

INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

NEWSLETTER n° 24

Lyon, January 1997

Jean



A SUBCOMMISSION OF THE INTERNATIONAL
UNION OF GEOLOGICAL SCIENCES (I.U.G.S.)



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A COMMISSION OF THE INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)**

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The Bureau Adress

1 - News from the 30th IGC in Beijing, China (August, 1996).....	5
1.1. Report on the activities of the ISJS (ENAY R., Chairman).....	6
1.2. Minutes of the ICS business meeting (REMANE J., Chairman).....	9
1.3. Evaluation of the work and administration of the ICS (RICARDI A. C., Chairman of the ISSC).....	15
 2 - Trias/Jurassic Boundary WG.....	 17
2.1. Report by the Secretary.....	18
2.2. Selection of the GSSP candidates for the base of the Jurassic System....	21
2.2.1. Proposal for the Utcumbamba Valley sections in Northern Peru (HILLEBRANDT A. von).....	21
2.2.2. Proposal for the New York Canyon area, Gabbs Valley Range, Nevada, USA (GUEX J., RAKUS M., TAYLOR D. & BUCHER H.)	26
 3 - Jurassic Stages Boundary WGs.....	 31
3.1. Sinemurian BWG (BLOOS G.).....	32
3.2. Toarcian and Aalenian BWG s meeting, report (CRESTA S.).....	40
3.3. Toarcian BWG (ELMI S.).....	42
3.4. Bathonian BWG (MANGOLD C.).....	43
3.5. Kimmeridgian BWG (ATROPS F.).....	43
3.6. Tithonian BWG (CECCA F.).....	44

4 - News on the Jurassic / Cretaceous Boundary.....	47
4.1. Information on resolutions of standing commissions of the Interdepartmental Stratigraphic Committee (ISC) on the Jurassic and Cretaceous Systems (ROSTOVTSEV K. O. & PROZOROWSKY V. A.).....	48
4.2. Jurassic / Cretaceous Boundary in the Boreal realm (Biostratigraphy and Boreal - Tethyan Correlation) (SEY I. I. & KALACHEVA E. D.).....	50
5. Enclosures.....	55
5.1. 5 th International Symposium on the Jurassic System, 1 st Circular.....	56
5.2. Aalenian BWG Membership.....	59
5.3. 2 nd Bathonian Digne meeting (April 1997).....	61
5.4. 1 st Tithonian BWG meeting in S. E. France.....	63
5.5. 4 th meeting on stratigraphy and paleogeography of Iberian Jurassic.....	65
5.6. Biostratigraphie du Jurassique Ouest Européen et Méditerranéen.....	67

THE BUREAU ADRESS

THE BUREAU ADDRESS

After seven years as chairman and secretary, we announce that this issue n° 24 is the last issue of Jurassic Newsletter managed by the past Chairman and Secretary. Achievement was made during the business meeting held in Lyon, November 14-15th, to assure the change of the management from the past to the new Bureau.

A retrospect is given below with the report of the activities of the Subcommission for the 30th I.G.C. in Beijing, prepared by the Chairman.

The next Bureau includes Prof. G. Pavia (Torino, Italy), chairman, Dr. D. Guy-Ohlson (Stockholm, Sweden), vice-chairwoman and Dr. F. Cecca (Urbino, Italy), secretary. We wish to them a fruitful period as officers for the Subcommission. Nominations were confirmed by the I.C.S. during the I.U.G.S. meeting at the 30 th I.G.C. in Beijing, August 1996.

Prof. R. Enay will stay in the Subcommission as Voting Member and Prof. C. Mangold as Corresponding Member. We will continue to take active part in the promotion of the necessary work concerning especially to achieve the G.S.S.P. project.

The G.S.S.P. project remains the main task on which the Subcommission is supposed to concentrate effort. Progress and results have been slow, but we succeeded and the first Jurassic G.S.S.P., probably also the first for the whole Mesozoic era, the Bajocian, was ratified by the I.U.G.S. at the 30 th I.G.C.

We thank with heart and hand all the Jurassic workers, the members of the Jurassic subcommission and the others, who help us during the past two four-years terms.

C. MANGOLD, Professor
Secretary of the I.S.J.S.

R. ENAY, Professor
Chairman of the I.S.J.S.

**1. NEWS FROM THE 30TH IGC
IN BEIJING, CHINA
(AUGUST, 1996)**

1. 1. REPORT ON THE ACTIVITIES OF THE SUBCOMMISSION BY ENAY R., CHAIRMAN

Unfortunately, owing to the lack of financial support, the chairman was prevented, as well as the vice-chairman, G. Pavia, and the secretary, C. Mangold, to attend the 30 th I.G.C. in Beijing. The I.S.J.S. activities will be reported and/or summarized by Prof. J. Remane, chairman of the I.C.S.

The present chairman and secretary were confirmed by the I.C.S. during the I.U.G.S. meeting at the 28 th I.G.C. in Washington, July 1989 and acted by the beginning of 1990. The vice-chairman position was introduced by the end of 1994, following the new Guidelines and Statutes of the I.C.S.

So, the present chairman and secretary are ending the normal two four-years terms (really the first term was reduced because the Washington I.G.C. was delayed from 1988 to 1989). Prof. R. Enay will stay in the Subcommission as Voting Member and Prof. C. Mangold as Corresponding Member. We will continue to take active part in the promotion of necessary work which concerns especially to achieve the G.S.S.P. project.

The next Bureau will include Prof. G. Pavia (Torino, Italy) as chairman, Dr. D. Guy-Olsson (Stockholm, Sweden) as vice-chairwoman and Dr. F. Cecca (Urbino, Italy) as secretary. We wish them a fruitful period as officiers for the Subcommission. Nominations of the chairperson and vice-chairperson have now been confirmed by the I.C.S.

The I.S.J.S. activities are reported below for the two terms, from 1990 to 1996.

1. Boundary stratotypes (G.S.S.Ps.) for the Jurassic System and Stages

Establishing boundary stratotypes (G.S.S.Ps.) for the Jurassic System and Stages remains the main task on which the Subcommission is supposed to concentrate effort.

1.1 A retrospect on the activity of the stage Boundary Working Groups

After the Working Groups of the I.S.J.S. have had to be reorganized following the new "Guidelines and Statutes for the work of the Commission and Subcommission", the past chairman, Prof. A. Zeiss, and the present one acted to obtain the working groups concentrate their work on the problems of the lower boundary of the corresponding stage, the final scope being to select and propose G.S.S.P.

But progress and results have been slow. So, as a whole, the I.S.J.S. appeared not very active to the I.C.S. The working groups convenors and the members of the I.S.J.S. have been informed (Newsletter n° 22, Sept. 1994) of the comments made in the minute of the business meeting of the bureau of the I.C.S. (Neuchâtel, Switzerland, April 1994).

The Bureau did not spare his strength to obtain progress and results. The reasons for which these have been long to come out are of various kinds which probably intermingle each other :

a) The first, often put forward (and we understand well !), is the lack of financial support for attending meetings and/or field trips. The few money they receive, the peoples like best to use it for their own research purposes.

b) The second reason connects together with the previous one : many Jurassic workers are involved in works not directly linked with the boundary stratotype project, sometimes providing financial support, but in exchange of this results have to be reach in time.

c) The third (and also the fourth) reason results from the peculiar situation we experienced in Jurassic stratigraphy : since the 1st (1962) and 2d (1967) Jurassic Colloques in Luxembourg, a good agreement exists within the Jurassic specialists concerning almost the eleven Jurassic stages, as well the individual extents as the stage boundaries.

d) So, and it is the fourth reason, the basic problems being considered as solved, the main interest for Jurassic workers seems to be i) refined subdivisions of stages, both in the historical reference areas and other areas and ii)correlations between different biogeographical realms and provinces. Exceptionnaly such correlations could concern also stages boundary e.g. the Oxfordian-Kimmeridgian in Subboreal and Submediterranean provinces.

This was the task originally requested from the working groups and to obtain new orientation of the activities within some working groups wanted much time and effort.

1.2. The current situation, seven years later

Progress and results were achieved by field works and meetings of the corresponding working group(s), also during the two International Symposium or Congress on Jurassic Stratigraphy which the I.S.J.S. organized (see item 2).

1.2.1. The **Bajocian** G.S.S.P. was submitted to the I.C.S. in time to be ratified before the next meeting of the I.U.G.S. during the Beijing I.G.C. It is the first Jurassic G.S.S.P. and, probably, also the first for the whole Mesozoic era !

1.2.2. **Bathonian** and **Oxfordian** G.S.S.P. have been selected by the corresponding working group. The proposals have to be formalized and confirmed by the vote of the I.S.J.S. before to be submitted to the I.C.S. during the next year, we hope.

1.2.3. **Callovian** G.S.S.P. also has been selected by the working group during the field meeting in Stuttgart, September 1990, but it does not satisfy the requirements defined in the Guidelines of the I.C.S. The procedure must to be reopened.

1.2.4. Proposals have been prepared in full detail and then the working groups concerned will have to select the G.S.S.P. concerning **Sinemurian** (Somerset, England), **Aalenian** (Wittnau, SW Germany and Fuentelsaz, Spain), and **Kimmeridgian** (Dorset/Lincolnshire, England and SE France).

1.2.5. **Trias-Jurassic** Boundary G.S.S.P. : the working group has been reorganized following the new Guidelines and Statutes concerning the International Boundary Working Groups. Proposals of G.S.S.P. have been presented (Somerset, England and Utubamba Valley, N. Peru) or are currently prepared (New York Canyon, Nevada, U.S.A.).

1.2.6. Potential G.S.S.P. for **Tithonian** and **Toarcian** stages are defined and the corresponding working groups planned meetings by the end of this year or 1997 to achieve first the selection and then the proposal.

1.2.7. Concerning the remaining **Pliensbachian** stage, after the convenor, R. Schlatter, was returning during the Jurassic Congress in Mendoza (1994) the commission he received

at Lisboa (1987), it was difficult to decide another people. Finally, Dr. C. Meister (Geneva) accepted and he is currently trying to reorganize the working group.

So, the chairman thinks that now the impulse has been done with the ratification of the first Jurassic (and Mesozoic) G.S.S.P. for the Bajocian stage, on the leadership of the Subcommission's next chairman, Prof. G. Pavia. So, he knows well the problems and the difficulties to solve before reaching a well done proposal. Several working groups are on the right way to present formalized proposal for submission to the I.C.S. well before the next I.G.C.

The Vth Jurassic Congress in British Colombia, Canada, August 1998, will be the next opportunity to make significant progress and achievements.

2. Workshops, Meetings and Congress

Besides the meetings which the I.S.J.S. or its working groups organized, other meetings offered opportunities to meet together Jurassic workers and convenors or members of the working groups or the Subcommission.

- 1990 • Proceedings of the meeting on Bajocian Stratigraphy, held in Piobbico, Italia, July 1988. *Memorie Carta Geologica d'Italia*, 90, 282 pp.
 - Oxfordian working group meeting, Basel, September.
 - Callovian working group meeting, Stuttgart, September.
- 1991 • Aalenian and Bajocian working groups, joint meeting, Skye, Scotland, April. Proceedings on conference published as a special issue of Birbeck College, University of London.
 - IVth International Congress on Jurassic Stratigraphy, Poitiers, September. Two volumes of contributions published in *Geobios*, Spec. Mem. 17, pp. 773.
- 1992 • Oxfordian-Kimmeridgian working groups, joint meeting, Warsaw, September. Contributions have been published as a special volume of *Acta Geologica Polonica*, 43/3-4, 1993.
- 1993 • The W.J. Arkell Symposium, London, September, offered opportunity for : Oxfordian and Kimmeridgian working groups joint meeting in Dorset, Lincoln and Yorshire.
 - Informal meeting (owing to the few numer of members) of the Subcommission, London.
- 1994 • Vth International Congress on Jurassic Stratigraphy and Geology, Mendoza, Argentina, October. Contributions have been published as a special volume "Advances in Jurassic Research", Georesearch Forum, vol. 1-2, 1996, 496 pp.
 - Field trips of the Sinemurian Working Group, SW Britain, April.
 - Aalenian-Bajocian working groups joint meeting, Marrakech, Morocco, May. Contributions have been published as a special volume by the Servizio Geologico d'Italia : *Miscellanea*, 5, 1994, 321 pp.

- Oxfordian-Kimmeridgian working groups joint meeting, Lyon and SE France, June.

1995 • Bathonian working group meeting, Digne, France, September.

1996 • Toarcian-Aalemian working groups joint meeting, Spain and Germany, September.

3. Jurassic Newsletter

The subcommission itself tried to inform the members by proceeding on the edition of the Newsletter initialized by the past chairman.

The technical help and also financial support (mail, phone, fax...) we received from our department have been quickly and regularly decreasing during these years. When are added the difficulties to obtain the informations or answers we requested from the members, these explains the number of issue was not as important as we wished.

4. Revision of the lists of the members

Membership of the Subcommission concerning Voting Members as well as Corresponding Members is currently being revised following the Guidelines and Statutes of the I.C.S. and in agreement with the next chairperson.

1. 2. MINUTES OF THE ICS BUSINESS MEETING (REMANE J., Chairman)

AGENDA ICS BUSINESS MEETING ON THE 30TH IGC IN BEIJING

1. Activity report

- 1.1. GSSPs, ratified in 1996, and those voted or being voted by ICS (see also session 1-1 of the scientific programme)
- 1.2. The revised Guidelines (see also session 1-1 of the scientific programme)
- 1.3. Participation of ICS in Symposium 1: Stratigraphy of the 30th IGC

2. Revision of the Statutes of ICS

- 2.1. Change of the voting procedure concerning non-responses
- 2.2. New regulations concerning the duration of the activity of members of the ICS Bureau

3. Future organization of ICS, especially concerning the possible termination of Subcommissions

The IUGS Executive urged ICS repeatedly to phase out SCs which have completed their task. The Bureau asks for comments and opinions

4. Revision of the Global Chronostratigraphic Standard of 1989

This will include a discussion of the choice of internationally agreed standard colours for chronostratigraphic units ; a joint Working Group of the Commission on the Geological Map of the World (CGMW) and ICS has been established to deal with this problem, the WG will meet for the first time on the Beijing IGC .

5 The importance of GSSPs for the stability of boundary definitions

This is related to the ongoing discussion about a possible change of the Plio/Pleistocene boundary, defined by a GSSP in 1985.

6. Varia

Minutes of the Business meeting of the International Commission on Stratigraphy

Beijing, China, August 9, 1996, 6:00 PM

Chairman Remane opened the meeting and reminded attendees that the Rules are strict in the fact that there could be no vote on issues at this meeting, as all voting must be by postal ballot.

The Chairman identified the new ICS Bureau. The two elected positions are as follows:

Prof. Jürgen Remane, Chairman

Dr. H. Richard Lane, 1st Vice Chairman (replacing Mike Bassett, retiring 1st Vice-Chairman)

As is the Chairman's prerogative, Prof. Remane had named Prof. Olaf Michelsen as the Secretary General in 1995 (replacing Dr. Klaus Gohrbandt, retiring Secretary General). Prof Michelsen will continue as Secretary General for the period 1996/2000.

Dr. Wang Naiwen was present as the outgoing 2nd Vice Chairman. The new 2nd Vice Chairman was as yet unnamed, but would come from the country hosting the next IGC which will be Brazil.

The following executive report was given.

1. Activity report

1.1. GSSPs, ratified in 1996, and those voted or being voted by ICS (see also session 1-1 of the scientific programme)

Since 1995 six new GSSPs (boundary stratotypes) have been ratified. These include :

1. Base of the Permian defined in the Aidaralash Gorge, Kazakhstan.
2. Base of the Bajocian defined at Cabo Mondego in Portugal.

The two above were ratified at the January IUGS Executive Meeting, whereas the following four were ratified at the IGC in Beijing.

3. Base of the Emsian Stage (Devonian) in the Zinzelban Gorge, Uzbekistan.
4. Mid-Carboniferous Boundary defined at Arrow Canyon in Nevada, USA.
5. Base of the Neogene at Lemme-Carrosio in Italy
6. Base of the new late Pliocene Gelasian Stage at Gela in Italy.

1.2. The revised Guidelines

Chairman Remane pointed out that the Commission has had a published set of Guidelines and Statutes since those of Cowie et al. (1986). However, recent matters have forced the Bureau to put forth a set of revised guidelines and statutes for ratification by the Commission members. The statutes had to be adapted to the new statutes of IUGS of 1992. These revised statutes were approved by the Full Commission of ICS and ratified by IUGS in January 1995. However, some further modifications have become necessary, concerning mainly the imposed change in the succession of the Chairman of ICS by IUGS (see below).

