Problem of the Stratigraphy of the Miocene Sediments of the Solotvin Depression of the Trans-Carpathian Downwarp

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The Solotvin depression occurs in the southeastern part of the Trans-Carpathian area of the Uk. S. S. R. It is bounded on the north by the Cretaceous and Paleogene rocks of the Carpathians and on the south by the volcanic rocks of the Vygorlat-Gutin Range.

The depression is composed of a thick unit of Miocene sedimentary rocks among which I. B. Pleshakov distinguished from the bottom upward (5): the Tereblin, Solotvino, and Khustetsk suites of the Tissen series; N’yagov, Tyachev, and Vul’khovetsk suites of the Teresvin series; and the Beshikur, Baskhev, Stremben, and Pregud suites of the Apshin series. The age of these series has been determined by I. A. Korobkov (5). The Tissen series is referred by him to the Gel’vet, the Teresvin to the Lower Tortonian, and the Apshin to the Upper Tortonian.

The Danilovo 1 research well was drilled in the central part of the Solotvin depression for study of the stratigraphic section and determination of the tectonic structure. To a depth of 2506 m the well penetrated probable Solotvin and Tereblin (salt-bearing) suites and at a depth of 1200-1920 m it encountered a unit represented by tuff and tuffite and rare interbeds of terrestrial rocks – argillites, siltstones, sandstones, and marls. This complex was distinguished by K. Ya. Gurevich (2) as a new suite – the Danilovo.

Under the sediments of the Danilovo suite at a depth of 1920-2506 m occur compact, deformed, variegated and black, strongly limy argillites, within which are distinguished two new suites – the Baylov and Lazov.

After a monographic treatment of the microfauna, we concluded that the age of the Miocene rocks encountered by the well should be reexamined. Thus, in the beds of the argillites, siltstones, and marls included in the thick tuffogenic Danilovo suite, numerous and very characteristic foraminifera have been found; important among them are Candorbulina universa (Orb.), Biorbulina bilobata (Orb.), Globigerinoides transitoria, Blow. Somewhat less numerous but also characteristic are Gaudryina typica Pischv. in litt., Pseudoparella nova Pischv., in litt., Globorotalia miocaenica Putrja, Globigerinoides aff. altispira Cush et Jarv.

This microfaunal assemblage from the Danilovo suite is unique; it differs from the microfaunal complex of the underlying rocks but displays great similarities to the microfaunal horizon with Candorbulina universa of the Lower Tortonian in the Cis-Carpathians. General forms not encountered below the Tortonian are Gaudryina typica Pischv. in litt., Pseudoparella nova Pischv. in litt., Candorbulina universa (Orb.), Biorbulina bilobata (Orb.), Globigerina transitoria, Blow., Globorotalia miocaenica Putrja.

The microfaunal assemblage of this horizon in the Cis-Caucasus is characterized by abundant Candorbulina universa (Orb.), Biobulina bilobata (Orb.), Globigerinoides transitoria Blow., Globigerina altispira Cush. et Jarv., Globorotalia miocaenica Putrja, Gl. cossovensis Putrja, Gaudryina typica Pischv. in litt., Pleurostomella alternans Schwag., Spiroloculina tenuissima Reuss. and others; these are found over all the Cis-Carpathian downwarp.

V. I. Kazakova (4) determined the age of these beds as Lower Tortonian on the basis of a pelecypod fauna: Amussium denudatum (Reuss.), Am. cristatum Bron. var. badensis Font., Nuclea nucleus L., Leda fragilis Chemn., Chlamys scissa Favre, Chl. seniensis Lom. and others.

An abundant assemblage of similar Globigerinids has a wide distribution also in the Trans-Carpathians. This assemblage was observed by us, besides from the Danilovo well, also in specimens furnished by I. B. Pleshakova from the Kliven’ Zvur creek near Apshitsa.

A very similar microfaunal assemblage, rich in tests of Candorbulina, Biobulina, and Globigerinoides was observed also in specimens of clay and argillite of the Lower Tortonian brought from Roumania by V. V. Glushko. (In Roumania the unit with Candorbulina universa is distinguished under the name Globigerinian suite. - Russ. Ed.). Both in Roumania and in the Cis-Carpathians the terrestrial rocks with abundant microfauna are correlated with tuffogenic rocks of different thickness, which are distinguished as the tuff marker horizon in the Lower Tortonian. It thus follows that the age of the Danilovo suite must be considered as Lower Tortonian.

This typically marine microfaunal assemblage characterizes a new stage in the existence of the Miocene basin and indicates the beginning of a broad transgression of the Lower Tortonian sea embracing both the western territories of the USSR as well as many regions of Western Europe. An indicator of the correctness of this conclusion is the finding of this fauna not only in the Cis-Carpathians, Trans-Carpathians, and Roumania but also in Hungary, Czechoslovakia, and Poland.