INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Newsletter 30

Edited by Nicol Morton and Paul Bown

July 2003

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FROM THE CHAIRMAN

Nicol MORTON

There is in several ways a four-year cyclicity in the workings of the Jurassic Subcommission. The Executive (i.e. Chairman, Vice-Chairman and Secretary) and the Voting Members are appointed by IUGS for a (renewable) four-year term of office, which is the interval between International Geological Congresses, in 2000, 2004, 2008 etc. However, for most of us by far the most important part of the four-year cycle are the International Jurassic Symposia, now timed to be approximately mid-way between IGCs, in 2002, 2006, etc.

This past year has seen the climax of our current cycle, with the superb 6th International Symposium on the Jurassic System held in September 2002 in Mondello, Sicily. We are all very grateful to our Italian colleagues in the Organising Committee, under the Chairmanship of Giulio Pavia (Torino), for all their hard work in the highly successful preparation and organisation of this great gathering of, to use John Callomon's phrase, the Jurassic family. He is right - the friendly atmosphere of these Symposia makes them the most enjoyable of events. The Conference Secretary, Luca Martire, has given an excellent report on the Symposium in this Newsletter. Apart from our memories there are permanent souvenirs already published in the form of the Abstracts volume, the Field Guide to the excursions and the two Gemmellaro volumes. These will be joined soon by the Symposium Proceedings. The stronger emphasis on thematic issues over biostratigraphic contributions compared with the early Symposia demonstrates the changes of direction which are under way in activities associated with the Jurassic Subcommission. It is interesting to report in this Newsletter that the International Commission on Stratigraphy is now following us!

In Mondello the location of the 7th International Symposium on the Jurassic System in 2006 was decided by open vote during the Subcommission meeting, also reported in this Newsletter. There was a clear majority in favour of this being held in Poland and Andrzej Wierzbowski (Warszawa) has been asked by the Subcommission to become Chairman of the Organising Committee for this event. We can all look forward to a visit to Poland during dates to be arranged.

Second place in the vote went to China. Perhaps the vote next time, in Poland, will be for the 8th Jurassic Symposium in 2010 to be held in China. This would confirm the international nature of the Subcommission's activities.

Biostratigraphy and chronostratigraphy must always remain as the strong foundation for research on Jurassic geology, with the programme of establishment of GSSPs for the Jurassic System and all the Series and Stages as the main priority at present. Three - Sinemurian, Aalenian (and Middle Jurassic) and Bajocian have already been ratified by IUGS and the proposal for the fourth, Pliensbachian, has been formally approved by the Voting Members of the Subcommission. It remains for minor revisions to improve the proposal to be completed before submission to ICS. The Pliensbachian Working Group under the Convenor Christian Meister are thanked and congratulated for all their hard work on this. Great progress has also been made with most other Stages and some Working Groups are now close to completion of selection of a GSSP and preparation of a proposal. All the successful proposals so far have taken many years to come to fruition - more years than are now available to meet the IUGS deadline of ratification (NOT submission) before the 2008 International Geological Congress.

Before then there will be the 32nd International Geological Congress in Florence, Italy, in August 2004. All the Subcommissions were encouraged by ICS to propose "special" sessions for this. In what I hope will not prove to be a rash moment of "inspiration" (or whatever else it was!) I suggested that the Jurassic Subcommission could organise a session with the title 'Jurassic World - Outside the Park'. Somewhat to my surprise this was accepted. I give more information about this later in the Newsletter and I hope that many of you will be able to make scientific contributions to what could be a high-profile event.

The Jurassic Subcommission is a body of the International Commission on Stratigraphy and so of the International Union of Geological Sciences. We are, therefore, governed by new statutes ratified last year (February 2002) by IUGS. Some aspects of these are discussed, with authority, by Geoff Warrington [who is also Secretary of the Triassic Subcommission] in his report for the Triassic/Jurassic Boundary (and Hettangian) Working Group (sorry, Task Group) I decided not to include these Statutes in this Newsletter because there are already many other things to report - you can consult them on the ICS website (www.stratigraphy.com). For the present I have also not adopted (with this one exception) some of the "cosmetic" changes such as the introduction of (to me inappropriate) American company terminology so that Working Groups and their Convenors become Task Groups with Chairpersons.

As with any family there are from time to time sad events to report. Since the publication of the last Newsletter we have lost two highly respected members of the Jurassic Subcommission - Bill Sarjeant (Voting Member) and Henri Tintant (Honorary Member). They are remembered by obituaries in this Newsletter (p. 38-42). I have personal memories of both.

In Bill's case it dates from the William Smith Symposium in Britain in 1969, when I remember being very impressed by a little notebook he proudly showed me in which he had made notes and given a star rating to all the malt whiskies he had sampled, and this came to about 200 I think. This kind of study has been carried out to a lesser extent by a few of us, but I don't know anyone else who, like Bill, followed his own teaching and recorded it all properly in his (field) notebook.

With Henri the occasion was during a lunch break in the Jurassic Symposium in Stuttgart (Rosenstein) in 1977. A large group of us, of various nationalities, was sitting round the table when Henri explained the significance of stratigraphy to wines in France, and especially the consequences of changing stage definitions. The wine Chablis was defined by (*inter alia*) the fact that the vineyards were established on the Kimmeridgian. After the 1967 Luxembourg Symposium when the French version of Kimmeridgian was modified to follow the "new" international agreement, this definition of Chablis had to be modified to ensure that inferior wines grown on Kimmeridgian limestones were excluded. So the new definition specifies the Kimmeridgian marls. Later, Henri explained to me that all French Appelation Controllé wines are governed by a Commission and that by law each must have a geologist as member. As Professor in Dijon he was the geologist on several commissions and so had a rather good wine cellar, so I should visit him sometime. Much later I discovered that he was also a superb chef, so one of my great regrets in life is that I never had the opportunity of visiting him at home.

I'm not quite sure whether the common theme running through these stories tells us something significant about members of the Jurassic family!

A third loss last year, also noted in this Newsletter (p. 41), was that of Michael House who, although not a member of this Subcommission, was a member of another Subcommission as well as making important contributions to Jurassic geology, particularly in the classical area of Dorset.

This Newsletter is the main channel of communication between all of us who have an interest in research on Jurassic geology and palaeontology. It is a publication, even though circulated only by electronic means. It should be available to everyone so please forward the Newsletter by whatever means you can to anyone who is interested in receiving it. In Mondello it was clear that this was not happening as widely as it should so that there were some colleagues informed us that they were not receiving the Jurassic Newsletters.

I close this report by expressing my grateful thanks to all the contributors and to Paul Bown for also putting the Newsletter together into its final form and distributing it.

Nicol MORTON, NICOL.MORTON@wanadoo.fr

REPORT ON 6TH INTERNATIONAL SYMPOSIUM 0N THE JURASSIC SYSTEM Mondello (Sicily), 12th-22nd September 2002

Luca MARTIRE, Secretary

Eighteen years have passed since the first International Symposium on the Jurassic System (ISJS) held in Erlangen (Germany) in 1984. Since then Jurassic researchers have met regularly, with a periodicity of three-four years, in Lisbon (Portugal, 1987), Poitiers (France, 1991), Mendoza (Argentina, 1994) and Vancouver (Canada, 1998). At first, these meetings were mainly dominated by biostratigraphers, and of course chiefly ammonitologists, of the Jurassic Subcommission who gathered regularly to compare, correlate and integrate biostratigraphic scales from different parts of the world with the final goal of defining GSSP's for the Jurassic Stages. Increasingly, however, the ISJS meetings have become broader in scope so that the focus is not a discipline or a geographical area or a palaeontological group, but a time period with all its aspects. This has made scientists from very different fields of Earth Sciences - from micropalaeontology to tectonics, from sediment-ology to geophysics - but all with a strong common interest, the Jurassic, meet regularly in a really widely international and multidisciplinary environment. The result has been lively and fertile discussions.

After two sessions in the New World, the ISJS returned to Europe for the 6th Symposium, organized by Giulio Pavia (Torino University) as President. It was held in Sicily (southern Italy) at the Centro Congressi La Torre which is beautifully located on a promontory of Mondello Bay, about 10 kms from Palermo city centre. A total of about 200 participants, representing 29 countries and 5 continents, convened in Mondello thus exceeding the already great results of past symposia and guaranteeing scientific success.

A varied field trip program was prepared, with a single pre-Symposium field trip and 5 post-Symposium field trips, which involved together about 130 participants. The pre-Symposium field trip aimed to introduce the Jurassic geology of western Sicily, giving an overview of the different palaeogeographical domains created by Triassic-Jurassic extensional tectonics in this crucial spot of western Tethys. The scientific programme of this field trip was very skilfully and wisely organized by Pietro Di Stefano (Palermo University) in such a way that participants could also enjoy the outstanding cultural attractions of western Sicily such as the ancient Greek temples of Segesta and Selinunte as well as the flavours of typical Mediterranean foods during invited lunch breaks in ancient farms.

Two post-Symposium field trips, led by Luca Martire (Torino University) and Massimo Santantonio (Roma La Sapienza University) respectively, focussed on details of two palaeogeographic units of western Sicily - the Trapanese and Saccense Domains. These show a common tectonostratigraphic evolution from Early Jurassic shallow carbonate platforms that drowned in the late Early Jurassic and became submarine plateaux with condensed pelagic sedimentation strongly affected by synsedimentary tectonics. Other field trips left Sicily and went to visit classical Jurassic sections in the Central Apennines and Southern Alps. Stefano Cresta (Agenzia Regionale Parchi Lazio) led one group to the Monte Nerone area, where pelagic successions with Sinemurian to Tithonian ammonite assemblages are beautifully exposed. Pierangelo Clari (Torino University) and Daniele Masetti (Trieste University) demonstrated to a second group several sections from the Trento Plateau and the Belluno Basin, part of one of the most beautiful natural transects across an

ancient passive margin. The first stop was at Lavini di Marco where one of the richest dinosaur tracksites in Europe was discovered about ten years ago.

In addition to the leaders, it is worth noting that a large number of contributors (more than 60) worked at preparing these field trips. This great effort resulted in the publication of a volume, edited by Massimo Santantonio, of more than 300 pages and 300 drawings, photos and palaeontological plates. The data reported in this volume were mostly unpublished and derive from 5 years of research by a national group coordinated by Giulio Pavia (Torino University). The funding of this by the Italian Ministry of University and Scientific Research is here gratefully acknowledged.

Another big editorial effort made in time for the 6th ISJS Symposium resulted in two volumes distributed to all the participants: 1) the anastatic reprint of the classical monograph on Jurassic fossils from Sicily by Gaetano Giorgio Gemmellaro, first published between 1872 and 1882 and obviously hardly accessible to the international palaeontological community; 2) the revision of the Jurassic ammonites of the Gemmellaro collections (edited by Giulio Pavia and Stefano Cresta), among which are many taxa newly defined by Gemmellaro commonly found in European successions.

As far as the scientific sessions are concerned, about 200 abstracts were received and compiled in the abstract volume of more than 200 pages. The large number of contributions submitted required the Organizing Committee to plan three parallel sessions for oral communications and two periods of poster displays. The scientific programme was organized in six special sessions, highlighting the multidisciplinary character of the meeting:

1) Jurassic tectonics and sedimentation: from intraplate rifting to margin platform growth and collapse, convened by Finn Surlyk (Copenaghen);
2) Taphonomy, facies and paleoenvironmental analysis, convened by Sixto Fernandez Lopez (Madrid);
3) Jurassic organisms in space and time, convened by Paul Smith (Vancouver);
4) Integrated stratigraphy, convened by Josef Palfy (Budapest);
5) Palaeoceanography and palaeobiogeography, convened by Hugh Jenkyns (Oxford);
6) Geoconservation: protecting Jurassic fossils, sites and science, convened by Kevin Page (Plymouth).

Each Convener introduced the session with a keynote lecture aimed to introduce the present state of the art in the specific field. Finally an open session allowed presentation of many mainly biostratigraphic research of regional interest.

Four moments of the plenary sessions were dedicated, both at the opening and during the following days, to invited lectures by outstanding scientists concerning aspects of Sicilian geology and more general aspects of Jurassic stratigraphy:

Jobst Wendt (Tübingen) gave a fascinating and unforgettable picture of how Sicilian geology and society appeared to the eyes of a young German in the Sixties;

Raimondo Catalano (Palermo) illustrated the extremely complex structural arrangement of the Sicilian chain in the light of the recent research greatly aided by seismic profiles;

John Callomon (London) made very lucidly the point of two centuries of progress in Jurassic bio-chronostratigraphy, combining scientific aspects with touching personal reminiscences;

Gerd Westermann (Hamilton) finally presented a review of the complex topic of ammonoid biogeography in which ecology, phylogeny and oceanography have yet to be integrated.

The proceedings of the 6th ISJS Symposium will be published in the *Rivista Italiana di Paleontologia e Stratigrafia* during 2003, under the scientific coordination of Guido Parisi (Perugia). It will probably contain more than 50 papers.

The organization of this meeting would not have been possible without the generous contributions by several public and private institutions that we have here the pleasure to thank once again: International Subcommission on Jurassic Stratigraphy, Consiglio Nazionale delle Ricerche, Dipartimento di Scienze della Terra of Torino University, Dipartimento di Geologia e Geodesia of Palermo University, Urbino University, Federazione Italiana Scienze della Terra, Assessorato dei Beni Culturali ed Ambientali e della Pubblica Istruzione of Regione Siciliana, Azienda Provinciale Turismo of Palermo, Italcementi, Eni spa, Nike Italia spa.

The next International Symposium on the Jurassic System will be held in Poland in 2006. To Polish colleagues our best wishes for a hard but rewarding work!

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MEETING OF JURASSIC SUBCOMMISSION MONDELLO, SICILY, 19th SEPTEMBER 2002

Nicol MORTON

On the occasion of the 6th International Symposium on the Jurassic System a meeting of the International Subcommission on Jurassic Stratigraphy was held on the final morning, before departures for the post-Symposium fieldtrips. The meeting followed on from meetings held earlier in the morning of some of the Subcommission Working Groups. The meeting was open to all and attended by "friends" as well as Voting and Corresponding Members of the Jurassic Subcommission.

Apologies:
Voting Members were asked to send apologies if unable to attend, and apologies were received from Peter Baumgartner and Jim Ogg.

Reports from Stage Working Groups:
[Please see Working Group reports in this Newsletter for more up-to-date details.]

Triassic/Jurassic Boundary: a summary of data for the four candidate sections was presented and would be sent to all WG members and to the IGCP (T/J Boundary Events) group.

Pliensbachian: the GSSP section had been selected and a formal proposal would be sent out soon.

Toarcian: For a GSSP proposal it had been decided to concentrate on the Peniche section, Portugal because this is the best available of the various sections considered. Sub-groups on other problems (e.g. anoxic events, biological events) may be established.

Callovian: There was nothing new to report on a GSSP proposal since the Vancouver meeting.

Oxfordian: Two possible sections in SE France have been proposed, though there remain some problems. Redcliff Point, Dorset, S England, has emerged as a possible alternative but requires further study.

Kimmeridgian: The diachronism of the Oxfordian/Kimmeridgian boundary between traditional Boreal (best section Staffin, Isle of Skye, NW Scotland) and traditional Mediterranean (best section Mt. Crussol, Ardèche, SE France) areas was close to being documented in detail, after which a resolution could then be proposed.

Tithonian: Studies were being carried out in different areas for possible candidate sections, and of the most appropriate biostratigraphic level for correlation.

Date, location of 7th Jurassic Symposium:
The next Jurassic Symposium should be held in 2006, maintaining a four-year interval. For the first time the location was decided by open vote during the Subcommission meeting. In response to a request in advance for suggestions, four invitations had been received from (in order of receipt by the Chairman) SW England (Malcolm Hart), China (Jingeng Sha), India (Jai Krishna) and Poland (Andrzej Wierzbowski). Each prepared a poster and gave a brief presentation to the meeting before being asked to withdraw briefly to allow general discussion and a vote by show of hands.

The votes given were as follows - SW England 4, China 23, India 5, Poland 34 (abstentions were not counted). Therefore, the 7th International Symposium on the Jurassic System will be held in Poland in 2006, with precise dates and locations to be arranged by the host organising committee.

The meeting expressed gratitude to all four proposers for their work in preparing a proposal and invitation.

Future activities of the Subcommission:
For most of the Jurassic Stages GSSP proposals have either been ratified or preparation is advanced. Although this is not envisaged by ICS and IUGS, it could be appropriate for the Jurassic Subcommission to ratify GSSPs for Substages and Standard Zones (and Subzones). This would be a continuation of activities for the established Stage Working Groups.

Otherwise it is appropriate for the Subcommission to continue to encourage development of Working Groups on various themes and topics in Jurassic stratigraphy, including, for example, climate, cyclicity and sedimentary sequences, evolutionary events, oceanography, palaeobiogeography, palaeogeography, tectonic events, and the Jurassic time-scale. In all of these topics the stratigraphical precision possible in the Jurassic is a significant asset.

The International Commission on Stratigraphy has also begun to have similar discussions about future directions after completion of the GSSP programme (due by 2008). To this end a special conference on future directions in stratigraphy was organised by the ICS in Urbino, Italy, in June 2002. The ISJS Chairman reported on this, see the separate article in this Newsletter (p. 5).

32nd IGC, Florence 2004:
During the next International Geological Congress, to be held in Florence, Italy, in August 2004, the Jurassic Subcommission will be organising a special half-day session on Jurassic themes. This will be a General Symposium (G22.8) with the title *Jurassic World (outside the Park)* to which anyone can contribute a poster. Details are given elsewhere in this Newsletter (p. 7).

Other Business:
The problem of communication remains - the main channel of communication is the Jurassic Newsletter, but this is still not being distributed as widely as it should be, especially in some countries. The number of Voting Members of the Subcommission is limited by IUGS and ICS Statutes, but there is greater flexibility over the number of Corresponding Members. The Subcommission has tried to establish an appropriate geographical network of Corresponding Members, but it is vital that each person receiving the Newsletter should copy it on to others. This should be very easy for anyone who has access to email.

The Jurassic Newsletter is now distributed electronically, however, the Newsletter is officially a publication, which can be referenced and quoted.

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NEW MEMBER OF JURASSIC SUBCOMMISSION

Nicol MORTON

Normally, Voting Members of Subcommissions are appointed by IUGS with effect from one of the International Geological Congresses. The current

membership was nominated and appointments confirmed during the 31st Congress in 2000. However, the death of one of the members of the Jurassic Subcommission resulted in a vacancy, which could be filled by "bye-election". Therefore, Jingeng SHA (Nanjing, China) has been appointed a Voting Member of the Jurassic Subcommission.

Professor Sha is Director of the Nanjing Institute of Geology and Palaeontology of the Chinese Academy of Sciences and President of the Palaeontological Society of China. He was previously a Corresponding Member of the Jurassic Subcommission and contributed to (for example) the previous Newsletter. I emphasise (again) that, like other Voting Members, Professor Sha is NOT a representative for a country, but appointed for his experience and expertise, not least as Director of an Institute with extensive research in many aspects of Jurassic geology and palaeontology. His personal research interests are in Mesozoic bivalves, palaeobiogeography and marine/non-marine correlations.

Professor Sha has been asked to take particular responsibility for Jurassic bivalves and palaeobiogeography, and for regional issues concerning South-Eastern Asia and generally the Eastern Tethyan region. He will also explore the possibility of establishing and being Convenor of a new Working Group on Marine/Non-marine Correlation. His contact details are:

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FUTURE DIRECTIONS IN STRATIGRAPHY

Special meeting of the International Commission on Stratigraphy (ICS) Urbino, Italy, 14-16 June 2002

Summary and Report- Felix GRADSTEIN (Chairman) & Jim OGG (Secretary)

Outline

Acknowledgements
The ICS thanks Stan Finney (ICS vice-chair) for organizing the meeting, and is very grateful to Prof. Rodolpho Coccioni and Dr. Simone Galeotti of the University of Urbino for hosting this conference and associated scientific and social program. Financial support for the Urbino conference logistics was provided by the IUGS, and travel support for several participants was from a special grant from ICSU.

Executive Summary

The special planning meeting of the International Commission on Stratigraphy (ICS) in Urbino, Italy on 'Future Directions in Stratigraphy' on 14-16 June 2002 has been overwhelmingly successful. A few highlights of this first-ever assembly of all ICS voting members are given below.

ICS Mission
The Commission is the primary body for facilitation of international communication and scientific cooperation in stratigraphy, defined in the broad sense of multidisciplinary activities directed towards better understanding of Earth history. The ICS needs to excite the next generation with new tools, high-resolution event correlation on a global scale, and other projects with relevance to public concerns and imagination.

To accomplish this mission, the Commission has established several strategic goals, including:

1. Completion of standards
a. A total commitment by the stratigraphic subcommissions to assign boundary stratotypes for the entire Phanerozoic by the year 2008.

b. Revitalisation of a Subcommission on Quaternary Stratigraphy scientifically linked with INQUA to propose major subdivisions of the Pleistocene and the base of the Holocene.

