INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Newsletter 29

Edited by Nicol Morton and Paul Bown

June 2002

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FROM THE CHAIRMAN

Nicol MORTON

For the Jurassic Subcommission this past year has been relatively quiet, in that there have been no decisions for members of the Subcommission. These are usually on GSSP proposals presented by a Stage Working Group. By contrast, some Working Groups have been very active, as is apparent from their reports in this Newsletter. Several have indicated that they hope to present proposals later this year, especially after further discussions during the 6th Jurassic Symposium in Sicily, of which more later.

As a result of activities in previous years, three of the Jurassic Stages (Sinemurian, Aalenian and Bajocian) have GSSPs officially approved by the International Commission on Stratigraphy and the International Union of Geological Sciences. Two were established in time to be shown on the I.U.G.S. International Stratigraphic Chart and listed in Appendix 1 of the Explanatory Note, published in 2000 (ISBN 0-930423-22-4), but the Sinemurian GSSP is too recent. The establishment of GSSPs is regarded by I.U.G.S. as the main role of I.C.S. and the System Subcommissions such as ISJS and a date of 2008 has been set for completion of this programme.

The main event this year is of course the 6th International Symposium on the Jurassic System being held in Sicily in September. Giulio Pavia and his colleagues have been working very hard to organise and prepare everything and I take this opportunity to thank them.

We are now trying to broaden the range of Subcommission activities, looking forward to post-GSSP Stratigraphy. We can judge the progress of this during the 6th Jurassic Symposium in Sicily when meetings of the Working Groups and of the Subcommission will be held. At that time we will discuss future plans for the Subcommission and also decide where and when to hold the 7th Jurassic Symposium. Suggestions will be welcomed.

From a personal perspective the last year has been very eventful. At the end of September I finally retired from my post at Birkbeck College, University of London. Four years earlier we bought a plot of land in southern Ardèche, France. At first this was to be for a holiday home, but we soon decided to make it our only home. Construction of our new house was started in June 2000 and we moved to France in July 2001. Much of our time since then has been devoted to re-organising and settling in, but we are both very happy in our new environment. Our address and other details are given in the section on Directory amendments in this Newsletter.

I look forward to seeing as many of you as possible in Sicily.

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6TH INTERNATIONAL SYMPOSIUM IN THE JURASSIC SYSTEM: Mondello, Palermo, Sicily, Italy 12th-22nd September 2002

You must all know by now that the next in the series of International Symposia on the Jurassic System will be held in Sicily in September this year. These symposia are organised every four years or so and are the most important international gathering for all specialists on the Jurassic.

The Second Circular was distributed in November 2001 and gave the following outline schedule:

September 12-15 Pre-Symposium Fieldtrip A

Sunday 15	Registration (Mondello), Ice-breaker party
Monday 16	Opening Ceremony, Sessions
Tuesday 17	Sessions, Symposium Dinner
Wednesday 18	Sessions
Thursday 19	Sessions, Working Groups, Closing
	Departure for Post-Symposium Fieldtrips.

September 20-22 Post-Symposium Fieldtrips:
Fieldtrip B1 (W. Sicily, 3 nights)
Fieldtrip B2 (W. Sicily, 2 nights)
Fieldtrip B3 (Central Apennines, 2 nights)
Fieldtrip B4 (Central Apennines, 3 nights)
Fieldtrip B5 (Venetian Alps, 3 nights)

Presentations, as poster or talk, are invited on all aspects of the Jurassic System and the following Special Sessions are planned:

1) Jurassic tectonics and sedimentation: from intraplate rifting to margin platform growth and collapse;
2) Taphonomy, facies and palaeoenvironmental analysis;
3) Jurassic organisms in space and time;
4) Integrated stratigraphy;
5) Palaeoceanography and palaeobiogeography;
6) Geoconservation – protecting Jurassic fossils, sites and science.

Other details, including accommodation and costs, are given in the Circular. A Third Circular will be emailed to those who have registered.

For further information please contact Dr Luca Martire, Dipartimento di Scienze della Terra, Via Accademia delle Scienze 5, 10123 TORINO, Italy (fax. 39 11 541755; email martire@dst.unito.it)

INTERNATIONAL COMMISSION ON STRATIGRAPHY: SOME INFORMATION ON ITS FUNCTION

Nicol MORTON

The Jurassic Subcommission (ISJS) is a constituent body of the International Commission on Stratigraphy (ICS) which is, in turn, a commission of the International Union of Geological Sciences (IUGS). This is the route for the small amount of funding the ISJS receives. As official bodies the IUGS and ICS have Statutes, which set out functions, organisation, etc. It would take up too much space to include the complete Statutes in this Newsletter, but I can email a copy of the ICS Statutes, which

incorporate those for the Subcommissions, to anyone who is interested.

According to its 'Purpose', the ICS is 'a body of expert stratigraphers founded for the purpose of promoting and coordinating long-term international cooperation and establishing and maintaining standards in stratigraphy'. The Commission is made up of Executive Officers (currently Chairperson Felix Gradstein, Secretary General Jim Ogg, Vice Chairs, and past Chairperson Jurgen Remane) and the Chairpersons of each of the Subcommissions. These are the Voting Members.

The principal objectives of ICS are:

1) the establishment and publication of a standard global stratigraphic time scale and the preparation and publication of global correlation charts, with explanatory notes;
2) the compilation and maintenance of a stratigraphic data base center for the global earth sciences;
3) the unification of regional chronostratigraphic nomenclature by organizing and documenting stratigraphic units on a global data base;
4) the promotion of education in stratigraphic methods, and the dessimination of stratigraphic knowledge;
5) the evaluation of new stratigraphic methods and their integration into a multidisciplinary stratigraphy;
6) the definition of principles of stratigraphic classification, terminology and procedure and their publication in guides and glossaries.

One of the main rôles of ICS is to approve proposals of GSSPs from the Subcommissions. Each Voting Member receives the full documentation of these and is expected to check that the proposed GSSP fulfils all the requirements. Obviously, they are not expected to verify the science.

IUGS have set as a goal having GSSPs in place for all Phanerozoic stages by the year 2008. Therefore, ICS are organizing a First Conference on Future Directions in Stratigraphy, by invitation only, in Urbino (Italy) in June 2002. The parallels between this and what has been happening in the Jurassic Subcommission are obvious! I will report on this at the Jurassic Symposium in Sicily. In the meantime, I would be grateful for constructive comments and suggestions to pass on to ICS.

Nicol Morton,
Chairman (Chairperson) of ISJS
Voting Member of ICS

REPORTS OF STAGE WORKING GROUPS

TRIASSIC-JURASSIC BOUNDARY WORKING GROUP

Geoff WARRINGTON and Gert BLOOS

The last Newsletter carried notice of the creation of IGCP Project 458 (Triassic-Jurassic boundary events: mass extinction, global environmental change and driving forces). Officers of the TJBWG were not consulted before this project was proposed to ICS; neither were myself or the ISJS Chairman advised by ICS of the proposal before the project was approved. In order to dispel any confusion that may have arisen it must be understood that IGCP Project 458 is distinct from the TJBWG. The TJBWG is the body responsible to ISJS for the selection of a preferred candidate GSSP for the base of the Hettangian Stage and thus defining, *inter alia*, the boundary between the Triassic and Jurassic. The advertised scope of IGCP Project 458 clearly relates to that of the TJBWG and work carried out and published under the aegis of the project will inform that of the TJBWG. I therefore view the activities of the groups, which share a number of members, as complementary and anticipate a constructive relationship.

During the year I have represented the TJBWG at the joint Geological Society of America and Geological Society of London Earth System Processes meeting held in Edinburgh, and at a field workshop in south-west England, organised by IGCP Project 458. The Edinburgh meeting included several lectures and poster presentations on matters relating to the Triassic-Jurassic boundary. The field workshop included visits to sections in Late Triassic-Early Jurassic successions exposed at Lilstock and St Audrie's Bay, west Somerset; Stowey Quarry, north Somerset; Manor Farm, near Aust Cliff, south Gloucestershire; and Pinhay Bay to Lyme Regis, Dorset. Nine lectures and a number of poster presentations were also made. This event was attended by a number of TJBWG members and effectively substituted for a joint field excursion to the candidate Hettangian GSSP and the Sinemurian GSSP in west Somerset, proposed by the TJBWG and Sinemurian Working Group in previous ISJS newsletters but which received inadequate response.

Since the previous newsletter appeared there has been considerable activity relevant to the remit of the TJBWG. This is partly reflected in the above meetings but is also evident from the following list of new publications. Of particular interest are those which provide additional documentation of candidate GSSPs for the base of the Hettangian (Taylor et al., 2001; Cohen & Coe, 2002; Hesselbo et al., 2002).

A meeting of the TJBWG will be convened during the 6th International Symposium on the Jurassic System, in Sicily.

Triassic-Jurassic Boundary, new literature

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DUFFIN, C. J. 2001. Synopsis of the selachian genus *Lissodus* BROUGH, 1935. *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen*, **221** (2): 145-218.

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SINEMURIAN WORKING GROUP

Gert BLOOS, Convenor

After the GSSP for the base of the Sinemurian Stage was ratified in the year 2000 by IUGS, other tasks which had been postponed in favour of the GSSP proposal had priority in 2001. Therefore, the activities of the Sinemurian WG were reduced. One necessity was to prepare a short communication on the GSSP for publication. This report appeared in the March 2002 issue of *Episodes* (Vol. 25/1, 22-28). Another necessity is a more detailed account of the ammonite fauna of the Conybeari Subzone in the GSSP section. The work for this account continued in 2001.

On October 17th 2001, a visit to the GSSP at East Quantoxhead was organized for participants of the IGCP 458 SW England Field Workshop. This Workshop took place at Taunton on October 14th-16th and dealt with the Triassic/Jurassic boundary. The visit one day after the Workshop offered the opportunity to see the thick succession from the upper Hettangian through the complete Conybeari and Rotiforme Subzones of the lower Sinemurian in the cliffs and foreshore of the Sinemurian GSSP.

Reference:

BLOOS, G. and PAGE, K.N. 2002. Global Stratotype Section and Point for base of the Sinemurian Stage (Lower Jurassic). *Episodes*, **25** (1): 22-28; Beijing.

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PLIENSBACHIAN WORKING GROUP

Christian MEISTER, Convenor

The compilation of the world data around the Sinemurian-Pliensbachian boundary showed that precise information at this boundary was poor. This fact was confirmed by the information recorded by the specialists of this interval. The small number of potentially well-known sections was an important problem and our work was mainly a process of elimination. To arrive at the choice of the Wine Haven section (Robin Hood's Bay, Yorkshire, UK), several other localities have been excluded because they did not fulfill the basic criteria of the Commission on Stratigraphy (ICS) (REMANE et al., 1996). These included: Bünde in NW Germany mainly for a faunal gap; Pabay in Hebrides for an important vertical facies change at the boundary; Aselfingen in SW Germany in the historical area of Pliensbach mainly because it is a reduced section with rare ammonites; Bosso River in Central Apennines because of slumps and a fault at the boundary (see Newsletter 1999 (26): 33-42).