Matters forcing the revision of the guidelines concern the need for a chronometric definition of Precambrian chronostratigraphic boundaries, not accounted for in the original

guidelines, and also the necessity to give more weight to non-biostratigraphic methods of chronocorrelation. Successive drafts of the new guidelines have been circulated to the Commission members. The Bureau drafted the first version which was circulated to the members for comments. These comments were taken into account at the April meeting of the Bureau in Neuchatel and recirculated for voting.

The vote count was as follows : **18 yes, 1 no, 2 no votes.**

Thus, the **final vote** is **20 yes and 1 no** and the revised Guidelines are now an official document of ICS. The new Guidelines will be published in Episodes. Chairman Remane pointed out that the Guidelines relax the definition of a GSSP with words such as "should", in order to provide a certain flexibility in their application so that the members are not always looking for the "Holy Grail" of the absolutely perfect type section.

Madam Cita, Italy, brought up the problem of marking the stratotype boundaries in the field. She felt there were no standards and that it would be impossible for some stratotype boundaries to be located by those not familiar with the area. Also, are the sites being protected under the government in which they reside? Perhaps a standard plaque should be designed and provided by the Commission in order to standardize GSSP field location and identification. Representative Sartenaer, Belgium, suggested that the geological surveys of each country should be responsible for marking and preserving the site. Representative Hardenbol mentioned problems existing at the El Kef K/T GSSP in Tunisia. Vice-Chairman Lane mentioned the need to establish protection for the new Mid-Carboniferous Boundary Stratotype in Nevada, USA.

1.3. Participation of ICS in Symposium 1 : Stratigraphy of the 30th IGC

Chairman Remane mentioned the successful organization of the ICS Symposium 1 at the 30th IGC. He felt there was much more participation in the scientific sessions than was anticipated and, in addition, many of the subcommissions held business meetings at the IGC.

Jin Yugan (NIGP, China) has established an agreement with a publisher to publish the proceedings of the IGC. Please send manuscripts of Session 1-1 to J. Remane but only those papers that were orally presented. Authors not wanting to publish in the IGC volumes, please inform your respective session organizers. We have space for a limited number of papers to divide among the authors.

2. Revision of the Statutes of ICS

Chairman Remane explained the new revisions to the Statutes. Two points were made by the Chairman :

2.1. Change of the voting procedure concerning non-responses

- The current statutes must be employed in the planned statute vote. In this case, not responding to a vote request counts as a yes vote. Yes votes of sixty percent of the voting members are required to pass. In order to avoid in the future the counting of non-responses as yes votes, the following change of the statutes will be proposed :

60% of yes votes among delivered completed ballots, will be sufficient for approval. However, in the new statutes, a **quorum** becomes important : a participation of **60% of the Voting Members** is required for a vote to become effective. Thus, 13 is the quorum in the ICS Full Commission and a minimum of 8 votes will be required to pass any issue. Delegate House (UK) suggested sending ballots to the Chairman, Vice Chairman and Secretary of each subcommission in order to maximize voting. In this case, the vote from the highest ranking officer would be the one counted. Chairman Remane agreed, but thought that the Secretary should not be included as he is not elected by the Full Commission. All Commission/ Bureau-related votes must follow the new statutes after their acceptance. Working Groups within Subcommissions are not included.

2.2. New regulations concerning the duration of the activity of members of the ICS Bureau

IUGS has asked for a change in ICS officer succession. It was requested that the ICS Chairman serve only one term. The Bureau discussed this thoroughly in April and suggested

that the Commission change its succession such that the 1st Vice Chairman be elected as the successor to the Chairman. In this way, continuity is preserved and the new Chairman will be well versed in ICS matters and issues once he/she succeeds to the new position. Also, this satisfies the IUGS request by limiting the Chairman's office to one four year term. In addition an elected 2nd Vice Chairman will be added to the Bureau to replace the position of the old 1st Vice Chairman. This is in case the 1st Vice Chairman needs to replace the Chairman during his term of office or the 1st Vice Chairman himself steps down during office. In addition, the old 2nd Vice Chairman becomes the Vice Chairman at Large and is selected by the next host country for the IGC. The Chairman still retains the power to appoint a Secretary General.

Thus, the new Bureau includes five voting members as before, including the Chairman, 1st Vice Chairman, 2nd Vice Chairman, Vice Chairman at Large and Secretary General. All Past Chairmen are invited to participate in Bureau meetings as non-voting, ex-officio members for reasons of better historical continuity.

3. Future organization of ICS, especially concerning the possible termination of Subcommissions

The IUGS expects that the Subcommissions will be shut down once their missions are complete. Most members agree, however, that the mission of the various subcommissions are long term and as intermediate missions are completed (e.g., GSSP definitions), other critical missions become evident and doable. It is generally felt that the IUGS is confusing the work of the boundary working groups with that of the individual subcommissions.

Overall funding this year to ICS from IUGS is USD 25,000. This is to cover Bureau, Subcommission and Working group annual expenses--a very small amount to cover the job needed to be done. Chairman Remane stated that stratigraphy in general does not have a good image with IUGS because many boundary definitions take more time than necessary.

4. Revision of the Global Chronostratigraphic Standard of 1989

Because of the flourish of activity in the last couple of years, it is time to update the Global Stratigraphic Standard Chart, last revised in 1989. Mike Bassett has not yet transmitted the new chart to Chairman Remane, which was to be distributed at this meeting, but the basic chart will be ready by the end of the year.

Following a meeting with Dr. Repetto from Unesco in January 1996, and with Prof. J. Dercourt, Chairman of the Commission for the Geological Map of the World (CGMW), a joint Working group of CMGW and ICS has been established. The need now is to use standard colors for the chart, the same as used by CMGW, and to standardize symbols for systems and create symbols for stages that have been defined which could then be used in the Geological Map of the World. There is hope that the printing of the new Global Chart will be supported by Unesco.

Discussion of supplemental funding strategies for ICS involving such ventures ensued. Felix Gradstein suggested that the Bureau should pull together a catalogue of all GSSPs and sell it for a profit. Discussion ensued and the subject is to be taken up by the Bureau.

5. The importance of GSSPs for the stability of boundary definitions

Problems have arisen lately with the boundary at the base of the Pleistocene. Maria Cita reviewed the history of the development of the base of the Pleistocene GSSP at Vrica: The current GSSP at Vrica in Italy corresponds to the top of the Olduvai. This GSSP is a product of an ICS constituted working group and was duly ratified by the ICS and IUGS Executive Committee. This boundary was originally agreed to by the INQUA. At a recent meeting of INQUA though, the terrestrial group expressed dissatisfaction with the Vrica boundary, stating that it could not be correlated into terrestrial sequences. Instead, they advocated a boundary at the base of the first indication of glaciation, which would

correspond to the base of the new Gelasian Stage at the top of the Pliocene, rather than the established boundary at Vrica.

In light of this, appeals were made to the IUGS Executive Committee, which decided that an ad hoc committee be established of 3 representatives each from INQUA and 3 from ICS to evaluate the issue. The ICS Chairman is specifically not allowed to participate in this ad hoc committee. The three representatives from ICS have been submitted to IUGS. However, little if any information has since been made available to the ICS Bureau. Chairman Remane pointed out that this initiative contravenes the statutes and guidelines of the Commission and puts to question established GSSPs. IUGS agreed thereafter that any new GSSP proposal would be required to obtain ICS and IUGS ratification. The Commission agreed that the stability of agreed boundaries and GSSPs should stand. Until a complaint is received about any GSSP, ICS will do nothing. It was agreed that very strong scientific reasons are needed to consider changing established and ratified GSSPs.

6. Varia

6. 1. Subcommission Reports

A. - Chairman Remane reported that the Archean will be divided into 4 units of nearly equal chronometric intervals with GSAs as proposed for the Proterozoic.

With recent exciting information coming out in the Terminal Proterozoic System, it seems probable that a GSSP is now possible. The base of the Cambrian is now at 540 million years. Prof. Rozanov (Russian Academy of Sciences) has suggested a new subcommission be established for the Proterozoic and this seemed to meet with favorable comments from the Commission in general. The addition of a new subcommission will have no negative effect on current funding, as the Terminal Proterozoic has been funded through the Precambrian Subcommission in the past.

B. - John Shergold reported on the Cambrian Subcommission stating that he had no report because the previous administration had not supplied him with one and that he was too new in the office to create one himself. Two major volumes are being published, however, on Cambrian matters.

C. - Barry Webby, outgoing Chairman of the Ordovician Subcommission, reported that several major accomplishments were achieved by the subcommission in the last 4 years.

1. The subcommission agreed on a tripartite subdivision of the System, resolving a long standing difference.

2. Recently, there has been a 94.4% vote in favor of a new GSSP at the base of the Ordovician.

3. Currently three sections are being voted on as boundary stratotypes for the Cambrian-Ordovician Boundary and results should be known next month.

4. Other levels within the system are being voted on also. Chairman Remane pointed out that the Ordovician Subcommission has set aside nomenclatorial differences and are identifying globally correlatable levels. This is a very positive and commendable action by Ordovician workers.

5. The Darwilian Stage has been agreed to for the *austrodentatus-gracilis* interval.

D. - The Silurian Subcommission was not present, as it currently was meeting in the field in New York State in the USA. The Subcommission has agreed to a 4 part subdivision of the system.

E. - Michael House noted that 3 activities have dominated the Devonian Subcommission.

1. A two volume work reviewing the 8 Devonian GSSPs is currently in publication.
2. A volume on Devonian Sea Levels is in preparation after a recent symposium on the topic.
3. Over the last 5 years the Subcommission has concentrated on defining its GSSPs and getting them ratified.

F. - Ian Metcalfe and Rich Lane reported on the Carboniferous Subcommission. The major accomplishment for the SCCS has been the ratification of the Mid-Carboniferous Boundary Stratotype at Arrow Canyon, Nevada. The Subcommission is now turning its attention to defining intrasystem boundaries. A field trip is planned for this fall to southern China to begin this process. In addition, the biennial field meeting of the Subcommission will take place in September of 1997 in southeast Australia.

G. - Bruce Wardlaw reported that the Permian Subcommission has successfully defined and ratified a GSSP for the Permo-Carboniferous Boundary. Stage nomenclature, although still a subject of spirited debate, has been agreed upon by a vote of the Subcommission. At least two GSSP proposals will be forthcoming in the next two years.

H. - The Permo-Triassic Working Group of the Triassic Subcommission is currently sending out postal ballots for a GSSP for the Permo-Triassic Boundary. Once this postal ballot is complete, the final recommendation will be submitted to the Subcommission for a vote. The Subcommission plans to turn its attention then to the base of the Ladinian. Other Triassic GSSPs are making progress. The Subcommission expects to have a magnetostratigraphic scale for the marine Triassic soon.

I. - Giulio Pavia is the new Chairman of the Jurassic Subcommission. Progress is accelerating in boundary definition within the system. The base of the Bajocian has been recently ratified by the ICS and IUGS. Also GSSPs have been accepted for the Oxfordian and the Aalenian.

J. - The Cretaceous Subcommission has several boundary proposals and a number of sections identified. After the 1983 Copenhagen Meeting where the Cretaceous Subcommission agreed to the subdivision of the Cretaceous into stages, there was little activity until 1992 when working groups were established for all Cretaceous stages in order to arrive at precise boundary definitions. These working groups are getting close to agreeing on GSSPs for the Maastrichtian, Valanginian, and the Aptian.

K. - There is no news from the outgoing and incoming administrations for the Paleogene Subcommission. However, Jan Hardenbol reported that a newsletter is planned soon. Also, good progress is being made on a Paleocene-Eocene boundary.

L. - The Neogene Subcommission, as reported by Maria Cita, has made excellent progress. Boundary stratotypes have been defined for the Oligocene-Miocene, Miocene-Pliocene and the Gelasian Stage defined at the top of the Pliocene. The Subcommission received a 100% vote on the GSSP for the Piacenzian Stage. Madam Cita asked how soon proposals need to be into the Bureau in order to be presented to the IUGS Executive Committee Meeting in January. The Chairman answered that they must be in by September 15 in order to be circulated to the Commission and IUGS Executive Committee.

M. - Chairman Remane participated in the Quaternary INQUA Meeting in Berlin in August 1995. The Plio-Pleistocene boundary papers from that meeting will be published soon. Chairman Remane wrote the preface for the volume.

N. - Prof. Riccardi, Chairman of the Subcommission on Stratigraphic Classification reported that a meeting on developing standard nomenclature for Sequence Stratigraphy was held in Houston in April of this year. Two subgroups were defined to work on Allostratigraphic Units and Sequence Stratigraphic Units. Prof. Riccardi also reported that a working group on Cyclostratigraphy will be constituted soon.

6. 2. Chairman Remane stated that the ICS Annual Report is due to be circulated to the IUGS Executive Committee by the beginning of December. Therefore, each Subcommission must have its report into the Bureau at the beginning of November so that they can be collated and a final report written for circulation.

The meeting was adjourned at 8:30 p.m.

Those attending the meeting are listed below, the following members and attendees were present:

Bruce Wardlaw, USGS, new Chairman of the Permian Subcommission

Brian F. Glenister, University of Iowa, Permian,

Jin Yungan, Nanjing Institute, outgoing Chairman of the Permian Subcommission,

Geoffrey Warrington, British Geological Survey, Secretary of the Triassic-Jurassic Boundary Working Group

Claude Spinosa, Boise State Univ., new Secretary of the Permian Subcommission

Ian Metcalfe, Univ. New England, Australia, new Secretary of the Carboniferous SC

Barry Webby, Macquarie University, Australia, outgoing chairman of the Ordovician Subcommission

Giuseppe Cassinis, Pavia University, Italy

Yuri B. Gladenkov, Russian Academy of Sciences, Moscow
Manfred Menning, Geoforschungszentrum Potsdam, Germany
Paul Sartenaer, Belgian Royal Institute for Natural Sciences, Devonian
Felix Gradstein, Saga Petroleum, Norway, Quantitative Stratigraphy
Maria Bianca Cita, Univ. Milano, outgoing Chairwoman of the Neogene Subcommission,
new Vice-Chairwoman of ISSC
Domenico Rio, Univ. Padova, Italy, new Chairman of the Neogene Subcommission
Maurizio Gaetani, Univ. Milano, Italy, new Chairman of the Triassic Subcommission
Michael House, University Southampton, UK, outgoing Chairman of the Devonian
Subcommission,
Frederik Agterberg, Canadian Geol. Survey, Chairman of the Committee on Quantitative
Stratigraphy
Augusto Azzaroli, Univ. Firenze, Italy
Chen Xu, Nanjing Institute, new Vice-Chairman of the Ordovician, Devonian
Jan Hardenbol, GSC Inc, Houston USA, new Vice-Chairman of the Paleogene
Subcommission
W. A. Berggren, Woods Hole Institute, USA, Paleogene, Neogene
C. J. van Vuuren, Council for Geosciences, South Africa
Carmina Virgili, Univ. Complutense, Madrid, Spain
Jozef Michalik, Slovakian Academy of Sciences, Bratislava
Marie-Pierre Aubry, Univ. Montpellier, France, Paleogene-Neogene
Pinyan Wang, Tongyi Univ., Shanghai, China

1. 3. EVALUTATION OF THE WORK AND ADMINISTRATION OF THE ICS (RICARDI A. C., CHAIRMAN OF THE ISSC)

For an evaluation of the work and administration of ICS it is necessary first to consider its objectives and organization.

According to the Guidelines and Statutes of the International Commission on Stratigraphy (Cowie *et al.*, 1996, Cour. Forsch. Inst. Senckenberg, 83) the objectives of ICS are « development of a standard global stratigraphic scale, distribution of information on its major subdivisions, establishment of their boundaries and correlation of their subdivisions ». In order to achieve these objectives ICS should be « the motivating, guiding and approving organization »... « drawing upon ICSs constituent Subcommissions, Working Groups and Committees ».

On these grounds ICS has a number of subcommissions, most of which deal with the major subdivisions of the global stratigraphic scale (here are those dealing with the different stratigraphic Systems) whilst a few are dedicated to provide the classificatory, nomenclatural and temporal framework to be used by the former (here are those on stratigraphic classification, on geochronology and on the stratigraphic lexicon).

How is this working ?

