



International Union of Geological Sciences
SUBCOMMISSION ON PERMIAN STRATIGRAPHY



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NEWSLETTERS

JULY 1978 - MAY 1981

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IUGS Subcommittee on Permian Stratigraphy
Current Information
July 1978

Dear Permophiles,

Your secretary discussed (by correspondence) the situation in SCPS with Dr. Martinsson (Chairman of the Stratigraphical Commission) and Dr. Nassichuk. I quite agree with the following Dr. Nassichuk's statement:

'It is clear that the Subcommittee does not appear to be as active as some other subcommittees are but it was only born in 1972 and formally constituted in 1975; thus, it has been 'active' for only three years. In truth it is even more active than some subcommittees. It is true, however, that certain members appear to have contributed nothing to the Subcommittee and it is clearly written in Commission Statutes that these members should be obliged to step down as active members. Other members continue with various phases of Permian research but fail to advise the Subcommittee or its Working Group of progress that has been made. Similarly, various Subcommittee members have complained to me that they are not sufficiently informed of activities within the Subcommittee. Thus you see, it is a simple matter of communication.'

To stimulate the communication it is here proposed to organize a regular issue of an informal SCPS Newsletter. This Newsletter may include a current information on the following items:

- newly published books and more important papers (short reviews of them will be appreciated),
- Suggestions on the exchange of collections,
- proposals to organize joint study of certain material,
- various questionnaires,
- coming international and domestic meetings,
- suggestions on SCPS activity,
- preliminary results of common interest, etc.

Due to the absence of the technical aid I am unable to prepare more than 20 copies of each Newsletter. Therefore I suggest to send 1 copy to each titular member of SCPS with a request to multiply it further for a distribution among specialists of his regional responsibility. I am asking all the members of SCPS to inform me about their ability to do this.

* * *

I would like to inform my colleagues that they are invited to participate in two newly established international programs:

1. Working Group on Unified Stratigraphic Time-Scale (UTS).

The aim of the working Group, as was stated by its convener, Dr. J. E. van Hinte in his letter of June 6, 1978,

'Is to present an "informal work-model" of an UTS at the 1980 IGS Paris meeting, and to propose future action for its improvement. One of the goals of the ICS Subcommittees is to establish a formal "Standard Global Chronostratigraphic Scale: for their respective parts of the geologic column. The closer the UTS work model will be to that standard, the better the language of our profession will be served. It is, therefore, natural that the UTS Working Group will follow your recommendations for those intervals of time for which your subcommittees have reached

agreement on chronostratigraphic nomenclature and concept. Similarly, we will integrate results of the subcommissions on radiometrics and geomagnetics where they apply to our tasks.

In a letter to Dr. van Hinte I have expressed an opinion that presently it is absolutely impossible to suggest an unified Permian scale, even tentative. It seems reasonable to prepare, instead, (1) two or three independent (or partly integrated) zonal schemes of regional value based on conodonts, fusulinids or ammonoids, or (2) a number of parallel schemes each reflecting a major region (e.g. continental succession within Gondwana, or marine succession of Arctic area).

R. Kahler and H. Kozur are members of UTS WG responsible for the Carboniferous and Permian. The following persons are ex officio members: D. S. Stepanov (Per., P-T), S. V. Meyen (Per.), C. A. Ross (C-P), J. M., Dickins (Gondwana), A. Bouroz (Carbon).

For further information and suggestions please contact Drs. H. Kozur (Staatlich Mussen, Schloß Elisabethenburg, DDR-61 Meiningen) and Jan E. van Hinte (213 Cours Victor-Hugo, 33321 Bêgles, France).

2. IUGS Program of correlation of coal-bearing formations (CCF); convener: Prof. P. P. Timofeev (USSR).

I was asked by Timofeev to be a convener of the stratigraphical part of the program on the domestic scale. The details of the CCF program will be discussed in this fall. I am going to suggest that CCF must not duplicate IUGS Stratigraphical Subcommissions and should elaborate stratigraphical correlations charts as a part of activity within subcommissions. I would be grateful for any advice.

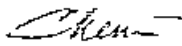
* * *

Dr. J. Vozar has informed me that the Geological Institute in Bratislava, CSSR, is organizing a symposium "The Permian of West Carpathian Mt." including field trips in the region and technical sessions. The symposium will be held on 26 August - 2 September, 1979. For further information please contact Dr. J. Vozar (Geologick& Ustav D. Stúra, Mlynská dolina 1. 809 40 Bratislava, CSSR).

* * *

Looking forward to hear from you soon

Yours sincerely



S. V. Meyen

S C P S NEWSLETTER 1

initiative. Meanwhile some items may be interesting to all Permophiles. I invite all my colleagues to send me reviews of books and papers of general interest, organizational news requests for material in exchange, current project lists, forthcoming conferences. Letters to the editor, questionnaires, etc.

Please note, that this Newsletter is written and typed by your secretary himself, and kindly forgive omissions in style, grammar and quality of the typescript.

Looking forward to hearing from you

Sincerely

S.V. Meyen, Vice-Chairman & Secretary

RESPONSE OF SCPS MEMBERS TO "CURRENT INFORMATION, JULY 1978"

W.W. Nassichuk, Vice-Chairman, August 25, 1978

I think the idea of a newsletter is excellent and I shall be pleased to be responsible for reproduction and distribution of the newsletter for North American and South American scientists. I regret that interest in a planned meeting of the Subcommittee in Washington prior to the Carboniferous Congress as been minimal and only two members have indicated that they might attend. In view of this I am now very much of the opinion that the Subcommittee should concentrate its efforts on good and effective meeting in Paris in 1980 rather than an "exchange of pleasantries" in Washington. I will have more to say on this subject at a later date. I hope to visit Permian sections in China in October and hope to have some important data for the Subcommittee when I return.

J.M. Dickins (Australia), September 26, 1978

...I think the Newsletter is a good idea and will have copies made and sent to Permian workers in Australia and New Zealand if I can find active workers in the latter.

...With regard to a unified scale for the Permian, as I indicated in my letter of 7 July 1978 to you, I believe already a scale is shown to be useful for both the temperate regions (Boreal and Austral) and for the tropical regions (Tethyan). The scale I have suggested to the convener for the Unified Stratigraphical Time Scale is as follows:

	<u>Stage</u>	<u>Substage</u>
Upper Permian	Tatarian	
	Kazanian	
	Ufimian	
<hr/>		
Lower Permian	Kungurian	
	Artinskian	Baigendzhinian
		Aktastinian
	Sakmarian	Sterlitamakian
		Tastubian
	Asselian	

I assumed that there was agreement on this at our Moscow meeting but now it seems this is not the case. As far as the Lower Permian is concerned this is a satisfactory scale and I believe better than any available in any part of the world. I could amplify the reasons for this if you wished. The scale for the Upper Permian does have shortcomings, especially as a considerable part of it is non-marine. For the present, however, I cannot see a more useful scale for the world

as a whole. I believe however that the Caucasus section has considerable potential, and would feel it vital to emphasize the point I made at the Moscow meeting that a scale based only on ammonites and fusulinids will fail to meet the requirements for a world scale. Description of other groups of forms is absolutely essential for the Permian and in particular brachiopods and other molluscs be included or no world scale is possible, I believe.”

R.E. Grant (USA) has send a copy of his circular distributed in December 1978 among Permophiles in North America. The major part of the circular is given below:

“...If we want to realize the benefits of having a Permian Subcommittee, it seems we should utilize this mechanism.

In the Toronto discussions that ranged over the whole field, we decided that perhaps something on standard reference sections would be a good place to begin. Here I might point out a recent paper by Waterhouse (1978) in Cohee et al. eds., *The Geologic Times Scale*, A.A.P.G. Studies in geology no.6. Waterhouse says that local reference sections are a thing of the past, that we now know enough to correlate world-wide and since the Russians have priority the standard scale for the Permian should use Soviet names and have Soviet type sections....all stages and substages. He devotes a full paragraph to anticipated protest from Americans whose motivation is attributed either to pure chauvinism or the misguided notion that local reference sections are useful. We all know that the word Permian refers to a city in the Urals, but the argument that names or sections in the U.S.S.R. have priority is specious: hardly any of their formal names antedate Girty's 1909 Guadalupian, Udden's 1917 Wolfcamp, Leonard, Hess, and Word, or Richardson's 1904 Capitan. The earliest name in the scale that he proposes is Kungurian (1890); Kazanian is 1915 but all the rest date from the '20s, '30s and '50s. Nonetheless, he feels free to abandon Artinskian (1874) and Tatarian (1887) as essentially facies terms. So much for priority.

Waterhouse states on p. 310, “However there must be one world scheme, not two, and if the Russian names have priority they presumably may lay claim to the world standard sequences.” On p. 300 he presents a chart showing his proposed subdivisions of the world Permian including Punjabiian, Kalabaghian, and Chhidruan from Pakistan and Dzhulfian from Iran (Dzhulfian is the Russian). So much for consistency.

Having disposed of the notions that the world standard for the entire Permian must be in one region and that Russian names have priority we can turn to the less scholastic question of where the standard sections ought to be. My view is that we should choose sections that are the most complete and the best known, stratigraphically and biostratigraphically. Obviously, these criteria do not provide for stability because later another section may be found to be more complete and intense study may make another better known. Personally, I think such state of flux is scientifically proper; I do not presently see the value in “golden spikes.”

Before discussing localities the question of how many series to recognize needs answering. Detect a movement toward recognition of 3 series rather than the traditional 2, mostly because of discovery of increasingly late Permian strata. When the Guadalupian or Tatarian were considered Late the twofold scheme made sense, but now that we have the Dzhulfian and Changhsingian as fossiliferous units demonstrably younger it seems time to divide the Permian into three. This agrees with Waterhouse's treatment both in his A.A.P.G. paper and his 1976 book on world correlations. Now we can quibble over where to draw the boundaries. I should think we want 3 subdivisions of roughly equal duration or stratigraphic representation. Waterhouse puts the Middle-Upper boundary above the Dzhulfian providing us with a long Lower and long Middle and

very short Upper. It is uncomfortable for me to not think of the Dzhulfian as Upper Permian, so I propose that the subdivision be at the top of the "Punjabian" or Chhidruan. This fits well into the American scheme as I see it, because in my opinion the Chhidru is Guadalupian, so our Guadalupian would constitute the Middle Permian here.

The Friends of the Permian meeting at Toronto drew only 5 or 6 participants, but the discussion was friendly and fruitful. The consensus of this small and perhaps unrepresentative group was that the Lower Permian reference section could be in the Southern Urals or the Southwestern United States. Personally, I favor the So. Urals because the strata there are well exposed and well studied, and the names are fairly firmly fixed except for Baigendzinian, which has been resurrected by Waterhouse to substitute for Artinskian. If Artinskian is a time transgressive facies as contended, the substitution probably is advisable.

According to John Cys the Lower Permian in the Glass Mountains is too shot through with diastems to make a good reference section. The sequence is better in some of the other ranges in Texas and New Mexico, but those are not nearly so fossiliferous nor as well studied. This is another argument in favor of designating the So. Urals.

The Middle Permian should be the Guadalupian of the SW United States: The Word of the Glass Mountains and the Capitan-Bell Canyon of the Guadalupe Mountains. These sequences are thick, fossiliferous, and well studied both stratigraphically and faunally. According to Waterhouse (1978) there still is controversy over possible equivalence of the Kungurian with some part of the Baigendzinian. Waterhouse (1976) describes the Kazanian as thin, dominated by brachiopods at the base and bivalves higher up, and with no marine top. It lacks both ammonoids and fusulinids. The Kungurian and Kazanian, therefore, seem less satisfactory than the Guadalupian as standard sections for the Middle Permian. A strong objection to the Guadalupian may well be the fact that the Kungurian and Kazanian constitute Murchison's original Permian, so this would be tantamount to removing from the Urals the part that was the whole system then. Nevertheless, these two stages were not named in Murchison's time, but later and by others.

The Upper Permian seems to be developed best in the gorge of the Arax River, in both the U.S.S.R. and Iran. Since it is all one outcrop region and the same sequence on both sides perhaps the whole area could be declared the "standard," thus helping to solve problems of access that might arise on political grounds. The region is no larger than the Guadalupe Mountains, or the Southern Urals, so why not let it straddle an international boundary? The names, however, are already established and they are from the Soviet side of the river.

Apparently there are very young Permian beds in China, so perhaps the Changhsing Limestone will find a place in the standard section after it has been investigated more thoroughly and made more accessible to foreigners. I am currently studying the brachiopods from some very young Permian rocks in Greece, but this section probably will correlate to some level in the Arax Gorge rather than prove to be younger.

F. Kahler (Austria, September 9, 1978)

"We agree in your proposal to prepare short Newsletters.

Our work in Progress:

At the southern slope of the Carnic Alps near Forni Avoltri we have found a Middle Permian fusulinid fauna (E. Flügel, F.&G. Kahler, 1978, N. Jb. Geol. Paläont. Mh.)

Middle carboniferous and Permian fusulinids have been described from Anatolia together with Permian fusulinids from Iran (F.&G. Kahler, Mitt. Österr. Ges., in press)

Just now we are studying the “Troglkofel stage (Lower Permian) of the Carnic Alps”. We hope to complete the work in spring 1979. The paper will be a joint work of W. Buggisch (geochemistry), E. Flügel-Kahler (microfacies and calcareous algae and F.&G. Kahler (fusulinids).

Problems:

a) in our material from Iran the genus Yabeina (+Lepidolina) is lacking. We would be interested to get information about the occurrence of this genus in the Iranian area.

B) does somebody know a paper dealing with a detailed comparison between the American and eastern Asian species of Yabeina?”

H. Kozur (DDR), August 23, 1978

“...1) I have published the part II of my paper on the conodont chronology of the Permian. This paper is thought to be a discussion platform for the non-fusulinid micropalaeontological working group...

2) I have in press the pt. III of my Permian paper consisting of two parts... I have correlated the continental Permian deposits of Europe with the marine scale... I have definitions of different stratigraphic units of the continental Permian of Europe: Rotliegend, Lower and Upper Rotliegend - as lithostratigraphic units of different chronostratigraphic content, “Autunan”, “Saxonian” and “Thuringian” - as biostratigraphic units. The latter three should not be used because the difference in chronostratigraphic content is used by different workers and in different regions.

Most of the Lower Rotliegend belongs to the Carboniferous, in some regions (e.g. Saar-Nahe basin) it belongs to the Carboniferous entirely. This agrees well with the radiometric data of the Grenzlager Formation (basal Upper Rotliegend, ca. 280 m.y.). The Upper Rotliegend belongs to the Lower...and Middle Permian (up to the Wordian). Therefore the Rotliegend is...Upper Carboniferous to Middle Permian...The first appearance of Callipteris is Stephanian B (C. bilharzii, a form transitional to Callipteridium)...Callipteris association (still without C. conferta) begins in the Lower Stephanian C as well as in the Middle Gzhelian and upper Missourian (!). C. conferta begins in the Upper Gzhelian that can be correlated with the Stephanian D.

An international convention is necessary on the lower boundary of the Asselian: Asselian s.l. (= Schwagerina horizon) or Asselian s.s. (Sensu Ruzhencev as defined in the stratotype). The base of the Asselian s.l. (=base of the Upper Orenburgian) lies within the Manebach Formation of the Thuringian Forest. The base of the Asselian s.s. coincides with the base of the Lebach Formation of the Saar-Nahe basin) as well as with the base of Goldlauter Formation of the Thuringian forest.

D.B. Smith (UK), October 5, 1978

I agree entirely with Dr. Nassichuk's sentiments on our lack of progress as a team, but suspect it is much more difficult to agree on how we can solve the problem. The main difficulty of the UK participation in this programme is that there are no more than five workers in the field who are in a position to make any useful contribution, and at any one time most of these people are working on other things also, and so can only devote part of their time to matters Permian. With funds at the present low level, it is difficult to see how this rate of work can be increased, since all of us have to do our Permian research work when time and circumstances permit. In my case, this means doing it all outside the normal working hours at home, and the situation is only slightly better

for Pattison and Warrington. A major second problem with which we are beset, is, as I am sure you will realize, the unfortunate fact that the Zechstein sequences with which we work are almost devoid of fossils found outside the Zechstein Basin, and so correlation between the sequences with which we are familiar and those farther afield is for us extremely difficult. For one thing, there is still no agreed standard with which we can make our correlations! For these reasons therefore, and in the continued unlikelihood of extra funds becoming available, I see the main UK role as being one of collection, sorting and compilation of existing data from our area, which we continue to do, whilst awaiting the agreement of the other members of the committee on provision of a standard sequence of stages and zones in fully marine sequences elsewhere. Our role, therefore, necessarily is less active than perhaps you would wish, but I can't see how we can become more productive given present circumstances.

