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Globochaete alpina Lombard in the Muschelkalk of Lower Silesia

ABSTRACT: The spores *Globochaete alpina* Lombard from the Lower Muschelkalk (Pelsonian) of Lower Silesia are described and illustrated. Their mode of occurrence is stated to be the same as in the Jurassic and Cretaceous of the Mediterranean province.

INTRODUCTION

The spores *Globochaete alpina* which belong to the family Protococcaceae are most frequent in pelagic microfacies of the uppermost Jurassic of the Mediterranean province (Lombard 1945; Birkenmajer 1954; Colom 1955; Andrusov 1959; Mišik 1959, 1966; Leischner 1959, 1961; Lefeld & Radwański 1960; Cuvillier 1961; Borzá 1970). They are also known from the Jurassic and Cretaceous of Mexico (Bonet 1956) and Cuba (Bronnimann 1955).

Two species of this genus are known so far, namely *Globochaete alpina* Lombard, 1945, and *Globochaete tatrica* Radwański, 1968. The stratigraphic range of the genus *Globochaete* was primarily confined to the Jurassic. Farther microfacial research broadened it to older and younger deposits.

The Triassic forms of *Globochaete alpina* were described by Mišik (1959) from the Norian of the Gemerides, and Ladinian in Reifling facies of the Choč nappe of the Lower Tatra Mts in Slovakia. The Upper Anisian *Globochaete* from Eastern Carpathians described by Patrulius (1964) is to be questioned (see below). The youngest Triassic spores are known from the Rhaetian of the Tatra Mts (Radwański 1968).

The above review clearly shows that Triassic *Globochaete alpina* were so far known entirely from the Alpine-Carpathian facies. The authoress found them in the epicontinental facies of the Muschelkalk in Lower Silesia, Southern Poland. They occur at the base of the Górażdże Beds and in the lower part of the Karchowice Beds which overlie the Terebratula Beds (*cf.* Zawidzka 1970, Fig. 1).

CHARACTERISTIC OF THE *GLOBOCHAETE* MICROFACIES

The microfacies of the Górażdże Beds range from micritic limestone with some Lagenidae and few quartz grains up to biosparites (Fig. 1) with micritic grains similar to those described by Wood (1941) as „algal dust". Some foraminifers are frequent, namely *Glomospira, Meandrospira,* Lagenidae probably *Austrocolomia,* as well as brachiopod and gastropod chips, crinoidal stem fragments, and echinoid spines coated with onkolitic envelopes (*cf.* Wood 1941, Radwański 1968). Oval or spherical forms built of sparite separated from cement by a thin micritic film are also common (*cf.* Friedman 1964). The spores *Globochaete alpina* occur there as single