2. Enhanced visibility and publications
a. More effective and broader publication and distribution of the scientific accomplishments of ICS, particularly with respect to new stratigraphic standards, time scale, color codes, stratigraphic guidelines and nomenclature.

b. A business-like approach to creation and marketing of important stratigraphic products such as geologic time scale posters, boundary stratotype standard brochures, international stratigraphic guide,

stratigraphic teaching modules on CD, and major stratigraphic datasets.

c. A stratigraphic scientific journal sponsored by ICS, which would receive a portion of the income. One possibility is an upgraded and expanded *Newsletter in Stratigraphy*.

d. An electronic stratigraphic 'journal' with full-fledged articles and databases to link and complement the printed journal of ICS.

e. A theme-oriented popular stratigraphic journal directed toward understanding new stratigraphic concepts and events. This journal would have beautiful front-page covers, full color images, and general-geology level of review articles on exciting topics.

f. International stratigraphic prizes (*Hedberg* and *Steno*) to be awarded every 4th year coincident with the IGC.

g. Potential creation of the 'International Association of Stratigraphic Geologists' (IASG) maintaining close ties with IUGS and preserving a major part of the present Subcommission structure with unique expertise for major Periods of the stratigraphic column.

3. Coordination of comprehensive stratigraphic databases (e.g., CHRONOS system)

4. An Urbino-style all-membership planning meeting will be held every second year.

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Jim OGG, jogg@purdue.edu

Postscript from NM;
This was the first ever meeting of the members of the ICS, mainly composed of the Chairmen of the various Subcommissions plus the Executive (Chairman, Secretary etc.) and was by invitation only. The Secretary General of IUGS and President of the 32nd IGC were also invited.

Only an extract of part of the report of the meeting is given here. The full version can be read on the ICS website at **www.stratigraphy.org**

Post-postscript from NM:
The question of an ICS journal has recently (May 2003) been resolved by making *Lethaia* the official journal of ICS.

2ND COLLOQUIM OF MOROCCAN JURASSIC (CJM2) MARRAKESH, MOROCCO 21-22 APRIL 2004

Abdellah AITADDI & El Hassane CHELLAI

Invitation
The 2nd Colloquim of Moroccan Jurassic (CJM2) will take place in Marrakesh, Morocco, on April 21-22, 2004. Topics cover the entire range of Jurassic geology, focusing on the broader area of Tethyan margins and its surroundings. Extended abstracts (up to 2 pages) will be published for all accepted presentations (oral or poster).

The first circular has been released, and pre-registration has already begun. You can pre-register now by completing the pre-registration form and sending it by mail, fax (+21244433170), or e-mail (aitaddi@fstg-marrakech.ac.ma).

We would appreciate it if you could inform your colleagues and co-workers about this colloqium. For more information go to the web site: http://www.ucam.ac.ma/fssm/cjm2

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Topics
The conference will be structured into a number of main topics:
A- Genesis and Geodynamics of Jurassic sedimentary basins;
B- Stratigraphy, Palaeoecology and Taphonomy;
C- Central Atlantique Magmatic Province;
D-Jurassic petroleum systems;
E- Natural resources: water, minerals and energy;
F- Geoconservation and Jurassic fossil sites protection.

Field Trips
Two field trips are planned:
• Jurassic of the Central High Atlas (4 days);
• Jurassic of the Atlantic Atlas (2 days).
Fees and registration for field trips will be communicated in the second circular

Programme
The 2nd Colloquim of Moroccan Jurassic is designed to improve the current understanding of Jurassic Tethyan margins and its surroundings, with particular emphasis on the Moroccan Jurassic. The organising commitee, call fore titles of oral and poster presentations. The programme includes oral presentations, posters, specialised workshops, round tables, etc.

Language
The meeting will be conducted in French and English. No translation facilities will be available.

Publications
The organising commitee has agreed to publish the proceedings of this meeting in a special issue. The name of the review will be communicated in the second circular.

Organising Committee
Secretariat: A. Aitaddi and E. H. Chellai,
Treasurer: Kh. Elhariri and M. Mouguina

Sponsoring: H. Ibouh, N.E. Youbi, M. Bouabdelli, M. Amrhar and D. Chafiki
Archivist: A. Bachnou and Kh. Boummane
Reception: L. Daoudi and R. Zayane
Field trips: 1) A. Aitaddi, D. Chafiki, Kh. Elhariri, H. Ibouh and N. Khalil; 2) M. Amrhar, E. H. Chellai, L. Daoudi, M. Ouribane and N.E. Youbi

Registration fees
The unit of currency in Morocco is Dirhams, the approximates exchange rates (February 2003) are: 1 USD= 11 Dhs, 1 Euro= 10,2 Dhs

Students:	100 Dhs
Attending members:	300 Dhs
Organisations and companies:	1000 Dhs

The registration fees include abstracts volume, coffee-breaks and lunches.

Payment
Payment of fees should be made by bank transfer or postal order to the following treasury account:

Faculty of Sciences and Techniques, Guéliz (Marrakech-MAROC): 2nd Colloquim of Moroccan Jurassic (CJM2); treasury account: CHB 8016, general treasury of Marrakech

Please, include a copy of the bank transfer or the postal order-form with your registration.

Dates to remember
Symposium and field trip preregistration: 1st March 2003; submission of abstracts: 1st December 2003; distribution of the final programme: February 2004.

32nd INTERNATIONAL GEOLOGICAL CONGRESS, FLORENCE, ITALY, AUGUST 20-28, 2004

Symposium organized byISJS
Nicol MORTON, Giulio PAVIA, Paul SMITH

The 32nd International Geological Congress will be held in Florence, Italy, next year and looks set to be a big occasion. Information has already been widely circulated - you may already have seen the First Circular (web-site at http://www.32igc.org).

In response to a request from the Scientific Organising Committee of the 32nd International Geological Congress for suggestions for themes for symposia, the Jurassic Subcommission proposed a session with the title Jurassic World (Outside the Park). Much to our surprise the suggestion was received with some enthusiasm; now we have to do something about it! So our provisional plan is summarised below and we are encouraging contributions, especially in the form of posters related to the themes listed.

IGC General Symposium G22.07: Jurassic World (outside the park)

This will be a half-day session, with 8 to 10 oral presentations as the limit plus an unlimited number of poster presentations. Our plan is to have a framework of topics, for each of which we would arrange one (or possibly two) keynote speaker(s) to give an oral presentation which would set the scene and act as a sort of introduction to the topic. Most contributions will be as posters.

The themes proposed are as follows:

1. Dating, correlation and the time-scale in the Jurassic
The emphasis should be on integrated stratigraphy, the relative precision possible with biostratigraphy, and review the numerical time-scale. The aim is to show the level of precision in correlation possible in the Jurassic.

2. Jurassic Palaeobiogeography and Palaeo-oceanography
Given the widely accepted palinspastic reconstructions of Jurassic palaeogeography, what is the evidence from different fossil groups for palaeobiogeographic links and barriers through time; also reconstruction of ocean currents and circulation patterns, cyclicity in ocean plankton.

3. Jurassic Climates and Climatic Change in Time and Space
Global climate patterns during selected time-intervals and their evolution through the Jurassic Period, with emphasis on critical assessment of lines of evidence from all sources - facies, faunas and floras.

4. Jurassic Tectonic Events, their Dating and Correlation
This topic would focus on the identification and dating of major tectonic events - from rifting and subsidence of sedimentary basins to ocean spreading to volcanism and tectonic and metamorphic events in areas of deformation. The aim is to enable comparison of such events and build up a picture of global patterns.

5. Major Evolutionary Events during the Jurassic
This partly follows on from the *Organisms in Space and Time* session in Mondello. There is a wealth of well-dated palaeontological data for the Jurassic, but critical assessment of the data is required in order to successfully identify the diversification and extinction events which occurred.

6. Jurassic Ecosystems – Marine, Continental and Marginal
There was considerable diversity of ecosystems during the Jurassic, ranging from deep to shallow marine through marine/continental margin interactions to continental (inside the Park?). The purpose of this topic is to give a critical review of trophic structures in marine and continental environments; detailed studies of particular subjects, e.g. bivalve assemblages, reef-building, would also be relevant in posters.

7. General Topic
This will be by posters only. The topics selected above are intended to enable a wide range of material to

be presented. However, there remain valid contributions on other subjects which should be included but may not relate directly to any of the above topics.

We invite poster presentations on these topics. Abstracts of posters must be submitted for review by **30th November 2003** or if submitted online by **10th January 2004**.The abstract must be in English and no line drawings or electronic artwork will be accepted. Instructions for submission are given in the second circular. For online submission go to http://www.32igc.org and click on 'abstract submission'. For paper submission obtain a form from the Scientific Secretariat

Review and selection of submissions for this Symposium is the responsibility of the Symposium Convenors.

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REPORTS OF STAGE WORKING GROUPS

TRIASSIC-JURASSIC BOUNDARY TASK GROUP

Geoff WARRINGTON

1. Organisational matters

New statutes of the International Commission on Stratigraphy (ICS) were ratified by the International Union of Geological Sciences (IUGS) in February, 2002, and supersede those ratified by in January, 1997, which appeared in *ISJS Newsletter* 26 (January, 1999).

In the 2002 statutes, bodies within ICS that have specific scientific objectives, such as the selection and definition of stratigraphic boundary stratotypes, are designated 'Task Groups' (TGs). The former Triassic-Jurassic Boundary Working Group (TJBWG) is one such body, the formal name of which is now the Triassic-Jurassic Boundary Task Group (TJBTG). The semantics are irrelevant; the objective of the body remains the same.

The 2002 statutes provide TGs with a four-year mandate that may be extended for one more term; a TG is automatically dissolved once it has fulfilled its objective. Officers of a TG (Chair (formerly Convenor) and Secretary) are selected by the management of the relevant ICS subcommission and serve for the period between consecutive International Geological Congresses (IGCs; normally four years); they may be re-elected for one additional four-year term. The present TG Chair (Warrington) and Secretary (Bloos) were elected in 2000.

The previous statutes stated that Intersystem Boundary Working Groups, such as the TJBWG, should be made up 'of ten (10) to twenty (20) Voting Members, including its officers, and shall represent regional and methodological diversity in an appropriate manner'. The 2002 statutes provide for the appointment of a 'reasonable' number of members to 'represent regional and/or methodological diversity in an appropriate manner' and vote on relevant issues; Voting members of a TG are elected by its executive, in consultation with existing voting members, and are confirmed by the management of the relevant ICS subcommission. For approval, all decisions require a 60% majority of delivered votes, subject to a quorum of 60% being achieved; a second vote is required if no quorum is achieved. Elections involving multiple candidates require the winner of a relative majority of less than 60% to achieve a 60% confirmation in a second ballot, in which they are the only candidate. Voting shall be by postal ballot or electronically, with a deadline of 60 calendar days for receipt of responses. Voting members may vote 'Yes', 'No' or 'Abstain'; 'hard-copy' postal confirmation of electronic votes may be requested.

In a document (*Future Directions in Stratigraphy*), issued after a special meeting in Urbino in June, 2002 and summarised in *Episodes* (**25** (3), 203: September 2002), the ICS announced a number of strategic goals. One, a 'total commitment by the stratigraphic subcommissions to assign boundary stratotypes for the entire Phanerozoic by the year 2008', is directly relevant to the future activity of TJBTG and is to be interpreted in terms of the current ICS statutes.

The ICS date for completion of boundary stratotype decisions is, effectively, that of the IGC in 2008, leaving little more than five years after the appearance of this report for the work of the TJBTG to be completed. Some workers involved with the TJBTG view the ICS schedule as providing licence for work on candidate stratotype proposals to continue for much or all of that time. This is, however, unrealistic and unacceptable. From this period must be subtracted the time required for what will be a lengthy voting procedure. The TJBTG will require at least two separate votes; the first to select a preferred candidate basal stratotype for the Hettangian Stage and, *inter alia*, the base of the Jurassic System, and the second to vote on that preferred candidate. The preferred candidate, when selected, will be referred to the International Subcommission on Jurassic Stratigraphy (ISJS) for consideration and a vote. If supported by a vote in the ISJS, the candidate will then be referred to the ICS for consideration and a vote.

The TJBTG must, therefore, now consider the candidate Global Stratotype Sections and Points (GSSPs) proposed for the base of the Hettangian Stage and proceed quickly with the selection of the preferred candidate. A presentation summarizing the attributes of the four candidates that have been advocated was made by the TG Chair at the TJBTG business meeting convened during the 6th International Symposium on the Jurassic System (6ISJS) in Sicily in September, 2002. This presentation was based upon responses to a questionnaire sent to the proposer(s) of each candidate GSSP. The questionnaire was intended to provide a basis for an objective comparison of the attributes of each candidate GSSP in relation to the ICS guidelines for the establishment of global chronostratigraphic standards (Remane et al., 1996; see also: Remane,

1996; Murphy & Salvador, 1999). Information was presented in five tables, reproduced here, in which the attributes of the candidate GSSPs are shown in relation to the principal categories in the ICS guidelines: *viz*. geological requirements (Table 1, next page), biostratigraphical requirements (Table 2, next page), biota available for correlation (Table 3, next page), other means available for correlation (Table 4, next page, next page), and non-geological requirements (Table 5); the degree to which each candidate fulfils the primary requirement for correlatability, through its record of relevant marker events, is summarized in Table 6 (next page). These tables are presented here to illustrate the information received by the TG Chair regarding the current state of knowledge for each candidate GSSP; ***they do not form any part of a preliminary vote*** which will be conducted on the basis of a comprehensive dossier of information provided by the respective proposers of each candidate and issued to Voting Members with their ballot form.

The TJBTG, like the TJBWG before it, does not have a formally constituted voting membership, but one must be established before any vote is embarked upon. The present TG membership will be considered in relation to ICS statutory requirements, including representation of regional and methodological diversity, and in consultation with the ISJS Chairman, who is required to confirm the voting membership. The ISJS Chairman has emphasized, during the ISJS Plenary Meeting at the 6ISJS in Sicily in September 2002, that ISJS voting members ***are not national representatives***; the same stricture applies to TJBTG voting members who will be responsible to the international geological community for the selection and proposal, to the ISJS, of a candidate GSSP for base of the Hettangian Stage and, *inter alia*, that of the Jurassic System.

Table 1: GEOLOGICAL REQUIREMENTS

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
ADEQUATE EXPOSURE? (THICKNESS SEEN IN CONTINUOUS SECTION)	11.5m	129m	>80m	185m
CONTINUOUS SEDIMENTATION (AROUND PROPOSED BOUNDARY LEVEL)?	**YES**	**YES**	**YES**	**YES**
RATE OF SEDIMENTATION ADEQUATE TO SEPARATE SUCCESSIVE EVENTS?	**YES**	**YES**	**YES**	**YES**
ABSENCE OF SYNSEDIMENTARY AND TECTONIC DISTURBANCES?	**YES**	***beds 'near vertical'***	**YES**	***small faults***
ABSENCE OF METAMORPHISM AND STRONG DIAGNETIC ALTERATION?	**YES**	***hornfels grade; CAI 4.5-5.0***	***aplite intrusions within 250m***	**YES**

Table 2: BIOSTRATIGRAPHICAL REQUIREMENTS

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
FOSSILS ABUNDANT, DIVERSE AND WELL PRESERVED?	**YES**	**YES**	**YES**	**YES**
VERTICAL FACIES CHANGES NEAR PROPOSED BOUNDARY LEVEL?	**NO**	**NO**	**NO**	***7.5m below***
MARINE FACIES ? (FAVOURABLE FOR LONG-RANGE CORRELATION)	**YES**	**YES**	**YES**	**YES**

Table 3: BIOTA

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
[illegible]	Radiolarians, porifera, gastropods, ammonoids, bivalves	Spores/pollen, coccoliths, foraminifera, radiolarians, porifera, ammonoids, bivalves, conodonts, ichthyoliths	Porifera, coelenterates, inarticulate brachiopods, articulate brachiopods, gastropods, nautiloids, ammonoids, scaphopods, bivalves, ostracods, crinoids, holothurians, conodonts, fish, reptiles, trace fossils	Spores/pollen, charophytes, coccoliths, dinoflagellate cysts, prasinophytes, foraminifera, coelenterates, gastropods, ammonoids, bivalves, ostracods, echinoids, fish, reptiles, acritarchs, trace fossils
[illegible]	Plants, foraminifera, coelenterates, bryozoa, brachiopods, nautiloids, scaphopods, cirripedes, ostracods, crinoids, ophiuroids, echinoids, holothurians, fish, amphibians, reptiles	Plants, dinoflagellate cysts, coelenterates, bryozoans, brachiopods, gastropods, nautiloids, scaphopods, crinoids, ophiuroids, echinoids, holothurians, amphibians, reptiles	Plants, spores/pollen	Plants, radiolarians, bryozoa, brachiopods, nautiloids, scaphopods, cirripedes, crinoids, ophiuroids, conodonts
APPROPRIATE STUDY NOT MADE OR NOT REPORTED	Spores/pollen, dinoflagellate cysts, coccoliths, conodonts	Cirripedes, ostracods	Dinoflagellate cysts, coccoliths, foraminifera, radiolarians, bryozoans, cirripedes, ophiuroids, echinoids, amphibians	Porifera, holothurians, amphibians

References:

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Table 4: OTHER METHODS

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
ISOTOPIC DATING	*Not studied*	**U-Pb** (zircon)	*Not studied*	**Re-Os**
MAGNETO-STRATIGRAPHY	*Not studied*	*Remagnetized*	*Unsuccessful*	**YES**
CHEMO-STRATIGRAPHY	*Not studied*	$\partial^{13}C_{org}$ *(diagenetically degraded?)* ; TOC	$\partial^{13}C$; Th/U; K%; REE; Cr, As, Sb	$\partial^{13}C_{org}$; TOC; % carbonate; Th/U; Re/Os; $^{187}Os/^{188}Os$; organic geochemistry
REGIONAL CONTEXT/FACIES RELATIONS	**YES**	**YES**	**YES**	**YES**
SEQUENCE STRATIGRAPHY	*Unsuccessful*	*Not studied*	*Not studied*	**YES**
IMPACT STUDIES?	*Not studied*	*In progress*	*Not studied*	*No Ir anomaly*
OTHER STUDIES	*None reported*	*None reported*	Sea level curve	Kerogen, sedimentology, sedimentary petrography, clay mineralogy, diagenesis, gamma-ray character

Table 5: NON-GEOLOGICAL REQUIREMENTS

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
APPROACH MEANS/ROUTE(S)	***AIR:*** To Lima, then Chachapoyas; ***ROAD*** : c.2hours; ***WALK*** : 10 minutes	***AIR*** : To Vancouver, then Sandspit (Queen Charlotte Islands); ***ROAD*** : c.1 hour; ***BOAT*** : c.2 hours; ***WALK*** : 100m	***AIR*** : To Reno; ***ROAD*** : 240km; ***WALK:*** 1km	Numerous options include: (i) ***AIR*** : To London; ***ROAD*** : 255km; ***WALK: 0.7km.*** (ii) ***TRAIN*** : To Taunton; ***ROAD*** : 30km; ***WALK*** : 0.7km
NATURAL RESTRICTIONS?	*Seasonal weather; altitude*	*Tides/seasonal weather; landing from open sea*	*Climate; terrain (off-road vehicle recommended)*	*Tides*
PERMIT REQUIRED FOR ACCESS?	**NO**	*YES (From Parks Canada and Haida Tribal Council)*	**NO**	**NO**
PERMIT REQUIRED FOR SAMPLE COLLECTION?	**NO**	*YES (From Parks Canada and Haida Tribal Council)*	**NO**	*YES (from English Nature)*
PROVISION OR GUARANTEE OF PERMANENT PROTECTED STATUS?	*No*	**YES**	**YES**	**YES**

Table 6: EVENTS

CANDIDATE GSSP	CHILINGOTE (Peru)	KUNGA ISLAND (Canada)	MULLER CANYON (USA)	ST AUDRIE'S BAY (UK)
Biostratigraphic	**YES**	**YES**	**YES**	**YES**
Isotopic	*No*	**YES**	**YES**	**YES**
Magneto-stratigraphic	*No*	*No*	*No*	**YES**
Dated level	*No*	**YES**	*No*	*No*

2. 6th International Symposium on the Jurassic System

The 6ISJS in Mondello, Sicily, provided an opportunity for a number of workers involved with studies of Triassic-Jurassic boundary successions to meet. A business meeting of the TJBTG was held on 19 September **(2.1)**, the last day of 6ISJS, and was followed by a report on TJBTG activities to the ISJS in Plenary Session **(2.2)**. The 6ISJS programme included a number of verbal and poster presentations relevant to this topic **(2.3)**.

2.1. TJBTG Business Meeting: 19.9.2002

The TG Chair had requested an allocation of time for a business meeting of the TJBTG during the 6ISJS, but received no specific information on this matter. On the basis of a general allocation for business meetings given in the 6ISJS Final Circular, he advised TJBTG members that the meeting would be on 19 September, between 09.00 and 10.30. At the 6ISJS it become evident that the TG would have only 30 minutes for its business, because of the number of such meetings to be held before the ISJS Plenary Meeting. In this situation the TG Chair prepared and conducted the following Agenda:

1. Welcome
2. Apologies for absence
3. Base Hettangian GSSP requirements
4. Candidate GSSPs: review of attributes
5. Matters arising from Item 4
6. Future meetings

Present: Bertellini, Bloos, Bown, Buratti, Carpentier, Carter, Chellai, Cirilli, Eagle, Edmonds, Feist-Burkhardt, Frixa, Gorican, Hall, Hesselbo, Hori, Hughes, Lathuiliere, Matsuoka, Mitta, Morton, Page, Palfy, Remane, Sha, Siblik, von Hillebrandt, Warrington, Whalen, Yin.