INFORMATION ON PERMAN NON-FUSULINID MICROFAUNAS I

Meiningen, December 4, 1978

Dear Colleagues,

Some time ago I sent you reprints of the paper: 'Beiträge zur Stratigraphie des Perms. Teil II: Die Conodonten-chronologie des Perms. - Freib. Forsch.-H., C334, Leipzig 1978'.

This paper is thought to be a basic one for a discussion with the micropalaeontological working group of the Permian Subcommittee. Above all the following points are to be discussed:

1. Taxonomy (including synonymy)
2. Stratigraphic ranges of taxa within both local lithostratigraphic and chronostratigraphic units (stages, substages)
3. Phylomorphogenetic lines
4. Correlation of ranges of conodonts with those of other microfossils and of ammonoids, brachiopods and fusulinids
5. Provincialism
6. Facially controlled changes in conodont faunas

The data provided by you will be published under the authorship of contributors.

Similar papers on ostracoda and other Permian microfossils as a basis for the discussion in the present working group will be prepared and published afterwards.

Kindly send me all kinds of Permian microfossils, excepting forams, for determination: ostracods, holothurian sclerites, scolecodonts, radiolarians, megaspores, charophytes. This will help me to prepare the basic papers for further discussions...

H. Kozur

Editor's remark: I have omitted Kozur's personal notes and supplements to the above mentioned paper.

INFORMATION ON PERMIAN PALYNOLOGY I

To the members of the IUGS Subcommittee on Permian Stratigraphy (Editor's remark: this information received from H. Visscher (State Univ. Of Utrecht, September 1978) is very interesting to many permophiles, but cannot be reproduced in full due to its length (16 pp.). Therefore the reader will find below only a part of the introduction to this information and the abstract of the paper. I presume that Visscher may provide the full text to those who interested to get it.)

"...From my experience in the Triassic Subcommittee, which is approximately of the

same age as the Permian Subcommittee, I have come to the conclusion that the best communication leading to collaboration is the personal contact. In this respect we are far behind in the Permian Subcommittee. I believe that it is time to try to arrange a subcommittee meeting... so that all members will be given an opportunity to meet each other.

In the meanwhile, I welcome the idea of a Newsletter as proposed by Dr. Meyen. In addition to this initiative, I want to separately distribute, at irregular times, relevant information on Permian palynology. The reason for doing this, is to clarify the status of bot palynology and the palynologist in te activities of the Permian Subcommittee. ...

Within the Triassic Subcommittee the present possibilities and limitations of palynology are now becoming duly recognized. Among non-palynologists this has already resulted in an active collaborative engagement in the search for material, critical for the further perfection of a palynological characterization of standard stages.

I hope that a similar engagement can be developed among the 'permophiles'."

"Aspects of a Palynological Chacterization of Late Permian and Early Triassic
'Standaaard' Units of Chronostratigraphical Classification in Europe

H. Visscher

A b s t r a c t

At present Late Permian palynology in Europe is successfully concerned with the study of the significance of palynological assemblages in biostratigraphical correlation. Moreover, palynology has greatly clarified the status of the Thuringian Stage in European chronostratigraphy. The relatively scarce Early Triassic assemblages, on the other hand, cannot yet be effectively applied in characterizing European units of chronostratigraphical classification.

Considerable difficulty also exists with respect to a correlation of the palynostratigraphical information available with the proposed world "standard" units as based on either te later Permian sequence of the European part of the U.S.S.R. r the isolated late Permian and Early Triassic ammonoid-bearing successions in various parts of the world.

A brief analysis of the present state of such correlation clearly indicates that the main obstacle blocking the route towards a satisfactory palynological solution to recognizing Late Permian and early Triassic "standard" stages in western Europe is still formed by the rarity of relevant palynological information from successions yielding marine faunas of presumed chronostratigraphical significance.

It is considered, however, that an intensive search for palynologically promising lithologies within such successions could well be one of the most rewarding projects in Later Permian and Early Triassic stratigraphy on the world-wide scale. If one looks towards a future integration of the West-European, Russian, ammonoid-based, and other chronostratigraphical units, there is every indication that palynology may provide a new basis for correlation between the different sets of units. Although long-range correlations may be complicated by the effects of geographical flora-differentiation, one may note striking compositional similarities between palynological assemblages from presumably different phytgeographical entities.

NEWS FROM POLAND

T.M. Peryt (Institute Geologiczny, Rakowiecka 4, 00-975 Warszawa, Poland) sent to the Editor a short report on the activity of the Permian Working group in the above mentioned Institute:

"1. From 27 to 29 April 1978 The International Symposium on Central European Permian was held in Warsaw. During the symposium which was attended by 121 workers from 16

countries, 56 papers were presented; these will be published in 1979 as a special publication of Institute Geologiczny, Warsaw. Before the Symposium the excursion presenting recent developments in the study of the Permian in the Polish Lowlands and the Holy Cross mts. Was organized.

2. As a result of many analytical studies conducted during the past years, in 1978 "Lithofacies - paleogeographical atlas of platform areas in Poland" (ed. S. Depowski) was published (in Polish, with English and Russian explanation and texts). It contains the following maps (8 maps are enumerated, -S. Meyen)... The textual part contains some correlation charts and a comprehensive literature on the Polish Permian.

3. The recently published synthetic papers on the Polish Permian in 'Przeład Geologiczny', No. 12 (1978) (in Polish, with English captions of figures and rather large abstract) can be of interest to Permianists: R. Wagner, T.S. Piatkowski & T.M. Peryt on the Zechstein; J. Pokorski on the Rotliegend; W. Ryka on the Rotliegend effusive rocks; S. Depowski, J. Pokorski & R. Wagner on the occurrence of mineral raw material in the Polish Permian.

4. The papers published by the present group are too numerous to be listed; they are given in the text of 'Atlas' and in the synthetic papers in 'Przeład Geologiczny'."

"L'HISTOIRE DU GONDWANA VUE DE MADAGASCAR"

Colloque Scientifique International

Madagascar 02 au 12 Septembre 1979

The First Circular of the Colloquium was distributed at the beginning of 1978. The deadline for returning the registration form was 15th December 1978. Meanwhile a short information on the colloquium may be reasonable.

The principal topics of the colloquium are (1) Precambrian crystalline basement, (2) sedimentation, particularly of Karroo, (3) global geology and tectonics, (4) stratigraphy, palaeontology, geochronology, (5) geophysics, incl. Palaeomagnetism, (6) economic geology and metallogenic areas, (6) fauna and flora.

Field excursions are planned.

For further information you may apply to

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INVITATION OF LETHAIA

Your secretary received from Stefan Bengtson (Uppsala Univ., Paleobiol. Avdelingen, Box 564, S-75122 Uppsala, Sweden) the following letter:

"Invitation of Organization or Project Presentation"

Lethaia has for a number of years been running columns called Project Presentation and Organization Presentations, now appearing under the joint heading Lethaia Forum. A considerable number of projects (among them most of the relevant IGCP projects) and organizations have been introduced to the wider palaeontological and stratigraphical community in this way.

You are kindly invited to contribute such a presentation for Lethaia. The text should have the form of a verso page filler, which means that its length (title and author's name and address not included) should be as close as possible to 6000 characters and spaces. There is virtually no

flexibility upwards, and contribution should preferably not be much shorter than indicated. As a rule, these fillers will be published immediately, in the next number to go to press after submission (proof-reading only in-house).

The contents should contain as much permanent scientific substance as possible, including main resolutions, proposals or items put up for discussion, as well as the general structure and activity pattern of the organization. Avoid ephemeral material, such as details of meeting announcements, listing of participants in ad hoc arrangements, etc. We are not going to be extremely dogmatic about the contents, however. A logotype or corresponding ornament may be added. These printed presentation have turned out to be very attractive publicity material for the organizations, and you may reprint from freely for your own use.

This is also a standing invitation for further verso page packages when you have accumulated more material or an old presentation has been outdated. Note that we also accept presentations of your Newsletter series, if you have a well established arrangement.

S C P S NEWSLETTER 2

IUGS Subcommittee on Permian Stratigraphy

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October 1979

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PLEASE MAIL NEWS AND CORRESPONDENCE TO YOUR SECRETARY
FOR INCLUSION IN THE NEXT SCPS NEWSLETTER
THE VIEWS EXPRESSED IN THE NEWSLETTER
ARE THOSE OF ITS CORRESPONDENTS

- : o : -

Editorial

Dear Permophiles,

I am glad that our newsletter was not still-born. Although the response of the SCPC people was not overwhelmingly active, certain material for No. 2 are in my hand and are resented below. Some of the letters included in te issue invite further discussion which, I hope, will follow in

subsequent numbers of the newsletter.

The reader will find here a full list of SCPC members and corresponding members. I cannot say that all of them were equally active in SCPS life. Some of them never replied to my letters and requests. I am reminding about this because in 1980 the 26th International Geological Congress will be held in Paris. It seems that the membership of SCPS should be revised at the Subcommittee meeting there. It may well be that some titular members feel their inability or unwillingness (or both) to participate in SCPS work after the Congress. In such case they are kindly invited to notify without delay.

Again ask permophiles to send me materials for subsequent issues of the newsletter - reviews of books and papers, provocative letters, current information, etc. Any suggestions regarding SCPS activity would be particularly appreciated.

Election of new officers 1980-1984

International Commission on Stratigraphy (Prof. A. Martinsson, chairman; Dr. M.G. Basset, secretary general) distributed a circular the text of which is given below:

“All terms of office in Commission bodies expire at the end of the Commission meeting in Paris in July, 1980. Officers and members are eligible for reelection for an unlimited number of terms. ‘Each Subcommittee shall present to the Commission in advance of its quadrennial meeting nominations for such officers as it wishes to have’ (Statutes, Article 12.) For all Commission bodies; the Statutes (q.v.) Prescribe approval or confirmation at the Commission level of additions to the membership and election of officers.

Different Commission bodies have developed different procedures of election, and the Commission will not interfere with them, except in one respect::

Officers and membership in Commission bodies are not nominal positions but are intended for completion of specific and administrative tasks in stratigraphical standard-making and in the coordinate research that is always associated with international standardization in science. ‘A member may be dropped if he fails to participate in the work of the Subcommittee’ (Statutes, Article 7.1).

Looking back through the history of the Commission (and the IUGS in general), some bodies have elected officers mainly with a view to letting them figure as deans or Altmeister of their branch of science, or geographical area, for a term, disregarding their ability to run an international office. The Commission cannot afford such a system.

The main working-form in the Commission remains correspondence by circulars and letters. Meetings are important, but for economic reasons and because of restrictions in travel in some parts of the world, they practically never attain a satisfactory coverage of the membership. Hence, swiftness in correspondence is a prerequisite for work in Commission bodies. Members which fail to reply to correspondence for a disturbingly long period of their term of office should not be proposed for reelection, and persons known to be poor correspondents should not be launched as new candidates.

Subcommittees are kindly asked to present to the Commission their nominations of officers before 1st May, 1980. Offices and memberships subject to the Commission’s confirmation or the Chairman’s approval according to the Statutes should be proposed via the appropriate application within a month of the election. This election may take place as late as during the Commission meetings at the IGC sessions in Paris in July, 1980.

Yours sincerely,

Anders Martinsson

Michael G. Bassett”

STRATIGRAPHICAL STANDARDS

The following circular distributed by Prof. A.Maartinsson, chairman, International Commission on Stratigraphy, may be of interest for permophiles:

Submission of standard proposals and implementation of stratigraphical standards

Several bodies of the Subcommittee are expected to conclude their work on major boundaries and subdivisions in the near future. At present there are no rules of procedure for the formal submission and adoption of stratigraphical standards. Revised statutes for the Commission will be prepared when the IUGS has adopted new statutes in 1980. Rules of procedures will be appended to the new statutes of the Commission. Until then, however, the following guide-lines will be valid:

(1) At the present stage of development, standard proposals should concern either the boundaries of systems or full set of subdivisions (series, stages) within a system, or at least a major part of a system. Proposals regarding, e.g., single stages or boundaries within a system should be made only when a previously adopted standard has to be revised in some detail and in particularly urgent and strongly motivated cases.

(2) The Commission will evaluate proposed standards particularly with regard to compatibility with the developing Standard Stratigraphical Scale and with ISSC regulations for definitions and nomenclature.

(3) Stratigraphical standards are valid from the time of circulation of the minutes of the Commission meeting at which the standards have been approved. The submitting body is responsible for the wider promulgation of the standard among its members and to the public. Publication of the standard in an internationally distributed journal (journals) is strongly recommended.

(4) Proposed standard boundaries and subdivisions may be used in publications even before approval by the Commission, as found practical or strategic by authors who follow the work in the bodies of the Commission. At this stage, editors should give equal and ample opportunity for alternative classifications and dissenting opinions to appear.

(5) When stratigraphical standards have been approved, governmental agencies, academic institutions and commercial companies can be expected to implement or enforce them. The editors of geological publication play a key role in these processes and at this stage should not accept deviations with valid justification.

Subcommittees for the impending meeting of the Commission in 1980 should reach the Secretary General (copy to the Chairman) before 1st May, 1980.

INFORMATION

From: W. W. Nassichuk, vice-Chairman
Subcommittee on Permian Stratigraphy
Subject: Subcommittee meetings held in Washington
- May 1979

The Subcommittee on Permian Stratigraphy held meetings in Washington, D. C. On May 17, 18, 1979 and discussed activities that are being planned by the Subcommittee for the International Geological Congress to be held in Paris in 1980. Dr. Dickens, Bureau of Mineral Resources, Australia, is coordinating Subcommittee activities for the Congress which will include a field trip and a series of lectures on the Permian. Members who are anticipating attending the Congress are invited to contact Dr. Dickens regarding details of the proposed field

trip and presentation of Permian papers.

The Subcommittee has been advised that a delegation of geologists from the Peoples Republic of China plans to attend the Congress in Paris and papers dealing with the Permian of China and particularly the Permian-Triassic boundary may be presented. AT the Washington meeting the writer (W. W. Nassichuk) presented a summary paper on the Permian of China based on a visit that he made to China in 1978.

In accordance with the Statutes of the Commission on Stratigraphy which suggest that Chairmen of Subcommittees should preferably serve for only four years, a nominating committee has been appointed so that a new slate of Subcommittee officers can be installed in Paris in 1980. The nominating committee includes Drs. R. E. Grant (Titular member), J. M. Dickens (Titular member) and N. Newell (Corresponding Member); Dr. Grant will serve as Chairman of the nominating committee. Members are hereby invited to submit nominations for Subcommittee Chairman, Vice-Chairman and Secretary to Dr. Grant before October 1, 1979. A slate or slates of candidates agreed upon by the nominating committee will be presented to the Subcommittee members for a vote after October 1st.

Symposium on Permian Stratigraphy and a Meeting of the Subcommittee

A meeting of the Subcommittee on Permian Stratigraphy was held in Washington at the Ninth Carboniferous Congress on 22nd May 1979. This meeting confirmed that a symposium on Permian Stratigraphy and a Business meeting of the Subcommittee would be held at the 26th International Geological Congress to be held in Paris in July 1980.

At the meeting I was commissioned to organize these meetings. The subject of the symposium is to be "Subdivision of the Permian and its boundaries with the Carboniferous and Triassic". It is hoped that some emphasis can be given under this title to relationships of marine and non-marine sequences. This subject is of great interest at the moment and it seems important that Permian workers should attempt to resolve some of the existing problems which hinder the development of international understanding of the Permian system.

I have asked the organizers of the Congress to allow for a day for the symposium and you are invited to submit proposals for papers for this symposium.

It was also suggested at the meeting in Washington that an independent excursion might be organized, perhaps in the Carnic Alps. If such a proposal is possible you will be informed directly.

