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Joint meeting of the Oxfordian and Kimmeridgian Working Groups; Warsaw, 7-12 September 1992

The third meeting of the Oxfordian Working Group of the ISJS was held in Warsaw, from 7th to 12th September 1992. The meeting, programmed as a joint meeting of the Oxfordian and Kimmeridgian Working Groups was superbly organized by the Jurassic team of the University of Warsaw, comprising Professors B.A. MATYJA and A. WIERZBOWSKI as organizers, and A. DREWNIAK, E. GŁOWNIAK and J. GUTOWSKI as an assisstant staff. Professor A. RADWAŃSKI contributed in the elaboration of the Guidebook and field excursions, and Professor J. KUTEK offered an introductory lecture and took part as well in the explanation of the excursions.

About thirty specialists, mainly from Poland and from West-European countries, attended the meeting. The exceptions from extra-European countries were W.A.S. SARJEANT (Canada) and J. KRISHNA (India). Most of the attendants were coming from the field of ammonite biostratigraphy. However, an increasing number of non-ammonite specialists is being welcome to these meetings, mainly on palynomorphs (dinoflagellates) and sponges.

The meeting started in Warsaw on Monday 7th September with the visit to the ammonite collections at the Geological Survey of Poland, kindly offered by Dr. L. MALINOWSKA, and the inaugural session at the University of Warsaw.

Then, the participants were transferred to Bocheniec (Holy Cross Mountains), where the oral presentations and the working sessions took place on Tuesday 8th. Then, the field trip developed from Wednesday 9th to Friday 11th across the most classical localities of the Holy Cross Mountains and Polish Jura.

THE ORAL PRESENTATIONS

Twelve contributions were presented during the Meeting sessions at Bocheniec, most of them on biostratigraphic problems of the Oxfordian and Kimmeridgian stages. This question of refining the currently established biostratigraphic scales has been (and it still is) the major goal of the specialists during the last years since the beginning of the activities of the working groups. It reflects the main concern of the biostratigraphic work for these last ten years since the first ISJS at Erlangen, 1984, and it also shows the long road ahead we have to go through, until a sound and acceptable proposal for the boundary stratotype can be presented, according to the International Commission of Stratigraphy (*ICS*) guidelines.

The refining of the biostratigraphic scales has undergone a remarkable progress in these last years, mainly on the fields of ammonites and dinoflagellates. Dinoflagellates, and the correlation of their biostratigraphic scales with those of ammonites through the Oxfordian and Kimmeridgian were the main of the lecture by POULSEN (1993, *this volume*). The paleogeographic reconstruction in some selected points of the South European platform under carbonate facies was carried out in three main lectures: Professor J. TRAMMER, for the Oxfordian of Poland, to show the value of fossil sponges as paleoenvironment indicators within the frame of the development of the sponge megafacies; AURELL & BADENAS for the Kimmeridgian of the Iberian platform on the basis of computer modelization of facies and thickness distribution, development of reef complex, etc.; MARQUES & *al.* (1993, *this volume*) for an analysis of the Middle-Upper Oxfordian platform of Algarve (S Portugal) on the basis of sea-level fluctuations and ecostratigraphic changes, as evidenced by changes in ammonite spectra and correlative variations in the distribution of benthic groups.

The rest of the presented communications were devoted to ammonite biostratigraphic problems of the Oxfordian and Kimmeridgian stages. Here again it is worth noting that most of the submitted papers were dealing with ammonite successions in extra-European areas, showing the significant progress achieved on the knowledge of the Oxfordian and Kimmeridgian in recent years. The Kimmmeridgian/Tithonian boundary at the Cuencamé area (Mexico) was studied by OLÓRIZ & *al.* (1993, *this volume*) proposing not to delineate the boundary coinciding with the first record of the endemic genus *Mazapilites*.

Moreover, KRISHNA, and KRISHNA & *al.* presented a synthetic updated view of the Oxfordian ammonite stratigraphy, and a characterization of the Kimmeridgian stage, and the Kimmeridgian/Tithonian boundary, at the SE Tethys, mainly the region of Kachh, India. Some specially noteworthy aspects concerning the Oxfordian are the recognition of a thick marly sedimentary episode, similar to the Renggeri marls in western Europe, ranging from the Upper Callovian to Lower Oxfordian, and the identification of some important biogeographic links with the western Tethys areas, such as *Neocampylites, Peltoceratoides, Dichotomosphinctes, Gregoryceras, Kranaosphinctes, Subdiscosphinctes.* A similar progress has been achieved on what concerns the Kimmeridgian/Tithonian boundary. The results of the faunal analysis in this case reinforce the idea of the unique Indo-East-African biogeographic province during the Late Jurassic.

