INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

NEWSLETTER N° 27

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Chairman: Prof. Giulio PAVIA - University of Turin, Italy

Secretary: Prof. Fabrizio CECCA - University of Marseille, France

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

NEWSLETTER N° 27

1 - CURRENT STATUS

1.1. CURRENT STATUS IN GSSPS' PROPOSITION/PREPARATION

STAGES	PROGRESS REPORT
TITHONIAN	The field trip and meeting in southeastern France was cancelled by the local organizer. The Convenor is looking for suitable sections so that a proposal meeting may be organizing in Germany and/or in Spain during 2000.
KIMMERIDGIAN	A good GSSP candidate is located along the Dorset coast. Secondary reference sections for the Mediterranean province may be selected in the Crussol Mountain and in the Iberian Chains. Ballot within ISJS by 2000.
OXFORDIAN	A draft of the proposal on the French GSSP at nearby Serres was presented at Vancouver Symposium (August 1998). The final proposal for ballot within ISJS is expected by Spring 2000.
CALLOVIAN	The proposal of a Swabian GSSP at nearby Albstadt is in progress. During 2000 it will be submitted for ballot within the BWG.
BATHONIAN	The French section Bas Auran as GSSP still needs ratification within the BWG. Complementary data from the section La Palud have been obtained. By Autumn 2000 a formal proposition of GSSP can be done.
BAJOCIAN	The GSSP at Cabo Mondego in Portugal was ratified in 1996. A joint Bajocian and Bathonian meeting in Hungary in September 2000 will Discuss on biozonal scheme and multidisciplinary correlation.
AALENIAN	The GSSP at the Fuentelsalz in the Iberian Chains has been accepted by ICS in September 1999. It will be formally ratified by IUGS in 2000.
TOARCIAN	Candidates for GSSP in Spain or North Africa are still under discussion within the BWG. A formal proposition is expected by the end 2000.
PLIENSBACHIAN	No definitive data ara available. Significant proposals are centered on Yorkshire sections. Ballot within ISJS is expected by the end 2000.
SINEMURIAN	The proposal for GSSP at East Quantohead in Somerset has been approved by the BWG and it is ready for voting within the ISJS in the very next months.
HETTANGIAN and T/J BWG	Four sections are questioned as GSSP candidates: New York Canyon (USA), Queen Charlotte Islands (Canada), Somerset (UK), Utcubamba Valley (Peru). The ballot within the ISJS is expected by 2000.

1.2. ANTICIPATED WORK PLAN FOR THE PERIOD 1999 - 2000

2000: Selection of candidates for Toarcian GSSP within the BWG.
Submission of Callovian GSSP proposal for ballot within the BWG.
Submission of T/J, Sinemurian, Pliensbachian, Bathonian, Oxfordian and Kimmeridgian GSSP proposals to ISJS for voting.
Presentation of proposals for T/J, Sinemurian and Oxfordian GSSPs to ICS.
2001: Selection of Tithonian GSSP candidates within the BWG.
Submission of Toarcian and Callovian proposals to ISJS for voting.

Presentation of proposals for Pliensbachian, Bathonian and Kimmeridgian GSSP to ICS.

1.3. COMMUNICATIONS FROM THE CHAIRMAN

It is on ballot the new Bureau of our Subcommission for the term 2000-2004. The nomination concerns the following offices:

Chairman: Nicon Morton, London
Vice-Ciarman: Paul Smith, Vancouver
Secretary: Paul Bown, London

Such a nomination has been very hard, as Dorothy Guy-Olson declined the office despite she was particularly proposed as the possible chairman of the ISJS for the term 2000-2002 during Mendoza Symposium. Her renunciation is due to the future hard job in the Stockholm Museum and in the Swedish Research Council, but arrived at the middle-June. At that time we were already late to send the nomination to Michelsen who was pushing me more and more.

With the advice of the Secretary, prof Cecca, I tried to find a non-ammonitologist (or at least someone who was involved also in different topics) so that it might be possible to concrete the suggestion derived from Mendoza to elect as the chairman a worker not "conditioned" by ammonite bio- and chronostratigraphy (please read the chairman editorial of the Newsletter 25, november 1997). From this statement derived the idea to propose Nicol Morton who is conducting very actively the Working Group on Sequence Stratigraphy.

In the meantime, we also thougth to other nomination: why not out of Europe? It is time, I think!! In this sight, two names came out: A. Riccardi from Buenos Aires and P. Smith from Vancouver, organizers of the last two Jurassic Symposium. We knew that Alberto was and is very busy with other subcommission of the ICS and was not contacted. Fortunately Paul answered yes with the condition to act as the vice-chaiman and with the agreement of a possibily jump in the
Bureau for the next term.

I am sure that the next Bureau is putting into good hands and in this direction some of you had already the occasion to express a positive opinion. I think that we have just to thank our Colleagues who accepted to be charged by this office, that I can assure is not so light.

2 - Review of Jurassic Stratigraphy of Siberia

(under the publications of 1999).

by

B.N.SHURYGIN

Jurassic rocks are widely distributed within northern half of Russia. On a greater part of this huge territory the Jurassic forms a part of the mantle of major structures in old and young platforms (Barents Sea platform, West Siberian plate, Pechora and Vilyuy syneclises, Enisey-Lena depression and so on). During the Jurassic time the area of sedimentary basins of northern Siberia increased constantly and the areas of marine sedimentation were growing in size also. Sedimentation in Jurassic boreal basins took place under both platformal and geosynclinal conditions. Platform basins occurred in western and central parts of northern Siberia and geosynclinal ones occupied eastern part. Despite the existence of the basins with diverse tectonic setting they generally accumulated predominantly terrigenous sediments.

Jurassic sedimentary basins in northern Russia make up marginal zones of arctic circumpolar basin, which was inhabited with distinctivetive boreal biota. The boreal basins, which were buffered in fact (transitional between the Paleoatlantic and Paleopacific), occupied in Jurassic vast circumpolar territory (Boreal paleobiogeographical belt) a greater part of which was covered by arctic aquatoria (northern Siberia and Asia as a whole, Canada, Alaska, Arctic islands) possessing most specific biota. The central position in this buffered zone was occupied by the basins surrounding the Siberian platform in the west, north and east (Shurygin, 1999).

When constructing detail stratigraphic charts for the Siberian Jurassic, which are the basis for all subsequent geological investigations, great difficulties were faced because of considerable lithological changeability of deposits, wide variation in thickness of one and the same stratotypes (from tens to thousand m), not adequate study of biostratigraphical, lithological and structural features of the Jurassic strata in not easy accessible areas, especially where Jurassic strata are covered by more young ones (Glinskikh et al.,1999, Shurygin,1999, Shurygin et al.,1999).

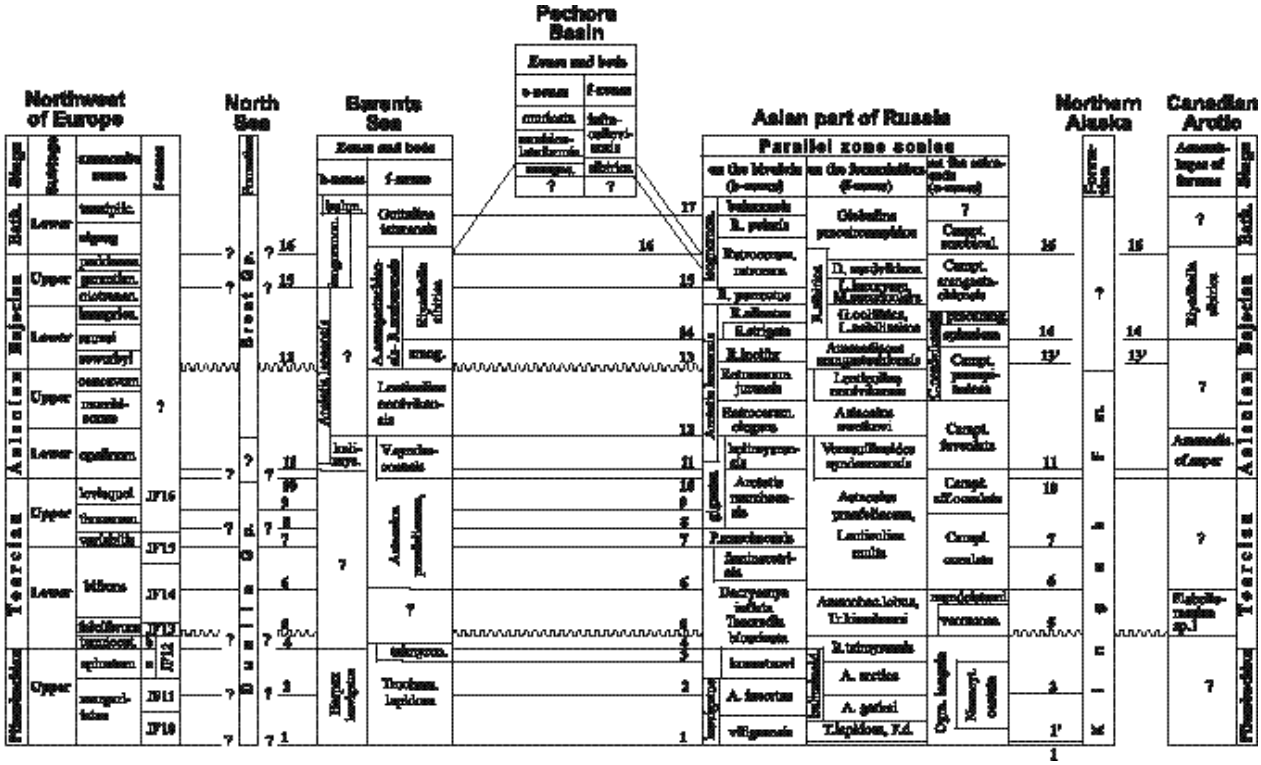

Fig. 1. The Circumboreal inter-regional correlation of Lower and Middle Jurassic by benthos. The regional scheme of separate regions are indicated from the literature data with modifications and additions of the authors: Arctic Canada (Wall, 1983 etc.), Northern Alaska (Tappan, 1955 etc.), Pechora basin (Chirva, Jakovleva, 1982; Lev, Kravets, 1982), Barents Sea (Basov et all, 1989 etc.), North Sea (Nagy, Johansen, 1991 etc.), Northwest of Europe (Riegraf, 1985; Copestake, 1989 etc.). At explanation (see below) of datum levels: ***w***-datum levels is traced on west, ***e***- datum levels is traced on east, without identification the datum levels are traced both parties.

