



Old Red Sandstone in eastern Poland

Turnau, E. & Jakubowska, L. 1989. Early Devonian miospores and age of the Zwolen Formation (Old Red Sandstone facies) from Ciepielów IG-1 borehole. *Annales Societatis Geologorum Poloniae* 59, 391-409, 4 text-figs, 6 plates.

The investigated borehole is located close to the margin of the East European Platform. Old Red Sandstone type rocks, with fish fauna in the middle and psilophytes close to the top, are distinguished in the area as the Zwolen Formation. It is underlain by lithologically similar but marine shallow-water deposits of the Czarnolas Formation and succeeded above by Middle Devonian marine platform carbonates. Further to the south-west, a narrow depression filled with more marine deposits of the Devonian separates the Platform from the Holy Cross Mountains area.

Rich and excellently preserved assemblages of land plant spores from the upper part of the Zwolen Formation are described in the paper. They represent a succession of assemblage zones similar to those recognized in the Ardennes and the Rhenish Slate Mountains: (1) breconensis-zavallatus Zone, corresponding to the latest Gedinnian in the Ardennes, (2) polygonalis-emsienis Zone of latest Siegenian age, and (3) annulatus-sexantii Zone of the Early to Middle Emsian. This sequence of floras might potentially result either from their biological evolution, or an ecological succession controlled by both eustatic and tectonic events connected with the formation of the continent of Laurasia, the two possibilities that unfortunately were not discussed by the authors. In any case, floristic similarities indicate that the Zwolen Formation covers the time span from at least the Late Gedinnian to the Early Emsian. As the entire Czarnolas Formation contains in the nearby borehole Pionki 4 spores of the Early Gedinnian micronatus-newportensis Zone, the non-marine sedimentation started in the Polish part of the East European Platform as early as in the Late Gedinnian. In this respect, the studied area does not differ from either the Ardennes, or the Podolia.

The paper provides a lot of valuable paleontological data. As a supplement to earlier papers by the same authors, twelve species are described and illustrated with both light and SEM photographs of good quality. One genus and seven species are proposed new.

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A monograph of the clymeniid ammonites

Czarnocki, J. 1989. Klimenie Gór Świętokrzyskich. *Prace Państwowego Instytutu Geologicznego* 77, 1-91, 21 text-figs, 50 plates (with English and Russian summaries). Edited posthumously by H. Makowski and K. Pawłowska (with cooperation of Z. Kotański).

This is the long-awaited monograph written by late Jan Czarnocki in early fifties. Delayed by the sudden death of the author it has been eventually published forty years later. It contains descriptions of 107 species of the clymeniid ammonoids from the Famennian of the Holy Cross Mountains based on material collected by Czarnocki from trenches at several classic localities of the area, mainly from Kowala, Ostrówka, Łagów, and Jabłonna. Some of the original specimens of Dymitr Sobolew, which had been borrowed for study from the Museum of the

State Geological Institute in Warsaw, survived its complete demolition in 1944, have been now reillustrated.

The descriptions and taxonomy follow good standards of the time when the manuscript was completed even if much taxonomic nomenclature is now outdated, an unavoidable effect of the more recent publication of large monographs by Petter (1960) and Bogoslovsky (1980), not to mention numerous papers of other authors. Most of the species identified by Czarnocki seem well defined and biologically substantiated. Of special interest are descriptions of excellently preserved latest Famennian wocklumeriids *Kielcensia* with modified, oxyconic and evolute, last whorls. The assemblage of tuberculate *Nodosoclymenia* species may be of much evolutionary importance as they, having quite a simple suture, show some similarities to the gonoclymeniids which they seem to precede stratigraphically. Particular species of the group differ mostly in the prominence of the tuberculation and they may possibly represent only morphotypes of an extremely variable species.

