

INTERNATIONAL SUBCOMMISSION ON JURASSIC STRATIGRAPHY

Newsletter No. 18

Copenhagen, November 1988

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A SUBCOMMISSION OF THE INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS)

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November 1988

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The present newsletter includes the revised member list in accordance with the decisions taken on the Lisbon meeting last year. Three new voting members have joined the subcommission, and, therefore, three of the former members have changed status to corresponding members in agreement with the statutes (which were circulated earlier). This member list is valid until medio 1989, when Enay and Mangold will become chairman and secretary, respectively. If there are any corrections of names or addresses, please inform Olaf Michelsen as soon as possible.

In enclosure 1 is presented a rectification of the decision concerning the Middle-Upper Bathonian boundary described in Newsletter No. 16.

Meetings:

The Bathonian working group may held a meeting in Nancy (France) Tuesday afternoon the 3rd of May 1989, before the field meeting of the West-German Subcommission on Jurassic Stratigraphy.

Two field excursions are arranged to take place in the summer of 1989 to examine Jurassic sections in the Western Cordillera. These trips will follow the meeting regarding Jurassic system and stage boundaries in the Americas, to be held in conjunction with the International Geological Congress, Washington (Newsletter No. 17), - see enclosure 2 and 3. Reports of the Bajocian and Oxfordian Working Group meetings are included (enclosure 4 and 5).

Arnold Zeiss

Olaf Michelsen

Enclosures:

1. Rectification (Charles Mangold)
2. ISJS Jurassic Boundary Field Meeting, July, 1989, Part I.
3. ISJS Jurassic Boundary Field Meeting, July-August, 1989  
Part II.
4. Report on the meeting of the Bajocian Working Group
5. First Oxfordian Working Group meeting
6. Report The Stratigraphic Research on the Jurassic Pelagic  
Sediments of Italy (Fabrizio Cecca)
7. Member List

Charles MANGOLD  
 Professeur

RECTIFICATION

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G. Westermann in a short letter remarks that in the Lisboa meeting we did not decide to place the Lower/Middle Bathonian boundary at the base of the Orbis Zone, as announced by the Subcommittee (News-letter n°16). In the working group session, in return, we have proposed to use the Submediterranean boundary of the Substages at the base of the Retrocostatum Zone, between horizon 10 (*Wagnericeras fortocostatum*) and horizon 11 (*Procerites quercinus*).

Therefore in the NW-European scheme appears an unnamed time-stretch between the restricted Hodsoni Zone and Orbis Zone.

U P P E R	NW EUROPE	SUBMEDITERRANEAN		WESTERN TETHYS
	ZONES	HOR.	SUBZONES	ZONES
U P P E R	ORBIS	14	RETROCOSTATUM	RETROCOSTATUM
		13		
		12		
	11	BLANAZENSE		
M I D D L E	?	10	B R E M E R I	
	HODSONI	9		

N.B. It is possible to held a Bathonian working group meeting in Nancy (France) Tuesday afternoon the 3th of May 1989 before the field-meeting of the West-German subcommission on Jurassic stratigraphy (DUGW Stratigraphische Kommission).

Please write to Charles MANGOLD as soon as possible for the meeting organization.

Nancy, le 26 octobre 1988

*Mangold*

**ISJS Jurassic Boundary Field Meeting**  
July, 1989

**Part I: Jurassic system & stage boundary sections in Nevada & Oregon.**

**Excursion leader:** Dr. David G. Taylor  
Department of Geology  
Portland State University  
P.O. Box 751  
Portland, Oregon 97207

**Objectives:** In Oregon, to visit Lower and Middle Jurassic section in John Day Inlier, eastern Oregon. Examine Hettangian/Sinemurian boundary and Aalenian/Bajocian transition. Visit localities in Graylock Fm. (yielding latest Hettangian-earliest Sinemurian faunas), Nicely Fm. (Late Pliensbachian faunas) and Snowshoe Fm. (Late Aalenian-Early Bajocian faunas). In Nevada, to examine Triassic/Jurassic System boundary and superjacent Hettangian through Lower Pliensbachian faunal succession. We will visit sections at New York Canyon and Pamlico.