1- Bivalves: *Harpax laevigatus, Myophoria lingonensis, Schafhaeutlia* etc.; foraminifers: *Trochammina lapidosa* (***w***), *Ammodiscus siliceus, Glomospira ex gr.gordialis* etc.; ostracods: *Ogmoconcha* spp.; **1'**- Bivalve: *Schafhaeutlia, Velata viligaensis* (***w***) etc.; foraminifers: *Ichthyolaria spp., Marginulina spinata interrupta, Dentalina terquemi, Nodosaria* spp etc.; **2**- Bivalves: *Kalentera* (***e***), *Anradulonectites* (***e***) etc.; foraminifers: *Saracenaria sublaevis* (***w***), *Involutina liassica* (***w***), *Ichthyolaria terquemi* (***w***), *Grigelis apheilolocula, Pyrulinoides anabarensis* (***e***), *Ammobaculites barrowensis* (***e***) etc.; **3**- foraminifers: *Recurvoides taimyrensis* (***w***) etc.; **4**- foraminifers: *Reinholdella pachiderma* (***w***), *Thurammina subfavosa* (***w***) etc.;

5 – The Early Toarcian all-Boreal crisis of the biota (crisis of the first type); Bivalve: *Dacryomya inflata*; foraminifers: *Trochammina kisselmani, Ammobaculites lobus, Bulbobaculites strigosus, Ammoglobigerina canningensis, Globulina sibirica, Triplasia kingakensis* (***e***), *Palmula deslongchampsi* (***w***), *Cyclogyra* sp. (***w***) etc.; ostracods: *Trachycythere verrucosa* (***w***), *Kinkelinella sermoisensis* (***w***) etc.; **6**- Bivalve: *Pseudomytiloides* ex gr. *mytileformis* (***w***); foraminifers: *Lenticulina multa* (***w***), *Astacolus praefoliaceus* (***w***), *Nodosaria pulhra* (***w***), *Palmula* ex gr. *tenuistriata* (***w***) etc.; ostracoda: *Camptocythere occalata*; **7**- Bivalve: *Pseudomytiloides* ex gr. *marchaensis* (***w***); foraminifers: *Lenticulina dOrbignyi, Reinholdella dreheri* (***w***) etc.; **8**- Bivalve: *Luciniola* (***w***); **9** - foraminifera: the first appearances of *Verneuilinoides syndascoensis* (***w***); **10**- foraminifera: epibole of *Verneuilinoides syndascoensis*; ostracoda: *Camptocythere foveolata* (***w***); **11**- Bivalves: *Mclearnia kelimiarensis; Sowerbya* (***w***), *Arctotis* ex gr. *lenaensis* (***e***), *Oxytoma jacksoni*; **12** - foraminifers: *Lenticulina nordvikensis* (***w***), *Citharina clathrata* (***w***); ostracoda: *Orthonotacythere* spp. (***w***);

13- "Ammodiscus facies " (crisis of the second type); 13' - Bivalve: *Retroceramus lucifer* (***e***); **14** - Bivalve: Solemya (***e***); foraminifers: *Ryadhella sibirica, Recurvoides anabarensis, Lenticulina incurvare* (***w***), Globulina oolithica (***w***), *Marginulinopsis pseudoclara* (***w***); **15**- Bivalves: *Isignomon isognomonoides* (***w***), *Musculus* ex gr. *czekanovskii* (***w***); ostracoda: *Camptocythere arangastachiensis* (***w***); **16**- Bivalve: *Meleagrinella* ex gr. *ovalis* (***w***); foraminifers: *Lenticulina galeatha, Pseudonodosaria sowerby* (***w***), *Guttulina tatarensis* (***w***), *Cyclogyra* sp. (***w***); ostracoda: *Camptocythere scrobiculataformis* (***w***); **17**- Bivalve: *Retroceramus bulunensis*;

Sequences structure, the conditions for development and mode of occurrence of the Jurassic in West, Central and East Siberia along with essential distinctions have much in common also. This is true first of all of close relationship between the Upper Triassic and

Lower Jurassic rock units, which frequently form consanguineous facial series in more complete sequences of the systems; regular cycle recurrence in structure of the sections that to a large extent is similar throughout a huge territory and caused possibly by eustatic reasons(Mickey et al.,1999, Pinous et al, 1999, Shurygin et al.,1999); terrigenous sedimentogenesis and relatively wide communications of biotas in the Jurassic basins. The latter thing allowed the development of stratigraphic scale of regional horizons unified for Siberia and the combination of parallel zonal scales based on diverse groups of macro and microfauna, that can be applied over the northern area of Asiatic part of Russia and in adjacent regions (Shurygin, 1999, figs.28,29- in English).

The book « Jurassic system. Stratigraphy of oil and gas basins of Siberia" is now in press. In this book on the basis of numerous new data, revision of all accumulated paleontological material and stratigraphical charts for West and Central Siberian Jurassic rocks an effort was made to unify the concepts of position of the boundaries of general and regional stratigraphic units of Siberian Jurassic and appropriate revision and improvement of lithostratigraphy. The analysis is made and the variants to solve a number of disputable and still unsettled problems of subdivision and correlation of appropriate strata are suggested. .(Shurygin, 1999).

The stage and zonal stratigraphical scales for the Jurassic used as international standards are further improved due to active work of International Subcommission on Jurassic Stratigraphy and its Working Groups. At the present time all stages of the Jurassic System have zonal and subzonal scales developed on the basis of the sections in North-Western Europe which in the Jurassic epoch was a part of Subboreal paleobiogeographical region. However the global standard cannot be applied to certain parts of the boreal Jurassic in Siberia because of high degree of endemic fauna. This is in particular true of a greater portion of the Middle Jurassic for which a special boreal standard with the stage and zone stratotypes in East Greenland was developed. The updated Siberian zonal scale of the Middle Jurassic was correlated with boreal East Greenland standard and wherever possible with global scale (Shurygin, 1999).

In investigations we followed the methods generally used in study of reference sections of Mesozoic terrigenous strata of Siberia. The major special feature of adopted methods was complex (concurrent works in field and laboratory) investigation of the sections carried out by the scientists of some geological disciplines, who solved (jointly and separately) the problems of stratigraphy and performed extensive lithological and geochemical, facial and genetic, paleontological, paleoecological and biofacial studies of deposits by main groups of fossils (ammonites, bivalves, foraminifers, ostracodes, spore and pollen, flora).

The position of boundaries and the range of stratons in regional charts relative to the scale of general (global) stratigraphical units have been defined with the use mainly of combination of parallel zonal scales and the lattice of datum levels, which record global and circumboreal reconstructions of biota (first of all based on data on ammonites, bivalves, foraminifers, dinoflagellate cysts, spore and pollen) (Fig.1) (Glinskikh et al., 1999, Meledina, 1999, Mickey et al., 1999, Riding et al., 1999, Shurygin, 1999). Mode of occurrence of the strata in general stratigraphical sequence, information about macrocyclicity and sequence stratigraphy were taken into account. (Mickey et al., 1999, Pinous et al., 1999, Shurygin et al., 1999).

The main working biostratons were the beds with particular group of fossils and zones based on a group of fossils (phylozones, teilzones, epiboles, complex zones etc.), which were recognized in a variety of ways. The whole diversity of zones are considered not only as the steps to the zone (=chronozone) justification as a part of the stage, but also as combination of scales in manipulation, that was used just in biostratigraphic subdivision, in recognizing

datum horizons (datum points), in subdivision from the logging, in cyclo- and seismostratigraphical analysis, in intra- and interregional correlation of Siberian Jurassic both in natural exposures and by drill core. (Shurygin, 1999). As datum levels are also used crucial turnovers, which record the start of drustic reconstructions in benthonic communities and are well traceable throughout boreal basin. Some of them are related to the eustasy (crisis of the 1st type), the other (crisis of the 2d type) are associated with local tectonic reasons but within the crucial (more often near boundary) zone of paleobasin. In remote interregional correlations benthos-based zonal scales may be treated as "bioevent"-scales, where datum intervals are characterized by unique succession of results of combinations of different nature biologic events (phylogenetic, chorologic and ecosystem). It is the recorded succession of events (independent of each other) of different nature that has apparently the most probability to be isochronous in recognizing within different regions (Mickey et al., 1999, Shurygin et al., 1999). The combination of all the scales provides very detailed succession in replacement of the assemblages of different groups and their combinations, which define the extent of cointervals (as we have called them). With the use of intervals of biostraton overlaps of parallel autonomous scales we were able to compare in detail the sections in natural exposures and from drilling core, to locate the intervals laterally pinching out, to define the volume of omissed beds with relative precision and so on (Shurygin, 1999).

The possibility and expediency of subdivision the Jurassic into regional horizons are discussed in a series of the publications which have left in 1999. There are given the data (refined with account of latest paleontological evidence) on the range of Jurassic horizons in Siberia and stratigraphical position of their boundaries (Glinskikh et al., 1999, Shurygin, 1999, Surkov et al., 1999). The description is given to zonal scales developed on the basis of different groups of fauna and flora: ammonites, belemnites, bivalves, ostracodes, foraminifers, spore and pollen, dynocysts, macroremains of flora. The Part includes the data (stratotype, boundaries position, geographical range and etc.) on parallel zonal scales (ammonites, belemnites, bivalves, ostracodes, foraminifers, spore and pollen, dynocysts) and information on flora characterization of Jurassic regional horizons in Siberia. Certain biostratons are shown to be traceable in Siberia both in natural exposures and from drill core. Sufficiently good basis was thus provided for detailed complex biostratigraphical correlation of local stratigraphical units, recognized both in West Siberia and in Central Siberia (Mickey et al., 1999, Shurygin et al., 1999, Shurygin, 1999, figs. 28,29- in English). With complex method it is clear that change in age of succession of bivalve-based (b-zone), foraminifer-based (f-zone) zones and palynozones within the marine Jurassic sequence of Siberia, succeeding the revision of age of ammonite zones, involves also the displacement of all the boundaries of local stratigraphical units thoughout Siberia, inasmuch the correlation, matter amount and relative position of stratons according to parastratigraphical groups remain unchanged. Drastic reconstruction made in the part for regional stratigraphical units in the charts resulted in the essential transformation in their correlation part.

The construction of correlation part in the stratigraphical chart depends greatly on the basic zonation of the region under discussion. Essential difference in conditions of Early – Middle Jurassic and Late Jurassic stages in sedimentogenesis of Siberian paleobasins was associated with gradual change in direction of the major transgressions, with significant change of climate and relatively drastic displacement of the center of marine sedimentation from east westward with virtually mirror paleolandscapes for the start and end of the Jurassic. The turnover in long-term trends of sedimentogenesis development predominating during two epochs falls approximately on the early Callovian. This is the circumstance that predetermined essential differences in structure and facial zonation of Lower – Middle Jurassic and Callovian – Upper Jurassic rocks in Siberia and which is applied to the construction of regional stratigraphical charts for Jurassic (Shurygin, 1999). In the new chart

of facial zonation adopted for the Lower and Middle Jurassic (Shurygin, 1999, fig. 55- in English) we recognize sublatitudinal facial areas where distinctions of sedimentary strata are of facial-genetic nature: in northern area Lower – Middle Jurassic sequence is made up mainly of sediments of marine genesis; in the central area it is composed of offshore sediments with involvement of deltaic and continental ones; in the southern area it consists remarkably of continental sediments. Thus, the boundaries of the areas are appeared to be virtually the boundaries of penetration zones of Early – Middle Jurassic sea in West Siberian region (i.e., maximum and minimum in sea transgression during these epochs). The regularities of vertical differentiation of strata are explained by eustatic and tectonic reasons and those of lateral one by peculiar paleogeography of the region.

Discussed principles of zonation may be used for development of facial zonation charts for all epicontinental basins in Siberia. Inasmuch as in Jurassic this was unitary connected system of sedimentary basins, disposed nearby a stable Siberian platform, it is possible to compose a single chart for facial zonation of Jurassic deposits in Siberia with West and East Siberia included (Shurygin, 1999, fig. 55,56- in English). As it is known, the Jurassic stage in Arctic development is characterized by north-southern direction of the main transgressions and regressions. Two basins under discussion had submeridional extension and were connected with each other by Khatanga sea-strait. Each of facial areas in its turn is subdivided into facial zones, within the limits of which Lower-Middle Jurassic deposits apart from genesis differ in stratigraphical completeness, thickness, matter composition and set of facies.

The history of formation of sedimentary series and conditions of sedimentation at Callovian – Late Jurassic stage differed essentially from preceding one, that caused a great difference in outlines of facial areas and regions also. Depositional center of marine sedimentation was displaced at this time to West Siberia, and in the east of Siberia continental conditions set in. The single facial zonation for the Callovian and Upper Jurassic in Siberia, where of great importance were genetic features of sediments, looks rather originally. (Shurygin, 1999, fig.56- in English). Each area is characterized by its own set of facial zones, types of sections and set of lithostratigraphical units, which occasionally replace each other laterally in various combination. Like the lower part of Jurassic, the Callovian – Upper Jurassic sequence in most areas of Siberia is as a rule relatively clearly differentiated into intervals, which are dominated by argillaceous or silt-sandy rocks. Specific character of vertical construction of Callovian – Upper Jurassic strata, lateral and vertical arrangement of highly-bituminous deposits, being indicative of peculiar conditions for sedimentation, formed the basis for the distinguish of facial zones.