J.M. Dickens

PERMIAN SUBDIVISIONS AND CORRELATIONS

It is kind of Dr. R. E. Grant to draw attention in the first SCPS newsletter to some of my proposals for subdividing the Permian Period (in Cohee et al., eds., The Geologic Time Scale, AAPG Studies in Geology no. 6) and I will send a copy of the paper to any member who indicates interest. Dr. Grant further obliged by fulfilling my prophecy that some citizens of the United States wouldn't like my suggestion that the Soviet Union should be repository for the world standard sequences for stages and series. Dr. Grant made his points rather forcefully, a little too forcefully perhaps for the good of his own argument. Rather than rebut his points, I would prefer to seek out the real strength that lies in views opposing my own suggestions, in the hope that we can all arrive at a mutually agreeable consensus on Permian subdivisions.

Priority of names

I have pointed out that for the most part priority is important, and most of the stages have been named first on the basis of rocks and faunas in the Soviet Union. To a large extent, the very period was conceived, and certainly finalized, from rocks and faunas of Russia and the Urals. The one dubious suggestion of mine, really made to fit in with recent proposals by students of Ammonoidea is that Artinskian should be abandoned in favour of Baigendzinian. Dr. Grant of course exaggerates his case a little, to pretend that the United States names Wolfcamp, Leonard, Hess and Word were proposed as time-rock units by Udden (1917). They were not. Udden used them as formation names, and referred to Russian stage nomenclature. It is my impression, without any exhaustive research, that the names came to be used as Series in 1939 (Bull. Am. Ass. Pet. Geol. V. 23, p. 1673) with a heavy emphasis on rock, rather than fossils. For instance, Miller and Furnish in their famous ammonoid study of 1940 (Geol. Soc. Amer. Mem.) very properly used Zones, not stages from the Texan and nearby faunas. In another very significant and profound study, P.B. King (1942 Amer. Assoc. Petrol. Geol.) Used the names "as provincial terms applying only to the west Texas region rather than to North America as a whole". King perceived, even then, that the west Texan faunas might be somewhat peculiar.

Girty (1902) did propose Guadalupian as a time-rock-fauna name for the Texas sequence, as the local follow-on for the Mississippian and Pennsylvanian, that is, as a local period, not a series or stage.

Boundaries for a three-fold division

There is merit in the suggestion that the base of the late Permian be placed at the base of the Djulfian Stage, rather than at its top. (Dr. Grant gravely informed us that the Iranians spell the word Djulfa and the Russians spell it Dzhulfa; but of course the Armenian and Iranian scripts look nothing like romanized words, and the early work and much subsequent work spelled the word Djoulfa or Djulfa, including the proposal of the Djulfian term (from Armenian rocks and faunas) as the time-rock unit in Schenck *et al.*, Bull. Geol. Soc. Amer. 1941, p. 2197.) A Djulfian base would indeed help make the divisions of more even length. If this seems to be a rather superficial reason, it might also be pointed out that the Otocerata started (I think) in the Djulfian, and that the Chinese group their Wuchiaping and Changhsing beds into the Upper Permian. I propose a start above the Djulfian because that boundary fails as discussed in my aforementioned paper, at a 30 million year interval, the early and middle Permian in my scheme are each 30 million years long. That provides a very sort late Permian division, and its shortness indicates severe perturbation, as must have occurred to dispose of so much Permian life. There are some distinctive brachiopod genera. Stratigraphically, the Dorashamian (post-Djulfian) starts as an emphasize new sedimentary cycle in the Himalayas and New Zealand, and marks a boundary in Armenia and parts of southern Europe, but this of course may not be very significant except to those actually concerned with geological mapping.

Type Middle Permian in North America

Although there is little historical support for placing the type Middle Permian in west Texas etc., for Udden did not propose stages for these regions, a good case can certainly be made. The sequences there are well displayed, and the faunas substantially covered by fine monographs, and the region is very accessible. The equivalent Kungurian and Kazanian sequences are less diversely fossiliferous and the question of their accessibility is yet to be clarified. On the other hand, the Kungurian and Kazanian lie at the very heart of the Permian Period as first conceived and it has certainly proved possible to correlate other world faunas with them; indeed, the extensive

Permian faunas of Canada and Gondwana are more readily correlated with the typical Kungurian-Kazanian than with what is supposed to be their Texan equivalents. New work by Kozur on conodonts of course throws a real problem up for consideration, when he proposes that the Cathedral Mountain beds of Texas, long considered to be upper Artinskian are, in fact, Kungurian.

TWO PROPOSALS FOR CONSIDERATION BY THE PERMIAN IUGS SUBCOMMISSION ON PERMIAN STRATIGRAPHY

In the light of the preceding discussion, I suggest it would be useful if the Subcommittee would undertake two allied tasks as part of its duties in fulfilling its roles:

1. that delegates or those interested undertake a brief summary of the history of proposed time-rock subdivisions within the Permian Period, in their country or sphere of interest.
2. that field trips to relevant regions, held to be contention for world stratotypes, or of world significance, be organized over a programme of a few years.

If the Subcommittee is agreeable, I will undertake to provide summaries of historical value on some local stage proposals, i.e. for New Zealand, and arrange for colleagues to cover the Australian divisions now in use. And, through colleagues, it would be possible to arrange relevant field excursions to classic and important regions of the Himalayas and New Zealand.

J.B. WATERHOUSE

WHY AM I A LAZY PERMIOPHILE?

“Dear Dr. Meyen,

... I received your circular of July 1978 and I also received your newsletter of Feb. 1979. I thank you very much for both of them. The newsletter is a wonderful idea and I hope you will be able to propagate it.

... Regarding your circular of July 1978 and referring to Dr. Nassichuk's statement (2nd paragraph), I feel that I have been a very inactive and lazy member. The reason is that I am not a paleontologist and I wonder if only a group of paleontologists would be able to solve Permian problems. First of all, let me ask you a few questions. Suppose that we find a continuous marine fossiliferous rock sequence which contains the upper Eocene fossils in the lower part and the lower Miocene fossils in the upper part. Is it logic to consider the middle part of this sequence as a complete Oligocene sequence or not? I think the answer is (Yes). In such case, do we restudy the evolution of the Oligocene fossils by studying the changes which occur in this rock sequence or we discuss the age of this (definitely complete Oligocene) sequence by occurrences of Oligocene fossils the range, evolution and exact age of which may be rather unknown and uncertain? I think in such a case, we have to test and check the age, evolution and exact range of previously known fossils according to occurrences in such a complete rock sequence. Regarding Middle and Upper Permian fossils, nobody knows exact range and age of Cyclobus, Paleofusulina, Tyloplecta, Leptodus, Pleramplexus, Orthotetina and many others. Paleontologists rely mostly on relative position of these fossils. Is this enough for determination of exact age of rock sequences? The exact position of these fossils have never been checked in a Permian continuous rock sequence and hypothetical evolution and relative occurrences have been the base of endless discussion among paleontologists. Why don't we invite field-geologists to participate in the Subcommittee and present characteristics of the Permian sections which they have seen? Isn't it the time to let some field geologists to find a continuous Permian marine rock sequence somewhere to restudy the range, age and evolution of the Permian fossils? Do you believe that without such a section,

paleontologists can solve so many complicated problems which exist in it. How do you look at the case that a rock sequence is considered as Guadalupian by some brachiopod specialists and the same sequence is considered as Upper Dzhulfian by some ammonoid specialists!?

Geological evidences in Central Iran show that this area had been covered by small shallow sedimentary basins during Permian time. This may be the case in many other places all over the world. So, Tethys geosyncline (sea or ocean) looks like a hypothetical geosyncline the exact location of which is unknown. Consequently the world-wide distribution of fossils, at least in this part of the world is uncertain and doubtful; specially distribution of species and subspecies. Some of our paleontologist friends are wondering why Oterceras woodwardi, Paleofusulina and Yabeina have not been found in Iran and they have tendency to believe that equivalent formations are missing in Iran. They highly believe that these fossils had been spread all over the world (world-wide distribution of fossils) and they must occur in all the Permian and Triassic basins. Field evidences oppose this idea. This is one of the reasons that I feel paleontologist may not be able to solve the Permian problems. Look at the fact that even right now, species and subspecies of some creatures in the eastern part of the Mediterranean sea are different from those in western part of the same sea. So, how do we want to correlate the neritic formations of Middle and Upper Permian age which are deposited in different basins and far away from each other, by subspecies of fossils which have not world-wide distribution.

Dear Dr. Meyen,

I feel tired of these useless and endless discussions, discussions, discussions and disagreements among Permian paleontologists. I believe that the general policy of SCPC (to solve the Permian problems only by paleontologists) has to be revised and Permophiles should study the Permian sections in field and their judgements should be based on the new concepts in structural geology and upper mantle studies. I also strongly believe that the range, age and evolution of the Middle and Upper Permian fossils must be revised.

I hope you understand why I am a lazy Permophile.

Best wishes, sincerely yours,

Hooshang Taraz, D.Sc.”

GENUS CALLIPTERIS REVISITED

(A letter received from H. Visscher)

Last year, the Laboratory of Palaeobotany and Palynology at Utrecht has initiated a combined taxonomic study / stratigraphical evaluation of the west- and central-European species of the formgenus Callipteris.

This work is supervised by Dr. M. Boersma and myself.

From the literature as well as from our rich collection from the German locality of Soberheim, we had the feeling that the number of described species can be drastically diminished.

Because of the classic importance of Callipteris in Permian chrono-stratigraphy of Europe, a re-evaluation of the species is highly desirable as a basis for modern stratigraphical considerations. Because of the present evidences that Callipteris, as a genus, is by no means restricted to the Permian, any new stratigraphical concepts (such as those proposed by Dr. Kozur) and dependent on clear description and delimitation of the individual species.

Therefore we want to concentrate in the coming years on a res-study of callipteris material, including of course type material, present in various west- and central-European palaeobotanical collections (France, GFR, GDR, CSSR).

We have a very good candidate for this work; Mr. J. Kerp who had a combined training in palaeobotany and stratigraphy has started the investigation.

We have asked the Dutch Organization for the Advancement of Pure Research (Z.W.O.) For financial aid...

...Personally, I believe that the work well fits within the activities of the Permian Subcommittee. I should also like to know your view with regard to including Calipteris material from the Donets basin in the project. Would it be possible to re-study this material, either by us or in collaboration with a Soviet palaeobotanist?

Our work in the Upper Permian of Italy is still in progress. A manuscript on the coniferalean genus Ortiseia Florin is nearly finished, providing new insight in the structure of the female cone within the Lebachiaceae. Revisions of other Late Permian conifers will follow...

IUGS Subcommittee on Permian Stratigraphy (SCPS)

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S C P S NEWSLETTER 3

IUGS Subcommittee on Permian Stratigraphy

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April 1980

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PLEASE MAIL NEWS AND CORRESPONDENCE TO YOUR SECRETARY
FOR INCLUSION IN THE NEXT SCPS NEWSLETTER
THE VIEWS EXPRESSED IN THE NEWSLETTER
ARE THOSE OF ITS CORRESPONDENTS

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EDITORIAL

Dear Permophiles,

The present issue of our newsletter includes not only news relating to SCPS directly, but some other materials of general interest as well. The amount of materials received from SCPS titular and corresponding members is as previously rather limited. I suspect that some members of SCPS who promised to duplicate the issues of SCPS Newsletter for further distribution among permophiles do not perform this function properly. I am asking them to do this job at least for the present issue.

I quite agree with our future chairman Prof. Brian F. Glenister who wrote in a letter to Dr. J. M. Dickins (March 3, 1980; copies to W.W. Nassichuk and me): 'Thinking in general terms, it seems to me that the best hope or future Subcommittee progress is in improvement of communication between Titular Members and a drastically increased number of Corresponding Members. Any active researcher should be offered a platform for rapid transmittal to interested colleagues via a revitalized Newsletter. In this way we can hope to provide a foundation for real progress on those relatively few occasions when conferences are feasible'.

S.V. Meyen

John Oulis
12/2/80

ELECTION OF SCPS NEW OFFICERS

After the International Geological Congress in Paris the following new officers of the Subcommittee will function:

Prof. Brian F. GLENISTER. Department of Geology, Trowbridge Hall, The University of Iowa, Iowa City, Iowa 52242 U.S.A. - Chairman

Dr. W.W. Nassichuk. Institute of Sedimentary and Petroleum Geology, 3303-33rd St., N.W., Calgary, Alberta T2L 2A7 Canada - Secretary

Dr. S.V. Meyen. USSR 109017 Moscow 17 Pyzhevsky per. 7, Geological Institute of the USSR Academy of Sciences - Vice-Chairman

Your secretary received the following letter of February 1, 1980 from Dr. Richard E. Grant, Chairman, Nominating Committee, Subcommittee on Permian Stratigraphy:

Dear Dr. Meyen:

As Chairman of the Nominating Committee of the Permian Subcommittee I can now report that the proposed slate of officers has been approved unanimously. I received 11 replies, and the stipulation was that unreturned ballots would be regarded as affirmative, hence unanimity! I have notified Dr. Glenister, Dr. Nassichuk and yourself, as well as the 2 members of my nominating committee. I presume that it is now up to you as current Secretary to make the results known to the membership at large. I am not certain when the new officers begin their terms, but I presume it will be at the International Congress in July. I personally thank you for your efforts as secretary, and hope that you will convey thanks to Dr. Stepanov for his role in organizing the Subcommittee.

IGC MEETING OF SUBCOMMISSION IN PARIS

This is to confirm that a scientific and business meeting of the subcommittee will be held during the IGC in Paris. The subject of the scientific discussion will be "Subdivision of the Permian and its boundaries with the Carboniferous and Triassic". The time should be included in the program of the conference, but I hope it will be possible to let you know individually about this before the Congress.

Although it is planned that the scientific sessions should be fairly informal, those who intend to speak should let me know together with the topic of their contribution. Professor Dr. Erik Flügel, Institut für Paläontologie, Universität Erlangen-Nürnberg, Bundesrepublik Deutschland, is prepared to organize a field visit to the Carnic Alps in order that a working group could examine the Permian units and the Permian-Triassic relationships. This would serve for the initiation of later examination by a subcommittee working group of other critical sequences for the Permian and its boundaries. I would urge the acceptance of this offer, and I and Professor Flügel will not be going to Paris and would meet us directly in the field at Carinthia, Austria, at the end of the Congress. Those of us who intend to participate would need to make our own arrangements to get to Carinthia.

March 12, 1980

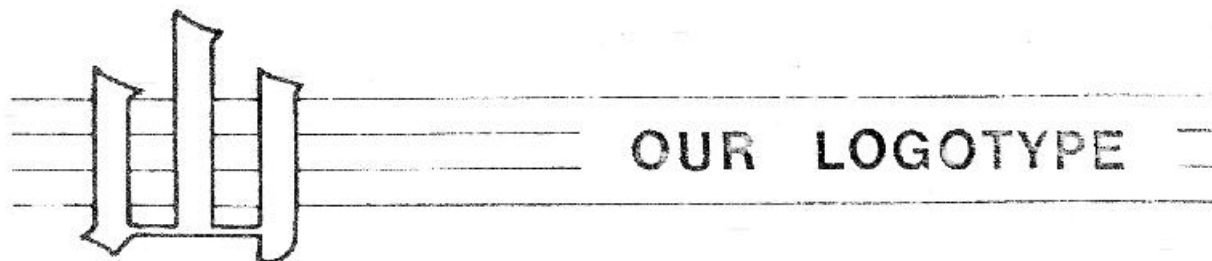
(J.M. DICKINS)
for Subcommission on Permian Stratigraphy
Bureau of Mineral Resources,
P.O. Box 378,
Canberra City, A.C.T., 2601, Australia

LOGOTYPE OF ICS

Prof. Anders Martinsson, Chairman, International Commission on Stratigraphy, informed your secretary about the ICS Logotype in the following letter.

Uppsala, 8th March 1980

To all Members of the Commission



After having searched for years for a logotype which presents an alternative to the traditional hammer, sometimes crossed with a pick, map or even a punch-card, we have now ended up with the Chinese logograph for *shan*, mountain, in the “type-face” reproduced above. There are many varieties, namely, simplified like “sanserif” in ordinary Latin or Cyrillic typography or strongly stylized. However, we have chosen a design as you mostly find it in Chinese and Japanese newspapers and books, adapted for printing out still with the serif-like tips taken over from calligraphic brush-painting.

