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THE PROPOSITION OF THE NEW STRATOTYPE OF THE PALEOCENE

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At the VIth African Micropaleontological Colloquium (Tunis, 1974) J. Salaj (CSR) proposed to recognize El Kef section of Tunisia as the hypostratotype of marine Paleocene beds of the Tethyan province. This proposition was accepted by the Colloquium and J. Salaj, K. Pożaryska and J. Szczechura were charged with paleontological and stratigraphical analysis of this section.

The El Kef section (El Haria Fm. of Tunisia) is one of the most complete sections of Paleocene marine sediments in the world, far more complete than any European section. The Danian, Montian and other European stratotypes display incomplete profiles of the stratigraphic units bounded by transgressive or regressive strata. The El Kef section is supplemented by the section from Hedil area, representing somewhat deeper-water deposits, treated as parahypostratotype.

European stratotype of the Paleocene is situated in the Paris Basin (France). It was selected in 1874 by Schrimper, who based the biostratigraphic subdivision of that stage on the evolution of terrestial vertebrates (mammals). Subsequent authors used the name Paleocene for marine deposits separating the Maastrichtian and Eocene. However, all these elaborations of the marine Paleocene, which may by treated as parastratotypes, concern incomplete or even fairly fragmentary profiles.

The Danian stage was introduced and defined by Desor in 1846. The exposures of "calcaire pisolithique" in the Paris Basin and Stevns Klint series exposed along 10 km section of the eastern shores of Zealand south of Copenhagen (Denmark) were selected as the type profiles of that stage. However "calcaire pisolithique" series appeared to be younger than these from Denmark and at present the Stevns Klint section and nearby Faxe section are considered as the type series of the Lower and Middle Danian, respectively. This area in Denmark, as well as the area of good outcrops of Danian sediments at Limhamn in Sweden (Skone) are considered as the type region of the Danian by Troelsen (1956) and Brotzen (1956). The Danian series completed in this way is, however, separated from the underlying Maastrichtian with a hard ground surface and from overlying Selandian — with conglomerate layer.

The concept of the Montian, a stratigraphic stage younger than the Danian, was introduced in Belgium for so-called "calcaire de Mons" series represented by marine "calcaire grossier" series overlied by freshwater gray and black marls with lignite intercalations (Upper Montian: Marlière, 1954). However, the Montian limestones do not crop out on the surface so that stratotype is rather unsatisfactory.

Similar difficulies are connected with the stratotype of the Upper Paleocene — Thanetian — distinguished in Kent (England) by Prestwick in 1852. The type series of the Thanetian directly overlays the chalk and it is overlain by variable sands, clays and pebble beds of the Woolwich and Reading Beds, and it also cannot be considered as a continuous section.

The Landenian stage was proposed in Belgium by Dumont in 1839. This stratotype originally comprised both the series of glauconitic tuffeau and argilles schistoides and the series of fine-grained saund subsequently interpreted as the Ypres by the same author and at present considered as the lowermost Eocene. Subsequently Lyell (1852) proposed subdivision of the Landenian into Lower and Upper and he assigned the Lower Landenian to the Paleocene and the Upper — to the Ypresian.

Munier-Chalmas and de Lapparent (1893) allocated the Heersian and Lower Landenian in the Thanetian, reserving the name Upper Landenian for the Sparnacian (Lower Eocene). Finally, Feugeur (1955) proposed to use the name Thanetian for the whole Landenian and to exclude Sparnacian from the Lower Eocene. Nevertheless, the situation remains unclear and the subdivision into planktonic foraminifer or nannoplankton zones is much more appropriate and unequivocal.

Rosenkrantz (1924) introduced the name Selandian for the time interval from the end of the Danian to Eocene. The European Paleocene stratotypes and their incompletness were discussed by Naidin (1959) and by Moorkens (1972).

The new stratotype of the marine Paleocene deposits of the Tethyan province proposed here is represented by the type profile El Haria Fm. situa-

ted at El Kef section. It is represented primarily by marls with limestone intercalations which is typical of the whole region situated NW of the Tuniesian furrow. The supplementary profile of Paleocene, representing somewhat deeper facies, is the Hedil section (in Sedjenane region) called Djebel el Gorraa. Therefore it is proposed to understand it as the parahypostratotype.