Updated concepts of the staged development of sedimentary basins in Siberia, which are based on a complex analysis of lithostratigraphical structure of Jurassic strata in this region, its biostratigraphical subdivision, distinctive features of attended replacement of trends of cyclicity and successive change of characteristic fauna and flora assemblages allow the subdivision of these strata into three specific series. The first series (in the range of Lower Jurassic and incomplete Aalenian) includes the formations replacing each other within the Zimniy, Levinskiy, Kiterbyut, Sharapov and Laydin horizons. The second series (in the range of incomplete Middle Jurassic) includes the formations corresponding to the Vym, Leont'ev and Malyshev horizons. The third series (Callovian – Upper Jurassic in the main) embracing at the bottom uppermost Upper Bathonian includes the formations corresponding to the Vasyugan, Georgiev and Bazhenov horizons.

Despite the wide scatter of opinions as regards the volumes and nomenclature of the formations, they are compared readily with the help of scales for regional stratigraphical units (horizons, parallel biostratigraphical zones by diverse groups of fauna and flora). Within the formations frequently well isolated are the set of cyclic members, which are rather well

recognizable both in natural exposures and from well logging data. It is especially characteristic of the formations corresponding to essentially arinaceous regional horizons. More often the members in their construction correspond to progressive and progressive-regressive cyclites.

Coordination of formations by application of the scale for regional horizons and appropriate estimation of the matter volume and stratigraphical range confined by the boundaries of the horizons in the Jurassic strata of Siberia, their lateral extent and facial replacement provide the possibility of establishing some regularities in their formation. From the bottom upwards the section on the whole increases the area of lateral distribution. The latter is particularly concerned with Jurassic lithostratons of West Siberia. In northern, central and southeastern regions of West Siberia dynamics of formation of the Jurassic strata infilling local depressions and covering bars and domes has general regularities though with its peculiarities. (Shurygin, 1999, figs.28, 29- in English).

The last section includes lithological and paleontological descriptions of lithostratons based on regional Jurassic horizons, information on thickness, geographical extent, lateral replacement in facial areas and regions, description of a number of lithostratons (Surkov et al., 1999, Glinskikh et al., 1999, Mickey et al., 1999, Riding et al., 1999, Shurygin, 1999).

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4 - The Jurassic Biochronostratigraphy and Sequence Chronostratigraphy Charts

by

Jacques THIERRY

INTRODUCTION:

One of the last issues of SEPM (Society for Sedimentary Geology) Special Publications (n° 60; P.-C. de Graciansky, J. Hardenbol, T. Jacquin & P.-R. Vail Eds) is devoted to "Mesozoic and Cenozoic Sequence Stratigraphy of European Basins". In addition to a thick volume (786 p.) which contains 46 original contributions (9 dealing with the Jurassic), 8 charts are provided in a separate fold; 2 of them deal with the Jurassic.

These charts are an attempt to construct a state-of-the-art biochronostratigraphic record of depositional sequences in West European basins for the Mesozoic and the Cenozoic. For each system, in order to have not too large documents, the charts has been printed in two parts: a "Sequence Chronostratigraphy Chart", and a "Zonal Biostratigraphy Chart"; each one is calibrated on the same palaemagnetic and radiometric data. For the Jurassic, they has been coordinated by J. Hardenbol, J. Thierry, M.-B. Farley, T. Jacquin, P.-C. de Graciansky & P.-R. Vail, and calibrated with the Gradstein *et al* time scale (1994). The project has been launched in 1990 and officially presented during an international symposium held in Dijon in 1992. The program has been supported by Amoco (U.S.A.), British Petroleum (U.K.), CNRS (France), Chevron (U.S.A.), Ecole Nationale Supérieure des Mines de Paris (France), Elf Aquitaine (France), Exxon Production Research (USA), Institut Français du Pétrole (France), Maxus (USA), Mobil North Sea (Norway), Shell (UK & Netherlands), Saga Petroleum (Norway); Total (France).

A well-calibrated regional biochronostratigraphic framework is seen as an essential step towards the demonstration of synchroneity of sequences in basins with different tectonic histories. The primary calibration in the Mesozoic between time scale and standard chronostratigraphy is based on ammonite biostratigraphy. The calibration was facilitated by the construction of a composite ammonite zonation facing the several order sequence succession recognised in European basins. Subsequent calibration of sequences with magnetostratigraphy, radiometric data, strontium isotope ratios (87 Sr/86/Sr), oxygen isotope events and additional fossil groups from oceanic, near shore and non-marine environments, was carried out by a large number of coordinators and contributors.

AMMONITE RESOLUTION AND CALIBRATION OF THE JURASSIC SYSTEM:

Ammonite biostratigraphy plays a central role in the definition of Jurassic stratigraphy and the boundaries and subdivisions of stages are primarily expressed in ammonite zones, subzones and horizons. The subdivisions used in the Jurassic chart

mainly refer to the most recently published synthesis with data from J.H. Callomon, J.C.W. Cope, K.L. Duff, T.A. Getty, M.K. Howarth, H.C. Ivimey Cook, C.F. Parsons, R.M. Sykes, H.S. Torrens, W.E. Wimbledon, J.K. Wright *(in* Cope *et al.*, 1980 a & b) and F. Atrops, E. Cariou, D. Contini, M. Corna, J.L. Dommergues, S. Elmi, R. Enay, J. Gabilly, J. Geyssant, P. Hantzpergue, Ch. Mangold, D. Marchand, C. Meister, R. Mouterde, M. Rioult, L. Rulleau, J. Thierry *(in* Cariou & Hantzpergue Eds., 1997). In terms of ammonite zonal scheme, additional data concerning the boundaries of the Jurassic System, the subdivisions of the Jurassic into subsystems, the boundaries between stages and the stage-subdivisions are listed in Hardenbol *et al.* (1998, p. 777). The scheme adopted is a synthetic and simplified one. The set of ammonite zones and subzones has been selected in order to maximise the relative time resolution of the biostratigraphic reference framework.

As a comparison with the Haq *et al.* chart (1987), the prominent progresses concern first an increasing precision of the biostratigraphic units: depending of the faunal realm, the Jurassic is subdivided into about 70 or 80 zones and 160 or 170 subzones (up than 350 horizons not listed in the present scheme). Considering the whole Mesozoic, the number of biostratigraphic units within this system which duration is near 70 millions years, remains the highest resolution attainable at this time by combining the most detailed fossil record. Second, a good correlation of these units is currently possible between the faunal realms: Boreal (Arctic areas and Northern Europe), Sub-boreal (North-Western and North-Eastern Europe), Sub-Mediterranean (South-Western and South-Eastern Europe) and Tethyan (Southern Europe and Tethys margins). However, due to major regressive events (continental barriers between marine areas in Bajocian-Bathonian and Tithonian on Northern Europe) or different palaeoenvironments (palaeoecological constraints as water depth between Northern Europe epicratonic platforms and Southern Europe Tethyan ocean margins), ammonite faunas are sometimes so highly different between European areas, that no direct correlation is possible. Than, the charts exposed the two possible zonal schemes in two separate columns.

CORRELATION BETWEEN AMMONITE ZONAL SCHEME AND OTHER FOSSIL GROUPS:

For the first time, tentative correlations with the maximum available fossil groups has been made. Following the advance in knowledge for the several groups investigated, direct or undirect correlations are proposed, either between zonal schemes or the distribution in time of taxa (First Appearance Datum - Last Appearance Datum). For the Jurassic, data comes from: Belemnites (R. Combemorel), Calcareous nannofossils (K. von Salis, J. Bergen & E. de Kaenel), Dinoflagellates (N.S. Ioannides, J. Riding, E. Monteil & L.E. Stover), Ostracoda (J.-P. Colin & A.-M. Bodergat), Larger Foraminifera (B. Peybernès), Smaller Foraminifera (C. Ruget), Brachiopods (B. Laurin, A. Boullier, & Y. Alméras), Charophytes (J. Riveline, M. Shudack, C. Martin-Closas & M. Feist), Radiolarians (P. de Wever) and Calpionellids (J. Remane). The basic data come mainly from the fundamental synthesis made by the "Groupe Français d'Étude du Jurassique" (E. Cariou & P. Hantzpergue Eds, 1987) and special contributions made by several authors and published in the Bulletin de la Société Géologique de France (All the references are listed in the appendix of the SEPM special volume; p. 763-781).

Such an integrated biostratigraphic chart will be an insuperable tool for relative dating of sediments, formations, sequences and cycles which do not yield ammonites, the chronometer for the Jurassic system.

GEOMAGNETIC POLARITY TIME SCALE:

In the scarcity of radiometric data, all ammonite zones or subzones within a stage are arbitrarily assigned equal duration. However, it must be noticed that at the present day several "tie points" can be referred to ammonite biozones accurately calibrated with radiometric data. In the Pliensbachian (Thomson & Smith, 1992), the boundary between the Early Pliensbachian (Early to Middle Carixian) Ibex and Jamesoni zones is near 194.1 ± 0.6 Ma. Respectively in the Late Bajocian (Odin *et al.,* 1993) and in the Early Bathonian (Odin *et al.,* 1992), the boundary between several ammonite zones can be inferred: Discites/Laeviuscula zones, 173.5 ±2.6; Sauzei-PropinquanslHumphriesianum zones, 167.1 ± 2.5; Garantiana/Parkinsoni zones, 164.8 ± 2.5; middle part of the Zigzag zone, 161.3 ± 3.2. Finally, the Early Oxfordian Cordatum zone (Fischer & Gygi, 1989) may be near 149.2 ± 1.7 Ma; the Middle Oxfordian Densiplicatum zone and the boundary between the Antecedens and Parandieri zones are respectively located at 148.5 ± 1.6, and 145.9 ± 1.8 Ma. One can note that quite all these data, refering to the Odin's last published time scale (1994), do not still closely match the new time scale compiled by Gradstein *et al.* (1994).

The magnetostratigraphy scale in the chronostratigraphic chart is mainly from the compilation by Ogg (1995). The Hettangian-Sinemurian and the Pliensbachian-Toarcian-Aalenian stages have not yet yielded new data and a verified magnetostratigraphy. Magnetostratigraphic polarity successions from the late Bathonian - Early Callovian stages have not yet been verified, and this interval represents the longest gaps in the knowledge of the Mesozoic Magnetic polarity time scale. Additional studies in the Callovian-Oxfordian-Kimmeridgian-Tithonian indicate that this part of the scale still requires modifications; the selected data are listed in Hardenbol *et al.* (1998, p. 776).

THE SEQUENCE CHRONOSTRATIGRAPHIC RECORD:

The philosophy and concepts of the sequence stratigraphy units used in the charts are clearly defined (Hardenbol *et al.*, 1998, p. 3-5) and the basic publications are listed (*op. cit.*, p. 11-13). The charts focused on the so-called "3rd order Depositional Sequences", which are considered as "lithologic units composed of a relatively comformable succession of genetically related strata and bounded at its top by unconformities and their correlative conformities". These units are regrouped into "2nd order Transgressive-Regressive cycles" and "1st order Major Transgressive-Regressive cycles". Each one is plotted facing the corresponding ammonite zonal scheme for the Boreal and the Tethyan realms.

The contributions in the volume (Graciansky *et al.* Eds, 1998; p. 445-640) give basic detailed and precise data on the Jurassic sedimentary sequences and cycles in Western Europe.

Concerning the depositional sequences, the "Sequence boundary" nomenclature is based on the stage in which a sequence boundary occurs and its ordinal position counting up from the stage base. For example, in the Bajocian, are recognised five sequences called Bj1 to Bj5, with Bj1 the oldest. It must be noted that it is the position of the sequence boundary that determines the name, even the most of the sequence is in the next younger stage: for example, the sequence boundary Bj5 is located in the Bomfordi subzone of the Parkinsoni Zone of the Late Bajocian; but, the total sequence reaches the Early Bathonian, with its top high stand at the Yeovilensis-Tenuiplicatus subzones boundary, within the Zigzag Zone.