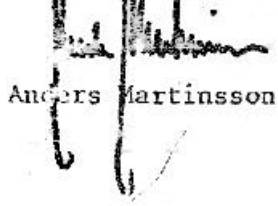
The logotype may be used by all Commission bodies, alone or against a background of four thin lines, symbolizing the three Eons of the history of the Earth and their boundaries, the uppermost one of which it is not yet our task to define. The lines may be drawn out across, e.g., your letterhead and be deformed by tectonics. It is recommendable to contour the logotype as above or print it in colour - if you use it in solid black and with the lines, try to avoid an impression of a clef for music. Use the size you prefer but keep strictly to the details of the design.

The background to the logotype is by no means that China has suddenly become our most active member country but that *shan* has such a concrete origin in a symbol naturalistically depicting three mountain peaks. In the upper of the two lines below you will easily identify this primordial (Anyang) ideograms as number three, and below you will recognize it as stylized in bush-painting. At the far right you will find the print which Mr. Yang Zhiling, Geological Society of China, kindly place at our disposal and which was used as our base.

日月山馬魚子
日月山馬魚子

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Yours sincerely,



Anders Martinsson

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ORRELATION OF COAL-BERING FORMATIONS”

All permophiles dealing with coal-bearing formations ae kindly invited to participate in the following UNESCO Project:

INTERNATIONAL GEOLOGICAL CORRELATION PROGRAMME

Project No. 166

“Global correlation of geological processes of accumulation and transformation of coal-bearing formations and recent peat accumulation in the Earth’s crust continental blocks and their oceanic margins (1979-1988)”

(The short title - “Correlation of coal-bearing formations” or the CCF Project)

The present state of the world energy resources necessitates the coal-geologists to join their efforts for global investigations aimed at the profound study and correlation of peat deposits and coal-bearing formations, maintaining the principal world reserves of solid fuel and metallurgic raw material. Of primary importance is the fact that due to decrease of oil and gas output and exhaustion of their reserves the share of coal will increase in the fuel-energy balance of most countries.

The coal-bearing formations are most variable in their stratigraphy, structural-tectonic location, thickness, facial composition, rank of coal, etc. Our knowledge of coal-bearing formations, especially of their detailed stratigraphic subdivision, genesis and distribution as well as their modern counterparts are insufficient.

To meet these needs and to improve our knowledge the project CCF sponsored by UNESCO was organized within the International Geological Correlation Programme. The project covers the following topics:

1. Stratigraphy of coal-bearing formations
2. Sedimentogenesis and classification of processes of accumulation of coal-, oil-shale-, and peat-bearing formations
3. Tectonic evolution of coal-bearing formations
4. Processes of transformation of organic matter
5. Processes of transformation of embedding rocks
6. Criteria of prospecting of solid fuel, its global distribution and resources.
7. Geochemical characteristics of coal-bearing formations
8. Geophysical characteristics of coal-bearing formations

The main aim of the stratigraphical part of the project is to establish zonal subdivisions of major coal basins according to different organic groups, integration of the subdivisions with that of palaeoclimatic, palaeomagnetic and other grounds, and correlation between zonal schemes of different basins. The work should result in detailed unified schemes of zonal subdivision for major palaeogeographic areas such as Angaraland, Equatorial Belt and Gondwanaland of the Upper Palaeozoic. A good example of such subdivision for a certain region has been provided by "Report of Commission Internationale de Microflore du Paléozoïque Working Group on Carboniferous stratigraphical palynology" (G. Clayton et al. 1977. Carboniferous miospores of Western Europe: Illustration and zonation. Meded. Rijks. Geol. Dienst, vol. 29). Comparable work can be done in other areas and for other groups of fossils.

The work on the project proceeds in national working groups. As an example an activity of Soviet stratigraphers participating in CCF is briefly outlined below.

Within the Soviet Working Group of CCF, regional stratigraphic subgroups has been organised. Every subgroup is responsible for a certain coal basin and unites specialists of different organizations working in the basin. The subgroups follow a standard programme which may be modified depending on local conditions. The programme stipulates selection and detailed study of several key sections in every basin. Key sections should be measured according certain standards with all possible kinds of sampling. Additional sections, when necessary can also be measured. All the materials collected will be analyzed, identified, described or otherwise treated by a team of competent specialists working in different organizations. To achieve agreement between specialists all the results (including lists of fossils coming from key sections) are to be approved at special annual colloquia of competent specialists. Divergences in opinions are carefully recorded and recommendations on necessary further studies are accordingly given.

At the next step correlation charts between key sections are prepared. The charts will be discussed on a permanent basis at annual 'regional stratigraphical colloquia'. The colloquia recommend direction of further studies. Interbasinal correlation charts and their relating zonal schemes will be discussed at 'interregional stratigraphic colloquia'. The final stage of the work is the correlation between zonal units of every basin and international chronostratigraphical units. Besides colloquia, regular field excursions to more important sections are planned. Without such excursions no formal decisions on units and boundaries should be made.

The results of the work are planned to be regularly issued as reports containing the description of key sections, illustrations and descriptions of guide fossils, correlations charts, etc. Comprehensive monographs on the stratigraphy of major basins are planned as final published results.

The stratigraphic work is performed jointly with commissions of the Interdepartmental

Stratigraphic Committee of the USSR. Field works according to the aforesaid programme will begin in 1980. Some colloquia of specialists were held in 1979 and 1980, others are currently organized. Stratigraphical investigations will be accompanied by monographical study of more important fossil taxa. To this aim a regular exchange of material between specialists will be stimulated.

The stratigraphical studies within the CCF project must not be a merely compilation of older data. The project should serve as a basis for a much more detailed study of coal-measure stratigraphy according to a unified approach and should result in much more reliable standard zonal stratigraphy than presently available. Readers of the present informations are invited to join the project. Details can be obtained from Dr. S.V. Meyen, USSR 109017 Moscow 17, Pyzhevsky per. 7, Geological Institute of the USSR Acad. Sci., or from Prof. Dr. P.P. Timofeev (leader of the Project) and Dr. B.V. Polyansky (secretary of the Project), same address.

S.V. Meyen

SCPS VICE-CHAIRMAN IN CHINA

W. W. Nassichuk (Canada) led a delegation of Permian and Triassic specialists from Canada to the Peoples Republic of China in order to examine the Permian-Triassic boundary in South China and to lecture on Permian and Triassic geology of North America. Dr. Nassichuk's comments on the boundary and areas visited in South China are as follows:

During October and November, 1978 four Canadian geologists visited the Peoples Republic of China, as part of an exchange organized by Academia Sinica and the Geological Survey of Canada. The purpose of the trip to China was to examine Upper Permian and Lower Triassic successions and especially the Permian-Triassic boundary in South China. Included in the Canadian delegation were W. W. Nassichuk (Permian ammonoids), E. T. Tozer (Triassic ammonoids), J. Utting (Permian palynomorphs) and J. Monger (tectonics). Subsequently, during August and September, 1979, five Chinese specialists in Permian and Triassic biostratigraphy and tectonics visited Permian and Triassic successions in Canada.

An important paper on the Permian-Triassic boundary in South China has recently been published by one of the Canadian delegates, E. T. Tozer, in Canadian Journal of Earth Science, 1979, vol. 16; "The significance of the ammonoids *Paratirolites* and *Otoceras* in correlating the Permian-Triassic boundary beds of Iran and the Peoples Republic of China". W. W. Nassichuk presented a summary of Permian stratigraphy in South China to a meeting of the Permian Subcommittee in Washington, in May 1979. Permian rocks are widely distributed in China and distinctive paleogeographic realms are clearly apparent for a variety of faunal groups. It is most fortunate for Permian studies on a global scale that details of Permian stratigraphy, faunas and floras are being documented in the literature with increasing frequency.

Considerable work has been completed by Chinese scientists on the Permian-Triassic boundary in South China and it is possible that some aspects of that research will be presented at the next International Geological Congress in Paris. A most effective Working Group dealing with the Permian-Triassic boundary in China has been organized in the Nanking Institute of Geology and Paleontology and includes: Chao, King-koo (Permian ammonoids), Sheng, Jiu-chang (Permian fusulinaceans), Liang, Zi-luo (Permian ammonoids), Rui, Lin (Permian fusulinaceans), Liao Zhuo-ting (Permian brachiopods), Wang, Yi-gang (Triassic ammonoids), and Chen, Chu-zhen (Triassic bivalves).

The base of the Triassic and, therefore, the Permian-Triassic boundary is generally defined

at the base of the *Otoceras woodwardi* Zone as developed in the Himalayas. Besides the Himalayas, beds containing well preserved representatives of *Otoceras* are known only from Alaska, northern Canada, Spitsbergen, Greenland and Siberia. In all of these places uppermost Permian strata are absent. Poorly preserved specimens of *Otoceras* from Kiangsu Province in South China described by Hsu (1937) have long been considered to be questionable because sutural details were obscured. Examination of the specimens by Tozer while in China confirms that they are indeed *Otoceras*.

Thus, South China is the only place in the world where representatives of both *Otoceras*, which characterizes the oldest Triassic and *Paratirolites*, which characterizes the youngest Permian; that is, the Changxingian Stage, occur. Even though there is now no doubt that both *Otoceras* and *Paratirolites* occur in South China they have not yet been found in sequence in the same stratigraphic section. *Paratirolites*, described as *Schizoloboceras* by Zhao, Liang and Zheng (1978), occurs in the Changxingian Talung Formation in Kiangsi Province (Tozer, 1979). The presence of *Paratirolites* in upper Changxingian strata in South China suggests correlation with Dorashamian strata in Transcaucasia and with the Ali Bashi Formation in Iran.

Until recently, Chinese geologists have maintained that Upper Permian rocks in South China are disconformably overlain by Lower Triassic rocks and that the boundary between the two systems is marked by a hiatus. This point of view has changed rather dramatically in recent years with discovery of a widespread "mixed fauna" in the lower 20 cm of the Lower Triassic Chinglung and equivalent formations. The "mixed fauna" contains abundant small brachiopods of Permian aspect and fragments of the Triassic bivalve *Claraia wangi*. Brachiopods in the "mixed fauna" include species of *Acosarina*, *Waagenites*, *Paryphella*, *Neowellerella*, *Crurithyris*, *Paracrurithyris*, *Araxathyris* and *Lingula*. Although it is entirely possible that the "mixed fauna" contains reworked Permian materials deposited during Triassic time, a point of view that is widely held by Chinese paleontologists is that the "mixed fauna" represents a depositional transition from Permian into Triassic without a significant hiatus.

Permian and Triassic successions were examined in four provinces in South China by the Canadian scientists. Near Nanking, in Kiangsu Province the lower Triassic (Griesbachian) Chinglung Formation, which is known to contain *Otoceras* near its base, overlies shales and siltstones of the Changxingian Talung Formation. It is from this region that Hsu (1937) described *Otoceras*. In Chekiang Province, near the town of Changxing, the type-section of the uppermost Permian Changxing Formation was visited. The type section contains 32 cm of well-bedded, fossiliferous limestones which overlie shales and coaly beds of the Lungtan (Dzhulfian) and which are overlain by mudstone of the Lower Triassic Chinglung Formation. In Kiangsi Province near the towns of Ichum and Anfu, the Loping coal series, with abundant otoceratacean ammonoids was exposed in deep trenches which were dug specially for the Canadian visitors. In Kiangsu, Chekiang and Kiangsi most Permian and Triassic rocks have experienced considerable tectonic deformation during mid-Mesozoic orogenesis but farther to the west, in Kweichow Province, Permian and Triassic strata are relatively little deformed. In Kweichow Province, near Kweiyang and Anshun the Changxing Formation and its lateral clastic equivalent, the Talung Formation rests on the Lungtan coal series and is overlain by mudstones of the Lower Triassic Tayeh Formation which contains abundant *Claraia* and crushed ammonoids.

AMMONOIDS AND BIOSTRATIGRAPHY OF CHINA

W. W. Nassichuk Notification of recent important publications dealing with Permian ammonoids

and biostratigraphy of China.

Zhao Jinke* and Zheng Shuoguan (1977). The Permian ammonoids from Zhejiang [Chekiang] and Jiangxi [Kiangsi]. *Acta. Paleont. Sinica*, 16, 217-254, 5 pls., 17 text-figs. [Chinese with English abstract]. A review of this paper by Brian F. Glenister, W. W. Nassichuk and W. M. Furnish was recently published under the title "Ammonoid successions in the Permian of China". *Geol. Mag.*, 1979, 116(3), 231-239.

Zhao Jinke*, Liang Xiluo, and Sheng Shuoguan (1978). Late Permian cephalopods of South China. *Palaeontologia Sinica* 154, New Series B, 12, 163 p. 34 pls. [Chinese with 16 page English abstract].

Tozer, E. T., (1979). The significance of the ammonoids *Paratirolites* and *Otoceras* in correlating the Permian-Triassic boundary beds of Iran and the Peoples Republic of China, *Canadian Journal of Earth Science*, 16, 1524-1532.

* formerly Chao, King-koo

THE 2-nd ALL-CHINA STRATIGRAPHICAL CONGRESS

The following article is taken with abbreviations from 'Circular No. 59' of February 25, 1980, of 'International Subcommittee on Stratigraphic Classification' issued by A. Salvatore, Chairman:

"The Second All-China Stratigraphic Congress was held in Beijing (Peking) on November 15-19, 1979. The Second Congress was jointly organized by the national Commission of Science and Technology, the National Bureau of Geology, and the Academia Sinica. Mr. Wu Heng, Vice Chairman of the National Commission on Science and Technology, was Chairman of the Congress, and Mr. Zou Jiayou, President of the Chinese Academy of Sciences, was the Secretary General.

More than 600 Chinese stratigraphers attended the Congress. They were joined in four days of technical sessions by eleven invited foreign stratigraphers from the Federal Republic of German, Hong Kong, Japan, New Zealand, the United States, and Venezuela. Dr. H.D. Hedberg and Im were among the eleven foreign stratigraphers attending the Congress.

The first three days of the Congress were devoted to the presentation of papers by Chinese stratigraphers. During the morning of the fourth day of the Congress, some of the foreign guests read papers on their respective specialities. Dr. Hedberg spoke about "Progress and Problems in Stratigraphical Classification," and I reviewed the work and plans of the ISSC in a paper entitled "The International Subcommittee on Stratigraphic Classification and its International Stratigraphic Guide".

During the afternoon of the fourth day several round-table discussions were held on more specific themes: stratigraphic classification, and Lower Paleozoic, Continental Mesozoic, and Quaternary stratigraphy. Each of the round-table discussions was attended by 25-30 Chinese specialists on the particular subject and one or two of the foreign guests.

The papers presented by the Chinese stratigraphers were mainly concerned with the achievements and most important advances of the stratigraphic studies in the People's Republic of China during the past twenty years. A very timely paper by a working group of the Institute of Geology of the Academia Sinica discussed the work now in progress toward the publication of a revised version of the Chinese Stratigraphic Code which will follow very closely the principles and procedures recommended in the International Stratigraphic Guide.

After the Congress, the foreign participants had the choice of attending one of four well-planned and informative geologic excursions: to the classic Upper Precambrian section in

Tienchin, to the Paleozoic section along the Yangtze Gorge in Hubei, to the Mesozoic sequence in the Sichuan Basin, or to the Paleozoic exposures near Nanking.

The foreign participants were unanimously impressed by the strong desire of the Chinese stratigraphers to raise and modernize the level of their knowledge in order to overcome the years of scientific isolation, and by the preeminent recognition given to stratigraphy by highly-placed Chinese government officials. These points were clearly emphasized by Mr. Sun Daguang, Minister of Geology, in his message to the participants during opening ceremonies of the Congress. In his own words: "We have keenly felt that stratigraphic work is the important basic work in the geologic field. Without stratigraphy there will be no structural geology, without correct stratigraphic subdivisions and correlation the geological mapping and the compilation of all kinds of geological maps will be impossible, and without stratigraphic work we cannot correctly conduct ore searching and exploration".