The ammonite succession across the Oxfordian/Kimmeridgian boundary in North Africa (Tellian basin, Algeria) and their relation with tectonically-induced paleogeographic changes were studied by ATROPS & BENEST, showing a detailed succession of ammonite assemblages through the Planula Subzone, and evidencing a change in the sequencial polarity at the base of the Lower Kimmeridgian, Platynota Zone.

Finally, the Oxfordian-Kimmeridgian ammonite succession in Europe were discussed in three contributions: VIDIER & *al.* (1993, *this volume*) who presented an extremely detailed succession at the Boulonnais in France, ranging from the upper Athleta to upper Mariae Zone and identifying some important biogeographic links among oppeliids and peltoceratids with southern areas, besides cardioceratids. On the other hand, ATROPS, GYGI, MATYJA & WIERZBOWSKI (1993, *this volume*) presented a detailed revision of the Middle Oxfordian to lowermost Kimmeridgian *Amoeboceras* succession in the Submediterranean areas, from SE France, Switzerland and Central Poland, and their correlation with the classical Submediterranean, perisphinctids successions. MELÉNDEZ & FONTANA (1993, *this volume*) presented a detailed correlation of the Middle Oxfordian, Transversarium and Bifurcatus Zone sediments, in numerous sections across the Iberian Chain (E Spain), showing the validity of the perisphinctid subzones and horizons proposed in the recent years.

THE FIELD TRIP THROUGH THE JURASSIC OF SW POLAND

The Callovian/Oxfordian boundary and the associated gaps, and biostratigraphic problems at the Lower Oxfordian were shown at Gnieździska quarry, Wysoka and Wrzosowa quarries. The Middle Oxfordian biostratigraphy, ammonite succession and biohermal complex associated were seen at Olsztyn, Zborów Hill, Wysoka quarry, Niegowonice quarry, Kromołowiec, Syborowa Hill. The Middle Oxfordian ammonite successions, from Plicatilis (Antecedens Subzone) to upper Bifurcatus Zone, were revised at the famous quarries of Zawodzie, Częstochowa. The Late Oxfordian to Early Kimmeridgian successions were observed in the quarries at Małogoszcz, Julianka, Bydlin, Latosówka, and Raciszyn. Many of these localities are classical names in the

