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The Fauna of the Channel Deposit of Early Saalian Age at Brandon, Warwickshire

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THE FAUNA OF THE CHANNEL DEPOSIT OF EARLY SAALIAN AGE AT BRANDON, WARWICKSHIRE

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[Plate 20]

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A fauna consisting of both vertebrates and invertebrates is described from an early Saalian deposit at Brandon, Warwickshire. Some 77 taxa, mostly Coleoptera, including 6 not now occurring in Britain, are recorded and though this is a very limited fauna, possibly due to rapidity of deposition, it is interesting as being probably the first to be described from this time horizon. The animal assemblage suggests deposition in a lake or slowly flowing river bordered by reeds and rushes with a *Salix* thicket on the surrounding ground. A climate cooler than that of today though not of arctic severity is indicated.

1. Introduction

The channel within the Baginton–Lillington gravels at Brandon described in a previous paper (Shotton 1968) was filled with grey organic silts exposed in a cutting. A small trial sample suggested that more detailed investigation might be worthwhile and so a section was cut down the face of the silts in the centre of the channel and samples taken in units of 4½ in. over a thickness of 6 ft. 5 in. The top 14 in. were subsequently disregarded because of the strong cryoturbation, leaving samples A (base) to N (top) covering 5 ft. 3 in. (160 cm). When these were examined for macrofossils it was evident that they were badly contaminated by modern insects which had crawled down cracks and fissures from the surface, but despite this enough undoubted fossil specimens were found to show that the site was potentially an interesting one. More samples were obtained after the surface of the section had been cut back to such a depth as virtually to preclude the possibility of modern contamination, and specimens for pollen analysis were simultaneously collected. Unfortunately the animal remains were very sparse and fragmented. In an attempt to remedy these defects a large amount (just over half a ton) was collected, but even so identification to generic level only was possible in many cases because of inadequate material. From the first, contaminated, section only those specimens were retained which were considered to be above suspicion.

Although the section was sampled serially at small intervals the contained fauna showed no evidence of a changing environment, so the deposit has been considered as a single

entity although the positions of the fossils in the deposit have been taken into consideration when the number of individuals present was assessed.

The deposit consisted of fine silt containing a small amount of recognizable organic matter. It broke down easily in gently running water and was washed through a sieve with a mesh size of 300 microns (μm) and the residue was sorted under a binocular microscope.

In the following faunal list the nomenclature of the Insecta follows Kloet & Hincks (1945) where British species are concerned and for the classification of the fish Jenkins (1954) is followed. The figure in the right-hand column indicates the minimum number of individuals estimated to have been present where it was possible to count them. In some groups, however (e.g. *Sialis*, *Daphnia*, *Trichoptera*) the numbers were so large that no attempt was made to recover them all, and in others, for instance the fish, it was not considered possible to estimate the numbers present from the material available (odd bones, teeth and broken scale fragments). In these cases no figure is given. An asterisk (*) beside a name indicates a species not found in Britain today.

2. Faunal list

VERTEBRATA

PISCES (identified by Dr P. H. Greenwood)

Esocidae

Esox lucius L. (Pike)

Cyprinidae

Gobio gobio (L.) (Gudgeon)

?*Phoxinus phoxinus* (L.) (Minnow)

Squalius cephalus (L.) (Chub)

Rutilus rutilus (L.) (Roach)

Misc. unidentified Cyprinids

Percidae

Perca fluviatilis L. (Perch)

Gasterosteidae

Gasterosteus aculeatus L. (3-spined stickleback)

INVERTEBRATA

ARTHROPODA

CLADOCERA

Daphnia sp (p.), ephippia

ARACHNIDA

Araneae, cephalothoraces

Acari, mites

INSECTA

MEGALOPTERA

Sialidae

Sialis sp., larval mandibles and head sclerites

TRICHOPTERA, larval sclerites and mandibles

COLEOPTERA

CARABIDAE

Elaphrus cupreus Dufts.	1
Elaphrus sp.	1
Dyschirius arenosus Steph.	2
D. globosus (Hbst.)	1
D. impunctipennis Daws.	1
Bembidion varium (Ol.)	1
B. aeneum Germ.	11
Acupalpus meridianus (L.)	1
Amara sp.	1