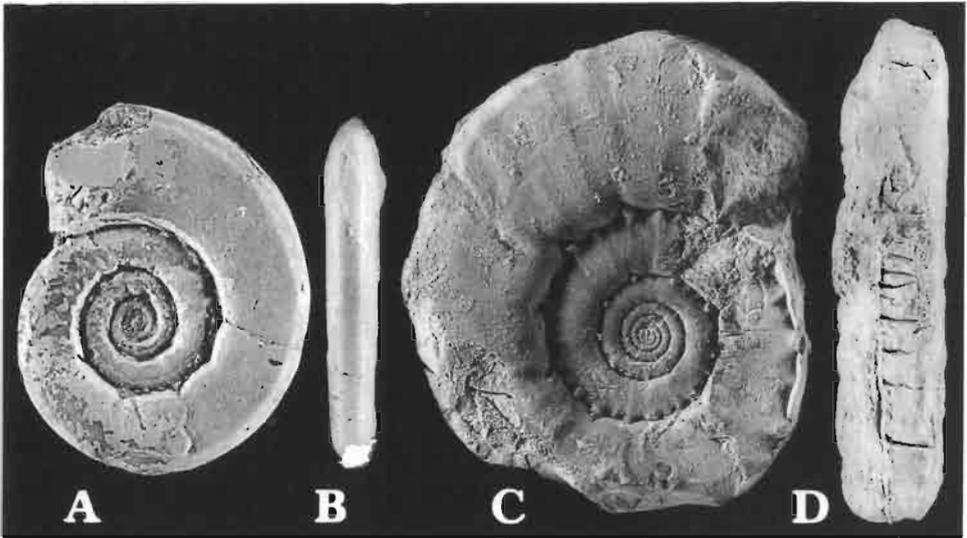


Fig. 1. Species of *Sphenoclymenia* not included in the Czarnocki's monograph. □A, B. *S. plana* Bogoslovsky 1981 from the *Kallosclymenia* beds cropping out between Besówka and Stokówka hills in Gałęzice, specimen IG 284.II.381, $\times 2$. □C, D. *S. brevispina* (Lange 1929) from the *Kallosclymenia* beds of Kowala, specimen IG 284.II.772, $\times 1$.

A major deficiency of the monograph is the complete lack of any references to bed numbers in Czarnocki's trenches. Probably the author himself is also responsible for not giving formal diagnoses of his new species, reversing the line drawing of the suture of *Borkovia*, and misplacing stratigraphically some specimens (*Eokosmoclymenia* from Ostrówka). From some reason the gonoclymeniids, although well represented in his collection, have been practically omitted from the monograph (Fig. 1). The geological part lacks any consistency with the descriptive part of the work and is very out of date. References to important descriptions of the classic sections of the Holy Cross Mountains have not been included, and there is no mention even of the Szulczewski (1971) monograph, although the literature is otherwise well covered up to 1984. Usually several specimens are quoted under the same museum number and in some cases (*Eocosmoclymenia* again) several holotypes are proposed for a single species.

Despite these shortcomings the Czarnocki monograph is definitely a very important source of information about the paleontology of the Polish Late Devonian.

Sclerites of Ordovician echinoderms

Sztejn, J. 1989. Possible holothuroid sclerites from the Upper Ordovician of north-eastern Poland. *Bulletin of the Polish Academy of Sciences, Earth Sciences* 37, 89-91.

This is a short note reporting on supposedly holothuroid sclerites from the subsurface Upper Ordovician. The material described includes poorly preserved irregular, perforated plates. According to the author, the systematic position of these plates remains doubtful, both because of the preservation and the uncertain systematic position of the morphologically closest sclerites known as *Protocaudina* and *Thuroholia*.

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Cretaceous flysch radiolarians

Górka, H. & Geroch, S. 1989. Radiolarians from a Lower Cretaceous section at Lipnik near Bielsko-Biala (Carpathians, Poland). *Annales Societatis Geologorum Poloniae* 59, 183-195, 2 text-figs, 3 plates.

Radiolaria of the Polish Cretaceous are still inadequately known even if in last few years their knowledge has significantly increased. Most of the published reports (also in this journal Vol. 34, No. 4, 1989) concern microfaunas from the Outer Carpathians and adjacent areas in southern Poland. The presented paper is a revision of the radiolarian fauna already described by the junior author in his joint paper of 1963. At the locality of Lipnik deep-water Carpathian flysch deposits are exposed, of ages ranging from Hauterivian (Grodziszczce Shales) to Albian (Lower Lgota Beds). New morphological evidence provided by SEM photographs has enabled more reliable taxonomic determinations, with some species recognized that were not identified earlier in the assemblage. All together 18 species of Spumellaria and Nassellaria have been illustrated and very briefly described, two of them having relatively short stratigraphic ranges.

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Foraminifer versus coccolith stratigraphy

Dudziak, J. & Kostka, A. 1989. Paleogene Foraminiferal-Nannoplankton Stratigraphy of the Maruszyna Succession at Maruszyna, Pieniny Klippen Belt, Carpathians. *Bulletin of the Polish Academy of Sciences* 37, 3-4, 143-167, 5 text-figs, 9 plates.