Each "Sequence boundary" may be also designed by its "isotopic age". But, we have to never forget that this "absolute age" depends of the referred time-scale and is

marked by a more or less confident error; than, it would be better to designate each sequence boundary by its position within the ammonite (or other fossil group) zonal scheme. For example, the above cited Bj5 falls in the Bomfordi subzone of the Parkinsoni Zone of the Late Bajocian; its "deduced absolute age" may be near 169,6 Ma refering to the Gradstein *et al.* (1994) time scale. The number indicated for this sequence boundary - 169,57 - is only a graphic reference mark.

In this new sequence stratigraphy chart the "Maximum flooding surfaces" are well indicated and precisely located in the ammonite zonal scheme. On the contrary, the lowstands are not distinguished; the systems tract boundary (top lowstand) between lowstand and transgressive systems tracts is not of chronostratigraphic significance and thus is not shown on the chart.

In Western Europe 2 "1st Order-Major Transgressive-Regressive Cycles" are recognised. Each one is subdivided into 7 to 9 "2nd Order Transgressive-Regressive Cycles". The difference between the number of the transgressive-regressive cycles and the stratigraphic position of their boundaries in the Boreal and Tethyan realms reflect differences in sediment response to regional and/or more local tectonic activity. The transgressive episode of the first one, the "Ligurian Cycle" (Graciansky *et al.*, 1998, p. 467) begins in the Uppermost Norian and its peak transgression falls in the Uppermost Lower Toarcian (Falciferum Subzone, Serpentinus Zone-Boreal realm) or the Lowermost Middle Toarcian (Lusitanicum Subzone, Bifrons Zone-Tethyan realm); it becomes regressive near the base of the Toarcian and it ends at the base of the Late Aalenian (Gigantea/Concavum boundary Subzones, Murchisonae/Concavum Zones boundary, Middle/Late Aalenian boundary). The transgressive part of the second one, the "North Sea Cycle" (Jacquin *et al.* 1998, p. 445) begins in the Middle Jurassic and its peak transgression falls in the Uppermost Kimmeridgian (Autissiodorensis/Irius Subzones boundary,Autissiodorensis Zone - Boreal realm; Eudoxus Zone - Tethyan realm); it becomes regressive near the top of the Kimmeridgian and ends in the Uppermost Berriasian.

CONCLUSION:

The results, illustrated by the "Jurassic biochronostratigraphy and sequence chronostratigraphy charts" are supported by a mass of basic data which is due to the work of generations of geologists. The construction of the biochronostratigraphic framework, which allows the precise stratigraphic positioning of sequences in various environmental setting and its calibration by geomagnetic and isotopic data, was made possible thanks to the large effort and the fruitful collaboration of coordinators and contributors whose name appears in various places of this report.

But, such charts must not be considered as definitive; they are perfectible and they must be improved in the future. They represent the state-of-the-art of the biochronostratigraphic record of depositional sequences, and subsequently a tentative to illustrate episodes of the history of the earth integrating various approaches which all belong to a fundamental branch of geosciences strongly connected with time: stratigraphy.

4 - Polish National Group Of The Jurassic System

by

Andrzej WIERZBOWSKI

Polish Jurassic System Working Group was founded on 13th May 1999 in Warszawa during initiative meeting in which participated 31 persons representing various geological centres in Poland. Actually 44 members announced their will to participate in the works of the Group. During 70th Annual Meeting of the Polish Geological Society in Miêdzyzdroje, on 9th June, 1999, the Group was officially established as the first chronostratigraphically oriented group in the Society. The Group leader is Prof. Andrzej Wierzbowski (Institute of Geology, University of Warsaw, e-mail: awzw@geo.uw.edu.pl); the executive body of the group consists, moreover of: Dr Jacek Grabowski (secretary of the Group; Polish Geological Institute, Warszawa, e-mail:jgra@pgi.waw.pl), Dr Micha³ Krobicki (University of Mining and Metallurgy, Kraków), Prof. Jerzy Lefeld (Institute of Geological Sciences, Polish Academy of Sciences, Warszawa), and Prof. Bronis³aw Matyja (Institute of Geology, University of Warsaw). The principal objectives of the Group include: information on the scientific activities related with studies of the Jurassic System in Poland, and all over the world (especially the activities of the International Subcommission on Jurassic Stratigraphy), arranging the field-meeting in Poland („Jurassica"), enabling the presentation of new results of studies and discussion, promoting of wide scientific problems, and coordination of the studies, as well as all other subjects related with studies of the Jurassic System in Poland.

5 - TRIASSIC/JURASSIC BOUNDARY WG

REPORT BY THE SECRETARY

G. WARRINGTON

1. Activities: 1999

The Secretary has collated the responses to questionnaires completed by workers involved with the four candidate Hettangian GSSPs proposed to the Triassic/Jurassic Boundary Working Group (TJBWG). This matter is discussed in section ***2***.

The Secretary continues as Secretary General of the IUGS Subcommission on Triassic Stratigraphy (STS) and, for the benefit of Triassic workers, has presented a summary of recent published work on the Triassic/Jurassic boundary and the lowest Jurassic, and of contributions on those subjects made to the 5ISJS, in the most recent STS newsletter (*Albertiana*, 22, 20-21 February 1999).

A list of recent publications on many different aspects of the Triassic/Jurassic boundary and contiguous sequences has been compiled (***3***, below). These include valuable contributions on *Neophyllites* by Bloos (1999) and on the stratigraphic relationship of that genus to other ammonoids in the north-west European province (Bloos & Page, 1999). Taylor *et al.* (1999) have published additional information on a candidate GSSP and other sections in the New York Canyon area, Nevada, and Pálfry & Dosztály (1999) provided a preliminary account of a new marine Triassic-Jurassic boundary section near Csövár, 50km north-east of Budapest, Hungary. Carter & Guex (1999) have documented phyletic trends in radiolarian genera from the uppermost Triassic in the Queen Charlotte Islands, British Columbia, including material from a candidate GSSP section on Kunga Island. A date of 199.6±0.3Ma has been proposed for the base of the Jurassic (Pálfy, Smith & Mortensen, 1999); this is based upon U-Pb dating of zircons from a volcanic tuff 6m below the proposed base of the system in the candidate GSSP on Kunga Island. Another valuable contribution to TJBWG work is the first report of the presence of Late Triassic-Early Jurassic passage beds at Germig, in the Lanongla area of southern Tibet, eastern Tethyan Himalaya. The succession here yielded an early-middle Hettangian ammonite succession; amongst the earliest psiloceratids are forms which compare more closely with ones from Nevada than with those from the European area (Jiarun Yin *et al.*, 1999). Dr Yin has also reported the discovery of *Choristoceras* cf. *marshi* in the Germig succession (*pers. comm.* to the Secretary) but feels that study of this newly discovered occurrence is only in its early stage, with much more work required before the significance of the occurrence can be properly appreciated.

2. Candidate Hettangian GSSPs

At the Vancouver conference (5ISJS) it was noted that four candidate GSSP proposals had been published or notified. A questionnaire prepared by the Secretary was sent to the principal worker concerned with each candidate; the format and content of the questionnaire has been endorsed by the ISJS Chairman. The responses received form a basis for an objective comparison of the candidate GSSPs, and for an assessment of their suitability in relation to ICS guideline criteria (Remane *et al.*, 1996). The four candidates are (in alphabetical order):

Chilingote, Peru (published proposal: Hillebrandt, 1997).

Site: west side of Utcubamba Valley, opposite Chilingote village; 250m north of farm house near bridge across the Utcubamba River. Geological map: 1:100 000 Cuadrangulo de Leimebamba, Carta Geológico Nacional, Lima, 1995 [see: Hillebrandt, 1994, fig.4].

Kunga Island, Queen Charlotte Islands, British Columbia, Canada (questionnaire response: Carter & Tipper, 1998).

Site: 52° 45' 35"N 131° 33' 36.6"W; UTM 327240mE 5848350mN. Topographical map: 1:50 000 Louise Island 103B/13, 103B/14. Geological map: GSC Queen Charlotte Islands. [Section 1, SKU-D, of Carter *et al.*, 1998, figures 1A, 5].

New York Canyon area, Gabbs Valley Range, Nevada, USA (published proposal: Guex *et al*., 1997).

Site: Ferguson Hill, 38° 29' 12"N 118° 04' 58"W [in Muller Canyon, see Taylor *et al.*, 1999, figure 1]. Topographical map: Mina Quadrangle, Mineral County, Nevada, 7.5 minute series, 1987. Geological map: Ferguson, H. G. & Muller, S. W. 1949. Structural geology of the Hawthorne and Tenopah quadrangle, Nevada. *USGS Professional Paper* **216**.

St Audrie's Bay, Somerset, UK (published proposal: Warrington *et al*., 1994).

Site: UK National Grid Reference: ST 1020 4330. Topographical map: 1:50 000 sheet 181 (Minehead & Brendon Hills). Geological maps: 1:50 000 + 1: 10560 sheet 279 with parts of 263 and 295 (Weston-super-Mare), 1:50 000 sheet 295 (Taunton), 1:50 000 sheet 263, 279 and part of 295 (Inner Bristol Channel & Severn Estuary).

The questionnaire requested information on the following, reflecting the requirements of the ICS guidelines for GSSP selection:

1. Site identification (see above)

2. Recognition of the base of the Jurassic in the candidate GSSP

2.1. How is this level recognized in the candidate section?
2.2. Lithostratigraphic unit containing the proposed boundary level
2.3. Position of the proposed boundary level in the host formation (m. from base/top)

3. Correlation

Using the criterion in 2.1 (above), how far can the boundary be traced **objectively** from that site?

4. Geological requirements

4 1. Thickness of strata (m.) normally visible in continuous exposure below/above the proposed boundary.
4.2. Is the proposed boundary in a fully marine sequence?
4.3. Does this sequence (4.2) represent continuous sedimentation?
4.4. Is the rate of sedimentation assessed as sufficient to allow successive events to be easily separated?
4.5. Do any condensed beds/exposure surfaces occur in stratigraphic proximity to the proposed boundary? If YES indicate their position (in m.) relative to the boundary.

4.6. Do any tectonic structures affect the candidate section?
4.7. Does strong diagenesis or metamorphism affect the candidate section?
4.8. Do any igneous intrusions affect the candidate section?
4.9. Is the candidate section subject to coastal erosion or landslip?
4.10. Are there similar sections nearby which supplement the candidate GSSP and could provide a substitute in the event of its destruction? If YES give name, location, distance from candidate section and thickness of beds exposed.

5. Biostratigraphical requirements

5.1. Is the facies favourable for long-range correlation?
5.2. Are there any major facies changes in stratigraphic proximity to the proposed boundary level? If YES, indicate their relative position (in m.).
5.3. Fossil diversity: workers were asked to indicate from a list of groups of fossils* those known to be present or absent through all or part of the candidate GSSP, or whether no search has been made.
(* dinoflagellate cysts, coccoliths, plant macrofossils, miospores, other palynomorphs (to be specified), radiolarians, Foraminifera, Porifera, coelenterates, bryozoans, inarticulate brachiopods, articulate brachiopods, scaphopods, gastropods, bilvalves, nautiloids, ammonoids, cirripedes, ostracods, ophiuroids, crinoids, echinoids, holothurians, conodonts, fish, amphibians, reptiles, others (to be specified)
5.4. Position (in m.) of proposed boundary relative to other biostratigraphical markers or biozonal boundaries.

6. Other means of correlation

6.1. Workers were asked to indicate any additional studies (e.g. magnetostratigraphy) carried out on part or all of the candidate GSSP, whether successful or not, or to indicate any such studies known to be in progress.
6.2. Position (in m.) of proposed boundary relative to any non-biostratigraphical marker (e.g. a magnetic reversal).

7. Access

7.1. Is access to the site freely available and open to all? If NO state nature of restriction.
7.2. Distance from nearest international airport(s) and means available/required for travel to immediate vicinity of (i.e. easy walking distance from) the site.
7.3. Nature of immediate access to site and any constraints on accessibility (e.g. tides).