HALIPLIDAE

Haliplus sp.	1

DYTISCIDAE

Hydroporus sp.	3
Ilybius sp.	2
Colymbetes sp.	4

GYRINIDAE

Gyrinus sp.	2

HYDROPHILIDAE

Ochthebius bicolon Germ.	1
Ochthebius sp.	8
Helophorus minutus agg.	57
**Helophorus jacutus* Popp.	1
**H. wandereri* d'Orch.†	4
Cercyon spp.	8

SILPHIDAE

Hydnobius sp.	1

STAPHYLINIDAE

**Micropeplus* sp.	4
**Pycnoglypta lurida* Gyll.	30
Omalium excavatum Steph.	1
Arpedium brachypterum (Grav.)	5
Geodromicus cf. *nigrita* Müll. (det. W. O. Steel)	1

† Since this was written, Mr R. B. Angus has discovered that *wandereri*, hitherto believed extinct, is synonymous with the living species *Helophorus obscurellus* Poppius, a species whose range in north Russia extends from the Kanin Peninsula to the Lena river. In this list and in subsequent discussion, we have retained the old name to avoid confusion with references to this insect in earlier papers.

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COLEOPTERA (*cont.*)	
Trogophloeus subtilicornis Roub. (det. W. O. Steel)	1
T. rivularis Motsch. (det. W. O. Steel)	1
Trogophloeus spp.	2
Oxytelus rugosus (F.)	5
Oxytelus nitidulus Grav.	24
Platystethus alutaceus Thoms.	2
Platystethus sp.	3
Stenus juno F.	1
Stenus spp.	8
Euaesthetus laeviusculus Mann.	1
Philonthus sp.	1
Gabrius sp.	2
ELATERIDAE	
Hypnoidus riparius (F.)	1
DRYOPIDAE	
Elmis maugei Bedel	1
Latelmis volckmari (Pz.)	2
LATHRIDIIDAE	
Lathridius sp.	2
Enicmus transversus (Ol.)	1
ANTHICIDAE	
Anthicus bifasciatus (Rossi)	1
Anthicus sp. (?spp.)	10
CHRYSOMELIDAE	
Plateumaris sp.	1
Phaedon cochleariae (F.)	1
Luperus sp.	1
CURCULIONIDAE	
Apion spp.	7
Otiorrhynchus arcticus F.	2
O. nodosus (Muell.)	1
O. ligneus (Ol.)	1
O. rugifrons (Gyll.)	3
O. ovatus (L.)	4
Trachyphloeus sp.	1
Sitona sp.	6
**Chlorophana* sp.	1
Notaris acridulus (L.)	1
**Ceuthorrhynchus* sp.	1
Litodactylus leucogaster (Marsh.)	1
Eubrychius velatus (Beck)	3

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HYMENOPTERA	
FORMICIDAE, mandibles	4
? PARASITICA	9
DIPTERA	
CHIRONOMIDAE, larval head capsules	
POLYZOA	
Cristatella mucedo Cuvier, statoblasts	9

3. NOTES ON CERTAIN SPECIES

Some of the entries in the faunal list, though identified to genus only, are nonetheless of considerable interest, chiefly because they could not be assigned to known species. These are discussed below.

Unidentified cyprinid (figure 1*a*, 1*b*, plate 20)

This curious tooth has been determined by Dr Greenwood as an unerupted pharyngeal tooth of a cyprinid fish but it has not yet been more closely identified.

Ochthebius sp.

Eight individuals of an *Ochthebius*, represented by heads and pronota, were recovered from positions scattered throughout the deposit. The closest match amongst the present-day fauna was *O. viridis*, but as they did not match perfectly with this species, and there are several closely related forms on the continent, it was considered better to leave these named only to genus.

Helophorus jacutus (figure 6, plate 20)

A single pronotum was recovered which somewhat resembled the British *H. nanus* in having no raised sculpture between the grooves. It differed from this species in having the submedian grooves angled and in its size, which was much larger than that of *nanus*. As it was no *Helophorus* known to us it was submitted to Mr R. B. Angus who has identified it as the East Siberian *H. jacutus*. This species is known to live now in a number of localities in East Siberia. Its occurrence in the English Midlands in early Saalian time is unexpected. It also appears either to have persisted through the Eemian Interglacial into the Weichselian or, what is perhaps more likely, to have re-invaded Britain during the last glacial phase, since it occurs quite commonly in mid-Weichselian deposits (Coope 1968).