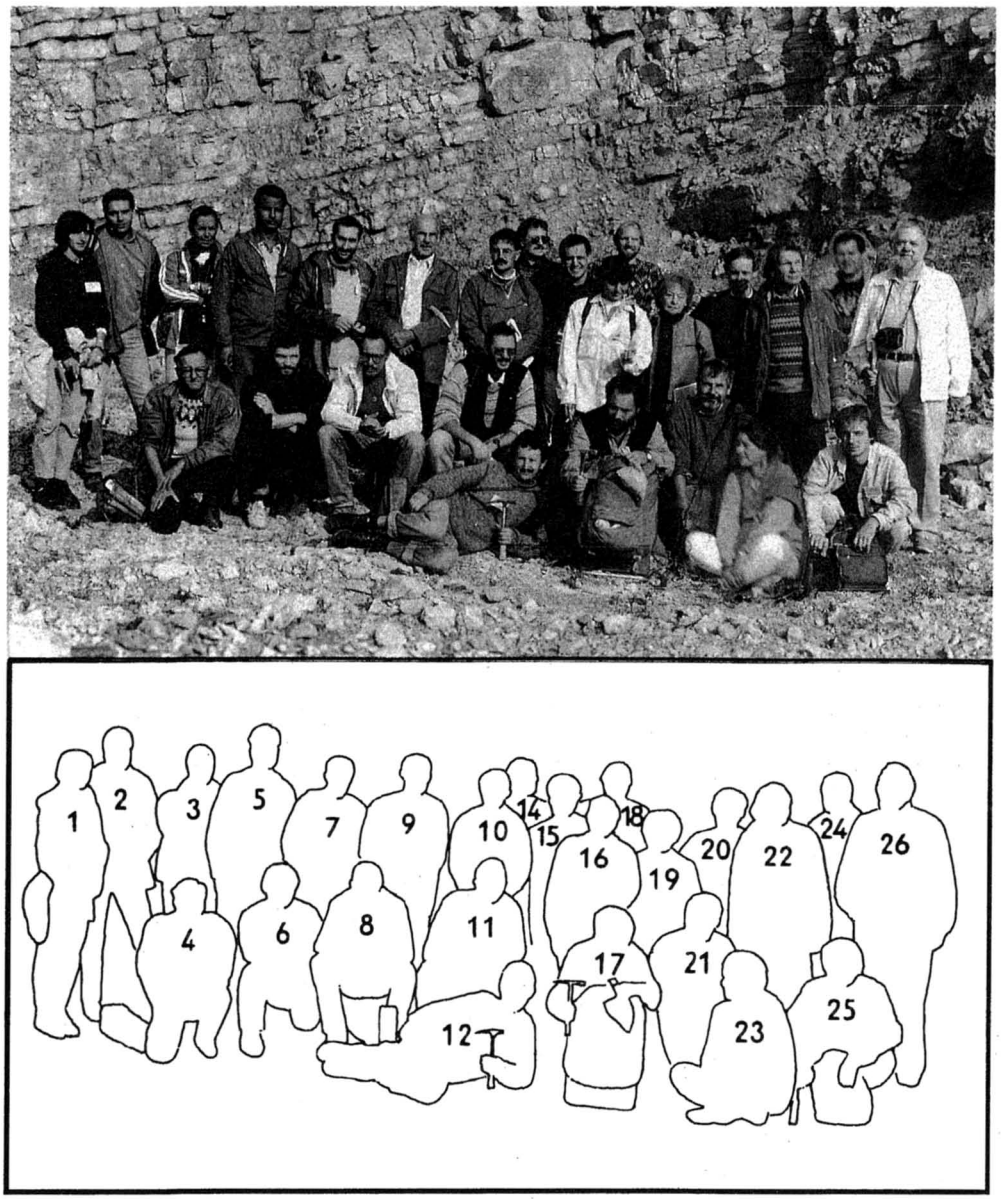
European Upper Jurassic literature and have provided many stratigraphic and paleontological names to the Oxfordian and Kimmeridgian biostratigraphy. All participants are grateful to our Polish colleagues, for offering this opportunity to get closer to the Jurassic of their country. All details of the organization only meant to increase pleasant souvenir of the nice field trip.

THE WORKING SESSIONS

The programmed working sessions of the Oxfordian and the Kimmeridgian Working Groups were held on Tuesday 8th afternoon, after the oral presentations. Discussions focused mainly around the question of the proposal and definitions of the boundary stratotypes. In order to select a good section for the boundary stratotype candidate a wide variety of factors must be taken into account. Most of them have already been specified by the procedure guide and the list of instructions published by the ICS. It is not necessary for the selected section to be placed at the type area. It is, however, important to fulfil some conditions, such as a good exposure and an easy access for further visits and sampling. Also, the stratigraphic succession should be as complete as possible for this boundary interval. This requirement can only be evidenced, obviously, by the detailed study of the most biostratigraphically resolutive (or at least the better known) fossil group. In both cases, the Callovian/Oxfordian and the Oxfordian/Kimmeridgian boundary, this fossil group would be the representatives of the ammonite family Cardioceratidae. However, a further requirement the selected section must fulfil is to offer a real possibility to allow the detailed biostratigraphic correlation with scales established by means of other fossil groups.

