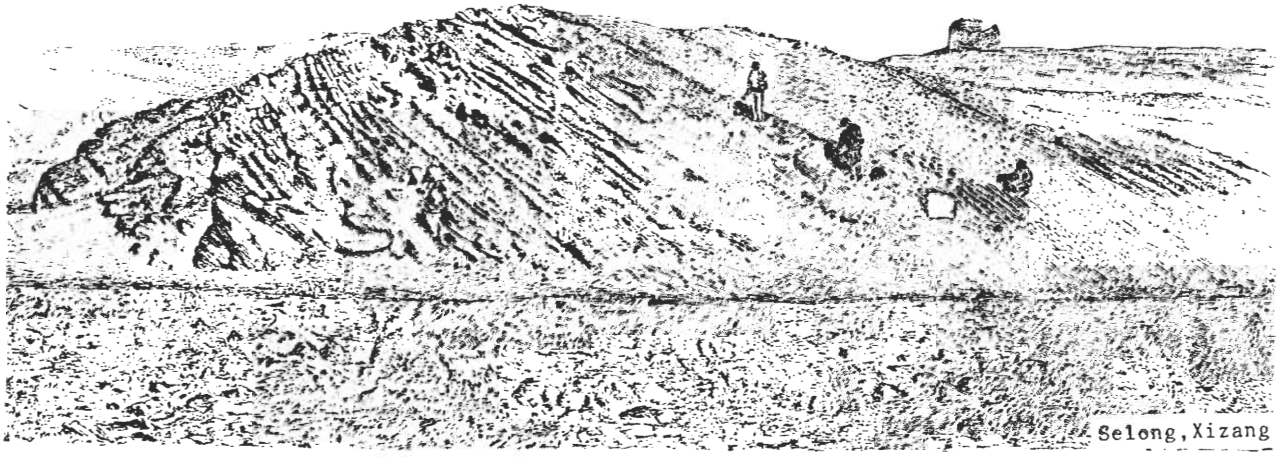
Permophiles

NO 13 October, 1988

A NEWSLETTER OF SCPS



SUBCOMMISSION ON PERMIAN STRATIGRAPHY

INTERNATIONAL COMMISSION ON STRATIGRAPHY

INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

CONTENTS

Editor's Note

In this issue are included reports on development of the following respects with much concern of the Subcommission.

An united team of Chinese and Canadian colleagues has found that the Selong Section of the P/T boundary in Xizang(Tibet) is as good as competitive with some classic sections in the Himalayas.

The International Working Group on the C/P Boundary has initiated its work on formulating a theoretical definition that is widely acceptable. It persuades national working groups to organize field trips or international field meetings in areas with potential stratotype of the C/P boundary such as Texas, Urals and South China.

During the symposium on the Rotliegen in Erfurt last year, a session on Permian magnetic sequence was organized by Dr. Manning. The results show that the Irrawarra Reversal is possibly of realiable reference for correlations of the Uppermost Permian. He expects to fix the precise level of each paleomagnetic event in terms of biostratigraphical sequence in South China in the coming Spring.

Finally, particular attention is invited to the election of officers of the Subcommission for the next term(1989-1992). All members will find a nominating form with this issue of Newsletter for the nomination of a candidate for Chairman and a candidate for Vice Chairman respectively. Prof. Sheng Jinzhang, Chairman of nominating board, will ask each of the nominees if they, once elected, would be willing to serve when he receives forms before January 1. The final list of nominees and a Ballot Form will be distributed to all Titular Members not later than Febrary 1 , 1989. If every thing goes well, the result of the ballot will be transmitted to the membership of SCPS and to the Chairman of International Commission on Stratigraphy for ratification by May 1, 1989.

To help in the selection of nominees for new officers of the Subcommission, a list of members is attached in this issue. However, the current Chairman, Prof. Sheng Jinzhang, has decided to decline service for one more term.

Jin Yugan

A POTENTIAL GLOBAL STRATOTYPE OF THE PERMIAN-TRIASSIC BOUNDARY

Wang Yi-gang, Chen Chu-zhen, Rui Lin
(Nanjing institute of Geology and Palaeontology, Academia Sinica)

In the Himalayas and the areas of high latitudes, such as Arctic Canada, Alaska, East Greenland, Spitzbergen and Northeast Siberia, the lowermost Triassic strata containing Otoceras fauna are well developed, while the uppermost Permian ones (Changhsingian) are as often as not lacking. Therefore, almost no definitely continuous marine sedimentary sequence around Triassic/Permian boundary has been found. By contrast, in the Middle and Eastern Tethys, owing to the facies change, the lowermost Triassic limestone with Otoceras fauna are replaced by the lowermost Triassic mudstone with Hypophiceras fauna, and the uppermost Permian strata are well developed. These two Permian-Triassic boundary sequences, called the Himalayan Type and the Cathaysian Type, take the Selong Xishan section in southern Tibet and the Meishan section in Changxing as their representatives respectively.

The Selong Xishan section outcrops along the Tingri-Gyirong Highway, about 1km NW of Selong village, southern Tibet and so, is easily accessible. Being fine or relatively continuous ranging from late Early Permian to Middle Triassic in the Himalayas, this section was first reported by Wang Yi-gang in 1967 and subsequently briefly described by Yin and Wang et al. (1974), Wang et al. (1984), Sheng et al. (1984). Last May, a cooperative working group including the authors and Drs. Tozer and Nassichuk from the Geological Survey of Canada made a survey of this section and expressed its primary comments on such aspects as divisions, lithostratigraphic and biostratigraphic characters and age as follows (Tables 1 and 2).

1. There is a small hiatus between Permian and Triassic strata, with some reworked fossils, such as Permian brachiopods, corals and crinoids being observed just above the irregular top surface of Permian strata.

2. The Triassic strata contain abundant ammonites, conodonts, bivalves and so on. The Otoceras bed representing the base of Triassic includes two horizons: the Otoceras latirmbilicun horizon below and the Otoceras woodwardi horizon above, which might be equivalent to the Otoceras concavum zone and O. boreale zone of Arctic Canada respectively.

3. Based on the present section, a complete ammonite (12 zones or beds) and conodont (7 zones) sequence of Early Triassic has been erected, their corresponding relationship between ammonite and conodont zones being rather clear.

The established index element of Triassic conodonts, Anchignathodus parvus first occurs in the upper part of Otoceras latiumbilicum horizon, in the lower part of which are however contained Neogondolella changxingensis, Anchignathodus minutus and a single specimen of Anchignathodus parvus with question.

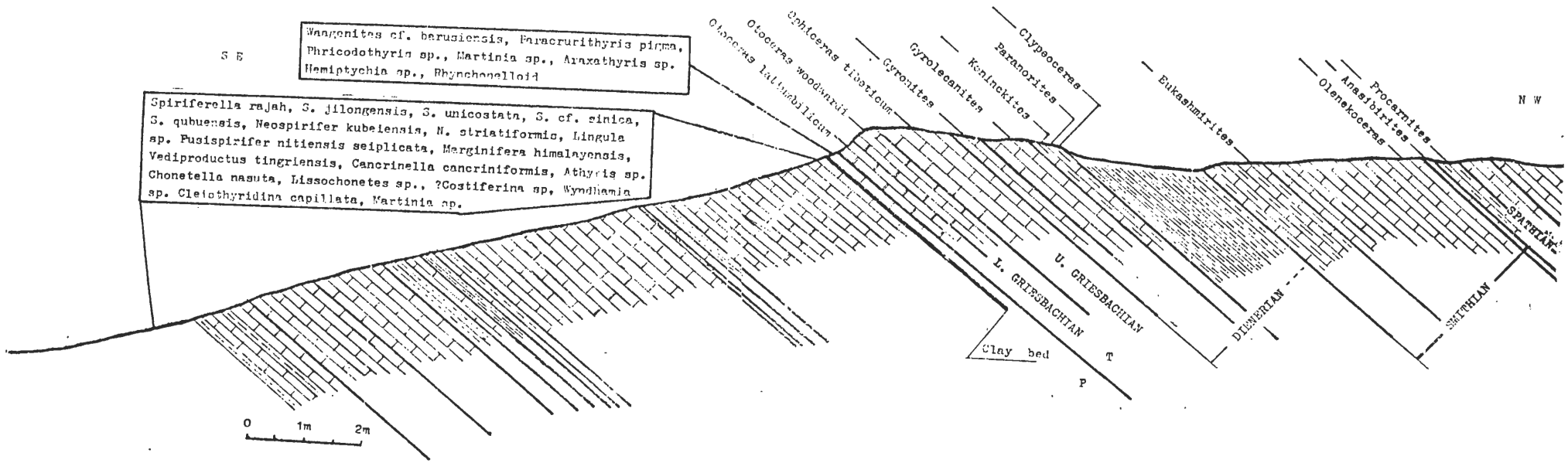
4. The occurrence of bivalves Peribositra from the Otoceras latiumbilicum horizon is of great significance stratigraphically. With a short geological range, Peribositra is a genus having been recorded first at the E1 bed of Guryul section of Kashmir and later at the Otoceras bed in NW Nepal. It is also distributed widely in South China but limitedly only at the "Mixed bed 1" along with Otoceras? and Hypophiceras in the Meishan section of Changxing, Zhejiang, and in the Hypophiceras beds in Jiangsu, Fujian and Hunan provinces.