8. Site conservation and protection

Describe any legal or other protection which exists to ensure the continued existence or maintenance of the candidate section.

9. Publications

The responses to these questions have been formatted and returned to the workers concerned to be checked for accuracy of transcription and with some points marked for addition or clarification. On receipt of agreed copies of these documents a set of the responses will be

posted to the TJBWG members listed in Newsletter 26. Members will be asked to indicate which of the four candidates best satisfies the ICS guideline requirements for a GSSP. If a preferred candidate emerges from this process it will proceed to the next stage of the selection process and will be the subject of a formal postal vote by the TJBWG membership.

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Warrington, G., Cope, J. C. W. & Ivimey-Cook, H. C. 1994. St Audrie's Bay, Somerset, England: a candidate Global Stratotype Section and Point for the base of the Jurassic System. *Geological Magazine* **131** (2), 191-200.

3. New publications

The following recent publications are relevant to the TJBWG:

Berridge, N. G., Pattison, J., Samuel, M. D. A., Brandon., A., Howard, A. S., Pharaoh, T. C. & Riley, N. J. 1999. Geology of the Grantham district. *Memoir of the British Geological Survey*, Sheet 127 (England & Wales). London: The Stationery Office, ix+133pp.

Bloos, G. 1999. *Neophyllites* (Ammonoidea, Psiloceratidae) in the earliest Jurassic of south Germany. *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen* **211** (1/2), 7-29.

Bloos, G. & Page, K. N. 1999. The basal Jurassic ammonite succession in the north-west European province - review and new results. *GeoResearch Forum* **6**, 27-40.

Bordonoba, A. P., Aurell, M. & Casas, A. 1999. Control tectonico y distribucion de las facies en el transito Triasico-Jurasico en el sector de Oliete (Teruel). *Geogaceta* **25**, 43-46.

Briden, J. C. & Daniels, B. A. 1999. Palaeomagnetic correlation of the Upper Triassic of Somerset, England, with continental Europe and eastern North America. *Journal of the Geological Society, London* **156** (2), 317-326.

Carter, E. S. & Guex, J. 1999. Phyletic trends in uppermost Triassic (Rhaetian) Radiolaria: two examples from Queen Charlotte Islands, British Columbia, Canada. *Micropaleontology* **45** (2), 183-200.

Cohen, A. S., Coe, A. L., Bartlett, J. M. & Hawkesworth, C. J. 1999. Precise Re-Os ages of organic-rich mudrocks and the Os isotope composition of Jurassic seawater. *Earth and Planetary Science Letters* **167**, 159-173.

Curtis, K. & Padian, K. 1999. An Early Jurassic microvertebrate fauna from the Kayenta Formation of northeastern Arizona: microfaunal change across the Triassic-Jurassic boundary. *PaleoBios* **19** (2), 19-37.

Farris, M. A., Oates, M. J. & Torrens, H. S. 1999. New evidence on the origin and Jurassic age of palaeokarst and limestone breccias, Loch Slapin, Isle of Skye. *Scottish Journal of Geology* **35** (1), 25-29.

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Kent, D. V. & Olsen, P. E. 1999. Astronomically tuned geomagnetic polarity timescale for the Late Triassic. *Journal of Geophysical Research* **104** (B6), 12831-12841.

Lucas, S. G., Heckert, A. B., Fraser, N. C. & Huber, P. 1999. *Aetosaurus* from the Upper Triassic of Great Britain and its biochronological significance. *Neues Jahrbuch für Geologie und Palaäontologie Monatshefte*, Jg 1999, H.9, 568-576.

Marton, E. 1999. Diagenesis in platform carbonate rocks: a palaeomagnetic study of an upper Triassic-lower Jurassic section, Tata (Hungary). *Geological Society of London, Special Publication* **151**, 157-165.

Marzoli, A., Renne, P. R., Piccirillo. E. M., Ernesteo, M., Bellieni, G. & De Min, A. 1999. Extensive 200-million-year-old continental flood basalts of the Central Atlantic Magmatic Province. *Science* **284**, 616-618.

McElwain, J. C., Beerling, D. J. & Woodward, F. I. 1999. Fossil plants and global warming at the Triassic-Jurassic boundary. *Science* **285**, 1386-1390.

Morton, N. 1999. Middle Hettangian (Lower Jurassic) ammonites from Isle of Raasay, Inner Hebrides, and correlation of the Hettangian-lowermost Sinemurian Breakish Formation in the Skye area, NW Scotland. *Scottish Journal of Geology* **35** (2), 119-130.

Olsen, P. 1999. Giant lava flows, mass extinctions, and mantle plumes. *Science* **284**, 604-606.

Olsen, P. E. & Kent, D. V. 1999. Long-period Milankovitch cycles from the Late Triassic and Early Jurassic of eastern North America and their implications for the calibration of the Early Mesozoic time-scale and the long-term behaviour of the planets. Philosophical Transactions of the Royal Society of London, Series A, 357, No. 1757, 1761-1786.

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Pálfy. J., Smith, P. L. & Mortensen, J. K. 1999. A revised numeric time scale for the Jurassic. *GeoResearch Forum* **6**, 181-182.

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Weedon, G. P., Jenkyns, H. C., Coe, A. L. & Hesselbo, S. P. 1999. Astronomical calibration of the Jurassic time-scale from cyclostratigraphy in British mudrock formations. Philosophical Transactions of the Royal Society of London, Series A, 357, No. 1757, 1787-1813.

4. TJBWG membership

See ISJS Newsletter 26 for the current membership list; no changes have been notified to the Secretary.

Please advise the Secretary promptly of any changes which occur; please print or type the information (name, title, full postal address, telephone and/or FAX numbers (with full international and regional codes), e-mail address) clearly and post, FAX or e-mail it to the Secretary at the address given below.

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6 - JURASSIC STAGE BOUNDARY WGS

6.1. REPORT OF HETTANGIAN - SINEMURIAN BOUNDARY WORKING GROUP

by
Gerd BLOOS
Convenor

In 1999, work on the base of the Sinemurian has been advanced so far that the activity of the WG could be concentrated on the submission of the GSSP proposal East Quantoxhead to the ISJS. The preparation of the submission could be finished end of October and was then revised by colleagues. End of November, the date of the present report, it was planned to send the submission to the ISJS in the course of December. Main elements of the WG's activity were:

- final field work at the site in July,
- the ballot on the proposed GSSP within the Working Group (voting papers sent to the members June 8th, deadline August 14th),
- the preparation of text and figures of the submission.

The aim of the field work was mainly to get some better specimens suitable for figuring in the detailed account of the section which is in work. The field study, again, was successful. Doubtless, work in the future will increase knowledge continuously. But the present knowledge appears sufficient to define the base of the Sinemurian.

The ballot yielded a clear vote for the proposed GSSP. Of 26 returned votes (65% of the members), 25 voted "Yes" (96%), 1 voted "Abstain". It should be mentioned that besides East Quantoxhead there was no other official candidate; potential candidates revealed not to meet the requirements in the same completeness as East Quantoxhead. Nevertheless, in the submission the potential candidates are regarded and discussed.

Studies are still going on. The microfossils are in work by members of the University of Plymouth; first results exist. Not all ammonites are prepared thus far because preparation in the hard limestones separating often with difficulty is very time-consuming and we must do it ourselves because there is no personel available to do that. But, as already mentioned, the results of the present studies, which can be expected in the next one or two years, will provide more details but will not change the position and the definition of the boundary level. Therefore there is general agreement in the WG that a decision on the proposed GSSP is now possible.

6.2. REPORT OF THE SINEMURIAN - PLIENSBACHIAN BOUNDARY WORKING GROUP

by
Christian MEISTER
Convenor

1999 was focalized on the field study. The purpose was to re-examine the situation around the stage boundary and to collect for multidisciplinary studies for the two best candidates for a GSSP. Two meetings took place. The first one in Yorkshire in May and the second one in Central Apennines in September.

The meeting in Italy regrouped M. HART, S. HESSELBO for Great-Britain; F. MACCHIONI, A. MARINI, G. PALLINI, G. PARISI, F. VENTURI for Italy; A. GÖRÖG for Hungary and C. MEISTER for Switzerland. The last days we met the "Societa' Paleontologica Italiana" guided by S. CRESTA.

In Italy the results were disappointing. Indeed in spite of a very acute work for the ammonite biostratigraphy by our Italian colleagues which remains a reference for the Mediterranean Province, the Sinemurian-Pliensbachian boundary cannot be observed due to slumps (problem already known) and mainly due to a fault which hides the contact between the last Sinemurian beds and the Pliensbachian sequence.

Based on these new pieces of information, the present section of the Bosso River cannot be chosen as a GSSP or an Auxiliary Stratotype Point (ASP).

The meeting in England regrouped differents specialists (J. BLAU and R. EBEL for Germany; M. HART, S. HESSELBO, M. HYLTON, K. PAGE, G. PRICE for Great-Britain; A. MARINI, F. VENTURI for Italy and C. MEISTER for Switzerland).

The profile of Wine Haven (Robin Hood's Bay) was measured and collected again for paleontology and geochimistry.

For the ammonites the ranges are specified and completed. Geochimistry (in progress) indicates a continuous sedimentation. Studies for Foraminifera and Palynology are in progress.

As already discussed the choice of a GSSP for the Pliensbachian is very restricted and this choice is rather a process of elimination. However, now only one section remains propitious to a GSSP: Wine Haven (Robin Hood's Bay, Yorkshire, UK).

So the work plan is to force the conclusion of some complementary studies (e.g. Foram) and to present these results to the members of the BWG.

Further work

1) To prepare the Pliensbachian for BWG voting in 2000.
2) Preparation of Pliensbachian GSSP proposal to ISJS for voting in 2000 or 2001.
3) Presentation of a proposal for Pliensbachian GSSP to ICS 2001 or 2002.

FOR COMMENTS, INFORMATIONS AND YOUR PARTICIPATION IN YORKSHIRE FIELD TRIP IN MAY 1999, PLEASE CONTACT: CHRISTIAN MEISTER, Muséum d'Histoire Naturelle, 1 rte de Malagnou, CP 6434, CH-1211 Genève 6, Switzerland. Tel. 0041 22. 418.63.46 Fax. 0041 22. 418.63.01 E-mail. christian.meister@mhn.ville-ge.ch

6.3. REPORT OF THE PLIENSBACHIAN - TOARCIAN BOUNDARY WORKING GROUP

by
Serge ELMI Convenor
and Emanuela MATTIOLI

Nous n'avons eu que quelques réponses à notre enquête sur le clone du stratotype de limite dans le domaine téthysien. Compte-tenu des decisions antérieures, le type sera proposé dans l'ensemble "Péninsule ibérique - Maroc". Les profils présentés par l'équipe de Madrid offrent de nombreux avantages mais ne sont pas très fossilères. Aussi nous envisageons de présenter au cours del'an 2000 les deux coupes marocaines qui pourraient offir les meilleurs caractéristiques :

- coupe de Talghemt, le long de la route principale du Haut Atlas (Midelt-Rich) ;
- coupe d'Ait Moussa, dans le Moyen Atlas.

L'inventaire stratigraphique est bien avancé en ce qui concerne les ammonites et la microfaune (travaux de K. Benshili ; M. Boutakiout, D. Sadki). En revanche, l'étude de la nannofaune et de la nannoflore reste à réaliser.

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Sadki D.,- Le Haut Atlas central (Maroc). Stratigraphie et paléontologie du Lias sup&rieur et du Dogger inférieur. Dynamique du bassin et des peuplements. Doc. Lab. Géol. Lyon, 142.

INFORMATION : à l'avenir la coordination du Working group du Toarcien sera assurée conjointement par Emanuela Mattioli et Serge Elmi.