DISCUSSIONS ON THE PROPOSALS FOR THE CALLOVIAN/OXFORDIAN BOUNDARY STRATOTYPE

Discussion on the formal definition of a lower boundary stratotype for the Oxfordian, according to the guidelines drawn in the GSSP project of the International Commission of Stratigraphy (ICS) have been slow and difficult since. This is mainly due to two basic reasons: on one hand the existence of a generalized stratigraphic gap at the Callovian/Oxfordian boundary throughout the mobile belt at the margins of the Tethyan Realm, most specially in those areas where the Callovian-Oxfordian transition is represented in carbonate facies. This makes it particularly troublesome to look for a suitable "continuous" stratigraphic succession in South European areas, except for those regions, in subsident basins, where the transition is represented by argillaceous ("Terres Noires") facies, mostly in SE France, at the Subalpine Chains (DARDEAU & *al.* 1988), and the Paris basin. In some other near regions, such as the French Jura and Swiss Jura the Lower Oxfordian is similarly well-developed in "Terres Noires" facies although the uppermost Callovian and the Callovian-Oxfordian transition itself are represented by somewhat incomplete condensed successions, often involving small gaps (ENAY 1966, GYGI 1990). The Callovian-Oxfordian transition is much better exposed, also under argillaceous black marls (Oxford Clays) facies in the Boreal Realm. Detailed biostratigraphic successions, mainly based on cardioceratids, have been classically described and studied in Britain, at Dorset, Oxfordshire, Yorkshire, and Scotland (CALLOMON 1955, 1957; WRIGHT 1968, 1983) and, at this Meeting, in



Participants of the *Joint meeting of the Oxfordian and Kimmeridgian Working Groups; Warsaw, 7-12 September 1992*, when visiting the Gnieździska quarry in the Holy Cross Mountains

1 – Blanca Fontana (Spain), 2 – Paulo S. Caetano (Portugal), 3 – Beatriz Marques (Portugal), 4 – Jan Kutek (Poland), 5 – Jai Krishna (India), 6 – Andrzej Pisera (Poland), 7 – Guillermo Meléndez (Spain), 8 – Didier Marchand (France), 9 – Raymond Enay (France), 10 – Frederico Olóriz (Spain), 11 – Niels E. Poulsen (Denmark), 12 – Jacek Gutowski (Poland), 14 – Krzysztof Leszczyński (Poland), 15 – Marc Aurell (Spain), 16 – Beatriz Badenas (Spain), 17 – Jerzy Trammer (Poland), 18 – Eckhard Mönnig (Germany), 19 – Natalia I. Shulgina (Russia), 20 – François Atrops (France), 21 – Andrzej Wierzbowski (Poland), 22 – Andrzej Radwański (Poland), 23 – Ewa Głowniak (Poland), 24 – Bronisław A. Matyja (Poland), 25 – Arkadiusz Drewniak (Poland), 26 – William A.S. Sarjeant (Canada)

the French Boulonnais, Anglo-Parisian basin (VIDIER & *al.* 1993, *this volume*). The second reason has been the strong provincionalism of ammonite faunas at this Callovian-Oxfordian interval, the Boreal cardioceratids and Tethyan perisphinctids and other groups appearing scarcely overlapping which makes the recognized ammonite successions in both areas difficult to correlate (*see also* ENAY & MELÉNDEZ 1985).

The lower boundary of the Oxfordian stage being definitively set at the lower boundary of the Scarburgense Subzone (CALLOMON 1990), the only published proposal for an Oxfordian basal boundary stratotype, has been made by CALLOMON at the first Oxfordian Group Meeting in Zaragoza in 1988. A first proposition of the boundary stratotype in the region of Yorkshire was made by this author as early as 1964 and precised subsequently by the choise of a recently described stratotype section and the designation of the basal boundary stratotype of the Scarburgense Subzone within this section, as new information became available following the research of J.K. WRIGHT at Scarborough, Yorkshire (WRIGHT 1968, 1983), where several good sections for the Callovian-Oxfordian transition were described in detail. The section proposed as the most suitable for the definition of the Scarburgense Subzone was "that at Osgodby Nab, 4 km SSE of Scarborough Castle", at Cayton Bay (CALLOMON 1990). No further proposal for the basal Oxfordian boundary stratotype has been published since, and subsequent discussions at the different working sessions of the Group have focused on the classic problems, concerning the detailed correlation of ammonite biostratigraphic scales in separate areas and to the search for suitable sections elsewhere.

ALTERNATIVE CHOICES AND FORTHCOMING WORK

As far as other ammonite groups are concerned this would mean the close correlation of Boreal cardioceratids and Submediterranean perisphinctids scales. Perisphinctids appear as the most suitable group for the Tethyan Realm. Their proved suitability for fine biostratigraphic subdivisions at the Middle Oxfordian (CARIOU & MELÉNDEZ 1990, CARIOU & *al.* 1991) has been recently enhanced by the description made by PAGE (1991) of the Callovian-Oxfordian transitional forms of perisphinctids from the Oxford Clay. This includes the identification of the *Alligaticeras* (*Alligaticeras*) (M & m) and *Alligaticeras* (*Properisphinctes*) (M & m) as a continuous evolving lineage through the Callovian/Oxfordian boundary, across the Lamberti and Cordatum Zones.