The Paleocene deposits occurring in the northern Tunisia overlay the Cretaceous and they pass into the Eocene without any breaks in sedimentation of the hardground or other types such as those occurring in other countries. It is a continuous series from the Cretaceous up to the Eocene, without any greater changes of facies easily accessible, exposed on vast areas and enabling bed-by-bed analysis of the whole section in several places.

The analysis of the El Kef and Hedil Paleocene sections made it possible to distinguish the following biozones (from the top to the base):

VIII — Globorotalia velascoensis zone
VII — Planorotalia pseudomenardii zone
VI — Globorotalia pusilla pusilla zone
V — Globorotalia angulata zone
IV — Globorotalia praecursoria uncinata s.l. zone
Globorotalia praecursoria praecursoria subzone
Globorotalia praecursoria uncinata subzone
III — Globoconusa kozlowskii zone
II — Globigerina trinidadensis zone
Globigerina inconstans subzone
Planorotalia compressa subzone
Globigerina pseudobulloides subzone
I — Globigerina taurica/daubjergensis zone

The equivalents of the European Danian, Montian and Landenian stages in the Paleocene of Tunisia, i.e. of the Tethyan province would be the zones I—II, III—IV and VI—VIII, respectively.

The Danian should be definitely assigned to the Tertiary as its basal unit. Up to now this has not been officially affirmed by any International Geological Congress but this was accepted by almost all stratigraphers as a part of the Paleocene. The Danian is markedly more complete and comprises two zones more in Tunisia than in the stratotype from Denmark (Europe). In the former region it is possible to distinguish an additional zone I — Globigerina taurica (Globoconusa daubjergensis at the base and subzone II c — Globigerina inconstans — at the top of that stage).

The first, lowermost zone of the Danian is characterized by small globigerinids of the Paleocene type not known from the stratotypes of the Maastrichtian or Danian in Europe (VIe Coll Afr. Micropal.-Discussion; Les actes du VIe — Coll. Afr. de Micropal., Tunis 1976). Therefore it should be assigned to the Danian.

The authors do not introduce any new names for particular stratigraphic links of the proposed hypostratotype of the Paleocene of the Tethyan province but they propose to use the planktonic zones or names originally proposed for the Boreal province: Danian, Montian, Landenian. It is hoped that this markedly more complete section of the Paleocene of Tunisia will make it possible to correlate both particular and substages and the biozones of the Paleocene of Boreal and Tethyan provinces. It should also enable estimating the range of stratigraphic gaps which are so common in the Boreal province. The further studies in Tunisia should also contribute to the knowledge of origin of faunas of these provinces and routes of their migration.

The results of detailed stratigraphic-paleontological study on the Tunisian hypostratotype of the Paleocene were published in Acta Paleontologica Polonica, 21, 2, 1976. In this paper 147 species of benthic and planktonic foraminifers are described and figured (Salaj J., Pożaryska K., Szczechura J.).

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STRESZCZENIE

Stratotyp paleocenu w Europie znajduje się na terenie Francji, w Basenie Paryskim. Został on tam ustanowiony przez Schrimpera w 1874 r. dla warstw kontynentalnych na podstawie ewolucji kręgowców lądowych. Jednak na świecie w bardzo wielu miejscach paleocen jest wykształcony w postaci osadów morskiego pochodzenia. Dla tego typu serii morskich paleocenu nie ma żadnego profilu klasycznego, z którym można by je porównać. W związku z tym wywiązała się w latach 1971—1975 interesująca dyskusja na łamach czasopisma „American Journal of Science" na temat: „Co to jest paleocen?".

Dyskusja ta dotyczy zarówno samego pojęcia paleocenu, jego granic (szczególnie górnej granicy paleocen-eocen), oraz problemu jego morskich odpowiedników. Pragnę włączyć się do tej dyskusji lansując profil paleocenu morskiego w Tunezji, który reprezentuje jeden z najpełniejszych profilów paleocenu na świecie. Nie jest on bowiem organiczony żadnymi przerwami sedymentacyjnymi, jak to ma miejsce w większości serii paleoceńskich na świecie, lecz stanowi serię ciągłą począwszy od kredy do eocenu, bez większych zmian facjalnych i jest łatwo dostępny, odkryty na dużych przestrzeniach w Tunezji północnej.