Mattioli@univ-lyon1.fr
Serge.Elmi@univ-lyon1.fr

6.4. REPORT OF THE TOARCIAN - AALENIAN BOUNDARY WORKING GROUP

by
Stefano CRESTA,
Convenor

Olaf Michelsen, the Secretary of the International Commission of Stratigraphy (ICS) informed us that the proposal for the Aalenian GSSP has been accepted by the Full ICS. 14 members (64%) have voted, and all voted YES (100%). The proposal will soon be forwarded to IUGS for ratification at the executive meeting in January 2000.

You will find below a summary of the different ballots which brought to the positive vote of ICS' members.

THE BALLOT WITHIN THE AALENIAN WORKING GROUP, WINTER 1997

The vote involved the directory af the AWG. Voting papers were mailed to 46 colleagues (Europe 37: France 5, Germany 7, Italy 8, Polonia 1, Spain 8, England 4, Portugal 1, Switzerland 2, Svezia 1; North and South America 8: Argentina 3, USA 2, Canada 3; Africa 2 (Morocco), Asia 2 (Iran 1, Japan 1).

The ballot offered a triple choice: (1) selection of the Wittnau section for Aalenian GSSP; (2) selection of Fuentelsalz section for Aalenian GSSP; (3) abstention meaning that a different section would be proposed. Options (1) and (2) were documented by reports.
By the deadline for the ballot, 31 answers (70%) had been returned: 9 (30%) for Wittnau; 18 (60%) for Fuentelsalz; 4 (10%) abstentions.

THE BALLOT WITHIN THE ISJS

The vote involved the Voting Members of ISJS. Voting papers, together with a booklet containing all geological and stratigraphical data on the proposed Fuentelsalz section for Aalenian GSSP, were mailed to all Voting Members (20 colleagues): Europe 11: France 3, United Kingdom 2, Germany 1, Italy 1, Poland 1, Russia 1, Spain 1, Sweden 1; North and South America 6: Canada 3, U.S.A. 2, Argentina 1; Asia 2 (India, China); Oceania 1 (New Zealand).
On the basis of the result of both the ballot within the Aalenian Working Group and the proposal submitted by the Convenor, the ballot within ISJS offered to Voting Members a triple choice: (1) Yes, (2) Abstention, (3) No.

By the deadline for the ballot 18 answers (90%) have been returned: 16 (80%) answered YES, 1 (5%) answered NO and 1 (5%) answered YES provided a slight, formal, change is included in the proposal.

In conclusion, the overwhelming majority of ISJS Voting Members expressed a positive answer for the proposal of the Fuentelsalz section as the Aalenian GSSP.

6.5. REPORT OF THE AALENIAN - BAJOCIAN - BOUNDARY WORKING GROUP

by
Andras GALACZ
Convenor

Bajocian and Bathonian Working Groups Meeting
Budapest, 2000, 23-27 August

First Circular

The convenors of the Bajocian and the Bathonian Working Groups of the International Subcomission on Jurassic Stratigraphy kindly invite to a joint Meeting everyone who is interested in the news and development on, or has any new results in the stratigraphy of these stages, or just simply wants to enjoy the company of people working on Middle Jurassic topics.

Call for papers

Papers are welcome in the following topics:

1. Stratigraphic data on and around the proposed/accepted GSSPs of the Bajocian and Bathonian;
2. Ammonite stratigraphy and correlation of the Bajocian and/or the Bathonian on zonal, subzonal or faunal horizontal level;
3. Stratigraphy and correlation of the Bajocian and/or the Bathonian by means of any other fossil group;
4. Non-biostratigraphic results on the Bajocian and/or the Bathonian;
5. Miscellaneous, i.e. any other data or information relevant to Bajocian and/or Bathonian stratigraphy.

Communications can be presented orally or by poster.

The submitted abstracts (instructions in the 2nd Circular) will be printed and distributed at the beginning of the Meeting.

A Conference Volume will be published (as a separate post-congress volume of *Hantkeniana*, the periodical of the Department of Palaeontology). Instructions will be distributed fort authors during the Meeting.

Venue and Accomodation

The Meeting will be held at the Bolyai College of the Eötvös L. University in Budapest. The College is located just out of the city center, near the subway and city buses.

The College can provide accomodation in single and double rooms and in apartments of limited number. Other accomodation is available in the University Guest House in the center

of the city or in small hotels nearby. A list of accomodation possibilities with prices will be supplied with the 2nd Circular.

Registration fee

It is estimated as 130 US$, which includes the Program/Abstract/Guidebook Volume, coffees and refreshments, an Opening Party, Conference Dinner and Conference Volume (with 50 reprints for authors of papers).

Timetable

At this moment it is planned 2 days for sessions in Budapest, and 3 days for field trips. In case of papers in greater number than expected, time planned for field trips will be reduced.
The planned excursions will visit localities in the Transdanubian Central Range (Bakony and Gerecse Mts) and in Southern Hungary (Mecsek and Villány Hills). Bajocian and Bathonian sections will be visited, and, as a special bonus, in Villány the classical Callovian site.

Organizers: Charles Mangold, Convenor of the Bathonian Working Group and András Galácz Convenor of the Bajocian Working Group.

Expression of interest and request of the 2nd Circular (to be sent out in January, 2000)

Name

Address

Telephone Fax

e-mail

I wish to make a contribution: □ oral □ poster

on topic 1 2 3 4 5

Provisional title:

Authors:

Field trip participation: □ yes □ no

All communications should be addressed to

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6.6. REPORT OF THE BAJOCIAN - BATHONIAN BOUNDARY WORKING GROUP

by
Charles MANGOLD
Convenor

Nothing has been done since the 1998 report. The schedule planned for 1999 is to be postponed to 2000.

Last year, I called to members of the WG to send me further results on palaeoecology, sequence stratigraphy or stratonomy. I never received new
data, but I am always involved with new results on these topics.

New E-mail : pouyet@univ-lyon1.fr

6.7. REPORT OF THE BATHONIAN - CALLOVIAN BOUNDARY WORKING GROUP

by
John H. CALLOMON,
Convenor

The Bathonian-Callovian Boundary Stratotype (Bat/Cal GSSP)

After the lengthy review of the state of progress so far given in the last Newsletter (no.26, January 1999), progress towards formal ratification has been limited. There are many competing calls on the time and resources available, but hope springs eternal and the beginning of a new century seems an appropriate target for final completion.

The restatement of the principles that should underlie standard chronostratigraphic taxonomy and nomenclature in the Phanerozoic has now been published in the volume of proceedings of the Vancouver Colloquium in August 1998 (CALLOMON & DIETL, 1999). One point raised in the last Circular could benefit from further response from our readers. It concerns the reconstituted membership of the Callovian Working Group. The call for reaffirmation of interest by the members of the Group of 1990, and of desire by new members to join, has elicited only a single response. We should like to hear from more of you, please. The path has now been further eased by your Convenor's connection to the Internet. Note also that London telephone-numbers have changed yet again:

J.H.C.: University College London, 20 Gordon Street, London WC1H 0AJ UK
tel: [44] 20 7504 4632; fax: [44] 20 7380 7463; <johncallomon@lineone.net>

Now would also be a good time to raise any further problems with or objections to the proposed choice of stratotype, at the base of the *K. keppleri* horizon at Albstadt-Pfeffingen.

Some news from the Front.

Interesting new sections across the Bathonian-Callovian boundary continue to emerge. Readers may recall that the standard succession of ammonite faunal horizons in the proposed boundary stratotype area of the central Swabian Alb is as follows:

Cal-III	*Cadoceras suevicum*
II	*Cadoceras quenstedti*
I	*Kepplerites keppleri*
Bat-XVI	*Clydoniceras hochstetteri* (= *discus*, variant?)

Of these, Cal-I-III fall into the Keppleri Subzone, the basal standard Subzone of the basal Herveyi Zone of the Callovian; and Bat-XVI is the highest horizon in the Discus Zone of the Upper Bathonian.

(1) The Swiss Jura.

A section has recently been described at Liesberg, 21 km SW of Basel (DIETL & GYGI, 1998). Horizon I could be clearly identified, yielding *K. keppleri* (typical); *Macrocephalites verus*,

with fine examples of its microconch (*M. hoyeri* MÖNNIG); *Kheraiceras bullatum*; and *Homoeoplanulites homoeomorphus* [m] and *H. (Parachoffatia) arisphinctoides, arkelli* [M]. The bed appears however to lie disconformably on Upper Bathonian of uncertain age (Calcaire roux sableux).

Horizon II has long been known from an ammonite-bed at Anwil (BL), 11 km NW of Aarau, that has yielded a profusion of *Macrocephalites verus* (Basel Museum, described in part by THIERRY, 1978, p.212, pl.17, figs.1-6; another large collection by H. RIEBER in the University at Zürich); fairly common *Cadoceras quenstedti*; and another specimen of *Cadomites altispinosus* DIETL & HEROLD (1986). These records now extend the known occurrence of the lowest horizons in the Callovian across the whole of the Franco-Helvetic basin, from the borders of the Bohemian Massif (Sengenthal/Ofr.) into the Swiss Jura.

(2) Hildesheim, NW Germany.

The classical section in the brickworks at Temme have been carefully redescribed by MÖNNIG (1995). The Bathonian/Callovian boundary is marked by a condensed concretionary lag whose ammonites suggest however a relatively short time-span. They include *Kheraiceras bullatum*, *Cadoceras suevicum* (horizon III), *Macrocephalites verus* [M} and its [m], *M. hoyeri* sp.nov., the usual early Callovian perisphinctids and a single specimen of an undoubted *Chamoussetia, Ch. menzeli* sp.nov. Horizons I and II could not be identified. The highest Bathonian Discus Zone immediately below is however thick and richly fossiliferous.

(3) Western France: Poitou.

As is well known, the ammonite succession in Poitou is one of the richest and most detailed we have, following the stratigraphical studies over 30 years by E. CARIOU. The original series of 23 faunal horizons of 1980-1985 (I-XX, three subdivided into a,b) has grown to 32 (CARIOU in THIERRY et al. 1997). It forms the basis of the standard chronostratigraphy of the separate Submediterranean Province (6 Zones, 16 Subzones), made necessary by the bioprovincialism of its ammonites, which differ significantly from those of the Subboreal Province (7 Zones, 17 Subzones, ca. 40 faunal horizons, also summarized in THIERRY et al. 1997). The Subboreal succession was historically the first to be worked out and has therefore usually been taken to be the primary standard, but as the figures above indicate, there is now little to chose between the two zonations as regards finesse of time-resolution achieved. Neither is there much difference in the areal extent over which the zonations can be applied, from Greenland across northern Europe as far as the Caucasus and Pamirs in the case of the Subboreal, and from Aquitaine and Lusitania via North Africa and the Balkans to the Elburz in the case of the Submediterranean.

There is sufficient bioprovincial overlap at many levels in the Callovian to make close correlations possible. But one problem that had long defied solution lies at the base of the Stage. It is therefore of direct relevance to this in terms of its basal boundary stratotype. The problem was that the lowest Callovian recognizable by means of ammonites in much of Poitou and the coastal sections of the Vendée seemed to lie above a non-sequence. At some localities the non-sequence could be positively identified, and various horizons (I-V) shown to lie directly with sharp lithological break on the Upper Bathonian, probably Retrocostatum Zone where datable. Nowhere could any evidence of the Discus Zone be found, in common with apparently many other areas in the Submediterranean Province, from the Ardèche to Cap Mondego. Even where the lowest Callovian beds were assigned to horizon I, the precise age could not be closely determined, for ammonites were sparse and not closely time-diagnostic. The best-known succession at Pamproux, for instance, commences with 3-4 m of limestones yielding sporadic *Kheraiceras bullatum* (hence horizon I, that of *Kh. bullatum*) and *Macrocephalites* spp., which, however, were younger than those of the Keppleri Subzone of

Swabia. There was therefore no satisfactory definition of the base of the lowest Submediterranean Zone, the Bullatus Zone, and even less, a close correlation with the proposed base of the primary Subboreal Zone, the Herveyi Zone.