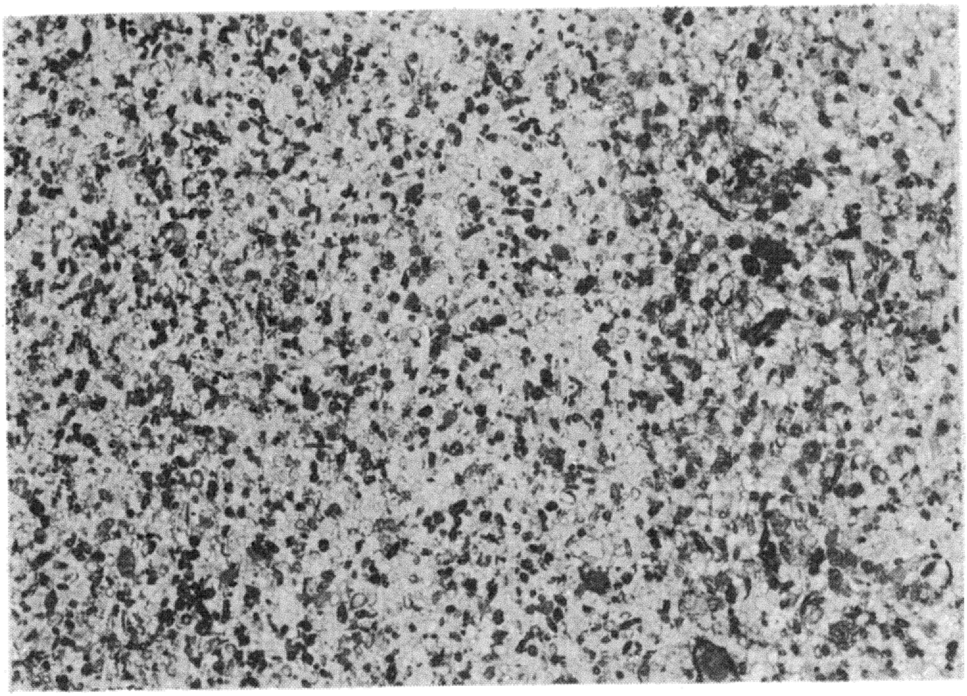

Fig. 1

General view of the microfacies (biosparite) with *Globochaete alpina* Lombard in the Górażdże Beds (Pelsonian) of Lower Silesia; × 5

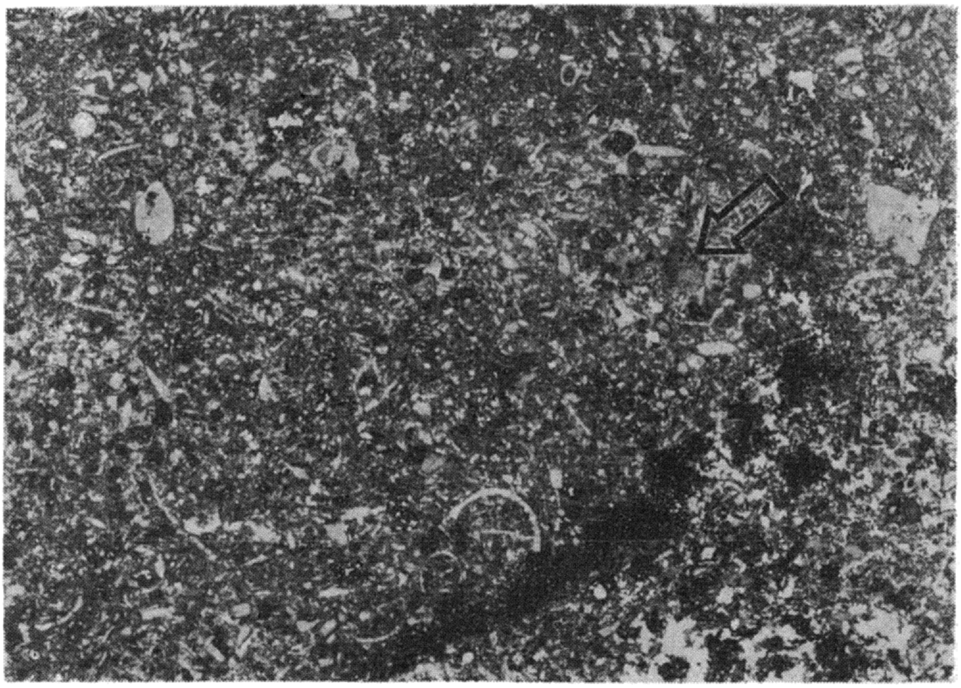

Fig. 2

General view of the microfacies (biosparite) with *Globochaete alpina* Lombard in the Karchowice Beds (Pelsonian) of Lower Silesia; arrowed is a bigger association of spores (*cf.* Pl. 1, Figs 1—2); × 5

specimens and in form of linear associations of 2—3 spores (Pl. 2, Fig. 1). Almost invariably there is black pigment in the centre, and frequently radial structure which in crossed nicols exhibits black cross. The diameter of the spores ranges from 70 to 150 μ.

The presence of *Globochaete alpina* in the Karchowice Beds is connected with microfacies of detrital, porous limestone with crinoidal stem fragments, brachiopod and gastropod chips, some ostracods, fragmented or almost complete Lagenidae and abundant forms resembling filaments (Fig. 2). Secondarily the rock is either silicified, or partly dolomitized. In the latter case there are usually aggregates of fine, isometric carbonate grains (probably dolomite) associated with limonite. Echinoderm chips are corroded and impregnated with limonite what accentuates their reticulate structure. Silification processes are connected mostly with brachiopod remains and proceed from the centres outward. Fibrous calcite is substituted by chalcedony without reorientation of fibres. The spores *Globochaete alpina* occur there as single specimens, or in associations of few up to several dozen of spores (Pl. 1, Figs 1—2). In some cases they adhere to elongated fragments of the "filament" type (Pl. 2, Fig. 2).

Various stages of fission and radial structure causing distinct black cross in crossed nicols are clearly observable (*cf.* Pl. 1, Fig. 2). The spores are from 70 up to 150 μ in size.