The Maruszyna Succession was previously investigated for foraminifers by different authors and was included either to Eocene or Middle - Upper Paleocene and Lower? - Middle Eocene. J. Dudziak and A. Kostka summarize the biostratigraphic results of re-examination of the Maruszyna Succession exposed along the Skrzypny Stream at Maruszyna, based on foraminifers (by junior author) and calcareous nannoplankton (by senior author).

Calcareous nannoplankton turned out to be more precise stratigraphic tool than foraminifers and it served to establish the stratigraphic framework. 43 species have been recorded in the studied samples; most of them are illustrated. Distribution of nannoplankton species in the succession is also presented. NP13/14 and NP15-17 nannoplankton standard zones have been recognized, indicating late Early and Middle Eocene age.

Two different foraminiferal assemblages have been found in the studied deposits. The agglutinated forms with *Cyclammina amplexens* Grzybowski from blue marls indicate a late Early - early Late Eocene age. The planktonic foraminifers dominating in red marls allow for a correlation of the studied samples with 'Acarinina rotundimarginata' local zone established earlier by the junior author in Szaflary profile. The world-wide stratigraphic ranges of selected

foraminiferal species are plotted against the age of the samples determined by means of calcareous nannoplankton. An astonishing conclusion of this plot is apparent contradiction between the stratigraphic results obtained by means of foraminifers and calcareous nannoplankton in some samples; the foraminifers indicate an older age. The causes of that phenomenon are not considered in detail, however. The authors deserve credit for interpreting the age of studied deposits on several groups of fossils, as the stratigraphic conclusions based on a single group may be biased due to reworking or selective dissolution.

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An oyster buildup surrounded by black mud

Hoffman, M. & Krobicki, M. 1989. Oyster buildup within the disaerobic facies mudstones (Middle Jurassic, Poland). *Annales Societatis Geologorum Poloniae* 59, 183-195, 4 text-figs, 9 plates, 1 tab.

The oyster buildup from the Bathonian of the Bełchatów open-pit is a solid, dome-shaped structure, 2 meters in diameter, composed of mutually attached *Liostrea explanata* shells. It is underlain by a lenticular coquina with hiatus concretions. Both the buildup and the coquina are encompassed by mudstones with sparse shelly fauna and numerous burrows of *Planolites*- and *Chondrites*-type. The authors interpret the mudstones as deposited under dysaerobic conditions and the coquina is regarded by them as a storm accumulation of reworked material. They propose that formation of the oyster buildup was preceded by (1) cessation of clastic sedimentation, and (2) appearance of a hard substrate (coquina lens). It was accompanied, according to the authors, by (3) an increase of oxygen content and (4) a temporal lowering of the salinity level. While the first three conclusions are completely acceptable, the fourth one does not seem consistent with the paleogeography of the area which represented an offshore zone of the Jurassic epicontinental sea. Moreover, there is no evidence that *Liostrea explanata* preferred brackish habitats.

There are very few reports on fossil oyster buildups. In the majority of examples reviewed by the authors, evidence is lacking that they were morphologically positive structures. Hence, the presented paper is an important and interesting contribution to our knowledge of these structures.

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Miocene fossils from the Holy Cross Mountains

Czapowski, G. & Studencka, B. 1990. Studium sedymentologiczno-paleontologiczne osadów barierowych dolnego sarmatu w rejonie Chmielnika (południowe obrzeżenie Gór Świętokrzyskich). *Przegląd Geologiczny* 38, 117-126, 16 text-figs (with English summary).

This interesting paper (for some reason published in Polish in a journal addressed mostly to industrial geologists) is a combined sedimentological and paleontological study on Upper Miocene (Sarmatian) detrital deposits from the southern slopes of the Holy Cross Mountains, aimed at the paleoenvironmental reconstruction and biostratigraphic correlations. It is proposed that the deposition took place in barrier and nearshore flat conditions. According to the authors, the fauna suggests a slightly reduced salinity. Biostratigraphic conclusions seem involve in a bit of circular reasoning. Namely, the youngest faunal elements are used to establish the lowermost Sarmatian age but shortly thereafter the presence of other species known only from the uppermost Sarmatian is used to extend their range back into the lowermost Sarmatian. Unfortunately, there is no comment either on the relation between the

rate of evolution and the migration of new species or on their ecophenotypic variation which has never been studied in detail in the Neogene molluscan faunas of the Paratethys. The latter, however, may potentially heavily influence our ideas about the stratigraphy of the Neogene in the area. Nevertheless, the reviewed paper may serve as a positive example of joint investigations which are badly needed in studies on the Neogene in the Paratethys.

