International Union of Geological Sciences

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NEWSLETTER 5

May 1981

C O N T E N T S



## 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 Subcommission 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. Subcommission 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 Subcommission 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 Subcommission 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 E1 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 Subcommission 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 Subcommission 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 $^{13}C/^{12}C$ 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 MICROPALEONTOLOGY 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., Dehli 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 Subcommission should support this symposium and use it for a meeting of the Subcommision.

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 Chihsia 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 lonq 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 through" 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

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|---|---|
| 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 (Slowenia, 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 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 synsedimentary submarine carbonate cements) and well-bedded limestones, deposited in shallow restricted and open-marine shelf-lagoons. The reefoid shelfedge 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 (Slowenia; 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

IUGS Subcommission on Permian Stratigraphy (SCPS)

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