Therefore, only one section showing stratigraphically continuous sedimentation with good faunal content and fulfilling the recommendations of ICS, remains suitable for proposal as GSSP: **Wine Haven (Robin Hood's Bay, Yorkshire, UK)**.

Multidisciplinary research on the boundary stratotype, developed over years by the Pliensbachian Working Group, focussed on this section with different degrees of success (see Newsletters 26, 27, 28).

During this year a proposed British project on the magnetostratigraphy through the Hettangian, Sinemurian and Pliensbachian in the North Somerset and Robin Hood's Bay GSSP's unfortunately failed. Moreover, we have no new information yet about the study of the Foraminifera.

However, the definition of the basal boundary of the Pliensbachian will be based mainly on the ammonites supported by the complementary studies like sequence stratigraphy and isotope stratigraphy (Figures 1 and 2).

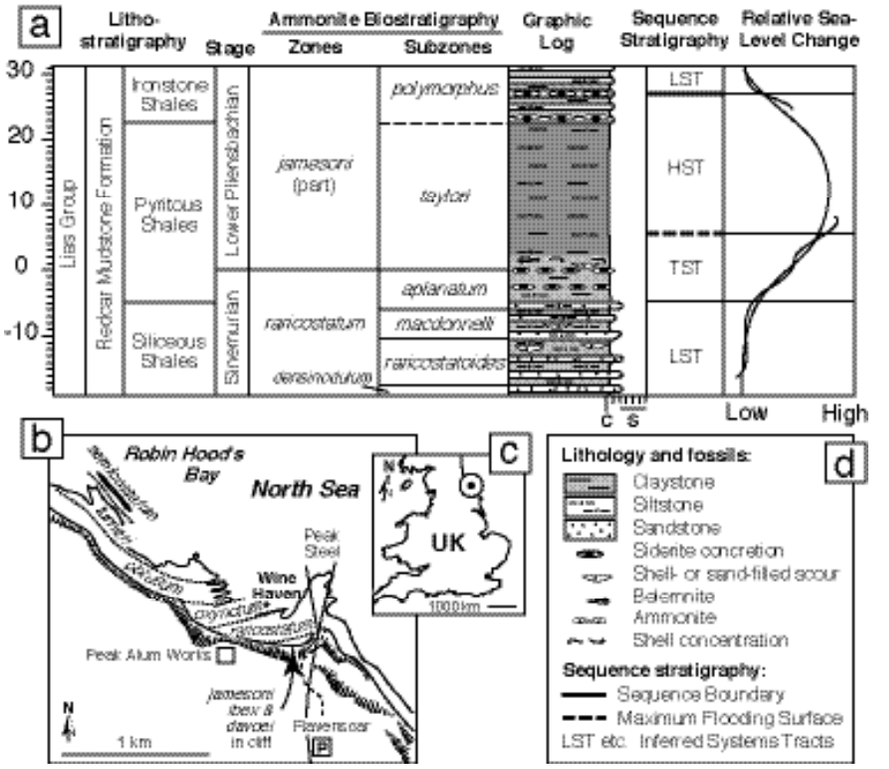

Fig. 1. (a) Summary stratigraphic log for the Upper Sinemurian to Lower Pliensbachian succession of Robin Hood's Bay, Yorkshire, based on data in Hesselbo & Jenkyns (1995, 1998) and Cope *et al* (1982). Vertical scale in metres. (b) Sketch geological map of the Wine Haven area showing distribution of strata in the inter-tidal zone (adapted from Rawson & Wright, 1992). (c) Location of Robin Hood's Bay. Key to panel (a) and Figure 2. Sequence stratigraphic abbreviations: LST = Lowstand Systems Tract; TST = Trangressive Systems Tract; HST Highstand Systems Tract (HESSELBO et al., 2000).

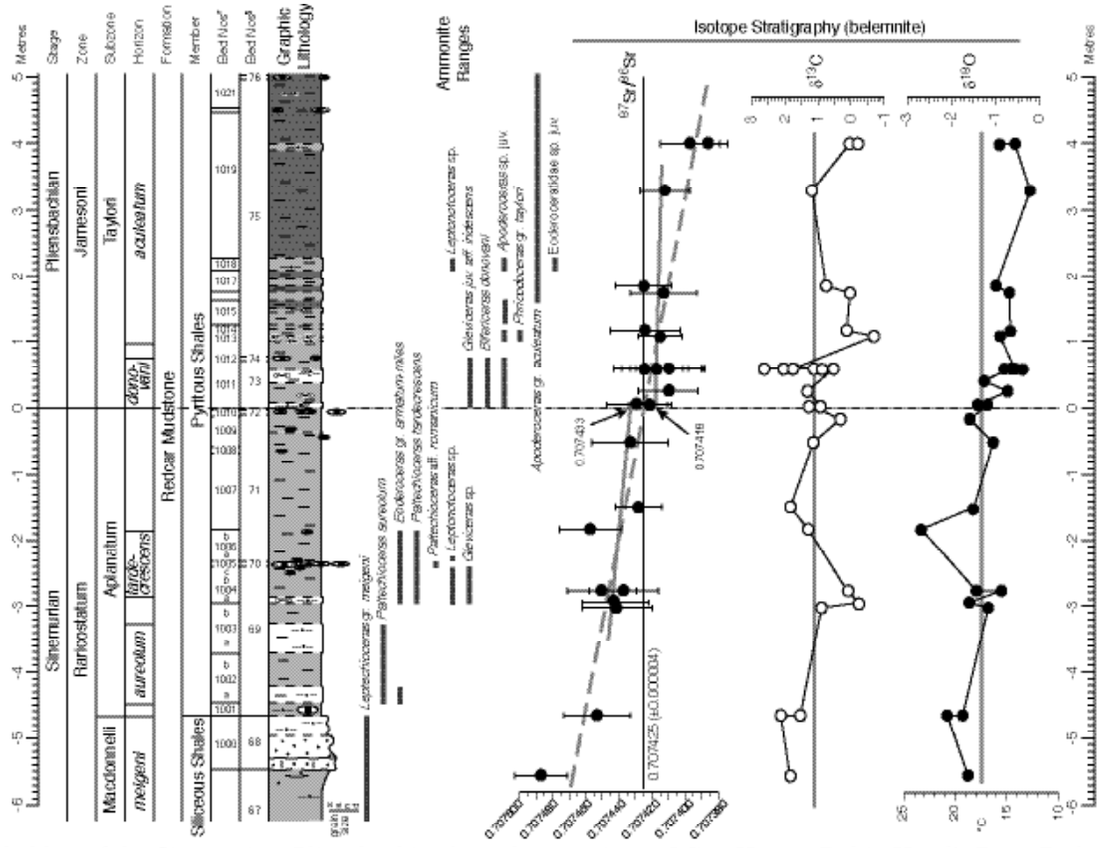

Fig. 2. Detailed log of the Sinemurian–Pliensbachian boundary section at Wine Haven, Robin Hood's Bay. Bed numbers are from Dommergues & Meister (1992) (*) and Hesselbo & Jenkyns (1995) (§). Key as for Fig. 1. Isotopic values are from diagenetically unaltered samples only. No ammonites have been recorded from between -1.8 to 0 m in the section (HESSELBO et al., 2000).

Consequently, the Pliensbachian Working Group has now arrived at 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 Pliensbachian Stage. A synthesis will be presented at the 6th Jurassic Symposium in Sicily in September 2002 and the voting process will start.

Reference:

HESSELBO, S.P., MEISTER, C., GRÖCKE, D.R. 2000. A potential global stratotype for the Sinemurian-Pliensbachian boundary (Lower Jurassic), Robin Hood's Bay, UK: ammonite faunas and isotope stratigraphy. *Geol. Mag.*, **137** (6), 601-607.

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TOARCIAN WORKING GROUP

Serge ELMI and Hugh JENKYNS

Remarques sur quelques profiles

Serge ELMI

Maroc:

L'étude des profils marocains supposés valables pour la définition de la limite Pliensbachien-Toarcien a été finalisée cette année sous la direction de K. BENSHILI (ENIM, Rabat) et de M. BOUTAKIOUT (Univ. Rabat).

Les deux profils retenus sont brièvement décrits ici, mais tous deux présentent des inconvénients qui nous amènent à abandonner leur "candidature".

1- Dans le Moyen-Atlas : coupe d'Aït MOUSSA : elle est merveilleusement bien exposée et montre un net changement de faciès entre des alternances marnes-calcaires à *Emaciaticeras* et des marnes à *Dactylioceras* (*Eodactylites*). Cependant les premières faunes toarciennes sont rares et sous forme de moules internes pyriteux très oxydés. Le pendage, subvertical, n'exclut pas, en outre, la possibilité de glissement. La coupe complémentaire d'Isssouka ne convient pas car les conditions d'affleurement des bancs calcaires fossilifères à *Eodactylites* sont mauvaises.

2- Dans le Haut-Atlas, la coupe du Col de TALGHEMT offre de bons affleurements le long d'un profil de bord de route où le dernier niveau à Emaciaticeras et suivi par un banc à *Eodcatylites* supporte des marnes à intercalations de turbidites calcaires. Là-encore, le principal obstacle est la rareté des fossiles du début du Toarcien au-dessus du banc à *Eodactylites* et, en plus, le voisinage du volcanisme.

Algerie:

Le passage Pliensbachien-Toarcien est magnifiquement exposé au Dj. Nador de Tiaret où la succession des faunes est bien documentée. L'étude sédimentologique et l'inventaire micropaléontologique ont été réalisés.

A mon avis, c'est le meilleur profil actuellement connu, mais il s'agit d'une région éloignée et reculée où le groupe des collègues oranais (M. BENHAMOU, A. SEBANE) n'a pas pu retourner en raison de la situation actuelle (insécurité).

Portugal:

En l'état actuel, le profil de Cruz dos Remedios à Peniche devient le meilleur affleurement pérenne offrant de bonnes conditions pour être GSGP.

Avantage: niveaux fossilifères étagés dans l'intervalle transgressif qui démarre dans la sous-zone à Emaciatum et qui se poursuit dans la sous-zone à Polymorphum; études sédimentologiques, géochimiques (L.V. DUARTE, Coimbra, WILSON, U.K.), paléontologiques (ROCHA, MOUTERDE).

Inconvénient : affleurement très visité, les faunes deviennent difficiles à extraire.

Remarques:

À mon avis les bons affleurements du Yorkshire et de Vendée ne répondent pas aux exigences d'un GSGP.

En effet, on a souvent évoqué le provincialisme et les crises biologiques pour expliquer l'absence des Eodactylites dans les gisements classiques d'Europe du NW. Il apparaît qu'en réalité cette absence est principalement due à un défaut d'enregistrement et, en particulier, à des lacunes. Cette conclusion est étayée par :

- l'existence sporadique des *Eodactylites* dans les coupes les plus continues (Allemagne du SW).
- l'étude de la structure des populations et leurs corrélations montrent que l'intervalle de temps correspondent aux sous-zones à Elisa et à Polymorphum est très mal représenté en Europe du NW.
- les effets de la crise biologique à la limite Pl./Toa. (voir Smith *et al.*) pour les données récentes faisant intervenir le volcanisme du Daryka.