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Late Cenomanian anoxic event and Late Maastrichtian shallowing

Peryt, D. 1990. Znaczenie stratygraficzne i paleoekologiczne późnokredowych otwornic prowincji przejściowej z obszaru Polski pozakarpackiej. *Przegląd Geologiczny* 38, 4, 161-167, 5 text-figs.

The paper refers to earlier published quantitative descriptions of foraminiferal faunal dynamics and geochemical isotope data on the Cretaceous part of the borehole Sawin, located E of Lublin. Logs of per cent contribution of dominating genera (for the whole Late Cretaceous) and species (for the Cenomanian/Turonian transition) are presented. Relative abundance of particular foraminiferan superfamilies and ranges of biostratigraphically important species are also given. Changes in contribution of planktic species are used to identify eustatic events. Two of such events resulted in strong reduction in number of planktic foraminifers, in the Late Cenomanian and Late Maastrichtian.

The Late Cenomanian event (Fig. 1) is expressed in the core by some (about 15 percent)

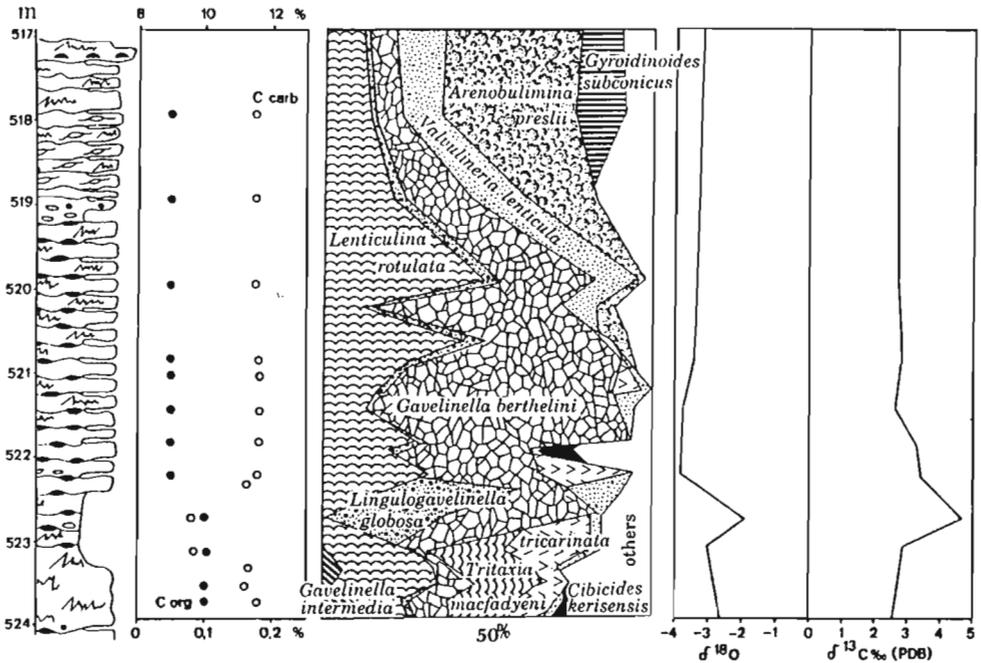


Fig. 1. Content of organic and carbonate carbon, log of per cent contribution of the most important species of foraminifers to samples, and plots of oxygen and carbon isotope contents across the Cenomanian/Turonian boundary in the borehole Sawin, eastern Poland (from Peryt 1990).

decrease in contribution of calcium carbonate but, at the same time, two-fold increase in organic carbon that is associated with increased values of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$. Planktic foraminifers almost disappeared while among benthonic ones earlier quite important species of *Tritaxia* were replaced for the span of the event with *Lingulogavellinella globosa* (Brotzen), which, together with other species, more uniformly distributed in the section, formed an extremely low diversity assemblage.

The Late Maastrichtian changes (Fig. 2) were more gradual, with slow decrease in contribution of planktic foraminifers that resulted in their virtual absence in the strata close