MICROPALAEONTOLOGICAL WORKING GROUP

Dr. H. Kozur (Meiningen, DDR), form letter of November 11, 1979: "In the micropalaeontological working group I have submitted a joint paper on the newest results in conodont biostratigraphy of the Permian particularly in the Uralian type region, Svalbard, S. China, Kashmir, Iran and Transcaucasia. This paper will be published under the authorship of all members of the working group who have answered to my first circular. A refined conodont zonation is discussed. The Chihsian stage of the type region is of about the same age as the Roadian in the USA. The Permian-Triassic boundary and the correlation of the S. Chinese and Iran-Transcaucasian Upper Permian successions are discussed in detail. The conodont fauna described by Szaniawski and Malkovski from Svalbard was revised. Neostreptognathodus svalbardensis is a younger synonym of N. transitus Kozur as shown by stereoscan micrographs. Nestreptognathodus pnevi, a guide-form for the basal Kungurian Shurtan Formation, is also present in the Svalbardian of Svalbard. The Svalbardian begins in the Uppermost Artinskian or the basal Kungurian."

VIEWPOINT OF A ZECHSTEINOLOGIST

Prof. D.L. Stepanov received the following letter from Dr. D.B. Smith, UK (cc: Dr. S.V. Meyen):

"I appreciated receiving the SCPS Newsletter Number 2 recently, and learning of your activities and the activities of some of my colleagues of the IUGS Subcommittee on Permian Stratigraphy. It is interesting to see that some of my colleagues are now moved to write to you in the hope that we will start to make some substantial progress in the future, and it is interesting to see that way their thoughts are taking them.

Whilst not wishing to start a lengthy correspondence myself, I particularly approve of the letter from Taraz, because, although I do not agree wholly with what he says, I certainly sympathise with the gist of his feelings. I feel reasonably sure that in the long run most major decisions regarding the position of the bottoms and tops of biostratigraphic units will be fixed on the basis of fossils as judged by you paleontologists; having said that, though, I am keenly aware

that it is very easy, without a lot of field experience, to overlook the evidence of paraconformity and non-sequences, particularly in shallow-water rocks where depositional breaks are possibly abundant but difficult to recognize. For this reason, should our Subcommittee be seriously considering setting up working groups to collect from and survey in detail sequences of rocks that might ultimately become standards, I hope you will find it possible to include at least one sedimentologist so that these possibilities are fully taken care of.

From the point of view of a western European Zechsteinologist, I feel particularly vulnerable to charges of inactivity; I am sure that you understand this, because in Western Europe we are dealing with an atypical sequence in which the biota is peculiar to the region and strongly controlled by local or limited regional features. An it is most difficult for us to relate most of these features to those of Permian rocks in other parts of the world. For this reason, except for those of us who are specialists in micro-palaeontology and palynology, we must wait on the side lines until it has proved possible to reach an agreement on world stratigraphical Permian stages and groupings. It is not that we wish to be unhelpful or uncooperative, but we are awaiting a standard with which we can compare our own work in the years to come. What I am saying, I suppose, is that inactive is not necessarily synonymous with lazy!"

GUIDE ON MAGNETOSTRATIGRAPHY

IUGS International Subcommittee on Stratigraphic Classification (Chairman, Amos Salvador, USA) and IUGS/IAGA Subcommittee on a Magnetic Polarity Time Scale (Chairman, Neil D. Opdyke, USA)

"Magnetostratigraphic polarity units - A supplementary chapter of the ISSC International Stratigraphic Guide" Geology, vo. 7, pp. 578-583, December 1979.

'CONCEPT AND METHOD IN PALEONTOLOGY'

International Symposium on "Concept and method in Paleontology" will be held in Barcelona, in May 1981, organized by the Facultat de Geologia, Universitat de Barcelona (Departament de Paleontologia), to discuss the methodological problems of paleobiology and biogeology. The invited papers will be presented in a time not exceeding 30 minutes followed by a 10 minute discussion. It is foreseen to publish all the invited papers. Free contributions will be allowed 15 minutes for presentation, and 5 minutes for discussion. Their publication is not guaranteed. The Symposium includes the following topics: Scientific method and paleontology. Form, function and evolution in paleontology. Environmental paleontology (taphonomy, paleoecology and paleobiogeography). Biostratigraphy. Teaching. Divulcation via publication. Applied paleontology.

The official languages of the Symposium will be English, Spanish, and Catalan.

For details write to Dr. Jordi Martinell, Secretary of the Symposium, Department de Paleontologia, Facultat de Geologia, Univ. Barcelona, Gran Via de les Corts Catalanes, 585 Barcelona 7, SPAIN.

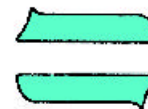
PATRIKA - Newsletter of Indian Association of Palynostratigraphers, No. 2, December 1979, was recently distributed.

Address: Janki Bhawan, 41/417, Narhi, Lucknow-226001, INDIA.



International Union of Geological Sciences

SUBCOMMISSION ON PERMIAN STRATIGRAPHY



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NEWSLETTER 4

October 1980

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PLEASE MAIL NEWS AND CORRESPONDENCE TO YOUR SECRETARY
FOR INCLUSION IN THE NEXT NEWSLETTER
THE VIEWS EXPRESSED IN THE NEWSLETTER
ARE THOSE OF ITS CORRESPONDENTS

- : 0 :-

EDITORIAL

Dear Permophiles:

All three previous issues of our Newsletter, prepared by Dr. S.V. Meyen, formerly Secretary and Vice-Chairman, and now Vice-Chairman of the Subcommittee, have proven to be extraordinarily useful in transmitting information. The format and style established for the Newsletter by Dr. Meyen have been complimented by Permophiles and will be followed in the future. Readers have indicated that they appreciate letters from colleagues published in the Newsletter as they provide a refreshing personal touch to Permian communications. All Members, Corresponding Members and others interested in the Permian are invited to send communications for the Newsletter to Secretary Nassichuk.

The present Subcommittee executive is currently dedicated to the task of revising and expanding the corresponding membership of the Subcommittee. It is hoped that a complete membership list will be published in the next Newsletter. As indicated in Commission Statutes, it may be necessary from time-to-time for Titular Members who have become inactive, for whatever reasons, to assume corresponding membership. This will provide an effective revitalization for the Subcommittee and will enable the Subcommittee to maintain a dynamic posture in science. The Subcommittee can be effective in dealing with the Permian System; of the world only if its membership is dedicated to the task. Ours is one of the youngest Subcommittees in the Commission on Stratigraphy. Thanks to the early dynamic leadership of Professors Meyen and Stepanov a sound foundation has been established for the Subcommittee. Now that we have established some principal objectives in dealing with the geology of the Permian System/, including definition and subdivision, it is time to get on with the job.

Yours sincerely,
W.W. Nassichuk

OPEN LETTER TO STUDENTS OF THE PERMIAN SYSTEM

"Dear Colleagues:

Upon my assumption of responsibilities for the Subcommittee on Permian Stratigraphy, I wish to express the belief that we collectively have both the obligation and opportunity to impose order and discipline upon Permian studies. Our obligation stems from the continued failure to establish an internationally acceptable framework for Permian correlations. Our opportunity results from advances in understanding of principles of stratigraphy in general, and also from the unprecedented increases in knowledge of biostratigraphy of the Permian System that have occurred in the past two decades.

A key to achievement of SPS objectives is more effective communication. We cannot hope for significant advances at our infrequent meetings unless the groundwork is laid through previous correspondence. This Newsletter series offers an economical vehicle, and all students of the Permian are urged individually to forward to Secretary Nassichuk or me any material that is suitable for inclusion in the Newsletter. We will undertake to distribute, to any colleague who welcomes its receipt, all available copy that is of general interest.

Membership of SPS is also critically important. Some current members have never participated in Subcommittee activities. Unless future participation is anticipated, inactive members are urged to consider resignation so as to facilitate new appointments. All Newsletter recipients are invited to submit to Secretary Nassichuk the addresses of any additional colleagues who would welcome receipt of the Newsletter. I will appreciate receiving nominations and supporting recommendations for appointments to Corresponding or Titular Membership of SPS.

The accompanying Minutes of the recent Paris meetings of SPS list projects that are ambitious but also provide prospects for progress prior to our next meeting, in conjunction with the 1984 International Geological Congress in Moscow. Your reactions to these proposals, and your eventual contributions to the projects are solicited.

In welcoming your participation in SPS activities, I look forward to international collaboration and the resulting better understanding of the Permian System.

Respectfully,
Brian F. Glenister"

MINUTES OF IGC MEETING OF SUBCOMMISSION IN PARIS

Minutes of the meeting held in the Palais des Congres, July 12, 1980.

Meeting convened 14:00 hrs. by Dr. J.M. Dickins. Attending were International Commission on Stratigraphy (ICS) Chairman Anders Martinsson, SPS Titular Members Dr. B.E. Balme and Dr. Dickins, Corresponding Member Dr. Carmina Virgili, and interested participants Prof. E.H. Gilmour, Prof. Brian F. Glenister, Prof. A.V.J. Gupta, and Dr. Yao Zhaogi. Apologies received from Titular Members, Dr. S.V. Meyen, Dr. W.W. Nassichuk and Dr. D.B. Smith. Dr. Dickins announced the election of the following officers for SPS, to assume responsibilities with the close of the 26th IGC.

Chairman Professor Brian F. Glenister

Vice-Chairman Dr. S.V. Meyen

Vice-Chairman, Secretary Dr. W.W. Nassichuk

Upon assuming the Chair for the business meeting, Prof. Glenister thanked the membership for their confidence, and expressed the hope and expectation that the succeeding four years will witness significant progress in achievement of Subcommittee objectives. He briefly outlined the history of the Subcommittee as follows:

1972 Subcommittee convened IGC, Montreal

1975 Inaugural meeting in conjunction with International Carboniferous Congress,
Moscow

1976 IGC meeting Sydney

He noted that separate working groups (WG) for the lower and upper boundaries of the Permian System had been authorized by the ICS, but that neither group had convened.

ICS Chairman Martinsson reported organization problems with the WG, noted that charges to convenors of both groups will be formally withdrawn, and stated that when at some future time the need for boundary WG becomes apparent, the SPS Chairman in collaboration with Chairs of the Carboniferous and Triassic Systems should propose authorization and membership of WG to the ICS.

Professor Glenister outlined achievements of the SPS as: development of an organization, publication of 3 newsletters, initiation of Dr. Meyen's Correlation Project, and sporadic communication between members. He expressed the opinion that the opportunity now exists for major rapid advances because:

- i. Basic stratigraphic principles have been established by the Silurian-Devonian Boundary Committee, and may serve to guide activities of other groups.
- ii. The past two decades have seen unprecedented increase in understanding of all phases of Permian stratigraphy.

He proposed a threefold program:

1. Improve Communication. Only frequent communication of members between meetings can provide a foundation for progress at infrequent meeting of SPS. Prof. Glenister urged timely response to correspondence, and pledged circulation of informative newsletters to any person actively interested in the work of the SPS. All Permian workers are urged to submit items of potential interest to Newsletter and SPS Secretary Dr. Nassichuk, or to the Chairman.
2. SPS Membership. Review of membership lists revealed that some Titular (voting) Members and Correspondents (not voting) have been inactive in SPS affairs to the extent of failing to respond to mail. Since SPS Titular Membership is restricted to 16 by ICS rules, Members who are unable to play a full role in SPS activities are urged to resign so as to permit appointment of active replacements. The number of Corresponding Members may be high, and Professor Glenister invited submission of names of persons actively contributing to SPS objectives.
3. Projects. Prof. Glenister invited attention to the following projects, each of which has potential for significant progress prior to our 1984 meeting at the 27th IGC in Moscow.
 - i. S.V. Meyen Correlation Project. Progress in some phases of this project are encouraging. Dr. Meyen is invited to restate the project and to clarify and circumscribe the objectives in the next SPS newsletter.
 - ii. Stratotypes. Prof. Glenister urged that, in the interests of economy of effort, SPS focus its attention on those sections judged to have greatest potential as either boundary or body stratotypes. He proposed that:
 - a. Any interested individual or national group be invited to sponsor Permian stratotypes.
 - b. SPS instruct members and national groups to sponsor and submit information on those stratotypes considered by SPS to have greatest potential for eventual adoption as world standard references. In explanation, it was stated that "a" above aims to limit the possibility that potentially important areas will be overlooked, whereas "b" is an attempt to focus on sections that approach the standards of an ideal stratotype (continuous sedimentation, maximum diversity and abundance of fossils, structural simplicity, accessibility). It was recognized that no single section meets all requirements for the entire Permian, so that a composite is necessary.

Stratotype proposal 3 ii b was approved unanimously, with subsequent discussion and approval of the following proposals:

- b.1 Lower Permian and Carboniferous - Permian Boundary. Academician V.V. Menner and Dr. S.V. Meyen to coordinate a proposal for the Southern Urals, and to explore the possibility of an excursion, preferably in conjunction with the Carboniferous Subcommittee and a possible boundary working group. Prof. E.H. Gilmour to coordinate presentation of data of the North American Southwest.
- b.2 "middle" Permian. Professor Glenister to organize a proposal for the North American Southwest (Guadalupian) with special emphasis on correlatives for its lower and upper boundaries (subsequently, Dr. R.E. Grant agreed to coordinate this presentation). Other areas of potential importance for the "middle" Permian are the Pamirs, Soviet and Iranian Transcaucasia

and South China: information on these areas is invited.

b.3 Upper Permian and Permian-Triassic Boundary.

b.3.1 Transcaucasia. Academician V.V. Menner and Dr. S. V. Meyen to coordinate a proposal for Soviet Transcaucasia, and to explore the possibility of an excursion, preferably in conjunction with the Triassic Subcommittee and a possible boundary working group. Information on the adjacent Iranian section is invited.

b.3.2 South China. Prof. Zhao Jinke to coordinate a proposal, possibly through Titular Member designate Prof. Jin Yu-gan.

b.3.2 Kashmir. Evaluation of these sections is requested, possibly by Corresponding Members H.M. Kapoor and Prof. K. Nakazawa. A problem exists in paucity of Permian fossils, but Prof. Gupta reported that new investigations are in progress.

EZ 82. Prof. Glenister reported communication with Corresponding Member Dr. D.B. Smith regarding the proposed Workshop on the English Zechstein (EZ 82), March 28-April 3, 1982, Nottingham, England. This field and discussion session was conceived as a follow-up to the successful 1978 meeting in Warsaw, and offers opportunity for discussion of matters of interest to SPS. The proposal that SPS accept the offer to joint sponsorship of EZ 82 was approved unanimously.

Following conclusion of this business, the meeting reverted to informal discussion. Meeting adjourned 17:00 hr., to be reconvened 08:30 hr. July 17.

Meeting reconvened 08:45 hr., July 17. Attending were ICS Chairman Professor Anders Martinsson, SPS Titular Members Dr. J.M. Dickins and Dr. R.E. Grant, Corresponding Member Dr. Carmina Virgili and interested participants Dr. N.M. Chumakov, Prof. E.H. Gilmour and Prof. Brian F. Glenister. The meeting was devoted to informal discussion of problems and of procedures to be followed in achieving SPS objectives. Meeting adjourned 10:00 hrs.

Brian F. Glenister

PERMIAN-TRIASSIC BOUNDARY AND TETHYS

"Dear Dr. Meyen:

I am highly grateful for your action to publish my letter to the SCPS Newsletter 2, however it was a personal letter to you and I had no intention to upset colleagues. After I received the Newsletter 2 I decided to keep quiet and wait for the oppositions. Surprisingly in the SCPS Newsletter 3 I found that I am not the only one who opposes the method of investigation. So probably it is now the proper time for me to express my view points and ask for comments. I really want to learn something. I highly appreciate if you would kindly publish this letter in the SCPS Newsletter 4.

Paleozoic - Mesozoic Boundary

The original definition for this Boundary is the gap between the Permian Zechstein and the Triassic Buntsandstein. Considering the fact that rapid change of facies in the Julfa section between the Paratirolites Beds and the Claraia Beds reflects the same gap between Zechstein and Buntsandstein, one can believe that this gap exists almost all over the world and consequently the original definition for the Boundary between Paleozoic and Mesozoic is still valid. In other words, conventionally the rock sequences below this gap (or below the sharp change of facies) are considered as Permian, and similarly the rock sequences above this gap (or above this sharp change of facies) are considered as Triassic. In this particular case I do not care about

paleontology because this Boundary is not defined by paleontology and paleontologists; it is defined by occurrence of a tectonic event. If I find a trilobite above this Boundary in the Claraia Beds, I am not going to say that the Claraia Beds are of Paleozoic age; I would simply say that trilobites pass the Boundary and some of them are of Triassic age. I simply reply on the conventional definition for the Boundary. I may ask paleontologists to check and tell us if this Boundary is contemporaneous all over the world or not, and they may tell us (certainly they can not tell) that it is not. But even in this case the Boundary between Paleozoic and Mesozoic is that non-contemporaneous gap or sharp change of facies between Zechstein (Paratirolites Beds) and Buntsandstein (Claraia Beds). Who said that this Boundary must be contemporaneous everywhere. Besides, we have no tools to check such a thing. The range and evolution of fossils at this Boundary is unknown because there is not a continuous marine fossiliferous Dzhulfian to Induan rock sequence found on the Earth that we can check confidently the range and evolution of fossils against that section.