**Cost:** Excursion fee is \$200, in U.S. funds, to be paid by May 15, 1989. Checks are payable to Dr. David G. Taylor. Food and motel expenses are additional and will be borne by each of the participants. Motel costs based on two nights in Portland and one night in Sacramento (double occupancy @ \$40/day) and six nights during the excursion (double occupancy @ \$20/day) are estimated at \$240.

**Limit:** 15

**Itinerary:**

<i>Excursion date</i>	<i>Activity</i>
July	
21	Arrival in Portland
22	Examine ammonite collections at Dept. of Geology, Portland State Univ.
23-25	Examine Jurassic section in central Oregon.
26	Travel to Hawthorne, Nevada.
27-28	Examine Gabbs & Sunrise formations (latest Triassic & Early Jurassic) at New York Canyon (Gabbs Valley Range) and Pamlico (Garfield Hills).
29	Travel to Sacramento, California (end of excursion)

**ISJS JURASSIC BOUNDARY FIELD MEETING, JULY--AUGUST,  
1989.**

**PART II: EXAMINATION OF UPPER JURASSIC AND LOWER  
CRETACEOUS BUCHIA--BEARING STRATA IN THE CALIFORNIA  
COAST RANGES.**

**Number of participants: 10 exclusive of fieldtrip leaders.**

**Cost:** No excursion fee. Vehicle to be supplied by USGS (Menlo Park, Calif.; fide C. D. Blome). Food and motel expenses will be borne by participants. Motel costs at Corning should be about \$45.00 per day. Cost of food should be about \$35.00 per day.

**ITINERARY.**

**July 30.** *Fly from Reno, Nevada to Sacramento, California.* Meet with fieldtrip leaders at Sacramento Airport in morning. Travel to Corning, California. Examine upper Tithonian to Valanginian Buchia-bearing strata (Great Valley Supergroup) at Grindstone Creek, Tehama County, California.

**July 31.** Examine Buchia-bearing strata at McCarty Creek, Elder Creek, and near Crowfoot Point, Tehama County, California. Upper Tithonian to Valanginian part of Great Valley Supergroup.

**August 1.** Return to Sacramento. (*Tour of Napa Valley optional*). Connections can be made from Sacramento Airport to San Francisco or Los Angeles.

Trip Leader:

Prof. Emile A. Pessagno, Jr.  
Programs in Geosciences  
The University of Texas at Dallas  
P.O. Box 830688  
Richardson, Texas 75083-0688

REPORT ON THE MEETING OF THE BAJOCIAN WORKING GROUP  
Italy, 3-7 July, 1988

(by Giulio Pavia)

The first meeting of the Bajocian Working Group took place from 3 to 7 July, 1988 with sessions in Piobbico and excursions in the Monte Nerone (central Italy) and Monti Lessini (north-eastern Italy) areas. 35 workers from ten different countries joined in the meeting:

Bulgaria - I. Sapunov, M. Stoyanova-Vergilova.  
France - S. Elmi, R. Mouterde.  
Great Britain - J. Callomon, J. Gregory, N. Morton.  
Hungary - A. Galacz, A. Vörös.  
Iran - K. Seyed-Emami.  
Italy - A. Baldanza, F. Cecca, B. Compagnoni, A. Conti, S. Cresta, E. Erba, F. Galluzzo, E. Mattioli, V. Molinari, G. Pallini, L. Pannuzi, G. Pavia, M. Santantonio.  
Morocco - K. Benshili, K. El Hariri, D. Sadki.  
Portugal - M.H. Henriquez, R. Rocha.  
Spain - S. Fernandez-Lopez, A. Goy, G. Melendez, J. Sandoval.  
Western Germany - G. Dietl, W. Ohmert, A. Zeiss.

The meeting has been organized by S. Cresta and by G. Pavia. The organisation was supported and sponsored by the International Subcommission on Jurassic Stratigraphy, the Italian National Research Council, the Italian Geological Survey and the Earth Science Department of Turin.

The Proceedings of the meeting are in print by the Italian Geological Survey. The volume will be sent to the participants of the meeting and to Bajocian workers. Please, contact dr. S. Cresta (Servizio Geologico d'Italia, largo S. Susanna 13, 00187 Roma) for extra-copies.

This was the program:

**Sunday, 3 (morning)** - 6 communications on the "Bajocian basal boundary stratotype: choice and proposals for the formalisation".

Discussion on the proposals of GSSP.