Item 1: The TG Chair welcomed TJBTG members, members of IGCP Project 458 (Triassic-Jurassic Boundary Events) and others. He outlined the Agenda and hoped that this could be completed in the very limited time available.

Item 2: Apologies had been received from Baud, Grant-Mackie, Guex, Hounslow, Orchard and Taylor (in response to the announcement of the meeting to TJBTG members).

Item 3: As an introduction to Item 4 the TG Chair reviewed the ICS guidelines and requirements for GSSP selection (from Remane et al., 1996: *Episodes*, **19** (3), 77-81):

Geological
- Exposure over an adequate thickness of sediments
- Continuous sedimentation: no gaps or condensation close to the proposed boundary level
- Rate of sedimentation sufficient for separation of successive events
- Absence of synsedimentary and tectonic disturbances
- Absence of metamorphism and strong diagenetic alteration

Biostratigraphic
- Abundance and diversity of well-preserved fossils
- Absence of vertical facies changes at or near the proposed boundary level
- Facies favourable for long-range biostratigraphic correlation

Other methods
- Radioisotopic dating
- Magnetostratigraphy
- Chemostratigraphy
- Knowledge/understanding of regional palaeogeographical context and facies relationships

Other requirements
- Physical and logistical accessibility
- Freedom of access

- Existence of, or provision for, permanent protection and a permanent fixed marker

Item 4: Four candidate GSSPs (*ISJS Newsletter* **27**, 20: December 1999) have been proposed for the base of the Hettangian Stage, defining, *inter alia*, the base of the Jurassic System and the Triassic-Jurassic intersystem boundary. The TG Chair has obtained, from the proposers of each candidate, responses to a questionnaire intended to facilitate the objective assessment and comparison of the attributes of each section in relation to the ICS requirements. The results of this exercise, illustrating the position achieved by the TJBTG, were presented in six tables.

Item 5: The very limited time available did not allow general discussion of the material presented under Item 4. The TG Chair referred to the ICS decision that work on Phanerozoic GSSPs must be completed by 2008 and stated that this should not be taken as licence to carry on working on a candidate until that date. He considered that there was no reason to defer selection of a preferred candidate GSSP; views such as that expressed at this and other meetings, that no action should be taken until a particular group had completed further work, were unacceptable.

Item 6: Notice was given of a meeting in Vancouver (26-28 May, 2003) and of the IGC in Florence (August, 2004), both of which will include thematic sessions on IGCP Projects 458 (Triassic-Jurassic Boundary Events) and 467 (Triassic Time) and related topics.

The TG Chair closed the meeting, thanking those present for their attention and hoping that outstanding issues could be discussed later in the day, before delegates dispersed.

2.2. Report by TJBTG Chair to the ISJS Plenary Session: 19 September, 2002

The TG Chair presented a brief report to the ISJS, summarizing the proceedings and content of the TJBTG Business Meeting (**2.1**, above).

2.3. 6 ISJS contributions relevant to the TJBTG *(from Abstracts and Program volume: * - not presented)*

Lectures:

BLOOS, G. Psiloceratids of the earliest Jurassic in the northwest European and Mediterranean provinces – a comparison.

EAGLE, M. K. Jurassic crinoidea and the impact of the T/J bundary extinction event on New Zealand faunas.

GALLI, M. T., JADOUL, F., BERNASCONI, S. M. & WEISSERT, H. The Southern Alps: a key area for a complete Carbon isotopic stratigraphy across the Triassic/Jurassic boundary.

GÓMEZ, J. J. & GOY, A. The Lower Jurassic cycles and palaeogeographical evolution of the central portion of the Iberian Platform, (eastern Spain).

HALL, R. & PITARU, S. New Hettangian ammonite faunas and the Triassic-Jurassic Boundary: Fernie Formation, Williston Lake, British Columbia.

HESSELBO, S. P., ROBINSON, S. A., SURLYK, F. & PIASECKI, S. Terrestrial and marine extinction at the Triassic-Jurassic boundary, carbon-cycle perturbation and possible links to initiation of massive volcanism.

HORI, R. S. & CARTER, E. S. Precise correlation of Radiolaria at the Triassic/Jurassic boundary between Inuyama, Japan and Queen Charlotte Islands, Western North America.

JIARUN YIN. Jurassic ammonoids biochronology in the Tibetan Himalayas.

PÁLFY, J. Advances in the integrated stratigraphy of the Jurassic.

RICCARDI, A. C., DAMBORANEA, S. E. & MANCENIDO. M. O. The Triassic/Jurassic boundary in the Andes of Argentina.*

SMITH, P. L. Jurassic organisms in space and time.

SMUC, A. & GORICAN**.** Jurassic sedimentology and subsidence history in the Julian Alps.

TRIPATHI, A. Palynology evidences Jurassic sedimentation in Rajmahal Basin, Santhal Pargana, Jharkand, India.

WARRINGTON, G. The Late Triassic to Early Jurassic succession in Somerset, England: palynostratigraphic and other considerations.

WILMSEN, M., MEHDI, M. & NEUWEILER, F. Facies development and stratigraphy of an Early Jurassic rift basin: the Lias of the Central High Atlas of Rich, Morocco.

Posters:

ABERHAN, M. Early Jurassic bivalve biodiversity: biogeographic and ecological patterns.

AL-SAAD, H. The Jurassic System in Qatar: stratigraphic and hydrocarbon approach.

AURELL, M., ROBLES, S., ROSALES, I., QUESADA, S., MELÉNDEZ, G., BÁDENAS, B. & GARCIA-RAMOS, J. C. Palaeogeographic evolution of Jurassic northeast Iberian basins in relation to transgressive-regressive sedimentary cycles.

BARDONABA, A. P. & AURELL, M. Sequential analysis of the Lower Jurassic of the northern Iberian range (NE Spain).

BERTELLINI, A., NANNARONE, C., PASSERI, L. & VENTURI, F. Hettangian ammonites and radiolarians in the Mt. Camicia succession (Gran Sasso, Central Apennines).

COHEN, A. S. & COE, A. L. Geochemical evidence for the cause of environmental change at the Triassic-Jurassic boundary.

HAGGART, J. W., CARTER, E. S., ORCHARD, M. W., WARD, P. D., TIPPER, H. W., SMITH, P. L. & TOZER, E. T. Triassic-Jurassic boundary strata, Queen Charlotte Islands, British Columbia, Canada.

MATSUOKA, A. & ZAMORAS, L. R. Radiolarian faunas around the Triassic/Jurassic boundary in chert sequences in Busuanga Island, North Palawan Block (Phillipines).

SHA JINGENG, QUN YANG, DONGLI SUN, HUAWEI CAI, BAOYU JIANG, GUOXIONG HE, CHENGQUAN HE, BINGGAO ZHANG, HUAZHANG PAN, JIANGUO LI & JINHUI CHENG. Marine Jurassic fossils assemblages from China.

STOLARSKI, J. & RUSSO, A. Early Jurassic stylophyllids (Scleractinia) from northeastern Sicily.

VIJAYA. Taphonomic observations and palynological dating of Dubrajpur Formation, Birbhum coalfield, West Bengal.

3. New literature relevant to the TJBTG

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CARNEY, J. N., AMBROSE, K. & BRANDON, A. 2002. Geology of the Loughborough district - a brief explanation of the geological map. *Sheet Explanation of the British Geological Survey*. 1:50 000 Sheet 141 Loughborough (England and Wales). Keyworth, Nottingham: British Geological Survey, ii+34pp.

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4. Contact information

Members of the TJBTG are asked to inform the TG Chair and Secretary immediately of any changes in their contact details (postal address, telephone and/or FAX numbers (including national and areas codes), or e-mail address) in order to ensure that they continue to receive notices and information from the TG.

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* IMPORTANT NOTE:
The TJBTG Chairman retires from the British Geological Survey at the end of July and will not be there after 25 July 2003. His e-mail address and phone number at BGS will not be effective after that date. Items may be posted to BGS but must be addressed to Dr S. G. Molyneux and clearly marked 'for the attention of G. Warrington'. After 25 July FAX messages may be sent to the main BGS FAX number (+44 (0)115 9363200) but these must also be addressed to Dr S. G. Molyneux and clearly marked 'for the attention of G. Warrington'. Any future changes to contact information, including any new e-mail address, will be communicated as soon as possible.

PLIENSBACHIAN WORKING GROUP

Christian MEISTER, Convenor

Multidisciplinary research on the boundary stratotype, developed over years by the Pliensbachian Working Group of the International Subcommission on Jurassic Stratigraphy is now brought to a conclusion with the proposition of the Wine Haven section at Robin Hood's Bay (Yorkshire, UK) as the best outcrop for defining the Global boundary Stratotype Section and Point (GSSP) of the Stage (Fig. 1).

The classic foreshore and cliff exposures of the Lower Lias in Robin Hood's Bay are undoubtedly one of the most important and complete «mid»-Sinemurian to Pliensbachian sequences in Europe. The Sinemurian-Pliensbachian is well developed in Robin Hood's Bay and contains a complete succession of quite well-preserved ammonite assemblages. The Sinemurian–Pliensbachian boundary succession lies within the Pyritous Shales Member and comprises pale grey and buff-coloured sandy mudstones which pass upwards into silty dark grey shales (Fig. 2 and ISJS Newsletter 29). The boundary between the Pliensbachian and Sinemurian stages is placed very close to the base of Bed 73 (1011), exactly at the base of Bed 73b in the Wine Haven section (i.e. 6 cm above the mid-line of nodules forming bed 72) (Fig. 3). It is characterized by the association of *Apoderoceras* sp. and *Bifericeras donovani* DOMMERGUES & MEISTER. The ammonite *Gleviceras* juv. aff. *iridescens* (TUTCHER & TRUEMAN) also belongs to this association. This fossil assemblage overlies the last Upper Sinemurian Echioceratidae and precedes the first classic Lower Pliensbachian *Apoderoceras* and *Phricodoceras taylori* (SOWERBY) (Fig. 4).

The data will be published in the *Eclogae Geologicae Helvetiae* (Meister *et al.* in press).

A formal proposal document was submitted for voting to all members of the Pliensbachian Working Group and to Voting Members of the ISJS. The results of the votes (January 2003) were:
Pliensbachian Working Group: 28 YES - 3 ABSTAIN - 0 NO
Jurassic Subcommission: 18 YES - 0 ABSTAIN - 0 NO.

This result is due to hard work by many members of the Pliensbachian Working Group in Wine Haven (Blau, Dommergues, Feist-Burkhardt, Hart, Hesselbo, Hylton, Meister, Page & Price) and in other regions, namely in Germany (Ebel) for the section of Herford-Diebrock (NW Germany), Schlatter in Pliensbach (SW Germany) and in Italy (Faraoni, Macchioni, Marini, Pallini, Parisi & Venturi) for the Bosso River section (Central Apenine, Italy). Note also that a recent study was published by Mike Howarth based on Leslie Bairstow's unpublished notes on Robin Hood's Bay (Howarth, 2002). In addition, Mark Hounslow is planning to do some palaeomag sampling in the Wine Haven section.

The proposal has therefore been accepted by the ISJS. Agreement on the choice of Wine Haven and on the definition of the Sinemurian-Pliensbachian boundary being achieved, the proposal will now be submitted to the ICS and, if accepted, to IUGS for ratification.

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Figures as pdf attachments

Figure 1. Wine Haven section. (a, b) Location of Robin Hood's Bay, Yorkshire, UK.

Figure 2. Wine Haven outcrop, (A-B) Lithological sequence at the Sinemurian-Pliensbachian boundary, bed 73b indicates (broken line) the base of the Pliensbachian.

Figure 3. Detail of the Sinemurian-Pliensbachian boundary in Wine Haven.

Figure 4. Ammonite faunas and horizons at the Sinemurian-Pliensbachian boundary.

TOARCIAN WORKING GROUP

Serge ELMI, Convenor

A first step in the search for a good profile to define the Pliensbachian – Toarcian boundary by a GSSP was taken in 1996 – 1998 after meetings of the Toarcian and Aalenian Working Groups in Fuentelsaz (Spain). A proposition was made to select the boundary marker in the Western Tethyan domain. This suggestion was submitted informally to several members and, although participation has been poor, a consensus was reached.

Several localities were proposed in Portugal, Morocco and Algeria where stratigraphical gaps do not exist or are very short. The North African localities have been discounted owing to problems of accessibility or to the existence of magmatism, or to poor documentation on the overlying Toarcian succession.

In conclusion, it appears now that the best profile currently available is in Peniche, Portugal (Ponte da Trovã- Cruz dos Remedios section). This proposal was given general agreement during the 6th Jurassic Symposium in Mondello (Sept. 2002). One of the positive features of this locality is that the «Tethyan» *Eodactylites* fauna is succeeded by the «English» *Orthodactylites* succession, in particular the occurrence of *O. crossbeyi* documents the equivalent of the Clevelandicum Subzone.

However, a lot of work remains to fulfill the requirements of the Subcommission. After preliminary contacts, a number of colleagues have provisionally shown interest in this work. Others will be very welcome. Work will be done in collaboration with Portugese colleagues (Rocha, Duarte and others). Concerning the ammonites, the essential basic work has been done by Mouterde, but some nomenclatural problems remain and Meister and Macchioni have expressed an interest. Goy and his Madrid colleagues will also participate and their experience with the Aalenian GSSP will be very useful. A team led by E. Mattioli will study the nannofossils (Mailliot PhD thesis). The brachiopods have already been studied by Alméras (see monograph). C. Ruget has long experience of the foraminifera and her studies can be extended to the microfauna from calcareous levels; M. Hart is also interested. Sedimentological studies will be coordinated by Duarte, and Wilson's results are of great value. Jenkyns will also be interested in the implications of the slightly later anoxic crisis.

Several colleagues have expressed an interest in visiting the locality. A provisional date for this has been arranged for the last week of October, any colleagues interested in this field meeting should contact Elmi and/or Rocha as soon as possible (Serge.Elmi@univ-lyon1.fr and rbr@mail.fct.unl.pt).

The priority of the Working Group is the definition of a precise reference or standard marker point as the GSSP for the base of the Toarcian Stage. This is a point in the bed at the chosen section, identifiable preferably by several criteria, not just a biostratigraphical marker based on a single species. This bed must be characterized by a palaeontological association. The choice will not resolve all the dynamic problems (event stratigraphy, biologic, biostratigraphic or sedimentologic). The work of the group may be subsequently extended but, at present, the priority is to define the GSSP.

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BATHONIAN WORKING GROUP

Sixto Rafael FERNÁNDEZ-LÓPEZ, Convenor

Two sections showing stratigraphically continuous sedimentation with good palaeontological content and fulfilling the recommendations of ICS are suitable for proposal as GSSP: Bas Auran (Haute-Provence, France) and Cabo Mondego (Portugal).

The Bas Auran section, in the Geological Reserve of Haute-Provence (France), has been proposed previously, but needs ratification as the preferred GSSP by the Bathonian Working Group. Other candidate sections for the Bathonian GSSP, in Iberia and North Africa, are still under study and discussion within the Bathonian Working Group.

New collecting of ammonites and field studies at Cabo Mondego (Portugal) were carried out in 2002 by Fernández-López and Henriques. Sampling through up to thirty metres of strata, enables distinction of the two highest zones of the Bajocian (Garantiana and Parkinsoni Zones) and the lowest zone of the Bathonian (Zigzag Zone). Parkinsonids, characteristic of the northern European faunal region or Subboreal Province, as well as Phylloceratina and Lytoceratina characteristic of the Mediterranean Province, are very scarce. The Garantiana Zone is characterized by an abundance of *Spiroceras annulatum* (DESHAYES), associated with *Prorsisphinctes* [M] - *Vermisphinctes* [m], *Garantiana* [M] *and Oppelia subcostata* (J. BUCKMAN). Specimens of *Sphaeroceras* and *Trimarginia* have been identified. Unfortunately, the uppermost Bajocian Parkinsoni Zone is poorly characterized due to the scarcity of well preserved ammonoids. Specimens of *Dimorphinites* occur, but possibilities for correlation of the youngest Bajocian ammonoids with those from the Mediterranean and Subboreal Provinces remain quite limited. The Lower Bathonian boundary may be established by the first appearance of the genus *Morphoceras*. The Convergens Subzone may be subdivided into a lower biohorizon with the development of *Zeissoceras* [M] - *Nodiferites* [m], *Lobosphinctes* [M] - *Planisphinctes* [m], and *Procerozigzag* [M] - *Zigzagiceras* [m], and an upper biohorizon characterized by the abundance of *Morphoceras* [M] - *Ebrayiceras* [m] and *Procerites* [M] - *Siemiradzkia* [m]. In the oldest Bathonian biohorizon, a specimen of *Gonolkites convergens* BUCKMAN has been found. These biohorizons correspond respectively to the Parvum and Macrescens subzones recognized in various areas of the Submediterranean Province.

New literature:

New papers concerning the Bajocian/Bathonian boundary are listed below.

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PAVIA, G.; MARTIRE, L.; CANZONERI, V. & D'ARPA, C. 2002. Rocca chi Parra Quarry, a condensed rosso ammonitico succession: depositional and erosional geometries, neptunian dykes and ammonite assemblages. In: SANTANTONIO, M. (ed.), General Field Trip Guidebook, VI International Symposium on the Jurassic System: 42-48.

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CALLOVIAN WORKING GROUP

John CALLOMON, Convenor

Since the last Newsletter there is once more little formal business to report concerning the Bathonian-Callovian Boundary Stratotype. Hope continues to sustain the plan to see the formal proposals prepared for submission in the coming year. It has also been a quiet year on the Callovian front elsewhere. This reflects the maturity of our state of knowledge of the Stage and, it has to be recognized, a shrinking band of those with the interest, time and resources to be active in it. The unsurpassed Colloquium on the Jurassic organized by our Italian colleagues at Palermo provided once again an opportunity to meet old friends from all over the world and to discuss problems in the Callovian as in the other Stages, but nothing of great import requiring urgent attention seemed to emerge. One of the many surprises was to be presented with copies of two superb volumes reprinting and revising the immortal contributions of Gaetano Gemmellaro. Callovian examples, though perhaps modest in numbers, include key elements fundamental in modern revisions world-wide.

There continues to be progress here and there at the local level. I can report only one example from personal experience. It concerns parts of the Kellaways Beds in the Lower Callovian. These are rarely seen in Britain, being developed largely in soft, recessive facies, so that there are almost no natural outcrops other than on the Yorkshire coast. They do, however, underlie wide tracts of river gravels in the basins of the upper reaches of the Thames, south of Cirencester in Gloucestershire. These gravels are intensively exploited, in part for the usual purposes of filler for concrete but, being composed largely of limestone derived by erosion of the Cotswolds, they find a particular use ground up as base for making cast building-blocks for housing in artificial Cotswold Stone. Drainage ditches expose the Kellaways Beds and

although the sections thus opened are very shallow, they are exposed over large areas. This provides ideal conditions for collecting rich assemblages from very narrow stratigraphical intervals, i.e. for the characterisation of faunal horizons. As a result, two new biohorizons of ammonites have been discovered in the vicinity of the village of Ashton Keynes. The first lies above that of *Kepplerites galilaei* and is characterised by forms that retain the size and rounded whorl-section of *K. galilaei* but have already the involute coiling and fine, dense ribbing of *Sigaloceras*. The *galilaei* horizon labelled XIII in the volume of the Lisbon Colloquium (1989) has therefore to be replaced by two: XIIIa and XIIIb. The second lies a little higher still and yields forms now unmistakably assignable to *Sigaloceras*, but having tabulate, flattened venters, only on the phragmocone. This is followed by a level of the true *Sigaloceras calloviense*, formerly XIV, now the higher of XIVa, XIVb. Finally, the most fossiliferous level of them all, that of *Sigaloceras micans*, XV. All these horizons span a thickness of strata barely more than two metres. I was particularly pleased to find confirmation of the distinctness of the levels of *Sig. calloviense* s.s. - always rare - and *Sig. micans*, found in profusion. To it belong most of the specimens figured in the literature. And so it goes on: Buckman would have felt pleased.

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OXFORDIAN WORKING GROUP

Guillermo MELENDEZ, Convenor

Introduction

The work of the Oxfordian Working Group during the last year has mainly focused on the effort for definition of the Callovian-Oxfordian boundary stratotype. As noted in the last OWG report (Meléndez, 2002) the main debate on this point is between two main candidate sections: the previously proposed section at Thuoux-Savournon, in SE France (Haut-Provence Alps) near the town of Serres, where the Callovian-Oxfordian transition interval is developed in an expanded, "Terres Noires" (black shales) facies; and the recently described section of Ham Cliff, east of Redcliff Point, Weymouth in Dorset, S England.