J. Salaj, K. Pożaryska i J. Szczechura ustanowili w profilu paleocenu El Kef w Tunezji 8 biozon, opartych na otwornicach planktonicznych, są to:

VIII — Globorotalia velascoensis zona,
VII — Planorotalia pseudomenardii zona,
VI — Globorotalia pusilla pusilla zona,
V — Globorotalia angulata zona,
IV — Globorotalia praecursoria uncinata zona s.l. z dwiema podzonami:

Globorotalia praecursoria praecursoria podzona,
Globorotalia praecursoria uncinata podzona;

III — Globoconusa kozlowskii zona,

II — Globigerina trinidadensis zona z trzema podzonami:

Globigerina inconstans podzona,
Planorotalia compressa podzona,
Globigerina pseudobulloides podzona,

I — Globigerina taurica/daubjergensis zona.

Pierwsze dwie zony zostały przez autorów zinterpretowane jako ekwiwalent danu, następne trzy — jako ekwiwalent montu, a pozostałe trzy najwyższe jako równoważnik landenu. Stratotypy danu, montu i landenu reprezentują w Europie tylko wycinki tych

pięter. Szczegółowa stratygrafia warstw hypostratotypu paleocenu morskiego oparta jest na otwornicach planktonicznych. W obrębie otwornic bentonicznych wyróżniono zespół występujący zarówno w prowincji tetydzkiej, jak i borealnej oraz przejściowej, następnie zespół ograniczony do prowincji tetydzkiej, a także zespół znany tylko i wyłącznie z obszaru północnej Afryki.

РЕЗЮМЕ

Стратотип палеоцена находится в Парижском бассейне во Франции и был определен Шимпером в 1874 г. по континентальным слоям на основании эволюции наземных позвоночных. Однако во многих районах мира палеоцен представлен отложениями морского происхождения. Палеоценовые морские свиты не имеют какого-либо классического разреза, который мог бы послужить для корреляций. В связи с этим, на страницах известного журнала „American Journal of Science" развилась интересная полемика на тему: „Что такое Палеоцен?". Обсуждались определения самого понятия палеоцена, его границ (особенно верхней границы палеоцен-эоцен) и морских эквивалентов палеоцена. Настоящая статья продолжает обсуждение этих проблем. Она посвящена разрезу морского палеоцена в Тунисе — одному из наиболее полных разрезов палеоцена в мире. Палеоцен в этом разрезе не ограничен седиментационными перерывами, которые наблюдаются в разрезах большинства палеоценовых толщ, и включает последовательную свиту с мела по эоцен, без существенных фациальных изменений. Кроме того, этот разрез обнажен на больших пространствах Северного Туниса и доступен для наблюдений.

Ж. Салай, К. Пожарыска и Я. Щехура определили в разрезе палеоцена Эль-Кеф в Тунисе восемь биозон на основании планктонных фораминифер. Эти зоны следующие:

VIII — Globorotalia velascoensis
VII — Planorotalia pseudomenardii
VI — Globorotalia pusilla pusilla
V — Globorotalia angulata
IV — Globorotalia praecursoria uncinata s.l.
Globorotalia praecursoria praecursoria
Globorotalia praecursoria uncinata sl.
III — Globoconusa kozlowskii
II — Globigerina trinidadensis
Globigerina inconstans
Planorotalia compressa
Globigerina pseudobulloides
I — Globigerina taurica daubjergensis.

Две первые зоны рассматриваются авторами в качестве эквивалента датского яруса, три следующих — монтского яруса и три остальных зоны в качестве эквивалента ландского яруса. Стратотипы указанных ярусов в Европе представлены лишь некоторыми интервалами. Детальная стратиграфия слоев гипостратотипа морского палеоцена основывается на фораминиферах планктонного типа. Среди бентонных фораминифер определено сообщество, представленное в тетической, бореальной и промежуточной провинциях, сообщество, ограниченное своим распространением лишь в тетической провинции, и сообщество, известное единственно на территории Северной Африки.