**Sunday, 3 (afternoon)** - 9 communications on the "Bajocian zonal and subzonal subdivision: a review".

**Monday, 4 (morning)** - 4 communications on the "Stratigraphic correlations within and between different biogeographic provinces during the Bajocian Stage".

4 communications on the "Multidisciplinary methods of correlation in Bajocian stratigraphy".

**Tuesday, 5** - Field trip on the Jurassic pelagic sequences of the Umbria-Marche Apennines: basinal facies along the Bosso river; pelagic carbonate platform sections in the Monte Nerone area.

Wednesday, 6 - Thursday, 7 - Field trip on the Jurassic sequences of the Monti Lessini Veronesi: facies variations of the Rosso Ammonitico fm.; Lower to Middle Jurassic formations (Calcari Grigi and Calcari Dolitici).

The main purpose of the meeting was the defining of the basal boundary of the Bajocian, *i.e.* of the Discites zone, and the choosing of the type locality for the Bajocian GSSP. Four sections as possible candidates for this boundary have been presented: Beaumont and Grande-Colle near Digne, France (G. Pavia); Berreraig Bay in the Isle of Skye, Scotland (N. Morton); Cap Mondego near Figuera da Foz, Portugal (R. Rocha et al.); Barranco de Agua Larga, southern Spain (J. Sandoval). All these sections are suitable, because they record the same biochronologic event, *i.e.* the first appearance of Hyperlioceras, Graphoceratidae ammonite considered as significant marker of the basal Bajocian. Moreover they rightly answer to the main points of Cowie's check-list of the ICS.

After the presentation of the sections, profitable critical discussion took place, mainly on the section of Cap Mondego and Berreraig Bay. The results have been assembled in an informal document voted by the participants (32 favourable, 2 abstained), as follows:

- 1) It was outlined that the correlation evidences are not upset or modified by the formalisation of the basal boundary stratotype, which is an important tool both for fixing the stratigraphic nomenclature and for helping in the correlation practice. In this respect any basal boundary has to be chosen on the basis of a well correlable biohorizon.
- 2) The basal boundary of the Discites zone, and then of the Bajocian Stage, is marked by the Graphoceratidae biohorizon, which contains the first Hyperlioceras, chiefly of the H. incisum - mundum group, and often the last representatives of the genus Graphoceras possibly with Haplopleuroceras. This biohorizon clearly appears correlatable in all the sections on discussion. Other biohorizons, defined by ammonites like Euhoploceras or Hammatoceratinae, do not seem very useful for defining the stratotype, because of their large range from Upper Aalenian or because of their general scarcity in the submediterranean sequences.
- 3) Among the proposed sections, Cap Mondego has been considered the most suitable as candidate for GSSP. However it is necessary to wait for the publication of the Cap Mondego stratigraphic data before taking any decision, mainly because of the fossil lacking near the boundary Aalenian-Bajocian.
- 4) The Berreraig Bay section could be proposed as auxiliary stratotype (ASP).
- 5) G. Pavia will prepare a schedule on the basis of the data listed in the manuscripts sent for the Proceeding of the meeting.



That schedule would collect the ultimate opinion of the colleagues on the proposals to the points 3 and 4. A small meeting may be organized next year in Cap Mondego (?) for evaluating the answers to the schedule and for coming to a definite proposal about the Bajocian GSSP.

Although we were not able to come to an ultimate proposal about the choosing of the Bajocian basal boundary stratotype, the work appears to have been profitable for a quick solution of the problem in the next future.

## FIRST OXFORDIAN WORKING GROUP MEETING (I.S.J.S.)

Zaragoza, September 20-23 1988G. Meléndez  
November 1988.

The first Oxfordian Working Group Meeting was held in Zaragoza, Spain, from September 20th to 23rd 1988, at the Geology Department. It was organized by the current coordinator of the Group, G. Meléndez. Some 23 people attended the Meeting and a whole of 10 short papers were submitted orally during the working sessions; One poster was also presented. The Meeting included a first day of scientific sessions and three days of excursions by the North eastern Iberian Chain, to visit some classical Upper Jurassic outcrops (mainly Oxfordian) of known localities, including Ricla, Aguilón, Moneva, Ariño and Calanda. Ammonites successions, as well as bio and chronostratigraphic problems were revised, from Callovian to Lower Tithonian, during three days of excursions (21-23 September).