So, if I find even Otoceras woodwardi in a formation below the gap, I am not going to call that formation as Triassic; I simply would say that Otoceras woodwardi occurs in the Permian too. In this particular case I check and correct paleontology by observing the type sections in field. I am not going to change the sound, solid, logical and practical definition of the Paleozoic - Mesozoic Boundary because of theoretical assumptions of paleontologists regarding paleobiological characteristics of a sub-species of a fossil along that Boundary.

Tethys and world-wide distribution of fossils

The writer accepts the idea that major faults associated with ophiolitic melange (or coloured melange) could reflect the contact line or collision zone between two continental plate at both sides of a "Red Sea type" sea (with oceanic crust) after approaching each other. The Main Zagros Fault (previously known as the Main Zagros Thrust) is a good example which indicates the location of the Tethys in the Middle East territory. The most logical image for the Tethys regarding the Middle East territory is a large sea with oceanic crust situated between the Arabian Plate at the south, and Central Iranian Plate at the north, extending at least as far as the East Mediterranean Sea to the west and as far as the Baluchistan region to the east. There had been a very large continental shelf at the south side of it. But at the north side the continental plate (Pakistan, Afghanistan, Iran and Turkey) had been extensively block-faulted and several shallow gulfs, bays and continental basins existed in the area, of which some have been connected to the Tethys sea and some could be isolated and disconnected. These conditions attract my attention to the point that at the existing time the Black Sea and the Caspian Sea have different faunas. This fact simply forces me to believe that similarly during Permian - Triassic time living conditions in these shallow gulfs, bays and continental basins in the Middle East territory varied so much from place to place that there is no basis to believe that a sub-genus or sub-species of any family of fossils of that time occurring in West Turkey must occur in Baluchistan too. In other words, considering paleogeographic conditions of Permian - Triassic time, I have tendency to oppose the idea that all the uppermost Permian rocks must necessarily contain Paratirolites kittli. The concept of world-wide distribution of fossils seems to be not applicable for that time.

Conclusion

The boundary between Paleozoic and Mesozoic had been originally defined by a tectonic event and that definition is still valid.

Distribution, range and evolution of some, if not all, of the Upper Permian and Lower Triassic fossils are poorly known. The SOPS should encourage geologists to find and describe in

sufficient details the Upper Permian and Lower Triassic sections. This opportunity will enable paleontologists to get more information about the unknown range, distribution and evolution of the Upper Permian and Lower Triassic fauna by observing those sections.

After these steps stratigraphy of the Upper Permian and Lower Triassic can confidently be established.

One more point; let us agree that paleontology should serve geology in the same manner as geology is serving economy and economy is serving humanity. Geology should furnish more reliable information to paleontologists for better services.

Sincerely yours,
Hooshang Taraz."

RESPONSE TO TARAZ LETTER IN NEWSLETTER 2 (LAZY PERMOPHILE)

"Dear Dr. Meyen:

Just now I received SCPS Newsletter 2. I also received its first number and other correspondence; but unfortunately I had to act as a lazy Permophile due to other assignments.

Now, in my present headquarters Calcutta, I can devote some time to the work of SCPS. Here I am looking at the publication of work on Permian and Triassic faunas of Kashmir which is being published in Palaeontologia Indica (Editors K. Nakazawa and H.M. Kapoor). I am also finalizing my work on Lower Permian floras of Permian Gondwana of Kashmir and Lower Permian fauna of Kashmir. These two contributions will be published in the Palaeontologia Indica. Most of the work involved in above projects will give sufficient time to look after the activities of SCPS, and now assure you full cooperation as a true Permophile.

The letter of Dr. H. Taraz is of much significance and value. The points raised by him are of importance. As a field geologist and laboratory worker I have faced such problems many a time and am a strong believer that analysis based on multidisciplines actually brings a clear picture. One group of fossils may be the main basis of defining a particular zone, stage of a system but it is the analysis of all the groups which will actually bring a clear picture. Other geological criteria such as sedimentation, palaeomagnetism, palaeoclimate, unconformities are also of value. It is true that all of a sudden every data can not be received or achieved but we have to think on those lines and make an attempt to work on those lines. I am sure the cumulative data and analysis will be satisfaction for all palaeontologists and geologists.

My experience with Permian correlations of Kashmir is so. We mostly indicate a particular stage of Permian, form a member just because it occupies relative position where one or two fossils of characteristic zone are found, in a layer or bed. Under normal conditions, it is not justifiable. It is only inferred - the bed in discussion may also be part of the zone on which analysis is made or there may be a number of probabilities. However, if we have control of other aspects, we may be close to analysis although characteristic life was not found. I quote example of the Unit E₁ of the Khunamuh Formation at Guryul ravine, Kashmir. This bed lithologically is quite different from Zewan, hitherto considered as Upper Permian. Unit E₁ has plenty of Permian brachiopods but unlike Zewan they are of stunted growth. In this bed we also get Claraia earlier considered only of Triassic.

Lithologically and by palaeocurrents, it appears to be part of Lower Triassic succession, while based on brachiopods it is Permian and by bivalves Triassic. It has been considered to be Dorashamian just because it is above the Cyclolobus horizon and below Otoceras Zone. If we take phylogeny of ammonoids, I think Permian limit can be raised up to the Dienerian stage. Breaks

(unconformities) are more puzzling -west of Kashmir they are evident near the Otoceras Zone and in the east above Cyclolobus and below Otoceras Zones. In the geocratic Permian, I think such variations/changes of lithology, fauna, unconformities etc. are very close both laterally and vertically. However, if cumulative analysis of all geological data is made the picture emerges much better. It is true with this effort many practical difficulties will arise, but slowly the goal will be achieved; it is only the achievement of results on a priority basis and defining them accordingly. Almost all the workers in brachiopods or cephalopods or fusulinids or bivalves realize the importance of other groups or of lithology or of palaeoclimates. As I understand Dr. Taraz's letter, he points to this anomaly and we as field and laboratory workers also feel this.

Besides this I would also like to inform about some of the recent progresses in India on Permian Stratigraphy. A group of geologists from the Geological Survey of India collected interesting fauna of Lower Permian from Lahul and Spiti regions comparable with that of Lower Permian Agglomeratic fauna of Kashmir and Bhalleh. In Kashmir the youngest level is lower part of Lower Artinskian while in Bhalleh upper limit is slightly younger than Kashmir, but Spiti fauna appears to be much younger than Kashmir. The marine gap between lower Artinskian and Abadehian is marked in Kashmir by volcanics and plant beds, but tracing the beds eastwardly now we feel that it may be possible to establish complete Permian succession in Himalaya. Many new Lower Permian horizons are coming to light in the eastern Himalaya. But all the evidences are favouring fauna to have marginal Gondwana marine nature.

I received letters from Dr. Dickins and Dr. Nassichuk for Symposium on Permian. I have written to workers in India for comments, views and contributions. I will be informing soon the outcome to Dr. Dickins on this subject.

I would also like to request you to send copies of SCPS Newsletter to our Director, International Wing, Geological Survey of India (27, JL Nehru Road, Calcutta 700016) (if possible 1st and 2nd too), to facilitate them to keep in touch with the progress in different geological commissions. I hope you will agree to this request.

Sincerely yours,
Hari Mohan Kapoor."

SYMPOSIUM ON TIBET

The Symposium on Tibet sponsored by the Academia Sinica held in the Jing Xi Guest House in the central part of Beijing (Peking) 25-31 May 1980 was attended by about 100 outside scientists together with about 200 Chinese registered participants. Other Chinese scientists attended sessions. The Symposium had ten sections: Geology, Geophysics, Geochemistry, Stratigraphy and Palaeontology, Zoology, Botany, Physiology, Geomorphology, Geography, and Meteorology. The official languages of the conference were Chinese and English and effective translation was made in all the sessions. In addition translation from other languages was made. The accommodation, the meeting rooms, also at the Jing Xi Guest House, and the arrangements made were particularly satisfactory.

Permian rocks are not particularly widespread in Tibet and most of the fossiliferous localities are not readily accessible but their interpretation is of considerable importance in understanding the structure and origin of the Plateau. In Nanjing (Nanking) I was able, however, to examine the collections which have been made. At the Symposium an interesting consensus was apparent among palaeontologists working on pre-Permian Palaeozoic faunas. At the species level, the marine faunas from the Himalayas and southern Tibet (no pre-Permian marine Palaeozoic faunas are known from Peninsular India) are so close to those of other parts of southern Asia that it

was concluded that India could not have been separated at this time from the rest of Asia by a wide sea. Consideration of Lower Permian (Upper Carboniferous of Chinese usage) marine faunas from Peninsular India affords further evidence for this conclusion. The cold and temperate Gondwana type faunas have now been identified not only in the Himalayas and southern Tibet but also in central Tibet north of the "Yarlung-Zangbo Suture Line". On the basis of my examination of the collections I can express agreement with the conclusions which have been made. In the Himalayas, southern and central Tibet the Lower Permian cold and temperate faunas are overlain by rocks with Upper Permian warm water marine faunas. This change of climate or geographic position may explain the occurrence of the Glossopteris flora in southern Tibet and the Cathaysian flora in northern Tibet the latter of which would indicate a warm climate.

Some palaeontologists have interpreted this data to indicate that an oceanic opening took place along the "Yarlung-Zangbo Suture Line" in the Triassic prior to continental collision in the Upper Cretaceous Tertiary in line with the views of one of the schools of plate tectonics. This ocean was considered never to have been very wide.

Field Visit to Tibet

Because of remoteness, height, shortage of facilities for visitors and the wide range of disciplines represented, the field visit to Tibet presented considerable organizational difficulties. Despite this the field visit was accomplished with success. There were about 70 outside participants. The height with lack of oxygen troubled most visitors -headaches, nausea, dizziness and shortage of breath were suffered by most at one time or another. The climate, however, was unexpectedly mild - the days were warm and sunny with rain sometimes at night. The nights were also mild and frost free. The threatened wind did not appear. The climate is dry and the bare mountainsides illustrate the geology in an ideal fashion. Travel over roads was by minibus brought to Tibet especially for the field visit. Bus was supplemented by four wheel drive vehicle.

The field visit was specially interesting for the Palaeozoic (with perhaps the exception of the Permian) and for the Mesozoic (Triassic, Jurassic and Cretaceous) with a profound unconformity between Lower and Upper Cretaceous. Igneous and structural geology was also well illustrated. By special arrangement I was able to spend a little time examining the Permian exotic blocks. The blocks comprise pieces from the size of small boulders to others many metres thick and as much as 1 km in length. They are emplaced in the Triassic and are accompanied by penecontemporaneous Triassic blocks. Both the Permian and the Triassic contain marine fossils. Permian blocks which are calcareous and dolomitic have a striking appearance and because of their resistance to erosion cap many of the hills. I saw Griesbachian and Norian fossils in Triassic which contained blocks. Doubtless these blocks represent large scale sliding in a tectonically active environment (olistostromes or "sedimentary melange"). They attest to strong tectonic movement in the some significance in understanding of the blocks the in the early Triassic, a feature perhaps of some significance in understanding the Permian-Triassic boundary. The fossils and lithology of the blocks seem to be close to that of the Wargal and Chhidru Formations of Himalayan Region. Permian blocks in Triassic rocks are recorded other places - Ladakh, Turkey and Sicily. Such olistostromes have been caught up in later tectonic movement to give rise to the famous tectonic and ophiolitic melanges. Study of the origin and nature of these blocks is undoubtedly important in understanding the development of the melanges associated with the ophiolitic belts of tectonically very active regions.

J.M. Dickins.

PERMIAN IN SOUTH CHINA

I was most fortunate to be invited to attend the Symposium on Tibet in Peking (25-31 May, 1980) and subsequent visit to Tibet organized by the Academia Sinica. Prior to the Symposium (May 14-23, 1980) I was able to visit the Nanjing Institute of Geology and Palaeontology of the Academia Sinica to examine Upper Palaeozoic and Lower Mesozoic collections, to visit field sections and to discuss problems, especially of the Permian, with Chinese colleagues. Nanjing Institute is the major centre for invertebrate palaeontological research in China with, I understand, about 250 workers.

In Nanjing are housed not only extensive collections from China but also fossil collections from Tibet where major geoscience work has been undertaken by the Academia Sinica.

In South China the Upper Palaeozoic sequences are of a stable platform type in mainly warm water environments. Formations are thin, carbonates are conspicuous and clastics present tend to be mature. Abundant and diverse marine faunas are present, indicating access to the open sea.

In South China all or most of the Permian is represented in marine deposits with abundant faunas. Plant fossils are also well represented. The boundary between Carboniferous and Permian is placed between Maping and Chihsia. The boundary is distinctive, stratigraphically and in sedimentation. The Maping contains equivalents of the Asselian. In places a hiatus separates the Chihsia from considerably younger (Artinskian) faunas. In other places intervening deposits equivalent to the Sakmarian are apparently present. The boundary thus differs from the conventional boundary placed at the base of the Asselian. The relationship in China requires further comparison with outside sequences.

The Lower Permian is made up of the Chihsia and Maokou which include equivalents of the Artinskian, Kungurian and Kazanian and of the Leonardian and Guadalupian. The Upper Permian comprises the Lopingian (Wuchiapingian) and the Changhsingian. The boundary between the Lower and Upper Permian is thus also placed considerably younger than the boundary in other places where a two-fold subdivision of the Permian is used.

The base of the Triassic is marked by the incoming of Otoceras. The nature of the boundary has been discussed by Tozer (1979), by Nassichuk in SCPS Newsletter No. 3, and in a paper by Zhao, Sheng and Yao given at the recent Geological Congress in Paris. I was able to examine the boundary in the Bao Qing quarry near Changhsing and at Tangshan near Nanjing.

In my opinion the South China sequence constitutes a major candidate for choice as Permian-Triassic boundary strata type. Diverse and representative marine faunas are found in the Permian and Triassic. Spore assemblages might be expected although to my knowledge they have not so far been recorded. In places a relatively continuous sequence seems to be present. I am assuming that the base of Otoceras is to be taken as the base of the Triassic. I will not discuss this problem here but express my agreement with the arguments of many workers as expressed by Tozer (1979). Tozer's account of the ammonites indicates how fragile a boundary based only on ammonites is likely to be and the South China sequence has great advantage in the diversity of the fauna represented. I am inclined to agree with Chinese colleagues who believe that virtually transitional sequences are present. It has become increasingly difficult to believe that the brachiopods of "Permian-type" recorded from many places with Otoceras are reworked fossils as argued by Tozer.

Other possible candidates for the Permian-Triassic boundary stratotype are Kashmir and Transcaucasia (USSR). In Transcaucasia the Lower Triassic seems to be less well represented

and in Kashmir Upper Permian marine faunas are less well developed. Well preserved spore assemblages are doubtful in both. The presence of spore assemblages in the boundary stratotype is particularly important.

The South China sequence might also be considered as a candidate for the Upper Permian stratotype. There are, however, rival candidates. In South China diverse marine faunas occur in the Upper Permian in a manner which is perhaps unequalled elsewhere. Apparently details of the local stratigraphy, its lateral variation and correlation with sequences in other countries, require elaboration. In correlation of the South China sequence with other areas considerable reliance is placed on the fusulinids. Further work in other groups is necessary to supplement this information and improve precision in correlation. Ranges of some fusulinids are controversial and work is needed on comparison of ranges in actual sequences in different parts of the Tethyan region. Fusulinids and some other important forms such as conodonts, calcareous algae and colonial corals are confined to the Permian warm water regions and to obtain a stratigraphic and time scale which is applicable to the whole world further attention to other elements of the fauna is required.

Reference

Tozer, E.T. (1979). The significance of the ammonoids Parathirolites and Otoceras in correlating the Permian-Triassic boundary beds of Iran and the People's Republic of China. Canadian Journal of Earth Sciences, 16, 1524-1532.

