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at the Natural History Museum

Burmese amber

Collection of the Burmese amber kept in the Natural History Museum (London) comprises only 117 amber blocks, and yet it is among the most valuable paleontomological collections.

First, it is unique: I am aware of no other entomological collection of this amber. The reason is that the source area, Northern Burma (now Myanmar) is the famous drug source area that is and was criminally controlled and thus hardly available for scientific activity. In any case, the NHM material was acquired not after the 1930ies.

Second, the amber is very rich in inclusionse. During my screening of the collection, I was able to count as many as 1200 arthropod inclusions.

Third, the insect assemblage studied is the most unusual one among all the fossil resin assemblages which I am aware of. Even the earlier data from the very superficial publications by Cockerell (1916-1922) and few subsequent publications have stimulated Zherikhin (1978) to hypothesize that the amber might be of a Late Cretaceous age, despite some geological indica-

tions of its Middle Eocene origin (Cockerell, 1922). I feel that results of further examination of the collection will be even more intriguing.

During my first stay at the NHM in September, 1995, I was able to look through only a minor part of the collection. However, it was possible to borrow several larger pieces and to make them accessible for study by my colleagues in Moscow. Now some preliminary results are available for discussion.

Meanwhile, in April, 1996, I was able to visit the NHM for the second time and to screen the majority of the blocks not yet examined, and to borrow the rest of the material. These new observations are still very preliminary.

My two visits to England became possible due to a financial support from the Geological Association (initiated by Dr John. A. Cooper) and the Royal Society (initiated by Dr. Richard A. Fortey). The working facilities were provided by Mr. Andrew J. Ross, Curator of the fossil insects, Invertebrate Paleontology, the NHM.

The general composition of the assemblage of animal inclusions is as follows:

Scorpiones	1	Thysanoptera	15	Blattodea	58
Pseudoscorpiones	38	Homoptera	75	Isoptera	100
Araneae	37	Heteroptera	9	Mantodea?	1
Acari	156	Coleoptera	203	Dermaptera	1
Diplopoda	61	Raphidioptera	1	Orthoptera	5
Collembola	55	Neuroptera	7	Insecta undetermined ..	14
Archaeognatha	1	Trichoptera	1	Arthropoda undetermined	2
Zygentoma	3	Lepidoptera	7	Gastropoda	1
Ephemeroptera	1	Diptera	200	Reptilia moulting skin	
Psocoptera	47	Hymenoptera	100		in 4 blocks

Comparatively few fossils have been described from the Burmese amber: 41 specimens studied represent the holotypes of the species described, one of them I was lucky to identify for the first time: *Disphaerocephalus macropterus* was described by Cockerell (1917, Amer. J. Sci. 44: 364) in a footnote and had never been located since that (cf. Stys, 1969). Several more holotypes will hopefully appear soon as a result of efforts of my colleagues here in Moscow (Ale-

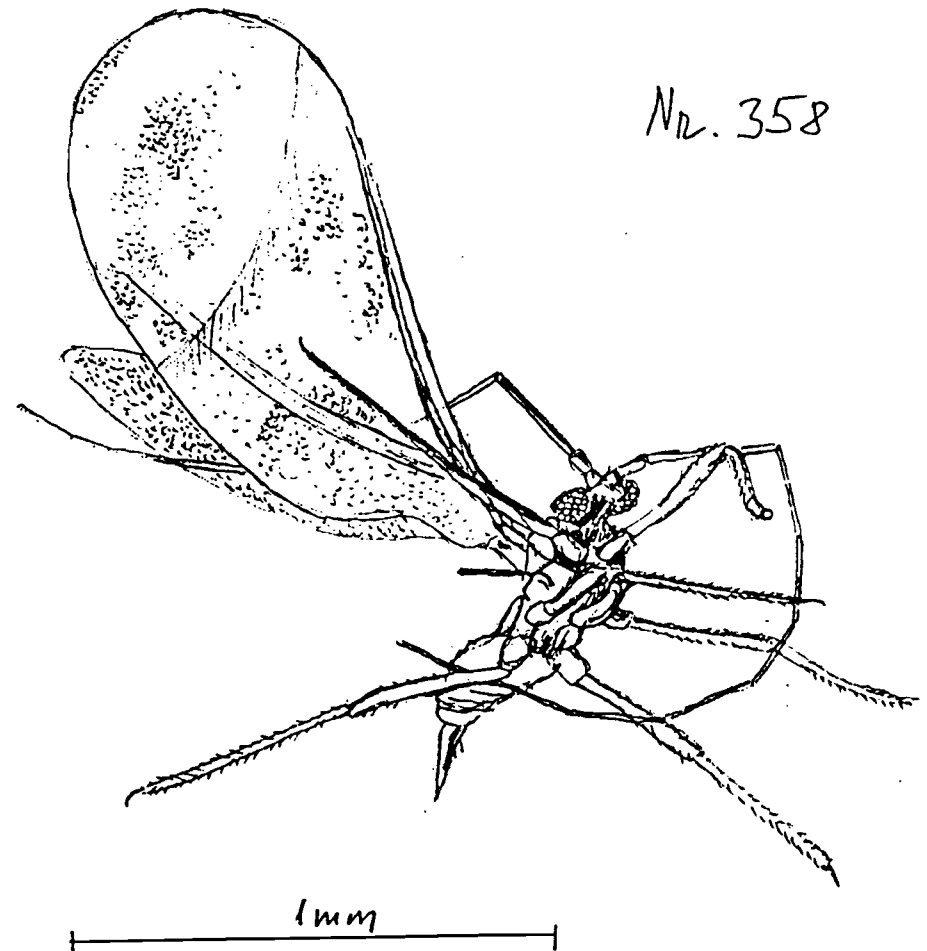
xandr V. Antropov: Sphecidae, Gennady M. Dlussky: Formicidae, Nickolay B. Nikitsky: heteromorous beetles).