Autres informations:

• Les ammonites des gisements classiques de la région de Lyon ont fait l'objet d'une monographie qui comprend la figuration de nombreux types de Dumortier et des principales espèces inventoriées. La stratigraphie et la paléontologie des principaux gisements font l'objet d'une synthèse regroupant des données nouvelles et, aussi, des informations dispersées dans de nombreux articles ou dans des mémoires de thèses inédits.

• On peut souligner l'importance de l'article de P. SMITH et coll....

• Le programme "Péritéthys" a rassemblé de nombreuses collaborations qui ont permis d'établir une carte des environnements du Toarcien moyen. Elle est accompagnée par une utile présentation des grandes régions depuis l'Atlantique à l'Ouest jusqu'à l'Arabie et le Caucasse à l'Est.

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Chemostratigraphy versus biostratigraphy: data from the Toarcian Stage

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The Toarcian stage has recently been investigated in considerable detail in terms of its chemostratigraphy. Parameters used include organic-carbon values (TOC), carbon isotopes of marine carbonate, marine organic matter and terrestrial higher plant material, nitrogen isotopes in

organic matter and strontium-isotope ratios in belemnites (Jenkyns & Clayton, 1986; Jiménez *et al*., 1996; Duarte, 1998; McArthur et al., 2000; Jenkyns et al. 2001; Rosales *et al.*, 2001). The TOC maxima in the British and German sections can be everywhere assigned to the lower to middle *exaratum* Subzone in terms of the Boreal (British) ammonite zonation (Jenkyns and Clayton, 1997; Rohl *et al.*, 2001). A negative $\delta^{13}C$ excursion in organic matter and, locally, in carbonates characterizes the lower *exaratum* Subzone in the most organic-rich lithologies, and this same excursion is also registered in terrestrial carbon (wood), showing that the isotopic disturbance characterized the whole of the ocean-atmosphere system (Hesselbo *et al.* 2000). Further, a positive $\delta^{13}C$ excursion in organic matter locally (Mochras Borehole, Wales) characterizes the *tenuicostatum* Zone, and a positive $\delta^{13}C$ excursion in organic matter, bulk carbonate and belemnite rostra characterizes the upper *exaratum* Subzone and is apparently traceable across northern and southern Europe (Jenkyns & Clayton, 1997; Jiménez *et al.*, 1996; Duarte, 1998). If these features are used as a correlative tool, they suggest a partial overlap between the *tenuicostatum* Zone, as typically defined in Tethys, and the *falciferum* Zone in northern Europe. *Hildaites*, the first occurrence of which is commonly used to define the *tenuicostatum-serpentinus* Zone boundary in the Tethyan region, appears halfway through the *exaratum* Subzone in Yorkshire (Howarth, 1992), thus, if the appearance of this genus is effectively synchronous across Boreal and Tethyan Europe, the same overlap is indicated (Jenkyns, in press). Hence the Toarcian black shales of the Tethyan region, attributed to the *tenuicostatum* Zone (e.g. Bucefalo Palliani & Mattioli 1994; Monaco *et al.* 1994; Nini *et al.* 1996; Pettinelli *et al*. 1995; Parisi *et al*. 1996; Morettini & Bartolini, 1999) are apparently identical in age to the black shales of *exaratum*-Subzone (*falciferum*-Zone) age in northern Europe. The Toarcian Oceanic Anoxic Event apparently left a more-or-less synchronous black-shale record across much of Europe, even though the levels of organic richness (TOC) are much lower in the Tethyan than in the Boreal region.

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BAJOCIAN WORKING GROUP

András GALACZ, Convenor

The Bajocian Working Group convenor made editorial and fund-raising efforts to bring out the volume of the contributions to the Bajocian-Bathonian Working Groups Meeting held in Budapest, 2000. The volume has been published and the abstracts are given below.

Some members of the Bajocian Working Group were busy this year preparing the Jurassic Symposium of 2002 in Sicily. This meant field-work to outline the excursions, organising stops and accomodation, and writing up text for the guide-books.

A few members of the Bajocian Working Group joined with others from other Working Groups in preparing manuscripts for the revision of ammonites from Sicily described by G.G. Gemmellaro. We hope that the revision will be published in book format in time to be distributed at the Symposium.

Abstracts of papers from Bajocian and Bathonian WGs meeting:

Remarks on the *Astarte* Bed (Upper Bajocian, Middle Jurassic) of Burton Bradstock (Dorset, Southern England)

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(With 1 figure and 4 plates)

The *Astarte obliqua* Bed of the Burton Bradstock district is subjected to detailed biostratigraphical examination. The bed is divisible by lithology and palaeontology into several horizons. However, the entire succession is not present at any of the closely spaced localities sampled, probably owing to local synsedimentary tectonics and pene-contemporaneous erosion. At all the places sampled the entire bed probably belongs to the Acris Subzone of the Garantiana Zone of the Upper Bajocian. The lowest part of the bed contains an Acris Subzone ammonite fauna. With this are derived specimens, and rare well-preserved morphospecies that normally typify earlier strata ranging down to the Dichotoma Subzone. These specimens may represent an earlier age or be lingering ancestral morphs persisting into the Acris Subzone assemblage. A preliminary assessment of the taphonomic status of the fauna is also made.

Upper Bathonian ammonites of the Catalan Basin (Tivissa and Cap Salou, Spain)

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(With 7 figures and 2 plate)

The two ammonite successions described in the present paper represent an unusually complete sequence of Upper Bathonian deposits. Ammonites of the Upper Bathonian from Tivissa and Cap Salou (province of Tarragona), two localities of the Catalan Basin, allow the recognition of several bio- and chronostratigraphic units commonly missing in the Iberian Basin. The Retrocostatum and Angulicostatum zones (Upper Bathonian) and the lowermost Bullatus Zone (Lower Callovian) established for Submediterranean areas of Europe can be identified in the Catalan Basin. *Epistrenoceras* and *Parapatoceras* are common at certain levels. Phylloceratina and Lytoceratina are virtually absent. Two specimens of Upper Bathonian Clydoniceratinae have been identified. However, the Discus Zone established for NW European areas of the Subboreal Province has not been recognized. The ammonite assemblages of the Catalan Basin comprised Submediterranean taxa during the Late Bathonian-Early Callovian interval.

Frogdenites, the early sphaeroceratid ammonite from the lower Bajocian of the Bakony and Gerecse Hills, Hungary

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(With 1 plate)

Genus *Frogdenites* and its two species are described on the basis of new finds from the Bajocian of Hungary. The study supports the previously suggested conclusions on systematics and stratigraphy: the genus, which represents the earliest member of the family Sphaeroceratidae, is a rare, but very good index of the topmost part of the Laeviuscula Zone. Dimorphism is demonstrated in both species, with a very low size ratio between macro- and microconchs.

Ammonite stratigraphy of the Bajocian in Northern Chile

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(with 3 text–figures, 3 tables and 10 plates)

Ammonites of Bajocian age are found in Northern Chile at many localities, but sections with ammonite beds of different age of this stage are rare. The Bajocian is subdivided using ammonite horizons. The distinguishable number of horizons is much smaller than that in Europe and corresponds to the quantity of zones or subzones occuring there. Faunal diversity is much lower than in Europe and many of the South American species are likely to have a longer biostratigraphic range. The lower diversity is probably caused by the special paleogeographic and biogeographic back arc basin situation. The entrance to this basin was restricted and its dimensions was much smaller than the huge area of the European shelf with a high potential of ecologic possibilties.

Proof of the European Discites Zone is difficult. The Ovalis Zone is represented only by one horizon. The Laeviuscula to Subfurcatum Zones can each be subdivided

into two horizons. It is not easy to ascertain the middle and upper part of the Upper Bajocian because ammonites of this age are very rare, endemic or unsuitable for an exact age determination.

Two new species are described being important for the biostratigraphy of the lowest Upper Bajocian.

Palaeogeographical distribution of early Bathonian ammonites of the *Asphinctites-Polysphinctites* group

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(With 4 figures and 2 plates)

The study of ammonites representing the dimorphic pair *Asphinctites tenuiplicatus* (BRAUNS) - *Polysphinctites secundus* (WETZEL) in the Tenuiplicatus Zone of Lower Bathonian in Central Poland, reveals their abnormal large sizes when compared with those occurring in other areas of Europe. The biogeographic distribution of the discussed ammonites, as well as older representatives of *Asphinctites* and *Polysphinctites* shows a general decrease in size of both forms towards the south from the Submediterranean Province to the Mediterranean Province, and the general disappearance of *Polysphinctites* in the Mediterranean Province. The phenomena may be related to changing environmental conditions which influenced the development of the discussed ammonites. We suggest that the ammonites inhabiting more distant areas from the Mediterranean Province, at the periphery of the geographic range of the species, could have reached larger sizes due to prolonged time of maturation.

Distribution of the Bajocian–Bathonian ammonites in the South–West chains of Hissar Range

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(With 2 figures and 9 plates)

The stratigraphical distribution of the Bajocian and Bathonian ammonitids in the South-West Hissar range (Central Asia) is reviewed. The figures of the major taxa, including types of species, described on the local material, are given.

Up a Bathonian backwater – a review of the ammonite evidence for correlating sequences with interdigitating non–marine facies in central and northern England

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(With 4 figures)

In southern England, Bathonian ammonite sequences are relatively complete and show a strong affinity with those recorded in Submediterranean Province areas, such as eastern France and north eastern Spain. From Oxfordshire, in southern central England, however, to North Yorkshire, north-east England, a gradual replacement of normal marine deposits by non-marine and quasi- or restricted marine facies inevitably leads to a corresponding decrease in the ammonite occurrence. Despite the general absence of these key guide fossils, there have been various attempts to correlate central and northern English Bathonian facies using other fossil groups such as brachiopods, ostracods and dinoflagellates. Lithostratigraphical correlation inevitably predominate, however. Further north into East and North Yorkshire, and ultimately Scotland no Bathonian ammonites are known, an inevitable consequence of the virtual absence of any marine influence within regions dominated by fluvial sedimentation. This belt of non-marine facies completely separates a typical Northwest European [ammonoid] Province, from the Boreal Sea to the north. A review of the known ammonite occurrences in central and northern Britain region is provided, including taxonomic and stratigraphical revisions of ammonite faunas described by previous authors, in particular W. J. ARKELL in a classic monograph.

This revision is used, in combination with stratigraphical information derived from other fossil groups, to present a provisional revised correlation of Bathonian lithostratigraphical units in central and eastern England (Oxfordshire to East Yorkshire).

Monsoon–like climate during the Bajocian: clay mineralogical and geochemical study on a limestone/marl alternation (Komló Calcareous Marl Formation, Mecsek Mountains, Southern Hungary)

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(With 11 figures and 5 tables)

Jurassic formations crop out in the eastern part of the Mecsek Mountains in a relatively extended area. The Aalenian-Bajocian interval is characterised by bioturbated marls and clayey limestones (Fleckenmergel, Allgäu facies) named the Komló Calcareous Marl Formation. The most obvious feature of this formation is rhythmic alternation of carbonate-rich and carbonate-poor semicouplets. Our work deals with characterization of changes of palaeo-environmental conditions of this sequence using an approach involving study of changes in clay mineral assemblages, determination of stable isotopic composition, and enrichment or impoverishment redox- and bioaffinity-controlled elements.

