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THE IUGS DEVONIAN-CARBONIFEROUS WORKING GROUP : A REPORT ON ACTIVITIES, 1978-1984

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(3 tables)

The IUGS Working Group on the Devonian-Carboniferous Boundary resulted from informal discussions during the Carboniferous Congresses in Krefeld (1971) and Moscow (1975) - It was officially organized by the IUGS in 1976.

The first meeting was held from August 27th to September 8th 1978 in connection with the 2nd Symposium on the Devonian System organized in Bristol (England) by the Paleontological Association - 22 localities were visited in western Germany, Belgium, northeastern France, southwestern England and southern Ireland, by 30 specialists (10 titular members). One of the major accomplishments of the excursion was the opportunity to compare within a span of ten days depositional environments ranging from bathyal to continental with some rates of sedimentation more than one hundred times greater in some areas than in others. One of the important conclusions is that discontinuities are obvious or inferrable in almost all of the sections visited. The meeting ended at Courtmacsherry (Ireland) where, in a first session, the members concluded collectively that :

1. There exists already a general correlation of strata near the Devonian-Carboniferous boundary, although refinement is desirable.
2. The most useful boundary will be one that lies within the span of fully documented continuous evolution of one or, more desirably, several groups of fossils.
3. Because of their abundance and tendency toward ubiquitous occurrence, microfossils offer the best practical guidance in selection of a boundary although megafossils will continue to play an important role.
4. Priority in definition of a boundary is a significant consideration but not a dominant one. The least disruption of the literature is a desirable objective.

A report of this first meeting has been published in *Lethaia* 1978, Vol. II, p. 280.

A meeting attended by 15 specialists (7 titular members) was held from May 17th to 20th, 1979 in connection with the 9th Carboniferous Congress organized in Urbana (U.S.A.). 10 localities were visited in the Mississippi valley. At a session, in Washington DC, the relations between transitional faunas of *Quasiendothyra* and the Cephalopod zonation were discussed in the light of comparative studies made by R. CONIL, B. MAMET and E.A. REITLINGER on recently collected material from the Etroeungt area. Later on, and despite B. MAMET's comments on the necessity of using a faunal succession in a continuous sequence and M. STREEL's arguments in favor of a conodont-based limit slightly higher than the *Gattendorfia subinvoluta* level, a text of a recommendation was submitted by R. LANE, C.A. SANDBERG and W. ZIEGLER. This text was adopted by the participants (titular members and others) and confirmed later by postal ballot (11 in favour, 1 conditionally in favor, 1 against, 1 abstention, 2 did not reply, see table 1).

RECOMMENDATION :

- A. In an attempt at close conformity with the current definition of the Devonian-Carboniferous boundary at the base of the *Gattendorfia* Zone which was recommended by the 1935 Heerlen Congress, the Working Group on the Devonian-Carboniferous boundary recommends a new operational definition of this boundary. This new definition is at the first appearance of the conodont *Siphonodella sulcata* within the evolutionary lineage from *Siphonodella praesulcata* to *Siphonodella sulcata* and immediately precedes the entry of *Gattendorfia* in the Hönnetal.

It is now important to begin the search for a boundary stratotype best displaying this evolutionary lineage, as well as exhibiting adequate representation among other zonally significant groups. The Working Group seeks information from all interested persons on the location of a boundary stratotype at this level.

B. The IUGS Working Group on the Devonian-Carboniferous boundary recommends that the lower limits on the Dinantian, Tournaisian, Mississippian, Kinderhookian, and other chronostratigraphic units of similar rank be adjusted to correspond exactly with the proposed placement of the Devonian-Carboniferous boundary at the base of the *Siphonodella sulcata* Zone.

The text of this recommendation was subsequently published in several reviews (Lethaia, 1980, vol. 13, p. 287; Episodes 1980, 3, p. 27; Przegląd Geologiczny 1980, n° 8, p. 438).

Table 1
Votes on the RECOMMENDATION (A)
and additional motion (B)

	A	B
I. CHLUPÁČ	in favor	in favor
B.F. GLENISTER	in favor	in favor
M.R. HOUSE	in favor	in favor
H. HOLLARD	in favor	in favor
L.I. KONONOVA	in favor	in favor
M. LYS	no answer	no answer
B.L. MAMET	abstention	in favor
E. PAPROTH	in favor	in favor
G. PLAYFORD	in favor	in favor
E.A. REITLINGER	in favor (1)	see
	under condition	remarks (1)
C.A. SANDBERG	in favor	in favor
P. SARTENAER	no answer	no answer
K.V. SIMAKOV	against (2)	in favor but
		see remarks (2)
M. STREEL	in favor	in favor
D. WEYER	in favor (3)	in favor
W. ZIEGLER	in favor	in favor

(3) The first recommendation needs much more additional palaeontological studies (morphology, variation, phylogeny) of conodont faunas in Devonian-Carboniferous boundary times (*Costatus*, *Protonathodus*, *Siph. sulcata* Zones) of several regions, describing complete faunal assemblages (D. WEYER).