5. In the Permian strata, two brachiopod assemblages can be distinguished: the Waagenites barusiensis-Paracrurithyris pigmaea assemblege above and the Chonetella nasuta assemblage below.

The Chonetella nasuta assemblage of Units 1-3 can be compared with that from the Zewan Formation of Kashimir since most elements are in common with those of the Zewan Formation.

The Waagenites barusiensis-Paracrurithyris pigmaea assemblage of Unit 4 is quite different in composition of taxa from the Chonetella nasuta assemblage. It is worthy to be noted that species such as Paracrurithyris pigmaea, Waagenites barusiensis and Araxathyris sp. are very common in the Changhsing Fm. and the "Mixed beds" of basal Triassic in S. China. This obviously exhibits a distinct aspect of latest Permian brachiopod fauna of the Tethyan province.

It may be concluded that judging from what has been mentioned above, Unit 4 of the Selong Xishan section represents the youngest bed of Permian and that the Selong Xishan section might be the most continuous one in the Himalayas. Therefore, it is reasonable to suggest the Xishan sectionas a candidate section for the Global Stratotype of Permian-Triassic Boundary besides the Changxin section.



Section of the P/T boundary in Selong, Xizang

table 1

Middle Triassic	Ladinian	Laibuxi Formation	Unit 9	Bed 36-38	25 m.	Blue Grey, black grey limestones alternated with green calcareous shales	Jpannites	
	Anisian		Unit 8	Bed 34-35	18 m.	Dark green, grey sandstones, blue grey calcareous shales intercalated with limestones	Protrachyceras Ptychites Hollandites	
			Unit 7	Bed 31-33	5.6 m.	Light yellowish grey limestones intercalated with fine sandstones in the upper part	Japonites	
Lower Triassic	Nammalian: Spathian / Smithian; Diener.	Kangshare Formation	Unit 6	Bed 23-30	5.86 m.	Light grey limestones alternated with reddish limestones, intercalated with calcareous shales	Leiophyllites	Neogondolella jubata
							Procarnites	
							Anasibirites Olenekoceras	
								Neospathodus waageni
							Eukashmirites	
							Clypeoceras	Neospath. pakistanensis
							Paranorites Koninckites	Neospath. cristagalli Neospath. Kummeli
							Gyronites	Neogondolella carinata
	Griesb.		Unit 5	Bed 20-22	1.13-1.5m.	Light grey limestones	Ophiceras	Neogondolella carinata
						Brown yellow, light grey dolomitic limestone and limestones	Otoc. woodwardi	Anchignathodus parvus
							Otoc. latiumbilicus	Neogondo. changxingensis

table 2

Permian	Selung Group	Changhsingian	Unit 4	Bed 19	0.06m. - 0-17m.	Grey, dark grey limestones	Brachiopods: Waagenites cf. barusiensis Araxathyris sp. Paracrurithyris pigmaea, Phyricodothyris sp. etc.
		Prechanghsingian	Unit 3	Bed 6-18	8.55 m.	Grey limestones intercalate with calcareous shales	Brachiopods: Spiriferella rajah, S. cf. sinica Neospirifer kubeiensis, N. striatiformis, Fusispirifer nitiensis semiplicata, Marginifera himalayansis, Chonetella nasuta, Cancrinella cancriniformis, Lissochonetes sp., Vediproductus tingriensis etc.
			Unit 2	Bed 2-5	18.21 m.	Grey limestones, argillaceous limestones alternated with calcareous shales	
			Unit 1	Bed 1	2 m.	Grey, dark grey limestones	

Wu Wangshi

Circular No.2, March 9, 1988

Since Oct. 1987, after sending Circular No.1 to the voting members of this working group and to the others who are interested in this research work, we have received a number of comments and suggestions on the search of the C/P boundary from Drs. Dickins, Ross, Utting, Chuvashov and others, which would improve the running work on this boundary so that it will go on more smoothly and effectively.

First of all, it is necessary for us to see into what are the current viewpoints on the position of the C/P boundary. So far as we know, there are several proposals for this boundary:

(a) Some scholars take the base of the Pseudoschwagerina zone as the bottom of the Permian; this is a traditional view held by many geologists and palaeontologists.

(b) Recently, after studying the fusulinids across the C/P boundary in Ural, some Soviet palaeontologists have pointed out that the base of the Schwagerina moelleri -- Pseudofusulina fecunda zone can be regarded as the base of the Permian and this boundary level is corresponding to the first appearance of Neogondolella.

(c) Some Soviet conodont specialists take the first occurrence of Neogondolella bisselli as the beginning of the Permian, which is equivalent to the base of the Middle Asselian.

(d) Some people hold that the base of the ammonoids Svetlanoceras -- Juresanites zone should be taken as the base of the Permian.

(e) Some Chinese palaeontologists take the first appearance of the fusulinid Pamirina and the conodont Neogondolella bisselli in the open marine platform carbonate facies and the basin marginal gentle slope facies, together with the fusulinid Darvasites ordinatus and / or Schwagerina cushmani in the restricted marine platform carbonate facies as the base of the Permian, which approximately corresponds to the base of the Sakmari an in Ural, USSR.

(f) Somebody prefers to use the coral Kepingophyllum assemblage as the bottom of the Permian in South China, which is roughly corresponding to the Pseudoschwagerina zone.

Judging from the situation of the different levels for the C/P boundary held by many palaeontologists, it is necessary to make some suggestions for references of all members of the working group to decide the definition of the boundary and to search for such a boundary, even though the thought may be so primitive.

(a) Because priority in the definition of a boundary is a significant consideration, one must know which kind of fossils in the C/P boundary strata should be selected. Here we would like to suggest the fusulinids, conodonts and ammonoids as the practical guiding elements which will play an important role in deciding this boundary. However, other elements of micro- and macrofossils also can be taken for references in studying the boundary.

(b) According to the principles set up by the ICS for deciding the boundary, it is of special important to look for the continuous section of the marine deposits in the C/P boundary strata. However, the non-marine deposits of these boundary beds also should be studied so as to make eventual correlations of the deposits in different facies of that period.

(c) Of course, in defining the boundary position, besides Palaeontology, special attention also should be paid to some other fields concerned, such as isotopic dating, oxygen and carbon isotopes.

Circular No.3, 27th Sept. 1988

1. Many geologists have known that it is more difficult to define the C/P boundary than other boundary positions, because there are several levels. Here we must consider the problem of what is the best way to define the C/P boundary which can be accepted by the most members. So, it is necessary to have a meeting for exchanging different views on the boundary position and discussing the problem of which level can be taken as the best C/P boundary. The best time for holding such a meeting is considered to be July 9-18, 1989, because the 28th International Geological Congress will be held in Washington D.C. and the International Commission on Stratigraphy will have a business meeting there around that time. Those who will attend the congress and the meeting are expected to give their views on the position of the C/P boundary at the meeting. We all hope that the discussion will be a successful one.

2. The referential Permian sections of West Texas and New Mexico have been worked out by the American geologists with a number of contributions. Dr. Bruce R. Wardlaw, the secretary general of our working group, and Dr. Richard E. Grant will express their warmly and friendly welcome to your visiting there after the 28 IGC. They can offer you most part of the expenses in the field, including transportation, lodging and boarding except the air-fare to El Paso, Texas. If you would like to join the informal trip, please keep direct contact with Dr. Bruce R. Wardlaw.

3. After distribution of circular No.2 to all members, we have received some comments on the situation of the position. Most of them agree that fusulinids, conodonts and ammonoides may be considered as the practical guiding elements in studying the C/P boundary and the Pseudoschwagerina Zone should be preferably assigned to the earliest Permian in age (Drs. Franz Kahler, Calvin H. Stevens, Rucha Ingvat and John Utting). Dr. J. Utting also noted that palynology probably could provide us with useful data for the correlation between marine and non-marine facies of the Carboniferous-Permian Boundary beds. This viewpoint is very important. In our consideration, besides palynology, the macro-plants also play a role in the study of the C/P boundary.

