ronmental differences in North America and Austria. There is no indication from the rock record that extinction was caused by a catastrophic environmental challenge to the entire conodont population.

Conodont Biofacies in the Belgian Famennian.

By R. DREESEN

Laboratoire Mikropaleontologie, Dept. Aardwetenschappen, Kath. Univ. Leuven, Redingenstraat 16 bis, B-3000 Leuven.

Different mega-environments are differentiated on the undathem-clinothem of the tidal epicontinental Famennian sea in the Dinant and Vesdre Basins. The vertical succession of the sedimentary formations, which are diachronic with regard to the standard conodont zonation, represents a regressive megasequence, ranging from relatively deep offshore open marine, shallow nearshore, to backshore restricted marine environments (THOREZ, 1969–1977).

Different associations of platform conodont genera (biofacies) reflect different ecological conditions which are directly or indirectly related to water depth, turbulency, salinity and proximity to the coast.

In this way, the distribution pattern of conodont biofacies throughout the Famennian represents a normal response to the oscillating movements of a prograding coast in the studied basins; the presence moreover of mixed conodont biofacies is also related to sedimentological mechanisms. From the top of the Upper Frasnian (Matagne Shales) to the base of the Lower Carboniferous (Hastière Limestone) the following sedimentary environments are recognized, each of them characterized by its (mixed or not) conodont biofacies:

The nodular clayey limestones scattered within the Famenne Shales, deposited during the *triangularis*- and *crepida*-Zones, yield a Palmatolepid biofacies and represent open marine offshore sediments (enclosing also pelagic macrofossils). A faunal break at the Frasnian/Famennian boundary and a temporary outburst of Icriodids are indicative of a probable sedimentary gap and/or a sudden appearance of unfavourable facies.

The Esneux Formation, composed of alternating thin-bedded micaceous sandstones and shales, developed during the *rhomboidea*- and Lower *marginifera*-Zones, contains coarse grained lenticular crinoidal limestones locally enriched with iron oolites, which are interpreted as storm layers deposited in the coastal sand-shelf mud transitional zone. In the same way the presence of iron oolites and hematitized skeletal debris in the nodular limestone facies of the underlying Famenne Shales may be attributed to the mechanism of „debris-flow" („fluxo-turbidites"). The source of these oolitic ironstones are the high-energetical sea-sides of crinoidal mud mounds, dispersed on a shoal in the proximity of the coast. The surroundings of these reef-like bio-accumulations were probably prolific for a Polygnathid – Icriodid Biofacies, which was mixed up with elements of a Palmatolepid – Polygnathid Biofacies in the adjacent relatively shallow subtidal environments.

The Souverain-Pré Formation, composed of sandy subnodular crinoidal limestones with foraminifera, is considered as a „back-reef" facies of those crinoidal mud mounds, during the *marginifera*- and Lower *velifer*-Zones. It is characterized by a (Palmatolepid) Polygnathid Biofacies often contaminated by elements of a Polygnathid – Icriodid Biofacies of the more shoreward intertidal environments.

During the *velifer*-Zone, the Comblain-la-Tour Formation and the Montfort Formation were deposited in adjacent tidal flat and sand barrier environments. Thin-bedded and fine-grained limestones, mostly sandy and dolomitized, intercalated within alternating shales and sandstones of the Comblain-la-Tour Formation, contain a Polygnathid – Icriodid Biofacies; local crinoidal lenticular limestones within sandstone units of the Montfort Formation yield a mixed conodont biofacies, composed of elements of both a Polygnathid – Icriodid and a Clydagnathid ? Biofacies. This mixed conodont thanatocoenosis and other sedimentological data (e. g. channels, intraclasts of restricted marine limestone) prove the presence of tidal inlets in the barrier complex, connecting restricted marine environments (tidal lagoon) to fore-barrier environments (very shallow subtidal to intertidal).