With regard to the work of the subcommissions dealing with the stratigraphic systems, the ICS Bureau has been very active as a « motivating, guiding and approving organization ». However, work by the subcommissions has been unbalanced and variable through time. As these differences are due to the international composition of the subcommissions and unpredictable leadership capabilities, they are mostly beyond the ICS Bureau responsibility. In this situation the ICS Bureau has only one possibility, which is usually applied : through a continuous monitoring of the subcommissions activities, to promote reorganization of those that are not productive enough - something that could take

several years to realize and materialize -. However, in no circumstance these subcommissions should be disbanded until they have accomplished their original goals. Even then a reappraisal would be necessary to establish if new objectives are existent to justify their permanence.

With regard to the work of the subcommissions dealing with the classificatory, nomenclatural and temporal framework to be used by the subcommissions working on the stratigraphic systems, the ICS Bureau has shown a tendency to go beyond its duties of being a « motivating, guiding and approving organization ». The ISC Bureau has assumed an active role in different matters, such as proposing the guidelines for the establishment of boundary stratotypes - a task which some people think should be undertaken by the Subcommission on Stratigraphic Classification -, or working in updating the Global Chronostratigraphic Chart, which perhaps could have been (partly) a responsibility of the Subcommission on Geochronology. Meanwhile the Subcommission on the Stratigraphic Lexicon was discontinued - a situation presently being reversed - and creation of a Subcommission on Magnetostratigraphy is still wanting. These outcomes could probably be attributed to situation quite similar to those mentioned for some of subcommissions on stratigraphic systems, i. e. international composition of the subcommissions and unpredictable leadership capabilities. Nevertheless, it seems erroneous to assume that because the Chairperson and/or the total membership of a subcommission appear as not having relevant working goals the ISC Bureau should assume the job of the subcommission would become unnecessary. Instead, as for the Subcommissions on stratigraphic systems, the ISC Bureau should determine if a subcommission in itself is or it is not necessary, without consideration of what its present chairperson and members do or think about its goals. The main question should be : What organizational changes are necessary for a subcommission (or WG) to attain its goals ?

An apparent misunderstanding on these issues resulted a few years ago in some disagreements between the ISC Bureau and some members of the Subcommission on Stratigraphic Classification. This disagreement was clearly shown with regard to who was responsible for the preparation of the GSSP Guidelines - the ICS Bureau or the ISSC - and in relation to the creation of a Working Group on Genetic Stratigraphy within ICS to work out a classification on sequence stratigraphy.

The situation has changed in the last two years, and a closer cooperation is developing. Thus far it has been based in the acceptance by all interested parties that the real issue is to obtain good results, and that in order to do that cooperation is more essential than sticking to assumed incumbencies. Thus, ISSC has participated actively in the discussion promoted by the ICS Bureau on the new GSSP Guidelines, and it was also agreed that the WG on Genetic Stratigraphy and ISSC would cooperate whilst, as work proceeded, a clear limit should be drawn up on the subjects to be handled by both bodies.

In the long run, however, incumbencies should be clearly established according to the present Guidelines and Statutes of the International Commission on Stratigraphy, mentioned above or according to a new set rules. ISC bodies and open discussion of all subjects.

A fundamental issue is the periodical renewal of Chairpersons in all ISC bodies and open discussion of all subjects.

Leaving usual disagreements aside scientific and administrative work by ISC can be rated as very good.

2. TRIAS / JURASSIC BOUNDARY WG

2. 1. REPORT BY THE SECRETARY

TRIASSIC-JURASSIC BOUNDARY WORKING GROUP (TJBWG)

*Chairman - Professor R. Mouterde, Université Catholique de Lyon
Secretary - Dr G. Warrington, British Geological Survey*

1. A list of Voting Members of the TJBWG is required by ICS.

A list of potential Voting Members, comprising people involved with potential candidate GSSPs, relevant independent specialists and representatives of relevant IUGS bodies and the ICS has been compiled by the Secretary and is under consideration. The composition of this list reflects ideas discussed at the Mendoza meeting and expressed in the minutes of that meeting, published in ISJS Newsletter No.23.

2. Progress with potential candidate GSSPs is slow but positive. It is anticipated that the sections in the Queen Charlotte Islands, British Columbia, in the Andes and in Nevada will shortly be formally proposed, like that in Somerset, England, as Candidate GSSPs.

3. The Secretary attended the 30th International Geological Congress in Beijing. There was no ISJS Business Meeting during the Congress but the ICS Chairman, J. Remane, invited the Secretary to make a brief statement on TJBWG activity at the ICS Business Meeting held during the Congress. The Secretary also reported briefly on this matter at the Business Meeting of the IUGS Subcommission on Triassic Stratigraphy (STS), held during the Congress.

4. The Secretary has succeeded Professor H. Visscher of the University of Utrecht, The Netherlands, as Secretary of the STS. This is complementary to his involvement with the TJBWG and is seen as facilitating dialogue between the ISJS and STS on the matter of the mutual boundary.

5. The differing styles and contents of the publications on sections generally considered as candidate GSSPs will make it difficult to make the objective comparisons necessary for the purposes of the eventual selection of GSSP. The Secretary therefore proposed, at Mendoza, that a 'common format' for presentation of data would assist comparison. A 'common format' with provision for all variations has proved too ambitious and a simpler version is being prepared which will allow comparison of the range of attributes shown by each potential candidate GSSP and will highlight those areas of study lacking from any particular section. It is particularly important to have information not only on the successful studies which have been published on each section but also on those which have been carried out but remain unpublished or were unsuccessful or proved unproductive. In this connection, Professor Lord (University College London) is preparing a report on all the sampling carried out by his group in connection with the TJBWG project.

6. The Secretary has received notification of progress on studies on the palaeomagnetic stratigraphy and on the lowest occurrences of ammonites in the proposed candidate GSSP in Somerset, England. Workers are encouraged to advise him of their current studies relevant to the Triassic-Jurassic boundary, and keep him updated on the progress of those studies and the publication of results. Publications relevant to the TJBWG that have appeared since the Mendoza meeting are listed in the Appendix to this report.

7. TJBWG members should notify the Secretary promptly of any changes in their contact information (postal address, telephone or FAX number) and, if e-mail is available,

should advise him of their address.

Appendix : relevant publications which have appeared since the Mendoza meeting

CANADA :

- BUSTIN, R. M. & MASTALERZ, M. 1995. Organic petrology and geochemistry of organic-rich rocks in the Late Triassic and Early Jurassic Sandilands and Ghost Creek formations, Queen Charlotte Islands, British Columbia. *Marine and Petroleum Geology*, **12**, 70-81.
- CARTER, E. S. 1994. Evolutionary trends in latest Norian through Hettangian radiolarians from the Queen Charlotte Islands, British Columbia. *Géobios*, **17**, 111-119.
- TIPPER, H. W., CARTER, E. S., ORCHARD, M. J. & TOZER, E. T. 1994. The Triassic-Jurassic (T-J) Boundary in Queen Charlotte Islands, British Columbia defined by ammonites, conodonts and radiolarians. *Géobios*, **17**, 485-492.
- TOZER, E. T. 1994. Canadian Triassic ammonoid faunas. *Geological Survey of Canada Bulletin* **467**.

DENMARK :

- KOPPELHUS, E. B. & BATTEN, D. J. 1996. Application of a palynomorph zonation to a series of short borehole sections, Lower to Middle Jurassic. Øresund, Denmark. Pp.779-793 in Jansonius, J. & McGregor, D. C. (eds), *Palynology: principles and applications*, volume 2. American Association of Stratigraphic Palynologists Foundation.

FRANCE :

- CUNY, G. 1995. French vertebrate faunas and the Triassic-Jurassic boundary. *Palaeogeography, Paleoclimatology, Palaeoecology*, **119**, 343-358.

GERMANY:

- HALLAM, A. 1995. Oxygen-restricted facies of the basal Jurassic of north west Europe. *Historical Biology*, **10**, 247-257.
- HEUNISCH, C. 1996. Palynologische Untersuchungen im oberen Keuper Nordwestdeutschlands. *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen*, **200**, 87-105.

GREAT BRITAIN :

- CALLOMON, J. H. & COPE, J. C. W. 1995. The Jurassic geology of Dorset. Pp.51-103 in Taylor, P. D. (ed.) q.v.
- HALLAM, A. 1995. Oxygen-restricted facies of the basal Jurassic of north west Europe. *Historical Biology*, **10**, 247-257.
- HESSELBO, S. P. & JENKYN, H. C. 1995. A comparison of the Hettangian to Bajocian successions of Dorset and Yorkshire. Pp.105-150 in Taylor, P. D. (ed.) q.v.
- IVIMEY-COOK, H. C., WARRINGTON, G., WORLEY, N. E., HOLLOWAY, S. & YOUNG, B. 1995. Rocks of Late Triassic and Early Jurassic age in the Carlisle Basin, Cumbria (north-west England). *Proceedings of the Yorkshire Geological Society*, **50**, 305-316.
- PARKINSON, D. N. 1996. Gamma-ray spectrometry as a tool for stratigraphical interpretation: examples from the western European Lower Jurassic. *Geological Society of London, Special Publication* **103**, 231-255.
- STORRS, G. W. & TAYLOR, M. A. 1996. Cranial anatomy of a new plesiosaur genus from the lowermost Lias (Rhaetian/Hettangian) of Street, Somerset, England. *Journal of Vertebrate Paleontology*, **16**, 403-420.
- SWIFT, A. 1995. Conodonts from the Late Permian and Late Triassic of Britain. *Monograph of the Palaeontographical Society*, London, 80pp. (Publication No.598, part of Vol.147 for 1995).
- SWIFT, A. 1995. A review of the nature and outcrop of the 'White Lias' facies of the Langport Member (Penarth Group: Upper Triassic) in Britain. *Proceedings of the*

- Geologists' Association*, **106**, 247-258.
- TAYLOR, P. D. (ed.). 1995. *Field Geology of the British Jurassic*. Geological Society, London.
- WARRINGTON, G. & IVIMEY-COOK, H. C. 1995. The Late Triassic and Early Jurassic of coastal sections in west Somerset and South and Mid-Glamorgan. Pp.9-30 in Taylor, P. D. (ed.) *q.v.*
- WARRINGTON, G., IVIMEY-COOK, H. C., EDWARDS, R. A. & WHITTAKER, A. 1995. The Late Triassic-Early Jurassic succession at Selworthy, west Somerset, England. *Proceedings of the Ussher Society*, **8**, 426-432.

GREENLAND :

- KRABBE, H. 1996. Biomarker distribution in the lacustrine shales of the Upper Triassic-Lower Jurassic Kap Stewart Formation, Jameson Land, Greenland. *Marine and Petroleum Geology*, **13**, 741-754.

ITALY :

- MICROBERTS, C. A. 1994. The Triassic-Jurassic ecostratigraphic transition in the Lombardian Alps, Italy. *Palaeogeography, Palaeoclimatology, Palaeoecology*, **110**, 145-166.

MEXICO :

- GONZÁLEZ-LEÓN, C. M., TAYLOR, D. G. & STANLEY, G. D. 1996. The Antimonio Formation in Sonora, Mexico, and the Triassic-Jurassic boundary. *Canadian Journal of Earth Sciences*, **33**, 418-428.
- STANLEY, G. D. & GONZÁLEZ-LEÓN, C. M. 1995. Paleogeographic and tectonic implications of Triassic fossils and strata from the Antimonio Formation, northwestern Sonora. *Geological Society of America, Special Paper* **301**, 1-16.

SOUTH AMERICA :

- VON HILLEBRANDT, A. 1990. The Triassic/Jurassic boundary in northern Chile. *Cahiers Univ. Catho. Lyon*, sér. Sci. **3**, 27-53 : (revised 1995).
- VON HILLEBRANDT, A. 1994. The Triassic/Jurassic boundary and Hettangian biostratigraphy in the area of the Utubamba Valley (northern Peru). *Géobios*, **17**, 297-307.

UNITED STATES OF AMERICA :

- FOWELL, S. J. & OLSEN, P. E. 1995. Time-calibration of Triassic/Jurassic microfloral turnover, eastern North America - Reply. *Tectonophysics*, **245**, 96-99.
- GUEX, J. 1995. Ammonites hettangiennes de la Gabbs Valley Range, (Nevada, USA). *Mémoires de Géologie (Lausanne)*, **27**.
- OLSEN, P. E., KENT, D. V., CORNET, B., WITTE, W. K. & SCHLISCHE, R. W. 1996. High-resolution stratigraphy of the Newark rift basin (early Mesozoic, eastern North America). *Geological Society of America Bulletin*, **108**, 40-77.
- VAN VEEN, P. M. 1995. Time-calibration of Triassic/Jurassic microfloral turnover, eastern North America - Comment. *Tectonophysics*, **245**, 93-95.

OTHER AREAS, AND GENERAL STUDIES :

- BATTEN, D. J. & KOPPELHUS, E. B. 1996. Biostratigraphic significance of uppermost Triassic and Jurassic miospores in northwest Europe. Pp.795-806 in Jansonius, J. & McGregor, D. C. (eds), *Palynology: principles and applications*, volume 2. American Association of Stratigraphic Palynologists Foundation.
- DAGYS, A. 1996. Triassic/Jurassic boundary in Boreal Realm and the oldest zone of Jurassic. *GeoResearch Forum*, **1-2**, 101-109.
- DE RENZI, M., BUDUROV, K. & SUDAR, M. 1996. The extinction of conodonts - in terms of discrete elements - at the Triassic-Jurassic boundary. *Cuadernos de Geología Ibérica*, **20**, 347-364.
- DOMMERGUES, J.-L., LAURIN, B. & MEISTER, C. 1996. Evolution of ammonoid

- morphospace during the Early Jurassic radiation. *Paleobiology*, **22**, 219-240.
- HALLAM, A. 1995. Major bio-events in the Triassic and Jurassic. In Walliser, O. H. (ed.) *Global Bioevents and Event Stratigraphy*. Springer-Verlag.
- HALLAM, A. 1996. Recovery of the marine fauna in Europe after the end-Triassic and early Toarcian mass extinctions. *Geological Society Special Publication* **102**, 231-236
- MICROBERTS, C. A. 1995. Extinction and survivorship of bivalves across the Triassic-Jurassic boundary in Alpine Europe (Abstract). *Palaeontological Association Newsletter*, **28**, 18.
- MICROBERTS, C. A. & NEWTON, C. R. 1995. Selective extinction among end-Triassic European bivalves. *Geology*, **23**, 102-104.
- PAGE, K. N. 1996. Mesozoic ammonoids in space and time. *Topics in Geobiology*, **13**, 755-794.
- SANDY, M. R. 1995. Early Mesozoic (Late Triassic-Early Jurassic) Tethyan brachiopod biofacies : possible evolutionary intra-phylum niche replacement within the Brachiopoda. *Paleobiology*, **21**, 479-495.
- STOVER, L. E., BRINKHUIS, H., DAMASSA, S. P., DE VERTEUIL, L., HELBY, R. J., MONTEIL, E., PARTRIDGE, A. D., POWELL, A. J., RIDING, J. B., SMELROR, M. & WILLIAMS, G. L. 1996. Mesozoic-Tertiary dinoflagellates, acritarchs and prasinophytes. Pp.641-750 in Jansonius, J. & McGregor, D. C. (eds), *Palynology : principles and applications*, volume 2. American Association of Stratigraphic Palynologists Foundation.
- WARRINGTON, G. 1996. Triassic spores and pollen. Pp.755-766 in : Jansonius, J. & McGregor, D. C. (eds), *Palynology : principles and applications*, volume 2. American Association of Stratigraphic Palynologists Foundation.

2. 2. SELECTION OF A GSSP CANDIDATE FOR THE BASE OF THE JURASSIC SYSTEM

2. 2. 1. PROPOSAL FOR THE UTCUBAMBA VALLEY SECTIONS IN NORTHERN PERU (HILLEBRANDT A. VON)

Introduction

In the area of the Utcubamba valley (N Peru) between the cities Chachapoyas and Leymebamba are found very complete, at least for South America the most complete, Triassic-Jurassic boundary sections, in different marine facies and with uppermost Triassic (Rhaetian) and lowermost Jurassic (Hettangian) ammonites (HILLEBRANDT 1994). The sections are good accessible and well exposed. Especially Hettangian ammonites are abundant and well preserved, in part with body chamber and aperture. Upper Triassic and lower Jurassic ammonites of this area were described and figured by different authors (TILMANN 1917, GEYER 1979, PRINZ 1985, HILLEBRANDT 1990, 1994).