The clay fraction of the examined samples is dominated by illite and illite/smectite mixed-layer phases (with 40-70 percent illite content, R=0 or R=1 type interstratification). It has been formed by preferential replacement of smectite by illite during burial diagenesis. Discrete illites seem not to be altered by heating during burial. Kaolinite is rarely found, only in samples rich in shelf–derived redeposited material. Abundance of the clay mineral species does not show any covariance with the lithology and the position in the profile. This phenomenon suggests that the processes forming the alternation of carbonate-rich and carbonate-poor

semicouplets did not directly and exclusively affect the genesis of the clay minerals. The clay mineral assemblage documents erosion of smectite-rich soils developed under warm and seasonally humid climate. Sparse occurrence of the kaolinite together with the high abundance of illite and illite/smectite suggest a relatively distant source area during deposition.

Stable isotope ratios of the carbonate fluctuate between 0.2 and 2.1 ‰ for carbon and between –5.1 and –0.5 ‰ for oxygen. Positive correlations were found between the measured isotope ratios of the two elements and between the isotope ratios and $CaCO_3$-content of the samples, also it can be established that carbonate-rich semicouplets are enriched in heavy carbon and oxygen isotopes in comparison with carbonate-poor semicouplets. This pattern suggests enhanced productivity, relatively 'cool' and/or 'saline' surface water during deposition of carbonate-rich semicouplets and a minor role of diagenetic carbonate redistribution.

Fluctuations of P in the carbonate-rich semicouplets seem to be controlled by carbonate dilution of the terrigenous material and enhanced surface-water productivity. Diagenetic enrichment under oxic pore water conditions seems to be the most plausible explanation for relative Mn-enrichment in the carbonate-rich samples. Enrichment of elements such as Fe, Zn, Cu, V, Ni in carbonate-poor semicouplets cannot be explained by a pure detrital source. According to Ti-normalised major and trace element enrichment factors relative to the PAAS, excess concentrations (over detrital) may be derived from seawater and could have been (at least partially) associated with the organic fraction during sedimentation. During early diagenesis moderately oxic, dysoxic conditions were favourable to decomposition of organic complexes, adsorption onto surface of the clay minerals and/or incorporation in sulfide minerals.

Rhythmic organisation of the couplets may represent palaeoenvironmental changes. Palaeoceanographic conditions alternated from efficiently mixed, high-fertility surface water and well-oxygenated seafloor (carbonate-rich beds) to enhanced runoff and/or decreased evaporation with sluggish vertical circulation and moderately oxygenated bottom water (carbonate-poor beds). This scenario should be connected to alternating anti-estuarine and estuarine circulation. The corresponding climatic conditions alternated from more arid to more humid.

Bajocian and Bathonian brachiopods in Hungary: a review

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(With 3 figures)

The Bajocian and Bathonian brachiopod faunas of Hungary, collected in the last decades, have been reviewed by the author. In the Pelsonia terrane (Bakony and Vértes Mts.), the Bajocian stage is especially rich in brachiopods: 18 species have been determined from the more than five hundred specimens. In the Tisia terrane (southern Transdanubia), the Bathonian beds provided very diverse brachiopod faunas: around 500 specimens and 9 species have been found in the Mecsek Mts., whereas the local occurrence in the Villány Mts. provided 11 specimens belonging to 4 species. The Pelsonia terrane belonged to the Mediterranean faunal province in the Bajocian, while the Tisia terrane was under the mixed influence of the NW-European and Mediterranean provinces in Bathonian times.

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BATHONIAN WORKING GROUP

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The French section at Bas Auran needs ratification as the GSSP within the Bathonian Working Group. Complementary data from the La Palud section were obtained during September 1998. A joint Bajocian and Bathonian meeting in Hungary in September 2000 had discussions on biozonal schemes and multidisciplinary correlation. Papers of this meeting have been published in vol. 3 of *Hantkeniana* (2001) [see report of Bajocian Working Group above]. Candidates for the Bathonian GSSP in Iberia or North Africa are still under study and discussion within the Bathonian Working Group. Selection of candidates for the Bathonian GSSP within the BWG is expected at the Sicily conference (6th ISJS, September, 2002). A formal proposal of the GSSP is expected by the end 2002.

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CALLOVIAN WORKING GROUP

John CALLOMON, Convenor

Since the last Newsletter there is little formal business concerning the Bathonian-Callovian Boundary Stratotype to report. There continues to be progress, however, in the biostratigraphical exploration of these Stages, some of it sensational. The latest news comes once again from our colleagues in Russia.

Some of our readers may recall that one of the outstanding unsolved problems in the Middle Jurassic was the correlation of two of the major standard chrono-stratigraphical zonations based on ammonites: the primary standard used in most of Europe and the western Tethys (the 'Tethyan' or 'Submediterranean' Provinces in common parlance); and the Boreal secondary standard used in the circum-Arctic shelf deposits of Eurasia and North America, previously loosely referred to as the Boreal Bathonian. The latter, based overwhelmingly on the ammonite biostratigraphy of East Greenland, is as refined as the former - if not even more so - in terms of the temporal resolution of its zonal units. The last comprehensive review (CALLOMON 1993) lists a succession of nine Zones below the base of the Callovian, starting with the Borealis Zone (index *Cranocephalites borealis* (SPATH)) and rising via the Ishmae Zone (index *Arcticoceras ishmae* (KEYSERLING)) to the Apertum Zone (index *Cadoceras apertum* CALL. & BIRKELUND), which probably spans the Bathonian-Callovian boundary. These nine Zones encompassed a biostratigraphy resolved into 25 ammonite faunal horizons. There were two problems.

Firstly, the lowest, Borealis Zone, lay everywhere in the Arctic above an ammonite biostratigraphic non-sequence. In Eurasia, the youngest faunas found below it were of Toarcian or oldest Aalenian ages (Opalinum Zone in Svalbard); in Arctic Canada, of earliest Bajocian age (Sauzei Zone, *Arkelloceras tozeri*). The Borealis Zone could therefore be still a lateral equivalent of the Bajocian, at some level from the Humphriesianum Zone upwards.

Secondly, the ammonites of the Boreal Bathonian were totally different from those of classical peri-Tethyan Europe. No areas of faunal overlap were known, so that correlation at zonal level of the primary standard Bathonian with the Boreal Bathonian was quite impossible. This case of mutually exclusive faunal provincialism was if anything even more serious and extensive than that in the famous Tithonian/Volgian/Portlandian example around the Jurassic-Cretaceous boundary.

At least partial solutions of these problems are now in sight. In the first, the 'age' of the Borealis Zone, there had been some previous indications, based on taxonomic affinities of the ammonites, that *C. borealis* was closely related by descent from NE Pacific species of *Chondroceras*, of Humphriesianum Zone age, i.e. latest Early Bajocian. An age of around the Early-Late Bajocian boundary has recently been confirmed by a physical technique, on the basis of the strontium Sr(87/86) isotope-ratios found in calcitic belemnites (M. ENGKILDE, Copenhagen, to be published).

News now comes of progress with the second problem. Until about ten years ago, the furthest south that Boreal Bathonian ammonites had been recorded in Eurasia had been in the Petshora basin, west of the northern Urals, the type-area of *Arcticoceras ishmae* itself. Renewed field-work by D.B. Gulyaev, D.N. Kiselev and V.V.Mitta in the Volga Basin has yielded rich and varied new collections from hitherto unexplored localities, especially in the region of the Middle Volga, along its northern tributary the R. Unzha, between Kostroma and Nizhniy Novgorod. (For more readily accessible descriptions, see D.B GULYAEV & D.N. KISELEV 1999, D.B. GULYAEV 2000, references below; the extensive review by V.V. MITTA was already cited in the previous Newsletter, no.28. A new review of the Middle Callovian has also appeared: KISELEV 2001). They include *Cadoceras infimum* GULYAEV & KISELEV, index of the highest, new Infimum Zone below the Callovian Elatmae Zone in a revised standard zonation, and *Kepplerites svalbardensis* SOKOLOV & BODYLEVSKY, types from Spitsbergen. Both are close to or identical with forms from the lower Calyx Zone of Jameson Land and Store Koldewey in East Greenland and undoubtedly of Upper Bathonian age. The rich new collections from the rest of the Lower-Middle Callovian, including the true *Kepp. keppleri,* were also referred to previously.

Now comes news from Saratov, on the Lower Volga, 51°N (the same as London), 700 km SE of Moscow. Vasilii MITTA permits me to pass on the following:

V.V. MITTA & V.B.SELTZER, 2002. First finds of Arctocephalitinae (Ammonoidea) in the Jurassic of the south-eastern Russian Platform, and the correlation of the Boreal Bathonian Stage with the standard scale. *Bulletin CF VNIGNI*, Moscow, **7**, in press.

The paper describes ammonites of the boreal subfamily Arcticoceratinae (Middle Jurassic, Cardioceratidae) that have been found for the first time in the south-eastern part of the Russian Platform, in a section in the vicinity of Saratov, in association with representatives of the "Tethyan" family Parkinsoniidae. Beds with *Oraniceras besnosovi* sp.nov. [closely related to *Oraniceras gyrumbilicum* (QUENSTEDT), [M] of *Parkinsonia wuerttembergica* (OPPEL)[m] - JHC] are overlain by beds with *Arcticoceras harlandi* RAWSON [found in Greenland and Svalbard in the lower part of the Ishmae Zone - JHC] and, higher, *A. ishmae* (KEYSERLING) itself. Also found, but not *in situ*, were some *Arctocephalites* spp.

The new discoveries allow us to correlate the Ishmae Zone of the Boreal Bathonian with a part [the highest - JHC] of the Lower Bathonian of the standard scale, and to see palaeogeographical and palaeobiogeographical relationships in the Bathonian in a new light.

So, the Ishmae Zone turns out to be equivalent to the highest part of the Lower Bathonian in Europe, where *Parkinsonia* (*Oraniceras*) *gyrumbilica/wuertembergica* occurs in the highest, Macrescens Subzone of the Zigzag Zone. In Greenland, new discoveries in 1996 have increased also the number of faunal horizons now discernible in the Boreal Bathonian *olim*, to a total of 50. The number recognized in classical Europe over the same interval, from basal Upper Bajocian to basal Callovian, stands at about 32.

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OXFORDIAN WORKING GROUP

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Introduction

Work on Oxfordian biostratigraphy and palaeontology has shown significant progress in recent years since the last Jurassic meeting (Vancouver 1998), firstly attempting to (re)define the chronostratigraphic extent of the Oxfordian Stage itself and secondly searching for a suitable section to be proposed as the standard type-section (GSSP) for the base of the Oxfordian Stage. Both problems are briefly outlined

below in order to shed some light on the main debates occurring within the Oxfordian Working Group. An updated list of active members of the group has also been produced as regards the planned OWG meeting at the Jurassic Symposium in Sicily 2002.