Scientific sessions of the first day were devoted to three main topics: 1) Oxfordian regional correlations, with the communications from: Checa and Sequeiros, "On Lower Oxfordian from Subbetics, Spain"; Aurell, Meléndez and Salas, "Oxfordian depositional sequence in E. Iberian and catalonian ranges, Spain"; Khudoley and Furrázola-Bermudez: "Oxfordian Stage of Cuba"; Myczynski and Meléndez: "On the current state of knowledge of Oxfordian ammonites successions from Cuba and adjacent areas"; Olóriz et al.: "Problems of litho-correlation in the México-caribbean area and the significance of Upper Oxfordian Discosphinctes". 2) Biostratigraphic value of Oxfordian Ammonite groups, including communications from: Malinowska, "Boreal influences in the Upper Oxfordian of Poland"; Matyja, "On stratigraphic value of Prososphinctes and Peltoveratinae"; Tarkowski: "Lower Oxfordian Taramelliceras ~~idae~~ of the Cracow Jurassic Chain; Their stratigraphic value". 3) Oxfordian biozonation problems, including communications from Callomon: "On the definition of the basal boundary stratotype of the Jurassic Oxfordian Stage"; Cariou and Meléndez: "A modified Perisphinctid zonal scheme for Lower-Middle Oxfordian".

The working session of the Oxfordian Group was held after the third scientific session, much more as a friendly and open Meeting. The main proposed topics for discussion, and the main conclusions were:

1) Position of Oxfordian stratigraphic boundaries in different biogeographic provinces.

a) The basal boundary of the Oxfordian: In the stratotype, and as recognised throughout the boreal realm, at the base of Mariae Zone, base of Scarburgense Subzone. The question of whether Paucicostatum Horizon actually belongs to Mariae Zone or to Uppermost Callovian, Lamberti Zone, was discussed in the paper submitted by J.H. Callomon (Meeting volume).

## 2. Standard zonal scheme(s) of the Oxfordian. Standard zonation for the Tethyan Realm.

According to the problems exposed above, it seems still premature to try to erect a standard zonal scheme for the Tethyan Realm. It is generally accepted the "classical" zonation proposed by Cariou et al. (loc. cit.), but much progress is still to be achieved before getting to a usable, reference biozonation for Mediterranean areas.

## 3. Alternative interprovincial and/or intertaxial (Ammonoidea) zonal schemes.

Much work is still in progress on what concerns the interprovincial biostratigraphy and correlations, specially in the Pacific Realm, as it can be seen by the papers submitted at this Meeting by Khudoley & Furrázolla; Myczynski & Meléndez, and Olóriz et al. The use of different groups of Ammonoidea for Oxfordian biostratigraphy is also in certain progress, as it was shown in some papers such as R. Tarkowski's on Taramelliceratinae. A recommendation was made, however, as far as erection of new biozonations and zonal names is concerned, for every ammonite group. Opinions supported the general view that it would be enough to show the biostratigraphic value of different ammonite groups, in order to keep the stability and homogeneity of established zonal schemes.

## 4. Oxfordian biozonations with other fossil Groups.

Little could be discussed on that item, due to the scarce representation of non-Ammonites specialists. A general agreement exists on what concerns the great value of dinoflagellates and palynomorphs as guide-fossils for the next future.

## 5. Main subjects of future research. Location of next Meeting.

To progress in the results of the items exposed above was assumed as the main subject of future work. It is specially the case of standard zonal schemes and the search for a good boundary stratotype section. According to that, it was readily accepted the proposal by R. Gygi, to celebrate the next Oxfordian Meeting in Basel; in September 1990, with the possibility to visit the classical Oxfordian sections of Swiss Jura. The following one; 1992, as proposed by B.A. Matyja, will be held in Warsaw, Poland, with visits to the Oxfordian of Polish Jura and Pienini.

## Excursions, Field Guide, and Publication

The three days excursion by the Upper Jurassic outcrops was led by the organizers. A special attention was put on ammonite successions and biostratigraphic, as well as taphonomic, analyses of Callovian to Kimmeridgian materials, and on sedimentologic details and paleogeographic reconstruction of Iberian Jurassic platform. A field guide was elaborated and delivered to the participants. This, together with the complete text of the contributions, will be published in the proceedings volume, in one year time.