Locality and site details

The facies of Rhaetian and Hettangian changes from north to south and thickness of sediments decreases in the same direction. The northern part of the investigated area is characterized by fine-bedded siltstones, marly argillites with rarely intercalated silty limestone beds or calcareous concretions (Aramachay formation). In the middle part fine-bedded siltstones and well bedded silty limestones with some layers of calcareous concretions predominate (Suta formation). The southern part of the area is composed of more or less thickbedded limestones with thin layers of shales and some silty limestone beds of small thickness. Ammonites are the most frequent macrofossils, found in all three facies-types. The fine-bedded siltstones yielded only crushed ammonites whilst the calcareous concretions, some limestone beds and mainly tempestites contain well preserved ammonites.

Two localities with reference sections are proposed :

1. Section along the road from Magdalena to Maino (Fig. 1a)

This section was described and figured by HILLEBRANDT (1994, fig. 1, loc. 2 ; 2b ; 3). The sequence is composed of fine-bedded siltstones and marly argillites with rarely intercalated fine-bedded, more or less calcareous beds up to 5 cm thick. Two horizons with crushed specimens of *Choristoceras* cf. *marshi* were found. Outside the section a well preserved, loosely coiled *Choristoceras* (HILLEBRANDT 1994, p. 1, fig. 19) was found. The specimens of *Oxytoma* above the last horizon with *Choristoceras* occur in other sections only in the Rhaetian.

10 m above *Oxytoma* was found the first horizon with *Psiloceras tilmanni*. 5 horizons with loosely and widely coiled *P. tilmanni* occur within a thickness of 7 to 7,5 m. Outside the measured section some well preserved specimens of *P. tilmanni* and small *Phylloceras* were found.

2. Sections near Chilingote

Near Chilingote different sections were described by HILLEBRANDT 1994, fib. 1, loc. 8, 8 ; 2e ; 3 ; 4 ; 5). On the left side of the Utcubamba valley, opposite to the village Chilingote, outcrops with Upper Triassic and Lower Jurassic sediments are exposed.

The best and most detailed Upper Triassic/Lower Jurassic boundary section (Fig. 2a) is found 250 m north of a farm house near the bridge crossing the Utcubamba river (HILLEBRANDT 1994, fig. 4). The lower part of this section is formed by thickbedded limestones. The uppermost beds yielded pelecypods with both valves.

45 cm below the first limestone layer with Hettangian ammonites is exposed a limestone layer with a thickness of 80 cm. From this layer a sample was taken and dissolved in acetic acid. Monaxon spicules are very frequent, triaxon spicules (e.g. *Dichotriaen*) and radiolarians are abundant. The radiolarians were investigated by E.C.CARTER (1993, p. 34, 35). The fauna is of late Rhaetian age.

The first ammonite horizon lies with an irregular bedding plane above a limestone bed without ammonites. *Psiloceras tilmanni* is very frequent and the specimens are often irregularly bedded. The horizon probably was built by a tempestite. Small specimens (\varnothing smaller than 30 mm) predominate and only one large specimen (\varnothing 53 mm, phragmocone) (HILLEBRANDT 1994, pl. 1, fig. 15) was found. The umbilical width is variable and the umbilical wall is steeper than in those specimens of *P. tilmanni* found in younger horizons. The suture is that of *P. tilmanni*. In addition a small specimen (\varnothing 11 mm) of *Choristoceras* sp. (HILLEBRANDT 1994, pl. 1, fig. 20a, b) was found. This specimen was reworked (tempestite!) from Triassic beds or occurred together with the first specimens of *Psiloceras tilmanni*.

The following limestone beds also yielded *P. tilmanni*, but no specimens could be isolated. A limestone bed 85 cm above the first ammonite bed yielded *P. tilmanni* up to an diameter of 83 mm. Loosely coiled specimens predominate and the umbilical wall is oblique. The following limestone bed (?tempestite) yielded loosely and closely coiled *P. tilmanni*. A second section (Fig. 2b) (HILLEBRANDT 1994, fig. 5a) was measured above the first section, 50 to 100 m north of the first section. The Triassic/Jurassic boundary is not

exposed. Horizons with loosely and closely coiled *P. tilmanni* are found together with one specimen of *Nevadophyllites compressus* GUEX. This section ends with a limestone bed yielding a new species of *Psiloceras* (HILLEBRANDT 1994, pl. 1, fig. 14) which is transitional between *P. tilmanni* and *P. primocostatum* HILLEBRANDT.

500 m south of the farm house a complete sequence (Fig. 1 b) from uppermost Triassic beds to upper Hettangian beds is exposed (HILLEBRANDT 1994, fig. 2e ; 3). *Psiloceras tilmanni* was found at least in three horizons.

Ammonite biostratigraphy

Various localities and sections with uppermost Triassic beds yielded different species of Choristoceras. The latest Rhaetian is proved by *Choristoceras cf. marshi*. Above these beds occurs *Psiloceras tilmanni* LANGE which is found in more than one horizon and the beds with this species are 3 to 8 m thick. At Chilingote the first horizon with *P. tilmanni* yielded a small (?reworked) *Choristoceras*. Loosely and closely coiled specimens of *P. tilmanni* are found in the same horizon and no change in time was observed. The loosely coiled specimens are identical to *P. pacificum* GUEX which was described from the lowermost Hettangian of North America (Nevada) (GUEX 1980, 1995). The umbilical width of *P. tilmanni* varies between 27,4 % and 35,4, % of the diameter (35 mm) and 30 % and 47 % of the diameter (70 mm). Involute specimens have an umbilical width as found in *P. planorbis* (SOW.) from England. An exact comparison with this species is not possible because the specimens are crushed. The most evolute specimens of *P. tilmanni* are as evolute as the most involute specimens of *P. psilonotum* (QUEN.) from the Swabian Jurassic. The whorl width of this species is smaller.

The suture of *P. tilmanni* is characterized by phylloid saddles, more or less complex lobes and slightly retracted umbilical lobes. The suture is not as complicated as found in *P. calliphylum* (NEUMAYR) from the Northern Calcareous Alps, but less simplified as in the very variable suture of *P. psilonotum*. *P. calliphylum* is more evolute and the whorl width is smaller.

The inclination of the umbilical wall is more vertical in specimens from the first horizon with *P. tilmanni* at Chilingote. This vertical umbilical wall and the more distinct umbilical edge is also found in Triassic genera of the family Discophyllitidae (e.g. *Rhacophyllites*). The suture of *P. tilmanni* is also similar. The younger horizons with *P. tilmanni* yielded mainly specimens with oblique umbilical wall and without distinct umbilical edge. The umbilical edge is more pronounced in evolute than in involute specimens.

Besides *P. tilmanni* occur very rarely specimens of Phyllocerataceae (*Nevadophyllites*, *Phylloceras*).

The Tilmanni Zone was proposed by HILLEBRANDT (1988). This zone yields the oldest Jurassic ammonites in South America. The Tilmanni Zone probably is more or less of the same age as the Zone of *Psiloceras pacificum* in North America (GUEX 1995) and the Planorbis Zone in England. Above the Tilmanni Zone follows in South America the Zone of *Psiloceras primocostatum* (HILLEBRANDT 1988). A transitional species between *P. tilmani* and *P. primocostatum* is found in the upper part of the Tilmanni Zone.

Other fossil groups

Pelecypods (e.g. *Monotis*, *Oxytoma*) of biostratigraphic value up to now only were found in Upper Triassic beds.

An Upper Triassic limestone sample was taken to find microfossils insoluble in acetic acid. Many siliceous sponge sclerites and a rich radiolarian fauna of Late Rhaetian age (CARTER 1993) were found.

In thin sections of the Triassic/Jurassic boundary section at Chilingote no foraminifera were observed. Sponge sclerites are more or less frequent. The upper two horizons with *P. tilmanni* contain many shell fragments and small gastropods.

Palaeobiogeography

Ammonite diversity was very low in Late Rhaetian time. The cosmopolitan genus *Choristoceras* is found in the Tethyan Realm, North and South America. The Hettangian genus *Psiloceras* must be derived from Triassic genera of the family Discophyllitidae which lived mainly in the open sea (e.g. Tethys) of that time. The tethyan species of *Psiloceras* are characterized by more complicated sutures as found in *Psiloceras* of shelf environments, but outer shell morphologies (coiling, cross section, ribbing) and its evolution in time are very similar. A possible reason could be the repeated immigration of species from the open sea to shelf areas and simplification of the suture. This explains the cosmopolitan distribution of Hettangian genera and closely related species. Contrary to northwestern Europe, but similar to the Mediterranean region the open sea Phyllocerataceae are present in the Hettangian of the Pacific shelf areas of North and South America where the connection with the open sea must have been better.

According to CARTER (1993, p. 35) the late Rhaetian Peruvian fauna of radiolarians indicates that radiolarian genera and even some species had wide distribution (latitudinal and longitudinal) in the Late Triassic Tethys ocean.

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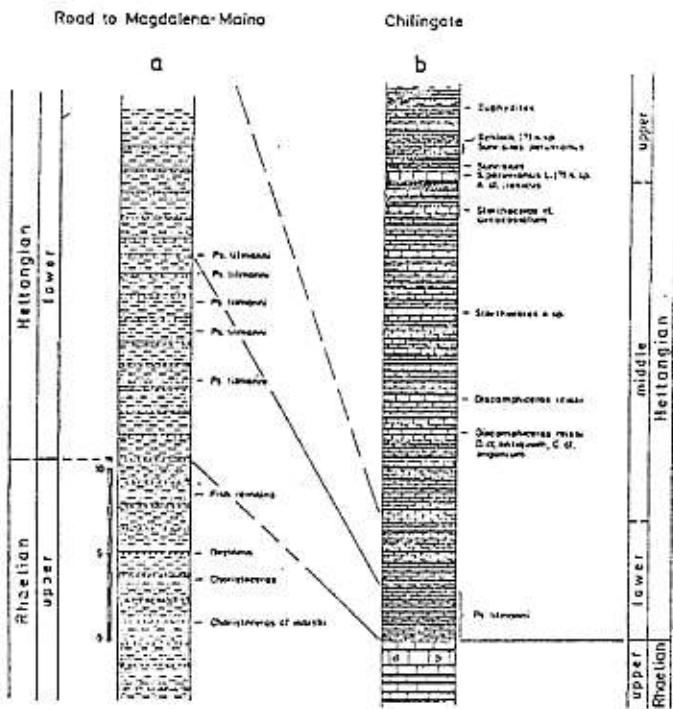


Fig. 1 - Sections at the road from Magdalena to Maíno and near Chillingate.

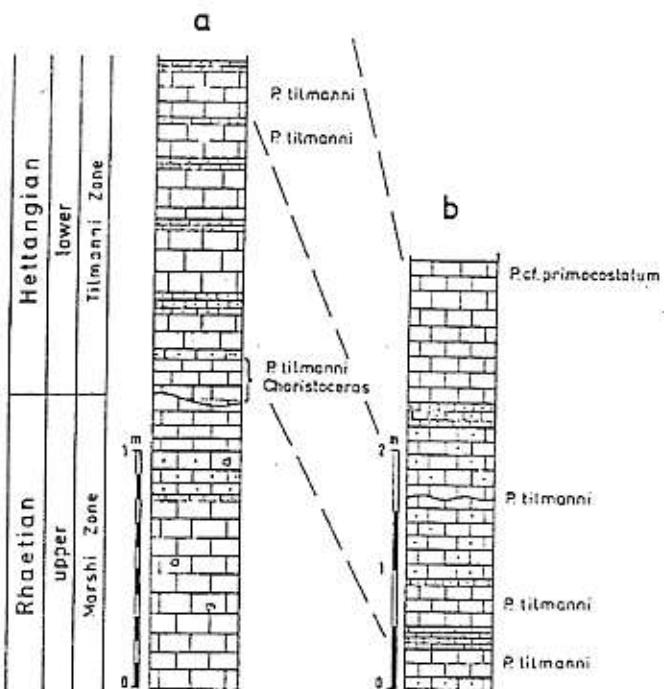


Fig. 2 - Rhaetian/Hettangian boundary section and lower Hettangian section near Chillingoate.

**2. 2. 2. PROPOSAL FOR THE
NEW YORK CANYON AREA,
GABBS VALLEY RANGE (NEVADA) USA
(GUEX J., RAKUS M., TAYLOR D. & BUCHER H.)**

Introduction

The base of the Jurassic system is traditionally defined by the first appearance of the smooth *Psiloceras* of the planorbis group which characterizes the first Hettangian ammonite zone. Lower Hettangian smooth *Psiloceras* are ubiquitous (they are found in the eastern-Pacific province, the Tethys and the Euro-boreal province) and are described under several specific names in the classical literature (*psilonotum*, *calliphyllum*, *planorbis*, *pacificum*, *sampsoni*, *tilmanni* etc). These names probably characterize local morphologic varieties of a single biospecies or of closely related coeval species. It is not possible to demonstrate a convincing anteriority-posteriority relationship between those variants, and specialists have a tendency to consider them globally synchronous. The same remark applies to the morphogenus *Neophyllites* which we have long considered a neotenous-looking *Psiloceras* with a globally simplified geometry generated by an important ecological stress related to the colonization of the shallow part of the NW-European platform during the early Hettangian (GUEX 1987, 1992 ; see also SCHLATTER 1994).

The selection of a stratotype for the Triassic-Jurassic boundary is still an open problem that has generated many discussions during the past few years (POLUBOTKO & REPIN 1983, 1990 ; HODGES 1994 ; HALLAM 1990, 1994 ; COPE 1991 ; WARRINGTON et al. 1994 ; GONZALES-LEON et al. 1996 etc). That problem was discussed by specialists attending the last international meeting on Jurassic stratigraphy at Mendoza (Argentina, 1994) and a detailed summary of those discussions and proposals has been published by WARRINGTON (1995).

Several areas have been considered as potential stratotype for defining that boundary.

- 1) Northeastern Russia (POLUBOTKO & REPIN 1983, 1990).
- 2) Northwestern European platform (England : WARRINGTON et al. 1994 ; HODGES 1994 ; France : ELM & MOUTERDE 1965 ; Belgium : GUERIN FRANIATTE & MULLER 1978 ; Northern Germany : LANGE 1941, BLOOS 1984).
- 3) Austrian Alps (KRYSTYN 1987 ; GOLEBIOWSKI 1986, 1990 ; WIEDMANN et al. 1979 ; LANGE 1952 ; HALLAM 1990, 1994).
- 4) Eastern Pacific cordilleras (Mexico : GONZALES LEON & al. 1996 ; Chili-Peru : PRINZ 1985 ; HILLEBRANDT 1987-1994 ; Queen Charlotte Island, Canada, TIPPER & al. 1994, TIPPER & GUEX 1994 ; Nevada GUEX 1980, 1982, 1995 ; TAYLOR et al. 1983 ; LAWS 1982).

In the following text we will discuss briefly the biostratigraphical data recorded in these different regions and our discussion will be restricted to the ammonite biochronology (see CARTER 1994 for an important contribution to the knowledge of the radiolarians evolutionary trends across the Triassic-Jurassic boundary in the Queen Charlotte Island, Canada).

Our philosophy is that a boundary stratotype should demonstrate and record the superposition between the last unit (zone or subzone) of one stage and the first unit of the following stage, even if that stage is formally defined by its base only.

DISCUSSION

1) The age of the oldest Hettangian sediments in northeastern Russia is controversial. The oldest ammonites found in that area were initially assigned to the genera *Primapsiloceras* (*P. primulum*) and *Psiloceras* (*P. suberugatum*, *P. viligense* and *P. planorbis*). The taxonomic position of *P. primulum* has been the subject of some critical discussions (GUEX 1987 ; DAGYS & DAGYS 1990). In our view, there is no longer any doubt that this group belongs to the middle Hettangian genus *Kammerkarites* (GUEX & RAKUS 1991). The "Psiloceras" which are stratigraphically superjacent to *K. primulus* are now assigned to a new genus,

Pleuropiloceras (GUEX et al. in press : type-species *P. suberugatum* KHUDOLEY & POLUBOTKO 1960). That genus is also of middle Hettangian age. Our interpretation implies that the stratigraphic sequence established in northeastern Russia cannot be considered as a potential stratotype for the Triassic-Jurassic boundary.

2) The first appearance of smooth *Psiloceras* in the northwestern European platform provides a good correlation criterion in that faunal province. Unfortunately the superpositional relationship between those forms and the last Triassic ammonoids is not established in that province. Ribbed ammonites observed below smooth *Psiloceras* by GUERIN FRANIATTE & MULLER (1978) in bore-holes drilled in Belgium (NE Bassin de Paris), while interesting, are exceedingly difficult to identify with any degree of confidence without the help of suture lines. We don't think that it is appropriate to propose those bore-holes as boundary stratotype for the systems discussed in the present paper.

