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GEISTER, Jörn: BAJOCIAN CORAL REEFS OF THE NORTHEASTERN PARIS BASIN: PALEOECOLOGICAL ASPECTS, Geologisches Institut der Universität Bern, Baltzerstrasse 1, 3012 Bern, Switzerland.

Cyclic Middle Jurassic sedimentation in the Paris Basin documented by recurring regressive sequences (KLÜPFEL 1921, PURSER 1969) has been attributed to important eustatic fluctuations of sea level (HALLAM 1963). Within the Bajocian three successive major cycles are separated by time lapses of less than one ammonite zone. Each of the cycles is recorded by shales with occasional ammonites, which pass vertically into coralliferous shallow-water limestones and terminate with a bored hardground. It is within this framework of major regressions and transgressions (the latter not recorded due to non-deposition and erosion) that major structural coral reefs developed near the southwestern shores of the Rhenish Massif. The studied coral reefs crop out between Metz (Lorraine) and the border of Luxembourg some 40 km to the north. They occur within three distinct superposed reef complexes, each corresponding to one of three major regressive cycles. The middle coral limestone wedges out in the south and probably indicates a sea level oscillation of lower amplitude.

The reefs are exclusively of the patch reef type and include lens-shaped reef bodies a few meters in diameter, together with domeshaped build-ups up to 10 m thick and 10 to 20 m broad. Additionally, large reef masses often up to 20 m thick and extending laterally more than 100 m are developed. Major reef bodies are usually truncated at their tops by the hard ground discontinuity plane that terminates the cycle.

Initiation of the reefs occurred during shallowing phases when sedimentation rates dropped notably to permit the colonization of the substratum by hermatypic corals. Isolated patch reefs usually developed on brachiopod and pelecypod shell beds. In addition, numerous small coral reef bodies with conical bases developed contemporaneously and by lateral fusion produced large reef masses within the first meter of vertical growth.

The reef bodies are formed by a dense and coherent rigid framework of a paucispecific coral fauna. This is composed mostly of large platy and encrusting hermatypic colonies (predominantly *Isastrea* spp.) with local additions of more massive colonies of the same genus and very rare branching corals. The reef rock may be formed by more than 70 % of coral skeletons. This is one of the very rare examples of Mesozoic reefs that show a rigid and coherent framework comparable to well developed Quaternary coral reefs.

The submarine relief of the reefs was low and averaged generally less than 0.5 m. Even in the vicinity of major build-ups it rarely surpassed 2 m and no steep or vertical reef walls were developed. Thus, even larger reef bodies rose gently as low mounds above a rather level sea floor, although, lateral transition from reef to inter-reef facies was generally abrupt.

Current, and possibly also wave action, were active at several levels in the section as evidenced by the frequent large scale crossbedding of the rather coarse inter-reefal sediments formed by the debris of crinoids and sea shells. The finest fraction was winnowed out and has been trapped apparently as intra-reefal sediment within the interstices of the reef framework (GEISTER 1984). As a consequence, the coral colonies of these reefs that have a rather shallow aspect, appear embedded in a matrix of calcareous mudstone (HARY 1970). Some of the smaller reefs observed in the lower cycle lived in a regime of increasing sedimentation rates that finally surpassed their net growth rate, so that they became suffocated by onlapping inter-reefal sediments. These build-ups are embedded in well-stratified argillaceous limestone that testifies to the absence of major rates of bioturbation and the shifting of sediments. They appear to have developed in deeper water below wave base. Reef- debris flanking the build-ups is almost non-existent in both reef types.

The low diversity coral fauna recovered from the reefs corresponds to that described for the whole area by MEYER (1888). It is dominated largely by platy but also massive colonies of Isastrea. Less abundant are platy Thamnasteria and the phaceloid Cladophyllia is more rare. Some of the larger platy Isastrea colonies attain diameters up to 1 m with thicknesses surpassing 10 cm. Massive colonies are smaller. Many lamellar corals exhibit a strange mode of branching with several superposed irregular lamellae connected by small skeletal necks (HALLAM 1975). This phenomenon - not known from Recent corals - appears to be due to partial burial of the living coral by sediment, subsequent regeneration by upgrowth and renewed spreading of the colony above the sediment level. The epithecae of some of the platy corals show rhythmic growth ridges at rather regular intervals of 3 to 4 mm. Assuming the ridges are yearly, they would indicate the lateral growth rate of the colony. Skeletal growth rhythms recognizable in longitudinal sections of recrystallized massive Isastrea are very similar to Recent growth bands. They suggest growth rates of the same magnitude.

No vertical or lateral ecological zonation has been recognized in these reefs. This is probably due both to the very low diversity of the frame-building biota that lack the necessary ecological spectrum and to the apparently insignificant environmental gradients that prevailed over the growing surface of the reefs. Preliminary macroscopic examination of the reefs did not reveal the presence of any calcareous algae.

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