Other group of macrofossils sufficiently resolutive lacking, a good alternative choice will, most probably, be provided by the microfossils and specially the dinoflagellates. In a recent report by POULSEN (1993, *this volume*) the Lamberti-Mariae boundary is shown to coincide with the last appearance of *Parvocysta prolongata* and the first appearance of *Wanaea frimbriata*, according to the zonation proposed by RILEY & FENTON (1982), and WOOLLAM

& RIDING (1983). The use of other microfossil groups for this biostratigraphic interval is still to be shown but it would be a desirable requirement for the future stratotype candidate to be also suitable for detailed sampling and further studies. As far as magnetostratigraphic studies are concerned, the selected section should be proven successful for paleomagnetic reversal evaluations at this stratigraphic interval, providing an independant test of the geological events. Some advanced studies in that field have already been fulfilled, mostly on the Middle Oxfordian calcareous facies and a first sampling has been started as well on the Lower Oxfordian in clay facies, although in that case they are still waiting for results.

On the other hand, as the currently known areas in the true Mediterranean Province, represented in condensed succession under "Ammonitico Rosso" facies appear specially inadequate for trying to select a stratotype candidate, it seems that our search should be rather directed to those areas in the Submediterranean Province where the Callovian-Oxfordian transition is represented in argillaceous facies (*see above*), at the overlapping area with the Subboreal Province, where parallel succession of cardioceretids and perisphinctids can be recognized and correlated (*see* ENAY 1980, for a description of this overlapping area).

The main programmed activities of the Oxfordian Working Group in these next two years, 1993-94, as regards the celebration of the IV*th* ISJS Congress to be held in Argentina, in October 1994, will include, therefore, the detailed revision of some selected sections in SE France, near Serres (Hautes-Alpes). Also, we should be open to the reception of further boundary stratotype proposals from other areas, such as southern England, to serve as alternative candidates in the future discussion. Our intention was to visit and revise the selected British sections with the occasion of the ARKELL Symposium, held in England, in September 1993. The final goal would be to present, at the Jurassic Symposium in Argentina, a set of sections suggested as alternative candidates for the Callovian/Oxfordian boundary stratotype, for discussion and possible decision between the members. An intense work ahead and long discussions are still waiting for us.

PROBLEMS OF THE OXFORDIAN/KIMMERIDGIAN BOUNDARY

Difficulties in defining a boundary stratotype for the Oxfordian/Kimmeridgian boundary have been hard to solve and have delayed a possible agreement on both the most adequate ammonite scale to adopt and the most suitable area to propose the choosing of a stratotype section across the Boreal and Tethyan Realms. These questions are mainly connected with the problems derived from the strong provincionalism observed at the turn of the Oxfordian and Kimmeridgian stages. As far as this is concerned, provincionalism has

impeded the detailed correlation not only between the Boreal and Tethyan Realms but also between biogeographic provinces and subprovinces within realms. A true Mediterranean and a Submediterranean Province can be recognized within the extension of the western Tethys area, whereas a Subboreal and a true Boreal Province are classically defined in the Boreal Realm. The Boreal and Tethyan Realms are clearly separated by an intermediate area characterized by a well-differenciated ammonite fauna, intermediate between the Subboreal and Submediterranean Provinces, at Aquitaine ("Franco-German Biome" of HANTZPERGUE 1989). Within each geographic subdivision the local abundance of some particular ammonite groups and sometimes the scarcity of common elements with other provinces have led to the setting of separate biostratigraphic scales in separate areas, based on different ammonite successions. Difficulties in the detailed biostratigraphic correlation between provinces generally arise from the lack of the key species outside their typical province.

THE CURRENT STATE OF PROGRESS

The modern biostratigraphic scale for the Boreal Realm has been firmly established by means of cardioceratids (SYKES & CALLOMON 1979, BIRKELUND & CALLOMON 1985) as the *Amoeboceras* zonation. In sharp contrast, biostratigraphic scales in the Tethyan Realm have been classically established by means of representatives of the families Perisphinctidae, Ataxioceratitedae, as well as oppeliids and aspidoceratids, which appear widespraed and dominant at the true Mediterranean Province (OLÓRIZ 1978). On the other hand, a remarkable progress has been achieved in the last years by the convenor of the Group (ATROPS 1992; ATROPS & BENEST 1981, 1982, 1984, 1986; ATROPS & MARQUES 1986; ATROPS & MELÉNDEZ 1985), in trying to set a detailed correalation between the Mediterranean and Submediterranean Provinces by means of representatives of the Ataxioceratidae and Aspidoceratinae (*Sutneria*). Finally, the ammonite successions through the Oxfordian/Kimmeridgian boundary at the Aquitaine region have been firmly established by HANTZPERGUE (1988, 1989) by means of representatives of the family Ataxioceratidae.