3) One classical Alpine section described in Austria (Kendelbach Graben, HALLAM 1990, 1994, 1996) is a potentially interesting stratotype for the Triassic-Jurassic boundary in the sense that it records the superposition between smooth psiloceratids and choristoceratids. The last *Choristoceras* identified in that section belong to the *C.marshi* group which is older than *Choristoceras minutum* which characterizes the topmost Triassic unit described in the Nevadan sections (see below). As far as the Rhaetian sequence is concerned, the section at Klein Zlambach (KRYSTYN 1987) provides a better ammonoid sequence. *Psiloceras calliphylum* was found in the Zlambach area by NEUMAYR (1879) but according to KRYSTYN (loc.cit.) the lithological transition between the Zlambach Schichten and the Lias is not exposed there.

4) More or less fossiliferous marine sediments recording the Triassic-Jurassic boundary are found in four main regions of the western-pacific province. In the Queen Charlotte Island (B.C. Canada) area, the lowermost hettangian smooth *Psiloceras* are absent and the oldest ammonites found there belong to costate Psiloceratids of the *primocostatum* group (TIPPER & GUEX 1994). *Choristoceras rhaeticum* occurs 20 meters below those costate *Psiloceras* (TIPPER et al. 1994). In other words the youngest Rhaetian and the oldest Hettangian ammonites faunas are not recorded in that region. In Sonora, Mexico (GONZALES-LEON et al 1996), no ammonites were found between the *Choristoceras nobile* - *C.marshi* beds (lower Marshi subzone) and the *Sunrisites* beds (Upper Hettangian).

In the Utcubamba Valley, Peru (PRINZ 1985 ; HILLEBRANDT 1987-1994), the upper Triassic ammonites from the lower part of the *Choristoceras marshi* zone occur several meters below *Psiloceras tilmanni* and the beds which are equivalent to our *Choristoceras minutum* subzone are not fossiliferous. In our opinion, the small nucleus of "*Choristoceras*" described by HILLEBRANDT (1994, Pl. 1, Fig. 20) co-occurring with *P.tilmanni* is not a convincing Choristoceratid.

The most complete sequence recording the Triassic-Jurassic boundary is found in the New York Canyon area (Gabbs Valley Range, Nevada) (see Fig.1). In that region, the upper Rhaetian (*C.marshi* subzone sensu KRYSTYN 1987) can be subdivided into 2 units. The first is characterized by *Choristoceras* of the *marshi* group, which is represented around the top of the Mount Hyatt Member of the Gabbs Formation, several tens of meters above the *Rhabdoceras suessi* zone and about 25 meters above *Cycloceltites arduini* (see LAWS 1982). *Choristoceras aff. rhaeticum* and *C.aff. nobile* were also found in those beds.

The second unit is characterized by *Choristoceras minutum*. The siltstones of the Muller Canyon Member (Upper Gabbs Formation : see TAYLOR et al. 1983) have yielded interesting (even if crushed like the holotype of *Psiloceras planorbis*) ammonites with a coiling intermediate between Phylloceratids and Psiloceratids (GUEX 1982). The upper beds of that member have yielded abundant tiny *Choristoceras* of the *minutum* group, co-occurring with very evolute ammonites assigned to *Psiloceras* sp.indet. (GUEX 1982). The first abundant three-dimensional smooth *Psiloceras* of the *pacificum* group appear about one meter above those levels (see GUEX 1995 for details).

If we consider the biostratigraphical record of the different sections which are briefly discussed above, we conclude that the New York Canyon area contains the most complete ammonoid sequence and therefore currently provides the best potential stratotype for defining the Triassic-Jurassic boundary.

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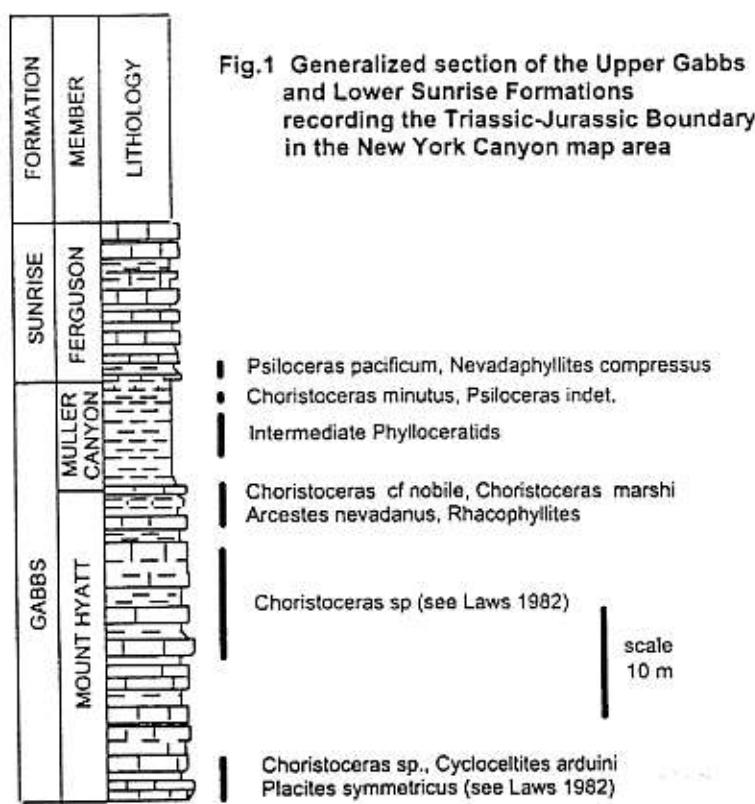
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3. JURASSIC STAGES BOUNDARY WGs

3. 1. SINEMURIAN BWG (BLOOS G.)

Results of work on Lower Lias stratigraphy as far as published in the last years are compiled in the adjoined list. This list might be incomplete but it gives an impression on the main progress in different fields of study. This progress must be the more acknowledged as many colleagues work under difficult conditions.

The main task of the working groups in the present moment is to propose a GSSP for the stages in their respective responsibility. Therefore great efforts are made to elucidate the situation around the stage boundaries in many regions.

The stages Hettangian and Sinemurian have been introduced in **Northwest Europe** and there the boundary is developed most clearly. A difficulty has been thus far that in this region exists a gap between the two stages, even in the formerly most favoured area of Dorset. K. Page has found the only known exception in Somerset, at the southern coast of the Bristol Channel at the locality of Quantock's Head (near Watchet). This section seems to meet best the requirements of a GSSP for the base of the Sinemurian (see Page 1995) :

- The boundary is situated in a thick sequence of beds (depressa Subzone ca. 8 m, conybeari Subzone ca. 14 m).
- There is no change of facies. The last Schlotheimia and the first Vermiceras above occur in a homogeneous horizon of bituminous shale which is 60 cm thick.
- The first Vermiceras fauna underlies the fauna with which normally the Sinemurian begins in NW Europe. This unique earlier fauna underlines that there is no gap in the section.
- The section is well and continuously exposed in a coastal cliff and in an adjoining extended foreshore area. It is well accessible.
- The locality is in an area under protection of law ; thus there is no danger of building activity or inaccessibility because of private ownership.

There are three disadvantages of the locality :

- The ammonites are all crushed in the shales, they are only uncrushed in the limestones which, however, do not occur immediately at the boundary.
- The fauna is not diverse, especially in the bituminous boundary layer the benthonic element is lacking.
- Initial paleomagnetic studies by the University of Plymouth have not yet obtained positive results at this level in the sequence.

These disadvantages are of minor importance because

- in Vermiceras the species are mainly distinguished by the style of ribbing ; in cross section and suture line the differences are low ; the ribbing can be recognized also in crushed state ;
- there is not to expect a spectacular change of benthonic fauna within the relatively short timespan of the gap in NW Europe ; therefore such studies can be made also in others of the numerous boundary profiles in NW Europe ; certainly planktonic microfossils and palynomorphs can be studied and preliminary sampling by the University of Plymouth under direction of M. Hart has been made ;

- the low diversity of the Vermiceras fauna at the base of the Sinemurian seems to make correlations difficult ; but since this fauna is situated in a wide-spread gap, not only in NW Europe but also in the Tethys, also a more diverse fauna would hardly find comparable assemblages elsewhere.

Additionally it must be mentioned that the sequence of uppermost Hettangian/lowermost Sinemurian is still by far thicker on the northern side of the Bristol Channel (locality of Nash Point). There the conybeari Subzone is more than 30 m thick. In contrast to Somerset the sequence here consists mainly of limestone. In these limestone beds the ammonites are uncrushed. Thus, the Nash Point section would be with some probability more suitable as GSSP. But in the boundary region the sequence seems to be very poor in

ammonites. For that reason, a documentation of the fauna there would require by far more work and more time to propose this section as GSSP. Therefore, it seems reasonable to favour the Somerset section. Glamorgan can be a good additional section, e. g. for paleomagnetic studies.

What is going on in the moment is to work out a documentation of the ammonite fauna around the boundary in the Quantock's Head section. Thus, the GSSP for the Sinemurian base is no more too far in the future.

In the **Mediterranean Province** there is no new situation. Rich in ammonites are only strongly condensed beds of mostly reddish limestone ; with certainty there are gaps, especially at the Hettangian/Sinemurian boundary. The thick shale sequences in the basins which are probably more complete are poor in ammonites in the boundary region. Therefore a candidate for the GSSP cannot be expected here in the near future.

An important region is situated in **Nevada/USA**. There are two main sections : the New York Canyon in the Gabbs Valley Range and the First Canyon in the Shoshone Mountains. An impressive documentation of the Hettangian ammonite fauna of the New York Canyon by J. Guex has appeared 1995. A documentation of the Sinemurian fauna is still in work by D. Taylor. As to D.Taylor's collections, the section of the Shoshone Mountains seems to be of special interest (see also Taylor 1990).

A further important section seems to be in **Argentina** (Rio Atuel, Mendoza ; Riccardi et al. 1991). There exists a rich and well preserved fauna (coll. A.C. Riccardi) on which is little published thus far. Regarding the enormous thicknesses due to rapid subsidence in this region (Riccardi et al. 1991, Fig. 2) a continuous transition between Hettangian and Sinemurian could be expected. Here as well as in North America the ammonite faunas show considerable differences to NW Europe. A correlation can be expected by means of the Mediterranean Province as stepping stone. A contribution to this aim is the study on the differences between Hettangian and Sinemurian Arietitidae by Bloos 1994 and 1996.

Further work : After the ammonite fauna of the Somerset section is presented the Working Group will decide if the section should be proposed as GSSP officially. We hope to do this by the congress in Vancouver.

Literature concerning Lower Lias stratigraphy 1987-1996

The last list has been compiled and distributed to the members of the Working Group 1987. The list can be obtained from the convenor.

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3. 2. TOARCIAN AND AALENIAN BWG's MEETING, REPORT (CRESTA S.)

The third meeting of the Aalenian WG of the ISJS was scheduled as a joint reunion with the Toarcian WG. The meeting has been organized by S. Ureta and her colleagues of the Universidad Complutense de Madrid and by W. Ohmert and his colleagues of Baden-Württemberg geologisches Landesamt.

The main part of the meeting has been devoted to field excursions in the Iberian Cordillera (20-22 september) and in the south west Germany (24 and 26 september).

Thirty-two workers attended the meeting and the following countries were represented : Algeria (1 : L. Mekhali), Canada (1 : G. Westermann), France (3 : S. Elmi, R. Mouterde, L. Rulleau), Germany (7 : Franz, M. Martin, W. Ohmert, Ch. Rolf, R. Schmidt-Effing, T. Wonik), Great Britain (1 : R. Chandler), Italy (7 : A. Baldanza, L. Benedetti, R. Buccafalo-Palliani, S. Cresta, E. Mattioli, N. Perilli, F. Venturi), Portugal (1 : R. Rocha), Spain (10 : C. Arias, E. Barron, J. Bernard, M. L. Canales, F. Garcia-Joral, J. J. Gomez, A. Goy, C. Herrero, S. Ureta), Switzerland (1 : H. Christ).

The proceedings will be probably printed by the Geological Survey of Italy, as a part of its Bulletin for the year 1996. Programme, reports of Aalenian and Toarcian WG, extended summary of the excursions and extended abstracts of the presented communications and posters, will be here assembled.

FIELD EXCURSIONS

The field trip guide and information on both areas have already been published by the Department of Paleontology, Universidad Complutense de Madrid (S. URETA (coordinator) and others (1996) - ISJS : 1st Toarcian and 4th Aalenian Working groups meeting. Field-trip Iberian Range Guide-Book : 1-77, ISBN : 84-8499-587-9) and by the Geologisches Landesamt Baden-Wurtemberg (W. OHMERT (Coordinator) and others (1996) - Die Grenzziehung Unter-/MittelJura (Toarcium/Aalenium) bei Wittnau und Fuentelsaz, Beispiele interdisziplinärer geowissenschaftlicher Zusammenarbeit. GLA Informationen, 8 : 1-52, Freiburg).

ORAL PRESENTATIONS

The following fourteen contributions (5 posters) were presented (the speakers in black) during the scientific session at Freiburg. They were not divided into topics and the abstracts are included in Aalenews n° 6.

- ELMI S., MOUTERDE R., ROCHA R. & DUARTEL L.V.** - La limite Pleinsbachien-Toarcien : intérêt de la coupe de Peniche (presented in Nuevalos).
- WONIK T.** - Stratigraphic division of borehole Wittnau 1 according to downhole logging.
- ROLF Ch.** The Aalenian boundaries at Wittnau : Paleomagnetic investigation.
- OHMERT W. & RIGRAF W.** - Updated stratigraphy across the Toarcian/Aalenian boundary at Wittnau (Oberrhein area, south west Germany), a candidate Global Stratotype Section and Point. [Poster].
- BALDANZA A. & MATTIOLI E.** - The calcareous nannofossils in the Wittnau KB Borehole.
- PERILLI N.** - Early Toarcian Calcareous Nannofossil biostratigraphy of the Rambla del Salto and La Almunia de Dona Godina sections from the Cordillera Iberica (Teruel, Spain).
- PARISI G., BENEDETTI L. & BALDANZA A.** - Stratigraphic events between the Lower Toarcian and the Middle Toarcian in the Umbria Marche basin (central Italy) and Ionian basin (western Greece) : an interdisciplinary approach.
- RULLEAU L.** - Le Toarcian inférieur de la région lyonnaise.
- CRESTA S., BENEDETTI L., VENTURI F.** - Toarcian and Aalenian faunal horizons in Umbria Marche Apennines (Italy).
- CRESTA S.** - Comments on Hammatoceratids (Ammonitina) taxonomy.
- CANALES M. L., HERRERO C.** - Diversity patterns in the foraminiferal assemblages from Fuentelsaz section. [poster].
- CHANDLER R.** - The faunal horizons of the *Graphoceras concavum* beds in Britain. [poster].
- VENTURI F., MACCHIONI F., PALLINI G., FARAOXI P. & MARINI A.** - The *Protogrammoceras bassanii* subzone of the Early Toarcian in Umbrian-marchean Apennines (Italy). [poster].
- SANDOVAL I., AGUADO R., BARTOLINI A., BAUMGARTNER P. O., CHANNEL J. E. T., MORENTINI E. & O'DOGHERTY L.** - Aalenian in Agua Larga section (Median Subbetic, Spain) : a multidisciplinary approach [poster].

AALENIAN GSSP DISCUSSION

The discussion took place in Freiburg on september 25 with the attendance of 26 WG members. A part from the selection of the boundary stratotype (see below), open problems of the Aalenian biochronology and chronostratigraphy have been summarized. In particular the convenor focused on Stage subdivisions (Substages and Zones) obtaining an agreement to submit by mail some possible solutions.

With respect to the GSSP, all participants agreed to define the boundary level coincident with the first appearance of *Leioceras opalinum* REINECKE non QUENSTEDT.

As no further proposals on alternative sections have been presented, the session actually concentrated on Fuentelsaz and Wittnau sections already discussed twice, namely in the past Aalenian meeting in Skye (1991) and Marrakech (1994).

Two field-trip days (22/9 - Fuentelsaz and 24/9 - Wittnau) have been spent to check and deepen the stratigraphic data collected from sections and it is now evident that the information furnished by German and Spanish colleagues were the best we could presently obtain (see the proceedings of Skye, 1991, and Marrakesh, 1994).

Following the ISJS's indication, a mail voting will be organized as soon as possible. The vote is involving both those who are listed in *Aalenews n. 1* and those currently working on the two sections (see the list below) for the choice between Fuentelsaz and Wittnau. In this selection, they can refer to the two extended proposals that will be organised by the convenor after the many contributions already presented on both sections.

By common agreement, the ballot will not provide for the possibility of abstention, as no further proposals on alternative sections have been presented.

