

incorrect reconstructions. Detailed attention to description of elements and their variation and detailed sample by sample logs of large faunas are required for stability in taxonomy in these early stages of Lower Ordovician multielement taxonomy.

BRANSON & MEHL Localities – Historical Perspectives.

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Middle and Upper Triassic Conodont Zonation of the Tethyan Realm.

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In the Middle-Upper Triassic there are the following conodont faunal provinces within the Tethyan realm: Asiatic, Dinaric (with Balkanide subprovince), Austroalpine, Westmediterranean-Arabian, Germanic, and Nevadic ones. Revised conodont zonations are established for all these conodont provinces. These zonations are correlated with the stratigraphic subdivision and with the ammonoid successions. A Middle-Upper Triassic standard conodont zonation is established and the conodont zonations of all faunal provinces are correlated with this standard zonation.

Silurian Conodonts from Yokokura-yama, Shikoku, Japan.

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The studied Silurian sequence about 80 metres thick have yielded the conodonts characteristic of the Llandovery-Wenlock boundary interval. The conodont fauna from the lower clastic part (ca. 40 m thick) are characterized by the more or less frequent occurrence of *Apsidognathus tuberculatus*, *Ozarkodina* sp. and *Panderodus* sp. and also by the more sporadic occurrence of *Ambalodus galerus* s. f., *Astrognathus tetractis* s. f., *Belodina* sp., *Carniodus carnulus*, *Hadrognathus staurognathoides*, *Llandoverygnathus pennatus*, *Pseudooneotodus tricornis*, *Pygodus lyra* and *Pterospathodus amorphognathoides*. In contrast the upper predominantly carbonate part have yielded *Dapsilodus* spp., *Ozarkodina excavata excavata*, *Panderodus* sp., *Pseudooneotodus beckmanni*, *P. bicornis* and *Walliserodus* sp. In this horizon the occurrence of *Kockelella ranuliformis* is noticeable although they are very low in the frequency of occurrence.

The described composition suggests that the lower clastic part are correlatable to the upper *celloni* and the *amorphognathoides*-Zones (latest Llandovery and earliest Wenlock) whereas the upper carbonate part to the lower or the lowest *patula*-Zone (early Wenlock). Zonal assignment of the uppermost part of the studied sequence remains not clear because except for the frequent occurrence of *Ozarkodina excavata excavata* and the rare occurrence of *Kockelella ranuliformis* no marker species of the *patula* or the *sagitta*-Zones have been recovered from this horizon in spite of closer examinations.

Taxonomy and Phylogeny of some Lower Carboniferous Conodonts and Preliminary Standard Post-*Siphonodella* Zonation.

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The attempt to synthesize a workable global conodont zonation of Upper Tournaisian and Lower Viséan (Osagean) strata resulted in a preliminary standard global zonation for the post-*Siphonodella*-pre-*Cavusgnathus* interval (pre-*Gnathodus bilineatus* in Europe) based on conodont faunas from Western Europe and Central and Western North America. The phylogeny and taxonomy of six genera –

Doliognathus, *Eotaphrus*, *Gnathodus*, *Protognathodus*, *Pseudopolygnathus*, and *Scaliognathus* – are revised, and 5 species and 17 numbered morphotypes of 7 previously known species are described as new. Between the highest range of *Siphonodella* and lowest range of *Cavusgnathus* (in North America) and *Gnathodus bilineatus* (in Europe) a zonation is proposed to consist in ascending order, of the Lower and Upper *typicus*-, *anchoralis*-, *latus*-, and *texasus*-Zones. Taxa proposed by COOPER (1939) and VOGES (1959) are reidentified.

Organic Metamorphism and Thermal Maturity of Paleozoic Strata of Southern Ontario Based on Studies of Conodont and Acritarch Alteration.

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Micropaleontological studies were undertaken to establish the burial temperature of the Paleozoic sedimentary sequence in southern Ontario through investigation of colour alteration of conodont and palynomorphs. Over 800 samples were used from both surface and subsurface localities that penetrated various units of Ordovician, Silurian and Devonian age in the subsurface.

Three thermal alteration zones are recognized along the surface and in the subsurface. The first extends from the top of the Paleozoic sedimentary sequence to depths extending into Upper Middle Ordovician strata. In this zone, the conodont alteration index (CAI) is 1.5 and reflects a burial temperature of 60–80°C. The second zone includes the remainder of the Ordovician section in southwestern Ontario and part of the Ottawa Valley in eastern Ontario. The CAI values for this zone lie in range 2–2.5 and suggest burial temperatures of about 80–90°C. Superimposed on this broadscale thermal alteration pattern that reflects burial depth, are several areas with higher alteration indices of 2.5–3 in the Ottawa Valley. These are interpreted as being the result of unusually high heat flow related to Cretaceous rifting that produced the Ottawa-Bonnechère graben. Study of acritarchs shows three changes in colour from light to dark yellow, to orange and dark brown within the zone defined by CAI 1.5.

The micropaleontological studies of thermal maturation have also been integrated with studies of the geochemistry and carbon isotope composition of Ontario's natural gases. The carbon isotopic composition indicates that most gases appear to have been generated from mature and overmature source rocks outside of southern Ontario.

Late Bashkirian – Early Moscovian Conodonts in a Section of the Cantabrian Mountains (Spain).

By C. A. MÈNDEZ and J. R. MENENDEZ ALVAREZ

Departamento de Paleontología, Universidad de Oviedo, Spain.

Several conodont faunas were collected in a section composed essentially by gray coloured limestones.

This section consists of 120 m of gray massive limestones (upper part of Valdeteja Formation), followed by 114 m of dark-gray thin bedded limestones with interbedded shales and chert at its basal 50 m and gray massive and bioclastic limestones in the uppermost 64 m (lower part of Caliza de Picos de Europa).

Platform conodonts are dominant. The genera are mainly composed by species of *Declinognathodus*, *Gondolella*, *Idiognathodus*, *Idiognathoides* and *Neognathodus*, among them, *Idiognathodus* and *Idiognathoides* are the most abundant genera.

Phylogeny and Biostratigraphy of the Conodont *Gondolella* (Carboniferous-Permian), Eastern and Central North America.

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Gondolella STAUFFER and PLUMMER, 1932 (type-species *G. elegantula*, O. D.) possessed a multi-element apparatus consisting of as many as seven kinds of elements (von BITTER, 1976) of which the

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