As remarked during the ISJS session Mondello, the year 2008 has been identified by the IUGS as the deadline for the completion of all GSSP designations. The proposal of the Oxfordian GSSP has followed a long history of studies and discussions, reflected in the yearly reports of the Group which have appeared through the years in this Newsletter. The main proposals so far have been already presented and developed in previous reports (Meléndez, 1999; 2002) and can be summarized as follows:

1. The SE France GSSP proposal, at the twin localities of Thuoux and Savournon, near Serres (Haute Provence), shows a good ammonite succession across the boundary (Fortwengler, 1989; Fortwengler & Marchand, 1994; Fortwengler *et al.*, 1997) including common cardioceratids, hecticoceratids and peltoceratids, and rare perisphinctids. It also yielded a good dinoflagellate succession (Poulsen *in* Meléndez, 1999). According to this report, the Lamberti-Scarburgense Subzone boundary (i.e. the Lamberti –Mariae Zone boundary) is sharply marked at the section of Savournon by the replacement of *Pareodinia prolongata* (LAD) by the *Wanaea fimbriata* (FAD) at the base of the Scarburgense Subzone and *Gonyaulacista jurassica desmos* (FAD) a bit higher, in the Praecordatum Subzone. However, some unresolved questions have so far impeded final proposal of this excellent section in either outcrop to the ISJS and the ICS. These are:

- The scarcity to total absence of other fossil groups (macro and micro) other than ammonites and dinoflagellates;
- The lack of such important data as magnetostratigraphy and radiometric dating;
- The debates concerning the cardioceratid succession itself in these sections and the interpretation by the authors (Fortwengler *et al.*, *loc. cit.*) of the species *Cardioceras woodhamense* Arkell at a higher horizon within the Scarburgense Subzone, contradicting its "classical" stratigraphic position in Britain at the type-locality in Woodham, as in the basal horizon within the Scarburgense Subzone (Arkell, 1939);
- The biostratigraphic unit proposed as the basal horizon of the Scarburgense Subzone (and hence, for the lower Oxfordian), the Thuouxensis Horizon based on the hecticoceratid species *Brightia thuouxensis* Fortwengler, still contains scarce elements of the *Cardioceras paucicostatum* Lange group but no (or exceptional) representatives of *Cardioceras scarburgense* (Young & Bird). This fact led some authors to consider this Thuouxensis Horizon as part of the Lamberti Subzone, Paucicostatum Horizon and a terminal, top horizon of the Callovian (see Meléndez, 1999; OWG Report; also discussion by Page *et al.*, in press, Fig. 1).

2. Alternative GSSP proposals for the Callovian/Oxfordian boundary, following the guidelines of the ICS were presented in Britain: The section of Osgodby Nab at Cornellian Bay near Scarborough (the type locality of the basal Oxfordian Scarburgense Subchronozone, in N England) was first put forward by Callomon (1990) after previous description by Wright (1968, 1983). It failed to receive further support after re-examination of the succession during the OWG field trip in 1993 showed it was too incomplete and condensed at the Lamberti-Mariae Zone boundary (Meléndez, 1999; see also Page *et al.*, in press).

However, favourable sections across the Callovian-Oxfordian boundary, in expanded clay facies, have been identified in Weymouth Bay, Dorset (S England). More precisely, the section at Ham Cliff, near Redcliff Point, was briefly referred to by Arkell (1947) while Wright (1986) made only brief mention of the outcrop. John Callomon sent this comment to me:
"The reason why it had been neglected since Arkell's days was that it was usually obscured by slumping and shingle. I remember looking at it in 1956 and actually

finding the Lamberti Zone there, in a small outcrop above the shingle. But all I learned was that it confirmed Arkell's report of an occurrence which had been ignored previously. Exceptional storm conditions in the winter of 1991-92 swept it all clear, giving a fine exposure".

Since then the section has been studied by various authors, who remarked on its potential as GSSP candidate for the Callovian/Oxfordian boundary (Callomon, 1993; Callomon & Cope, 1995; Page, 1994, 2002). The ammonite succession recognized by N. Chapman (1997, 2000) across the Lamberti-Mariae Zone gave rise to intense debates due to the particular interpretation of some *Cardioceras* species such as *C. paucicostatum* Lange and *C. woodhamense* Arkell (see Meléndez, 2002, OWG report).

Work in Progress

A detailed stratigraphic study and palaeontological sampling of the Callovian-Oxfordian transition at Ham Cliff is now being undertaken by several British colleagues (Page *et al*., in press). Preliminary results of this study appear promising as some of the drawbacks of the section in Haute Provence might be, at least partly, overcome. Such microfossil groups as foraminifera (agglutinated and calcareous), nannofossils, ostracoda and holothurian sclerites are common at these stratigraphic interval and seem to provide useful supplementary information to the ammonite biostratigraphy. Further sampling work to carry on studies on the microflora are still under way, and geochemical and magnetostratigraphic samplings have also been attempted (Coe & Ogg, 2002).

An obvious advantage of the section at Ham Cliff is, according to Page *et al.* (*loc. cit*.), its location "within the South Dorset Coast Site of Special Scientific Interest (SSSI). Hence it is protected for its geological and ecological features under the Countryside and Rights of way Act 2001". The main drawbacks for stratigraphic studies and palaeontological sampling are due to its particular location at the seaside, which makes it especially vulnerable to local landslipping. This point, minimized by previous authors, has been underlined by Page *et al*. (*loc.cit.*, figs. 5, 7). Also, the fact that, according to the same authors, "The extent and quality of the exposure at Ham Cliff varies from season to season and from year to year, depending on the height of the shingle storm beach and cliff erosion". All these features might to some extent set real sampling and study problems, in relation to the requirements of the ICS.

Forthcoming work programme

In order to trigger progress on stratigraphic and palaeontologic studies of these potential candidate sections across the Callovian-Oxfordian boundary, a new, supplementary sampling programme has also been scheduled in late May in SE France, at the Thuoux-Savournon sections. This will try to complete as far as possible the macro and microfossil successions, as well as geochemical and isotope analyses. This work will be undertaken by A. Chiara Bartolini (Univ. Paris), whilst F. Atrops (Univ. Lyon) and G. Meléndez (Univ. Zaragoza) will revise the ammonite succession, mainly perisphinctids, in order to establish a biostratigraphic succession parallel to those recognized by Fortwengler (1989), Fortwengler & Marchand (1994) and Fortwengler *et al*. (1997) for the cardioceratids, oppeliids and peltoceratids. Members of the "Dorset Team" (Kevin Page and others) have been also invited to take part in this sampling programme, in order to have the chance to make a first-hand comparison of ammonite successions in both areas. Further search for relevant microfossil groups, which has proved unsuccessful so far, is also programmed. Fabianne Giraud (Univ. Lyon) will study the nannoplankton samples. Macroinvertebrates, other than ammonites, are scarce in this interval, but Graciela Delvene (Univ. Zaragoza) will study the bivalve associations.

Similarly, a programme of further field sampling has been scheduled for this springtime or early summer, 2003 in Dorset, with participation of the OWG convenor and some other colleagues (F. Atrops, A. Chiara Bartolini) invited, to collaborate with the "Dorset team". The aim is to revise the ammonite successions, especially other than cardioceratids, and to carry on with geochemical and isotope analyses. Sampling for other macroinvertebrate groups and nannoplankton is also planned. Should the results prove satisfactory, this would allow submission of a joint proposal before the end of 2003. In which the Dorset section of Ham Cliff could be an alternative candidate for Oxfordian GSSP (see Page *et al.*, in press for details).

Following personal information received from the ISJS chairman (Nicol Morton) " there is urgent requirement for further work on several topics – possible researchers could include - Kevin Page and John Callomon (ammonites), Malcolm Hart (forams and some other microfossil groups), Paul Bown (calcareous nannofossils), Stephen Hesselbo/Angela Coe/Darren Gröcke (sedimentology and geochemistry including C O and Sr isotopes etc.), Mark Hounslow (palaeomagnetic stratigraphy)". It is still not resolved who might take the study of other macroinvertebrate fossils (which are not very abundant, anyway).

Final remarks: GSSP proposals

Results of this new research, added to the excellent work previously carried out in both areas, should provide a sound basis to arrive at a general consensus on the most suitable candidate section. This will be presented by the members of the Oxfordian Group as potential GSSP for the Callovian-Oxfordian boundary. It seems that, whatever the final decision, the choice will not be bloody since, as the two sections are the only outcrops known so far showing such good stratigraphic and ammonite succession. No doubt one of them will be the stratotype (GSSP), with the 'golden spike', whilst the other will be proposed as Auxiliary Stratotype Point (ASP) to provide supplementary information from a distinct, separate area. Both sections will stand as the universal reference for this particular stratigraphic boundary.

Acknowledgements
This report has been prepared with the great help of personal information from many OWG Members and colleagues, especially Kevin Page (Univ. Plymouth), John Callomon (London), Nicol Morton (ISJS chairman, Ardèche, France), John Wright (Royal Holloway College, London), François Atrops (Univ. Lyon, France), Anna Chiara Bartolini (Univ. Paris-VI, France), Raymond Enay (Univ. Lyon, France), Dominique Fortwengler (France), Didier Marchand (Univ. Dijon, France) and Niels Poulsen (Geol. Survey, Denmark). It is also based on the useful information provided in the paper, now accepted for publication in *Geosciences in south-west England* by K. Page, M. Hart, N. Chapman, M.J. Oxford and M.D. Simmons (2003). I wish to express my warm thanks to all of them and to all colleagues currently working on the Callovian-Oxfordian boundary stratotype problems.

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KIMMERIDGIAN WORKING GROUP

Andrzej WIERZBOWSKI, Convenor

The first results of field-studies carried at Flodigarry in Staffin Bay, Isle of Skye, Scotland, were presented during the 6th ISJS Symposium in Palermo in 2002, and the relevant paper was submitted to the Symposium Proceedings. The paper presents the general ammonite succession in the Flodigarry section – a possible GSSP candidate for the Oxfordian/ Kimmeridgian boundary. However, some additional studies in the section are planned for this year (2003). These include additional collecting of ammonites around two levels of greater chronostratigraphic significance: (1) at the first appearance level of the

ammonites *Pictonia*, and *Amoeboceras* (*Plasmatites*) ex gr. *bauhini* – corresponding to the base of the Baylei Zone and the Bauhini Zone of the Subboreal and Boreal lowermost Kimmeridgian; (2) at the boundary of the Bauhini and Kitchini zones of the Boreal scheme, corresponding to the base of the Submediterranean Galar Subzone, and thus having great correlation potential (for details see: Wierzbowski, 2002; Matyja et al., 2002, 2003 in press). There is also progress in the palaeomagnetic (M. Hounslow), and oxygen-carbon isotope studies (D. Grocke) in the Flodigarry section: after the taking of additional samples the final results are expected soon.

The next step for studies concerning the Oxfordian/Kimmeridgian boundary problem should include the Submediterranean sections – especially the Mt. Crussol section in southern France (F. Atrops) which may be treated as another candidate GSSP section. It is also necessary to document in detail sections from Central and Eastern Europe – in Poland, Russia and southern Germany, important for correlation of the Subboreal/Boreal and Submediterranean zonal schemes. A new chart showing correlation of the major standard chronostratigraphical zonations around the Oxfordian/Kimmeridgian boundary is presented and discussed in this Newsletter (p. 26).

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Publications:
New publications related to the Oxfordian/ Kimmeridgian boundary problem announced to the convenor (excluding papers cited above):

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TITHONIAN WORKING GROUP

Federico OLORIZ, Convenor & Guenter SCHWEIGERT, Secretary

Ki-Ti boundary news

In 2001, F. Atrops compared and studied ammonites from the Canjuers and Crussol sections with those from SW Germany. Although there are, at present, no GSSP candidate sections in SW Germany, a correlation between SW Germany and the French sections is quite easy, and the French sections appear to represent adequate candidates for a later definition of the lower boundary of the Tithonian in respect of its excellently preserved and diverse ammonite faunal

succession, especially the *Hybonoticeras* chronospecies relevant for correlation.

During the 6th Jurassic Symposium in Mondello, Pavia et al. proposed a Sicilian section, Fornazzo near Castellamare in W Sicily, as an alternative GSSP candidate. A publication dealing with this section and an integrated stratigraphical approach was prepared for publication in the Symposium volume.

There can be no doubt, that both a discussion on the sections and, later, voting needs previous publication of the main stratigraphic results and relevant faunas. The presentation of the Canjuers and Crussol sections is just in preparation (F. Atrops, G. Schweigert, J. Ogg, and others). We hope to finish the study this year so that it should be available for the next Working Group meeting planned for 2004 in Stuttgart, Germany (as a joint meeting with the Oxfordian/Kimmeridgian group).

Other activities

M. Rogov (Moscow) is very busy studying new and traditional sections of the Upper Jurassic of the Russian Platform. The aim is a better correlation between the "Volgian" and the Standard Tethyan zonation, helped by Tethyan ammonites migrating into the Subboreal of Russia and vice versa.

M. Schudack, M. Aberhan (Berlin) and other collaborators are involved in a new integrated project on the famous dinosaur site of Tendaguru in Tanzania, which is partly Kimmeridgian – Tithonian in age.

F. Olóriz (Granada) & A.B. Villaseñor (Mexico) are progressing with precise biostratigraphy and the interpretation of the occurrence of Tethyan ammonites in relation to trangressive pulses during the Early Tithonian in Mexican areas. One paper is under revision in GFF and another one will soon be sent to Geobios.

F. Olóriz & A. Serna (Granada) are working on the precise stratigraphy of ammonite assemblages through Kimmeridgian/Tithonian boundary strata in the Betic Cordillera while F. Olóriz and J.Mª Molina are studying the taphonomy of these and other Kimmeridgian and lower Tithonian ammonite assemblages, in the Betic Cordillera.

New Publications

References to new papers concerning the Kim/Tith boundary, Early Tithonian stratigraphy or containing information on these topics are listed below. These are only those which have been communicated to the Convenor or to the Secretary. Abstracts presented in the abstract and field trip volumes of the 6th Jurassic Symposium in Mondello are not listed here, apart from that of PAVIA et al. on the Fornazzo section.

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REPORTS OF THEMATIC WORKING GROUPS

GEOCONSERVATION WORKING GROUP

Kevin PAGE, Convenor

The Geoconservation Working Group held it first formal meeting at the 6th International Symposium on Jurassic Stratigraphy in Mondello (Sicily) on the 19th September 2003. The meeting followed two conference sessions dedicated to the Geoconservation theme, during which 9 talks were presented and 5 posters displayed – both sessions and the working group meeting were very well attended. This is certainly a remarkable achievement for all involved and certainly demonstrates that for a significant number of Jurassic specialists, geological conservation issues are of very real concern and significance.

The publication in the conference proceedings of the various papers submitted in this field will make a

valuable contribution to the development of geoconservation as a discipline, especially within Europe. Crucially these papers represent the views and experience of true scientific specialists, rather than environmental managers. They therefore address aspects of the protection of geological sites and specimens from the only group who can really comprehend the true significance of the protected features and the implications of the various, activities which impinge on important geological and palaeontological sites.

For the recommendations of the Group to carry weight in a wider scientific or heritage management forum, they should clearly represent the objective views and experience of true scientific experts. It is also clear that links need to be developed with other related projects, within IUGS (e.g. the *Geosites* programme; Wimbledon et al., 2000) but also regionally, for instance with ProGEO in Europe (*The European Association for the Preservation of the Geological Heritage*; www.sgn.se/hotel/progeo). In this way greater support could be gained for any recommendations and consequently a greater likelihood of their adoption as working practice.

The Working Group meeting in Palermo included further discussion on the proposed statement on Palaeontological Heritage, which had been previously distributed electronically in the Third Circular for the meeting in 2002. This classification scheme is again reproduced here, as an Appendix, to allow other colleagues to comment. Please email these to the Convenor of the Working Group. A brief statement of affiliation and research interests would also be useful!

***Other activities*:** The ISJS, through the Geoconservation Working Group, formally offered its expertise to the management group for the recently listed East Devon and Dorset "Jurassic Coast" World Heritage site in southern England (see Report of the Geoconservation Working Group in *Newsletter* **29**). Further discussions on this matter will continue (see also the forthcoming newsletter of the British Institute for Geological Conservation which can be seen at www.sgu.se/hotell/progeo/nordeuropa/bigc.html).

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APPENDIX: Draft Statement of Guidelines for the Conservation of Palaeontological Heritage and the Protection of the Global Geological Time Scale.

Preamble: The following statement has been developed to provide guidelines and recommendations for national, regional and local community administrations, heritage conservation services and officials, and all owners and managers of geological heritage sites and palaeontological heritage resources, both in natural outcrop and in public and private institutions. It recommends the adoption of legal systems, methodologies and policies which promote the protection and responsible management of geological, including palaeontological, heritage for future generations. Fundamentally and in the spirit of international collaboration and co-operation, this management should permit ongoing site-based research and study, in order to facilitate the continuing education and scientific development of global societies as a whole. As a framework for the wise and responsible management of this global geological heritage, a scheme of principles is recommended which, if adopted, could assist in the decision-making process as to which mechanisms and statutes are necessary, within the context of national legal process and policy, to achieve such ends. The principles recommended would apply not only to natural monuments of geological, including palaeontological, importance, but also to the moveable heritage that these sites have yielded, that is rock, fossil and mineral specimens of significant scientific importance. These two schemes of principles are outlined below:

For **PALAEONTOLOGICAL HERITAGE**, the following classification scheme for fossil specimens, as a guide for decision making processes, is proposed:

Category 1: Specimens of typological importance for the definition of fossil species as regulated by the International Commission on Zoological Nomenclature (a UNESCO project), including holotypes, lectotypes, neotypes and syntypes. Every type specimen is a global reference for the species it defines, it is therefore irreplaceable. The type specimen of even the smallest oyster species is more important, in heritage protection terms, than a skeleton of a large dinosaur, if the latter has no typological significance. Scientific method therefore dictates that all Category 1 fossils must be deposited and protected in nationally recognised scientific and cultural institutions and legal systems should aim to achieve such ends. Specimens only become types, however, after scientific study, which can only be facilitated by free and open access to palaeontological localities for *bone fide* geological study. Legal systems should on the one hand ensure that such access can take place and on the other hand seek to guarantee that institutional deposition and full protection of the relevant specimens is achieved once study is completed.

Category 2: Specimens figured or cited in scientific papers or unique, rare or exceptionally complete specimens or assemblages of specimens of fundamental importance to actual or future scientific studies. Specimens belonging to Category 2 are fundamental to the science of palaeontology, both as the evidence for published studies and as the raw material for ongoing or future studies. Conservation and legal systems or practice should, therefore, ensure, including through the use of expert advisors or assessors, that such specimens are deposited and protected within nationally recognised institutions,

where they will remain accessible for future study and appreciation.

Category 3: Key specimens of stratigraphical or palaeobiological significance, material complementary to ongoing scientific studies, specimens of especial suitability for museum display or educational use, by virtue of completeness or other features of instructive value. Category 3 specimens are not only important for ongoing scientific research, they are also important for scientific education. They would include rare records of important taxa better known at other localities and assemblages of ecological or stratigraphical importance in place in natural outcrops. Specimens of high educational value are included, even if their research potential is more limited. Conservation and legal systems or practice should aim, therefore, to promote the wise management of this resource by preventing the over-exploitation of Category 3 fossils and ensuring that the needs of educational and research are not prejudiced by activities such as commercial or unregulated recreational collecting. Wherever possible, these procedures should encourage the deposition of Category 3 fossils in national or regional institutions, to maximise availability for future scientific study or educational use.

Category 4: Common and representative species and specimens, well represented in national museums and other institutions, or sufficiently abundant that any non-scientific collecting or removal will not prejudice future scientific work; specimens collected loose, for instance from scree, rubble or beach material, where the lack of stratigraphical information significantly reduces scientific use. Such specimens can be very abundant, even rock-forming and may even become part of a commercial mineral resource, such as limestone or coal. The use of such specimens for teaching, public education and personal enjoyment provides opportunities to promote a respect and understanding for geological heritage, without prejudicing its long-term conservation. Category 4 fossils do not normally require legal protection, especially when they lie outside of protected areas. It is therefore recommended that legal systems adopt a degree of flexibility to allow more public experience of palaeontological heritage belonging to Category 4, but at the same time providing guarantees, guidelines and statutes to ensure that any new finds assignable to categories 2 and 3, or potential to Category 1, can be fully protected.

Categories 1-3 would be considered to be of "significant scientific importance" in the context of palaeontological heritage management with only Category 4 specimens considered to be as "not of significant scientific importance".

For those geological sites of regional and international importance for the definition and use of a global **GEOLOGICAL TIME SCALE**, including stratotype sections and reference localities, the following framework, as a guide to identification, delineation, protection and managed scientific study is proposed:

1. Boundary delineation: The site is clearly identified and delineated, to its full scientifically relevant extent, both in documents and, as far as is practical, in the field, including through the use of appropriate national procedures relevant to the permanent protection of natural monuments and natural heritage sites, and through governmental development planning, structural and construction-regulation systems. Site selection is of course, a crucial precursor to site protection, and in many cases national lists compiled by specialists may already exist, for instance linked to the IUGS Geosites programme. Such lists can provide a valuable framework for selecting sites for legal or procedural protection.