AALENIAN WG DIRECTORY

Alméras Y., Baldanza A., Benedetti L., Boutakiout M., Bucefalo Palliani R., Callomon J., Canales M. L., Carter E., Cecca F., Chandler R., Christ H., Cobianchi M., Cox B., Damborenea S., De Kaenel E., Dietl G., Elmi S., Fernandez Lopez S., Franz Galbrun B., Garcia Joral F., Goy A., Guy-Ochluss D., Hall R., Henriques M. H., Herrero C., Von Hillebrandt A., Mancenido M., Martin M., Martinez G., Morton N., Mouterde R., Ohmert W., Pavia G., Perilli N., Riccardi A., Rieber H., Rolf C., Ruget C., Rulleau L., Sadki D., Sato T., Seyed Emami K., Sandoval J., Sarjeant W., Schmidt-Effing R., Ureta S., Venturi F., Westermann G., Wonik T.

3. 3. TOARCIAN BWG (ELMI S.)

During the September meeting, the initial discussion has been devoted to the selection of the best biostratigraphical boundary because it will dictate the choice of the GSSP. Two proposals were made: under or above the Mirabile Subzone (base of the Polymorphum Zone of the Tethyan Realm). An informal agreement has been reached in order to take in account the priority, the common use and, also, the scientific arguments. The proposal is to draw the boundary below the first appearance of the *Eodactylites* (*mirabile-polymorphum* group)

A first selection of reference profiles has been presented as well as a review of the presently available data (France, Portugal, Morocco, Algeria, Italian Apennines). A detailed description of the Peniche section (Portugal) has been presented and illustrated in order to underline some important characteristics necessary to the definitive selection of the GSSP as :

- correlation between the Tethyan Polymorphum and the Mid-European Tenuicostatum Zones, especially at the subzonal level;
- accurate definition of the Harpoceratids generic and subgeneric nomenclature (*Protogrammoceras*, *Tiltoniceras*, *Paltarpites*, *Eleganticeras*).

The field work on the profiles outcropping in the Iberic Ranges -particularly the Sierra Palomera Section- has been very useful to complete the data concerning the base of the Polymorphum Zone but it is poorly fossiliferous and cannot be selected as a good GSSP. The FAD of *Eodactylites* occurs within calcareous beds which are equivalent to the transition beds ("couches de passage") of several Tethyan successions as it has been illustrated by the Peniche section. Spanish colleagues put forward the Belchite section which has not been visited during the meeting. This section documents the change between the *Pleuroceras-Tauromeniceras* fauna and the *Eodactylites* one (according to the M.J. COMAS-RENGIFO's thesis).

In South-Western Germany, an excavation especially bored by the Dotternhausen Quarry Staff has allowed to check that the *Eodactylites* occur above the *Pleuroceras*

Finally, it may be remembered that numerous good profiles occur in North-Western Africa (Morocco, Algeria) and in Italy (Central Apennines). I consider that the best one is located in Algeria (Djebel Nador, South of Tiaret) but it is not presently accessible.

3. 4. BATHONIAN BWG (MANGOLD C.)

During the end session of the Digne meeting (Oct. 1996) the following items were released (see Newsletter n° 23, p. 102-103) :

- Further collecting and taphonomic studies through the Bajocian / Bathonian boundary ;
- Revision of ammonites collected in the past ;
- Definition of a formal biohorizon with a view to correlation ;
- A proposal on auxiliary GSSP around Digne (Chaudon, La Palud).

A second meeting at Digne should be organized from 25th April to 30th April. People involved in biostratigraphy and taphonomy are welcome. An inscription form is given in enclosure n° 3.

3. 5. KIMMERIDGIAN BWG (ATROPS F.)

In 1996, efforts have continued by the active members of the Group in discussing the choice of an appropriate GSSP candidate for the basal Kimmeridgian stage. Now, there is a large agreement about the designation of a locality in the NW European Province (Boreal Realm).

Progresses have been made towards the selection of the Kimmeridgian boundary GSSP in Great Britain. Among the British colleagues consulted by J. H. Callomon, the preferred choice of locality for the formal designation of a GSSP is the Dorset coast rather than South Ferriby (Lincolnshire, N England) or Staffin Bay in Scotland. For a precise locality in Dorset, in accordance with J. Callomon, there is the choice between Ringstead, Osmington Mills, Black Head and Wyke Regis. These sections have been closely compared in a minutely detailed description by M. E. Brookfield (1978). Moreover, the critical guide fossil of the basal Kimmeridgian faunal horizon, *Pictonia densicostata* SALFELD has been well illustrated by Arkell (1947) in his Weymouth Memoir which also provides the familiar regional descriptions. As all these sections are essentially identical stratigraphically, one is as good as another. It seems that Black Head is now the most clearly exposed section (opinion of J. Callomon). It could be a good primary standard basal stratotype.

The strong provincialism shown by the ammonites between the Boreal and Tethyan realms, at the turn of the Oxfordian and Kimmeridgian stages, makes necessary to select also a complementary reference section (secondary standard section) in the Tethyan realm. The localities of Crussol and Châteauneuf-d'Oze (SE France) have been proposed (Atrops, 1994,

1995) because the stratigraphic successions appear thick, continuous and quite rich in ammonites at this level. The section of Crussol (type locality of the Crussolian stage, Rollier, 1909), supplying a highly detailed biostratigraphic resolution and a good magnetostratigraphic scale (Ogg & Atrops in prep.) seems one of the best in the Mesogean Province. For this province, good ammonite successions have recently been studied in Swabia by G. Schweigert (1995). They allowed to propose, for the first time, a precise correlation with the base of the Kimmeridgian (*sensu anglico*). The base of the subboreal Kimmeridgian stage is characterized by the occurrence of the ammonite species *Amoeboeras bauhini* (OPPEL). In the Swabian Upper Jurassic, this species occurs in the Bauhini Horizon which represents the youngest faunal horizon of the Hauffianum Subzone. These new data show that the «Upper Oxfordian» (sub-) mediterranean Planula Zone is completely of Kimmeridgian age in the northwest european sense. Earlier and new results carried out in Poland by B. Matyja and A. Wierzbowski (Warsaw University) agree with these conclusions.

The next Kimmeridgian Working Group Meeting will be held in Stuttgart in 1998, in order to visit, under the guidance of G. Schweigert, good sections in Southern Germany and to put out the last discussions for the definitive proposal of primary and secondary lower boundary stratotypes. The formal proposition and the vote will be made before the end of 1998. In 1997, a Meeting, related to the GEUS-University of Warsaw joint project, will be held in Warsaw (25-29 May). It concerns particularly the erection of a detailed high resolution correlation between the Polish Submediterranean Province and the Subboreal Province. A Meeting of the KWG could be held in September 1997 at Warsaw.

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- ATROPS, F. 1995 - Report of the proposals for basal Kimmeridgian GSSP candidates in Great Britain (K. N. Page & B.M. Cox) and in SE France (F. Atrops), 27 p., 7 fig.
- BROOKFIELD, M. E. 1978 - The lithostratigraphy of the upper Oxfordian and lower Kimmeridgian Beds of South Dorset, England. *Proc. Geol. Assoc.*, 89, 1 : 1-32.
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- SCHWEIGERT, G. 1995 - Zum Auftreten der Ammonitenarten *Amoeboeras bauhini* (OPPEL) und *Amoeboeras schulginae* MESEZHNIKOV im Oberjura der Schwäbischen Alb. Jh. Ges. Naturkde. Württemberg, 151 : 171- 184.

3. 6. TITHONIAN BWG (CECCA F.)

Chairman : Prof. Arnold ZEISS
Secretary : Dr. Fabrizio CECCA

NEWS

Field Meeting in Southern France

The first field meeting of our Working Group will be organised by François Atrops (Lyon) in South-East France, 16-21 june 1997. You will know the dates and the necessary information in the 1st circular which will be sent out by François by October.

The meeting is dedicated to the candidate sections for the stratotype of the Kimmeridgian/Tithonian boundary. We will spend most of our time to visit the sections of Canjuers and Crussol which François Atrops recently sampled with Jim Ogg for magnetostratigraphy. Oral contributions, discussions on the boundary as well as visits of the palaeontologic collections housed at Lyon are also included in the program.

Other Field Meetings

The field meetings in Southern Spain (Subbetic Zone), organised by Federigo Oloriz and in Southern Germany, organised by Zeiss and Schweigert, are now programmed for 1998. We will have more details next year.

The Secretary changes his address !!!

Starting from November 1st, Fabrizio CECCA will have a new position. Please note the new address :

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Information

The Chairmen of the Russian Commissions on Jurassic and Cretaceous Systems, respectively Prof. K. O. Rostovtsev and V. A. Prozorovsky, communicated us information on resolutions of the Interdepartmental Stratigraphic Committee of Russia about the use of Tithonian and Volgian stages and the position of the Jurassic - Cretaceous Boundary as well. This information is reproduced in the following pages (see 4. News on the Jurassic/Cretaceous Boundary).

K/T Boundary Library

The references of new papers concerning K/T boundary, Early Tithonian stratigraphy or also containing information on these topics are listed below. These papers correspond only to those which have been communicated to the Secretary.

- BENZAGGAGH M. & ATROPS F. (1995) - Les zones à Chitinoidella et à Crassicollaria (Tithonien) dans la partie interne du Prérif (Maroc). Données nouvelles et corrélation avec les zones d'ammonites et de calpionelles. C. R. Acad. Sci. Paris, t. 320, sér. IIa, 227-234, 2 fig.
- BENZAGGAGH M. & ATROPS F. (1996) - Répartition biostratigraphique des principales espèces de "microproblématiques" dans le Malm supérieur - Berriasien du Prérif interne et du Mésorif (Maroc). Biozonation et corrélation avec les zones d'ammonites et de calpionelles. C. R. Acad. Sci. Paris, t. 322, sér. IIa, 661-668, 2 fig.
- ENAY R., BERNIER P., BARALE G., BOURSEAU J.-P., BUFFETAUT E., GAILLARD C., GALL J.-C. & WENZ S. (1994) - Les ammonites des calcaires lithographiques de Cerin (Ain France) : stratigraphie et taphonomie. Geobios, M. S., 16, 25-36, 1 tab., 4 pl., Villeurbanne.

- ENAY R. & CARIOU E. (1996) - Identification du Kimméridgien du domaine Indo-Sud-Ouest Pacifique : la faune à *Paraboliceras* (Ammonitina) de l'Himalaya à la Nouvelle-Zélande. C. R. Acad. Sci. Paris, t. 322, sér. IIa, 469-474, 4 fig.
- FOZY I. (1995) - Upper Jurassic ammonites from Seno di Guidaloca (Western Sicily). Geczy Jubilee volume, Hantkeniana, 1, 131-143, 2 fig., 3 pl., Budapest.
- OLORIZ F., CARACUEL J. E. & RUIZ-HERAS J. J. (1995) - Numerical analysis of sedimentary components : a key for interpretation of macroscopic and microscopic features in Ammonitico Rosso facies (uppermost Jurassic - lowermost Cretaceous). Jour. Sed. Research, A65(1), 234-243.
- OLORIZ F., CARACUEL J. E., RUIZ-HERAS J. J., RODRIGUEZ-TOVAR F. J. & MARQUES B. (1996) - Ecostratigraphic approaches, sequence stratigraphy proposals and block tectonics : examples from epioceanic swell areas in south and east Iberia. Palaeogeogr., Palaeoclimatol., Palaeoecol., 121, 273-295, Amsterdam.
- SEY I. I. & KALACHEVA E. D. (1996) - Upper Jurassic - Lower Cretaceous biostratigraphy and fauna of South Primorie (Russian Far East). Geol. of Pac. Ocean, 12, 293-312, 2 fig., 2 tab., 4 pl., Amsterdam

The volume containing the Proceedings of the 4th International Symposium on Jurassic Stratigraphy has been published : RICCARDI A. C. (Ed.) "Advances in Jurassic Research". Geo Research Forum, vol. 1-2, Transtec Publications, Switzerland.

From this volume we only select here those papers containing informations on K/T boundary or Tithonian stratigraphy.

- BONAPARTE J. F. (1996) - Late Jurassic vertebrate communities of Eastern and Western Gondwana. Geo Research Forum, 1-2, 427-432.
- BOWN P. R. (1996) - Recent advances in Jurassic calcareous nannofossil research. Geo Research Forum, 1-2, 55-66, 4 fig, 1 tab., 2 app.
- ENAY R., BARALE G., JACAY J. & JAILLARD E. (1996) - Upper Tithonian ammonites and floras from the Chicama basin, northern Peruvian Andes. Geo Research Forum, 1-2, 221-234, 3 fig.
- LEANZA H. A. (1996) - The Tithonian ammonite genus Chigaroceras Howarth (1992) as a bioevent marker between Iraq and Argentina. Geo Research Forum, 1-2, 451-458, 1 fig.
- LO FORTE G. L., ANSELMI G. & AGUIRRE-URRETA M. B. (1996) - Tithonian palaeogeography of the Aconcagua basin, West-Central Andes of Argentina. Geo Research Forum, 1-2, 369-376, 2 fig.
- KRISHNA J., PATHAK D. B., & PANDEY B. (1996) - Quantum refinement in the Kimmeridgian ammonoid chronology in Kachchh (India). Geo Research Forum, 1-2, 195-204, 4 fig.
- KRISHNA J., PATHAK D. B., & PANDEY B. (1996) - Ammonoid chronology in the Tithonian of Kachchh (India). Geo Research Forum, 1-2, 205-214, 5 fig.
- PESSAGNO E. A. & MEYERHOFF HULL D. (1996) - "Once upon a time in the Pacific" : chronostratigraphic misinterpretation of basal strata at ODP Site 801 (Central Pacific) and the impact on geochronology and plate tectonics models. Geo Research Forum, 1-2, 79-92, 6 fig.
- PODOBINA V. & TATYANIN H. (1996) - Stratigraphy of the Upper Jurassic of Western Siberia based on Foraminifers. Geo Research Forum, 1-2, 215-220, 2 tab.
- PUJANA I. (1996) - Occurrence of Vallupinæ (Radiolaria) in the Neuquén basin : biostratigraphic implications. Geo Research Forum, 1-2, 459-466, 4 fig.
- QUATTROCCHIO M. E., SARJEANT W. A. S. & VOLKHEIMER W. (1996) - Marine and Terrestrial Jurassic Microfloras of the Neuquén Basin (Argentina) : palynological zonation. Geo Research Forum, 1-2, 167-178, 4 fig.
- WESTERMANN G. E. G. (1996) - Correlating New Zealand regional stages by ammonites. Geo Research Forum, 1-2, 93-100, 1 fig.

4. NEWS ON THE JURASSIC / CRETACEOUS BOUNDARY

4. 1. INFORMATION ON RESOLUTIONS OF STANDING COMMISSIONS OF THE INTERDEPARTMENTAL STRATIGRAPHIC COMMITTEE (ISC) ON THE JURASSIC AND CRETACEOUS SYSTEMS (ROSTOVTSEV K. O. & PROZOROWSKY V. A.)

Traditionally, the Russian (Soviet) stratigraphers regarded the Volgian as corresponding to the Tithonian and crowned the Jurassic system with it. The version of the chronostratigraphic scale adopted by the ISC (1978) comprised two parallel stages - Tithonian for the Mediterranean Realm and Volgian for the Boreal Realm. However, in the last two decades, in many regions of the world, data have accumulated which contradict the correlation adopted in Russia.

Commissions on the Jurassic and Cretaceous systems of the ISC at their joint meeting on January 26, 1995, considered new materials on stratigraphy of the Jurassic/Cretaceous boundary deposits in Russia and the data on other regions of Europe, Asia, North and South America analysed in the paper by I. I. Sey and E. D. Kalacheva « Biostratigraphic criteria of the Jurassic/Cretaceous boundary in Russia » (1993). After the exchange of opinions, the Commissions resolved :

1. To draw the Jurassic/Cretaceous boundary in the Boreal Realm between the middle and upper substages of the Volgian, and not at its as it was earlier adopted in Russia (1978). This boundary mainly corresponds to the Tithonian/Berriasiian boundary in Tethyan Realm (Colloque..., Lyon - Neuchatel, 1975). Correspondingly the Lower Volgian in the whole correlated with the Lower and Middle Tithonian ; the Middle Volgian, with the Upper Tithonian ; the Upper Volgian, with two lower zones of the Berriasiian (Jacobi/Grandis and Occitanica) (Table).

2. To transfer the Volgian in its former range to the category of regional stratigraphic units (regional stage). To distinguish as chronostratigraphic units in the boundary part of the Jurassic and Cretaceous scale of Russia only Tithonian and Berriasiian.