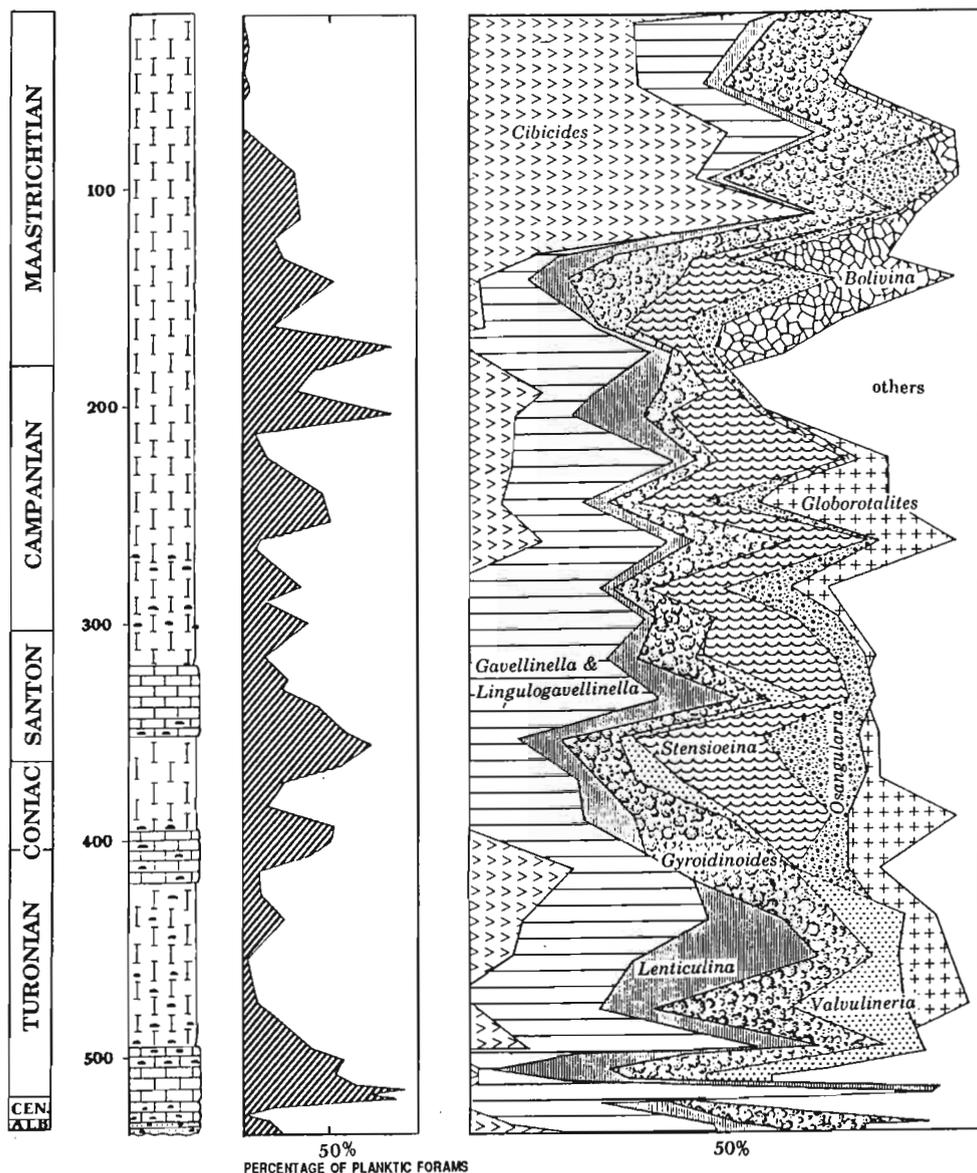


Fig. 2. Logs of planktic foraminifers index and per cent contribution of specimens representing particular foraminiferan genera for the Late Cretaceous part of the borehole Sawin, eastern Poland (from Peryt 1990).

to the top of the section. The benthonic assemblage of the Late Maastrichtian was dominated by species representing superfamilies Lituolacea, Cassidulinacea, and Orbitoidacea. The latter group shows even greater increase in its importance in the topmost sample, being there followed by the Buliminacea.

These two events are quite different regarding features of their faunal dynamics. In the Early Turonian, immediately after the anoxic event, domination of planktic species reached 90 per cent while the benthonic assemblage continued to be of very low diversity, with only two species dominating. In all later transgressive events, connected with increase in contribution of planktic foraminifers, benthonic faunas are invariably of high diversity (measured both with the Fisher α -index and Shannon information index).

Using these data the author discusses the problem of reliability of paleobiogeographic inference based on distribution of species and taxa of higher ranks. Evidently, above-species rank groups enable only a quite crude estimation of biogeographic relationships of faunas, especially when longer time spans are considered. Particular coeval species within a genus may differ much in their ecological preferences. Moreover, they may change their modes of life in the course of evolution. In any case logs of per cent contribution of specimens representing particular taxa (preferably species) to samples are the most useful and objective tools of both an analysis of environmental events recorded in rock sections and their correlation between sections.

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