2. Management scheme: A clear administration system should be applied or established to oversee the management and protection of the geological site and regulate scientific and educational use. This administration should have the authority the grant permission to any bone fide person or group, whether national or foreign, for the genuine and responsible scientific use and sampling of the stratotype locality. The authority should also have the legal power, or access to such systems, that permit appropriate action to be taken to prevent damage, destruction or irresponsible non-scientific removal of the geological features and specimens for which the geological area is protected. The use of internet web-sites to inform would-be visitors of procedures they should follow is beneficial.

3. Free Access: Access procedures, including applications for legal permissions, should be simple and efficiently managed and permit free and open use of the geological site by both national and foreign scientists, for genuine and responsible research and study. When in doubt as to the *bone fide* status of applicants, the responsible authority can establish suitability through existing national and international scientific networks, including Subcommissions of the International Commission on Stratigraphy.

4. Collection of specimens: The responsible scientific collecting of geological specimens, including rocks, minerals and fossils, is an essential part of the *bone-fide* scientific use of a stratigraphical locality and should not be unreasonably restricted. Conversely, steps should be taken to control, restrict or prohibit the non-scientific collection of specimens, for instance for commercial or recreational purposes, should such activities have the potential to impair or damage the scientific utility and heritage value of the site. The principles of palaeontological heritage classification, cited in this statement, can provide a guide for regulating the ultimate destination of any palaeontological specimens collected, but noting that the protection of specimens in foreign institutions, especially those belonging to categories 3 and 4, can benefit science and international understanding and co-operation, without threatening or undermining the goals and responsibilities of national heritage protection agencies and systems.

Concluding remarks: The responsible management of sites of regional and international importance for the definition and communication of the Geological Time Scale provides opportunities for all nations to contribute to the global understanding and wise management of the exceptionally rich natural heritage of this unique planet that we share

Further information on global geological heritage can be obtained from: www.sgn.se/hotel/progeo and www.unesco.org/science/earthsciences/geological heritage].

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LIAISON WORKING GROUP

Robert CHANDLER, Convenor
with contributions by Volker DIETZE, Murray EDMUNDS and David SOLE

The past year has been an active and scientifically productive time for Jurassic research in England. The Dorset Geologists' Association prepared a guidebook on the geology of the Dorset and Devon coast which includes excursions within the World Heritage Site. Doreen Smith and a host of workers are to be thanked for all their hard work. The year also saw the sad loss of Michael House (1930-2002) who is a contributor to the guide. The Dorset group fondly remembers Michael, and has dedicated the book to his memory. The title is *Coast and Country Geology Walks in and around Dorset* (ISBN 9544354-0-0).

Work with English Nature concerning FACELIFT has brought together Dorset County Council and various landowners in an attempt to restore and make scientific collections from important sites in the Dorset area. Presently, Frogden Quarry near Oborne, an important SSSI in the Middle Jurassic, has proved a successful partnership with all involved. Scientific collections have been made from the section from the Inferior Oolite, Sauzei to Ovale Zones and later work will explore the upper beds (Bajocian–Bathonian) in careful detail.

On the coast at Burton Bradstock, due to the skills of David Sole and Tony Gill, it was possible for me to obtain excellent faunas, carefully collected from the Garantiana and Parkinsoni Zones. The exposure was temporary, in preparation for the caravan park.

Murray Edmunds has been active for some time on the Lower Lias of the Radstock platform. He has made careful and detailed collections from temporary exposures during the construction of a business park. Some of this material will soon be published in the *Proceedings of The Geologists' Association* and will figure new material and interpretations of the Lias ammonites found. See also his contribution to this report.

Success has been limited in finding people to work on phyla other than ammonites. However, I have recently been in contact with a number of students interested in researching the depositional environment of the Inferior Oolite bivalves (see note by David Sole). Volker Dietze has been studying private collections in Germany and a short report follows.

Some contributions by private collectors in Southern Germany to scientific work in the Jurassic.

Volker DIETZE

In Southern Germany there is a tradition of private fossil collecting unrivalled in other countries. In the 19th century such collectors were often priests, chemists or teachers; the local intelligentia. Today this has changed totally. We have collectors from every social level and the success of collecting has little to do with the intellectual status, much more with vigorous enthusiasm and a wish to learn more about palaeontology. For example, in a small town such as Aalen there exists a Geological Club with about 100 members, 30 or so having a serious scientific agenda, including R. Schlegelmilch, well known for his publications on Jurassic ammonites.

Sometimes private collections are a rich source of interesting, and often important, specimens from special sites or levels, mostly near the home of the collector. As a consequence we have in Southern Germany many excellent private collections from each Jurassic Stage, including ammonites, corals and echinoderms, and collections of vertebrate fossils including those of the Solnhofener Plattenkalke (Upper Jurassic), and the Holzmaden (Toarcian).

Recently, tunnelling in the Franconian Alb near Dorns, at the classical site of Thalmässing has attracted hundreds of collectors, many of whom have accumulated representative faunas of ammonites; a task often impossible for a university- or museum-based scientist. Included in the specimens of the "tunnel project" workers are some unknown or poorly understood Lower Bathonian (Convergens Subzone) morphoceratids, which hopefully will be investigated in the near future. People who are experts in the use of air tools and airabrasive technology have cleaned many such specimens, a time consuming and expensive task!

It is clear, that some of these collections are vital to the preservation of material that would otherwise be lost to science. In addition, increasingly more can identify important and interesting specimens and know well the stratigraphy and disposition of the strata in their region.

My first serious scientific publication was a result of co-operating with local collectors in the classical area of Schwandorf in the Upper Palandine previously investigated by Arkell (1951). I was shown a small site in a wood with a very unusual fauna of Bathonian ammonites. I would never had the idea to look anywhere like this for ammonites. Some of my colleagues have collected now for 40 years in the Lower Bajocian of the Fils area. With their help it will be possible to revise Waagen's (1867) classical work within a modern framework.

The discovery of an early stephanoceratid in the Laeviusula Zone of the Wutach area by a private collector was the start of an investigation of similar-aged and comparable ammonites in Southern England. One of the results is the new ammonite genus *Westermannites* and a better understanding of the development of early stephanoceratids. One collector showed me a site in the Middle Swabian Alb, where it is possible to collect excellent specimens from the Sauzei/Humphriesianum Zone boundary. This is very unusual for Southern Germany. In another private collection I was able to evaluate a collection of Toarcian and lowest Aalenian ammonites of the Eastern Swabian Alb and gather information for part of a work about *Onychoceras*/*Csernyeiceras*. Most of the material gathered for a revision of the genus *Strigoceras*, under the leadership of G. Schweigert, comes from private collections.

Most important are the friends accompanying and supporting me in the field. These people have generously donated the scientific material for my research, a level of collecting that I could not undertake alone.

Work in progress on Liassic ammonites of the Radstock Shelf

Murray EDMUNDS

Although I have a science education and work in a scientific (medical) environment, I am essentially an amateur collector of Liassic ammonites and not a trained geologist. Nevertheless, I have pursued the hobby energetically for over twenty years, and in the process of extensive field work and reading of scientific literature, I have built up some knowledge of Liassic ammonite biostratigraphy and systematics. In recent years, with the much-appreciated encouragement of John Callomon, Bob Chandler and Nicol Morton, I have opened up a new facet to the hobby that I have found immensely rewarding. This has involved taking a more scientific approach with a view to publishing important discoveries. In my view, this is a responsible and natural progression for the amateur enthusiast that can convert an unknown, personally-cherished private collection into one of wider significance and enduring scientific value. The culmination has been the decision to bequeath my collection to Oxford University Museum, and a recent PGA publication. Written in collaboration with two fellow collectors, this paper dealt with biostratigraphical and systematic issues arising from fossils collected *in situ* from excavations made during commercial development at the Westfield industrial estate in Radstock, East Somerset.

The Lower Lias of the Radstock shelf represents a series of long-celebrated, fossiliferous, calcareous deposits. The sequence is greatly attenuated compared to other more familiar basin deposits, and the beds herein are often highly condensed and are thought to represent near-shore deposits, hence an abundance of fossils. There are many large non-sequences in the Radstock Lower Lias, but the intervals that are present are fascinating in that they often illustrate horizons not represented in the better known Dorset coast sections. Hence, the Radstock Lias complements the Dorset Lias. Much of what is known of the Radstock Lias stems from early descriptions of artificial exposures that were created in association with the erstwhile local coal-mining industry; these were most comprehensively logged over 75 years ago by JW Tutcher and AE Trueman (*Quarterly Journal of the Geological Society of London*, 1925). Today there are few permanent sections left to examine and little has been published on the Liassic palaeontology in the intervening years.

One of the most celebrated beds of the Radstock Lias was the so-called 'Armatum Bed', which took its name from the numerous examples of the ammonite genus *Apoderoceras* Buckman, formerly misidentified as *Ammonites armatus* (Sowerby). The Armatum Bed is of particular palaeontological interest as it includes fossil elements known to span the Sinemurian–Pliensbachian boundary – a time of marked change in NW European ammonite faunas. This bed was recently well exposed in the course of the new development at Westfield, and forms the basis of the PGA paper. An interesting and unexpected finding was that, here at least, the bed is stratified and does not represent a single lag conglomerate mixing derived late Sinemurian and early Pliensbachian fossils as formerly reported. Bed-by-bed collecting within the, admittedly highly-condensed, Armatum Bed revealed a series of readily discernable assemblages including three that potentially represent true faunal horizons in the basal Pliensbachian; these could increase resolution of the Phricodoceras taylori Subzone, Uptonia jamesoni Zone. Furthermore, quantitatively recorded sequential morphological changes in *Apoderoceras* specimens collected from these three beds appeared to illustrate evolutionary changes in an indigenous population, thereby helping to resolve some systematic issues within this striking, but previously poorly understood genus.

The *in situ* rediscovery of many topotypes of ammonite species collected early in the last century helped clarify some other systematic issues. A pleasing example concerned the genus *Radstockiceras* Buckman, named in honour of the town itself. Topotypes of the type species *R. complicatum* (Buckman) could be precisely located to a horizon low in the Taylori Subzone and could be seen from morphological and stratigraphical evidence to represent the evolutionary descendents of *Gleviceras victoris* (Dumortier) from the uppermost Sinemurian. The name *Radstockiceras* has been used in most recent literature for various smooth, involute and compressed Arietitid ammonites of the Upper Simemurian and Pliensbachian, including *Ammonites buvigneri sensu* Dumortier. However, *in situ* discoveries of the latter at a lower stratigraphical horizon than *R. complicatum* suggest a more distant phylogenetic relationship between the two species than is implied by their attribution to the same genus; the divergence of *R. complicatum* (which defines the genus) from *Gleviceras* occurred some time after that of *'Radstockiceras' buvigneri* (*sensu* Dumortier). The latter is therefore better regarded as a synonym of *Fastigceras clausum* (Buckman).

I hope that the first PGA paper will be the first of many, and I intend to follow up this work with other papers concerning ammonite systematic and biostratigraphical issues. The amateur collector is well placed to make significant contributions in these fields as long as key specimens are secured for posterity. The amateur is often possessed of boundless energy and enthusiasm in the field, and can monitor and record temporary sections and other transient local developments, perhaps in communication with institution-based professionals. I would strongly encourage other collectors to take on a more academic approach to their hobby. Not only can the wider geological community benefit, there is also a great sense of personal achievement to be gained. And, as John Callomon wisely said to me many years ago, the hobby itself becomes far more interesting.

Fossil recording scheme in west Dorset

David SOLE

In the Liaison Working Group report in ISJS Newsletter **29**, Bob Chandler commented on the lack of involvement (so far) of those scientists interested in groups other than ammonites.

In the hope that it might help to stimulate the sort of wider involvement looked for, I would like to draw attention to the fossil recording scheme now being operated here in West Dorset at the Charmouth Heritage Coast Centre.

The purpose of the scheme is twofold. Firstly, it is to provide an easily accessible register (or record) of the key scientifically important fossils being found along the West Dorset Coast. Secondly, it is intended to encourage and facilitate constructive communication between collectors and researchers - the sort of liaison that I assume the Liaison Working Group would like to support.

The register, which includes a considerable diversity of Jurassic fossils besides ammonites, can be accessed at www.charmouth.org - (Go to 'fossils' page, then click on to 'fossil records'). Contacts with collectors can be made initially through the Heritage Coast Centre by emailing info@charmouth.org. Researchers are invited to communicate their particular interests to collectors by this means.

The message from collectors here is: Don't hesitate to get in touch. We would welcome your approach and hope we can help.

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CORRESPONDENCE

CORRELATION CHART OF STANDARD CHRONOSTRATIGRAPHIC AMMONITE ZONATIONS AT THE OXFORDIAN/ KIMMERIDGIAN BOUNDARY

Bronislaw A. MATYJA & Andrzej WIERZBOWSKI

Due to well known biogeographical differentiation of ammonite faunas during the Late Oxfordian and Early Kimmeridgian, independent ammonite zonations are in current use for different parts of epicontinental Europe and the Arctic, and western Tethys. These make possible recognition of the Boreal, the Subboreal, the Submediterranean and the Mediterranean zonal schemes. Although the detailed correlation between particular zonations still presents some problems, marked progress has been achieved in the last decade – mostly in showing the different position of the Oxfordian/Kimmeridgian boundary between the Subboreal/Boreal, and the Submediterranean zonal schemes (Atrops et al., 1993; Schweigert & Callomon, 1997; Matyja & Wierzbowski, 1997). A new study of the Flodigarry section at Staffin Bay in the Isle of Skye, Scotland (Matyja et al., 2002, 2003 in press), and sections from northern Poland (Matyja & Wierzbowski, 1997, 2002) yield new data on the Subboreal/Boreal ammonites and their stratigraphical relation to the Submediterranean ammonites, important for wider correlation. All these new data make possible presentation of the new correlation chart (see pdf attachment) which is briefly commented on below.

Of special biostratigraphical importance is placing the base of the Baylei Zone of the Subboreal zonal scheme markedly below the Hauffianum Subzone of the Submediterranean zonal scheme – possibly somewhere within (or even at the base) of the Bimammatum Subzone. This is a consequence of recognition of the oldest *Pictonia* fauna (*Pictonia* sp. nov. in: Matyja et al., 2002; 2003 in press) together with first representatives of *Prorasenia*, as well as the first *Amoeboceras* (*Plasmatites*) ex gr. *bauhini* in the lowermost part of the Subboreal Baylei Zone and the Boreal Bauhini Zone in the Flodigarry section on the Isle of Skye. It should be remembered that some of these ammonites – such as *Prorasenia* and *Amoeboceras* (*Plasmatites*) ex gr. *bauhini* have their first appearance just in the Bimammatum Subzone of the Submediterranean zonal scheme in Poland (e.g. Wierzbowski, 1978, Pl. 3, Fig. 8; Matyja & Wierzbowski, 1998, Pl. 1, Figs 9-10; see also Malinowska, 1991, Pl. & Fig. 17, and relevant comments in Matyja & Wierzbowski, 1998, p. 40), and Germany (Schweigert, 2000, Pl. 1, Fig. 8).

On the other hand, phylogenetic relations between the Subboreal genus *Pictonia*, and its Submediterranean relatives still needs discussion. There is no doubt that the ammonites of the genus *Pictonia* are local representatives of the aulacostephanid lineage fully developed in the Subboreal Province and that they are replaced toward the south by similar forms referred also to the genus *Pictonia* (Schweigert & Callomon, 1997), as well as by late forms of the genus *Ringsteadia* which represent long persisting Submediterranean stock of the genus (Wierzbowski, 1970; 1994). But still the most important for correlation is the fact that the oldest ammonites of *Prorasenia* type (i.e. forms with swollen primary ribs different from phylogenetically preceding *Microbiplices*) are the Subboreal microconchs of the genus *Pictonia*: both *Pictonia* and *Prorasenia* showing identical innermost whorls appear at the same level corresponding to the base of the Baylei Zone in the Flodigarry section (Matyja et al., 2003 in press).

Because the first ammonites of the *Prorasenia* type appear in the Submediterranean sections in the Bimammatum Subzone, and are represented by *Prorasenia crenata* (Quenstedt) and its relatives similar to the oldest Subboreal species *Prorasenia bowerbanki* Spath, it seems highly reasonable to assume that the appearance of ammonites of *Prorasenia* type in the Subboreal and the Submediterranean sections was isochronous. It may thus indicate that the *Ringsteadia* ammonites of the Submediterranean lineage from the Bimammatum Subzone to the Planula Zone having *Prorasenia* type microconchs, are in fact time-counterparts of the Subboreal macroconch genus *Pictonia* (Wierzbowski, 1994). Although the biological interpretation of this phenomenon needs further studies, it appears that the phylogenetic relations between Subboreal *Pictonia – Prorasenia*, and the Submediterranean late *Ringsteadia – Prorasenia*, are closer than previously assumed.

Still other new studies in northern Poland resulted in recognition of the *Pictonia* type ammonites distinguished as *Pictonia kuiaviensis* Matyja & Wierzbowski in a lower part of the Submediterranean Galar Subzone (Matyja & Wierzbowski, 2002). This new species is a late representative of the genus *Pictonia*, showing some features of the genus *Rasenia*, and thus transitional to that very genus. Although the species is not known so far in the Subboreal succession, it may appear important for correlation in future, as it is highly probable that similar forms may occur in the uppermost part of the Baylei Zone in the Subboreal Province (see correlation chart). Possibly even more stratigraphically important is, however, occurrence of the first representative of the Boreal subgenus *Amoebites – Amoeboceras* (*Amoebites*) *bayi* Birkelund & Callomon, at the base of the Submediterranean Galar Subzone in the Bielawy section in northern Poland (Matyja & Wierzbowski, 2002): this indicates that the base of the Galar Subzone corresponds to base of the Boreal Kitchini Zone and the level has a wide correlation potential.

From the above it becomes evident that the most important priority at that moment is detailed study of ammonite successions to determine precisely the stratigraphical position of each of the two classical Oxfordian/Kimmeridgian boundaries, i.e. that of the Subboreal/Boreal zonations (put at the base of the Baylei and Bauhini Zones), and the other of the Submediterranean zonation (put at the base of the Platynota Zone, or at the base of the Galar Subzone), and to recognize their correlation potentials. Any final decision on the GSSP for the Oxfordian/Kimmeridgian boundary before the correlation between the Subboreal/ Boreal and Submediterranean zonations becomes fully understood is premature, and could result in serious confusion. Such, unfortunately, is the last interpretation of Melendez (2002) who proposes to transfer the upper part of the Submediterranean Hauffianum Subzone ("Bauhini/Hauffianum/Tiziani Biohorizon") into the Planula Zone to define a "uniform" Oxfordian/Kimmeridgian boundary at the base of a widely understood a new Planula Zone. In fact such a boundary does not correspond to any well marked faunal level in the Subboreal/Boreal succession. The proposal introduces a new Oxfordian/Kimmeridgian boundary beside the two existing "classical" boundaries.

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LATEST JURASSIC STAGE NOMENCLATURE

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The Tithonian Stage has been internationally accepted as the terminal Jurassic Stage and this decision has been ratified by the Jurassic Subcommission and the IUGS. However, some of the implications of this decision do not seem to have been appreciated, particularly by some British workers. One of the most important consequences of this decision is that the underlying Kimmeridgian Stage is automatically terminated at the base of the Tithonian, as chronostratigraphical units are defined at their bases and their tops are automatically fixed by the base of the succeeding unit of the same rank. Thus continuing to use the term 'Kimmeridgian' in its longer *sensu anglico* sense is no longer a permitted option, but some authors continue to use it, and referees and editors continue to accept its use.

The problems arise, of course, because of the original ambiguity of d'Orbigny's definitions of his Kimmeridgian and Portlandian stages. The former was quoted by d'Orbigny (1850) as being the equivalent of the Kimmeridge Clay and Weymouth Beds of Fitton 1836 (the modern Baylei to Fittoni zones), whilst the Portlandian was the equivalent of the Portland Sand and Portland Stone of Fitton 1836 (the modern Albani to Anguiformis zones). These definitions appeared unambiguous to British workers, but d'Orbigny named *Ammonites gigas, gravesianus* and *irius* as typical of the Portlandian Stage. In 1913 Salfeld recorded the occurrence of these ammonite species (which he assigned to his new genus *Gravesia*) in the lower part of the Upper Kimmeridge Clay of Dorset, thus providing a Portlandian age for these beds under the second of d'Orbigny's criteria. But Salfeld was not the first to be aware of this problem.

Blake (1880, 1881) had already noted that the beds of the upper part of the Kimmeridge Clay were recognised as Portlandian in France. In 1881 (p. 581) he stated 'for the series of deposits which overlie the true Kimmeridgian or Virgulian, and underlie the true Portland Beds the name Bolonian is proposed. The name Portlandian has usually been applied to them [in France], but since it is certain that they do not correspond to our Portland rocks, but to beds below them, the name is to the last degree misleading and the only way out of the confusion is the use of a distinct name.' It is clear too that Blake appreciated that the zone of *Gravesia gigas* occurred at this level, (over 30 years before Salfeld found the species in Britain), as he refers (1881, p. 582) to the 'Lower Bolonian, or zone of *Amm. gigas*'. Blake (1881, p. 580) also stated quite clearly that 'The Kimmeridge Clay of England has been shown to be divisible into two groups, formerly called Upper and Lower Kimmeridge [this division was made by Blake in 1875]. The term Kimmeridgian must now be confined to the latter.' In addition he stated (1881, p. 584) that the 'Bolonian strata are pretty nearly synonymous with …the title Upper Kimmeridge'.

