. *Mesoraphidia inaequalis*, n. sp.

1a. Aspect of the whole body, without the wings, from above; abdomen somewhat turned; 1b — basal half of the ovipositor, more enlarged; 1c — stripes on the pronotum (left side), more enlarged; 1d — tarsus of the anterior leg and two portions of antennae; 1e — stripes on the head.

Fig. 2. Wings of *Mesoraphidia inaequalis*, n. sp.

Fig. 3. *Protadiplatys fortis*, n. g., n. sp. Body from side; head and thorax damaged  
3a — tibia and tarsus of the posterior leg.

Fig. 4. *Dermatopterön*, gen. sp.? Head and thorax from beneath.

Fig. 5. *Pamphagopsis maculata*, n. g. n. sp. Hind wing folded; *MA* gives two branches, *M*<sub>1</sub> and *M*<sub>2</sub>, *MP* simple (*M*<sub>3</sub>); *Cu*<sub>1</sub> fused in the basal portion with *MP*.

Fig. 6. *Pamphagopsis modesta*, n. sp. Hind wing folded.

Fig. 7. Elytra of *Aboilus fasciatus*, n. g., n. sp. On the right elytron the stem of *M* invisible; fasciae are numerated from the base.

Fig. 8. *Necrophasma shabarovi*, n. g. n. sp., Anterior wing.

Fig. 9. *Karatawia turanica*, n. g., n. sp. Anterior wing.

Fig. 10 a — e. *Chrysoleonites ocellatus*, n. g., n. sp. 10a — outlines of the head; b — left wings, c — right ones.

Fig. 11. *Kirgisella ornata*, n. g., n. sp. Anterior wing; a — f, bordered spots along the hinder margin, k — p, similar spots in the middle region of the wing; r and s, two small posterior spots.

Fig. 12. *Dilurites incertus*, n. g., n. sp.; preserved portion of the anterior (?) wing.

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