Micropeplus sp. (figure 5*a*, *b*, *c*, plate 20)

At first sight the Brandon *Micropeplus* elytra resemble those of *M. tesserula* as the large punctures between the keels, found in all the other British species of the genus are absent. *Micropeplus tesserula*, however, gives the impression of being shagreened, at low magnification whereas the fossils are smooth and shining. At higher magnification the sculpture of *tesserula* (figure 5*d*) is seen to consist of many fine granules which are quite absent in the fossils. There does not seem to be any species in Scandinavia or Western Europe to which these fragments could belong.

Chlorophana sp. (figure 3, plate 20)

A single head was found belonging to a member of this genus. No species of *Chlorophana* is now found in Britain but several are widespread on the continent and one species occurs in Scandinavia. The nearest match found for the Brandon specimen was *C. gibbosa*, a continental species which lives on *Hippophaë*. It was considered, however, that the head alone does not carry sufficient characters for a definite identification.

Ceuthorrhynchus sp. (figure 2*a*, *b*, *c*, plate 20)

A head, pronotum, left and right elytra, a metasternum and two legs of a blue *Ceuthorrhynchus* were found together in one sample. It seems highly probable that these parts all belonged to one individual. The combination of characters displayed by these fragments, which include striate puncturation on the base of the rostrum, a curious sculpture on the interstices of the elytra and large teeth on the two femora cannot belong to a British species nor to any continental species with which it has been possible to compare the fossils.

4. Implications of the fauna

(*a*) *Ecology*

A large proportion of the fauna is made up of animals which lived in the water in which the deposit was laid down. All the fish, with the exception of the minnow (*Phoxinus phoxinus*) are inhabitants of still or slowly flowing water. The alder fly, *Sialis*, which was present in large numbers also inhabits quiet water where its larva lives in the mud at the bottom. Vegetation overhanging the water is necessary to provide oviposition sites for the female. Many of the Trichoptera and Chironomidae, both very abundant at Brandon, also live in similar situations and the beetle *Plateumaris* spends its immature stages on the roots of water plants such as *Scrophularia*, *Nymphaea*, *Potamogeton* and various sedges, on whose leaves *Sialis* frequently lays its eggs. The aquatic weevils *Eubrychius velatus* and *Litodactylus leucogaster* are frequently found together as they both live in standing water on *Myriophyllum* and *Potamogeton*. The polyzoan *Cristatella mucedo* also inhabits still water but the very small number of statoblasts found suggests that the animal was not living very close to the site, or was at any rate, very uncommon. The minnow, mentioned above, the two dryopid beetles *Elmis maugei* and *Latelmis volckmari*, and the hydrophilid *Ochthebius bicolon* are usually found in running water with a sandy, gravelly or stony bottom but their numbers are so small that it seems likely that they were washed in from smaller streams feeding the site of the channel deposits.

Amongst the terrestrial members of the fauna there are no species which suggest the presence of trees other than *Salix*, the foodplant of *Luperus*. The staphylinid beetle *Pycnoglypta lurida*, one of the more abundant members of the fauna generally lives amongst the leaf litter under *Salix* bushes. A number of the other species present are usually found in waterside habitats, in moss or leaf litter or beneath rich herbaceous vegetation beside more or less stationary water. The rather numerous *Anthicidae*, which in the adult state are usually found on flowers, develop in accumulations of vegetable refuse or dung, a habitat shared by several of the other listed species. These include *Oxytelus nitidulus*, one