So here we have Blake in 1881 stating quite clearly that in Britain the Kimmeridgian Stage name should be applied to the Lower Kimmeridge Clay, the Bolonian applied to the Upper Kimmeridge Clay, whilst the Portlandian should be reserved for the Portland Beds. What relevance is this to today?

Prior to the 1960s the ammonite fauna of the Upper Kimmeridge Clay of Britain was thought to contain species of the Tethyan genera *Subplanites* and *Lithacoceras* in its lower parts (Arkell, 1956). Cope (1967) showed, however, that these ammonites were in fact a quite distinct group of ammonites belonging to the genus *Pectinatites*. Higher parts of the Kimmeridge Clay contained *Pavlovia* and *Virgatopavlovia* (Cope, 1978). Apart from rare *Gravesia* at the base of the Upper Kimmeridge Clay, it was thus impossible to correlate with the Tithonian faunas of southern Europe. Similar problems attended correlation between the Lower Volgian of Russia and Poland with the Tithonian faunas, as they again had their own distinctive ammonite genera. Cope (1993, 1995, 1996) recognised that correlation with the Tithonian still presented major problems and that it would be necessary to continue to use these stages, locally, for the foreseeable future.

Recognising that the Tithonian was now the internationally recognised stage for the terminal Jurassic, Cope (1993) advocated restriction of the Kimmeridgian Stage to its (shorter) pre-Tithonian use. He suggested that the Bolonian Stage of Blake (1881) should be resurrected for use in North-west Europe, combined with the Portlandian Stage.

Blake (1881, p. 584) stated that the base of the Bolonian Stage 'must be drawn in the midst of clays, where the most marked introduction of new species commences, this….may be as low as Bed 40'. In fact the base of the Elegans Zone (which yields *Gravesia gigas* — Cope 1967) is some 6m lower than this at Kimmeridge, at the base of Blake's Bed 42 and Cope (1993, p. 154) proposed this level for the base of the Bolonian Stage at Hen Cliff, Kimmeridge.

As opposed to the status of the Tithonian as the Primary Standard Stage, the Bolonian and Portlandian should be regarded as Secondary Standard Stages (Cope, 1995). Similarly for Russia or Poland, Volgian should be regarded as a Secondary Standard Stage. Secondary Standards should be used as long as deemed necessary, but once firm correlation with the Primary Standard has been established, they will cease to be of use.

In the forthcoming second edition of the Jurassic Correlation charts for Britain (now in an advanced state

of preparation) Kimmeridgian is used in its international sense as a Primary Standard Stage, whilst for the Tithonian, the Bolonian and Portlandian Secondary Standard Stages are used.

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THE 'JURASSIC COAST'; THE DORSET AND EAST DEVON COAST (UK) WORLD HERITAGE SITE

Richard EDMONDS & Jonathan LARWOOD

World Heritage Site designation was bestowed on the Dorset and East Devon Coast in December 2001 following many years of work at a local, national and international level. The Site, which encompasses a 95 mile stretch of cliff, beach and foreshore between Exmouth in East Devon and the southern point of Studland Bay in Dorset (excluding the frontages of the coastal towns) qualifies for a Natural World Heritage Site under UNESCO criterium i:

The Site should be an outstanding example, representing major stages of Earth's history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features

As a spectacular Earth science showcase this coastline contains a near complete and accessible sequence through the Mesozoic, a number of internationally important fossil localities and a superb range of active geomorphology.

The oldest Triassic rocks in the west form the red cliffs of East Devon between Exmouth and Seaton. A full sequence of Jurassic rocks is displayed between Lyme Regis and the Isle of Portland. Though complicated by the Purbeck Monocline a near complete Cretaceous sequence is seen in the east from Durlston to Studland while the Lower Cretaceous transgression is spectacularly represented by an unconformity seen over-stepping progressively older rocks as far west as Sidmouth.

There are nine internationally important fossil localities recognised across the Site. These include the Triassic reptile fauna of East Devon, the Lower Jurassic reptile, fish and insect fauna of West Dorset and the Kimmeridge Clay, the famous Lulworth Fossil Forest and the overlying Purbeck Bed at Durlston Bay containing reptiles, fish, insects and early mammals.

The coast contains numerous exemplars of active geomorphological processes, which collectively represent an exceptional interest contained within such a short section of coast. The highlights include the great landslides of East Devon and West Dorset, Chesil Beach and the Fleet and classic features such as Lulworth Cove on the Purbeck coast, which graphically illustrate the relationship between geological structure and the evolution of the coast.

This coastline has provided, and continues to provide vital evidence for the development of the Earth Sciences. William Buckland, the Reverend William Conybeare, Henry De la Beche and Richard Owen are but a few of the early geologists inspired by the coast's geology. Mary Anning (1799-1847) of Lyme Regis is perhaps the world's most famous fossil collector. The illustration, *Duria Antiquior* ('a more ancient Dorset') by Henry De la Beche which was based on Mary Anning's finds, was the first ever attempt to illustrate a past environment. Today, important research and fossil discoveries continue to be made yearly. In the last decade at least two new species of ichthyosaur have been discovered in the Lias, a unique and near complete scelidosaur has been recovered, while in October 2001, the first dinosaur trackway from Portland was discovered and represents some of the earliest prints of this age seen in the Purbeck Beds (Upper Tithonian) of Southern England.

Conserving the World Heritage Site

Dorset and Devon County Councils and the Dorset Coast Forum, developed the case for World Heritage on behalf of the UK Government. Led by Professor Denys Brunsden the process involved consultation

with a wide range of partners and interest groups. Invaluable contributions were provided from some seventy scientists across the globe. The development of the bid has raised the profile of the Earth Sciences and created local support from the public, local government and landowners.

World Heritage Sites are designated through the UNESCO World Heritage Convention but their protection is the responsibility of the State party; the UK Government. In the UK nationally important nature conservation sites are protected as Sites of Special Scientific Interest (SSSI's).

There are 11 geological (and biological) SSSIs within the World Heritage Site. These form the principal means of Site protection which is overseen by English Nature (www.english-nature.org.uk), the government's statutory advisor on nature conservation in England. The SSSIs have been identified on the basis of the Geological Conservation Review (GCR), a rigorous and comparative assessment of key geological sites across Great Britain, which was undertaken between 1977 and 1990 (details are available on the Joint Nature Conservation Committee (JNCC) web site at: www.jncc.gov.uk/earthheritage/default.htm). There are 66 GCR sites within the World Heritage Site which are protected as SSSIs.

The setting of the World Heritage Site is protected through the Area of Outstanding Natural Beauty designation (there are two AONB's) and these effectively provide the 'buffer zone' to the Site. The site is given additional protection for a number of biological interests under the European Habitats and Species Directive.

World Heritage Site status strengthens the SSSI designation and offers unparalleled opportunities for the Site, the local area and the Earth Sciences. The UNESCO World Heritage Convention clearly states that World Heritage Sites should be protected *and* promoted to the public. Indeed, it is essential to demonstrate that the designation has a relevance to the public.

The Management Plan

The Management Plan for the Site contains objectives that aim to integrate conservation with education, enjoyment and economic development in a sustainable fashion:

Objective 1: to conserve the geology and geomorphology of the Site by:

a) ensuring that there is minimal disturbance to natural coastal processes due to human activities
b) ensuring that human activities do not significantly reduce the quality of coastal exposures of geology within the Site
c) promoting responsible collection of fossils and other geological specimens.

Objective 2: to conserve, and enhance where appropriate, the quality of the landscape and seascape of the Site.

Objective 3: to welcome local people and visitors to the Site at levels which it can sustain.

Objective 4: to encourage safe use of the Site by educational groups of all ages, and to provide a high quality range of educational information and services about the Site.

Objective 5: to foster the gathering and dissemination of scientific information about the Site.

Objective 6: to ensure that World Heritage Site status will be used responsibly in all aspects of publicity in relation to the Dorset and East Devon Coast, and assists wider sustainable development objectives within Dorset and East Devon.

The Management Plan is available on the Jurassic Coast web site at www.jurassiccoast.com.

Delivering the Management Plan

Managing a Site as long and complex as the Dorset and East Devon Coast represents a considerable challenge. There are many landowners, different user groups and interests. The principal threats to the Site relate to coastal defence, coastal development and inappropriate specimen collection, but the greatest challenge is probably one of communication between all of the interest groups.

In order to address these issues a small World Heritage Team, based in Dorset, has been established by Dorset and Devon County Councils. The team includes geologists, a Coastal Policy Officer and a Tourism Officer. The team works to a Steering Group drawn from a wide range of organisations and interest groups and this Group will report to UNESCO, via the UK Government, on matters relating to the Site.

Under the conservation programme a Science and Conservation Advisory Group (SCAG) and a wider Science and Conservation Advisory Network (SCAN) have been established. The SCAG is a small group made up of representatives of organisations and interest groups with a direct responsibility for, or interest in, the Site. Its membership will be reviewed biannually. The SCAN is open to all and the idea is simple: to communicate current management issues to the experts with detailed knowledge of the Site in order to ensure that the most up to date information is considered when threats or opportunities arise. In particular this will include consultation on threats posed by coastal defence as well as the ongoing development of management initiatives such as Shoreline Management Plans. Where development proposals could cause unacceptable damage, contributions from scientists, combined with the added weight of the World Heritage status, can be used to resist damage. Currently three coast defence issues are active and details are available in the Jurassic Coast web site under the link to 'Conservation and Management' from the home page.

Monitoring of the World Heritage Site will be an essential vehicle to inform management and should provide further opportunities for scientists and researchers to contribute their observations about the

Site and state of conservation. Indeed it is anticipated that the SCAN will do far more in the future as a forum for discussion on the work programme, management issues, research and opportunities along this coastline. As the work programme develops it is anticipated that the World Heritage Site will act as a focus for further research, particularly where it can be used to inform management.

Fossil collecting

The collection of fossils has been a cause of some concern for many years, particularly in West Dorset, and in anticipation of World Heritage status, a fossil collecting Code of Conduct was developed between interest groups and through wide consultation. The code draws on the fossil collecting position statement of English Nature and the concept of 'responsible collecting'.

The West Dorset coast is an unusual site subject to rapid erosion that uncovers exceptional fossil material. This dictates a need for regular collecting of fossils, particularly vertebrates, before they are lost to the sea. The code requires collectors not to dig in the cliffs and to report their important finds at the local visitor centre. If these finds are for sale, the collector is obliged to offer them first to a UK museum for a six-month period. In return ownership is transferred to the collector. The code aims to stop digging *in situ* without permission and uses the benefit of transferred ownership to achieve compliance, i.e., it is in the collector's interest to observe the code. The result has been a notable decrease in digging in the cliffs and a growing record of important finds. Very limited digging continues by one or two collectors and this is an ongoing issue. Details of the code, the reasoning behind it and the record of important finds are available at on the Jurassic Coast web site at www.swgfl.org.uk/jurassic/fossilcode.htm and the Charmouth Heritage Coast Centre web site at www.charmouth.org. The code also has provision for researchers to communicate their interests to local collectors. This should lead to collecting which is more focused and supportive of specific research needs. It is to be hoped that readers of this Newsletter will make use of this provision and work with the code and local collectors through the Charmouth Heritage Coast Centre.

Education and tourism

UNESCO emphasises the importance of education and interpretation of World Heritage Sites. Indeed, unless the interest is understood, there is a risk that it will be undervalued. The successful designation has already generated great interest at a local level. The World Heritage Team has invested considerable time in talking to local groups and developing interpretive materials and events for the Site in order to meet demand and expectation. However, the World Heritage Team is small and has limited resources and therefore a considerable part of the role is to influence others through partnership.

The Natural History Museum in London has been commissioned to look at the role of museums and visitor centres along the coast. The curation and acquisition of specimens will form an important element of this work, complementing what has already been developed with the fossil collecting code of conduct.

Conclusions

The Earth Sciences are poorly understood and undervalued and World Heritage Site status provides the opportunity to make a very real difference to the subject through an integrated approach, balancing conservation with education and access to the Site. This work is being developed in partnership with a wide range of organisations and will take time. But it is better to do things well rather than rush them at the start. Scientists with an interest in the coast are invited to join the SCAN and contribute to our work programme. Please get in touch.

Acknowledgements: Tim Badman (World Heritage Team), Professor Malcolm Hart (Plymouth University), David Sole (local collector) and Tony Weighell (Joint Nature Conservation Committee) are all thanked for their comments on earlier drafts of this article.

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GERMAN STRATIGRAPHIC COMMISSION - SUBCOMMISSION ON JURASSIC STRATIGRAPHY: *Report of the year 2002*

Gert BLOOS, Secretary, Gerd DIETL, Chairman

The following changes in the hierarchy of institutions have occurred. The German Stratigraphic Commission (Deutsche Stratigraphische Kommission) is now a member of the German National Committee (Deutsches Nationalkomitee) which is attached to the IUGS. Thus, national and international subcommissions on Jurassic stratigraphy are now affiliated to IUGS.

Since autumn of 2002 the German Subcommission on Jurassic Stratigraphy has a website on the internet: http://mitglied.lycos.de/jurasubkom

The work on the monograph of the lithographic subdivision of the Jurassic in Germany went on. This monograph will appear in two volumes, one for northern and one for southern Germany. Such monographs are also being prepared for all other systems, from the Precambrian up to the Quaternary. A few volumes have already appeared, that of the Cretaceous and some of Paleozoic systems.

One result of this work is the Stratigraphic Table of Germany 2002 (Stratigraphische Tabelle von Deutschland 2002). In this large table (96 x 130 cm; folded 29.6 x 21 cm) most lithological units down to

the level of formations are illustrated. The monographs can be regarded as the explanations of the table. [ISBN 3–00–010197–7]

Information:
http://www.gfz-potsdam.de/bib/std2002.htm
The table can be ordered by e-mail:
bib@gfz-potsdam.de
Telephone: ++493312881673
Fax: ++49331 288-1607
The price is **5 Euro plus mailing**. The address is: Bibliothek des Wissenschaftsparks Albert Einstein, Telegrafenberg, 14473 Potsdam, Germany.

In 2002, the annual meeting of the German Subcommission on Jurassic Stratigraphy took place from May 8th to 11th in Springe, a small town situated a few kilometres southwest of Hannover (northwestern Germany). It was organized by E. Mönnig from the Natural History Museum in Coburg. The number of participants was 24. In the hills surrounding Springe (Weserbergland) there are large quarries that provide magnificent exposures of the Middle and Upper Jurassic. Excursions were guided by regional experts. An instructive field guide has been produced which is, however, not printed.

The annual meeting for 2003 will be held in Kirchheim/Teck in the middle part of the Swabian Alb (southwestern Germany), in the neighbourhood of the historical site of the Pliensbachian and Holzmaden with its famous bituminous shales of Early Toarcian age.

For those interested in new information concerning excavations of the Nusplingen Lithographic Limestone (Upper Kimmeridgian) of the Swabian Alb under G. Dietl and G. Schweigert, please see the website at http://mitglied.lycos.de/nuspl_fossil_smns

Most results on the Jurassic in southern Germany, with respect also to other regions, are published in "Stuttgarter Beiträge zur Naturkunde, Serie B (Geologie und Pläontologie)". A list of the titles can be obtained by http://www.naturkundemuseum bw.de/stuttgart/schriften/stuttgarterbeitraege/b_index.html

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Gerd DIETL

JURASSIC TECTONICS AND GEOSITES FRAMEWORKS OF BULGARIA

Platon TCHOUMATCHENCO

1. Jurassic tectonics

One of the fundamental problems of SE European Jurassic palaeotectonics and palaeogeography is, for me, the connection between the East/South Carpathian Units (Krautner, 1996-97; Mutihac, 1990; Sandulescu, 1984, 2000) and the Southern Crimea and the North Caucasus (Mileev, et al., 1989) trough, the territory of Northern Dobrogea (Gradinaru, 1984), Bulgaria [Sapunov, Tchoumatchenco, 1987; Sapunov et al., 1983, 1985, 1988, 1991; Tchoumatchenco, 2002; Tchoumatchenco, Cernjavska, 1989-90; Tchoumatchenco, Sapunov, 1994; Tchoumatchenco et al., 1989; 1992, 2001,) and Eastern Serbia (Andjelkovic et al., 1996; Dimitrijevic, 1992, 1995; Grubic, Antonievic, 1961-62; Karamata et al., 1996-97). Here I would like to explain my point of view on this problem and to propose my reconstruction of the position of the major tectonic structures of Tethys in Bulgaria and adjacent areas during the Bajocian (Fig.1) and the Late Tithonian (Fig. 2) on the basis of terrane analysis. In Bulgaria there exist two large and complicated continental terranes – the Thracian Massif Terrane and the Moesian Platform Terrane separated by the Balkan Terrane (the rifted north branch of the Tethys) with Late Carboniferous time of docking to the East European Plate and to one other (Haydutov et al., 1996-97). I took the name of these terranes after Haydutov et al. (1996-97) and regard the Jurassic palaeotectonics only as a moment in the evolution of these terranes after their docking.

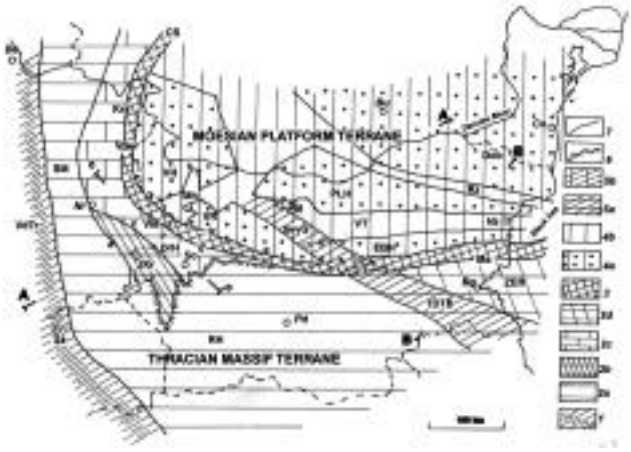

Fig. 1. Tectonics during the Bajocian
1-Vardar-Transilvanium Terrane (VdTr) ; *Thracian Massif Terrane*; *2a*- SM-Serbo-Macedonian; RH-Rhodope Massif: *2b*-Jurassic Kraishtids (JKr); *2c*-Bucovino-Getic-Dragoman Unit: Dragoman Horsts (DrH); Zlatarski Exotic Ridge (ZER); *3*-Balkan Terrane: CS-Civcin-Severin "Terrane"; Kra – Krajna Zone, Vra – "Vratarnicka Seria"; Iz– Izdremets Graben Unit; Ma - Matoride Rifted Basin Unit; *Moesian Platform Terrane*: *4a* – Horsts: VH-Vidin Horst Unit; PLH - Pleven Horst Unit; Dob-Dobrogea Horst Unit ;VR-Vratsa Horst Unit; EBH – East Balkan Horst Unit; *4b*- Grabens: Mh – Mihaylovgrad Graben Unit; VT- Veliko Tarnovo Graben Unit; Rz – Razgrad Graben Unit; *Tundzha-Sevlievo Diagonal Basin: 5a* – Sevlievo Graben Unit (SevG); *5b* – Tundzha Diagonal Tilted Basin Unit (TDTB) *6*- Thracian Suture (sensu Haydutov, 1987); *7* – Major Faults (the names of the faults are after Bonchev, 1961, 1986): a – Penkiovtsi (Gorochevtsi-Bunovo) Fault; b–Struma Fault; c– Ozren-Trun (Trun-Kosharevo) Fault; d – satellites of Sub-Balkan Fault (Vidlic Dislocation); e – Balkanide Front Line (Fore-Balkan Fault; Stara Planina frontal strip). *Be*-Belgrad; *Bu*-Bucarest; *Bg*-Burgas; *Co*-Costanta; *Pd*-Plovdiv; *Ple*-Pleven; *Sk*–Skopie; *So*-Sofia; *Ni*-Nish; *Va*-Varna