A new exposure has now resolved this problem. The section lies in a quarry near Buffevent, ca. 3 km west of Niort. Dr CARIOU and I were kindly shown this section recently by M Patrick BRANGER (Cherveux, près de Niort). The lowest beds exposed are :

(1) Bathonian limestones, typical, seen 1-2 m; followed after a prominent plane parting by

(2) limestones, ca. 0.5 m, with occasional ammonites, including perisphinctids of the group of *Homoeplanulites* [M] and [m], *Oxycerites* spp., and *Eohecticoceras biflexuosum* (ORB.: ?topotypes);

(3) ammonite bed: limestones, 0.6 m, with a profusion of ammonites, including *Homoeplanulites* [m] / *Parachoffatia* [M] of the group of *P. arisphinctoides* (ARKELL), *subbakeriae* (ORB.); *Macrocephalites verus* BUCKMAN, typical, across its whole range of variability; *Kheraiceras bullatum* [M] and [m], typical; *Oxycerites tilli* LOCZY [M] and [m]; *Paroxycerites subdiscus* (ORB.: topotypes?); *Phlycticeras* cf./aff. *dorsocavatum* (QU.) (BRANGER coll.); and: *Kepplerites keppleri* (OPPEL)! (BRANGER coll.);

(4) and higher: limestones and marls, another 3 m, with *Choffatia* and *Macrocephalites* spp.

The fauna of the ammonite bed, (3), is as near identical to that of the *K. keppleri* horizon of Swabia as could be expected over a distance of 700 km - yet another demonstration of the almost incredible power of ammonites as guide-fossils for time-correlations. Taking bed 3 as the basal horizon of the Bullatus Zone, the bases of the Bullatus and Herveyi Zones would coincide in age within the highest precision currently attainable by any available chronometer and the Callovian Stage would have a common base throughout the whole of the Subboreal and Submediterranean Provinces.

That leaves the intriguing question as to the age of bed (2): Discus Zone, or earlier? One begins to reflect more and more on MANGOLD's suggestion (1990, p.97, fig.9) that the allegedly widespread absence of the Discus Zone is not in fact a lithostratigraphical gap but rather a biostratigraphical gap, the absence of the guide-fossils on which the recognition of the Discus Zone so often depends. And these are largely the species of the one genus, *Clydoniceras*. Those of the other associated groups, of perisphinctids and oppelids, tend to be rather long-ranging and are usually too sparsely represented or incompletely preserved to provide satisfactory alternatives as age-indicators. Could the *Prohecticoceras angulicostatum* Subzone in fact include the equivalents of the whole of the Discus Zone? A detailed study of the section at Buffevent might throw much light on this question.

(4) England.

The widespread presence of the *K. keppleri* horizon in the Cornbrash is attested by the collection of the index at numerous localities between Dorset and Oxford. It is however rare and seldom accompanied by any additional faunal elements. Most of the material is in museums and not closely assignable to recorded sections. What evidence there is suggests that the *keppleri* horizon lies at the base of the Upper Cornbrash, but this may not be invariably the case. The Cornbrash is now known to be chronologically so incomplete, made up of a mosaic of lenticular deposits, that it does not in any case contribute much to generalized chronostratigraphy around the Bathonian-Callovian boundary.

Things become more interesting higher up, in the Kellaways Beds, and a number of new finds are of note. One of these is the discovery of *Cadoceras stupanchenkoi* MITTA in the Lower Kellaways Clay (Cayton Clay Member), of Frome, Somerset, Herveyi Zone, Kamptus Subzone, top, horizon of *Macrocephalites kamptus* γ. This species was recently described by MITTA (1998) from the region of Kostroma on the Russian Platform, where it marks a faunal

horizon placed at the base of the Gowerianus Zone, immediately above the top of the Zone of *Cadoceras elatmae* as drawn there. The base of the Gowerianus Zone in western Europe has been taken in recent years to lie in the first faunal horizon with *Kepplerites (Gowericeras*), that with *K. (G.) toricellii*, well characterized in the whole of the Franconian-Swabian Basin and in northern Germany. It has now also been found in England at two places: in a clay-pit in Kellaways Clay near Cirencester in Gloucestershire, and at the same locality as *Cad. stupanchenkoi*, at Frome. There it lies a little higher than the *Cadoceras*, on top of a thin laminated mass-flow sandstone called the Hengstridge Bed marking the change from Cayton Clay to Kellaways Sand.

Conclusions.

Many gaps remain to be filled in the ammonite biostratigraphy of the Callovian Stage, but the main framework of chronostratigraphic classification is becoming very firm and converging on what may be its final form.

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6. 8. REPORT OF THE OXFORDIAN-KIMMERIDGIAN BOUNDARY WORKING GROUP

by François ATROPS (Convenor)

In the last issue (n°26) of the Newsletter of the International Subcommission on Jurassic Stratigraphy, we have given detailed informations about the search for a GSSP candidate. The different possibilities were reviewed. Since, some progresses have been achieved to advance the question of the proposition of candidates for a GSSP.

According to the last data (Atrops, Ogg, Wierzbowski), I think that the best choice would be between the sections of Staffin Bay at Skye in Scotland, and Crussol in Southeastern France. These sections have many advantages in their favour: good exposure, good ammonite successions, continuity and are well documented for magnetostratigraphy.

About the England-Scotland magnetostratigraphy sections (South Ferriby, Staffin Bay, Ringstead Bay) J. Ogg thinks (e-mail of 12-12-99) that «If one wishes to keep the British version of the Oxfordian/Kimmeridgian boundary as an internatinal definition, then, of the 3 sections that we studied, only the Staffin Bay exposure may be continuous across the boundary. South Ferriby is second-best for continuity, but the boundary event will be a short hiatus that causes juxtaposition of the polarity zones (removal of the uppermost Oxfordian, relative to the
boundary placement at Staffin Bay). The Staffin Bay exposure also includes a longer "downward" continuation into the upper Kimmeridgian than the other sections». J. Ogg adds that « In Staffin Bay the magnetostratigraphy covers the upper regulare Zone and Rosenkrantzi Zone of the upper Oxfordian, and the Baylei and Cymodoce Zones of the lower Kimmeridgian ».

About the Submediterranean Province sections, the best candidates for GSSP are indubitably the Montagne de Crussol section, and the Châteauneuf-d'Oze section in southeastern France. The magnetostratigraphy has been established from bed 57 of Crussol section (Atrops, 1994) which is located in the middle part of the Hauffianum subzone ; see this section, fig. 4, p.72 of the Newsletter N°26 (1999). The Chateauneuf-d'Oze section has been recently studied in detail, for palynofacies, palynology, geochemistry and sequential analysis (Bombardiere et Gorin, 1998; Bombardiere, 1998; Jan du Chène, Atrops et al., in press; Rafaelis et al., in press). All these data completes those which are given by the ammonites. It is noteworthy that the lithostratigraphic and biostratigraphic correlations between the two sections of Châteaneuf-d'Oze and Crussol are very precise. But, before the formal proposition of one of these two sections, it will be necessary to study more in detail the levels around the Bimammatum and Hauffianum subzones. It is also the opinion of A. Wierzbowski (see below his opinion). So, perhaps, it will be necessary to postepone in 2001 the proposition and decision about the choice of the GSSP.

Now, the future proposal for a choice between Scotish and French sectios seems clearer. John Wright will be contacted for a formal proposition of the section of Staffin Bay, Isle of Skye, Scotland. But all other alternatives will be counted. I will make a formal proposition for the Crussol section. Now, the designation of the GSSP is near to be solved.

Are enclosed below some comments, by A. Wierzbowski and Polish colleagues.

COMMENTS ON THE SELECTION OF THE OXFORDIAN-KIMMERIDGIAN BOUNDARY STRATOTYPE

Andrzej Wierzbowski

In the last issue of Newsletter (no.26) of the International Subcommission on Jurassic Stratigraphy, some information given on the Oxfordian-Kimmeridgian GSSP (see „Current status in GSSP proposition" p. 4, and „Report of the Oxfordian-Kimmeridgian Boundary Working Group" pp. 67-74) need additional comments. It is also a good occasion to present my opinion in this matter which has been discussed with Polish colleagues.

The problem of the Oxfordian-Kimmeridgian boundary lies in recognition of the GSSP in one province, and independently of the reference section and point in another. It is related with well known differentiation of the ammonite faunas in this stratigraphical interval in Europe, and twofold definition of this boundary, introduced especially from the times of the Luxembourg symposiums. Of the two boundaries which are usually taken into account, this between the Subboreal Pseudocordata and Baylei Zones is of larger historical value (however, there is no formal priority regulations in stratigraphy), and of smaller correlation potential for the world, whereas that between the Submediterranean Planula and Platynota

Zones is of larger correlation potential, as it may be easy recognised in all the Tethyan Realm. The main difficulty is that the precise position of each of these boundaries in the ammonite succession in other province remains so far unknown, although there is no doubts that these boundaries are not isochronous. Thus, so far, we cannot recognise more precisely the position of the Pseudocordata/Baylei Zones boundary in the Submediterranean succession than stating it runs not higher than the mid-lower parts of the Hauffianum Subzone of the Bimammatum Zone, and similarly we cannot recognise more precisely the Planula/Platynota Zones boundary in the Subboreal/Boreal successions than stating it runs somewhere in the upper part of the Baylei Zone, and possibly close to the base of the Boreal Kitchini Zone (MATYJA & WIERZBOWSKI 1997; SCHWEIGERT & CALLOMON 1997). The detailed study of the sections in Europe (mostly in Germany and Poland) showing the presence of the Subboreal/Boreal ammonites within the Submediterranean ammonite succession should solve this difficulty, but the anticipated term for presentation of the Oxfordian/Kimmeridgian GSSP proposal in 2000 as given in ISJS Newsletter seems in this case premature.

In the Boreal/Subboreal Provinces the most commonly considered sections as the potential candidates for GSSP (or reference stratotype section and point) are: the section at Weymouth in southern England, the section of South Ferriby in northern England, and the section of Staffin Bay in Skye in Scotland. The requirements indicated for GSSP (REMANE & *al*. 1996), however, in several points are not fulfilled by the two English sections: „exposure over an adequate thickness of sediments" (in fact at Weymouth - small thickness), „ continuous sedimentation" (in fact stratigraphical gaps at Weymouth, and South Ferriby - see *e.g*. WIGNALL 1990), „ abundance and diversity of well preserved fossils" (in fact at Weymouth of the ammonites nearly only representatives of Aulacostephanidae), „absence of vertical facies changes at or near the boundary" (at Weymouth just the important facies change at the boundary). Moreover, the section of South Ferriby cropped out in a deep clay pit has a small chance of preservation, when mining will be stopped. In these circumstances the best is the section of Staffin Bay in Scotland - it shows the continuous succession of dark clays with abundant ammonites both of Aulacostephanidae, as well as of Cardioceratidae; moreover it is the natural outcrop of high preservation potential, although showing some inconvenience in accessibility as it occurs in the intertidal zone. At least, it should be remembered that the opinions of the English workers on the potential values of the sections in Great Britain are not so uniform as indicated in „Current Status in GSSP proposition" in the ISJS Newsletter where it is said that „English workers prefer a GSSP section on the Dorset Coast", because as shown in the same Newsletter (pp.69-74) some of them prefer Staffin Bay section treating it as excellent candidate for stratotype section.

In the Submediterranean Province undoubtedly the best known, and the most often cited as the candidates for GSSP are the Montagne de Crussol section, and Chateauneuf d'Oze section in southern France. The sections are faunistically well recognised at the boundary of the Planula and Platynota Zones, *i.e.* at the Oxfordian/Kimmeridgian boundary as treated now in the Submediterranean Succession. The ammonites of this interval have been carefully studied by ATROPS (1982) - and thus from the biostratigraphical point of view they are ready to present as the GSSP candidates. Additional value of the sections is the fact that some Boreal Cardioceratidae are known to occur in a few levels (ATROPS & *al*. 1993). Thus, they seem much more better candidates than the Iberian Chain sections mentioned (but not closely commented) in the „Current Status in GSSP proposition" in the ISJS Newsletter. It seems, however, that the discussed French sections should be studied more carefully around the Bimammatum-Hauffianum Subzones interval, what may appear especially important in the case when the Oxfordian/Kimmeridgian boundary will be founded at the Subboreal Pseudocordata/Baylei Zones boundary, and the sections in question will be treated as candidates for the reference section and point. Thus, also of that reason the anticipated term

for Oxfordian/Kimmeridgian GSSP in 2000 as suggested in ISJS Newsletter seems premature.