Biostratigraphic remarks

The extent of the Oxfordian stage has been the subject of intense debate due to correlation problems at the base of the Kimmeridgian Stage between the Mediterranean and Boreal realms. As discussed in a previous Kimmeridgian Working Group report (Meléndez & Atrops, 1999) the species *Amoeboceras bauhini* (Oppel) has proved to be a useful link for correlation between otherwise separate realms. The record of this form together with *Pictonia baylei* in Dorset (Ringstead Bay) at the base of the Kimmeridgian, and in the same levels as the type specimens of *Taramelliceras hauffianum* (Oppel) and *Orthosphinctes tiziani* (Oppel), in Plettenberg (Swabian Jurassic, SW Germany), has imposed a strong constraint on the Oxfordian biostratigraphic zonal scheme and boundaries until now assumed.

As has been demonstrated by Settles, Schweigert and Soffel, (see Meléndez & Atrops, *loc. cit.*, Fig. 1), should this correlation prove valid across the Tethyan Realm, then the lower boundary of the Kimmeridgian Stage should be pushed down to the base of the Bauhini/Hauffianum/Tiziani Biohorizon, an upper interval of the Hauffianum Subbiozone according to Settles *et al.* This Biohorizon would thus be transferred to the base of Planula Biozone as the basal biohorizon of the Kimmeridgian stage. If this were the case, then it would seem advisable to revise the former subbiozones of the Bimammatum Biozone into full biozonal status. This would be justified by the wide geographical extent and correlation potential of these biostratigraphic units across the Tethyan Realm, in the Mediterranean and Submediterranean provinces, by means of such taxa as *Euaspidoceras, Epipeltoceras, Orthosphinctes* and *Passendorferia*. The upper Oxfordian would then include the Hypselum Biozone, which in turn would comprise the Semimammatum and Berrense Subbiozones (Cariou & Hantzpergue, 1997), the Bimammatum Biozone (*s.str.*) and an upper interval partly equivalent to the lower part of the former Hauffianum Subbiozone. Since the Hauffianum-Bauhini-Tiziani interval *proper* has been transferred to the base of the Planula Biozone, it does not seem advisable to retain the former name Hauffianum Subbiozone of the Bimammatum Biozone for this lower interval. The species *Orthosphinctes tizianiformis* Choffat, proposed as the type species for this interval ("Tizianiformis" Biohorizon, in Settles *et al.*, *loc. cit*.), might be considered as a valid name for this uppermost biozone of the Oxfordian stage. This point, however, is still open to discussion.

Other smaller biostratigraphic problems concern the accepted biozonal scales currently in use and the setting of the chronostratigraphic boundaries within the Oxfordian. These questions are largely a matter of taste and should ultimately be supported individually by researchers, unless a formal decision is taken by the ICS, which seems unlikely. The main problems currently needing attention are (1) the position of the middle-upper Oxfordian boundary, (2) the extent and subdivisions of Oxfordian biozones, and (3) the position of zonal boundaries.

(1) The position of the middle-upper Oxfordian boundary within the biostratigraphic scale defined for the Tethyan Realm, has been a matter of discussion over the last 30 years. The main point of debate is whether it should be established at the base of the Hypselum Biozone (as originally defined and historically accepted in its Oppel sense) or at the base of the Bifurcatus Biozone, as proposed by the French Jurassic Group (Cariou *et al.*, 1971).

It should be noted that the Bifurcatus Biozone was first recognised as a subbiozone of the Transversarium Biozone by Enay (1966) and only later given full biozone status in the Jurassic biozonation put forward by the French Jurassic Group (Cariou *et al., loc. Cit*, see also Cariou & Hantzpergue, 1997). However, general agreement was reached in the Jurassic meeting at Erlangen (1984) to set the base of the upper Oxfordian at the base of the Hypselum (sub)Biozone, in its original, Oppel, sense. This level can be further supported by the sharp changes recognized in the ammonite successions at this point throughout the whole Tethyan Realm (Submediterranean and Mediterranean provinces). Such changes include the disappearance of representatives of the subfamily Perisphinctinae in the upper part of the Bifurcatus Biozone; the rapid appearance and expansion of the genus *Epipeltoceras* and representatives of the subfamily Ataxioceratinae *(Orthosphinctes*), as well as the clear and widespread presence of *Euaspidoceras hypselum* Oppel at the base of this biozone, as has been recently confirmed within the Mediterranean Province, in Sicily (D'Arpa & Meléndez, 2001, 2002). On the other hand, possible correlation problems with the Subboreal and Boreal provinces (i.e. the base of the Pseudocordata Biozone) are still far from definitively solved, yet they do not seem to create serious difficulties at that point.

In the same way, reasons given for lowering the middle-upper Oxfordian boundary to the base of Bifurcatus Biozone in order to "balance" placing the Oxfordian-Kimmeridgian stage boundary at the base of the Hauffianum/Bauhini Biohorizon, cannot be justified. The stratigraphical and palaeontological criteria for setting the positions of both boundaries are different in each case. It seems, therefore, safer for reasons of stability to maintain a "conservative" position and set the base of the upper Oxfordian in its long-accepted position, at the Bifurcatus-Bimammatum Biozone boundary.

(2) The extent and subdivisions of Oxfordian biozones in the Tethyan Realm, Submediterranean Province, have undergone some changes since the initial zonal scheme proposed by Callomon (1964) and subsequently completed by Enay (1966) and Cariou *et al*. (1971). This "classical" zonal scheme included a lower Oxfordian subdivided on the basis of the succession of Boreal *Cardioceras* species, parallel to the Boreal zonal scheme. It consisted of the Mariae Biozone (including the Scarburgense and Praecordatum subbiozones), and the Cordatum Biozone (including the Bukowskii, Costicardia and Cordatum subbiozones). In the same way, the middle Oxfordian was mostly subdivided on the basis of the succession of species of Submediterranean *Perisphinctes*, into the Plicatilis and Transversarium Biozones. The Bifurcatus Biozone was either included as the last biozone of the middle Oxfordian or the first biozone of the upper Oxfordian (see above; also: Meléndez *et al.*, 1985; Callomon, 1988; Meléndez, 1989; Meléndez & Fontana, 1993, Caracuel *et al.*, 2000).

The Plicatilis Biozone was subdivided into the Vertebrale (or Tenuicostatum) and Antecedens subbiozones (Callomon, 1960, 1964). The Transversarium Biozone, first subdivided into a lower, Parandieri and an upper Schilli subbiozone (Enay, 1966), was subsequently subdivided, quite definitively, into the Parandieri, Luciaeformis, Schilli, and Rotoides subbiozones (see Cariou & Meléndez, 1990; Cariou *et al.*, 1991; Meléndez & Fontana, 1993). This would mean that the base of the Transversarium Biozone would be defined at the base of the lowest subbiozone (i.e. the Parandieri Subbiozone) by the first record of the pair: *Perisphinctes parandieri* (M) -*buckmani* (m). The Bifurcatus Biozone, classically subdivided into the lower Stenocycloides and upper Grossouvrei subbiozones (Cariou *et al.*, 1971) was subsequently the subject of further refinement (Meléndez & Fontana, 1993). The base of this biozone would be marked by the base of the lower Stenocycloides Subbiozone, which is defined by the basal Bifurcatoides Biohorizon (type species: *Perisphinctes (*m *Dichotomoceras) bifurcatoides* Enay). So the base of this unit can be delineated at a point coinciding with the record of the first representative of the subgenus *P. (Dichotomoceras*), i.e. *P. (*m *Dichotomoceras) bifurcatoides* Enay.

Some authors made interesting contributions to refining this zonal scheme and to facilitating correlation between Boreal and Mediterranean realm successions. Among them it is worth noting Bourseau (1977), who showed the biostratigraphic equivalence (or the equivalent stratigraphic distribution) of *Cardioceras vertebrale* and *Perisphinctes paturattensis* De Loriol, hence opening the door to identifying the lower Plicatilis Biozone interval in the submediterranean successions, generally devoid of cardioceratids. Similarly, Brochwicz-Lewinski (1981) demonstrated the equivalence of the classical lower Oxfordian perisphinctid assemblage (Bukowski 1887, including some forms of *Prososphinctes*, as well as *Passendorferia czenstochowiensis* Siemiradzki) with the lower Cordatum Biozone, Bukowskii Subbiozone. Both contributions have undoubtedly helped clarify the biostratigraphic succession of this lower interval of the Oxfordian in the Tethyan Realm, which is generally incomplete and full of nonsequences.

(3) The position of zonal boundaries

In refining a currently accepted biostratigraphic zonal scale one should pay attention to the difference between recognising or defining new, hitherto undescribed, biostratigraphic intervals and modifying zonal boundaries or the names of long-accepted biozones in a stable biostratigraphic scheme. Recent modifications to the hitherto accepted middle Oxfordian scale include some interesting, yet arguable, proposals by Glowniak (1998, p. 31-32) for new biostratigraphic units in the Plicatilis-Transversarium Biozone interval of the Polish Jura Chain. Some of the proposals, e.g. the supposed co-occurrence of *Perisphinctes* (m) of the groups *antecedens* Salfeld and *buckmani* Arkell, must be the subject of further debate since they challenge former conclusions by Brochwicz-Lewinski (1976) in the same area.

A further proposal was made to lower the basal boundary of the Bifurcatus Biozone to include the Wartae Biohorizon, originally defined as the uppermost biohorizon of the upper Rotoides Subbiozone of the Transversarium Biozone (Cariou *et al*., 1991, Meléndez & Fontana, 1993). This is based on the author's interpretation of *Perisphinctes wartae* Bukowski as an early representative of the subgenus *P. (Dichotomoceras)* so justifying its inclusion within the Bifurcatus Biozone. This proposal, however, is debatable on two grounds: (1) the generic interpretation or *P. wartae* Bukowski itself as a *Dichotomosphinctes* or a *Dichotomoceras* (see Brochwicz-Lewinski, 1980; Meléndez, 1989; Cariou *et al*., 1991); and (2) the fact that boundaries of standard stratigraphical units should not depend upon the decisions of palaeontologists on the (sub)generic status of guide-fossils (Callomon, 1990, p. 121-122).

Recent contributions made by Gygi (2000, 2001) on the (re)definition of zonal boundaries and subzones of the Transversarium ammonite Zone in the reference section of the type locality of Birmenstorf (Canton Aargau, northern Switzerland) contain several interesting proposals. The author, following the original definition of the Birmensdorf Member (now spelled Birmenstorf) by Moesch (1863) and designation of the Transversarium Zone by Oppel (1863) and Oppel & Waagen (1866), proposed a new definition of the Zone. This would include the Birmenstorf Member in "normal facies" (roughly equivalent to the Parandieri and Luciaeformis subbiozones) plus the underlying "condensed beds" at the base. The latter include the Mumienmergel Bed (corresponding to the Densiplicatum/Tenuicostatum/ Vertebrale Subbiozone of the Plicatilis Biozone) and the Mumienkalk Bed (equivalent to the Antecedens Subbiozone of the Plicatilis Biozone). The proposal is supported by the claimed record of specimens of true *Gregoryceras transversarium* (Quenstedt) in these lower levels, it being argued that the vertical extension of the type-species *G. transversarium* justifies acceptance of a revised Transversarium Biozone as proposed by the author.