COMPARATIVE REMARKS

Diagenetic processes, first of all recrystallization, cause changes in structure, shape and size of the spores *Globochaete alpina* and in associated bioclasts what may lead to erroneous determinations. This is particularly true in case of single foraminiferal chambers filled in with radially oriented calcite (usually small Lagenidae), which are associated with undisputable spores. Some illustrations (*e.g.* Patrulius 1964, Pl. 2, Figs 23—24, 27—28) are questionable in regard of diagnosis and those spores resemble rather sections of chambers of Lagenidae filled with calcite.

Groups of the spores *Globochaete alpina* Lombard found along linear fragments of the "filament" type are regarded as epiphytes (Lombard 1945, Colom 1955, Bonet 1956). It should be pointed out, however, that they occur invariably on the concave side of linear elements. Hence it seems probable that these are remnants of parent vegetative cell with zoospores which still remain attached to it.

Majority of the so far known sites with *Globochaete alpina* Lombard represent pelagic, usually deep marine environments. Colom (1955) pointed out a possibility of expansion of pelagic organisms over neritic areas, what was confirmed by farther investigations. Bonet (1956) noted *Globochaete alpina* in pelagic and shallow-water benthic Jurassic and Cretaceous sediments of Mexico. Dufaure (1958) described them from pelagic facies with intercalations of littoral character. Mišík (1959) found *Globochaete* sp. in Eocene reef limestones. They occur as well in shallow--water, benthic facies of the Rhaetian of the Tatra Mts (Radwański 1968), and in the Middle Jurassic of the Tatra Mts, and of the Villany Mts in Hungary. In the two latter localities their occurrence is connected with stromatolites (Szulczewski 1963, 1968; Radwański & Szulczewski 1966). In neritic facies the discussed spores occur also in the uppermost Jurassic of Spain (Perconig 1968).

As it may be seen from the above presented data, the occurrence of *Globochaete alpina* Lombard in epicontinental, shallow-water facies is common. Their finding in the Muschelkalk of Lower Silesia supports this distribution and additionally points to a connection of the Silesian epicontinental basin with that of the Tethyan one of the Carpathians what was confirmed by finds of common forms of other groups of organisms in both basins (Zawidzka 1970, Kozur 1971a, b, Trammer 1972a, b). Distribution of these algae, aside of euphocity of the zone in which they throve, was not limited by other factors which usually impede the expansion of organisms.

As not only the Górażdże Beds but also the lower part of the Karchowice Beds correspond to the Pelsonian, what was revealed by recent works (Kozur 1971a, b), the spores *Globochaete alpina* Lombard occurring in them would be the oldest ones so far known from the Mesozoic strata.

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K. ZAWIDZKA

GLOBOCHAETE ALPINA LOMBARD W WAPIENIU MUSZLOWYM DOLNEGO ŚLĄSKA

(Streszczenie)

Podczas badań mikrofacjalnych utworów dolnego wapienia muszlowego Śląska Opolskiego stwierdzono obecność spor *Globochaete alpina* Lombard, które występują u podstawy warstw górażdżańskich i w dolnej części warstw karchowickich (*por.* fig. 1—2 oraz pl. 1—2). Obecność tych spor stanowi jeszcze jeden dowód wyraźnej wymiany w środkowym triasie organizmów morskich między zbiornikiem geosynklinalnym a basenem epikontynentalnym (*por.* Zawidzka 1970, Trammer 1972a, b). Pozycja stratygraficzna warstw górażdżańskich i karchowickich odpowiada pelsonowi (*por.* Kozur 1971a, b), wobec czego stanowisko występujących w nich spor *Globochaete alpina* Lombard staje się najstarszym znanym dotąd w mezozoiku.