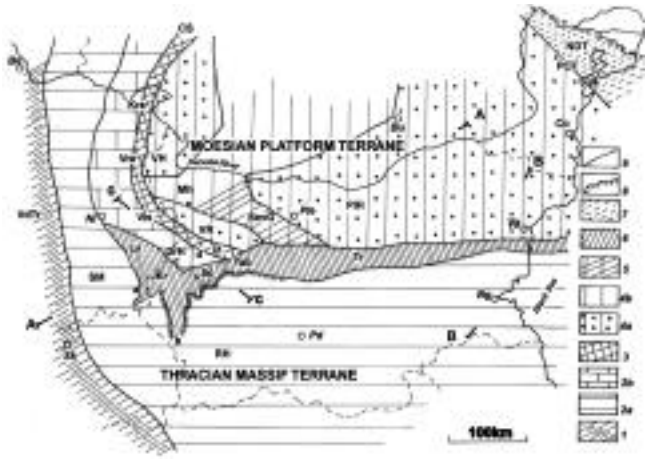

Fig. 2. Tectonics during the Late Tithonian
1-Vardar-Transilvanium Terrane (VdTr); *Thracian Massif Terrane*: *2a* - SM - Serbo-Macedonian; RH - Rhodope Massif Block; *2b* –Bucovino-Getic-Dragoman Unit: Dragoman Horst (DrH); *3*-Balkan Terrane: CS-Civcin-Severin "Terrane"; Kra – Krajna Zone, Vra – "Vratarnicka Seria"; Iz – Izdremets Graben Unit; *Moesian Platform Terrane*: *4a* - Horts: VH-Vidin Horst Unit; PlH-Pleven Horst Unit; VR-Vratsa Horst Unit; *4b* – Grabens: Mh – Mihaylovgrad Graben Unit; *Tundzha-Sevlievo Diagonal Basin* (northern part)*: 5* - Sevlievo Graben Unit *(*SevG); *6*- Nish-Troyan Foreland Basin: JKr-Jurassic Kraishtids Unit (Lu - Luznica Trough) ; Yab – Yablanitsa Trough Unit; Tr – Troyan Trough Unit; *7* – North Dobrogean Terranes (NDT); Peceneaga-Camena Fault (PCF) *8* - Thracian Suture (sensu Haydutov, 1987); *9* – Major Faults (the names of the faults are after Bonchev, 1961, 1986): a – Penkiovtsi (Gorochevtsi-Bunovo) Fault; b–Struma Fault; c– Ozren-Trun (Trun-Kosharevo) Fault; d – satellites of Sub-Balkan Fault (Vidlic Dislocation); e – Balkanide Front Line (Fore-Balkan Fault; Stara Planina Frontal Strip). *Be*-Belgrad; *Bu*-Bucurest; *Bg*-Burgas; *Co*-Costanta; *Pd*-Plovdiv; *Ple*-Pleven; *Sk*–Skopie; *So*-Sofia; *Ni*-Nish; *Va*-Varna

During the Jurassic the Thracian Massif Terrane represented an island arc; the Balkan Terrane in its turn – a back arc trough, and the Moesian Platform Terrane – a carbonate platform. At the beginning of the Early Jurassic separation of the continental blocks started, and a rifting stage in the evolution of the Balkan Terrane. During the Jurassic this structure was connected to the northwest with the Civcin-Severin Rift (Krautner, 1996-97; Mutihac, 1990; Sandulescu, 1984, 2000), and to east extends into the Matoride Basin (Tchoumatchenco, Cernjavska, 1989-90; Tchoumatchenco, Sapunov, 1994; Tchoumatchenco et al., 1989; 1992, 2001) and the North Dobrogea Orogen (Gradinaru, 1984), and the South Crimea-North Caucasus (Mileev, et al., 1989). These terranes follow the configuration of the Carpathian-Balkan Arc. On them is imposed the Tundzha-Sevlievo Diagonal Basin; its southern part was closed during the Early Callovian (?), together with the Matoride Rifted Basin of the Balkan Terrane by the Agassitz (?) Cimmerian Phase. During the Middle Callovian, after this closure, between the Moesian and the Thracian Terranes was formed a new tectonic unit - the Nish-Troyan Foreland Basin, situated north of the closed eastern part of the Balkan Terrane. A very important role within it was played by the diagonal Yablanitsa Trough, which connected the Jurassic Kraishtids with the Troyan Trough. The terranes are shown in their present day positions.

2. Geosites frameworks for the Jurassic rocks

Recently in the WG1 for SE Europe of Progeo there was discussion about the distinction between geosites and geosite frameworks. For me (Tchoumatchenco, 2002) the geosite frameworks for sedimentary rocks represent a part of a basin, where the sedimentation, the distribution of the fauna, the sequence stratigraphy, etc., are predicated by the palaeotectonics and the palaeogeography and all other elements are a consequence of these. The geosites frameworks are structured by many elementary geosites of palaeontological, stratigraphical, historical, etc., significance. Here the notion of the geosites frameworks for Bulgaria is developed on the basis of the Jurassic terranes:

Moesian Platform Terrane: Jurassic sediments crop out only in its north-western parts, and are subdivided into 2 geosites frameworks:

Vidin Palaeohorst geosites frameworks (Figs. 1, 2) (Sapunov et al., 1988) – sedimentation began with Middle Jurassic shallow marine sandstones and continued during the Middle Callovian-Early Tithonian with "ammonitico rosso" type limestones, and during the Late Tithonian-Early Cretaceous with "Stramberg" type carbonate platform limestones;

Vratsa Palaeohorst geosites frameworks (Fig. 1, 2) (Sapunov et al., 1988) – with shallow water Lower, partly Middle and Upper Jurassic sediments; the Vidin and the Vratsa Paleohortsts are separated by:

Mihaylovgrad and Belotintsi Palaeograbens geosites framesworks (Sapunov et al., 1988) – with relatively deep water sedimentation during the whole Jurassic - in the Mihaylovgrad Graben, or during the Middle and Late Jurassic – in the Belotintsi Graben.

Balkan Terrane: in this terrane are identified two geosites frameworks (fig. 1, 2):

Matoride Basin (eastern Stara planina Mountains) (Tchoumatchenco, Cernjavska, 1989-90; Tchoumatchenco et al., 1992) filled by Lower Jurassic siliciclastic turbidite sediments (connected by progressive transition with Upper Triassic calciturbidites) and Middle Jurassic sediments "wild-flysch" type with large Triassic and Jurassic olistolites, included in black shales; this basin was closed during the Early Callovian (?);

Izdremets Palaeograben (western Stara Planina Mountains) (Sapunov et al., 1985; Tchoumatchenco et al., 2001) - with non-turbidite, relatively deep water sedimentation - Middle Jurassic "Black Shales with *Bositra alpina*" and Upper Jurassic "ammonitico rosso", predominantly calciturbidite type sediments.

Thracian Massif Terrane: During the Jurassic only parts of this terrane were covered by sea and the structure formed palaeotectonic-palaeogeographic units (= geosites frameworks):

Tundzha Diagonal Tilted Basin (Strandzha Mountain)(part of the Sevlievo-Tundzha Diagonal Unit) with Early-Middle Jurassic sedimentation (Catalov, 1990) and Bathonian (? or Early Callovian) Zabernovo Exotic Nappe - during the formation of the last the Tundzha Basin and the Matoride Basin were closed;

Getic-Dragoman Unit (western Bulgaria) – sedimentation started predominantly in Middle Jurassic and continued with Callovian - Late Jurassic carbonate platform sedimentation (type "Stramberg") (Dodekova et al., 1984; Sapunov et al., 1985);

Sub-Getic-Jurassic Kraishtide Unit – series of grabens with Lower Jurassic shallow water sediments and Middle Jurassic sediments – black shales in some grabens and bioclastic limestones in others (Dodekova et al., 1984). The Thracian Massif Terrane, during the Early Cretaceous, played the role of an island-arc (Nikolov, Tzankov, 1997). I assume the same role also during the Jurassic.

Nish-Troyan Foreland Trough (geosites frameworks): newly opened structure after the closure of the Tundzha and Matoride Basins with Late Kimmeridgian-Tithonian siliciclastic turbidite sedimentation (Tchoumatchenco, Sapunov, 1994), imposed on the Moesian Platform (in the eastern part) and on the Thracian Massif Terrane (on the western part). The Yablanitsa Trough (Boncev, 1986) connected its different parts.

The Jurassic geosites frameworks outlined here are distinguished from those of Triassic sediments as a result of a transgression. The majority of them apply also to Lower Cretaceous sediments.

The next steps, which must be taken, are comparisons of the Bulgarian Jurassic geosites frameworks with those of neighbouring countries: Romania - for the frameworks in Eastern Stara Planina and North Dobrogea; and Serbia – in the western Stara Planina Mountains and to find the best cross-border frameworks.

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JURASSIC RESEARCH AND SYMPOSIA IN JAPAN

Akira YAO

The Jurassic is widely distributed in the Japanese Islands, mostly represented by the Jurassic accretionary complexes. The complexes consist mainly of melange and chert-clastics sequences. The latter have a continuous stratigraphy of Triassic to Jurassic Panthalassan deep-sea sediments. The middle Triassic to lower Jurassic of the sequence is represented by bedded chert, and it grades upward into the middle Jurassic siliceous mudstone and clastics. Radiolarian biostratigraphic research has proceeded since the 1980s in the chert-clastics sequence of Southwest Japan. This sequence represents the typical Jurassic stratigraphy of pelagic and deep-sea facies.

Recently the Early to Middle Jurassic radiolarian faunal change has been analyzed in manganese nodules from the chert-clastics sequence of the Japanese Islands.

On 9th September, 2002, the symposium "Jurassic" (Conveners: Matsuoka A., Yao A. and Kondo Y.) was held in Niigata University as one session of the Annual Meeting 2002 of the Geological Society of Japan. This symposium was aimed at gaining a foothold so that Japan becomes the stronghold of Jurassic research in Asia. The presentations in this symposium were as follows:

1. Yao A.: Research on the Jurassic of the Japanese Islands and Activity of the International Subcommission on Jurassic Stratigraphy (ISJS).
2. Matsuoka A.: GSSP's candidates for the Triassic/Jurassic boundary in UK and Canada.
3. Kondo Y.: Present status of studies on Jurassic macrobenthic associations.
4. Hori S. R.: Radiolarian biostratigraphy of the Lower Jurassic and IGCP 458 (Triassic-Jurassic boundary event).
5. Hori N.: Middle and Upper Jurassic radiolarian biostratigraphy – review and prospect.
6. Nakae S.: A trend of current research on Jurassic accretionary complexes in Japan and outlines of their stratigraphy.
7. Ishida N.: Uppermost Jurassic slope apron deposits in the Southern Chichibu terrane.
8. Takei M.: Geological and paleontological implications of the ammonites from the Upper Jurassic Torinosu Group.
9. Sugawara K.: The Lower Jurassic benthic molluscan associations in the South Kitakami Belt, Northeast Japan.
10. Komatsu T.: Biostratigraphy of the Tetori Group in Shokawa village, Gifu Prefecture – The Jurassic/Cretaceous boundary (a preliminary work) -.
11. Sato T.: Short History of the International Subcommission on Jurassic Stratigraphy.
12. Discussion

The second symposium "Jurassic" will be held in September, 2003, in Shizuoka University as a session of the 2003 Annual Meeting of the Geological Society of Japan.

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JURASSIC IN SHAN THAI PROJECT, ACTIVITIES 2001-2002

Francis HIRSCH

The so called Shan Thai project, is a collaboration between Japanese and Thai colleagues encompassesing the Shan Thai Terrane, or what it is believed belongs to it, in NW Thailand. Having recently retired and moved to Japan I have found myself involved with this.

We are trying, using palaeontological methods, such as radiolarians, conodonts, ammonites and bivalves, to unravel the time constraints of the orogenic activities from Palaeozoic (mostly Permian) to Triassic and Jurassic times. The Jurassic is the desert, as it belongs to the post-orogenic sealing (cachetage) and its deposition lasted only from the Early to the early Middle Jurassic; afterwards that part of Thailand came

out of the water for good. The Jurassic, being truly an authochton to SE Asia, has already been the object of earlier palaeontological work, which promises wider correlation with other countries in the region, as these open to joint research teams.

Summary of activity in Thailand, 2001- 2002:
For the second consecutive year, a team of Thai and Japanese geologists and paleontologists has been active for about a week in studying the Early and early Middle Jurassic sedimentary cover of the Shan-Thai Terrane in the Mae Sot and Umphang areas of Tak Province, northwestern Thailand. Samples were collected with the scientific and logistic support of the Dept. of Mineral Resources. They are now under study at the Bureau of Geological Survey in Bangkok, Tokushima University and Naruto University (Japan).

The team is composed of the following researchers.
THAILAND
1. Dr. Assanee Meesook (stratigraphy, palaeontology, marine Jurassic bivalves)
2. Mr. Wattana Tansathien (stratigraphy, palaeontology (trace fossils)
3. Mr. Wirote Saengsrichan (biostratigraphy)

JAPAN
1. Prof. Keisuke Ishida (stratigraphy, radiolarians)
2. Prof. Takeshi Kozai (stratigraphy, marine and freshwater bivalves)
3. Dr. Francis Hirsch (stratigraphy, marine Jurassic bivalves).
4. Mr. Shigeru Mori (fossil plants).

Recent discoveries of marine Jurassic bivalves permit correlation of Jurassic strata of Northern Thailand, Southern Peninsular Thailand and even Vietnam.

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JURASSIC RESEARCH GROUP ACTIVITIES

Emile PESSAGNO

ABSTRACTS

1. "Tectonostratigraphic Significance of Sedimentary strata occurring within and above the Coast Range Ophiolite (California Coast Ranges) and the Josephine Ophiolite (Klamath Mountains) Northwestern California)". With Hopson, C. A. and Hull, D. M., *Geological Society of America Penrose Conference on Ophiolites and Oceanic Crust*: New Insights from Field Studies and Ocean Drilling Program, September 13-17, 1998, Marconi Conference Center, Marshall California, **Invited Presentation**, 1998.

2. "Regional tectonostratigraphic events exemplified by Middle and Upper Jurassic successions west of the Walper Megashear, east-central to west-central Mexico". *Geological Society of America, Abstracts with Programs*, vol. 30, no. 7, p. A-171, 1998.

3. "Pacific Origin for Southwestern Part of Gulf of Mexico". *Geological Society of America, Abstracts with Programs*, vol. 31, No. 7, p. A72, 1999 (Topical Session T04: "Applied Integrated Stratigraphy in Exploration and Development Geology: New Techniques and Perspectives", Cushman Foundation, GSA Sedimentary Geology Division).

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5. "Tectonostratigraphic significance of sedimentary strata occurring within and above the Coast Range Ophiolite (California Coast Ranges) and the Josephine Ophiolite (Klamath Mountains, Northwestern California". 2001, *With* Hopson, C. A. and Hull, D. M., *In* Dilik, Y, Moores, E. M., Elthon, D., and Nicolas, A., eds., Ophiolites and Oceanic Crust: New Insights from Field Studies and Ocean Drilling Program, *Geological Society of America Special Paper 349*, p. 383-394.

6. "Upper Jurassic (middle Oxfordian) Radiolaria from the Sula Islands (East Indies): Their taxonomic, biostratigraphic, chronostratigraphic, and paleobiogeographic significance": 2002, With Hull, D. M. *Micropaleontolgy*, vol. 48, no. 3, p. 229-256, text-figures 1-14, pls. 1-4.

IN PRESS

7. "Tectonostratigraphic evidence for the origin of the Gulf of Mexico: 41 p., 21 figs. With Martin, Christopher. AAPG Special Paper, Geology of Mexico, Central America, South America, and Caribbean. **In Press, 2003.**

DISSERTATIONS

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SELECTED ABSTRACTS REFERENCED TO NUMERED CITATIONS ABOVE.

Reference 4:
Jurassic and Early Cretaceous stratigraphic data from terranes in Central Mexico situated southwest of the Walper Megashear demonstrate similar records of paleobathymetry and tectonic transport. In general, each of these terranes shows the same paleobathymetric fingerprint: (1) Marine deposition at inner neritic depths during the Callovian to early Oxfordian (Middle to Late Jurassic); (2) marine deposition at outer neritic depths during the late Oxfordian (Late Jurassic); (3) sudden deepening to bathyal or upper abyssal depths (ACD = aragonite compensation level) from the early Kimmeridgian (Late Jurassic) until the end of the Cretaceous. This paleobathymetric fingerprint differs markedly from that

occurring to the east-northeast of the Walper Megashear in the Coahuiltecano terrane (emended herein: = ~ Sierra Madre Oriental Terrane). In the Coahuiltecano terrane (e.g., Peregrina Canyon near C. Victoria, Tamps.), no Mesozoic marine deposits older than late Oxfordian occur. The paleobathymetric fingerprint of this terrane was (1) inner neritic during the late Oxfordian (Late Jurassic) to ~ Barremian (Early Cretaceous) and (2) bathyal to abyssal during the remainder of the Cretaceous (Aptian to Maastrichtian). Though varying in detail, each succession that has been examined in the mosaic of suspect terranes to the southwest of the Walper Megashear shows evidence of tectonic transport from higher latitudes to lower latitudes during the late Middle Jurassic, the Late Jurassic, and the Early Cretaceous. For example, the paleolatitudinal signature of the San Pedro del Gallo terrane (Durango) supplied by faunal data (Radiolaria and megafossils) and preliminary paleomagnetic data indicates that this terrane was transported tectonically from higher paleolatitudes (Southern Boreal Province: ~ 40º N) during the Late Jurassic (Oxfordian) to lower paleolatitudes (Tethyan Realm: Northern Tethyan Province) by the Early Cretaceous (Berriasian). The Jurassic and Lower Cretaceous successions at Mazapil (Zacatecas), Sierra de la Caja (Zacatecas), Sierra de Zuloaga (Zacatecas), Symon (Durango), and Sierra de Catorce (San Luis Potosi) are all genetically related to that at San Pedro del Gallo. They are regarded as representing dismembered remnants of the San Pedro del Gallo terrane. Faunal data (Radiolaria and megafossils) from the Mazapil succession (Sierra Santa Rosa) indicates that this remnant of the San Pedro del Gallo terrane was situated at Southern Boreal paleolatitudes (> 30º N) during the Oxfordian and Kimmeridgian and at Northern Tethyan paleolatitudes (22 to 29º N) during the Tithonian and Berriasian. Preliminary paleomagnetic data from the upper Tithonian to Berriasian part of the Mazapil succession indicates ~ 25º N. Farther to the southeast (San Luis Potosi, Hidalgo, Veracruz, Puebla) in the Huayacocotla Segment of the Sierra Madre Oriental, previous investigations indicate tectonic transport from Southern Boreal paleolatitudes (> 30º N) during the Callovian to Northern Tethyan paleolatitudes (22º to 29º N) during the Kimmeridgian and Tithonian and to Central Tethyan paleolatitudes (< 22º N) during the latest Tithonian (Late Jurassic) and the Berriasian (Early Cretaceous).

Jurassic and Early Cretaceous successions in Western Cuba (Sierra del Rosario and Sierra de los Organos, Piñar del Río Province) show lithostratigraphic, paleobathymetric, and paleolatitudinal signatures which are nearly identical to those of San Pedro del Gallo terrane remnants in Central Mexico. They clearly represent portions of the North American Plate and are treated as remnants of the San Pedro del Gallo terrane herein. The Cuban remnants of the San Pedro del Gallo terrane were carried to eastern Yucatan by the Walper Megashear. By the Middle Cretaceous terrane amalgamation had occurred between the San Pedro del Gallo and Coahuiltecana terranes and all movement along the Walper Megashear had ceased. Subsequent southwest to northeast movement of the Caribbean Plate during the Late Cretaceous and Early Tertiary bulldozed the Cuban remnants of the San Pedro del Gallo terrane into their present position. Once the Cuban San Pedro del Gallo remnants were carried northward by the advancing Caribbean Plate, it is likely that they became part of an Atlantic-type margin.

Reference 5:

An analysis of sedimentary rock that formed as interpillow sediment within ophiolite lava and as strata that rest in depositional contact above the lava can supply valuable data pertaining to its tectogenesis. This report focuses on two North American ophiolites: (1) The Coast Range ophiolite (CRO), California Coast Ranges and (2) the Josephine ophiolite (JO), Klamath Mountains. The CRO lithosphere formed at an open-ocean spreading center where calcareous pelagic sedimentation and ferruginous/siliceous hydrothermal deposition accompanied volcanism. Based on an analysis of the physical stratigraphy, the geochronometry, and the radiolarian biostratigraphy, we conclude that a disconformity with a 8 Ma to 11 Ma hiatus occurs between the CRO and the overlying volcanopelagic sequence. This unconformity is correlative chronostratigraphically with that occurring in the San Pedro del Gallo terrane southwest of the Walper Megashear in Mexico and in western Cuba. Therefore, we postulate that the regional unconformity indirectly reflects the titanic forces at work during the final break up of Pangea and the opening up of the North Atlantic.

Radiolarian faunal and paleomagnetic data show that all remnants of the Coast Range ophiolite originated at near - equatorial paleolatitudes (Central Tethyan Province) during the latest Middle Jurassic and were rapidly displaced northward to higher paleolatitudes (Northern Tethyan and Southern Boreal provinces) during the Late Jurassic. During northward tectonic transport the CRO "plate" subsided to abyssal depths, passing through a region of non-deposition (starved sedimentation, bye passing, erosion) during the late Bathonian to early Oxfordian. It then moved through a region of siliceous (radiolarian) pelagic and tuffaceous volcaniclastic sedimentation - the depositional apron from an adjacent active volcanic arc - during the Middle Oxfordian, Kimmeridgian, and Tithonian. The VP-Great Valley Supergroup (GVS) contact marks a period in which waning volcanogenic sedimentation was overwhelmed by a sudden influx of voluminous siliciclastic turbidite that originated from the continental margin (uplifted Jurassic volcanoplutonic arc) at the beginning of the Nevadan Orogeny (late Tithonian: lower Subzone 4 alpha [Radiolaria]). A period of turbidite deposition occurs both at precisely the same time and biohorizon in the distal back arc domain (San Pedro del Gallo terrane) in Mexico (age substantiated by ammonites, *Buchia*, and Radiolaria). Moreover, paleolatitudinal (faunal and paleomagnetic) data place these SPG remnants at approximately the same latitude as the Jurassic volcanoplutonic arc (Sierra Nevada segment) during the Late Jurassic (late Tithonian).

