

PROBLEMS OF THE LOWER TRIASSIC CONODONT STRATIGRAPHY AND THE PERMIAN-TRIASSIC BOUNDARY

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During the last few years conodonts have provided valuable tool for zonal subdivision and correlation of Permian and Triassic rocks exposed in different parts of the world. Within the Griesbachian succession of the Tethys, four conodont zones have been established, i.e., *Anchignathodus typicalis*, *Anehgnathodus parvus*, *Isarcicella isarcica* and *Neogondolella carinata*. The first appearance of *Anchignathodus parvus* and *Isarcicella isarcica* and extinction of the genus *Isarcicella* are important biological events in conodont biostratigraphy.

Three major conodont changes throw new light on the problems of the Permian-Triassic boundary and the Lower Triassic stratigraphy. The Upper Dorashamian conodonts *Neogondolella subcarinata* and *Anchignathodus typicalis* penetrate in the Lower Griesbachian (*Otoceras woodwardi* Zone) and characterize the interval of *Neogondolella subcarinata* Zone; in the middle parts of the latter is situated the accepted Permian-Triassic boundary (first possibility). The disappearance at the middle of the Griesbachian of typical ammonitic and ostracod taxa; the disappearance of *Anchignathodus* and the occurrence of *Isarcicella isarcica* seems sufficient to mark a boundary (second possibility). Thus the Lower Griesbachian would be referred to the Permian, and the Upper Griesbachian (*Ophiceras commune* and *Proptychites strigatus* Zone and their equivalent *Isarcicella isarcica* Zones) to the base of the Lower Triassic. If *Isarcicella* is confirmed to be a younger synonym of *Anchignathodus*, the Upper Griesbachian strata including those with *Proptychites strigatus* could be referred to the Permian. It was assumed that the Palaeozoic conodonts (without *Neogondolella carinata*) had already disappeared, and typical Triassic conodonts still had not appeared. Our data from the Kashmir Himalayas show that *Anchignathodus* almost reached the boundary with the Dinerian and afterwards within a very short time gap, the Triassic *Neospathodus* made its appearance. These events at the lower boundary of the *Proptychites candidus* Zone represent a drastic change and another possibility for a clear boundary (third possibility). The Lower Triassic conodont zonal stratigraphic scheme is simplified (9 zones). The Lower-Middle Triassic boundary is included in the volume of *Neospathodus gondolelloides* Zone and the problem for its more precise conodont definition is open.

TABLE I.

SERIE	STAGE	Ammonoid Zones	Proposed Conodont Zonal Standard (Present paper)	Possible levels of Permian-Triassic Boundary	
LOWER ANISIAN (part)			Neospathodus gondolelloides R.Z.		
L O W E R T R I A S S I C	SPATHIAN	Keyserling, subrobustus			
		"Olenikites" pilaticus	Neospath. triangularis - Neospath. homeri C.R.Z.	Neogondoll. jubata A.S.Z.	
				Ns.collins R.S.Z.	
	SMITHIAN	Wasatchites tardus	Neospath. waageni R.Z.	Beds with platyvillos.	
		Eufleming. romunderi		N.milleri R.Z.	
				Parachirognathus - Furnishius Interval	
				Neogondolella ? nepalensis R.Z.	
	DINERIAN	Vavilovites svedrupi	Neospathodus dieneri - Neospathodus cristagalli C.R.Z.		
		Proptychites candidus			
	GRIESBACHIAN		Ns.kummeli		←
		Proptychites strigatus	N.carinata A.S.Z.		
		Ophiceras commune	Isarcicella isarcica R.Z.		
Otoceras boreale		Anchignathodus parvus / Isarc. isarcica I.Z.		←	
	Otoceras concavum	Anchignathodus typicalis - Neogondolella subcarinata C.R.Z.		←	
UPPER PERMIAN (part)					

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