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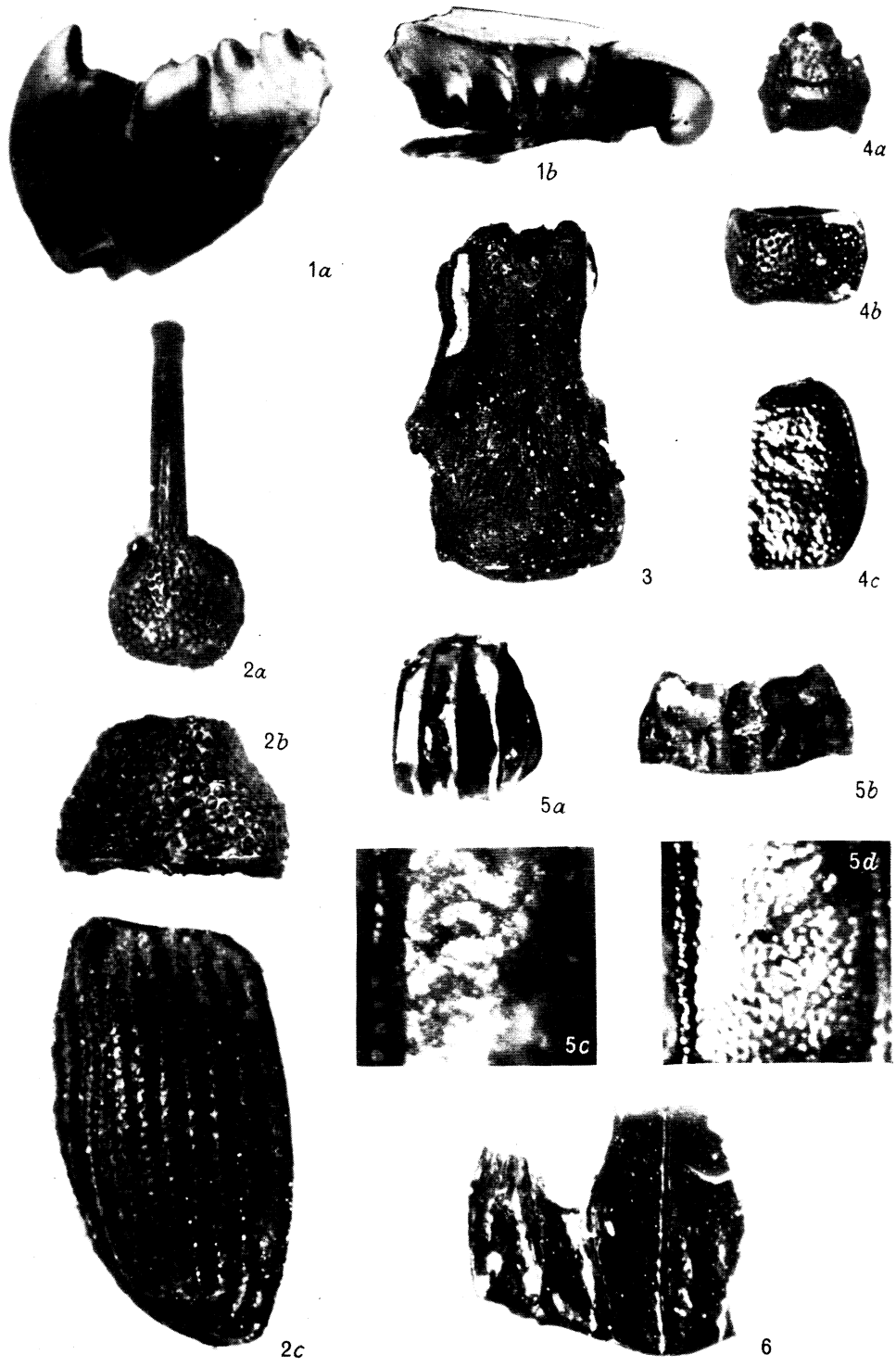

FIGURE 1*a*. Pharyngeal tooth of unidentified Cyprinid, lateral view (× 20).
FIGURE 1*b*. The same Cyprinid tooth in crown view (× 20).
FIGURE 2*a*. *Ceuthorrhynchus* sp., head (× 40). FIGURE 2*b*. *Ceuthorrhynchus* sp., pronotum (× 40).
FIGURE 2*c*. *Ceuthorrhynchus* sp., left elytron (× 40). FIGURE 3. *Chlorophana* sp., head (× 30).
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FIGURE 5*c*. *Micropeplus* sp., microsculpture of elytron (× 250).
FIGURE 5*d*. *Micropeplus tesserula*, modern specimen, microsculpture of elytron (× 250).
FIGURE 6. *Helophorus jacutus*, part pronotum (× 40).

(*Facing p.* 422)

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of the most abundant beetles at the site. Another group is the one including the various species of *Otiorrhynchus*. These are omnivorous plant feeders, the more northern species, *arcticus*, *rugifrons* and *nodosus* generally inhabiting rather barren places where they are frequently found under stones.