The Soviet geologists have paid a lot of attention to the C/P boundary, but there are still different viewpoints in USSR on the position of the boundary. Recently, information summarized by Drs. V.I. Davydo, A.V. Popov and G.V. Kotlyar shows that the focus of dispute concentrates on the problem of

faunal and floral data.

Favourable facies for development of widespread reliable and time-significant correlation horizons: this requires that the GSSP should not be in or close to conglomerates, breccias, olistostromes, turbidites or remanié deposits.

Freedom from structural complication, metamorphism or other alteration: currently the question of exotic accreted terrains is pressing but the problem of the relationship between present and past position may hot adversely affect global stratigraphy. Speculation here, which affects all historical geology, does not need to lead to despair or defeatism.

Freedom from unconformities: an obvious boundary should be suspect. Either it is too obvious because there is a marked change in lithology or because there is marked change in fauna or flora. In either instance the change may imply a time break, and consequently an unsuitable horizon at which to fix any time definition; no disconformities, unconformities, cryptic paraconformities or time-breaks in sedimentation any longer than a brief diastem can be tolerated close to a GSSP.

Amenablility to magnetostratigraphy and geochronometry. Although these factors are mentioned last they are probably the most important for future work and some would argue that no GSSP should be accepted without one or both."

We expect your contribution of reports or papers for informal publication before December this year in order to exchange views on the C/P boundary and to promote mutual understanding. We are also planning to publish the proceedings after the meeting in 1989, if we could collect enough papers, in the hope that all members would render us support and advice to improve the boundary work.

On the Illawarra reversal

M. Menning

The Illawarra reversal (Illawarra transition zone) is a first-order marker in Palaeozoic time. By its aid it is possible to correlate Upper Permian sequences to an intercontinental scale nearly independent on the facies. The Illawarra reversal delimitates to PERMO-CARBONIFEROUS REVERSED MEGAZONE (intra-Moskovian to intra-Tatarian = intra Upper Rotliegendes, about 50 Ma) and the PERMO-TRIASSIC MIXED MEGAZONE (with rapid change of normal and reversed magnetic zones: intra Upper Rotliegendes to lower Anisian, about 17 Ma). It was found in more than 11 impartant Permian sequences of five continents up to now and timed to 255 Ma, based on ODINs (1982) time scale (MENNING 1986).

The given date are unpublished results of MENNING (in cooperation with LOTZNER and LUDWIG), 400 samples consisting of three to six cubes have been sampled since 1978. It was tried to find the Illawarra reversal in the thick sections of the Thuringian Forest (more than 3000 m) in the eastern foreland of the Hartz Mountains (Mansfeld district, about 1800 m) and in the Block of Flechtingen (about 1500 m).

In the thuringian forest, it was proved revarsed polarity nearly exclusively. Thus the sequence was nearly completely deposited during the Permo-Carboniferous Reversed Megazone (Fig. 1e). Only the uppermost part of Eisenach Beds, the Grenzkonglomerat, has normal magnetization. Therefore, the Illawarra reversal is positioned below it. Inside the darkgrey Manebach Beds it was found signs of normal polarity (Fig. 1d).

The Rotliegendes of the southeastern foreland of the Hartz Mountains was investigated by aid of palaeomagnatism only partially. The investigated parts of the Hornburg and Brachwitz Beds have reversed polarity (Fig. 2). They must be integrated in the Permo-Carboniferous Reversed Megazone. The Eisleben Beds of the uppermost Rotliegendes show normal and reversed (mixed) magnetization. They are younger than the Illawarra reversal.

In the Nahe Depression (F.R.G.) the Illawarra reversal is situated in the Kreuznach Beds (DACHROTH, 1976) (Fig. 2), but after an other interpretation it exists in the Wadern Beds. Both belong to the Upper Rotliegendes.

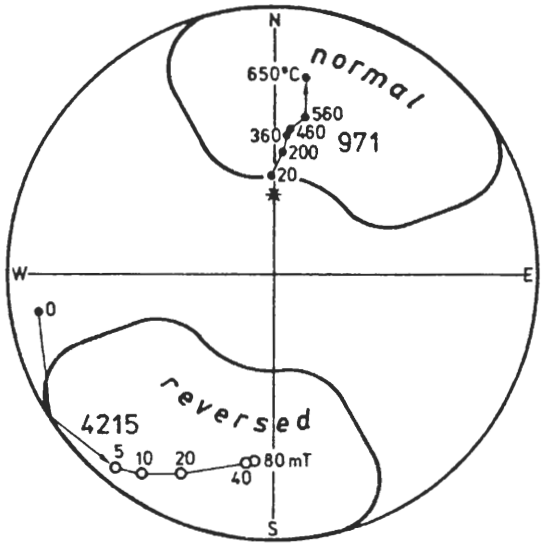
In the G. D. R. part of the Central European Depression the thickness of the Upper Rotliegendes are of more than 1200 m. The upper part (more than 1000 m) has a mixed magnetization but the lowermost part and the Lower Rotliegendes (more than 2000 m) have reversed magnetization. The Illawarra reversal is situated in the Havel Formation (Fig. 2).

In all investigated sequences of Central Europe, we found the Illawarra reversal inside the Upper Rotliegendes.

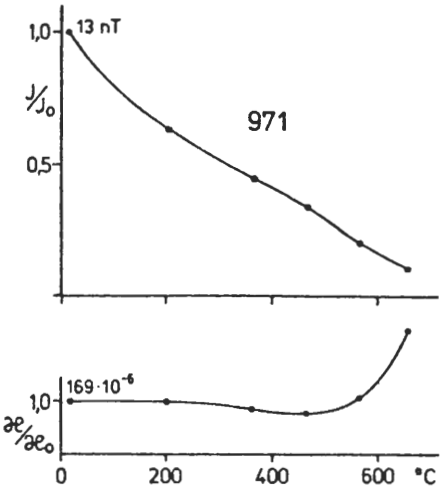
On the East European Platform, the Illawarra reversal is positioned at the boundary of Lower and Upper Tatarian or little below it (Fig 3). That means between the Nizhneustinsk Beds (Lower Tatarian) and the Suchonsk Beds. The Tatarian lithostratigraphic units were not synchronously deposited and therefore, the Illawarra reversal is situated in different parts of them (MOLOSTOVSKIJ 1983).

In 1971, PETERSON and NAIRN systematically investigated the Permian of Southwestern United States. They believed that the whole Permian belongs to the Permo-Carboniferous Reversed Megazone. Therefore, they misinterpretated three zones with normal polarization in the Upper Permian, which they found, as normal events only and not as magnetic zones with normal polarization. The Illawarra reversal is positioned in the Capitanian between the Seven Rivers and Yates Formation of Southwestern New Mexico. This reinterpretation is confirmed by a worldwide study of Palaeozic magnetostratigraphic and palaeomagnetic data.

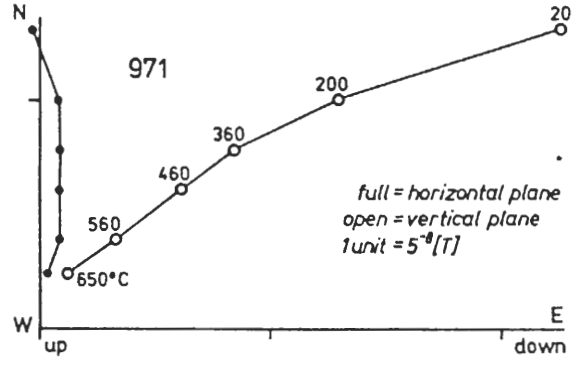
If there is a true normal magnetization in the Manebach Beds of Thuringian Forest (Fig. 1d, 2), it is obvious to correlate the Manebach Beds with the normal polarized parts of the Washington Formation of West Virginia (Dunkard Series, between the Washington coal and the Washington A coal. HELSLEX 1965, p. 416) and with the basal Asselian of Donbass Basin (middle part of Kartamysk Svit, KHRAMOV 1963, p. 109). In all three sections Callipteris (Autunia) conferta is found for the first time some meters below the normal polarized members. Perhaps this magnetostratigraphic zone will be a useful marker to define the Carboniferous-Permian boundary. But in current time this correlation is a speculative one.