Questionnaires filled in by specialists of the Jurassic/Cretaceous boundary deposits have shown, that the majority (over 50%) agreed with the proposals of the Commissions.

On February 2, 1996, the ISC approved by its Decree the Resolution of the Commissions and recommended to send information to the International Subcommissions on the Jurassic and Cretaceous Stratigraphy (chairmen R. Enay and P. Rawson, correspondingly) with the request to present this information to the International Commission on Stratigraphy and publish it in the Journal « Newsletters ».

TETHYAN REALM				BOREAL REALM			
CRETACEOUS		SYSTEMS		SUBSTAGES		BOREAL STAGES	
KIMMER. (part)	TITHONIAN	BERRIASIAN	STAGES	ZONES	ZONES	SUBSTAGES	BOREAL STAGES
				Fauriella boissieri	Surites tzikwinianus		
				Tirnovella occitanica	Riasanites rjasanensis		
				Pseudosubplanites grandis / Berriasella jacobi	Craspedites nodiger		
				Durangites	Craspedites subditus		
			UPPER	Micracan- thoceras microcan- thum	Kachpurites fulgens		
			MIDDLE	Paraulaco- sphinctes transitorius	Epivirgatites nikitini		
			LOWER	Simplisphi- nctes abnormis	Virgatites virgatus		
				Micrancanthoceras ponti	Dorsoplanites panderi		
				Semiformiceras fallauxi			
				Semiformiceras semiforme			
				Neochetoceras darwini	Ilovaiskya pseudoscythica		
				Hybonoticeras hybonotum	Ilovaiskya sokolovi		
				Hybonoticeras beckeri	Ilovaiskya klimovi		
					Aulacostephanus autissiodorensis		

=====
Jurassic /Cretaceous boundary in Tethyan Realm and its suggested position in Boreal Realm

=====
Jurassic /Cretaceous boundary in Boreal Realm presently accepted

4. 2. JURASSIC / CRETACEOUS BOUNDARY IN THE BOREAL REALM (BIOSTRATIGRAPHY AND BOREAL TETHYAN CORRELATIONS) (SEY I. I. & KALACHEVA E. D.)

Establishing the Jurassic/Cretaceous boundary is one of the main problems of Mesozoic stratigraphy. Jurassic/Cretaceous transition was time of major abiotic and biotic events which caused sharp differentiation of marine faunas of the Boreal and Tethyan realms. This fact was a reason for creating a system of concurrent stages : Tithonian and Berriasiian in the Tethyan Realm and Volgian stage and Ryazanian horizon in the Boreal Realm. At the International Colloquium in 1973 the Jurassic/Cretaceous boundary was determined as the Tithonian/Berriasiian boundary at the base of *Jacobi/Grandis* zone.

But only part of the problem was touched on by the above decision. For a long time Volgian stage of the Boreal scale has been believed to be an equivalent to Tithonian, and Ryazanian horizon (or Boreal Berriasiian) has been considered as a counterpart of Tethyan Berriasiian. However, a number of workers (Casey, Barthel, Zeiss, Kutek, Enay, Hoedemaeker, Sasonova and Sasonov) consider Tithonian and Volgian stages not to be of the same stratigraphical range, the Upper Volgian being part of the Berriasiian. It means that the Jurassic/Cretaceous boundary in the Boreal Realm should be shifted.

Key to these problems can be found in the regions with mixed Boreal-Tethyan faunal. Within Russia such regions are the Far East, Northern Caucasus and Russian platform.

In the Far East the Upper Jurassic-Lowermost Cretaceous strata contain mixed faunal assemblages with Boreal *Buchia* and Tethyan ammonites. As it has been determined by the authors rocks with Middle Volgian *Buchia* include the Upper Tithonian ammonites (*Durangites*), and the Upper Volgian *Buchia* are associated with the Lower Berriasiian ammonites (*Pseudosubplanites* cf. *grandis*, *P. aff. combesi*, *P. sp.*, *Berriasella ex gr. jacobi*, *B. ? sp.*, *Dahmasiceras orientale* sp. nov.). These data are in good agreement with findings on similar faunas in California and British Columbia.

The Northern Caucasus is one of the key region for solving the problem of Boreal-Tethyan correlation. The authors (together with Mesezhnikov) have studied the Berriasiian strata and ammonite fauna along the Uruk River which enabled them to elaborate a detailed stratigraphic scale and correlate it with Berriasiian stratotype in SE France (Figs. 1,3). European *Occitanica* and *Boissieri* zones have been established in the Berriasiian of the Northern Caucasus. In the *Boissieri* zone a *Euthymiceras* level sandwiched between two *Riasanites* levels has been distinguished (Figs. 1,2). These levels correlate with the *Paramimounum* and *Picteti* subzones in the stratotype thus determining the stratigraphical range of *Riasanites* and *Euthymiceras*. The latters which are the main markers for correlation of Subboreal sequences of the Russian platform with Mediterranean scale.

Boreal Volgian stage established in the Russian platform has been traditionally believed to be an equivalent to the Tithonian. Stratigraphical interval of Ryazanian horizon which is separated by a hiatus from the Volgian strata has been considered as ambiguous. Recently Mesezhnikov and Shulgina correlated Ryazanian horizon with the near-complete range of Tethyan Berriasiian taking into account similarity of Ryazanian and Upper Volgian faunas. However presence of *Riasanites* at the base of the Ryazanian horizon implies that the

latter belongs to the Upper Berriasian (*Boissieri* zone). Consequently the Upper Volgian corresponds to the entire or significant part of the Lower Berriasian. *Buchia* - ammonite faunas of the Russian Far East and North America as well as Volgian-Tithonian ammonite faunas of Central Poland provide support for the above conclusion. Study of the Central Poland faunas conducted by Kutek and Zeiss has shown that the Lower/Middle Volgian boundary corresponds to the Middle/Upper Tithonian boundary.

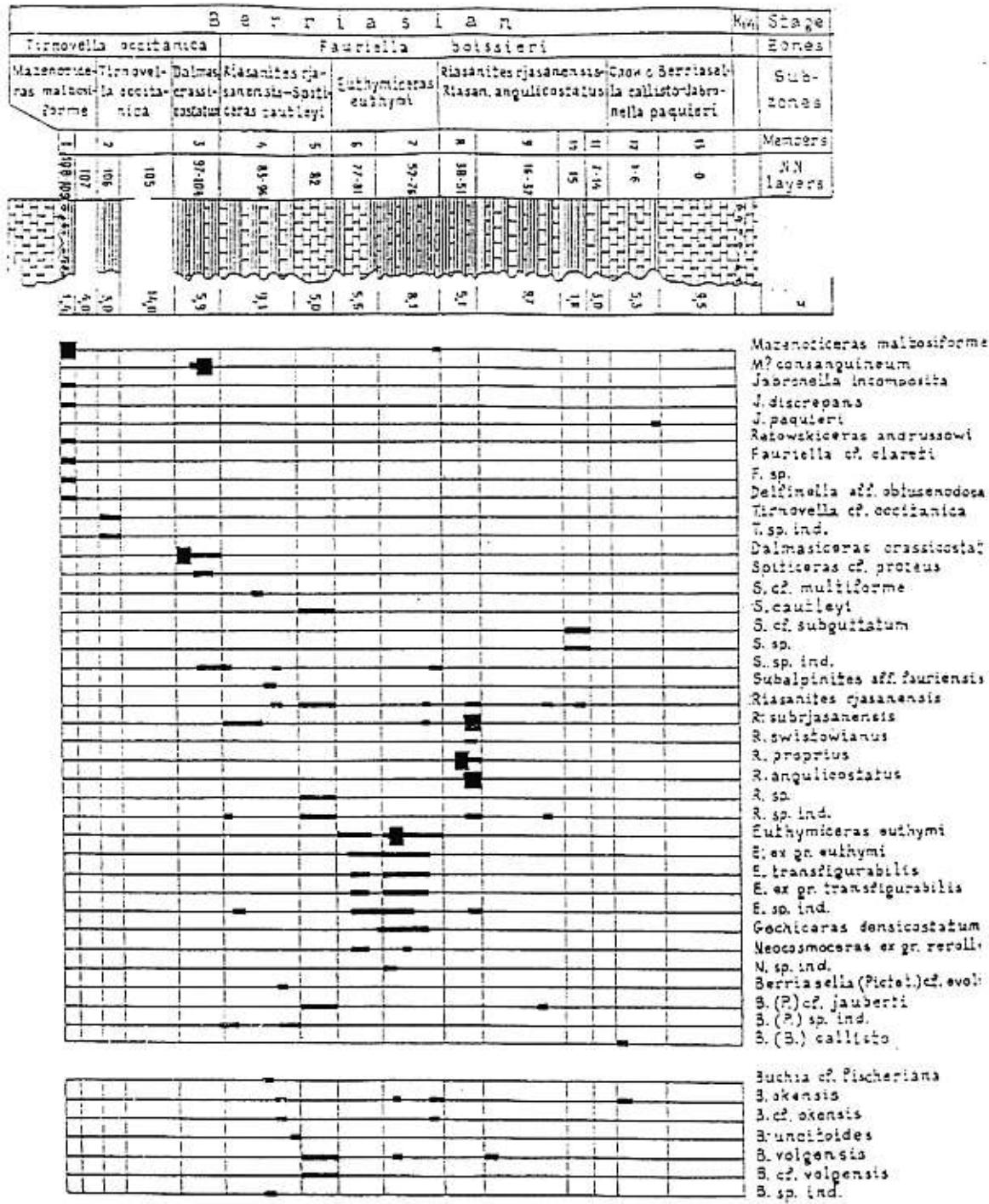
Unlike the Russian platform a continuous succession of Jurassic/Cretaceous boundary strata exists in Northern Siberia. Unfortunately the Northern Siberian detailed ammonite scale can't be related directly to European scale and should be correlated with Mediterranean scale through regions with mixed Boreal-Tethyan faunas (Russian platform, Far East, North America). As a consequence almost the entire Siberian Berriasian is correlated with the Ryazanian horizon and correspondingly with the Upper Berriasian (*Boissieri* zone). The Upper Volgian in Siberia as well as in Russian platform is compared with the Lower Berriasian (*Jacobi* s.l. + *Occitanica* zones). Examination of biostratigraphy and correlation of Jurassic/Cretaceous boundary strata have demonstrated interval discrepancy between boundary stages in Tethyan and Boreal scales. This fact implies revision of Jurassic/Cretaceous boundary position in Boreal Realm and possibly worldwide since such an important divide should be actually traced in all the realms. Essentially all the notable levels in the interval from the top of Tithonian to the base of Valanginian have been proposed as the Jurassic/Cretaceous boundary. Consideration of development of ammonite faunas conducted by Oloriz and Tavera has shown the Tithonian-Berriasian boundary (between *Durangites* and *Jacobi* s. l. zones) in Tethyan Realm to be the most pronounced of all the above levels. In Boreal Realm boundary of this kind lies between the Middle and Upper Volgian (by Schulgina's data). In the latter case not only ammonites have been taking into account but *Buchia* as well.

The authors consider this level as the most correlatable, it has been accepted as the Jurassic/Cretaceous boundary in the Tethyan scale. That is why this level should also be accepted as Jurassic/Cretaceous boundary in Boreal scale. Provided the boundary is at the level mentioned the Lower and Middle Volgian correspond to the Tithonian stage and the upper Volgian and the Ryazanian horizon (or Boreal Berriasian) together are matched by the Tethyan Berriasian. It means that unification of boundary stages of Jurassic and Cretaceous is feasible.

Abstract of « Biostratigraphic criteria of Jurassic/Cretaceous boundary in Russia » by I. I. Sey and E. D. Kalacheva, VSEGEI, 1993, 1-60, 7 text-figs, St-Petersburg (in Russian).

1 2 3 4

Fig. 4 The Berriasiian section along the Urush River (Northern Caucasus) and distribution of ammonites and *Buchiia*.
1-timestone; 2 - clay, siltstone, marlstone; 3 - interbedding of limestone, clay, marl; 4 - breccias.



5. ENCLOSURES

5. 1. 5TH INTERNATIONAL SYMPOSIUM ON THE JURASSIC SYSTEM, 1ST CIRCULAR

QUESTIONNAIRE

Please fill out and return to Dr. Paul Smith at address given under Correspondence, to reach him not later than 15th January, 1996. Second Circular with details of Symposium program, fieldtrips and accommodation, will only be sent to those returning this Questionnaire.

PLEASE PRINT

NAME: _____

ADDRESS: _____

FAX: _____

E-MAIL: _____

Please indicate your participation in the following:

Attend Symposium: certain probable

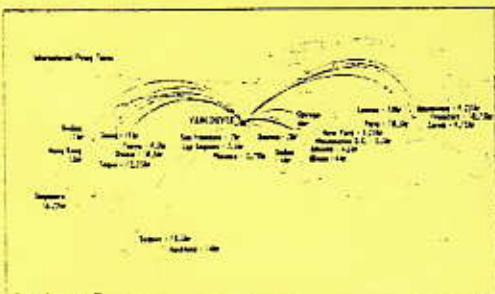
Oral presentations: certain probable

Poster presentation: certain probable

Attend: A1 certain probable
fieldtrips: A2 certain probable

B1 certain probable B2 certain probable B3 certain probable

Spouse attending: yes no



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Vancouver
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Nature.**
British Columbia, Canada

FIRST CIRCULAR

Tourism
Vancouver

5th INTERNATIONAL SYMPOSIUM ON THE JURASSIC SYSTEM

First Circular INVITATION

The Organizing Committee has the honour of inviting you to participate in the Fifth Session and Fieldtrips of the International Symposium on the Jurassic System, to be held in Vancouver, British Columbia, CANADA, August 12 - 25, 1998.

TENTATIVE PROGRAMME

August 12 - 16 Pre-Symposium field trips
17 - 20 Scientific sessions
21 - 25 Post-Symposium field trips
All Scientific sessions will be held on the campus of The University of British Columbia, in Vancouver.

FEES

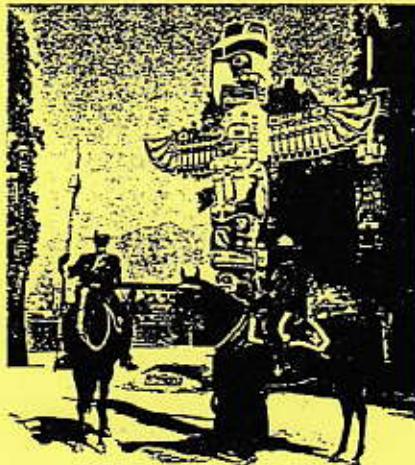
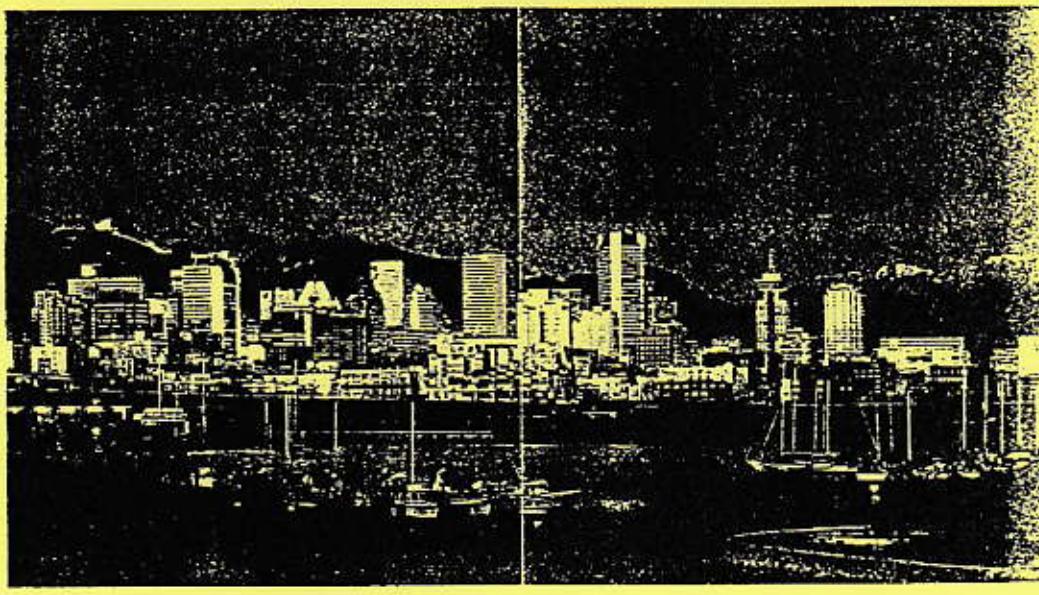
Information on registration fees, field trips and accommodation will be included in the Second Circular.