A picture emerges, therefore, of a pond, lake or possibly a slowly flowing river, fed by small streams. In the water were growing pond weeds, with reeds and rushes at the margins and around the pool the vegetation was probably mainly a *Salix* thicket. On the higher and less sheltered, drier ground the bushes appear to have given way to low vegetation such as grass, low growing herbs and moss. A meander loop on a wide gravel flood plain, being cut off and gradually stagnating would fit well with the evidence.

(*b*) *The climate*

The picture of the climate which can be deduced from the fauna is not a straightforward one like that of the environment. The fauna contains basically three main elements, the widespread eurytherms of which little need be said, a group of species with a northern distribution and a more southern group. The northern group includes the three *Otiorrhynchus* species mentioned in the previous section, *Pycnoglypta lurida*, *Arpedium brachypterum*, *Helophorus wandereri* and *H. jacutus*. All these species occur together in cold deposits of the Last Glaciation, the two *Helophorus* species not previously having been known fossil from any other time. The three species of *Otiorrhynchus* and *Arpedium* all occur in this country, although only in the north and *Pycnoglypta* is not found in Britain but is widespread in Scandinavia. Although *Helophorus wandereri* is found at several full glacial sites of the last (Würm) glaciation, being the second most abundant beetle at Brandon in the adjacent No. 2 terrace deposits, it was not recorded from the somewhat warmer interstadial deposit at Upton Warren (Coope, Shotton & Strachan 1961). This suggests that it requires a colder climate than that found at Upton Warren. This is also the case with *Helophorus jacutus* which was found in Avon No. 2 terrace at Fladbury (Coope 1962) and again in the same terrace at Brandon (Coope 1968).

However, as was the case at Upton Warren, the fauna is not homogeneous and contains a number of species whose most northerly ranges only reach the southern part of Scandinavia, if at all. These include *Acupalpus meridianus*, *Ochthebius bicolon*, *Platystethus alutaceus*, *Anthicus bifasciatus* and *Otiorrhynchus ligneus*. Of these only *Platystethus alutaceus* is represented by two individuals, the rest by only one so that they do not seem to have been a very important element in the fauna of the time. It may be that these were precariously surviving members of an earlier and warmer fauna which owed their continuing existence to a habitat which to some extent buffered them against the cooling climate. Thus *A. meridianus* has been recorded living in the nests of rodents (Jeanell 1942), *O. bicolon* lives in water and *P. alutaceus* inhabits moss and vegetable debris. *Anthicus bifasciatus* is found in old manure heaps. The other species, *O. ligneus* has already been recorded from other sites in which the faunas have a northern aspect (Coope 1962; Coope *et al.* 1961). It may be that this species does not at present occupy all its potential range or that the fossils belong to a physiological race of *ligneus* which has become extinct.

As a whole the fauna suggests a climate cooler than present day and the indirect evidence provided by the insects also suggests that *Salix* scrub was well developed but that

there was an absence of thermophilous trees. This interpretation is in accord with Kelly's (1968) examination of the flora. It is not, however, possible to suggest a full glacial climate in view of the absence of Arctic stenotherms and the presence of a few (and rare) surviving comparative southerners. Shotton (1953) originally postulated that the Baginton–Lillington gravels were river deposits preceding the onset of the Saale glaciation in the Midlands. The fauna described supports this, with the deposits being ascribed to the early Saalian rather than to the late Hoxnian, in what may have been a continuous climatic decline, though Kelly (1968) suggests, from the flora, that the climate was warming slightly from a colder episode.

Our thanks are due to Dr P. H. Greenwood for naming the fish remains, to Mr W. O. Steel for his identifications of some of the staphylinid beetles and to Mr R. B. Angus for his determination of *Helophorus jacutus*. We would also like to thank the Trustees of the British Museum for allowing access to the collections in their charge and to Mr J. Balfour-Browne for his unstinted help at the Museum. Finally, we are indebted to Dr G. R. Coope for much helpful discussion and advice.