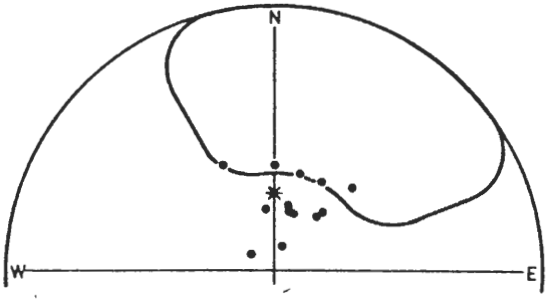
a. Type regions of Permian remanence vectors for Central Europe; alternating field and thermal cleaning



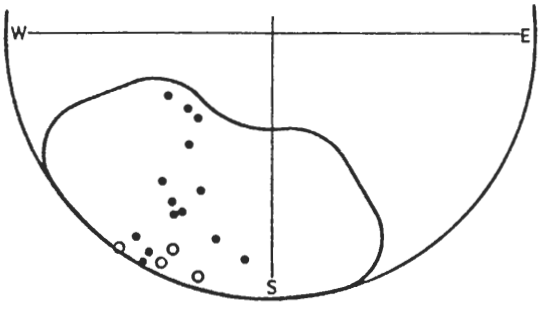
b. Intensity of remanent magnetization and susceptibility by thermal demagnetization



c. ZIJDERVELD plot of a normal polarized specimen



d. Manebach beds (20-40 mT), ? normal



e. Tambach beds (80 mT), reversed

Legend (a,d,e, next figures)

- *lower hemisphere*
- *upper hemisphere*
- *present field direction*
- *normal polarized*
- *reversed polarized*
- *questionable polarized*
- *uninvestigated*
- *gap*

Fig. 1 Polarity and magnetic cleaning of Rotliegendes, Thuringian Forest

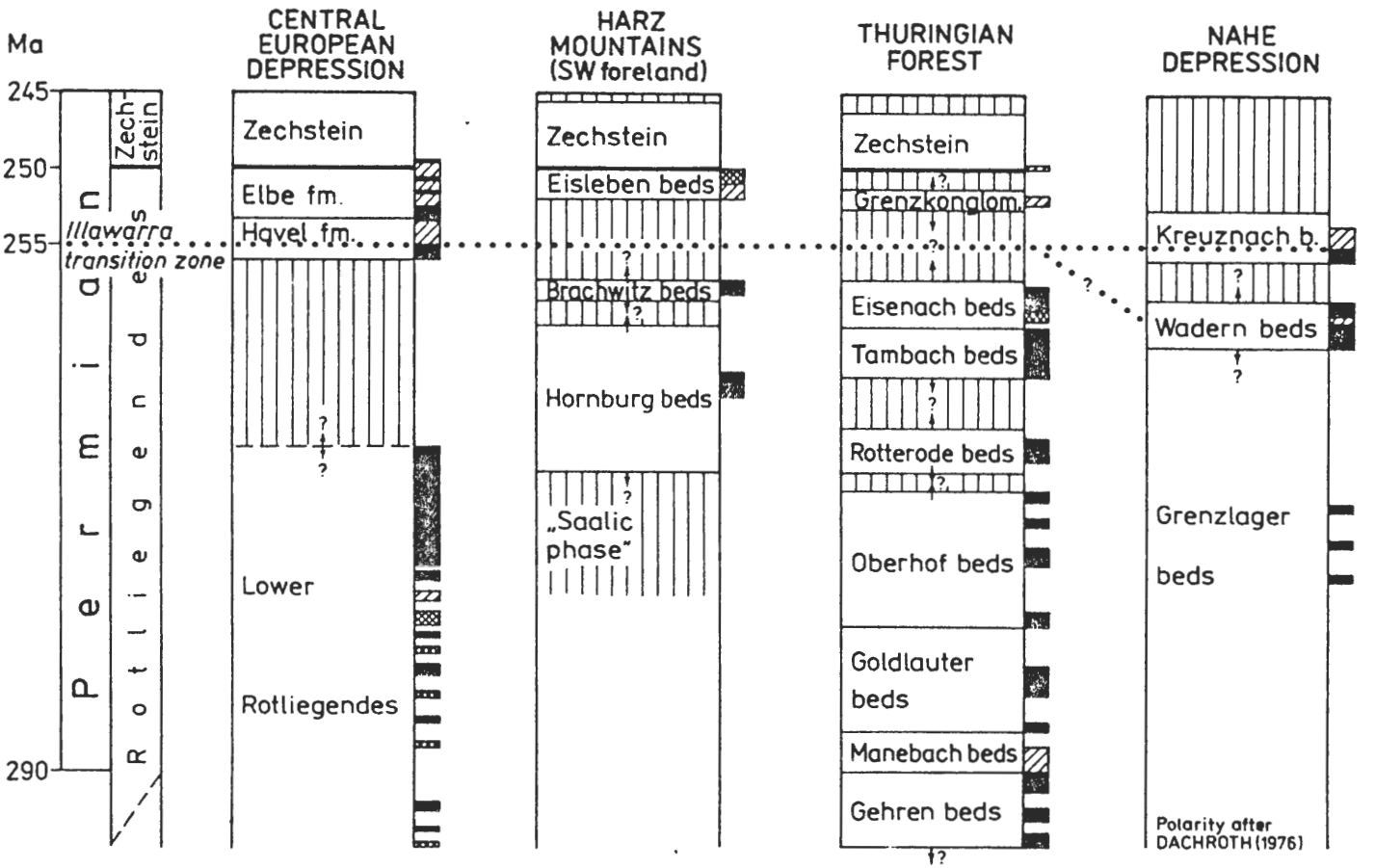


Fig.2. Preliminary magnetostratigraphic correlation chart of the Permian of Central Europe

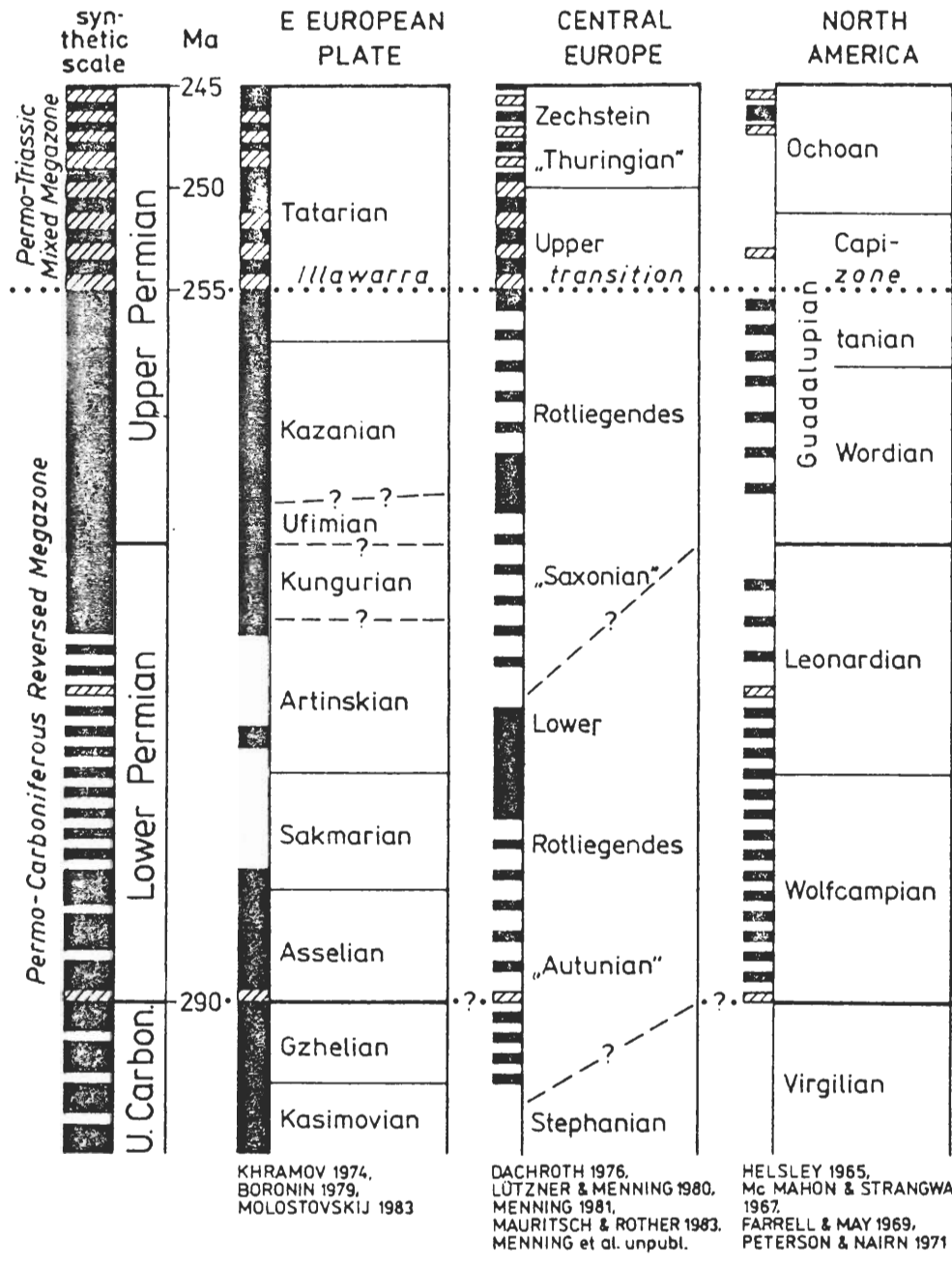


Fig. 3 Preliminary magnetostratigraphic correlation of late Palaeozoic reference profiles

Vertical scale and correlation East European Plate - North America: DUNBAR et al. 1960.
Ages: boundaries of Permian: ODIN 1982; Illawarra transition zone and base of Zechstein: MENNING 1986.