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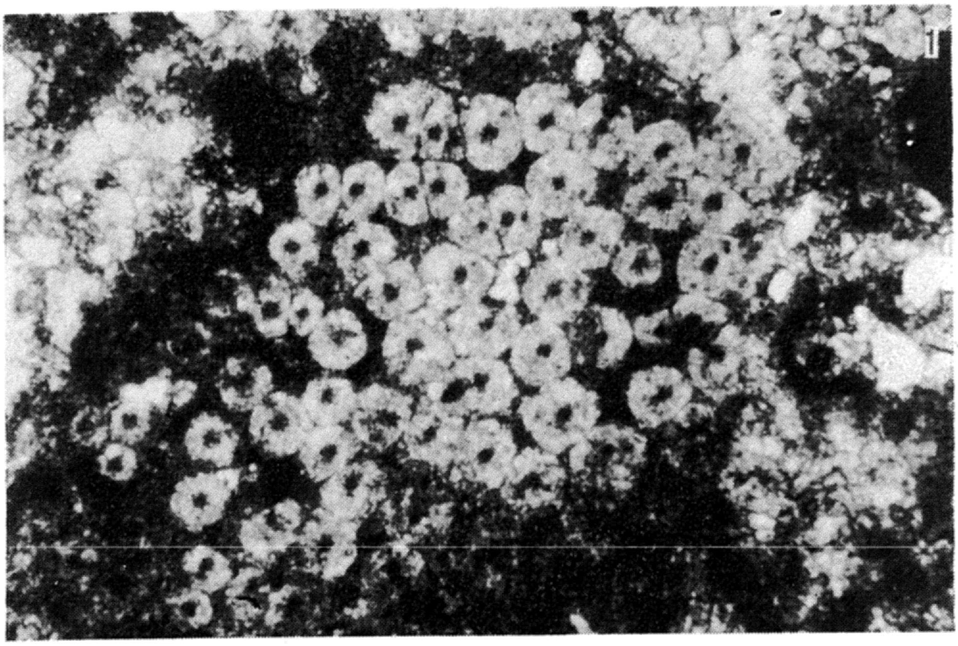