As far as the Tethyan Realm is concerned, not a sound conclusion could, actually, be reached, due to the huge Callovian-Oxfordian hiatus recorded throughout Southern Europe. Three points are still under discussion:

1. Perisphinctids appear, unfortunately, highly incomplete to virtually absent in Subboreal to Boreal regions, so making impossible any attempt of correlation.
2. The use of Creniceras renggeri as a guide species for the lowermost Oxfordian Zone in Tethyan Realm, correlable with Mariae Zone, has been suggested. The real trouble, however, would be once more the condensed character and the underdevelopment of Lower Oxfordian materials in Southern Europe areas.
3. A realistic, though somewhat chimeric possibility was also proposed, to place the basal boundary of Oxfordian Stage at the base of Transversarium Zone, as an easily correlable level.

The question of the other boundaries received less attention (i.e. the Lower-Middle and Middle-Upper Oxfordian boundaries) since they do not appear to have suffered much modification since the last OWG Meeting at Lisbon (1987). The base of Middle Oxfordian would be placed at the base of Plicatilis Zone, within the Tethyan Realm, that is: at the base of its lower subzone, i.e. Vertebralis Subzone (for Subboreal and Central European areas), (Cariou et al. 1971), and Paturattensis Subzone (Brochwicz-Lewinski 1981; Meléndez et al. 1985) for South-European and Mediterranean areas, where Cardioceratids are unrecorded and Perisphinctids form the main stock for biozonations. This solution might be considered valid if the approximate equivalence of both subzones is evidenced, as it seems to be the case (Bourseau 1977). Then, Plicatilis Zone could be assumed as the nominal standard Zone for Lower Middle Oxfordian in the Tethyan Realm, which would add a gain in stability and homogeneity for the classical standard Oxfordian zonal scheme (cfr. references above).

The question of the choice of boundary stratotypes is still a long, unresolved problem, specially as far as the Tethyan Realm is concerned, due to generalized incompleteness here of transitional Upper Callovian-Lower Oxfordian series. Some proposals of possible candidates were made by (1) R. Gygyi, in some localities of Swiss Jura, such as Herznach, where condensed series could, however, show fairly complete ammonite successions. (2) F. Atrops in SE. France, where transitional series appear developed in basinal, argillaceous facies, allowing a very good, bed by bed collection of ammonite associations from Upper Callovian up to Upper Oxfordian. Perisphinctids here are, however, markedly scarce. These two main areas were, therefore, regarded as possible future candidates.

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REPORT: THE STRATIGRAPHIC RESEARCH ON THE JURASSIC  
PELAGIC SEDIMENTS OF ITALY.

by

Fabrizio CECCA

1) INTRODUCTION

This report deals with the researches carried out on the stratigraphy of the Italian Jurassic pelagic sequences during the last four years. It complements a first report previously realized by PAVIA (1981) and the reports on the jurassic ammonite biostratigraphy presented by PAVIA & SARTI (1987 cum bibl.) during a reunion of the Italian Paleontological Society.

As regards the shallow-water platform and related margin-areas sediments I refer the reader to the recent syntheses by DE CASTRO (1987 cum bibl.) and CHIOCCHINI (1987 cum bibl.).

The Italian Working Group on Jurassic, coordinated by G.PAVIA (University of Turin), is currently organizing two annual meetings which include field excursions and discussions about the researches in progress.

Most of the papers mentioned in the present report are in press at the moment in the proceedings of the 2nd International Symposium on Jurassic Stratigraphy (Lisbon, 1987), the 2nd International Meeting "Fossili, Evoluzione, Ambiente" (Pergola, 1987) and the Meeting on Bajocian Stratigraphy (Piobbico-Monti Lessini Veronesi, 1988).