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6.9. REPORT OF THE KIMMERIDGIAN-TITHONIAN BOUNDARY WORKING GROUP

by
Fabrizio CECCA
Convenor

Günter SCHWEIGERT is the new Secretary of the Working Group. Günter's address is:
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FIELD MEETING IN SOUTHERN GERMANY

The field meeting of the Working Group, which was announced for two times in South-East France under the direction of François ATROPS (Lyon) has never taken place for different reasons. However, on the basis of oral informations from Atrops, scientifically speaking the sections of Canjuers and Crussol, which we were supposed to visit, have problems. The former section, despite an interesting ammonite fauna, has a Tertiary re-magnetization and poorly significant, or even absent, microfaunas and floras; the latter section has a reliable magnetic signal but ammonite faunas seem to be less significant than

those from Canjuers and microfaunas and floras have not been studied yet. Furthermore Atrops' data have never been published.

The disappointing outcome is that we still need a candidate section for the GSSP of the Kimmeridgian/Tithonian boundary.

Günter SCHWEIGERT (Stuttgart) has suggested to organize a meeting in Stuttgart (Germany) in June or September 2001. The Convenor has proposed end June. Further details in the next Newsletter. In any case we could make field trips to the best sections around the Kimmeridgian-Tithonian boundary and a session for discussion and study of the material housed in the collection of the Stuttgart Museum.

On the other hand Federico OLORIZ (Granada), has given a positive answer for a field trip in southern Spain in february 2003.

7. JURASSIC THEMATIC WORKING GROUPS

7.1. WORKING GROUP ON SEQUENCE STRATIGRAPHY

by
Nicol MORTON
Convenor

Dear Colleagues,

This is to remind you about the field workshop planned for April next year. Details were given in the last Newsletter, and are copied below.

To date Marc Aurell and I have received only a very small number of responses and it seems we will have to cancel or postpone the meeting. To give Marc adequate time to prepare the Workshop and make all the arrangements, we must set a deadline for registration of 8th November.
Please respond to Marc and/or myself by this date if you are able to attend.

REMEMBER: DEADLINE FOR REGISTRATION IS 8TH NOVEMBER.

Best wishes,

Nicol Morton

Field workshop on the Middle-Upper Jurassic sequence stratigraphy of the Iberian Basin

ZARAGOZA - TERUEL, SPAIN; APRIL 26th - 30th, in the magic year 2000

INTRODUCTION

The Iberian Cordillera, a mountainous system which stretches in a northwest-southeast direction in the northeastern part of the Iberian Peninsula, contains well-preserved outcrops of Jurassic sedimentary rocks. Laterally continuous outcrops allow several cross-sections to be studied across the basin, some hundred kilometres in length, linking the more proximal zones (towards the west) with the more distal ones (towards the east). This lithostratigraphic control, along with the precise biostratigraphic framework based on analysis of the ammonite record, provides the essential constraints to analysis of the sequence stratigraphy of the Middle-Upper Jurassic of the Iberian Cordillera.

The aim of this workshop is twofold. First, we want to discuss and examine the depositional sequences and systems tracts defined in the Middle-Upper Jurassic in the Iberian basin, an extensional intracontinental basin, developed during Mesozoic. Most of our attention will be devoted to the Kimmeridgian rocks. To illustrate our present sequence stratigraphic interpretations, we will focuss on two transects of the basin, one located north of Zaragoza, another located near Teruel. From them, we will document the facies transition from relatively proximal to distal areas. For more details about this rocks see our recent paper (Aurell et al., 1998) published in the Special Publication of the Geological Society of London on Carbonate Ramps, no. 149, pages 137-161.

During this workshop we will also have one day for presentations related to the Jurassic Sequence Stratigraphy. This will provide us an opportunity for discussions on the methodological approach, nomenclature, search for possible regional events that can be traced across several related basins, and plan for future meetings.

ORGANIZATION

The workshop organization will be undertaken by Marc Aurell (Dptment. Ciencias de la Tierra, Univ. of Zaragoza, 50.009 Zaragoza, Spain) and co-workers.
E-mail contact is maurell@posta.unizar.es.

PROGRAMME

Wednesday 26th April

Late afternoon (around 16.00 pm): Transport from Madrid airport (Barajas) to La Almunia (a village located 50 km West of Zaragoza, and some 250 km away of Madrid), We will have dinner and night in this village.

Thursday 27th April

Morning-visit to the Callovian-Tithonian sequences of Ricla in two selected outcrops. Lunch in the field.
Afternoon: visit to the Aalenian-Tithonian of Aguilón.
Evening: Transport from Aguilón to Albarracín, where we will stay for the next three nights.

Friday 28th

Reserved for oral/poster presentations in Albarracín. We will have the opportunity to get to know this most beautifull Middle Age village.

Saturday 29th

Field trip to know the Oxfordian-Tithonian of the Albarracín area, in a transect from relatively distal ramp areas (Jabaloyas, where we will visit a very well exposed late Kimmeridgian reefs), to more proximal areas (Terriente, Moscardón, Frías de Albarracín). We will also have some local references to the Middle Jurassic sequences.

Sunday 30th.

We will drive people back to the Madrid-Barajas airport. There is a long trip from Albarracín (about 4 hours). We suggest you arrange the return flight to your respective countries on Sunday late in the evening. In this case, on Sunday morning, we could visit the Bajocian-Oxfordian of Pozuel del Campo and/or the Bathonian-Kimmeridgian of Aguatón.

COST AND DEADLINES

The cost of the excursion is dificult to know now, since it partly depends on the number of the people attending the meeting. We estimate that the ideal number Would be from 20 to 25. Including all meals (from dinner on the 26th, to lunch on the 30th), four nigths (double room) and transportation, it could be something around 350 Euros.

Albarracín is a touristic place. To be sure that we will have places in the local hotels, we should arrange the rooms before the end of January. Therefore, the end of January 2000 will be the deadline for payment.

Abstract for the presentation should also be provided at this time.

People interested in the workshop may contact either M. Aurell or N. Morton as soon as possible. Please let us know if you will present any communication, also your preference for oral or poster presentation, and a preliminary title.

ORGANISER

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7.2. JURASSIC MICROFOSSIL GROUP

News on the Middle Jurassic palynological scene in Poland

by Niels E. Poulsen & Marcin Barski

My (NEP) palynological studies of the Jurassic of Poland started many years ago at the 2nd International Symposium on Jurassic Stratigraphy in Lisbon, Portugal in 1988, where I met Prof. Andrzej Matyja and Prof. Andrzej Wierzbowski. In the following year I went to Poland to do fieldwork in co-operation with Andrzej and Andrzej. These first studies ended up as part of Poulsen's Ph.D. thesis (published in Poulsen, 1993 (Acta Geologica Polonica, 43), Poulsen, N. E., 1994 (Geobios, M. S. 17) and Poulsen, 1996 (AASP Cont. Ser. 31).

The co-operation continued in the following years, when we formed a research collaboration between the Geological Survey of Denmark and Greenland (GEUS) and the Geological Institute (University of Warsaw), which studied the Middle-Late Jurassic in central Poland. The Results from this project have been published in a number of papers in Acta Geologica Polonica (e.g. Kutek and Zeiss, 1997, Matyja and Wierzbowski 1997 and 1998, Poulsen, 1998,).

These projects were followed up by Marcin Barski, a Ph.D. student at the Geological Institute (University of Warsaw). Marcin's subject (working title) is "Dinoflagellate cyst biostratigraphy and palaeoenvironmental analyses using palynofacies studies of the Middle Jurassic of Central Poland." Marcin is currently on a sabbatical study visit here at GEUS, funded by the Danish Rectors' Conference.

At present the research continues and we look forward informing you of the latest achievements.

Niels E. Poulsen (GEUS) and Marcin Barski (University of Warsaw)
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9 - BOOKS

FIFTH INTERNATIONAL SYMPOSIUM, VANCOUVER 1998

"Advances in Jurassic Research 2000", the proceedings of the Fifth International Symposium on the Jurassic System, is in press and will be published early in the new year. The work is edited by Russell Hall and Paul Smith and contains 51 papers totalling 576 pages. Those who attended the Symposium will receive a free copy which will probably be distributed before the end of 1999. Copies can be purchased from Trans Tech.
Publications Ltd. Switzerland <ttp@ttp.net>; FAX (41) 1-922-10-33.

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Jurassic System. Stratigraphy of oil and gas basins of Siberia.
B.N.Shurygin (editor).

Novosibirsk, UIGGM SB RAS, 1999. 400 p., 107 figs., ref.480 (In Russian, Summary in English- 26 p., 5 figs. in English: the regional stratigraphical scheme for the Jurassic of Siberia on 20 p., the chart showing facial zonation of Jurassic in Siberia on 4 p.).

This work is the latest analytical review of the Jurassic stratigraphy of Siberia. The notions of Jurassic stratigraphy in Siberia and adjacent territories (West and East Siberia, North-Eastern Russia) are generalized and unified in sufficient details for the first time. This review includes the analysis of present state of the knowledge of Jurassic stratigraphy and also new materials on bio- and lithostratigraphy and paleontology for to substantiate regional stratigraphical charts for Siberia. The latest paleontological, litho-, bio- and cyclostratigraphical data obtained in the study of all main Jurassic sequences in Siberia and their comparison with such recorded throughout the territory of boreal and subboreal Mesozoic distribution, there was virtually developed new system of stratigraphical coordinates for geological investigations of the Jurassic strata. The Jurassic scale, its history of improvement and the relation between the Siberian regional scale and global scale are considered. Ammonite-based zonal scale for the Jurassic of Siberia became almost twice as detailed; there were changed the age interpretation and the scheme of many zonal units and their correspondence to standard ones. The scales based on bivalves, foraminifers, ostracods and belemnites are essentially modified. The authors have developed and justified the principles of creation autonomous parallel zonal scales based on various groups of fauna and flora and application of their combination in correlation at intrazonal level. Interregional correlational datum levels in the Jurassic are first recognized and analyzed here by bivalves, foraminifers and ostracods, that allows circumboreal comparison of the sections (frequently lack of ammonites). The composed scheme of stratigraphic datum marks relates the Jurassic in Siberia, Alaska, Arctic Canada, shelfs of the Barents and North seas to each other and to the Jurassic standards of NorthWestern Europe. New unified charts for facial zonation of Lower – Middle Jurassic and Upper Jurassic in Siberia are developed. The notions of lithostratigraphy are revised and unified; the description is given to lithostratigraphical units and their horizon-by-horizon lateral series in facial areas and regions are shown on new correlational basis. Unified stratigraphical charts of Siberia (Western and Eastern) are composed for Lower - Middle Jurassic and for Upper Jurassic. Local stratigraphical units are

given general lithological, paleontological and biostratigraphical characterization and a number of new formations are described. Figures and the text show subdivision and the characters (litho-and biostratigraphical, logging and so on) of the Jurassic reference sections in different regions of Siberia, which are exposed in natural outcrops and due to drill cores. Geological profiles, the charts of formations facial replacement, the zones of lateral extent of formations and horizons, index-maps for lateral distribution of arinaceous and argillaceous sequences, the depth of occurrence and relief of the bottom and roof of separate strata in different regions of West Siberia (south-east, center, Arctic margins) are shown. Many debatable problems of the Jurassic stratigraphy in Siberia are discussed and there are suggested versions to solve them with account of all latest data on bio-and lithostratigraphy.

This book can be used as the handbook of notions of the Jurassic stratigraphy of Siberia, which were formed by the end of the second thousand years. It designed for all geologists who study the Mesozoic sequences.