This proposal, in fact, re-activates a long lasting polemic on the stratigraphical equivalence and/or succession of the Plicatilis and Transversarium biozones, first discussed by Arkell on various occasions (1946) who supported the stratigraphical equivalence of both zones, and subsequently (?) solved by Callomon (1960, 1964) and Enay (1966) who demonstrated the actual stratigraphic succession of both units. This interesting proposal by Gygi will give rise, no doubt, to intense discussions (which are not the subject of this report) in the near future. For the moment several counter-arguments and objections appear possible:

1) Designation of the type locality and section of the Birmensdorf (today, Birmenstorf) Member by Moesch and attribution by Oppel of this area as the "*proper region*" of *Ammonites transversarius* Quenstedt are to an area around Birmenstorf recognised to be "a ploughed field" where there is "no indication that an outcrop of the Birmenstorf Member ever existed near this village". When this is the case, the accuracy of the original stratigraphic distribution of a species should be, at least, open to discussion. In the same way, the subsequent designation by Gygi (1969, p. 64) of a nearby section in the Eisengraben ravine near Gansingen (Aargau) as the type section of the Birmenstorf Member, although valid in itself, should, however, take into account the progress and acceptance of this biozone reached over the years by different authors. The proposal itself might also be subject to

discussion, as a recent definition different from the original.

2) The proposed vertical distribution of the species *Gregoryceras transversarium* Quenstedt in the type area is, of course, possible. However, it should be noted that it clearly contradicts the recognised distribution as recorded by different authors across the Tethyan Realm in the last thirty years

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KIMMERIDGIAN WORKING GROUP

Andrzej WIERZBOWSKI, Convenor

As planned in the last report (Wierzbowski 2001), field studies at Staffin Bay in the Isle of Skye were carried out in July 2001: this included the collecting of ammonites (B.A. Matyja, K. Page, A. Wierzbowski, J. Wright) together with sampling for micropaleontology (N. Hogg, S. Lang, H. Tykoezinski), isotope stratigraphy (D.R. Grocke) and magnetostratigraphy (M. Hounslow). The section chosen for detailed studies as a possible candidate GSSP section is placed on the foreshore at Flodigarry where the deposits show minor tectonic disturbances and are exposed the most completely. The studied stratigraphical interval spans the beds from SS 33 (upper part) to bed SS 45 according to standard division of the Staffin Shale Formation, which corresponds to the Pseudocordata Zone, and upper Regulare to Rosenkrantzi zones below, to the Baylei-lowermost Cymodoce zones, and the Bauhini-lower Kitchini zones above (see Sykes & Callomon 1979; Wright 1989, 2001; Morton & Hudson 1995). The ammonites collected here

represent the families Aulacostephanidae and Cardioceratidae occurring in nearly equal numbers, thus, enabling easy recognition both of the Subboreal and Boreal zones, and detailed correlation of the two zonal schemes. The study of the collected ammonites is nearly finished, and more detailed results will be presented during the ISJS Symposium in Palermo, and in a forthcoming paper. For the stratigraphical correlation it is most important to state that the first appearance of ammonites of the genus *Pictonia* typical of the Baylei Zone of the Subboreal lowermost Kimmeridgian is at the same horizon as the first appearance of *Amoeboceras* (*Plasmatites*) of the *A. bauhini* group (mostly *A. praebauhini*) indicative of the Boreal Bauhini Zone, about 1-1.5 m below bed SS 36, which results in the placing of the Oxfordian/Kimmeridgian boundary in the Subboreal and Boreal zonal schemes at the same level.

Nevertheless, possible acceptance of this level as the standard Oxfordian/Kimmeridgian boundary needs the detailed stratigraphic recognition of the position of this zonal boundary within the Submediterranean ammonite succession. Work needs to be done on the faunas of the Bimammatum Zone, and especially the faunistically poorly known Bimammatum Subzone, to make the correlation between the particular zonal schemes more clear. Necessity of such a study as indicated in the last report (Wierzbowski 2001) should cover sections from Central Europe where the Boreal/Subboreal ammonites co-occur with some ammonites of Submediterranean affinity (northern and central Poland, southern Germany), as well as sections from southern Europe showing the most complete succession of the Submediterranean/Mediterranean ammonites. One of the sections from southern Europe could be considered in future as another candidate GSSP section.

There still exists however, the possibility of placing of the Oxfordian/Kimmeridgian standard boundary in another place in the ammonite succession, much higher than the currently accepted Subboreal/Boreal Oxfordian/Kimmeridgian boundary. Of the two possibilities in the Submediterranean Succession: one, at the base of the Galar Subzone, and another, at the base of the Platynota Zone, the former seems especially interesting. The boundary of the Submediterranean Oxfordian and Kimmeridgian was placed here until the early sixties, and the Galar Subzone is faunistically well characterized in the Submediterranean Succession (Arkell 1956; Atrops 1982; Schweigert & Callomon 1997). What is especially interesting is that it corresponds to the boundary between the Boreal Bauhini and Kitchini zones, and hence it is easily recognized in the Boreal ammonite succession (Schweigert & Callomon 1997; Matyja & Wierzbowski 2002, in press). Such a solution needs of course the finding of the relevant candidate GSSP sections but these may include also the Flodigarry section (as the Boreal candidate) where the boundary in question is recognized in the upper part of Bed SS 41, and one of the Submediterranean/Mediterranean sections as indicated above.

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List of the Kimmeridgian WG members

The new list of members of the Kimmeridgian Working Group presented below includes only these persons who positively answered to our e-mail/letter request, and confirmed their willingness to remain/become members of the working group. Nevertheless, the list is still open, and if someone does not receive any information, and is interested in active membership of the Kimmeridgian W.G., they are kindly requested to send personal data as given in the list, to the convenor.

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TITHONIAN WORKING GROUP

Federico OLORIZ, Convenor & Guenter SCHWEIGERT, Secretary

Kimmeridgian-Tithonian Boundary News

The meeting of the K/T working group planned for the end of June 2001 had to be postponed because of the very small number of interested participants. However, the major problems concerning correlation and fixing of the lower boundary of the Tithonian were discussed in a small circle of colleagues involved (F. Atrops, G. Schweigert, A. Zeiss). As a result, the major problems concerning the stratigraphical record and the correlation potential of ammonite faunal horizons around the lower boundary of the Hybonotum Zone are now recognized. It is planned to publish the succession of *Hybonoticeras* chronospecies of the section of Canjuers (Dépt. Var, France) as an important basis for further discussion during the Jurassic meeting in Palermo in 2002.

Other activities

Revision of the ammonites from the Tithonian Neuburg Formation (Lower/Upper Tithonian, Bavaria) is under way (A. Scherzinger, G. Schweigert). It includes both the type material published by T. Schneid in 1915 and material collected bed-by-bed by the late K.W. Barthel. The material spans 5 ammonite faunal horizons, some of them with Tethyan influxes, so that a correlation of the regional data with the Tethyan standard is partly possible.

In South America, H. Parent from Rosario studied Tithonian sections in the Neuquén and Mendoza Basins of Argentina. His high resolution biostratigraphy is accompanied by a revision of ammonite material from old collections of the students of G. Steinmann still housed in the University of Bonn, Germany, to locate their type horizons.

M. A. Rogov (Moscow) started a new effort for correlation of the Volgian in Russia with the Tithonian based on Tethyan immigrants within the ammonite faunas.

In southern North America, F. Olóriz & A.B. Villaseñor made progress with the study of the first record of the genus *Simocosmoceras* in Mexico, as well as on analysis of new records of simoceratids, on the basis of bed-by-bed sampling and precise biostratigraphy. Contributions on these topics are under review.

In Sicily, F. Olóriz and G. Pavia are working on the precise biostratigraphy of the Kimmeridgian/Tithonian boundary at Monte Inici, and progress with the study of *Hybonoticeras* and associated ammonites.

In southern Spain, F. Olóriz and A. Serna are working on the precise biostratigraphy of beds with *Hybonoticeras* in the Betic Cordillera.

New Publications

New papers concerning the Ki/Ti boundary, Early Tithonian stratigraphy or containing information on these topics are listed below. These include only those which have been communicated to the Convenor or to the Secretary.

BAIER, J. & SCHWEIGERT, G. (2001): Zum Vorkommen von *Aulacostephanus yo* (D'ORBIGNY) im Schwäbisch-en Jura (Ober-Kimmeridgium, SW-Deutschland). *N. Jb. Geol. Paläont., Mh.*, **2001**: 184-192, 3 figs.; Stuttgart.

DIETL, G. & SCHWEIGERT, G. (2001): Im Reich der Meerengel. Fossilien aus dem Nusplinger Plattenkalk. 144 pp., 209 figs.; München (Pfeil).

PARENT, H. & CAPELLO, O. D. (1999): Amonites del Tithoniano Inferior de Casa Pincheira, Mendoza (Argentina). *Rev. Paléobiol.*, **18**: 347–353, 3 figs.; Genève.

ROGOV, M. A. (2001): Jurassic Haploceratina (Ammonoidea) in the European part of Russia. (Abstract of Thesis) 24 pp., 4 figs, 1 table; Moscow. (In Russian)

ROGOV, M. A. (2001): New scheme of the Tithonian-Volgian correlation on the base of distribution of the "Tethyan" ammonites in the Lower-Middle Volgian of Central Russia. In: *Problems of the Mesozoic stratigraphy and paleogeography*. 5th Löecturing in Memory of V. N. SACHS, 23-25 April, 2001. Geo, **2001**: 25-27, 2 figs.; Novosibirsk. (In Russian)

SCHUDACK, M. (2000): Ostracods from the Upper Jurassic (Oxfordian-Tithonian) of southern Germany. *J. Micropalaeontology*, **19**: 97-112, New York.

ZEISS, A. (2001), with contributions of HOFMANN, T.: Die Ammonitenfauna der Tithonklippen von Ernstbrunn, Niederösterreich. *Neue Denkschriften des Naturhistorischen Museums in Wien*, **6**, 116 pp., 20 pls., 24 figs.; Wien.

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REPORTS OF THEMATIC WORKING GROUPS

GEOCONSERVATION WORKING GROUP

Kevin PAGE, Convenor

Special Session at the 6th Jurassic Symposium

The Geoconservation Working Group will hold its first formal meeting as a Special Session of the forthcoming Jurassic Symposium in Palermo in September 2002. Informal meetings and discussions have, however, already been taking place with a number of colleagues associated with the ISJS, in particular concerning the content and structure of this session.

It is proposed that the meeting commences with two keynote addresses, the first will provide a review of the challenges and opportunities faced by Jurassic workers as geoconservation systems develop (or fail to develop!) in different countries. These largely relate to the availability of sites for field studies and the restrictions placed on would-be researchers, especially through legal systems. Fundamental amongst these are issues close to any palaeontologist's heart, those relating to fossil collecting. Uncontrolled non-scientific collecting can destroy or significantly reduce the usefulness of a locality, but too much restriction can also prevent scientific study (Page *et al.*, 1999).