Comment on Correlation Chart of the Upper Permian

A. V. Gomankov

Having examined the correlation charts of Upper Permian in "Permophiles", No. 12, 1987 I take a liberty to make some comments concerning the correlation of Tatarian stage particularly with sequences of the Tethys, especially in connection with the hope expressed by the members of Japanese Working Group of succeeding in correlation of the Permian of the Tethys with that of the Urals by Russian colleagues.

There is a large break (with tectonic disconformity in some cases) between uppermost Permian and Vetlugian Series of the Lower Triassic age in the Russian platform. So the question exists about the volume of this hiatus. By many evidences (palynological correlation with Greenland based on data of Balme, 1979 for example) the lower boundary of Vetlugian Series corresponds the middle of Otoceras Zone. So the hiatus includes at least the lower part of Otoceras Zone. But does it include any parts of Permian sequence too? I believe that it does. Upper Tatarian substage of Russian platform corresponds by my opinion to Midian and so this Permo-Triassic gap includes at least two stages of the sequence of Tethys. The reasons for such mind are following.

1. The miospore assemblages described by B.E. Balme (1979) from East Greenland look out so similar to those of Russian platform that we must consider them as reflecting the same phytogeographic province. This circumstance permits a direct stratigraphic correlation of both regions on the miospore grounds and such correlation shows the correspondence of Upper Tatarian substage and three Permian units of East Greenland (Productus limestone, Posidonia shale and Martinia limestone).

2. The miospore assemblages described by the same author (Balme, 1970) from Salt Range reflect most probably the mixture of floras from different provinces including that of Russian platform. Hence the correlation on the miospore grounds with this region is also possible and it shows that the assemblage from the uppermost Chidru (of Dzhulfian age) has "more young" appearance than that of uppermost Tatarian: it contains some taxa (Densoisporites, Lundbladispora obsoleta, Ephedripites, Gnetaceaepollenites etc.) which in Russian platform occur in Vetlugian Series only.

3. Davydov et al. (1982) adduce palaeomagnetic data obtained from Pamirian stage of eastern Pamir. According to them the Kiama-Illawara hyperzone boundary, which corresponds in Russian platform the boundary between Lower and Upper Tatarian substages, coincides approximately with the base of Midian. In Midian

whether the position of the C/P boundary should be defined at the base or at the top of a newly recognized zone Daixina bosbytauensis-D. robusta.

In China, the traditional C/P boundary position was drawn at the base of the Misellina claudiae Zone. Results from abundant materials recently obtained demonstrate that the C/P boundary should be moved more downward from the Misellina claudiae Zone. As to the problem of which position is available for the C/P boundary, there are two opinions. One holds that it should be placed at the bed where the fusulinid Pamirina makes its first appearance, nearly corresponding to the conodont Neogondollella bisselli which began to enter into the same horizon. Another opinion holds that it should be based on the evolutionary lineage of the conodont Streptognathus. Many scientists prefer to take the first appearance of Streptognathus barskovi as the marker point to define the base of the Permian.

Dr. J.M. Dickins considers the principle of defining the boundary position to be mostly based on physical data. The attached chart he made shows that the Late Carboniferous regression and the rather fascinating transgression are the factors marking the beginning of the Permian. This viewpoint is rather interesting, as there may be some close links between the physical and biological events.

As to the guidelines in detail for establishing a global stratotype section and point (GSSP), we would like to recommend the some sections of the requirements of the ISC as follows:

" Continuity of sedimentation through the boundary interval-preferably a marine succession without major facies change. A continuous monofacial (or with only rapidly alternating and repeating facies changes) will reduce possible errors resulting from stratigraphic gaps and biostratigraphic limitations due to the occurrence of facies fossils and appearances and disappearances associated with only environmental change and not to biological evolution of lineages.

Completeness of exposure: not in an isolated position but with a succession which can be followed easilly above and below the GSSP and preferably laterally as well.

Abundance and diversity of well-preserved fossils: appearances and disappearances of single fossil species can be expected to be diachronous and therefore a bad guide for the location of a GSSP. Multispecies fossil zones (e.g. faunal assemblages) may be preferable biostratigraphic signatures for GSSP guidance. Exclusion from consideration of taxa which are palaeoecologically tied to a facies would be the ideal although all fossils are to some extent facies fossils. In order to minimize possible effects of environmental controls on different fossil group, recognition of the boundary level should preferably be based on all available

successions the authors reveal two zones with direct polarity and two - with reverse one. The same picture may be observed in Upper Tatarian substage. In Eastern Australia the Kiama-Illawara boundary is founded somewhere in Illawara Series which on the palynological grounds (see Foster, 1979) is synchronous to or even more ancient than Chidru Formation.

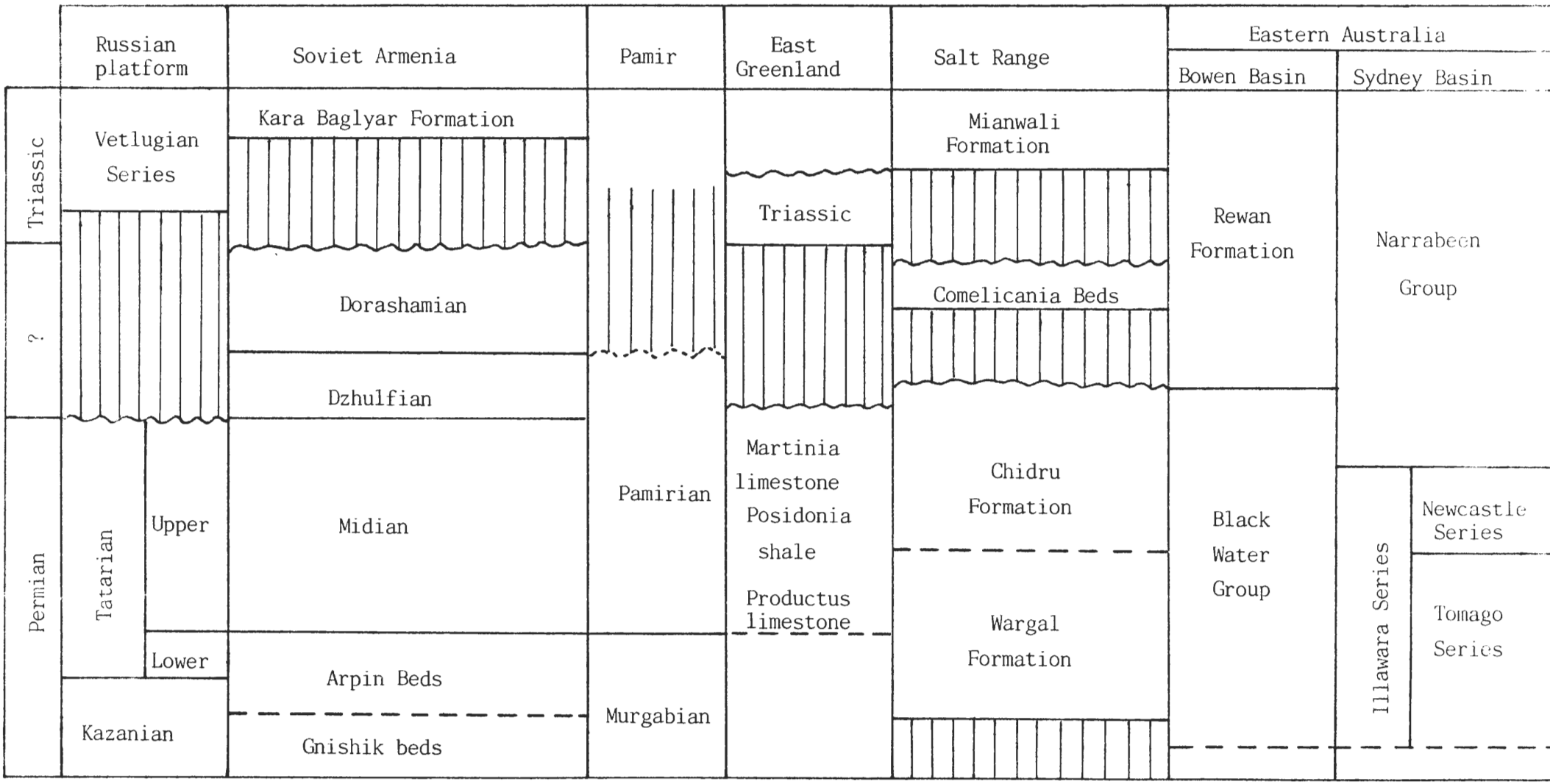
4. P.K. Tchudinov (1987) correlates with Tatarian the whole sequence of Permian vertebrate zones of South Africa. Although the correspondence of these zones with the sequence of Tethys is in general unknown still according to J.M. Anderson (1977) only the latest of them (e.g. Daptocephalus zone) corresponds to the middle of Dzhulfian and the others are of more ancient age.