It is premature now to present a complete account of the Burmese insect assemblage: the work is far from being finished. Following are some of the most striking observations. Naturally, I shall rely mostly on the hymenopterans here.

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Inclusion Wrostek

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This newsteadia drawing by Dietrich Zawischa clearly demonstrates that rock'n'roll was performed already in Deep Miocene (assuming that Bitterfeld amber is of this age).

Burmese amber

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The first important observation is that this assemblage shows appreciable similarity to various assemblages from the Late Cretaceous fossil resins, and differs considerably from the Cenozoic ones - even of the Paleocene age (Sakhlin amber). This is not to say that the actual age of the Burmese amber is necessary Cretaceous: the amber well might have its origin on an isolated island in the midst of the Tethys ocean, and the source fauna might be a Cretaceous relict in a Cenozoic world.

The Burmese hymenopteran assemblage, characteristic of the Upper Cretaceous bears the following features:

Evaniidae are represented by an undescribed subfamily that is archaic compared with the Cenozoic forms.

The Peleciniid specimen belongs to the ancestral, strictly Cretaceous subfamily *Iscopininae*.

Scelionidae comprise more than half specimens of parasitic hymenopterans (21-23 of 39) - a unique feature of the Late Cretaceous amber assemblages.

Serphites (*Serphitidae*) is a widespread Cretaceous endemic family. Palaeomyrm (*Mymarommatidae*) and *Chalcidoidea* are of comparable abundance (2 and 3 specimens, respectively):

in the Cenozoic, Chalcidoids dominate overwhelmingly over *Mymarommatidae*.

Aculeate wasp assemblage consists essentially of *Chrysidoidea* and *Sphecidae*, like in other Cretaceous fossil resins.

Important is the evidence from ants. Three ant specimens are found: one or two of them belong to a very specialized new genus of the Upper Cretaceous endemic subfamily *Sphecomyrminae*, the third is a specialized representative of either *Sphecomyrminae*, or *Aneuretinae*, or *Nothomyrmecinae*. *Aneuretinae* and *Nothomyrmecinae* are also very primitive groups that are easily expectable in the later Late Cretaceous, because the more advanced *Dolichoderinae* and *Ponerinae* are now recorded as early as in the Campanian (Canadian amber: Dlussky, in press).

Some other insect inclusions suggest ancient relationships of the Burmese amber assemblage

as well. The most striking is occurrence of an aberrant relative of *Lophioneuridae*, the family recorded since the Permian till the Late Cretaceous and supposed to be a thrips ancestor (see Vishniakova, 1981, Trans. Paleontol. Inst. Ac. Sci. USSR, 183, 43-63).

Numerous are also unique and aberrant taxa and their combinations that jointly attest the source fauna as isolated or otherwise belonging to an unknown ancient realm.

Among hymenopterans, unique are, e.g., the abundance of various primitive *Gasteruptionae* (as opposed to *Aulacidae*), a group otherwise virtually unknown as fossils; the absence of any *Ichneumonoidea* (particularly *Braconidae*) and *Chrysididae*, which are common in other Late Cretaceous fossil resins; the overwhelming dominance of *Bethylidae* and *Shecididae* among aculeate wasps; and the wealth of new higher rank taxa. For example, the first sample borrowed included 5 sphecids wasps: when studied by Antropov, only one of them was found to represent just a new genus and species. Two other specimens were attributed to two new tribes of *Ampulicinae*, while two more of them will be described as two different new subfamilies. A proctotrupoid fossil combining features of both *Diapriidae* and *Monomachidae* also merits a higher rank taxon of its own, the same is probably true for a pair of tiny wasps tentatively ascribed to *Tiphidae*.

This report on the insects in the Burmese amber is very preliminary, and any its statements may prove incorrect. My aim here is just to draw attention of the colleague paleoentomologists to this collection, which is very interesting, informative, and easily available for study, but unjustly neglected.

Post scriptum

The size of the Burmese amber specimens varies, and some pieces are really large. Several largest blocks studied have appeared as slides (ca. 1 cm thick) cut off from a large subspherical lump about 10 cm across. There are several other large blocks.

There are problems in studying inclusions in the depth of such blocks, but a majority of inclusions do permit a more or less successful examination.

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