Because of the alluvio-lagoonal facies of the Evieux Formation (enclosing evaporitic dolomites and red arenaceous beds, probably related to sabkhas – after J. THOREZ, pers. comm.) and because of the supposed presence of a Clydagnathid Biofacies, the index conodonts for the *styriacus*-Zone have never been found in Belgium; further investigation is required to prove the existence of this

Zone in these unfavourable environments.

At the end of the Famennian finally (in the so-called „Strunian" deposits: „Fa2d" and „Tn1a": during the *costatus*-Zone) more marine influences are reappearing: rhythmic alternating thin-bedded sandstones, shales and calcareous layers with stromatoporoids and foraminifera.

The conodont associations are characteristic of a Polygnathid – Icriodid Biofacies mixed with elements of a Bispathodid – Pseudopolygnathid Biofacies; this is indicative of a new transgression which only will by completed during the Lower Carboniferous.

Palmatolepis **Conodont Apparatuses – Empirically Derived Composition and Structure.**

By L. E. FAHRAEUS

Department of Geology, Memorial University of Newfoundland, St. John's, Newfoundland, Canada A1B 3X5.

Some Late Eo- and Mesotriassic Conodont Multi-Elements: Notes on their Taxonomy, Phylogeny and Distribution.

By F. HIRSCH

Geological Survey of Israel, 30, Malkhe Yisrael St., 95501 Jerusalem, Israel.

A comparative study of Late Eotriassic and Mesotriassic conodont Multi-elements from North America (Utah, Nevada) and the circummediterranean region indicates their derivation from two major stocks: Ellisoniid *(Ellisonia, Furnishius, Parachirognathus, Hadrodontina* and *Pachycladina)* and Xaniognathid. The latter branches into two substocks: Neogondolellid *(Neogondolella, Neospathodus, Pseudofurnishius, Carinella* and *Epigondolella)* and Gladigondolellid *(Gladigondolella)*.

The paleogeographic distribution of these taxa was controlled by paleoecologic factors relating to their habitat.

A Summary of Chesterian (Carboniferous) Conodonts from the Illinois Basin, USA.

By A. S. HOROWITZ and C. B. REXROAD

Indiana University, Bloomington, IN, USA; Indiana Geological Survey, Bloomington, IN, USA.

The Chesterian Series in the Illinois Basin is a sequence of dominantly limestone units alternating with clastic intervals of shale and sandstone. The clastic units are mostly nonmarine and essentially lack conodonts, but conodonts have been reported from all limestone formations or members.

Because of lack of study, however, some have almost no record of conodonts. For example, published accounts list only a few specimens of discrete element *Hindeodella* from the Vienna Limestone, but the present study shows that conodonts are diversified and moderately abundant in it. This is true of the other formations.

At least ten multielement genera have been recognized in the Chesterian Series. They are *Adetognathus, Cavusgnathus, Gnathodus (Dryphenotus), Hindeodus, Idioprioniodus, Kladognathus, Lochriea, Lambdagnathus, Synprioniodina ?,* and a new genus whose Pa element is discrete element *Spathognathodus campbelli.* In part these genera are recognized on the basis of statistical analyses, and much of the new data on occurrences is based on collecting done specifically for multielement analyses. Generally, sets of four samples were collected from single beds or portions of beds that were selected to represent a variety of environments. These samples were analyzed both collectively and individually.

We used four binary similarity coefficient (Baroni-Urbani-Buser, Jaccard, Simpson, and Phi) for which we believe levels of significance can be calculated by using standard clustering strategies. Our analysis also included the Fager coefficient because it has been used commonly in conodont studies. The data were clustered by using all five coefficients with both the complete linkage and unweighted pair clustering strategies. The Phi coefficient permits the selection of a level above which single element taxa are associated at probabilities significantly greater than randomly expected. Treating the Baroni-Urbani-Buser, Jaccard and Simpson coefficients as binomial probabilities also permits the selection of levels above or below which associations are significantly different from those expected on a random basis. Finally, the assumption of binomial probabilities also permits the direct assessment of the significance of linkages between clusters.

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