THE POSITION OF THE OXFORDIAN/KIMMERIDGIAN BOUNDARY

The question of the precise position of the Oxfordian/Kimmeridgian boundary has raised difficult problems and long discussion in the last ten years, since the Erlangen Meeting in 1984. According to its historical definition, the base of the Kimmeridgian stage is located at the base of Baylei Zone, which starts at the base of the Kimmeridgian Clay, in Dorset, S England, where a fine assemblage of *Pictonia* spp. has been classically recognized. The main problems

arise in characterizing this boundary elsewhere in Europe, where this basal boundary of the Kimmeridgian is placed at the base of the Platynota Zone. This has made traditionally difficult to correlate the different biostratigraphic scales currently used in separate provinces, the supposed synchronism between the base of Baylei and Platynota Zones, generally assumed by many authors, being not really supported by sound paleontological evidence.

The *Pictonia baylei* assemblage being difficult to identify outside the type area, a solution to this problem seems to be in the study of cardioceratids. A first discussion of the problem of correlation between the Boreal-Subboreal cardioceratid succession and the Submediterranean and NW-European scales was made by SYKES & CALLOMON (1979, p. 894), who suggested the possibility that the lower boundary of the lowermost Kimmeridgian, Baylei Zone should not be delineated at the base of Platynota Zone but rather somewhere within the Planula Zone, which should therefore be included ("most if not all") into the Lower Kimmeridgian. This idea was somewhat in accordance with the opinion expresed by ARKELL (1956, p. 111, Table 9) who established a tentative correlation between the Baylei Zone and by ATROPS (1982, p. 340), for whom the base of the Baylei Zone would find its equivalent in the Submediterranean Province at the base of the Galar Subzone rather than at the base of Platynota Zone.

On the other hand, MATYJA & WIERZBOWSKI (1988; *see also* WIERZBOWSKI 1991) have proposed the correlation of the lower boundary of the Baylei Zone of the Subboreal and Boreal Provinces with the base of the Planula Zone of the Submediterranean Province, as evidenced by "the occurrence here of the morphospecies *Amoeboceras bauhini* (OPPEL)" within the Planula-Costatum Horizon. This point of view could, however, not be so divergent as it appears, if we take into account that: (*i*) The species *Subnebrodites planula* (QUENSTEDT) is currently found at the very top of the Planula Subzone, (*ii*) The referred specimens belonging to the "morphospecies *Amoeboceras bauhini* (OPPEL)" are recorded (MATYJA & WIERZBOWSKI 1988, Pl. 2) within an assemblage dominanted by the biospecies *Amoeboceras prebauhini* SALFELD. It would therefore be interpreted as a matter of the *bauhini* morphology being already present in the former assemblage.

The lack of a definite argument was still insufficient knowledge of the *Amoeboceras* succession during the Lower Kimmeridgian at the moment, but the idea was further exposed and discussed during the working session of the Jurassic Symposium at Erlangen, 1984 (ENAY & MELÉNDEZ 1985). Further evidence was supplied by BIRKELUND & CALLOMON (1985, pp. 16-17) who established a horizon of *Pictonia densicostata* (SALFELD) at the base of the Baylei Zone, and showed the co-occurrence of this first species of *Pictonia* and the cardioceratid species *Amoeboceras bauhini* OPPEL at the section of South Ferriby at the Isle of Skye (*cf. also* WRIGHT 1989). The interest of this correlation received further support by the recorded presence of this species

within the Galar Subzone of southern Germany quoted by these authors, and has been recently enhanced by new findings in the Swiss Jura (ATROPS & *al.* 1993, *this volume*).