2) NORTHERN ITALY

a) Maritime Alps - LUALDI (1986) has studied the Lower Lias in the Arnasco-Castelbianco tectonic unit (ligurian Prepiemont). By means of Hettangian and Sinemurian ammonites he was able to recognize some hiatuses in the liassic sequence. The sedimentologic features and the paleogeographic implications of the radiolarites cropping out in the above mentioned Arnasco unit have been examined by DELLAGIOVANNA & DI GIULIO (1985).

b) Lombardian Basin - BAUMGARTNER (1984; 1987 cum bibl.) discusses new data on radiolarian biostratigraphy and interesting interpretations of the genesis of the Tethyan Radiolarites as well. His studies were also carried out in the Trento Plateau and Umbria-Marches Apennines. CANTALUPPI & CASSINIS (1984) have studied the ammonite faunas and the sedimentology of the domerian-toarcian beds exposed in the Cava del Caricatore quarry 7 Km far from the type locality of the Domerian Substage (Colma di Domaro). The studied section is proposed by these Authors as a possible reference section for the Domerian-Toarcian boundary. The sedimentary pheno-

mena and the paleogeographic evolution of the Lombardian Basin during the Lias have been studied by VERCESI & BISSOLATI (1985) in Val Lumezzane (Brescia) and by JADOUL & DONISELLI (1987) in the Morterone sequence near Lecco. TINTORI et al. (1986) have found a new Crustacean Rugocaris indunensis in the Domerian "Calcarei a Cefalopodi". The Authors also discuss the paleoecological significance of this discovery. ERBA & QUADRIO (1987) define correlations between calpionellids and calcareous nannofossils in the Tithonian beds of the Mt. Pernice section (Brescia).

c) Trento Plateau and adjacent basins - The sedimentology and the rich ammonite faunas of the Jurassic sequences exposed in the so-called Trento Plateau have been recently described in several papers. CLARI et al. (1984) have illustrated the sedimentological features of the "Rosso Ammonitico Inferiore" formation of the Northern Lessini Mountains as well as the important Late Bajocian, Middle Bathonian and Callovian ammonite faunas. DALLA BRUNA & MARTIRE (1985) have studied nine jurassic sections, ranging from Pliensbachian to Kimmeridgian in age, exposed near Belluno. The ammonite faunas provide fine biostratigraphic correlations. JENKYNS et al. (1985) study the organic-rich shales occurring in the Igne formation (Belluno Trough). This level is dated to the early Falci-ferum Zone by means of ammonites. These Authors correlate this with the widespread Early Toarcian anoxic event. BENETTI et al. (in press) present a preliminary note on Late Jurassic ammonites from the Western Lessini Mountains. In the same area PAVIA et al. (1987) have published the results of a detailed paleontologic and biostratigraphic research: Middle-Late Oxfordian and Early Kimmeridgian ammonite faunas were collected through bed-by-bed sampling in 3 sections. SARTI (1985; 1986 cum bibl.; in press b) studied the Late Jurassic faunas of the Trento Plateau. This Author has recently proposed for the Late Jurassic of this region a zonal scheme based on ammonites (SARTI, in press a). The calpionellid faunas from this area have also been illustrated by CLARI & PAVIA (1987). CHANNELL et al. (1987) and CHANNELL & GRANDESSO (1987) define correlations among polarity chrons, nannofossils and calpionellids. CLARI et al. (in press) discuss the sedimentology and the stratigraphy of the siliceous beds occurring in the Trento Plateau. HORRELT et al. (in press) illustrate the stratigraphy and the sedimentary evolution of the Jurassic basin located NW of Cortina d'Ampezzo; their correlations are based on some newly discovered ammonite faunas.

d) Eastern Liguria (Northern Apennines) - CONTI & MARCUCCI (in press) have recently examined some Middle Callovian-Early Oxfordian radiolarian assemblages in two sections. These radiolarites represent the sedimentary cover of the ophiolite unit in Monte Rossole and Val Graveglia. MARCUCCI et al. (in press) have discus-

sed the age of the apenninic and alpine ophiolites and the correlation with the atlantic ocean opening by means of radiolarians. VENTURI (1988) revised the Late Hettangian faunas collected by CAPELLINI and CANAVARI in the La Spezia area.

### 3) CENTRAL ITALY

a) Umbria-Marches-Sabine Apennines - The paleontology and the paleogeography of the Jurassic of this region have recently been studied in numerous papers.