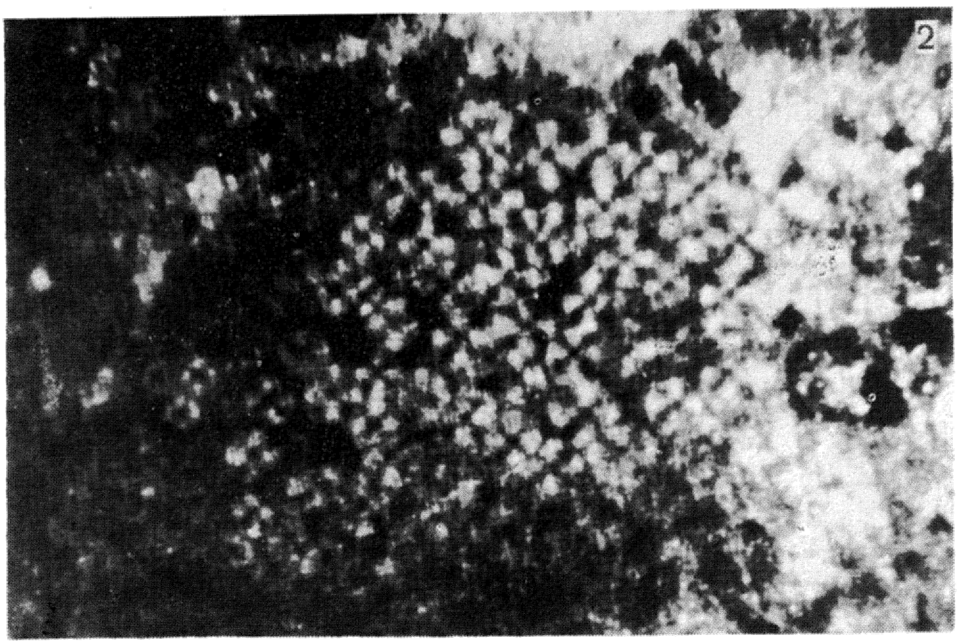
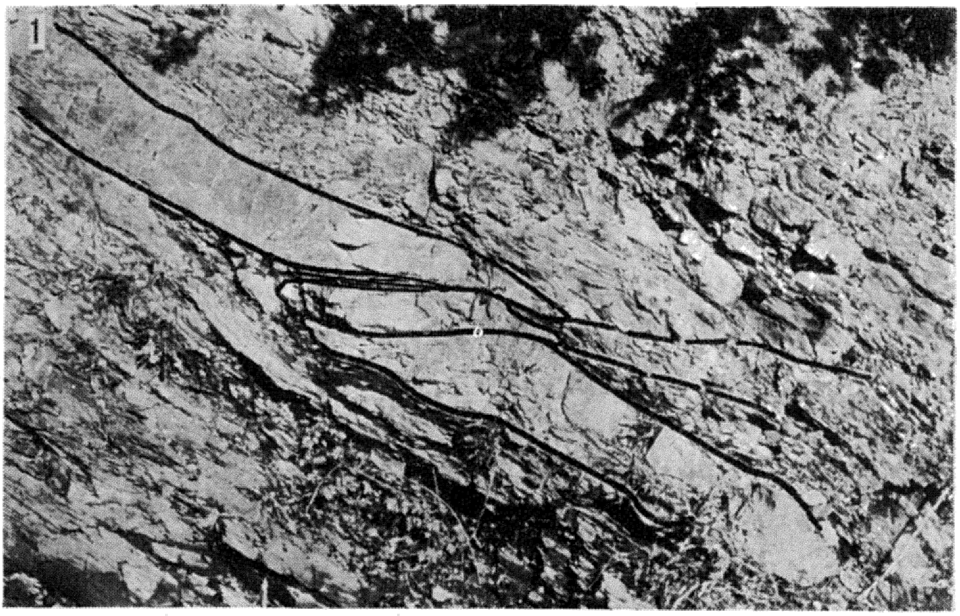
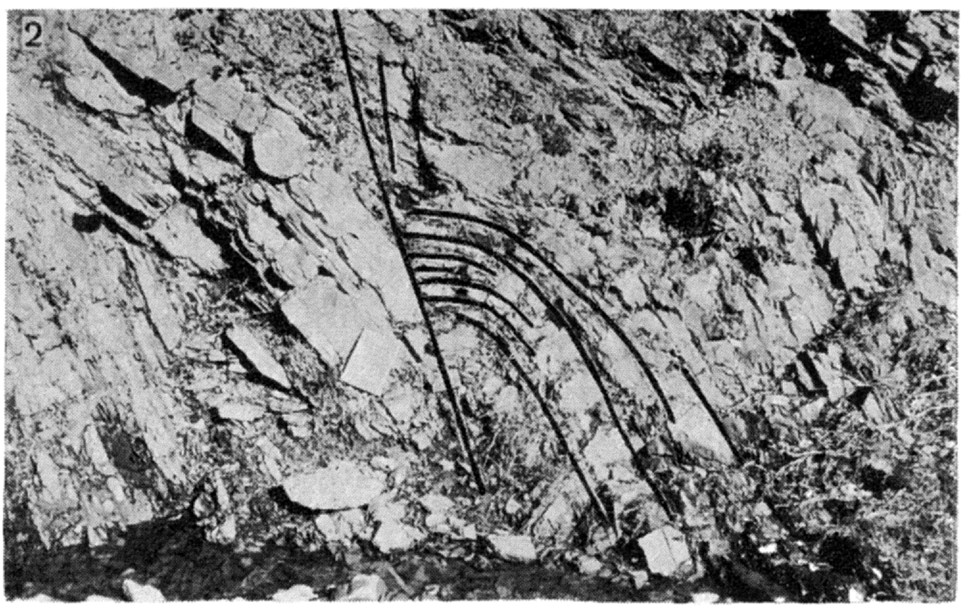