J.M. Dickins.

CHINA IN INTERNATIONAL STRATIGRAPHY AND PALEONTOLOGY

The following is an abstraction of an article by Anders Martinsson, Chairman of the JUGS Commission on Stratigraphy, which appeared in *Lethaia*, Vol. 12, 1979, p. 2~30: "China in international stratigraphy and paleontology".

In the autumn of 1977 a delegation from the International Union of Geological Sciences (IUGS) visited China. The ten members of the delegation included representatives of the main scientific bodies of the IUGS and the Board and Scientific Committees of the International Geological Correlation Programme (IGCP), the cooperative IUGS-Unesco enterprise with governmental participation. The IUGS is the first international (non-governmental) scientific organization with which the People's Republic of China has established relations.

The main task of the JUGS delegation was to negotiate with its national adhering organization, the Geological Society of China, about the initiation of concrete scientific cooperation. The negotiations extended over a whole month and were interspersed with most hospitable and instructive visits to geological institutions and field areas between the famous oilfield Daqing (Taching) in northern Manchuria and the mountains bordering the Red River basin in the south. Participation at a state banquet hosted by Chairman Hua Guofeng (then Hua Kuo-feng) and a audience with Vice Premier Ku Mu the manifestative highlights of the visit, and the discussions involved a wide spectrum of the geological elite of the country. The main sessions were held in Beijing (then Peking) on 30th September and in Guangzhou (Kwangchow, Canton) on 12th October.

On the latter occasion the initial Chinese interest was defined as comprising one of the IUGS Scientific Commissions (the International Commission on Stratigraphy), one of its Affiliated Organizations (the International Palaeontological Association, IPA) and the IGCP. Within the Commission it was the Subcommissions on Ordovician, Silurian, Devonian, Carboniferous, Cretaceous and Quaternary Stratigraphy and the Working Group on the Precambrian-Cambrian

Boundary which attracted interest.

CHINA PARTICIPATION - COMMISSION ON STRATIGRAPHY

"Dear Colleagues:

I am pleased to announce to you that the Geological Society of China, which is the Chinese National Adhering Body of the IUGS and hence of our Commission, has decided on Chinese participation in the work of no less than sixteen of our bodies in addition to the seven included in our initial agreement after our negotiations in China in 1977.

For the practical details as a consequence of this message I refer to my circular letter of 1977 11 03. The essential item is that until Chinese members (voting or/and corresponding) of your respective bodies have been elected, all correspondence should be channelled through the Geological Society of China. Please note that Mr. Meng has now retired and been succeeded by Mr. Wang as Secretary General of the Society and that the Pinyin type of romanization, in exclusive official use since 1979 91 91, leads to modification of its address as follows:

Mr. Wang Zejiu, Secretary General
Geological Society of China
Baiwanzhuang Road
Beijing (Peking)
People's Republic of China
Yours sincerely,
Anders Martinsson"

COMMISSIONS AND WORKING GROUPS - GEOLOGICAL SOCIETY OF CHINA

The Geological Society of China, Peking, China

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1. Commission on Stratigraphy
 - a. Subcommittee on Permian Stratigraphy
 - b. Subcommittee on Triassic Stratigraphy
 - c. Subcommittee on Jurassic Stratigraphy
 - d. Subcommittee on Neogene Stratigraphy
 - e. Subcommittee on Palaeogene Stratigraphy
 - f. Regional Committee on Stratigraphic Correlation for the ESCAP Region.
 - g. Subcommittee on Stratigraphic Classification
 - h. Subcommittee on Geochronology
 - i. Subcommittee on Magnetic Polarity Time Scale
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 - k. Working Group on the Carboniferous-Permian Boundary
 - l. Working Group on the Permian-Triassic Boundary
 - m. Working Group on the Jurassic-Cretaceous Boundary
 - n. Working Group on the Cretaceous-Palaeogene
 - o. Working Group on the Palaeogene-Neogene Boundary
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2. Committee on Storage, Automatic Processing and Retrieval of Geological Data: (COGEO DATA)
3. Committee on the History of Geological Sciences (INHIGEO)

POLISH PERMIAN ACTIVITIES

In 1979 the Permian-studying group at Instytut Geologiczny, Warsaw (see Newsletter 1) continued their studies. In Wrocław, J. Jerzykiewicz (Instytut Geologiczny) conducted palynological examination of the Upper Carboniferous-Lower Permian section in the Intra-Sudetic trough that yielded a rich microflora, and also some well sections from the Fore-Sudetic area. In Poznań, J. Fedorowski (University) continued his extensive study of Permian corals from Greenland (collected by K. Birkenmayer), Svalbard, and also a very rich collection by G.A. Cooper, with collaboration of R.E. Grant.

Other Polish activities include the publication of some results of mainly paleontological investigations, in the Zechstein of western Poland (J. Klapcinski, L. Karwowski, University, Wrocław) and the Permian of Svalbard (K. Malkowski, Polish Academy of Sciences, Warsaw).

T.M. Peryt

IS THE THREE-FOLD SUBDIVISION OF THE PERMIAN REALLY NECESSARY?

Recent advances in the Permian stratigraphy of the Tethyan province (belt) resulted in attempts of some stratigraphers to take certain versions of the three-fold subdivision of the Tethyan Permian as an international standard (Kahler, Kozur, Leven, Waterhouse). On the other hand some authors concluded that in the Fore-Uralian scheme, currently used as the international standard, there is an equivalent of the Tethyan 'Middle Permian', i.e. Kungurian and Ufimian (Gorsky, Guseva, Stepanov, Ustritsky).

Further discussion on the problem may be fruitful only if reliable correlations between sections of Tethys, Fore-Urals, North America, Angaraland, Central Europe and Gondwanaland is attained. However, the correlations between Tethys and these areas is even more difficult than the tracing of units established in Fore-Urals. In the latter region the Permian section consists of alternation of fully marine, lagoonal (brackish) and freshwater (continental) beds. The high proportion of the nonmarine deposits in the Fore-Urals is currently established as an essential defect of the stratotype area of the Permian. In reality, however, this very feature of the stratotype area provides possibility for correlations with both marine successions of the Tethys and North America, and continental ones of Central Europe and Angaraland.

The conodont studies of the Permian of Fore-Urals (Movshovich et al., 1979; Trudy Inst. Geol. i Geokhim, UNC AN SSSR, vyp. 145, Sverdlovsk:94-131) and Tethys (Kozur) allowed to conclude that the Tethyan 'Middle' Permian roughly corresponds to the lower Upper Permian of Fore-Urals (see also: Movshovich, 1979; Izvestia Akad. Nauk SSSR, ser. geol., No. 2:56-60). It seems evident that such local units of the Tethyan Permian cannot serve as standard units. This does not mean the rejection of its usage for the provincial Tethyan scheme. However, the subdivisions of this regional unit would be hardly useful in other provinces.

To the author's mind the further progress would be impossible on the basis of a radical

change of the already existing Fore-Uralian scheme which should be kept as the standard scale. But this scheme is to be improved by means of the selection and investigation of hypostratotypes in the type area (throughout the Fore-Urals including its northern part). The hypostratotypes should be reliably correlated with (1) known parastratotypes and (2) sections yielding ammonoids, conodonts, ostracods, forams, insects, vertebrates, miospores and plant megafossils. This will allow a reliable correlation with other provinces.

Only special integral studies for mutual coordination and correlation of tonal schemes based on different faunal and floral groups (based on the fundamental theoretical principle of the chronological interchangeability of stratigraphical characters, as established by S.V. Meyen) will permit to maintain an international (standard) integrated zonal scheme of the Permian which will serve as the basis for global correlation. An experience of such studies of the Lower Permian has shown (Movshovich et al., 1979, l.c.) a real possibility to recognize stratigraphical units of the Fore-Uralian Permian in Tethys and North America.

Of course, the international status for the Fore-Uralian scheme may involve the necessity of some changes in its units. But this should be done only after a detailed substantiation and comprehensive discussions. For example, it is possible that the Sterlitamakian and Lower Artinskian together will form an independent stage. However, correlations need larger units (superstages, subseries, rather than stages) without essential changes in stages, series and their boundaries.

Only this way will lead to success in global correlation of the Permian without permanent rearrangements of both standard and provincial schemes. Provincial schemes should be established or modified irrespective of the standard scale.

E. V. Movshovich, Rostov-na-Donu, USSR

Recent Permian Publications

Permianland, D.L. Baars (Ed.), A field symposium - guidebook of the Four Corners Geological Society; ninth field conference, 1979.

Seventeen important papers dealing with Permian stratigraphy, sedimentology, climate, and economic geology of the Colorado Plateau are contained in the volume.

Proceedings of Symposium on Qinghai-Xizang (Tibet) Plateau (Abstracts) Symposium on Qinghai-Xizang (Tibet) Plateau, Beijing, China May 25-June 1, 1980; Organizing Committee, Symposium on QinghaiXizang (Tibet) Plateau, Acad. Sinica.

Some 300 abstracts dealing with geology, faunas, floras, geography of the Tibetan Plateau are included. About 15 abstracts are of interest to Permophiles.

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NEWSLETTER 5

May 1981

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**NOTES FROM THE
CHAIRMAN**

As reported in Newsletter 4, Dr. R.E. Grant is coordinating sponsorship of sections in the North American Southwest as possible candidates for "middle" Permian stratotypes. Local groups (especially the Permian Basin Section of the S.E.P.M., West Texas Geological Society, Four-Corners Geological Society and El Paso Geological Society) have long been active in geological investigation of the area, and progress toward an integrated stratotype proposal is being achieved.

Upon the initiative of SPS Corresponding Member, Dr. Carmina Virgili, Chairperson of the Subcommittee on Triassic Stratigraphy, a working group on the Permian-Triassic boundary is now being constituted. SPS nominations have been forwarded to the International Commission on Stratigraphy Chairman, Professor Anders Martinsson, and it is expected that a convertor will be announced soon.

Important conferences are planned for each of the coming three years. The Workshop on the English Zechstein (EZ 82) will be held March 28 - April 3, 1982, in Nottingham, England. Additional information is available from G.M. Harwood, Department of Earth Sciences, The University, Leeds LS2 9JT, United Kingdom. International Carboniferous Conference X is to be held September 12-17, 1983, in Madrid, Spain. The Carboniferous-Permian boundary will be a symposium topic, as well as the subject for a field excursion. The Permian System is to be a major focus for the 27th Session of the International Geological Congress to be held in Moscow, August 4-14, 1984. Subcommittee on Permian Stratigraphy has requested arrangements for field examination of prospective Permian stratotypes in the Southern Urals and Transcaucasia.

Brian F. Glenister

ABSTRACT FROM OPEN LETTER TO GEOLOGICAL SOCIETIES IN
SOUTHWESTERN USA

.... At the meeting of the Subcommittee in Paris it was decided that the choice of stratotypes for worldwide reference was an important task for the SPS. Certain areas contain potential stratotypes and warrant intense study. For example, the Lower Permian should be and the very topmost stages should be located in the souther Ural Mountains, and the topmost stages should be in Soviet or Iranian Azerbaigan or, perhaps, south China. Several areas must be considered for the middle part of the Permian, but many think that the southwestern United States has the best sequence. It has not been decided yet whether or not to recognize a formal "Middle Permian", but surely there is a middle part to it and it is well represented in West Texas and New Mexico. The Subcommittee wants to base its decisions on the best advice possible, on the most thorough knowledge, so it was decided to consult the experts most directly concerned. Dr. Glenister commissioned me to enlist opinions on good mid-Permian sections in the Southwest, and I decided to request the organizational help of the societies that are on the scene. I am writing to officers of the Permian Basin Section of the S.E.P.M. (of which I am a member), the West Texas Geological Society, the El Paso Geological Society, and the Four-corners Geological Society. If there are others I should contact, please let me know.

I hope that you will convey to your members the invitation of the Subcommittee to propose potential stratotypes for the Middle Permian (which we define roughly as the Guadalupian; the Word and Capitan equivalents, possibly omitting the Lamar). The best kind of help the society could render would be to organize a committee for the Permian, with a chairperson and members with whom I could communicate directly.

The establishment of a world-wide system of nomenclature for the Permian is an important step in enabling stratigraphers and paleontologists to communicate without ambiguity. That the system could be based on the reality of good stratigraphic sections is obvious.

R.E. Grant

LETTER FROM CHAIRPERSON, SUBCOMMISSION ON TRIASSIC STRATIGRAPHY

Dear Dr. Glenister:

I am very glad about your decision regarding the Permian-Triassic boundary working group. As soon as you have Professor Martinsson's approval, please let me know.

At the meeting of the Triassic Subcommittee in Sarajevo at the beginning of October, we shall appoint someone in charge of the Permian-Triassic Working Group. Our choice will be proposed to Dr. Martinsson.

I am so sorry you cannot attend the Carboniferous Congress in Spain and that it is not possible to hold a meeting of the SPS, but I understand your reasons. Instead, I feel it is a good idea to hold a symposium on the Carboniferous-Permian boundary. I shall inform Professor Melendez and the others responsible for the organization of the Congress of your decision. Then, I shall contact Dr. W.W. Nassichuk to find out how much time we need for the symposium, etc.

The Congress will include a 5-day excursion to the Permian of central Spain, which I am directing together with my collaborators. However, in this area, the Permian has a lack of continuity with the Carboniferous and the rest of the Paleozoic. On the other hand, the Permian-Triassic Boundary problem is very interesting. As you will see from the offprints that I am sending you apart, the palatine discordance is under some series with Thuringien microfloras.

I completely agree with you regarding the International Geological Congress and am going to write to Professor Martinsson this very day, stressing my interest in the organization of the Transcaucasian excursion.

Carmina Virgili

RESPONSE TO C. VIRGILI, SUBCOMMISSION ON TRIASSIC STRATIGRAPHY

Dear Professor Virgili:

Thank you indeed for your letter of May 25. By now you will have a copy of Prof. Martinsson's letter to me dated May 21 in which he approved of our procedures in setting up a Working Group on the Permian-Triassic Boundary. I agree with your proposal to raise the matter at the Sarajevo meeting in October, and assuming a name for Chairperson of the Working Group is selected it should be forwarded for formal approval to Prof. Martinsson. Appointment of the Permian and Triassic Chairs as ex officio members of the new working group is entirely appropriate and desirable, although not mandatory.

Please consider my previous letter regarding the forthcoming Carboniferous Congress in Spain as official, and inform Prof. Melendez accordingly. I have taken the liberty of forwarding a copy of your letter of May 25 directly to Dr. Nassichuk so that he can advise Congress officials on conduct of the proposed Carboniferous-Permian boundary symposium.

Brian F. Glenister

NOTES RELEVANT TO CARBONIFEROUS-PERMIAN BOUNDARY IN JAPAN

Dear Dr. Nassichuk:

Today I received Newsletter 4 of SPS. Thank you very much.

As you may understand through our recent book published early this year and entitled "The Abean Orogeny, Variscan Geohistory of Northern Japan", in Japan, Upper Carboniferous is poorly developed. Nonetheless, the Kassimovian is somewhat widely distributed in Central and Southwestern Japan. However, the deposits assignable to the Gzhelian or Virgilian in USA are not known in Japan except for a single locality named Ichinotani, located in Central Main Island, where *Quasifusulina longissima* (Möller), *Q. pseudoelongata* Maclay, *Triticites paramontiparus* (Rosovskaya), *T. ichinotaniensis* Niikawa and *T. Kato* Niikawa and

Schubertella kingi Dunbar and Skinner. Of them, two new species resemble *T. plummeri* Dunbar and Condra which is prevalent in the Virgilian of the USA. cf: Niikawa, I, 1978: Carboniferous and Permian fusulinids from Fukuji, Central Japan, Jour. Fac. Sci. Hokkaido Univ. Ser. 4, vol. 18, p. 533-610.

Masao Minato

NOTES ON ZECHSTEIN STUDIES

In December 1980 "The Zechstein basin, with emphasis on carbonate sequences" (ed. by H. Füchtbauer and T. Peryt) was published in the series "Contributions to Sedimentology", no. 9, pp. 328, by Schweizerbart (Stuttgart).

The volume contains papers dealing with sedimentary evolution of particular parts of the Zechstein basin; some of them are of general interest - e.g., M. Magaritz and K.H. Schulze discuss the carbon isotope anomaly of the Permian period, The $^{13}\text{C}/^{12}\text{C}$ ratio in Permian carbonate rocks from the Zechstein of Harz Mts. and other places over the world exhibit a drastic change compared to other periods, and it may be caused by a period of ocean stagnation similar to that reported from the Cretaceous. The changes had to affect the life on Earth.