1 - Ammonite paleontology and biostratigraphy - The liassic faunas are the best known in the Apennines. Recent papers by PALLINI (1986) and CECCA et al. (1987 b) provide new data on Lotharingian ammonites whilst the papers by MOUTERDE & FERRETTI (1986), CECCA et al. (1987 a) and DOMMERGUES et al. (in press) contain paleontological and biostratigraphic information on the carixian ones. DONOVAN (in press) has discussed the different aspects (paleontology, paleobiogeography, paleoecology, biostratigraphy) of the Sinemurian and Pliensbachian faunas of the Central Apennines. Biostratigraphic data on Sinemurian to Toarcian ammonites are exposed by CECCA et al. (in press) in a monograph on the Jurassic sediments cropping out in the Monte Nerone area. KÄLIN & URETA (1988) have studied the ammonite faunas of the Upper Domerian-Lower Toarcian and Upper Toarcian-Middle Aalenian as well as the sedimentology of the Gorgo a Cerbara section (Monte Nerone area). The Middle Jurassic ammonites (Aalenian-Early Bajocian) are poorly known. Due to the efforts of S. CRESTA (Geological Survey of Italy) these faunas have been thoroughly studied and the first results have been presented in the above mentioned (see Introduction) International Symposia (CRESTA in press a, b; CECCA et al. in press). Other informations on faunas of this age can be found in the papers by CECCA et al. (1986) and PALLINI (1987).

Ammonite faunas from the Blagdeni Zone (Upper Bajocian) to Strombecki Zone (Lower Kimmeridgian) are completely lacking in the Umbria-Marches-Sabine Apennines due to a 20 million year-long hiatus recognized on the structural high sequences, where we usually find the most ammonitiferous facies (CECCA & SANTANTONIO, 1986; CRESTA et al. in press). In the basin sequences, which are supposed to be continuous according to the radiolarian stratigraphy (BAUMGARTNER 1987) no ammonites have so far been found above Lower Bajocian levels (CECCA et al. in press).

The rich and often well preserved Late Jurassic ammonite faunas, found in pelagic condensed limestones occurring on structural high sequences, have been actively studied during the last years (CECCA 1985; in press a, b, c; CECCA et al. 1985, 1986, in press; CECCA & SANTANTONIO 1986; SANTANTONIO 1986 a, b, c). This has led to the definition of a zonal scheme for the Lower Tithonian (CEC-



CA & SANTANTONIO in press).

2 - Belemnites - N.MARIOTTI (University of Rome) is currently studying this important fossil group. Some very interesting data on the paleobiogeography and paleontology of the tithonian faunas can be found in three recent papers (COMBEMOREL & MARIOTTI, 1986 a, b; in press a). New data on the ultrastructure of the belemnite guards are also illustrated by MARIOTTI & PIGNATTI (in press).

3 - Gastropods - Very interesting faunas collected in some nep-  
tunian dykes of Bajocian age have been studied by M.A. CONTI (University of Rome). The results of this research led to important conclusions on paleobiogeography and paleoecology (CONTI & MONARI, 1987 cum bibl.) as well as good correlations with similar faunas known in Hungary (CONTI & SZABO in press).

4 - Crinoidea - The study on the taxonomy, paleoecology and functional morphology of the Tethyan Jurassic Crinoidea has been carried out in the University of Rome since 1979. Concerning Italy some recent papers provide information about new forms of Crinoids (MANNI & NICOSIA 1985, 1987 b, in press; DELOGU & NICOSIA, 1986) and Saccocomids (MANNI & NICOSIA 1986; 1987 a).

5 - Microfaunas - GIOVAGNOLI & SCHIAVINOTTO (1986) have presented a biometric study of some Protoglobigerinid faunas. Their results seem to be useful in biostratigraphy. The radiolarian faunas have been studied by BAUMGARTNER (1984; 1987). New data on biostratigraphy of forams and calcareous nannoplankton are provided by CRESTA et al. (in press). BALDANZA et al. (in press) define correlations between calcareous nannoplankton and ammonite faunas of the Aalenian-Bajocian boundary in Monte Nerone area. New data on calpionellid faunas sampled in some structural high sequences of the above mentioned area are discussed by CECCA et al. (in press).