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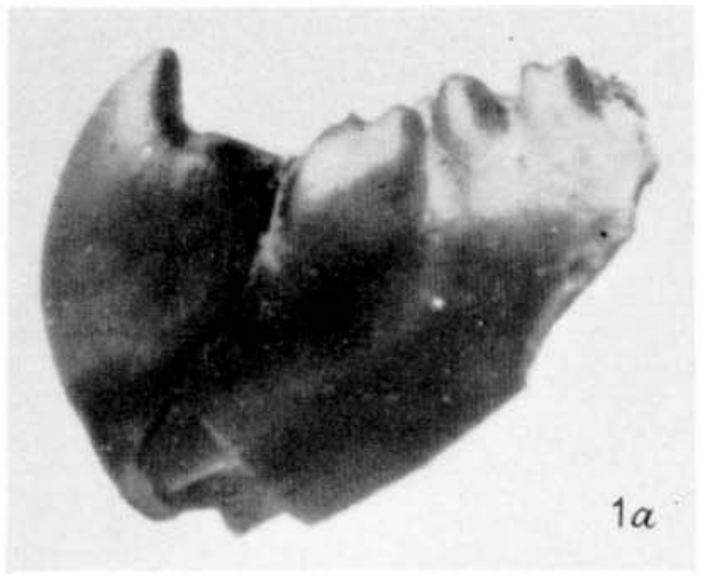