The Josephine ophiolite formed at a backarc or forearc spreading center close to a Jurassic volcanoplutonic arc

where calc-alkaline interpillow tuff and tuffaceous chert occur within the volcanic member of the ophiolite. In the Smith River subterrane the JO (162 Ma ± 1: late Callovian) is conformably overlain by VP strata. Continuous volcanogenic sedimentation occurred during the late Callovian to early Oxfordian (? early middle Oxfordian). A low latitude (Central Tethyan Province) origin, coupled with northward transport, is also indicated by paleontological data (Radiolaria, ammonites, *Buchia*) for the Jurassic Josephine ophiolite (Western Klamath terrane). The disconformable contact between the VP and the Galice *s.l.* reflects a sudden influx of siliciclastic turbidite from a Jurassic volcanoplutonic arc source area and from older rocks of the accreted continental margin that lay inboard of the arc. The same event is represented in the Foothills terrane (Sierra Nevada) by the deposition of the siliciclastic turbidite of the Monte del Oro and Mariposa Formations. It is suggested here that it might also indirectly reflect the sudden deepening (inner neritic to upper abyssal/lower bathyal) of the paleo Gulf of Mexico between the middle Oxfordian and early Kimmeridgian demonstrated to occur in remnants of the San Pedro del Gallo terrane (SPG) in Mexico and in Cuba. Faunal and paleomagnetic data from Mexican SPG remnants (distal backarc) indicate that these remnants were situated at Southern Boreal (> 30º N) latitudes during the Middle and early Late Jurassic. Middle to Late Jurassic megafossils (ammonites and bivalves) from the Sierra Nevada indicate Southern Boreal paleolatitudes.

Reference 6:
This report deals with the Upper Jurassic (middle Oxfordian) Radiolaria of the Sula Islands, Indonesia. The radiolarian assemblage, though abundant and extremely well preserved, is poorly diversified and includes ~ fifty species level taxa. The presence of common *Praeparvicingula* and rare pantanelliids within the faunal assemblage in association with Austral ammonites suggests that the Sula Islands were situated in the Northern Austral Province (>30° south) during the Oxfordian. This paleolatitude is in keeping with the Gondwanaland origin proposed by some workers. The Sula Island middle Oxfordian assemblage is strikingly similar to that described from the Galice Formation (Smith River subterrane, Klamath Mountains, North America). Some faunal elements described from the Sula Island assemblage are characteristic of the Southern Hemisphere and are only known elsewhere from New Zealand (Aita and Mackie 1992). Three radiolarian taxa were originally described from the Galice Formation in the Northern Hemisphere. No ammonite taxa are in common between the Sula Islands and the Galice Formation.

Reference 7:
Tectonostratigraphic data derived from on-going biostratigraphic, chronostratigraphic, paleobathymetric, paleobiogeographic, and lithostratigraphic investigations in west-central and east-central Mexico suggest that the Gulf of Mexico formed in two phases:

Phase 1: Rifting and subsequent sea floor spreading during the Late Jurassic (middle Oxfordian). All but the southwestern portion of the Gulf of Mexico formed during Phase 1.

Phase 2: Northwest to southeast tectonic transport of allochthonous San Pedro del Gallo terrane remnants along the west side of Walper Megashear during the Middle Jurassic to Early Cretaceous.
Where the stratigraphic successions are complete, megafossil data indicates that the San Pedro del Gallo terrane was situated at Southern Boreal paleolatitudes (>30° N) in the Nevadan back arc domain during the Middle Jurassic (late Bathonian to early Callovian) and was subsequently carried to lower paleolatitudes during the Late Jurassic and Early Cretaceous. For example, in the Huayacocotla remnant the Boreal ammonite, *Kepplerites*, was recovered in the subsurface from the Palo Blanco Formation by Cantú-Chapa. In North America, *Kepplerites* is known from the Izee terrane (east-central Oregon), Western Interior (Montana and Saskatchewan) and northward to southern Alaska. Radiolarian, calpionellid, ammonite, and bivalve faunal data indicate that the Huayacocotla remnant had been transported to Northern Tethyan paleolatitudes (23° N to 29° N) during the Kimmeridgian and Tithonian and to Central Tethyan paleolatitudes (<23° N) by the beginning of the Early Cretaceous.

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WATCH THE ENDING!

John COPE

As one who now spends more time in publishing on Lower Palaeozoic molluscs than Jurassic ones (though I try to keep my hand in!) I was made aware by a referee of my first paper on Ordovician bivalves in 1993 of a change made by the ICZN which still does not seem to have reached many Jurassic ammonite workers (nor Cretaceous ones either).

The change affects the ending of superfamilies. The change was introduced in the 1989 edition of the Code and remains unaltered in the 1999 edition. Article 29.2 of the Code (p. 32) states
'the suffix –OIDEA is for a superfamily name'.

So please, Jurassic ammonite enthusiasts, delete the '-aceae' from your memories!

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OBITUARIES

PROF. W. A. S. (BILL) SARJEANT, DSC, FRSC, (1935-2002)

Geoff WARRINGTON

Delegates at the 6th International Symposium on the Jurassic System observed a short silence at the start of the ISJS Plenary Meeting on Thursday 19 September, 2002, in memory of William ('Bill') Antony Swithin Sarjeant, who died on 8 July, 2002.

William Anthony Sarjeant, the only child of Harold and Margaret (née Cantrell) Sarjeant, was born in Sheffield, UK, on St Swithin's Day, 15 July, 1935. He adopted the forename 'Swithin' by deed poll, in time for it to appear on the certificate of a BSc (Honours) degree in geology awarded by the University of Sheffield in 1956. Bill remained at Sheffield University, completing his PhD (*An investigation of the palaeontology and stratigraphical potentialities of the micro-plankton (dinoflagellates and hystricho-spheres) in the Upper Jurassic*) under the supervision of Charles Downie in 1959, and thus embarking on the branch of science with which most people came to associate him. Whilst in Sheffield he edited the students' union newspaper and founded and edited the Sorby Society's *Sorby Record*, activities which signalled his energy and propensity for other involvements. From Sheffield Bill went, briefly, to Norfolk County Technical College, Kings Lynn, followed by the University College of North Staffordshire (now Keele University) (demonstrator, 1960-61) and Reading University (research fellow, 1961-62), before taking up an assistant lectureship, followed by a lectureship, at Nottingham University (1963-72). In 1960 he married Pat, was divorced from her in 1963, married Ann Margaret ('Peggy') (née Crowe) in April 1966, was a Visiting Professor at the

University of Oklahoma, Norman (1967-68), and lost most of his research material in a fire at Nottingham University. He emigrated to Canada, with his family, in April 1972, to take up the post of Associate Professor at the University of Saskatchewan, Saskatoon (1972-80). He became Professor of Geological Sciences in that university in 1980 and was based there until his death, from liver cancer, one week before his 67th birthday.

In 1972 Nottingham University awarded Bill a DSc; his submission comprised 119 articles, of which 66 were on microplankton and the remainder encompassed his interests in ichnofaunas, mineralogy and other non-palaeontological topics. In 1995 he was elected a Fellow of the Royal Society of Canada.

If little is said here about Bill's work on marine phytoplankton it is because that is well known to students of the Jurassic and other systems, whether they are palynologists or not. This was only one of many areas of science that interested Bill and to which he contributed prodigiously; his first article appeared 1950, in *The Torch*, the magazine of Nether Edge Grammar School, Sheffield, and his last is still to appear, posthumously. Bill's less familiar interests included the history of earth sciences, reflected in his *Geologists and the History of Geology*, published in 10 volumes between 1980 and 1996, the mineralogy of the Derbyshire Peak District and Shropshire, and vertebrate ichnofaunas, on which he contributed numerous papers, including compilations on collections in British museums, Henry Beasley's material from the Triassic, and a history and bibliography of UK footprint records, including Jurassic examples. He was a founder member of the Peak District Mines Historical Society (1959) and of the East Midlands Geological Society (1964), contributing to the activities and publications of both and editing the publication of the latter, the *Mercian Geologist*, until 1970; he was also a founder member of the American Association of Stratigraphic Palynologists.

He was in the forefront of heritage activities in Saskatoon where his lobbying persuaded the authorities of the need for a *Special Committee for the Identification and Listing of Historic Buildings*; Bill was, appropriately, its first chairman (1974-1979). He co-authored *Saskatoon – a Century in Pictures* (1982) and edited the Saskatoon Heritage Society's *Saskatoon Historical Review*, from 1989 until his death. He also served on the Saskatchewan Archives and Heritage Advisory boards and was involved with the Saskatoon Environmental and Nature societies, Nature Saskatchewan, SaskCulture and the Canadian Folk Music Society, the last reflecting an interest dating from student days, or before. Whilst at Sheffield University he was in the *Acid House* skiffle group, home to which was, apparently, above a paint-stripping works. In Saskatoon he was in the *Prairie Higglers* folk group and introduced British folk songs to its repertoire. Further non-geological activities included membership of the Sherlock Holmes Society, with extensive knowledge of the works of Conan Doyle, several of which he subjected to critical analysis. Bill was also, under the name of 'Antony Swithin', a novelist in his own right, writing fantasy fiction, such as *The Perilous Quest for Lyonesse*, a four-volume work.

Many people will have many memories of Bill, ranging from those of the students, whom he supported tirelessly, and of his professional colleagues, to more bizarre recollections of, for example, his consumption of bowls of pickled onions in 'The Miner's Arms', Brassington, Derbyshire, or his demolition of a dish of Szechuan-style fried red chilies which proved too challenging even for the colleague from India who was witness to this event.

Bill was a geologist, palaeontologist, historian, biographer, compiler, diarist, chronicler, bibliophile, novelist, folksinger, *bon viveur* and devoted family man - a BIG man who has left his mark on many areas. He is survived by Margaret, his second wife, and their daughters, Nicola, Rachel and Juliet.

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HENRI TINTANT

Christianne RUGET

On the 14th November last Henri Tintant left us. This is a great sorrow for the scientific community: geologists, palaeontologists, biologists, philosophers and all who are interested in Man. Henri Tintant brought them the essentials of methodological enquiry, helping them to take a new look at science and sometimes pushing them to call into question their speciality.

Retracing the life of Henri Tintant is a very long difficult exercise. The scientist was also a scholar. His interests were many and one could pass whole evenings, even days, with him on very varied topics: history, painting, theatre, music, architecture, sailing, the sea, boats and certainly wine and cuisine.

I do not want to risk making a grandiose compendium on the man and his work. He himself did not want it and told me so many times. I would like to remind our scientific community of his affection for all who worked with him and above all of the new ideas he brought to palaeontology. One can even say that he revolutionised it while respecting previous workers.

His Vocation

The career as palaeontologist of Henri Tintant is the result of an "early and clear vocation". After brilliant secondary school study at the Lycee Hoche de Versailles, he entered the Sorbonne to study for the *Licence de Sciences naturelles*, to which he added an impressive number of certificates, all passed with distinction. A regular on the excursions of Abbé Albert de Lapparent at the *Institut Catholique de Paris* (he even took a voluntary post as assistant to be nearer the geologist), Henri started a *Diplôme d'Etudes Supérieures* (DES) on the Callovian of the southern Jura, supervised by de Lapparent and Professor Jacob.

That was in 1938; the shadow of war loomed on the horizon, which prompted Henri to accelerate his fieldwork and laboratory identifications. *Hecticoceras*, *Reineckeia* and *Kosmoceras* were his daily bread. With *Hecticoceras* one can already foresee his ideas on evolution of palaeontology.

Wartime

War broke out and disturbed his growing passion for the Natural Sciences. The DES was put in abeyance. Being a deferred conscript he was mobilised and sailed under French military orders.

Then came the demobilisation of the class of 38. Liberated he rejoined his family in Montpellier, refugees from Versailles. By an almost providential combination of circumstances [Daisy Jacob, daughter of Charles Jacob and friend of the Tintant family told him about the possibility of a temporary post in the Faculty in Montpellier] he met Marcel Casteras, Professor of Geology, who was very annoyed at having just lost his assistant, Maurice Dreyfus, victim of the antisemitic actions of the Vichy government. The post was immediately given to Henri and he occupied it from 1942 until November 1944. It was in this Faculty with few students that Henri learned about petroleum geology with SNPLM, surveying the areas of Corbières, Pic St Loup, Ardèche, Cevennes and Bas Languedoc, which formed the basis for publications between 1943 and 1949, often in association with those who became his friends: Maurice and Charles Gottis, Orgeval, Mainguy.

Installation

The situation becoming normal or nearly so, he had to leave Montpellier and Maurice Dreyfus returned to his post. An opportunity opened thanks to Professor Jacob who strongly advised meeting Raymond Ciry, appointed Professor in Dijon but who had not yet recruited an assistant. The matter was quickly settled and in November 1944 Henri was installed in Dijon. There he did a lot of teaching; although there were few students, for two it represented 8 to 9 hours per week.

What thesis?

Some years later the Dijon team was reinforced. From assistant, Henri became senior lecturer and the question of the thesis came up. Here is what Henri Tintant wrote on this *"… the way seemed quite clear: a thesis on a regional theme, seeking to establish a refined chronology supported by detailed study of the ammonite faunas."*

Starting from the area of Montpellier and extending up the right bank of the Rhône Valley researching facies variations in the Callovian and Oxfordian, he passed several summers in the field in collaboration with Maurice Gottis. But to establish a precise chronology *"it is necessary to have species defined precisely, for which biological evolution alone can supply the clock, marking irreversibly the passage of time, of which we have urgent need. I become more and more critical of the way of working, in this aspect, of our predecessors."*

Aware of the publications of Ernst Mayr, then of Huxley, Dobhzansky and Simpson on evolution and the new systematics, he developed another concept for palaeontology. The orientation of the thesis took a significant change of direction. It was necessary *"to try to apply the notion of species-populations to fossil material, as much in space as in time."* From this came statistical studies applied to palaeontology by him and his young researchers: brachiopods, ammonites (*Phylloceras* from the Bajocian to the Tithonian), Pliocene foraminifers, small vertebrates. It was at this time that Jean Piveteau, compiling his *Traité de Paléontologie*, asked him to write a chapter on the principles of systematics.

But the thesis remained always unwritten, because Henri Tintant worked very much with the young researchers whom he initiated into his methods, but this enabled him to refine his biological concepts of the species.

It is mainly from cephalopods that he took his evolutionary models: certainly with ammonites (more than 30 papers) but also on the nautiloids on which he became the authority (26 publications).

Portugal

Interested by the thesis I was preparing on Portugal on the Dogger and Malm north of the Tagus, and not content just to help me with identification of the faunas, Henri Tintant came to join us in the field in 1957. He was fascinated by the magnificent sections of Cap Mondego and Montejunta described by P. Choffat at the beginning of the century. It was at that time that he first encountered Portugese geology and his involvement continued for many years, sometimes with us, sometimes with young Portugese researchers, now become professors in their turn. Note the list of publications, notably on the stratigraphy of the Lusitanian in the classical sections of the Montejunta, Torres Vedras and the Serra d'elRei. The Callovian faunas interested him especially by their novelty, giving rise to descriptions of new species and even genera (*Rugeticeras*). After investigations in the Serra d'Arrabida (1968) and in Algarve (1972), he tackled presentation of the stratigraphical and zonal scale of the whole of the Portugese Jurassic (1971-1971).

While always following up the biostratigraphy of the Jurassic, one suspects that he had begun to see in the fossils something other than stratigraphical markers. In 1966 appeared a publication on the *Principles and Methods of Modern Palaeontology* (58) followed by the *Species Concept in Palaeontology* (60). His collaboration with biologists was close and fruitful; it was in the *Bulletin de la Société Zoologique de France* that appeared *The Species and Time* (71). Henri Tintant is certainly one of the few palaeontologists to have worked, published and exchanged ideas with his biological colleagues. In the light of his work one sees the concerns he had about the biological concept of the species (87), and relations between embryology and evolution (78).

Quaternary
The problems of the Quaternary were also of interest, notably climatic changes and their effects on sediment in Burgundy (.20, 26, 33, 34), with Joly (177) or on terrestrial faunas with Puiségur; also on karst evolution in Burgundy (38-41) and in Mediterranean climate (colloquia in southern Italy and in former Yugoslavia).

Again, he followed attentively everything which related to the origin of Man (133-156) and on its philosophical and religious repercussions: *"Man Product or Author of his Evolution?* (111, 167, 170).

The Philosopher
With a versatile mind, widely read and a well-organised memory, which Henri exercised daily, nothing about human beings was unfamiliar to him, as the Greeks say. From the founding of the multidisciplinary group "From Naturalists to Theologians" at the Catholic University of Lyon, Henri Tintant became one of the leaders, participating in courses on evolution, at the Chantilly sessions. At this time he was invited to different colloquia in France and abroad: on Evolution, on Faith and Science, on Exclusion or Complement-arity?, on Evolution and Creation, conferences and round-tables with biologists, philosophers, pre-historians and theologians followed each other. He became a member of numerous associations and published in highly specialised reviews: *Association Gonseth* (114), *Revue des Questions Scientifiques, Louvain* (115), *Société Zoologique de France* (124), *Dossiers Archéologiques et Préhistoire* (135), *CNRS* (139) etc… In 1996, with his friend Charles Devillers, he published in PUF "*Questions sur le Problème de l'Evolution*" (196), a message to younger generations.

Very close collaboration occurred with Father Gustave Martelet, a Jesuit theologian who sought permanent dialogue between his theological research and scientific knowledge. Some of the theologian's publications, especially the 1st volume of "*Evolution et Création*", owe their scientific basis to Henri Tintant's work. A few days before his death we reread a 40 page manuscript by Father Martelet.

The last years
His faith was profoundly nourished by reflection, supported by knowledge of the scriptures, and listening to informed critical explanations. One day he confided to us his expectations after death: "*I remain convinced that in death, the inevitable fate of all living things, everything does not disappear totally and that another life, unimaginable to our limited minds, emerges which brings us perfect fulfilment of our hopes and wishes*."

Close, and even very close to him, because 8 years of severe health problems forced him into a total change of life and to become nearer to us, we admired the way in which he could accept his dependence, the loss of his autonomy and the everyday threats of even more serious attacks. In spite of this he was always working and enabling us to benefit from his knowledge. During these months of convalescence with us, he confided to his computer these words which are for us something of his testament:
"that my career as palaeontologist was the result of an early and clear vocation, nothing can call into doubt, even though there was not a direct line, or a straight road without obstacles. Quite to the contrary, chance, the obligatory recourse of all historians, has played an important role, sometimes to favour sometimes to discourage. Here, as in all evolution, chance happenings and constraints played a major role and only a strong will could enable taking advantage of the first and getting round the second to keep the objective more or less at the point initially fixed…..
….life, like research, follows winding and unforeseen paths….
…. The greatest danger for a researcher is to content himself/herself with that to which he/she has come instead of constantly looking for the way past…."

I think that Henri Tintant knew how to show us.

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[translation NM: For a list of Henri Tintant's publications contact Christiane Ruget]

MICHAEL HOUSE

Malcolm HART

Professor Michael House died in Weymouth during the summer of 2002 following a short period of illness. Though perhaps best known as an authority on Devonian goniatites and stratigraphy, he was nevertheless passionate about the Jurassic stratigraphy and palaeontology of the Dorset Coast.

Born in Blandford (Dorset), Michael and his family moved to Wyke Regis, near Weymouth, when he was still quite young. He became a geology student at Cambridge where he fell under the influence of the great Jurassic geologist W.J.Arkell. Michael was keen to undertake PhD research into Jurassic ammonites but was persuaded that, rather than repeating recent work, he should investigate the fossil ammonoids of the Devonian. A lecturership was created for him at Durham University by Prof. Sir Kingsley Dunham and his PhD, which was done part-time, was awarded in 1958. He was immediately awarded a scholarship to extend his work in SW England to the Devonian rocks of New York State. Awarded a lecturership at Oxford University, he embarked on the publication of all his Devonian work. He moved to the University of Hull as Professor of Geology and, following the infamous Earth Sciences Review, moved to the University of Southampton – taking early retirement in 1993. At that time he moved back to Weymouth, but retained a part-time role in Southampton.

Michael's long-standing love of Dorset and its geology was ever-present and he had an un-paralleled knowledge of the area. His book on the *Geology of the Dorset Coast* is recognised as the most complete guide to the area. Not surprisingly he was heavily involved in the June 2000 submission to UNESCO for a World

Heritage Site on the Dorset/East Devon Coast. His contribution to gaining that recognition is to be remembered in a dedication that will appear in a new World Heritage Site Guidebook that is about to be published.

Michael made an outstanding contribution to British palaeontology and stratigraphy over his long career. He served as President of the Yorkshire Geological Society and President of the Palaeontological Association as well as being Chairman of the Ussher Society. While he made an outstanding contribution to our understanding of the Devonian rocks throughout the world, it is possibly for his love of the Jurassic rocks of Dorset that he will be most remembered by friends and colleagues alike.

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