Of even more fundamental importance, however, to the entire existence of the ISJS and to ICS as a whole, is the protection of GSSP localities. ICS guidelines require that a candidate GSSP has some guarantees of protection and continued access. It must in effect, therefore, be conserved using appropriate national or regional conservation legislation or procedures. After ratification, these systems become crucial to the function of the GSSP - if the site is lost, for instance through the construction of engineered coastal defences, its value as a global reference will be impaired and in extreme cases a replacement site may then need to be selected. Examples of successes, failures and ongoing issues on Jurassic sites will be used to illustrate this address. The focus will be primarily on the UK but with additional examples from countries or regions not represented later in the session.

The second keynote address will place the work of the ISJS in the broader context of other UNESCO projects more explicitly in the field of Geoconservation. Crucial amongst these is the UNESCO Geosites programme, which aims to establish a listing of all those geological sites of global importance to the Earth Sciences. Almost by definition this would include all ratified GSSPs.

An open session will follow which we hope will include presentations from colleagues with a wide range of experiences and opinions on the application (or absence) of legal conservation systems to Jurassic sites and fossils (e.g. site loss and damage, fossil collecting issues, legal constraints, and general site management). The emphasis of the session will be focused on the scientist's perspective of the effectiveness or otherwise of the Geoconservation systems in place in their own study region, ideally including information on:

(1) National or regional site selection systems (i.e. related to legal protection procedures) or reviews (e.g. in scientific or heritage protection volumes), if any.

(2) Legal systems relevant or applicable to geological and palaeontological heritage protection and general information on categories of protected geological and palaeontological sites and specimens.

(3) Successes and failures: A scientists perspective on the effectiveness or otherwise of the above systems and any problems or benefits they can or could create for scientific studies.

(4) Case histories: Examples of actual conservation processes or issues applied to key internationally important Jurassic sites, in particular GSSPs, proposed GSSP candidates and other classical Jurassic localities and / or reference sections.

The session will conclude with a discussion of a proposal for an international declaration of the needs of working geoscientists in the context of geological and palaeontological site and heritage protection. This declaration is intended as a guide for national legal and administrative authorities when devising or applying conservation and heritage laws - the aim being to encourage the development of procedures and practices which permit continued international scientific study, whilst ensuring at least a minimum level of site and palaeontological heritage protection. In addition, should the declaration be approved by the meeting, it is hoped that it may have value as an internationally agreed framework for colleagues to use in any representations to, or discussions with, administrative authorities in their own countries.

The declaration is currently in draft form and it is intended that it will be circulated with the third circular for the Palermo Meeting in June 2002, for wider consultation. Should any colleagues wish to contribute to the development of this declaration at an earlier stage, however, please contact the convenor at the above address!

Other news

Some colleagues will already be aware that UNESCO has recently listed the Dorset and East Devon coasts as a World Heritage Site. The designation follows a proposal by the two local government authorities in the region, Dorset County Council and Devon County Council, focussing in particular on the remarkably complete Jurassic succession for which the area is quite rightly famous.

The emphasis of much of this project, however, appears to have been on the economic potential of such a designation, especially through increased tourism, so much so that the proposal document submitted to UNESCO was not rigorously scientifically reviewed and contained a number of minor scientific errors, especially stratigraphical. In addition and quite bizarrely for a project celebrating a rich geological and palaeontological heritage, part of this economic development would appear to involve locally based commercial fossil collectors and dealers. To a certain extent, this participation stems from the total absence of specific palaeontological heritage protection laws in the UK, meaning that scientists and institutions occasionally have to match global market-place prices for important palaeontological specimens. Within the management plan developed for the World Heritage site this issue is addressed by a *voluntary* code of conduct, which requests fossil collectors to report finds *they* consider to be unusual and then allow UK institutions 6 months to raise the necessary monies to secure the specimen, before it is offered for sale elsewhere. Unfortunately ammonites, the key stratigraphical tools for Jurassic marine sequences, are considered to be little more than "*bread and butter*" fossils for these collectors and generally not even worth recording in this scheme!

Despite this scenario, however, the World Heritage designation has a real potential to start to improve geological and palaeontological conservation in the area. The articles in the World Heritage Convention put great responsibility on national governments to do their utmost to protect and responsibly management listed sites. In Dorset, as well as potentially forcing a review of approaches to managing fossil collecting, these commitments may even eventually allow the reinstatement of important geological exposures lost to relatively recent engineering works - the latter including famous Oxfordian-Kimmeridgian boundary sections at Ringstead and near Sandsfoot Castle, Weymouth and also parts of the Jurassic-Cretaceous boundary succession in Durlston Bay, Swanage. Concerns about such damage and also relating to the local commercialism of fossil collecting have already been voiced by several other specialists in the field of Geoconservation (e.g. J. Macadam, 2000; *Down to Earth*, **32**, p.4), although

it is unclear what, if any, action is likely to be taken by the relevant administrative authorities.

The ISJS has also offered its services to the Steering Group administering developments relating to the World Heritage designation in Dorset and East Devon, to ensure that decisions on the management of Jurassic stratigraphical and palaeontological sites are made with the best available scientific information and from an international perspective. We await a response.

For further information on the Dorset and East Devon World Heritage Site consult: www.jurassic-coast.com

Geoconservation bibliography

This feature is intended to be a regular part of WG reports, listing key works of particular relevance to the protection of Jurassic sites and fossils. Contributions from all colleagues are invited and national bibliographies are especially welcome. The two lists below are no more than a first instalment and will be considerably augmented by future contributions.

(a) Conference proceedings and papers relevant to international geological and palaeontological site and specimen protection (Part 1):

BARETTINO, D., VALLEJO, M and GALLEGO, E. (eds), 1999. *Towards the balanced management and conservation of the Geological Heritage in the new Millenium*, Sociedad Geológica de Espana, Madrid, 459pp.

BARETTINO, D., WIMBLEDON, W. A. P. and GALLEGO, E. (eds), 2000. *Geological Heritage: It's conservation and management.* Instituto Technológico GeoMinero de España, Madrid, 212pp.

HALLORAN, D. O', GREEN, G., HARLEY, M. and KNILL, J. (eds), *Geological and Landscape Conservation*, Geological Society, London, UK, 530pp.

MARTINI, G. 2000. Geological Heritage and Geo-tourism. *In*: BARETTINO, D., WIMBLEDON, W. A. P. and GALLEGO, E. (eds), 2000. *Geological Heritage: It's conservation and management*. Instituto Technológico GeoMinero de España, Madrid, 147-156.

MARTINI, G. and PAGÈS, J.-S. (eds) 1994. Actes du Premier Symposium International sur la protection du Patrimonie Geologique, Digne-les-Bains, 11-16 juin, 1991. *Mémoires de la Société Géologique de France, Nouvelle Série* **165**, 276pp.

PAGE, K.N. 2001. Geoconservation Working Group. *International Subcommission on Jurassic Stratigraphy, Newsletter* **28**: 11-13 (electronically published).

PAGE, K.N. and MELÉNDEZ, G., 1996. Protecting the Jurassic: global boundary stratotypes and conservation. *Geology Today*. **November-December 1995:** 226-228. UK.

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(b) Publications relevant to geological and palaeontological site and specimen protection in the UK (Part 1):

BASSETT, M. G., KING, A. H., LARWOOD, J. G. and DEISLER, V. K. 2001. A Future for Fossils. *National Museums and Galleries of Wales, Geological Series* **19**, 156pp.

ELLIS, N. V. (ed.), BOWEN, D. Q., CAMPBELL, S., KNILL, J. L., McKIRDY, A. P., PROSSER, C. D., VINCENT, M. A. and WILSON, R. C. L. 1996. *An introduction to the Geological Conservation Review. Geological Conservation Review Series* 1. Joint Nature Conservation Committee, Peterborough, 131pp.

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NATURE CONSERVANCY COUNCIL 1990a. Earth Science Conservation – A Strategy. Nature Conservancy Council, Peterborough, 84pp.

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PAGE, K. N. 1999a. Geoconservation in Devon - The developing infrastructure. *Geoscience in south-west*

England **9**: 352-357.
PAGE, K.N. 1999b. Sites and their uses - Geoconservation in Devon, south west England, UK. *In*: BARETTINO, D., VALLEJO, M and GALLEGO (eds), *Towards the balanced management and conservation of the Geological Heritage in the new Millenium*, Sociedad Geológica de Espana, Madrid: 28-31.
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WRIGHT, J.K. and COX, B.M. 2001. *British Upper Jurassic Stratigraphy (Oxfordian to Kimmeridgian)*, Geological Conservation Review Series **21**, Joint Nature Conservation Committee, Peterborough, 266pp.

(c) Useful Website addresses:

ProGEO: www.sgn.se/hotell/progeo

UNESCO Earth Science Division:
www.unesco.org/science/earthsciences/geological_heritage

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LIAISON WORKING GROUP

Robert CHANDLER, Convenor

The year 2001 in Britain was blighted by the occurrence of foot and mouth disease. Events that had been long in planning had to be abandoned as it was no longer possible to cross farmland to reach geological sites. In spite of this, considerable progress has been made and 2002 has started very well.

English Nature, under the direction of Andy King, continued the FACELIFT initiative. This project involved the cleaning up and recording of a number of important sites in the UK. A combination of amateur and institution-based scientific input led first of all to the re-profiling of Horn Park Quarry (Dorset) to provide a permanent section within the SSSI of the full succession. The site is now available for study and displays a section from the top of the Bridport Sands (Upper Lias), to the Lower Bathonian, Fullers Earth.

The next project to involve collaboration was the cleaning up of the famous site at South Main Road, Dundry (Avon). Simon Carpenter, Alan Bentley, Mark Varah and myself were joined by the English Nature team and John Callomon. A publication assisted by funding from the Curry Fund of the Geologists' Association will shortly be in print in that association's *Proceedings.*

An invitation to Hans Rieber, Rolf Chiarini and Peter Clay (Zurich) to investigate the Scissum and Comptum beds in Dorset proved most successful. The material collected will be used to investigate the origins of *Ludwigia* (Aalenian). Serge Elmi, Louis Rulleau and others have now expressed an interest in involvement with this work.

In early 2002 a remarkable opportunity arose near Burton Bradstock on the Dorset coast. The extension of a caravan site included the removal of a large quantity of fossiliferous Inferior Oolite. Through the kindness of David Sole and Tony Gill, both professional fossil collectors, I was able to make a full record of the site, obtain well preserved representative fossils and extend our knowledge of the Astarte Bed. Volker Dietze and I published a short work describing the new section and its relevance to our work in the recent volume of *Hantkeniana.*

Through the combined efforts of a number of amateur and paid scientists it has been possible to gather together ammonites for a project on strigoceratids by Guenter Schweigert and Volker Dietze.

With guidance from John Callomon, Nicol Morton and myself, Murray Edmunds (Oxford) has managed to bring to publication the studies made by him on a number of important Liassic ammonite groups. His liaison with Christian Meister and Gerd Bloos has resulted in the information from this amateur collection being available to us.

Our main limitation so far is in lack of involvement from those interested in groups other than ammonites. Correlation studies concerning ammonites flourish, but we need to also involve those interested in conducting parallel studies on bivalves or other important groups.

Involvement outside the UK has been limited, but at least we have a start as you can read in this report! Your help in encouraging others to become involved with the Group would be appreciated. The Group is already serving a very useful role in bringing to light finds in private collections.