5. N.I. Novozhilov(1970) pointed out the striking similarity in assemblages of conchostracs between uppermost Tatarian on the one hand and uppermost Newcastle Series or lowermost Narrabeen Group of Eastern Australia on the other hand. These Australian successions may be also correlated with Chidru Formation on the base of palynological data adduced by C.B. Foster (1979).

So the correlation chart to my mind must be approximately as shown on the separate sheet enclosed herein.

Some controversing data however may be obtained from Chandalaz Formation of Primorye. On the grounds of marine fauna it is of Midian age, but it contains also a floristic assemblage which in the light of correlation with Kuznetsk basin is not younger than Lower Tatarian. Still both exact interrelations of flora- and fauna-bearing beds inside Chandalaz Formation and floristic correlation by the use of intermediate section of Kuznetsk basin are not clear enough and I assume that they will be changed in the course of more detailed investigation.

In conclusion I would like to arise a slightly "phylosophical" question: what is Permian? Originally it was defined by the use of type sections of Russian platform. So its upper boundary by the definition coincides with the upper boundary of Tatarian stage and if above described correlation is correct then the question exists whether Dzhulfian and Dorashamian stages can be regarded as Permian ones.


Russian platform
Soviet Armenia
Pamir
East Greenland
Salt Range
Eastern Australia
Bowen Basin
Sydney Basin
Triassic
?
Permian
Vetlugian Series
Kara Baglyar Formation
Dorashamian
Dzhulfian
Midian
Arpin Beds
Gnishik beds
Tatarian
Upper
Lower
Kazanian
Pamirian
Murgabian
Triassic
Martinia limestone
Posidonia shale
Productus limestone
Mianwali Formation
Comelicania Beds
Chidru Formation
Wargal Formation
Rewan Formation
Black Water Group
Narrabeen Group
Illawara Series
Newcastle Series
Tomago Series

SUBCOMMISSION ON PERMIAN STRATIGRAPHY

WORKING COMMITTEE ON UPPER PERMIAN CORRELATION AND STANDARD SCALE

Meeting 1st September 1987, at 11th International Carboniferous Congress, Beijing, China.

The committee set up at the meeting of the Subcommission held at Brescia, Italy, in July 1986 is composed of Professor A. Ramovs of Yugoslavia, Dr G.V. Kotlyar of the Soviet Union, H.M. Kapoor and S.C. Shah of India, Dr Jin Yugan of China, Professor K. Nakamura of Japan, Professor B.F. Glenister and Dr R.E. Grant of U.S.A. and Dr J.M. Dickins of Australia (Convenor).

Each member had been asked to prepare a correlation chart for the Upper Permiam, either individually or with a small working group, and to circulate the chart to all other members. Prior to the meeting, charts had been circulated by Professor Ramovs, Dr Jin Yugan, Professor Nakamura and Dr Dickins. Correspondence had been undertaken on the circulated charts with H.M. Kapoor, S.C. Shah, B.F. Glenister and R.E. Grant, and at the meeting a correlation chart was presented by Dr Kotlyar.

Present at the meeting were Dr Kotlyar, Dr Jin Yugan, Professor Nakamura, Dr Grant, Dr Dickins and about fifteen other interested colleagues.

Considerable discussion took place on the details of the correlation. A consensus on the overall correlation was apparent which is illustrated in the accompanying chart prepared by J.M. Dickins and N.W. Archbold.

The following report and recommendations were made to the Subcommission.

1. There is general agreement on a five - fold ("Stage") subdivision for the Upper Permian. The names for the bottom three vary but the names for the upper two, Dzhulfian and Changhsingian (Dorashamian) are in general use. Names for the bottom three from lowest to highest include:
a) Zfimian, Roadian, or part of it, Kubergandian and Cancellina Zone.
b) Kazanian, Murgabian, Wordian and Capitanian (Guadalupian) and Neoschwagerina Zone.
c) Midian, Abadehian, Chidruan.

The Working Group will work towards refining and improving the reliability of the five-fold subdivision.

2. For the Permian, general use of a three-fold subdivision is to be discouraged for the present, although the different usage of Lower and Upper is recognized in China and a threefold subdivision in Japan.

3. The following problems were considered especially worthy of immediate attention:

a) The detailed field investigation of the Ufimian including its lateral and vertical relationships.

b) The position of the Misellina claudiae Zone.

c) The vertical and lateral relationships of the Roadian

d) The position of the Kazanian especially in relation to the Soviet Tethyan sequence.

e) Definition of the Midian including special attention to the boundary with the Dzhulfian.

4. Each member (or group) of the Upper Permian Working Group will now prepare another chart on the basis of the discussion to circulate to other members with the aim of producing a single chart within a year. This chart would be sent to all the members of the Subcommission and other interested scientists for discussion at the Washington International Geological Congress in 1989 (or at an earlier meeting if this is possible).

The recommendations of the Working Group were accepted by the Subcommission at its meeting on 2nd September 1987.

J.M. Dickins, Convenor and Chairman

ANNUAL REPORT OF SUBCOMMISSION ON PERMIAN STRATIGRAPHY FOR 1987

MEMBERSHIP

Two Corresponding Members, Prof. Wu Wangshi and Dr. B.I. Chuvashov have been proposed to replace the position of Titular Members Prof. F. Kahler and Dr. S.V. Meyen. However, this is still a matter of motion subject to official retification of International Commission on Stratigraphy.

With profound regret the subcommission was informed that Dr. Meyen died in late March this year. He had contributed a great deal in cooperation with Prof. D.L. Stepanov to the organization of the subcommission and was its Vice-Chairman from 1972 to 1984.

Emeritus Professor F. Kahler is famous for his outstanding work on fusulinids and one of the enthusiastic Titular Members. Unfortunately, from his recent reply letter we have learnt that he is impossible to attend meetings of the subcommission because of his venerable age. So we are obliged to shift his name to the list of Corresponding Members.

In view of the importance of the Working Group on Carboniferous-Permian Boundary we suggest to appoint its leaders Prof. Wu Wangshi and Dr. I.B. Chuvashov as the new Titular Members of SCPS.

Four experts of Permian stratigraphy are recommended as new Corresponding Members, namely, Dr. M. Menning (DDR), Dr. J. Schneider (DDR), Dr. J. Zakarov (USSR) and Zhou Zuren (China).

ACTIVITIES DURING THE XI-ICC

New title for the Congress: The programs of recent four sessions of the International Congress of Carboniferous Stratigraphy and Geology show that the interest of organizers and participants on Permian stratigraphy was on the increase. In the last session in Beijing, Permian stratigraphy was

regarded as a main topic both in oral presentation and field excursions. The International Permanent Committee for ICC noticed this tendency of historical development of the Congress and approved unanimously the use of a new title, "The International Congress on Carboniferous-Permian Stratigraphy and Geology" hereafter. The subcommission appreciates this decision and will see to it that the Congress attracts an increasing number of experts in Permian to attend business meeting of SCPS and the affiliated organization and symposium organized by SCPS.

Symposia: Three symposia respectively on correlation of the Permian in Tethys, Subdivisions of the Permian and Carboniferous-Permian Boundary were organized by the subcommission. Ten papers were presented to the former two symposia and the other ten to the last one. Some major controversial issues in correlation of the Permian were clarified at the meetings. An extensive study on the sections around Carboniferous-Permian Boundary in South China and the western slope of Ural Mountains has become the focus of the last symposium.