A meeting was held in Paris on the 16th July 1980 during the 26th International Geological Congress. It was a joint meeting with the Subcommittee on Devonian Stratigraphy, which 10 titular members attended. Reports on **Czechoslovakia** (CHLUPÁČ), **Canada** (MAMET, 1984), **Australia** (PLAYFORD, 1984), **British Isles** (HOUSE & SEVASTOPULO, 1984) were given. None were prepared to recommend a stratotype in these regions.

There seems to have been a turning point in the geological development of the globe near the Devonian-Carboniferous boundary: guide fossil bearing, marine, essentially continuous sections are rare.

In the U.S.A. the section of Stark roadcut, Bowling Green Quadrangle, Pike Co., Missouri (visited by the Working Party in May, 1979), has been taken into consideration as possible boundary stratotype. However, as to the sparsity of fossils (in the lower part of the Louisiana Limestone) which seems to prevent the exact recognition of the first appearance of *Siphonodella sulcata* in this locality, too, the Stark roadcut has been abandoned as an aspirant stratotype for the time being.

A belt of Devonian and Carboniferous sediments is well known from northeastern France, Belgium and northwestern Germany (Aachen area). The recent supposition that most of these sediments belong to a tectonic nappe (Dinant nappe) does not touch the importance of stratigraphical information from this area. The uppermost Famennian (upper Devonian) and lowermost Dinantian is characterized by a gradual - and temporarily regressing - transgressing sea approaching the North Continent from southern directions. - The distinctive conodonts *Siphonodella prae-sulcata* and *Siphonodella sulcata* are lacking. *Siphonodella duplicata*, supposedly the next descendant of *Siphonodella sulcata* usually is the first member of the *Siphonodella* stock to appear in this area (VAN STEEN-WINKEL, 1984).

In the northern and eastern border of the German Rhenish Massif (Rheinisches Schiefergebirge), marine sedimentation from the uppermost Devonian to the lowermost Dinantian seems to have been sufficiently continuous in several places, but the silty-sandy sediments yield only rare fossils and generally no conodonts ("Hangenberg-Schichten").

However, the sedimentation area was subdivided by shoals, formed by dead Givetian-Frasnian reefs. On

- (1) I am in favour of the RECOMMENDATION only under condition that the boundary at the first appearance of the conodont *S. sulcata* were defined more distinctly and confidently by other groups of fauna and flora (particularly by microfauna and microflora). Operational definition of this boundary is not easier than that at the base of *kobeitusana* Zone. Both of these boundaries should be discussed at the Geological Congress 1980 (the lower boundary was probably not discussed at the Washington Meeting!). The boundaries of stages, systems etc should be adopted in conformity with the proposed position of Devonian-Carboniferous boundary (E.A. REITLINGER).
- (2) This level cannot be traced in conodont-free sections since the boundaries of zonal units established by the aid of other faunal groups do not, even approximately, coincide with this level (K.V. SIMAKOV).

the flanks and the top of some at least of the shoals more calcareous and generally fossiliferous sediments were built; intercalated beds of (terrigenous) detrital material, derived from coastal plains in the north or local sources in the south may yield spores.

The original position of these environments on the flanks or the top of shoals make condensations, non-sequences and lacunes common. On the other hand, sediment traps exist on the flanks of the shoals which were exposed to the direction of the source area of the (terrigenous) detrital material.

Several sections which combine calcareous layers with marine fauna (mostly nodular limestones with cephalopods, trilobites and conodonts) and silty-sandy layers with spores have been studied recently.

K. SIMAKOV (see also CHIGOVA, REITLINGER & SIMAKOV, 1984) reported on possible stratotypes in the **Urals and in northeastern Siberia** (The Omolon sections were visited by E. PAPROTH, E.A. REITLINGER & K. SIMAKOV at the opportunity on the 16th Pacific Science Congress in 1979).

At the end of the Paris meeting, a resolution was adopted to concentrate researches in the Rhenish Slate Mountains and some specific regions of U.S.S.R. like the Urals.

An information meeting was held in Leeds (England), on the 31st August 1981 during a session of the IUGS Subcommittee on Carboniferous Stratigraphy.

From 8th to 11th August 1982, a field meeting was organized in the **Rhenish Slate Mountains**. 10 sections were visited by 20 specialists (7 titular members). The attenders recognized that the examined area provides the best common occurrence of faunas and microfloras around the proposed level, known to us in the world. However none of the sections then provided a sufficiently detailed record to be proposed as a stratotype. End of 1982 and early 1983, much work has been done on the Hasselbachtal section which now provides the best display of the Devonian-Carboniferous boundary in the Rhenish Slate Mountains (BECKER *et al.*, 1984).