The Baylei Zone corresponds, therefore, to the vertical range of the genus *Pictonia* and its lower boundary is marked, in fact, by the first record of representatives of this genus. A closer correlation between Boreal and Submediterranean scales has recently been reached by means of the species *Amoeboceras bayi*, which forms a well-defined horizon at the upper part of Baylei Zone (BIRKELUND & CALLOMON 1985, p. 13, Fig. 5). New evidence has led to the recognition of this species as well at the base of the Platynota Zone, Orthosphinctes Subzone in both SE France (ATROPS 1982, "Horizon à *Amoeboceras*") and Switzerland (ATROPS & *al.* 1993, *this volume*). This makes correlation between both biostratigraphic scales more solid. It confirms the different position of the lower boundary of Platynota Zone and Baylei Zone and gives further supports to the alternative choice for placing the Oxfordian/Kimmeridgian boundary, in the Tethyan Realm, at the base of the Galar Subzone. A further advantage of placing the boundary at this level would lie on purely lithological grounds, since in wide areas across southern Europe this boundary is also marked by a sharp lithologic change, from calcareous to marly facies and a change in the sedimentary trend, indicating the beginning of a new sequence (the "Kimmeridgian Sequence"; ATROPS & FERRY 1990, AURELL 1990).

PROPOSALS FOR THE BOUNDARY STRATOTYPE AND FORTHCOMING WORK

In selecting a good section as the Lower Kimmeridgian boundary stratotype two main factors are to be taken into account. On one hand, cardioceratids, rather than any others, appear as the most convenient group, as a well-known continuous evolving lineage across the Oxfordian/Kimmeridgian boundary, to be used as stratigraphic marker. Most specially since they have supplied a well-established succession of species, so that the basal, Densicostata horizon of the Baylei Zone can be identified, besides the presence of *Pictonia densicostata* (SALFELD), by the presence of *Amoeboceras bauhini* (OPPEL). The finding of this *Amoeboceras* species in different regions of the Submediterranean Province makes this choice specially valid for correlation purposes. For this reason those sections showing the most continuous cardioceratid successions would appear as the most suitable candidates for the boundary stratotype. Besides the type locality of the Kimmeridgian at Kimmeridge, Dorset, some classical localities, such as Staffin Bay at the Isle of Skye have been known for long time. Similarly, the section of South Ferriby in Yorkshire, as referred by BIRKELUND & CALLOMON (1985, p. 17) as "one of the thickest,

most complete, and fossiliferous successions through the Oxfordian-Kimmeridgian boundary in NW Europe" might be an alternative good candidate deserving, perhaps, a more detailed description.

A second factor to take into consideration would be the good possibilities a candidate section should show for correlation between the biostratigraphic scales of the Boreal and Tethyan Realm. As far as this is concerned, a further good candidate for the boundary stratotype should show a continuous, parallel succession of Boreal (cardioceratids) and Submediterranean (ataxioceratids, *Sutneria*) groups. Such possibility appears quite hypothetical for the present moment but several references to some particular sections across SE France, in Crussol (ATROPS 1982) and northern Switzerland, at Sumerhalde (ATROPS & GYGI 1990) have shown the presence of several forms of cardioceratids in association with *Sutneria galar* (OPPEL) and *Sutneria platynota* (REINECKE). Such sections would represent excellent reference localities for biostratigraphic correlation purposes with the pre-Tethyan provinces and would deserve as well a more detailed study as potential candidates for boundary stratotypes.

Both choices appearing equally valid for the future selection of a boundary stratotype the solution could, perhaps, come from the evidence provided by other requirements and studies, as indicated by the ICS guidelines. Attention should be paid, therefore to the results of both magnetostratigraphic and micropaleontologic studies, as well as some other factors such as accessibility of the outcrop, facilities for sampling and the suitability of the particular type of facies, etc. As far as this is concerned, it should be noted that first studies on microfossils appear still unpromising and studies of magnetostratigraphy at this particular boundary, as well as other macroinvertebrate groups are still in project. However, further results should be expected in the forthcoming years.

The working programme for the time coming would include, as the main task, the detailed revision of the most continuous, selected sections in the Boreal and Subboreal provinces (Skye, Yorkshire, Dorset) as well as in the correlation between cardioceratids and ataxioceratids (and representatives of the genus *Sutneria*). A parallel development of micropaleontological sampling and magnetostratigraphic projects should be carried out at the same time, in order to present a set of potential candidates for the Oxfordian/Kimmeridgian boundary stratotype at the next Jurassic Subcommission Meeting in Argentina 1994.

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