GENERAL INFORMATION

Vancouver is Canada's gateway to the Pacific rim and one of the most beautiful modern cities in the world. Set in the Fraser Valley, and overlooked by the peaks of the Coast Mountains, the city is bordered on the west by the Pacific waters of the Strait of Georgia.

The University of British Columbia is at the tip of a peninsula separated from the downtown area by the Pacific Spirit Park. Sandy beaches and towering rainforests are integral parts of the city. The climate is pleasant and mild. In August (av. temperature 23°C, rainfall 3.6 cm) temperatures stay in the mid to upper 20s with occasional hot spells and wet periods. Vancouver is a vibrant and cosmopolitan city famous for its restaurants, Chinatown, gardens, theatres, music and outdoor activities.

The Canadian Cordillera on the leading edge of the North American plate has been the site of a continental-oceanic boundary for over 700 million years. Jurassic rocks occur on the stable craton and on the far-travelled, allochthonous terranes that have accreted to the continent. The terranes are remarkable for their plutons and thick sequences of volcanic and volcanioclastic rocks. Fossils (especially ammonites and radiolarians) have been invaluable in unlocking the complex Jurassic history of this part of the world.



FIRST & SECOND CIRCULARS

The First Circular is being mailed to all who have attended recent Jurassic meetings; if you know of interested colleagues who may have missed receiving this Circular, please copy it to them. Please return the preliminary questionnaire before January 15, 1997 — the Second Circular will be sent only to those who return the Questionnaire by this date.

SYMPOSIA AND SPECIAL SESSIONS

The Board, Subcommission Working Groups and various IGCP Projects will meet during the Symposium. We encourage individuals to propose/organize half- or full-day sessions on special topics related to the Jurassic System. If you would like to organize such a session, please contact the Organizing Committee before February 1, 1997. Space and time will be allocated for poster sessions.

FIELD TRIPS Pre-Symposium

A1 Calgary to Vancouver

Days 1, 2: foreland basin deposits, Fernie Fm., Pliensbachian & Touronian black shales, Bajocian-Bathonian grey shales, belemnite battlefields, Oxfordian glauconitic sandstone, transition to non-marine Cretaceous. Day 3: hike to "pre-Jurassic" (i.e. Cambrian) Burgess Shale, Walcott's Quarry, Yoho Park. Days 4, 5: transect of Rocky Mountains, allochthonous terranes and collision tectonics. Estimated cost: \$CAN 750.00 (meals included)
Max: 40 persons

A2 Nevada

Early Mesozoic back-arc marine record in western Nevada: emphasis on Upper Triassic and Lower Jurassic marine strata, their invertebrate faunas, and the exceptionally complete Triassic/Jurassic boundary sequence in New York Canyon. Starts and finishes in Reno.

Estimated cost: \$CAN 850.00 Max: 20 persons

Post-Symposium

B1 Queen Charlotte Islands

Visit one of the most complete and fossiliferous Lower and Middle Jurassic sequences in North America: Sandlands Fm., Hett/Sin., Ghost Creek Fm., Sin./Pliens., Fannin Fm., Pliens./Toarc., Whiteaves Fm., Toarc., Phantom Creek Fm., Toarc./Aal., Yikoun Gp., Baj., Moresby Gp., Bath/Cal., Ammonoids, conicals, bivalves, radiolaria, forams, ostracods, fish, vertebrates and plants occur.

Estimated cost: \$CAN 1,000.00 Max: 30 persons

B2 Coast Mountains

Day 1: Harrison Lake (see description below) and scenic Fraser Canyon. Day 2: Transgressive, coarse clastic Pliensbachian rocks and Bajocian siltstones. Ashcroft area. Days 3, 4: relaxation at elegant mountain lodge with helicopter excursions to Hettangian-Sinemurian and Oxfordian-Tithonian successions of Tsaughion Creek to explore upper and lower limits of Jurassic System in Coast Mountains. Day 5: Coast Mountain transect.

Estimated cost: \$CAN 750.00 (meals not included)
Max: 20 persons

B3 Harrison Lake

One-day excursion to study unmetamorphosed succession of acid to intermediate lava flows, pyroclastics and fossiliferous volcaniclastic rocks ranging in age from Toarcian to Oxfordian.

Estimated cost: \$CAN 35.00 Max: 80 persons

CORRESPONDENCE

All Symposium correspondence should be addressed to:

Dr. Paul Smith,
5th International Symposium on the Jurassic System,
Department of Earth and Ocean Sciences,
University of British Columbia,
6350 Stores Road,
VANCOUVER, British Columbia,
Canada V6T 1Z4

Telephone: 604-822-6456
Fax: 604-822-6088
e-mail: psmit@eos.ubc.ca

Current information on the Symposium and fieldtrips
can be obtained on our Web site at:
<http://www.eos.ubc.ca/jurassic/announce.htm>

QUESTIONNAIRE

Because of the geographic locations of the most important Jurassic exposures in western North America, considerable logistical problems exist for travel and accommodation. Consequently, participation in Pre- and Post-Symposium fieldtrips will be costly and numbers must be strictly limited. Brief descriptions of the contents of each proposed fieldtrip, and estimated costs, are provided under Fieldtrips.

The Organizing Committee must know by early 1997 how many wish to register for one of these trips and will estimate these numbers by responses to the attached Questionnaire. Should any fieldtrip be oversubscribed, preference will be given to those who have clearly indicated their intentions on this questionnaire, which must be returned no later than January 15, 1997.

ORGANIZING COMMITTEE

Dr. Paul Smith (Chairman)
Dr. Russell Hall
Dr. Howard Tipper
Dr. Elizabeth Carter
Dr. Giselle Jakobs
Dr. James Haggart
Dr. David Taylor
Dr. Terry Poulton
Mr. Josef Palty

ORAL COMMUNICATIONS

Members participating in the Symposium are invited to give oral communications accompanied by an abstract in English that must reach the Organizing Committee not later than February 1, 1998. Abstracts should be prepared in accordance with a format to be given in the Second Circular.

PUBLICATIONS

Accepted abstracts will be published in the Symposium Programme which will be distributed to all participants. Complete papers will only be published in the Proceedings of the Symposium after acceptance by the Scientific Committee. Instructions for preparation of manuscripts will be provided in the Second Circular.

OFFICIAL LANGUAGE

English will be the language of the Symposium and its publications.



5. 2. AALENIAN BWG MEMBERSHIP



INTERNATIONAL SUBCOMMISSION
ON JURASSIC STRATIGRAPHY
Aalenian Working Group

Convenor: Stefano Cresta
Servizio Geologico Nazionale
Largo Santa Susanna 13, I-00187 Roma
Phone (6) 4744645 - Fax (6) 4827338

Please fill up and return this form to the Convenor

SURNAME and FIRST NAME

ADDRESS

PHONE and FAX

I am interested in Aalenian Stratigraphy

- mainly in:

- biochronology and biostatigraphy
- sedimentology
- sequence stratigraphy
- magnetostratigraphy
- paleontology

group(s)

- ecology
- biogeography

- geographic area(s)

I want to be a member of the Working Group

- as an active member (voting)
- as an ordinary member

Signature:

5. 3. 2ND BATHONIAN DIGNE MEETING (APRIL 1997)

INTERNATIONAL SUBCOMMISSION
ON JURASSIC STRATIGRAPHY
BATHONIAN B. W. G.

2ND BATHONIAN GSSP Field meeting at Digne (France)
25th April - 30th April 1997

Convenor : Charles MANGOLD
UFR des Sciences de la Terre
Université Claude Bernard Lyon 1
27-43 Bd du 11 Novembre 1918
F-69622 VILLEURBANNE CEDEX
Tél. : 33-04.72.44.83.76
Fax : 33-04.72.44.83.82
E-mail : charles.mangold @ univ-lyon 1.fr.

Please fill up and return this form before 28th february 1997 to the convenor.

NAME :

ADDRESS :

.....
.....
.....

Tel. : E-mail :

Fax :

Please indicate :

• your participation

certain

probable

• your accommodation

réserve géologique

hotel

5. 4. 1ST TITHONIAN BWG MEETING IN S. E. FRANCE

International Subcommission on Jurassic Stratigraphy

1st Tithonian Working Group Meeting (Lyon and South-Eastern France Basin, 15th-20th June, 1997)

AIM OF THE MEETING

This Meeting will be devoted to visit, in the South-Eastern France, good candidate sections for the stratotype of the Kimmeridgian-Tithonian boundary, and promote discussions among the participants, on the problem of the choice of a reference section for the basal Tithonian. It will provide also the opportunity to have a general overview on the Kimmeridgian-Tithonian in the main areas of the South-Eastern France basin and study large ammonite collections at the University of Lyon I.

ORGANIZATION AND PROGRAMME

The Meeting will be organized by François Atrops at the University of Lyon I. It will include four days of field trip (June 15th-19th) and one day for scientific sessions (June 20th). The programme will be as follows :

- Sunday 15th June : departure from the University in the end of the afternoon. Drive to Saint-Péray (Ardèche). Overnight in Saint-Péray.
- Monday 16th June : Crussol and Saint-Péray sections. Overnight in Saint-Péray.
- Tuesday 17th June : sections near Aubenas (Ardèche). Overnight in Comps (Var).
- Wednesday 18th June : sections in the military camp of Canjuers (Var). Overnight in Comps.
- Thursday 19th June : touristic tour in the Verdon canyon (Kimmeridgian-Tithonian). Sections in the Haute-Provence subalpine Chains, then in the Southern subalpine Chains (Diois, Dévoluy). Overnight in Lyon.
- Friday 20th June : scientific session (lectures, discussions and conclusions, revision of ammonite collections). End of the Meeting.

PUBLICATION

The field guide including abstracts of the presented papers (up to three pages) will be delivered during the Meeting. Only the works devoted to the problem of the Kimmeridgian-Tithonian boundary are accepted. The presented papers could be submitted for publication in Geobios.

REGISTRATION DATES

January 15th, 1997 : deadline to return the preinscription form

February, 1997 (beginning) : sending of 2nd circular

March 15th, 1997 : deadline for final inscription at the Meeting

April 15th, 1997 : deadline for submitting abstracts of oral communications

The second circular will be sent only to those who have returned the preinscription form.
The cost is 3000 FF (except the night of June 20-21th in Lyon).

CORRESPONDENCE

Please send all correspondence and the registration form (also by Fax or E-mail) to :

François ATROPS, UFR des Sciences de la Terre, Université de Lyon I, 27-43 boulevard du 11 novembre, F-69622 Villeurbanne cedex.

Tel. : (33) (0)4 72 43 13 41 ; Fax : (33) (0)4 72 44 83 82 ;

E-mail : Francois.Atrops@univ-lyon1.fr

Registration form, 1st Tithonian Working Group Meeting (Lyon and South-Eastern France Basin, 15th-20th June 1997)

Surname..... Name.....

Address

City Postal Code..... Country.....

Tel..... Fax..... E-mail.....

My attendance to the Meeting is : very probable possible unlikely

I intend to present an oral contribution : yes no

5. 5. 4TH MEETING ON STRATIGRAPHY AND PALEOGEOGRAPHY OF IBERIAN JURASSIC

IV Meeting on Stratigraphy and palaeogeography of Iberian Jurassic

(Alcañiz, prov. Teruel Spain, 14th-19th September, 1997)

Spanish Mesozoic Group

The fourth Meeting on Iberian Jurassic will be organized by the Jurassic team of the University of Zaragoza, sponsored by the Spanish Mesozoic Group. It will be open to researchers from all nationalities working on stratigraphy and palaeontology of Iberian Jurassic.

ORGANIZATION

The meeting will be held in the city of Alcañiz, province of Teruel (E Spain) from September 14th to 19th 1997. The preliminary programme will be as follows: a three-day pre-congress field trip (September 15th-17th) and two days for scientific sessions (18th-19th).

ORGANIZING COMMITTEE

CONVENOR: Guillermo Meléndez (Paleontología, Universidad de Zaragoza, Spain).
Marcos Aurell (organization), Isabel Pérez Urresti y Graciela Delyne (Secretary).

SCIENTIFIC SESSIONS

Oral and poster communications can be submitted to any of the two programmed sessions. The first day will be devoted to the first monographic session: *Stratigraphic and palaeontological synthesis*. This will be intended to promote the presentation of global synthetic papers made up by research teams on different aspects of Iberian Jurassic. The second day will be devoted to a *general session*, including small presentations on local and/or particular problems. The aim of the meeting will be to raise the debate in depth on the palaeogeographic evolution of the Iberian plate during Jurassic times.

PUBLICATION

A first proceedings volume, including long abstracts of the presented papers and a second volume, the field guide of the excursion, will be delivered by the day of the meeting. Abstracts of the papers, up to three pages long including text-figures and references must be sent in advance, by the deadline June 30 1997.

The complete texts of the presented papers will be published in a regular issue of the geological journal: *Cuadernos de Geología Ibérica* (CSIC, Madrid). Hints for publication will be the usual ones for this journal.

INSCRIPTION DATES

February 28th, 1997: Deadline for returning the preinscription form
March, 1997: Delivery of 2nd Circular
May 31st 1997: Deadline for final inscription to meeting and excursion
June 30th 1997: Deadline for submitting of Abstracts of oral and poster communications.
The second circular will be sent only to those who have returned the preinscription form. The inscription fee for the meeting is 20000 pta. Inscription fee for the field trip will be also 20000 pta. Students can benefit of a 50% reduction in both cases (10000 pta).

CORRESPONDENCE AND SECRETARY OF THE MEETING

Please send all correspondence and the completed Preinscription Form to:
Guillermo MELENDEZ: Dpto. de Geología (Paleontología), Universidad de Zaragoza, 50009 Zaragoza, Spain;
Tel. Nr.: 34.976.761076; Fax Nr.: 34.976.761088; E-mail: guillermo.melendez@msf.unizar.es
Please Note: From February 8th 1997 the figure (9) must be dialed in the telephone and fax number.
Preinscription can be also sent via Fax or E-mail. We should be grateful if you would spread this information sheet around in your department.

Preinscription, IV Meeting on Stratigraphy and Palaeogeography of Iberian Jurassic Alcañiz (Prov. Teruel), Spain, 14th-19th September 1997

Surname..... Name.....
Address.....
City..... Postal Code..... Country.....
Tel. Nr..... Fax Nr..... e-mail.....

Will present a contribution
Session
Field trip

ORAL POSTER
 Monographic General
 Yes No

5. 6. BIOSTRATIGRAPHIE DU JURASSIQUE OUEST EUROPEEN ET MEDITERRANEEN

BIOSTRATIGRAPHIE DU JURASSIQUE OUEST EUROPÉEN ET MÉDITERRANÉEN

Groupe d'Étude Français du Jurassique

Coordonnateurs : E. CARIOU
P. HANTZPERGUE

elf aquitaine édition : Mémoire n°17

Publié en décembre 1996.
300 p., 6 fig., 79 tab., 42 pl.
Relié, format 21,5 x 27,5
ISSN : 0181-0901 - ISBN : 2-901/026-14-2.

Prix : 300 FF

Elf Aquitaine Édition
Elf Aquitaine Production
F-64018 PAU cedex, France.



Cette synthèse biostratigraphique intéresse en gros l'Europe occidentale et les pays du pourtour méditerranéen. Elle porte sur 11 groupes d'invertébrés et microfossiles. Trente cinq spécialistes ont collaboré à la mise à jour des tableaux de zonation, des successions d'associations d'espèces et de bioévénements, selon les groupes.

Ces diverses unités ou repères biostratigraphiques sont corrélés entre eux par référence au cadre chronostratigraphique défini par les Ammonites.

This biostratigraphic synthesis covers most of Western Europe and the countries which border on the Mediterranean. It focuses on eleven groups of invertebrates and microfossils. Thirty-five specialists collaborated to update the zonation tables and the series of species assemblages and of bioevents. The correlation between these diverse units, or biostratigraphic markers, is made using, as a reference, the chronostratigraphic framework as defined by the Ammonites.

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- signature

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SCIENCES DE LA TERRE - BATIMENT 402
43 boulevard du 11 novembre
69622 VILLEURBANNE CEDEX
FRANCE

Vous pouvez nous contacter par E-Mail : GEOBIOS@univ-lyon1.fr

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3	(1979) L'Urgonien des pays méditerranéens. A. ARNAUD-VANNAUD & H. ARNAUD (coord.) - 404 p., fig., pl.....	60FF
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