An information meeting was held from August 28th to 30th, 1983 in **Moscow** (USSR) to allow the participation of as many Soviet specialists as possible. 34 (5 titular members) attended this meeting, listening for 10 reports on specific regions of USSR and Western Europe. Afternoon sessions allowed specialists to exchange informations and to compare ostracod, foraminifer, miospore and cephalopod material.

On the 16th September 1983, 12 participants (8 titular members) attended a meeting in **Madrid** (Spain), held during the 10th Carboniferous Congress. Discus-

sions started from the results settled during a symposium-meeting of the Congress (see BRAUCKMANN & HAHN, 1984; PRICE & HOUSE, 1984; BLESS & GROSS-UFFENORDE, 1983; POTY, 1984; HIGGS & STREEL, 1984; CHIGOVA, REITLINGER & SIMAKOV, 1984; SIMAKOV, 1984).

A RECOMMENDATION (C) to retain, for the time being the four sections: Hasselbach, Kija, Berchogur and Muhua corresponding to three different environmental conditions of sedimentation, was accepted by all attenders (titular members and others) and confirmed later by postal ballot (9 in favor, 2 abstention, 4 did not reply, see table 2).

Table 2
Vote on the RECOMMENDATION (C)

I. CHLUPÁČ	in favor
B.F. GLENISTER	no answer
M.R. HOUSE	in favor
L.I. KONONOVA	no answer
M. LYS	no answer
B.L. MAMET	in favor
E. PAPROTH	in favor
G. PLAYFORD	in favor
E.A. REITLINGER	abstention (1)
C.A. SANDBERG	in favor
P. SARTENAER	in favor
K.V. SIMAKOV	abstention (2)
M. STREEL	in favor
D. WEYER	no answer
W. ZIEGLER	in favor

(1) I don't know the section Muhua and therefore I can't recommend it for a boundary stratotype. My recommendation is to concentrate researches in some specific sections of Urals such as Zigan and Sikaza (E.A. REITLINGER).

(2) The most favourable section might be at Berchogur or Hasselbach. Kija is not good by the new information. For voting on Muhua we need more information (K.V. SIMAKOV).

The table 3 gives the attendance of the Titular members to the different meetings.

The last recommendation resulted in the circulation among the members of 3 reports on the sections involved* (BARSKOV *et al.*, 1984; BECKER *et al.*, 1984; HOU *et al.*, 1984).

* The Kija section has been withdrawn by K. SIMAKOV (See table 2, note 2). A short report on Muhua by W. ZIEGLER was also circulated.

Table 3

TITULAR MEMBERS	ATTENDANCE					
	1978	1979	1980	1982	1983	
					Moscow	Madrid
I. CHLUPÁČ, ČSSR (trilobites)	-	-	X	X	-	-
B.F. GLENISTER, U.S.A. (cephalopods)	X	X	X	-	-	-
M.R. HOUSE, UK (cephalopods)	X	X	X	X	X	X
H. HOLLARD†, Morocco (stratigraphy)	X	-	-	-	-	-
L.I. KONONOVA, USSR (conodonts)	-	-	-	-	-	-
M. LYS, France (foraminifers)	X	-	X	-	-	-
B. MAMET, Canada (foraminifers)	X	X	X	-	-	X
E. PAPROTH, FRG, Chairwoman (stratigraphy)	X	X	X	X	X	X
G. PLAYFORD, Australia (spores)	-	-	-	-	-	X
E.A. REITLINGER, USSR, Vice-Chairwoman (foraminifers)	-	-	-	-	X	-
C.A. SANDBERG, U.S.A. (conodonts)	X	X	X	-	-	X
P. SARTENAER, Belgium (brachiopods)	X	-	-	X	-	X
K.V. SIMAKOV, USSR (brachiopods)	-	-	X	X	X	X
M. STREEL, Belgium, Secretary (spores)	X	X	X	X	X	X
D. WEYER, GDR (anthozoa, cephalopods)	-	-	-	-	-	-
W. ZIEGLER, FRG (conodonts)	X	X	X	X	-	-

† On the 25th of May 1980, the Working Group lost one of its members and a scientist of international reputation by the death of Dr. H. HOLLARD, Morocco.

Neither of these sections was perfect in "best displaying the evolutionary lineage of *Siphonodella praesulcata* to *S. sulcata* as well as exhibiting adequate representation among other zonally significant groups" (see PAPROTH & STREEL, 1984) but the Working Group did not see any realistic chance to find a more perfect section in the near future.

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