Business meeting: A general assemble of members of the subcommission was held on September 1 in Beijing with 7 Titular members and 13 corresponding members represented by 9 countries being present. Secretary was authorized to make a general report on membership, Working Group on C/P Boundary, International Committee on Correlation of Upper Permian, Nominating board for candidates of new officers, Newsletter and some other items related. Prof. Wu Wangshi and Dr. B.I. Chuvashov were elected respectively as Chairman and Vice-Chairman of Working Group on C/P Boundary.

Reorganization of the Working Group: A meeting for reorganizing the Working Group on Carboniferous-Permian Boundary (WGCP) opened on September 2. Its main item was to nominate Secretary and members of the Working Group. Up to now, Dr.Bruse Wardlow (USA), one of the nominatees, has agreed to hold his post as secretary and 11 colleagues from other countries have accepted to undertake their work as members.

Committee on Upper Permian: A meeting of the International Committee on Correlation of Upper Permian was held as scheduled in Brescia last year. Five of the six working groups of the Committee have worked out a correlation

chart of Upper Permian in the region under their own charge respectively for circulation in the first half of this year. At the meeting no agreement was reached on twofold or threefold subdivisions of the Permian. Five stages are generally acceptable in case the base of Kungurian could be taken as the lower boundary of Upper Permian, namely, Kugurian, Ufimian, Kazanian, Dzhulfian and Changhsinian(Dorshamian). Charts having been further elaborated, will be submitted to the 28th IGC for discussion and, then, publication.

AN ad hoc MEETING IN ERFURT

Symposia were held respectively on the Zeichstein in Hannover and on the Rotliegen in Erfurt. Secretary of the Subcommission participated in the meeting in Erfurt at the invitation of the organizers. Both symposia show that some significant results have been achieved recently on chronostratigraphy of Permian continental deposits in Central Europe. It seems to be the high time for us to inquire about the possibility of organizing an international committee on subdivision and correlation of continental Permian. An ad hoc meeting was held in Erfurt attended by five members of the subcommission and 12 related parties. Most participants at the meeting held that such a committee could be organized as soon as an internationally recognized chronostrstigraphical scheme of marine Permian sequences is presented.

FUTURE PLAN

Election of new officers: According the Statute of ICS, in terms of tenure, this Bureau of the subcommission is due to expire next October. A nominating committee consisting of Prof. Sheng Jinzhang, Dr. J. M. Dickins and Dr. Jin Yugan was passed in the recent business meeting in Beijing. It will take months to call on members to nominate candidates for new officers of the bureau. A candidates slate will be sent to Titular members for election before next February.

Working Group on Permian magnetostratigraphy: During the International Symposium on Rotliegen in Erfurt, a session specific for Permian magnetostratigraphy was successfully organized by Dr. Manfred Menning who is enthusiastic about establishing a correlation of sequences of magnetic events during Permian period and has found that the Irrawara reverse event will be an ideal mark of lower boundary of Upper Permian in threefold sense. The subcommission will take step to help experts interested in this topic to organize an international working group for working out a reasonable correlation chart of Permian magnetostratigraphy and organizing some international cooperative program. Since the geographical diversity of the Permian is so remarkable both in deposits and biota that magnetic sequence of events might be a reliable evidence which can overcome these difficulties in worldwide correlation.

Working Group on continental Permian: The subcommission will keep in touch with all those colleagues who are interested in stratigraphy of continental Permian in order to organize an international working group. With the opening of an international sypoaium on Rotliegen scheduled for next year, we are planning to hold a meeting for the same purpose.

Classification of Permian in China and its neihbouring areas: A nationwide symposium on classification of the Permian in China and its neihbouring areas is planning to be held next year. Attention will be drawn to clarify the definition of regional chronostratigraphical units, especially stages of the Permian in China. Lower boundary of the Permian will also be a major topic for discussion. Colleagues from countries other than China who are interested in these topics are welcome.

IUGS Subcommission on Permian Stratigraphy SCPS)

DIRECTORY

Titular Members

Prof. Sheng Jin-zhang
Nanjing Institue of Geology and Palaeontology
Academia Sinica, Chi-Ming-Ssu, Nanjing
People's Republic of China

Dr. J.M.Dickins (Vice-Chairman)
Bureau of Mineral Resources, Geology and Geophysics
Box 378, Canberra City
Australia

Dr. Jin Yu-gan (Secretary)
Nanjing Institue of Geology and Palaeontology
Academia Sinica, Chi-Ming-Ssu, Nanjing
People's Republic of China

Dr. Brian F. Glenister (Past-Chairman)
Department of Geology
University of Iowa, Iowa City
Iowa 52242, USA

Dr. B.I. Chuvashov
Institute of Geology and Geochemistry of the Urals
Scientific Centre of the Academy of Sciences of the USSR
SR-620219, Sverdlovsk
USSR

Dr. Sonia Dybowa-Jachowicz
c/o Geological Survey of Poland
W.E. Bialego 5, 41-200 Sosnowiec
Poland

Dr. R.E. Grant
MRC-121, National Museum of Natural History
Smithsonian Institution
Washington, D.C. 20560
USA

Dr. Makoto Kato
Department of Geology and Mineralogy
Faculty of science
Hokkaido University, Sapporo 060
Japan

Dr. G.V. Kotlyar
Mozhajskaja ul.,40, Rv.4
Leningrad
198147, USSR

Dr. H. Kozur
Hungarian Geological Institute
Nepstadion ut 14, H-1143, Budapest
Hungary

Dr. E. Ya. Leven
MGRI, Kafedra regionaln
geologii prosp. Marksa,18
Moscow K-9
USSR

Dr. W.W. Nassichuk
Geological Survey of Canada
3303-33 street N.W.
Calgary, Alberta, T2L 2A7
Canada

Dr. Chan Li-pei
Chinese Academy of Geological Sciences
Institue of Geology, Baiwanzhuang, Beijing
People's Republic of China

Dr. Charles A. Ross
Gulf Oil Exploration and Production Company
P.O.Box 36506, Houston
Texas 77236
USA

Prof.Wu Wangshi
Nanjing Institute of Geology and Palaeontology
Academia Sinica, Chi-Ming-Ssu, Nanjing
People's Republic of CHina

Corresponding Members

Dr. S. Archangelsky
Depto. C. Geologicas
Facultad Ciencias Exactas Y Naturales
Univ. Buenos, Argentina

Dr. N.W. Archbold
Division of Geomechanics, CSIRO
P.O.Box 54, Mount Waverley, VIC.3149
Australia

Dr. B.E. Balme
Department of Geology
University of Western Australia
Nedlands, W.A. 6009
Australia

Dr. D. Baghbani
Exploration South, National Iranian Oil Co.
P.O.Box 1065, Tehran
Iran

Dr. E.W. Bamber
Geological Survey of Canada
3303-33 Street N.W.
Calgary, Alberta T2L 2A7
Canada

Dr. M.F. Bogoslovskaya
Paleontological Institute
Academy of Sciences USSR
Leninsky Prospect 33, Moscow B-71
USSR

Mr. H. Campbell
Department of Earth Sciences
University of Cambridge
Downing Street, Cambridge CB2 3EQ
England

Dr. J.D. Campbell
Department of Geology University of Otage, Dunedin
New Zealand

Prof. G. Cassinis
Universite Degli Studi di Pavia
Departimento di Scienze della Terre
Strada Nuova, 65
27100 Pavia, Italy

Dr. Chang Hi Cheon
Department of Geology
Seoul National University, Seoul
Korea (South)

Dr. Chang Zhi Lee
Department of Earth Sciences
College of Education, Chungbuk National University
Cheongju 310
Korea (South)

Dr. M.J. Clark
Department of Mines
GPO Box 124B, Hobart, Tasmania
Australia

Dr. M.J. Cowie
Chairman, Commission on Stratigraphy
Department of Geology
University of Bristol
Bristol BS8 1TR, England
U.K.