In Poland the studies mentioned in the former issues of Newsletter continued.

T.M. Peryt.

ACTIVITIES OF MICROPALAEONTOLOGY WORKING GROUP

Our micropaleontological working group continues to be very active. A paper about the present-day knowledge of Permian stratigraphy in the light of conodont data was published. It is based on conodont faunas of the type areas of the Permian stages.

Bando, Y.; Bhatt, D.K.; Gupta, V.J.; Haysahi, Sh.; Kozur, H.; Nakazawa, K. and Zhi-hao Wang: Some remarks on the conodont zonation and stratigraphy of the Permian. Recent Researches in Geology, 8, S. 1-53, 5 Abb., 9 Taf., Delhi 1980.

Professor Mostler, Innsbruck, plans to organize a Symposium on the Permian system like that held in Innsbruck, 1972 on the Triassic system. The topics should be stratigraphic subdivision in the marine and continental Permian and correlation between the marine and continental Permian deposits. When I get the exact data I will inform you. Our Subcommittee should support this symposium and use it for a meeting of the Subcommittee.

The above mentioned paper is a first step and I think an important contribution to Permian stratigraphy. It shows a complete conodont zonation of the stratotype Lower Permian of Cis-Ural that can be correlated with other areas. It also shows conodont correlations of the Upper Permian of Soviet Transcaucasia, Julfa, Abadeh and South China, and also the age of the Chihshia limestone according to conodonts. Of course, we cannot publish any year such a big paper, but at the moment an ostracode zonation of the deeper parts of the Upper Permian from Hungary is in press that can be used as a standard zonation in the future. After the conodonts the main activities are concentrated in the ostracods and radiolarians, but the next joint paper of the working group will not be ready for another 3 or 4 years. This is because we must now do a lot of taxonomic work on these groups. But this does not mean that we are inactive. Several papers will be published on Permian microfaunas, above all Radiolaria and ostracods by several members of the working group, but the time for publication of a synthesis like the above referenced paper will be in some years after finishing taxonomic works.

H. Kozur.

NOTES ON THE PERMIAN-TRIASSIC BOUNDARY

I quite agree with the letter of Dr. Kapoor in Newsletter #4. Also I quite agree with Dr. Dickins that India cannot be separated in the Permian from Asia by a large ocean. But otherwise, I cannot agree to place the Triassic lower boundary with the first appearance of *Otoceras*, the last survivor of a Permian superfamily. In no section where *Otoceras* is present, is the immediate forerunner of this genus present. Therefore, the first appearance of this genus must be in all cases facies controlled. Moreover, not only do Permian brachiopods occur together with *Otoceras*, the whole microfauna (conodonts, ostracods and even the sporomorphs, see Foster, 1979) are clearly Permian in *Otoceras*-bearing beds. From all referenced Triassic bivalves no forerunner is present in the underlying beds. Therefore, we do not know where these forms, as well as *Otoceras*, begin. Otherwise, *Julfotoceras* is an *Otoceras* that begins in the highest Dzhulfian below the Dorashamian. The Conchostraca of the lowermost Triassic in the German Basin, where the Permian-Triassic boundary was originally fixed, are even younger than the *Ophiceras* fauna. So, quite surely the *Otoceras* fauna is older than the oldest Triassic of the Germanic basin. If we placed the Permian-Triassic boundary at the first appearance of *Otoceras*, then we have quite surely a diachronous boundary and if *Otoceras* is absent we will place the contemporaneous beds in the Permian because of Permian microfaunas. The same mistake to define a stratigraphic boundary with an ammonoid genus, the immediately forerunner of which is unknown, was made in the Norian/Rhaetian boundary and has caused a lot of trouble, because always the first appearance of *Rhabdoceras* was believed to be contemporaneous. In reality, the first appearance of *Rhabdoceras* in the Kossen beds was within the uppermost part of the range of *Rhabdoceras*, but this could not be recognized, because only the first appearance of an ammonoid genus with unknown forerunner was taken to establish the boundary. We should always consider that not the appearance or disappearance of a fossil or fossil group is the basis of the stratigraphy, but the evolution of the fossils. So long as we cannot find *Otoceras* and the immediate forerunner in one section of the "Triassic" bivalves and their forerunners in one section, the first appearance of these groups is useless for stratigraphy. The first appearance of *Claraia* was formerly thought to be Upper "Griesbachian" but later, this genus was found in the Lower "Griesbachian" and now even below the *Otoceras* fauna. On the other hand, the disappearance of *Otoceras* is not facies controlled and coincides with the disappearance of the last Permian brachiopods, typical Permian conodonts and ostracods.

I also quite agree with the opinion of Movshovich. Above all, the Sterlitamakian and the Lower Artinskian seems to be an independent unit quite different from the Upper Artinskian and also different from the Tastubian (Lower Sakmarian).

H. Kozur.

WORKSHOP ON THE ENGLISH ZECHSTEIN

This is a meeting for discussion of all aspects of current research on the Zechstein basin. Contributors should, so far as possible, relate their conclusions to the English Zechstein. However, it is hoped that workers on similar evaporite basins will also take part.

Programme

25 - 30 March

Field Excursion

31 March - 2 April

Papers, Discussion and Exhibits

FIELD EXCURSION: There is one pre-conference field excursion. Those taking part in the excursion will meet in Durham on Thursday 25 March for an introductory discussion. The next

three days (26-28 March) will be spent examining Zechstein strata in the Durham/Newcastle area with accommodation at Durham University. The 29 and 30 March will be in the Yorkshire/Nottinghamshire area with accommodation at Nottingham University. Travel will be by coach throughout. As the number of participants on the excursion will be limited, preference will be given to those from overseas.

PAPERS AND DISCUSSION: Three days (31 March-2 April) will be devoted to the presentation and-discussion of papers at Nottingham University. Provision will also be made for participants to display exhibits. Cores from onshore and, possibly, offshore bore-holes will be on display. Papers and exhibits on all aspects of Zechstein geology are invited eg.

- a) palaeontology and sedimentology
- b) palaeogeography and palaeoenvironment reconstruction
- c) basin analysis
- d) economic aspects

All papers should have a substantial new content and should contain some reference to the onshore or offshore English Zechstein. It is proposed to publish papers which will be refereed. Papers should preferably be in English.

COSTS AND ACCOMMODATION: In order to minimize expense, university accommodation will be used throughout the workshop. It is impossible as yet to quote 1982 prices but, as a guide, 1980 charges for full board were under £14 per person per day and daily travel costs for a similar field excursion were £5 per person.

REGISTRATION: Must be completed prior to March 1, 1982. A scale of registration fees has yet to be decided but will be announced in the second circular in the summer of 1981. Persons wishing to attend are requested to write to:

G.M. Harwood
Department of Earth Sciences
The University
Leeds LS2 9JT
UK

G.M. Harwood

WORKING GROUP VISIT TO CARNIC ALPS, SOUTHERN AUSTRIA
AND NORTHERN ITALY, 25-28 JULY 1980
E. Flügel (Field Leader), J.M. Dickins, R.E. Grant
and D. Wurm and H. Herbig (research students)

We were able to examine the sequence from the Upper Carboniferous Auernig Formation through to the Lower Triassic Werfen Formation and into the lower Middle Triassic Muschelkalk Formation. Briefly, the sequences are as follows:

- (1) The Auernig Formation consists of silty shale, sandstone, quartz conglomerate, and intercalated limestone. The total thickness is 800 m. Characteristic for the sequence are alternating marine and nonmarine horizons (so-called "kuernig rhythm" according to F. KAHLER). Marine fossils (fusulinids, brachiopods, pelecypods, gastropods, echinoderms, calcareous algae) are in places abundant and coal and plants occur. The fusulinids suggest a Kasimovian and Gshelian age for the Formation.
- (2) Several "stages", partly based on fusulinids, are used in the Southern Alps (South Tyrol, Carnic Alps, Karawanken Mountains) as well as in Yugoslavia (Slovenia, Velebit

Mountains/Croatia, Montenegro) in order to characterize the Permian sequences. These are:

The Rattendorf Stage at the base (Asselian), the Trogkofel Stage (Sakmarian, Artinskian, "Kungurian"), the Gröden Stage (early Upper Permian of the Russian standard sequence), and the Bellerophon Stage (late Upper Permian).

The Rattendorf Formation consists of three lithological (and biostratigraphical) units: The Lower *Pseudoschwagerina* Limestones, the predominantly clastic Grenzland Beds, and the Upper *Pseudoschwagerina* Limestones. The whole sequence is about 470 m thick. The Lower *Pseudoschwagerina* Limestones were deposited cyclically in a near-shore inner-shelf area with alternating regressive and transgressive phases. Four lithological cycles with basal clastics and overlying carbonates (with algal buildups) are known. The erosion of metamorphic and acid volcanic rocks and the increasing sedimentation of clastics in a nearshore high-energy environment with alternating inter- and subtidal conditions were responsible for the origin of the sandstone and silty shale of the Grenzland Beds. The Upper *Pseudoschwagerina* Limestones were deposited in an open-marine shelf-lagoon. The three units can be defined by the fusulinid zones with *Pseudoschwagerina alpina*, *Pseudoschwagerina confinii* and *Zellia* respectively. The fusulinids indicate an Asselian age.

- (3) The Trogkofel Formation consists of the Trogkofel Limestone (up to 400 m thick), the Treßdorf Limestone (about 15 m thick), the Goggau Limestone (more than 150 m thick), and the Tarvis Breccia (up to 140 m thick).

The Trogkofel Limestone from fusulinids is considered to correspond to the Tastubian (lower part of the Sakmarian) respectively to the lower part of the *Pseudoschwagerina schellwieni* zone, the Treßdorf Limestone to the lower part of the Artinskian respectively to the *Pseudofusulina lutugini* zone, and the Goggau Limestone to the upper part of the Artinskian or Kungurian (= *Pseudofusulina vulgaris* zone + *Pamirina* zone).

The Trogkofel Limestone includes massive, partly dolomitized limestone (representing shelf-edge carbonates with different types of mud mounds formed by sediment-binding algae and foraminifera, and by syndimentary submarine carbonate cements) and well-bedded limestones, deposited in shallow restricted and open-marine shelf-lagoons. The reefoid shelf-edge carbonates are exposed in the type locality of the Trogkofel limestones (Trogkofel west of the Nassfeld Pass), the platform carbonates in the section of Forni Avoltri (westsouthwest of the Nassfeld Pass) and in the Karawanken Mountains (Slovenia; here most of the brachiopods described by SCHELLWIEN were found). Marine fossils (brachiopods, mollusks, echinoderms, and calcareous algae) are common. Fusulinids are more abundant in the bedded platform carbonates than in the reef carbonates.

The Treßdorf Limestone is a polymict stylobreccia with microfacially differentiated limestone clasts which can not be compared with the clasts of the Tarvis Breccia in age or in microfacies. The formation of the Treßdorf Limestone may indicate a new regression phase.

The Goggau Limestone is a well-bedded limestone, rich in calcareous algae. The limestone is overlain by the Tarvis Breccia.

- (4) Overlying the Trogkofel Limestone, the Goggau Limestone, and - in the Sexten Dolomites - the Variscan quartzphyllites, the widespread Tarvis Breccia is found. This breccia consists

predominantly of limestone within a carbonate matrix. At the base of the breccia sequence the matrix is formed by lacustrine algal micrites. In Forni Avoltri and in Tarvis in upper parts of the sequence a siliceous matrix is found too. This breccia corresponds to a regression at the end of the Lower Permian connected with intensive intra-Permian block-faults. A tectonic uplift of some sedimentary regions seems to be responsible for widespread submarine (and subaerial?) destruction of the Trogkofel and Goggau Limestones. From the fusulinids found in the limestone clasts the whole Lower Permian seems to have been affected by erosion, in some localities also Upper Carboniferous Auernig Limestones.

- (5) The Groden Stage includes the red clastic Gröden Sandstones, developed predominantly in South Tyrol, and a few marine limestones, which indicate an early Upper Permian age (Neoschwagerina zone) for parts of the Gröden Stage. The typical Gröden Formation consists of coarsegrained and poorly sorted conglomerate and sandstone consisting mainly of reworked material from the basement. In the Carnic Alps this is found only at the base of the formation, but in South Tyrol and in the Western Karawanken Mountains it clearly~predominates. This unit is overlain by fine-grained, medium- to well-sorted interbedded silt- and sandstone with high feldspar content, lack of kaolinite, and high carbonate contents (dolomite); in South Tyrol it occurs between the Karawanken and the river Etsch. The transition between these units characterized by gypsum, coal, enrichment of Pb, and by a typical association of clay minerals. The coarse-grained clastics were deposited within a lacustrine and continental environment. The transition beds show characteristics of a coastal region with marginal sabkha environments. Paleontological data (tetrapod traces, drifted cephalopods and foraminifera) are in accordance with this interpretation. The fine-grained clastics were deposited in marine environments as suggested by scarce foraminifera, ostracods and gastropods as well as by geochemical data.
- (6) The famous Bellerophon beds of the Bellerophon Formation are made up of well-bedded limestone and dolomite (up to 400 m in thickness), which contain marine fossils in the upper parts of the sequence. An increasing transgression during the Upper Permian resulted in the deposition of basal bituminous sediments and evaporites (especially in the southwestern near-shore area with sabkha conditions), followed by the deposition of normal-marine carbonate. In the Carnic Alps 250 m thick Bellerophon limestones are developed, which indicate a change of the environments from restricted to open-marine conditions with foraminifera, then to evaporitic conditions, followed by an alternation of open-marine conditions (with dasycladacean algae and foraminifera) and more restricted conditions. Conodonts have been found but not yet described.
- (7) The Werfen Formation most commonly considered entirely of Scythian age is well exposed in some sections east of the Nassfeld Pass. The thickness is about 80 m. At the base a distinctive horizon with red ooids is developed. The formation is mainly limestone and dolomite and has this volcanic layers.
- (8) The overlying Alpine Muschelkalk Limestone has a distinctive limestone breccia at its base containing pieces of the Werfen Formation and other units. It is of Anisian age. The Muschelkalk is overlain by the Schlern Dolomite (Ladinian) which represents the top of the section in the Nassfeld area of the Carnic Alps. Deposition of the sequence was mainly or entirely in a warm, shallow platform

environment with formation of relatively thin carbonate sequences and characterized by a number of oscillations of sea level, perhaps giving rise to subaerial exposure of previous deposits. From the nature of the marine fauna, probably there was some restricted circulation with the open sea.

Correlation has been based largely on fusulinids (see F. KAHLER). However, although other elements of the fauna tend to be restricted in occurrence they are present and modern work will allow extraction of substantial faunas as an aid in relating the sequence to other areas. This may be true specially for the brachiopods.

Because of the presence of both marine and nonmarine fossils in the Upper Carboniferous Auernig Formation, the section of the Auernig and the Garnitzen could prove of considerable consequence in establishing the Carboniferous-Permian boundary more satisfactorily since it could be of potential use in relating the nonmarine western European Carboniferous and Permian sequences with the marine sequences of the Ural area where it may be expected the boundary stratotype will be established. These sections may also resolve the problem of the "Orenburgian" of the Soviet sequence which may represent part of the Gschelian and part of the Asselian.

In my opinion the value of this sequence for international correlation has been underrated. It is certainly an important reference area for the western Tethys. The various parts of the Permian are represented by marine deposits and it contains important information on the Carboniferous-Permian and the Permian-Triassic boundaries. Because of the reasonably complete Lower and Upper Permian sequence it can offer important data to supplement that of the classical standard Permian sequence of the Ural-Russian platform with its nonmarine upper part and the Transcaucasian sequence where Lower Permian is apparently not well represented. Spore-pollen assemblages might be expected to have been destroyed or their preservation badly affected and I doubt the likelihood of the sequence being a candidate for the Permian-Triassic boundary stratotype.

In preparing this note I have relied heavily on Professor E. Flügel for information and comment for which I would like to thank him. I accept responsibility, however, for its content and conclusions and I hope it will encourage further discussion on correlation and stratotypes for the Permian System and contribute towards a scale for the Permian which can be used world-wide.

J.M. Dickins

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