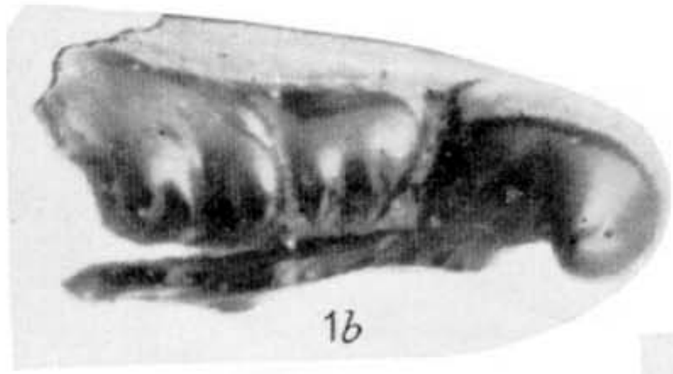

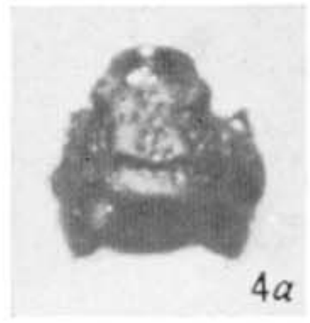

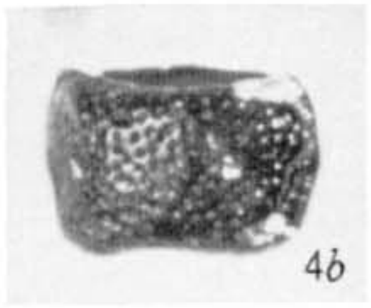

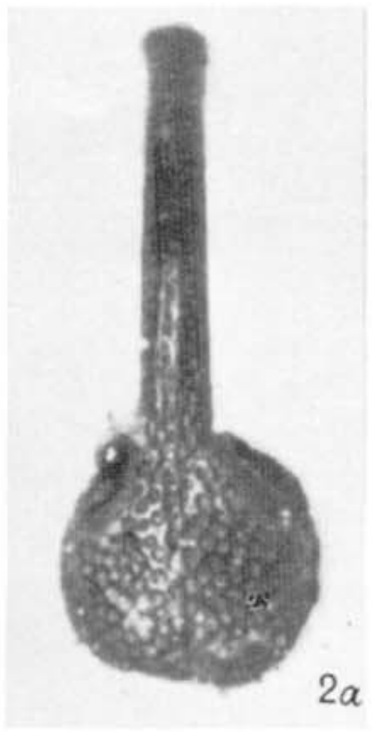

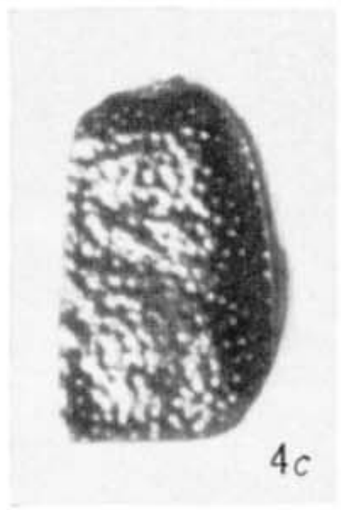

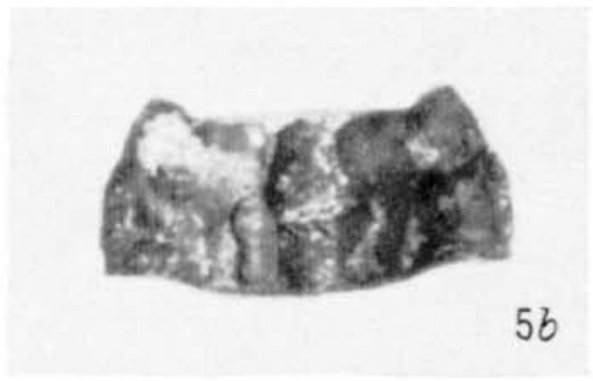

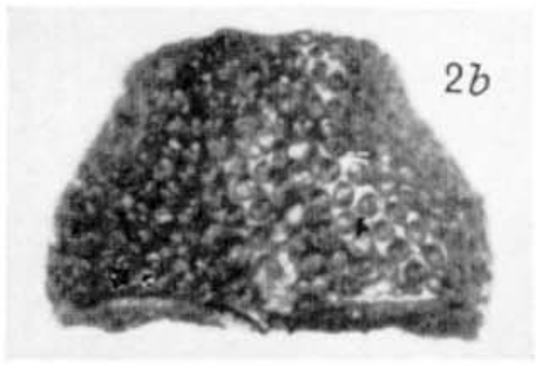

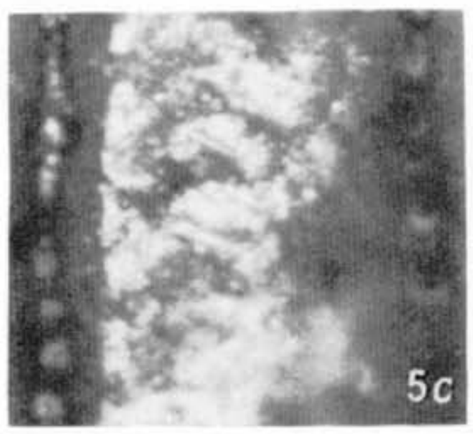

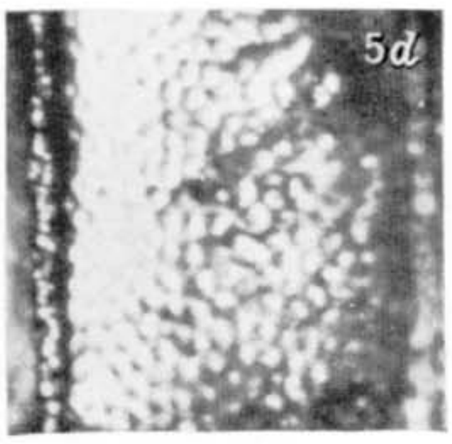

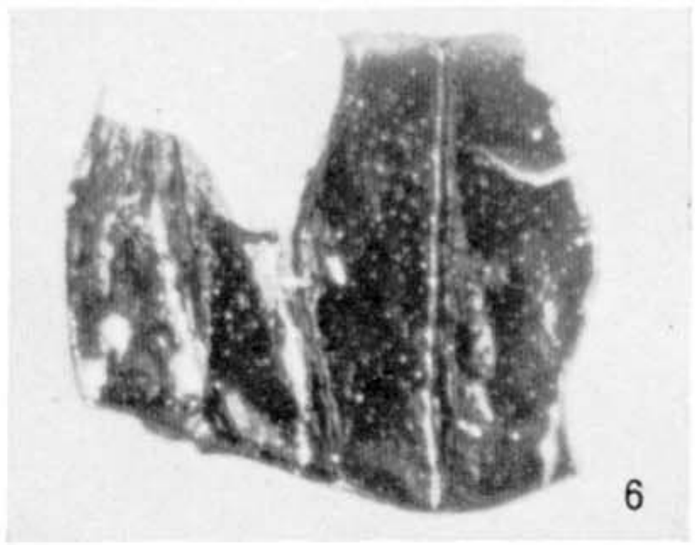

FIGURE 1*a*. Pharyngeal tooth of unidentified Cyprinid, lateral view (× 20).
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