Robert Chandler
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PALAEOBIOGEOGRAPHY WORKING GROUP: AIMS & OBJECTIVES

Fabrizio CECCA, Convenor

The creation of a Working Group on Jurassic Palaeobiogeography within the ISJS (Newsletter 28) has been proposed to provide sources of information and consultation to Stage WG Convenors, as refinement of the chronostratigraphical scale by integration of multidisciplinary methods of correlation remain a priority. The group has been constitued as both a subgroup of the "Friends of Palaeobiogeography" (Chairman F. CECCA) and a WG of the ISJS.

Three fields of investigation of a WG on Palaeobiogeography have been suggested and will be discussed on the occasion of the 6th Symposium on the Jurassic (Sicily, September 2002):

(1) The different phases of provincialism and cosmopolitism known in the Jurassic have important implications for biostratigraphic correlations. These may affect the choice of GSSPs of stage and sub-stage boundaries. Therefore, the biogeographic limitations to biostratigraphic correlation may be evaluated through biogeographic analyses of

different kinds (definition of biotic provinces through phenetic methods or by means of parsimony analysis of endemicity, etc.). This could represent a possible starting point for the Working Group.

(2) The WG could also produce palaeobiogeographical maps for different fossil groups during selected time-slices of the Jurassic. The palaeogeographic base can be represented by the numerous atlases now available.

(3) V. Zakharov suggests that one of the directions of the WG activity could be a research of biogeographical Boreal-Tethyan ecotones. An ecotone is an aquatic area occupied by both Boreal and Tethyan faunas. In the Jurassic period Boreal -Tethyan ecotones are established in Boreal-Atlantic and Boreal-Pacific paleobiogeographical realms between 45° and 55° northern latitudes (see Zakharov et al. 1996). The territories of ecotones are key for Boreal-Tethyan correlation at some stratigraphic levels, for example, the Bathonian-Boreal Bathonian, Tithonian-Volgian, Berriasian-Boreal Berriasian. In addition, the exact fixing of a geographical site of the ecotone provides information concerning the movement of plates and terranes from the south to north through geological time.

Other suggestions are welcome.

Below, there is the list of colleagues who have agreed to participate in this Working Group, together with their recent publications on palaeobiogeography and/or related subjects. Anyone interested in participating in the activities of this WG should contact the Convenor (email address below).

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ABERHAN M. 2001. Bivalve palaeobiogeography and the Hispanic Corridor: time of opening and effectiveness of a proto-Atlantic seaway. *Palaeogeography, Palaeoclimatology, Palaeoecology* **165**: 375-394.
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Palermo 2002: **YES**
CECCA F. (in print) *Palaeobiogeography of marine fossil invertebrates: concepts and methods.* Taylor & Francis, London.
MACCHIONI F. & CECCA F. (in print) Biodiversity and biogeography of middle-late liassic ammonoids: implications for the early Toarcian mass extinction. *Geobios, mém. spéc*. **25**.

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Palermo 2002: **NOT**
HALLAM A. (2001) A Review of the broad pattern of Jurassic sea-level changes and their possible causes in the light of current knowledge. *Palaeogeography, Palaeoclimatology, Palalaeoecology* **167**, 23-37.

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HILLEBRANDT A. v. (in press): Ammoniten aus dem oberen Sinemurium von Südamerika. *Rev. Paléobiologie*, Geneva (with chapter on Paleobiogeography).

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LATHUILIERE B. (2000) Les coraux constructeurs du Bajocien inférieur de France.1ère partie *Geobios* **33**, 1, 51-72.
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MACCHIONI F. & CECCA F. (2002 in print): Biodiversity and biogeography of middle-late Liassic ammonoids: implications for the Early Toarcian mass extinctions. *Geobios M.S.* **25**.

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MARIOTTI N. (accepted). Systematics and taphonomy of an Early Kimmeridgian fauna from the Mediterranean Tethys (Monte Nerone, Central Apennines, Italy). *Geobios.*

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DOMMERGUES J.-L., MEISTER C., BONNEAU M., CADET J.-P. & FILII. (2000) Les ammonites du Sinémurien supérieur et du Carixien inférieur à moyen du gisement de Lefterochori (Albanie méridionale). *Geobios*, **33**, 3: 329-358.
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MELEDINA S.V. (2001) A history of distribution and progressing of Ammonoidea in Jurassic Boreal seas and paleobiogeographic zoning // Problems of stratigraphy and paleogeography of Boreal Mesozoic. Materials of scientific session. Novosibirsk, Publ. house RAS, Department "GEO", 2001. P. 55-57. (in Russian).
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ROGOV M.A., 2001. Ways of migrations and correlative potential of the Middle Oxfordian ammonites: new data from the Russian Plate // Int. Conf. on Paleobiogeography and Paleoecology. Piacenza & Custell Arquato (Italy). May 31-June 2. 2001. P.181-182.
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MELEDINA S.V., SHURYGIN B.N., ZAKHAROV V.A. (2001) - The offers to a manual on biogeographic zoning and nomenclature of biogeographic units of Jurassic Boreal basins // Problems of stratigraphy and paleogeography of Boreal Mesozoic. Materials of scientific session. Novosibirsk, Publ. house RAS, Department "GEO". P. 58-60. (in Russian).

NIKITENKO B.L., SHURYGIN B.N., MICKEY M.B. (2001) - Early Jurassic biogeography of the Arctic// AAPG Intern conf. Abstracts. St.Petersburg, VNIGRI, P.P8-2 (3) (in Rus. & Eng.).

ZAKHAROV V.A., MELEDINA S.V., SHURYGIN B.N. (in press) - Paleobiochores of Jurassic Boreal Basins// *Russian Geology and Geophysics*, 2002, **43**.

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SHA J,, SMITH P.L., & FÜRSICH, F. 2002. New Jurassic Ostreoida (Bivalvia) from China (Tanggula Mountains, Qinghai-Xizang Plateau) and their paleobiogeographic context. *Journal of Paleontology*, **76**: in press.

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WIERZBOWSKI A., SMELROR M., MØRK A.. in press. Ammonites and dinoflagellates in the Upper Oxfordian and Kimmeridgian of the northeastern Norwegian Sea (Nordland VII offshore area): Biostratigraphical and biogeograhical significance. *Neues Jahrbuch fur Geologie und Palaeontolgie*.

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THIERRY J.. *et al.* (40 co-authors) (2000) Late Sinemurian, Middle Toarcian, Middle Callovian, Early Kimmeridgian, Early Tithonian. In: J. Dercourt, M. Gaetani, B. Vrielynck, E. Barrier, B. Biju-Duval, M.F. Brunet, J.P. Cadet, S. Crasquin & M. Sandulescu (eds) *Atlas Peri-tethys*, Palaeogeographical maps 7 to 11 & Explanatory notes, p. 49-110. CCGM/CGMW, Paris.

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VÖRÖS A. (2001) Paleobiogeographical analysis: a tool for the reconstruction of Mesozoic Tethyan and Penninic basins. *Acta Geologica Hungarica*, **44** (2-3): 145-158.

VÖRÖS A. (2001) Bajocian and Bathonian brachiopods in Hungary: A review. *Hantkeniana*, **3**: 177-182.

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MATYJA B.A. & WIERZBOWSKI A. 2000. Biological response of ammonites to changing environmental conditions: an example of Boreal *Amoeboceras* invasions into Submediterranean Province during Late Oxfordian. *Acta Geologica Polonica*, **50** (1), 45-54.

MATYJA B.A. & WIERZBOWSKI A. 2001. Palaeogeographical distribution of Early Bathonian ammonites of the *Asphinctites-Polysphinctites* group. *Hantkeniana*, **3**, 89-103.

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CORRESPONDENCE

IGCP PROJECT 458: TRIASSIC/JURASSIC BOUNDARY EVENTS

J. PÁLFY (Hungary), S.P.HESSELBO (U.K), C. MCROBERTS (U.S.A.)

SECOND ANNOUNCEMENT
(Deadline Extended)
2nd Field Workshop of IGCP 458 Project
Newark Basin, USA
7-12 June 2002

Non-marine boundary events in the Newark Basin (New Jersey, Pennsylvania and Connecticut), Eastern United States

RATIONALE:
Triassic-Jurassic boundary strata are well exposed at several locations in the Mesozoic rift basins of the Eastern US. Studies of these sections, have strongly influenced interpretations of Tr-J boundary events in the non-marine realm and provide a critical basis for documenting the end-Triassic biotic crises observed within non-marine tetrapods and palynomorphs within a high-resolution temporal framework. The second field workshop of IGCP project 458 will make use of the new paleontological, geochemical and paleomagnetic datasets that now exist for these sections, and is aimed to provide a reference for comparison to other non-marine Tr-J sections forming the focus of subsequent workshops.

Field Trip Leaders: Paul Olsen (Lamont Doherty Earth Observatory) and Christopher McRoberts (State University of New York at Cortland)

DRAFT PROGRAM:
June 7th: Participants arrive (afternoon/evening).
June 8th; Field excursions (all day): Central Newark basin classic section (Carnian-Hettangian).
June 9th: Field excursions (all day): Southeastern Pennsylvanian including Tr-J boundary with Ir.
June 10th: Core examination in AM (Rutgers); talks & poster presentations in PM.
June 11th: Participants depart (AM); Optional all day excursion: Hartford Basin.
June 12th: remaining participants depart.

ORGANIZATION:
Estimated cost (per person): US$ 250-300 + most meals + getting there and away.

Deadline for commitments: April 7th, early responses appreciated. We will decide on what accommodation arrangements need to be made once we have a rough idea of the number of participants.

Short talks or poster presentations are invited. Abstracts should be submitted by May 1.

Please indicate your interest in participating in this field workshop by
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THE BAJOCIAN GSSP IN A CD-ROM VERSION

Maria Helena HENRIQUES

Information on the Bajocian Stage GSSP is now available on CD-ROM. This is the first multimedia product developed in the scope of a research project on the Jurassic of Portugal, by Maria Helena Henriques and Luis Duarte of the University of Coimbra (Portugal).

The main purpose of this CD-ROM is to provide to specialists information on the location, the stratigraphic value, the palaeontological data and the bibliographic references for the Bajocian Stage GSSP, which was formally established in 1996 by the IUGS at Cabo Mondego, Central Portugal.

The CD-ROM is available in an English version for a specialized public, and in a Portuguese version for teaching staff and the general public, because GSSPs (Global Boundary Stratotype Sections and Points) are global time references for the history of the planet just as CET (Central European Time) is for today´s human activities. The preservation of GSSPs depends on the respect of the public and politicians which can be achieved if they are presented not only as a geological site of global relevance but as a (geo)monument like many others.

The narrative structure of the CD-ROM reflects this concern and it includes a strong integration of sound and image effects as important means for supporting the transmission of information and scientific data. It was developed using different software: Corel Draw 9.0/Corel Photo-Paint 9.0, Sound Forge XP 4.5, Macromedia Director 8.0, Microsoft Visual Basic 6.0 and Quick Time Player.

The establishment of GSSPs is a complex processes involving worldwide specialists over a long period of time and the final resolutions must be available to everybody. The use of multimedia support is probably the best way to integrate and present all the information produced during that time.

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