Mr. Y.M. Crosbie
Geological Survey of New Zealand
P.O.Box 30368, Lower Hutt
New Zealand

Mr. Ruben Cuneo
Av. Angel Gallardo 470
Buenos Aires (1405)
Argentina

Mr. John M. Cys
Certified Petroleum Geologist
3402 Stanolind
Midland, Texas 79707
USA

Prof. W.R. Danner
Department of Geological Sciences
University of British Columbia
Vancouver, British Columbia, V6T 2B4
Canada

Dr. T.A. Dobruskina
Geological Institute of USSR, Adacemy of Sciences
Pyzhevsky 7, Moscow 17
USSR 109017

Dr. Marina Durante
Geological Institute of USSR, Academy of Sciences
Pyzhevsky 7, Moscow 17
USSR 109017

Editor
International Union of Geological Sciences, Episodes
Room 177, 601 Booth Street, Ottawa
Ontario K1A OE8
Canada

Mr. Vicente Etayo
Universidad de Navarra, Faculrad de Ciencias
Department de Zoologia, Pamalona
Espana

Prof. H. Falke
Geologisches Institut.
Johannes-Gutenberg-Universitat
6500 Mainz, Saarstrasse 21
BRD

Dr. J. Federowski
Uniwersytet im. A. Michiewicza
Katedra Geologii, Prac. Paleozoologii Bezkregowcow
ul.Mielzynskiego 27/29, 61-725 Poznan
Poland

Prof. Eric Flugel
Institute für Palaontologie
Universitat Erlangen-Nurnberg
Loewenichstrasse 28, D-8520 Relangen
BRD

Mr. H. Fontaine
128 Rue du Dac
75341 Paris Cedex 07
France

Dr. C.D. Foster
Western Mining Corporation
Exploration Division - Petroleum
P.O.Box 409, Unley 5061, South Australia
Australia

Dr. Victor G. Ganelin
Vsegei Middle Prospect Vasiliev Island
74, 199026 Leningrad
USSR

Dr. Ernest H. Gilmour
Department of Geology
Eastern Washington State College
Cheny, Wasnington 99004
USA

Mr. A.V. Gomankov
Geological Institute of the USSR
Academy of Sciences
Pyzhevsky per. 7, Moscow 17
USSR 109017

Dr. T.A. Grunt
Paleontological Institute
Academy of Sciences USSR
Leninsky Prospect 33, Moscow B-71
USSR

Dr. V.J. Gupta
Centre of Advances Study in Geology
Panjab University, Chandigarh
India

Mr. Charles Henderson
1303, 3500 Varsity Drive N.W:
Calgary, Alberta T2L IY3
Canada

Dr. A.C. Higgins
Geological Survey of Canada
3303-33 Street N.W., Calgary, Alberta T2L 2A7
Canada

Dr. V. Holub
Ustreedmo ustav geologicky
Malostranske nam. 19 CSSR-11821, Praha 1
Hungary

Dr. Rucha Ingavat
Geologist, Geological Survey Division
Department of Mineral Resources, Bangkok 5
Thailand

Dr. Ken-ichi Ishii
Dept. of Geoscience, Himeji Institute of Technology
2167, Shosha, Himeji, Hyogo, 671-22
Japan

Dr. Janina Jerzykiewicz
6611-71 Street N.W., Calgary
Alberta T3B 4A3
Canada

Dr. H.M. Kapoor
Geological Survey of India
84 B Nirala Nagar Lucknow 226007
India

Dr. F. Kahler
A-9020 Klagenfurt
Linsengasse 29
Austria

Dr. Liao Zhuo-ting
Nanjing Institute of Geology and Palaeontology
Academia Sinica, Chi-MingSsu, Nanjing
People's Republic of China

Dr. T.B. Leonova
Paleontological Institute, Academy of Sciences USSR
Leninsky Prospect 33, Moscow B-71
USSR

Dr. H. Lützner
Akademie der Wissenschaften der DDR
Zentralinstitut für Phyisk der Erde 69 Jena, Burgweg 11
DDR

Dr. Th. Martens
Museum de Natur, Parkallee 15
DDR-5800 Gotha

Dr. M.L. Menning
Zetralinstitut für Physik der Erde Telegrafenberg
DDR-1561, Potsdam

Prof. Dr. H. Mostler
Institute of Geology and Palaeontology
Universitatsstr 4/11
A-6020 Innsbruck/Austria

Dr. E.V. Movshovich
VNIGRIUGOL pr. Stachki, 200/r, kor.3
344071 Rostov Ha Donu
USSR

Dr. Koji Nakamura
Department of Geology and Mineralogy
Faculty of Science, Hokkaido University
Sapporo, Japan

Dr. S. Nataseanu
Departmentul Geologiei
Institutal de Geologie si Geofizica
St. Caransebles m.1, Bucaresti
Romania

Dr. Merlynd Nestell
Department of Geology
University of Texas at ARlington
ARlington, TExas 76019
USA

Dr. N.D. Newell
American Museum of Natural History
Central Park West at 79th Street
New York 10024
USA

Dr. M. Orchard
Geological Survey of Canada
100 West Pender, Vancouver
V6B 1R8, Canada

Dr. Mario Pasini
Universita degli Studi di Siena
Dipartmento di Scienze Della Terra
I-53100 Siena, Via delle Cerchia, 3
Italy

Dr. T.W. Peryt
Institute Geologiczny
Rakowieka 4, 00-975 Warszawa
Poland

Prof. Anton Ramovs
Yu-61000 LJUBLJANA Kumerdejeva 5
Yugoslavia

Dr. W.H.C. Ramsbottom
Institute of Geological Sciences
Ring Road, Halton, Leeds LS15 8TO
UK

Dr. Jurgen Remane
Secretary General, International Commission on Stratigraphy
Universite de Neuchatel 11, rue Emile-Argand, 2000 Neuchatel 7
Switzland

Sr. Rui Lin
Nanjing Institute of Geology and Palaeontology
Academia Sinica, Chi-MingSsu, Nanjing
People's Republic of China

Prof. Dr. E. Sittig
Universitat, Karlsruhe, Geologisches Insititute
D-7500 Karlsruhe 1, Kaiserstr.12, Postfach 6380
BRD

Dr. D.B. Smith
79 Kenton Road, Newcastle upon Tyne
England NE3 4NL
UK

DR. D. Spinosa
Department of Geology
Boise State University
1910 University DRive, Boise, Idaho 83725
USA

Mr. Jasenka Sremac
Dept. of Geol. & Palaeont.
Faculty of Science
University of Zagreb
Socijalisticke revolucije 8/11
Yu-41000 Zagreb
Yugoslavia

Dr. Stapf
Geologisches Institute, Johannes - Gutenberg Universitat
6500 Mainz, Sarrstrasse 21
BRD

Prof. D.L. Stepanov
Kafredra paleontologii Leningrad University
16 Linia 29, Leningrad B-178
199178 USSR

Dr. Calvin Stevens
Department of Geology, San Jose State University
One Washington Square, San Jose
California 95192-0102
USA

Dr. W.C. Sweet
Department of Geology and Mineralogy
Ohio State University
Columbus, Ohio 43210
USA

Dr. H. Taraz
Earth Science Department
Nicholls State University
Thibodaux, Louisiana 70310
USA·

Dr. G.A. Thomas
Department of Geology
University of Melbourne, Parkville
Victoria 3052
Australia

Dr. E.T. Tozer
Geological Survey of Canada
601 Booth Street, Ottawa
Ontario KIA OE8
Canada

Dr. V.I. Ustritsky
Moiki, 120, Sevmorgeo
Leningrad 121 naber
190121 USSR

Dr. J. Utting
Geological Survey of Canada
3303-33 Street N.W.
Calgary, Alberta T2L 2A7
Canada

Dr. Carmina Virgili
Catedratico de Estratigrafia
Geologia Historica
Fac. Geologicas, Universidad Complutense
Madrid-3, Spain

Prof. J.B. Waterhouse
Dept. of Geology
University of Queensland
St. Lucia, Queensland 4067
Australia

Dr. David Worsley
Palaeontologisk Museum
Sars Gata 1, Oslo 5
Norway

Prof. Yang Zun-yi
Beijing Graduate School
Wahan College of Geology, Beijing 100083
People's Republic of China

Mr. Zakharov Yu. D.
Institute of Biology and Pedology
Acad. of Science
690022 Vladivostok,22
USSR

Prof. Zhang Lin-xin
Nanjing Institute of Geology and Palaeontology
Academia Sinica, Chi-MingSsu, Nanjing
People's Republic of China

Dr. Zhou Zuren
Nanjing Institute of Geology and Palaeontology
Academia Sinica, Chi-Ming-Ssu, Nanjing
People's Republic of China

INTERNATIONAL SUBCOMMISSION ON PERMIAN STRATIGRAPHY

(SCPS)

Nomination for Chairman and Vice Chairman for Term 1989-1992

I nominate for Chairman of SCPS _____

Comments:

I nominate for Vice Chairman of SCPS _____

Comments:

NAME (print or type) _____

SIGNATURE _____

DATE _____

PLEASE RETURN ONE COPY OF NOMINATING FORM TO REACH Prof. Sheng Jinzhang, CHAIRMAN OF THE NOMINATING BOARD NOT LATER THAN JANUARY 1, 1988.