1 — Association of spores *Globochaete alpina* Lombard in biosparite of the Karchowice Beds (*cf.* Text-fig. 2), × 75.

2 — The same, nicols crossed.



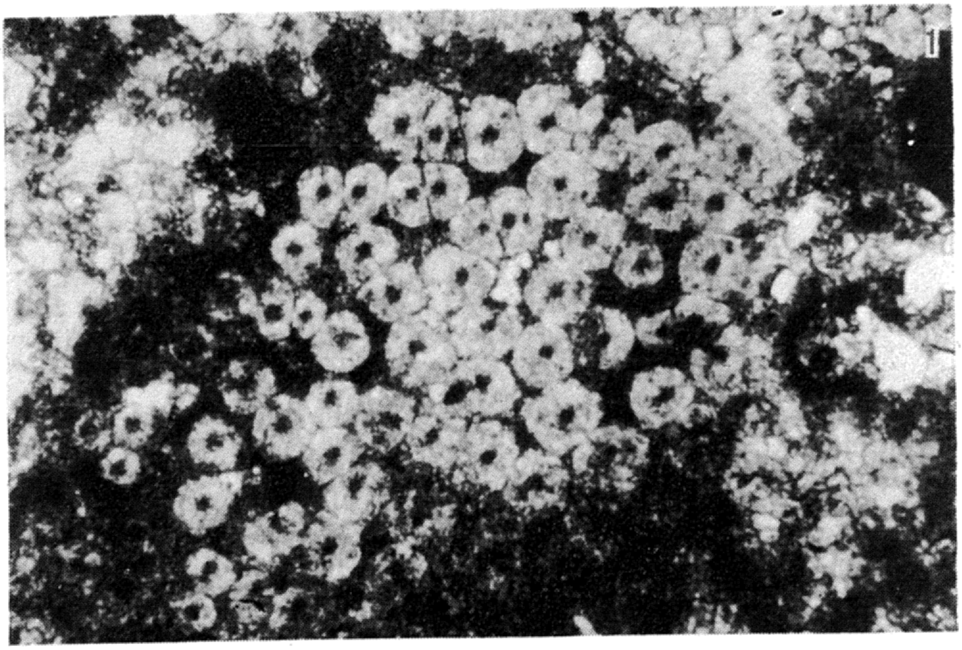


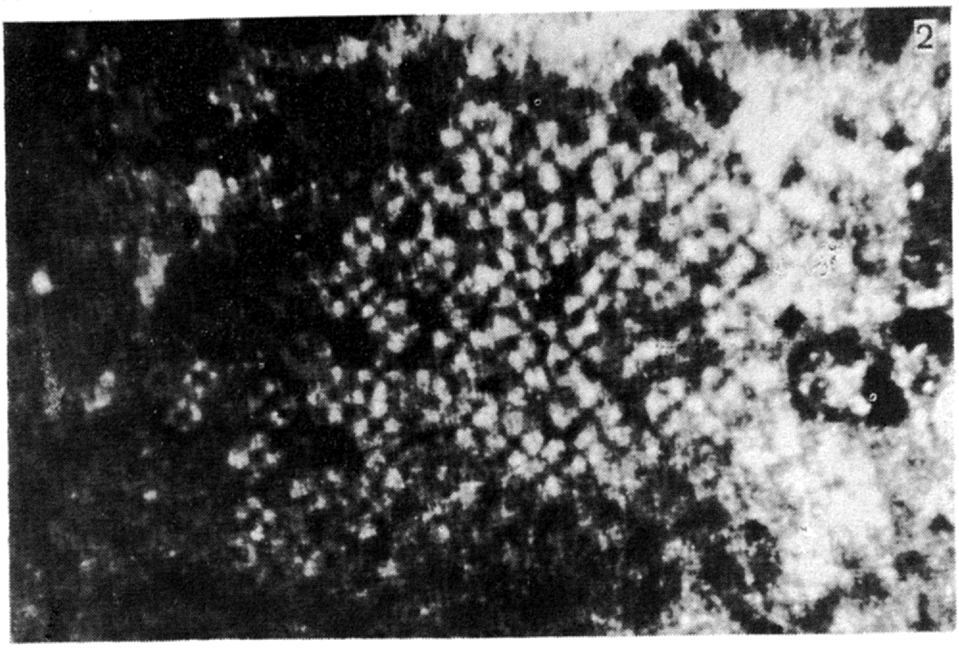
1 — Warstwa piaskowca fliszowego zgnieciona w wyniku nacisku działającego od północy (koryto Kacwińskiej Rzeki, ok. 1300 m na S od kontaktu z Pienińskim Pasem Skałkowym).

2 — Fragment złuskowania warstwy piaskowca (odsłonięcie to samo).

1 — Sandstone layer squeezed by a compression from the north (Kacwińska Rzeka bed, *c.* 1300 m south of contact with the Pieniny Klippen Belt).

2 — Thrust fault in a sandstone layer (the same exposure).





1 — Association of spores *Globochaete alpina* Lombard in biosparite of the Karchowice Beds (*cf.* Text-fig. 2), × 75.

2 — The same, nicols crossed.

1 — *Hibbardella lautissima* (Huckriede); 2 — *Cypridodella unialata* Mosher; 3 — *Cypridodella muelleri* (Tatge); 4 — *Hibbardella magnidentata* (Tatge); 5 — *Prioniodina latidentata* Tatge; 6 — *Cypridodella venusta* (Huckriede); 7 — *Chirodella dinodoides* (Tatge); 8 — *Enantiognathus ziegleri* (Diebel); 9 — *Didymodella alternata* Mosher; 10 — *Cypridodella spengleri* (Huckriede)

All figures × 100, taken by L. Łuszczewska, M. Sc.