6 - Sedimentology and Paleogeography - BICE & STEWART (1985) have studied the sedimentary and paleomorphological features of the transition between an intrabasinal structural high zone and an adjacent basin in the Sibillini mountains. IMMERZ (1985) described the sedimentary evolution of the Monte Nerone area during Jurassic and Early Cretaceous. GALDENZI (1986) shows the occurrence of megabreccias in the so-called "dorsale marchigiana" and discusses their importance in the paleotectonic reconstructions of the area during the Jurassic. FARINACCI (1987) has presented a summary of the previous studies on the umbria-marches Jurassic. CRESTA et al. (in press a) made a revision of the lithostratigraphy of the jurassic sediments outcropping in this part of Apennines. The results of a paleoenvironmental analysis by COLACICCHI et al. (in press) led to new evaluations of the depth of the depositional environments during the Jurassic. This problem has been strongly debated since 1967 by the geologists of the University of Rome (see FARINACCI, 1987). The bathymetric problems related to the jurassic pelagic sediments of the Central Apennines have also been discussed by FARINACCI (in press). This Author refuses the models based on C.C.D. to explain the occurrence of the radiolarites. ALVAREZ

(in press a, b) studies the effects of the jurassic rifting in the Monte Nerone area. In the same area CECCA et al. (in press) carried out a study based on detailed ammonite biostratigraphy and bed-by-bed sedimentological observations. The paleogeographic model proposed by these Authors is time-controlled to the ammonite zone level. SANTANTONIO (1987) has presented a synthetic study of the so-called pelagic carbonate platforms (usually mentioned as structural highs or seamounts in the literature) based on data collected in the Umbria-Marches Apennines and in Calabria.

b) Western Marsica - In this part of the Apennines a transitional facies between the bahamian-type Latium-Abruzzi carbonate platform and a pelagic basin (similar to the Umbria-Marches basins) can be observed. Neritic facies in the Lias and slope facies in the Dogger-Malm are exposed. Recent papers by CIVITELLI et al. (in press) and GALLI et al. (in press) provide results of the sedimentologic and biostratigraphic studies carried out on some jurassic sequences.

#### 4) SOUTHERN ITALY -

a) Calabria (South the Sangineto line) - The revision, and very often the discovery, of the jurassic sequences of this very complex sector of the Italian peninsula was carried out by the late C.T. TEALE, who realized detailed geological maps of the area as well as important sedimentologic studies (TEALE & YOUNG 1987; SANTANTONIO & TEALE 1987 cum bibl.). His observations were complemented with biostratigraphic data based on ammonites by M.SANTANTONIO (Geological Survey of Italy) especially in the liassic levels (see also YOUNG et al., 1986). M.SANTANTONIO and G.ZUFFA (University of Bologna) are currently editing the geological map at the 1/25000 scale of the Longobucco-Bocchigliero area: this had been extensively surveyed and mapped by TEALE for his PhD thesis project with the Imperial College of London. The Longobucco and Caloveto Group names were proposed by TEALE (1985) and SANTANTONIO & TEALE (1985), respectively, for these calabrian sequences. The rich liassic brachiopod fauna of Longobucco is currently being studied by E. TADDEI RUGGIERO (University of Naples) who has published together with VÖRÖS (1987) an interesting article on paleobiogeography. The Sinemurian brachiopod faunas show strong affinities with the NW European ones, whilst in the Domerian the faunas closely resemble the Mediterranean ones. BAUDELLOT et al. (1988) confirm the Hettangian age of the marine transgression in the Sila mountains and in Sicily. BOULLIN et al. (1988 cum bibl.) discuss lithostratigraphy, synsedimentary tectonic evolution and paleogeography of some jurassic sequences exposed in different tectonic units of Calabria. The Authors also give information on some liassic ammonite faunas.

b) Sicily - As regards the Jurassic, this is the less studied

region of Italy. The above mentioned papers by TADDEI RUGGIERO & VÖROS (1987) and BAUDELLOT et al. (1988) provide some biostratigraphic data about the Peloritani mountains. GALACZ (1985) has studied a Bathonian faunula from Monte Kumeta. DE WEVER et al. (1986) have published a study of the jurassic sequence exposed at Santa Anna (near Sciacca). Biostratigraphic successions based on radiolarians, calcareous nannoplankton, ammonites, brachiopodes and calpionellids were precisely correlated in this locality. COMBEMOREL & MARIOTTI (in press b) carried out the revision of the belemnite faunas from NW Sicily collected and previously studied by GEMMELLARO. By means of brachiopods and ammonites VÖROS et al. (1987) were able to date the fragmentation of the Panormide carbonate platform since Pliensbachian to the Bajocian.

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