



PLATES

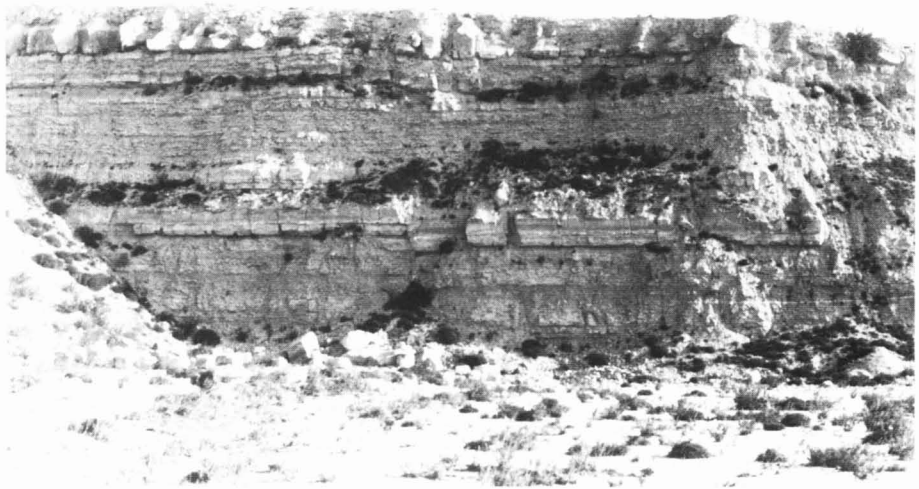
## Plate 1

### Site views

- Fig. 1: The Arruda Valley from Batalha hilltop. Valley floor and slopes are formed by Abadia marls, shoulders by Corálico/Oólitico outcrops and occasional relics of the Sobral formation (also foreground). In the background Montejunto elevation.
- Fig. 2: View from Calhandriz southwards to Calhandriz section. Cereal fields situated in Abadia level, above it Amaral formation (white arrow), overlain by a very thin Sobral formation (small terrace) and by the limestone/marl sequence of the lower part of the »Pteroceriano« formation. Note angular discordance within beds (black arrow).
- Fig. 3: The oolitic and coral limestone downhill Alrota.
- Fig. 4: Quarries of Bom Jesus, above Alhandra (Tejo). Marly, mostly nodular limestones of the lower part of the »Pteroceriano« formation. Upper part of section Bom Jesus; quarry wall is 25 m high.



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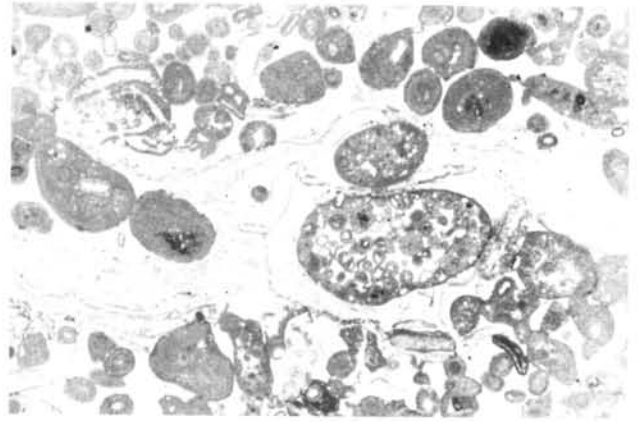
## Plate 2

Oolites of the Oórito member and the Sobral formation (1–5); sandstones of the Sobral formation (6–8); (outcrops, microfacies).

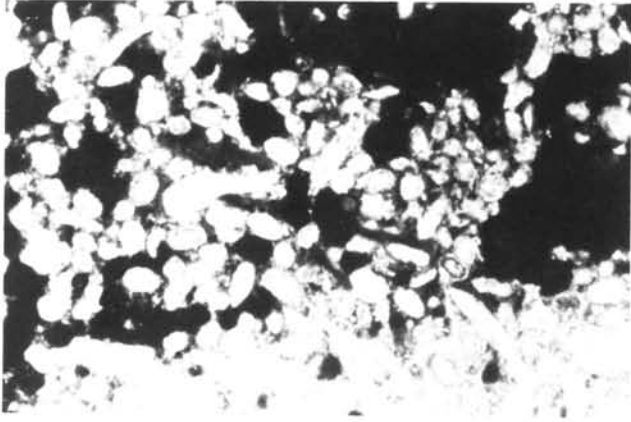
- Fig. 1: Oolites, exhibiting cross-stratification with concave foresets in middle part (arrow), possibly indicating dune development.  
Oórito member, NE Cadafais; quarry wall is ca. 10 m high.
- Fig. 2: Poorly sorted oolitic grainstones with bioclasts. Ooid nuclei commonly bioclastic. Note lumps of re-worked oolite, multiple ooids and oysters.  
Oórito member, E Alverca; thin-section AV13, x 6.5
- Fig. 3: Marly, bioclastic-oolitic packstone with small superficial ooids, mostly quartz-cored. Intensive impregnation by bitumen.  
Sobral formation, Sobral sections; acetate peel SB1, x 24
- Fig. 4: Moderately to well sorted oolitic pack/grainstone with large bivalve clasts and *Pseudocyclamina* sp. (upper right corner). Ooids radially structured (not visible at this scale), surrounded by micritic, iron hydroxide-stained outer rings. Nuclei composed of quartz grains and bioclasts, e.g., ostracods.  
Oórito member, section Boieiro; thin-section BR-V, x 26
- Fig. 5: Well sorted oolitic grainstone. Ooid nuclei mainly composed of quartz; lighter grains represent *Marinella lugeoni*. Note pitting of ooids.  
Sobral formation, Silveira, W Sapataria; thin-section Si7, x 22
- Fig. 6: Conglomeratic sandstone with caliche pebbles, sandy limestone pebbles, ooids, cortoids and lignite litter.  
Sobral formation, Silveira, W Sapataria; thin-section Si16, x 4.3
- Fig. 7: Burrowed sandstone, bedding plane.  
Sobral formation, Via Galega, NW Sobral de M. Agraço; diameter of objective cap is 5 cm.
- Fig. 8: Small scale cross-bedded sandstone, partly with climbing ripple lamination.  
Sobral formation, Via Galega, NW Sobral de M. Agraço; diameter of objective cap is 5 cm.



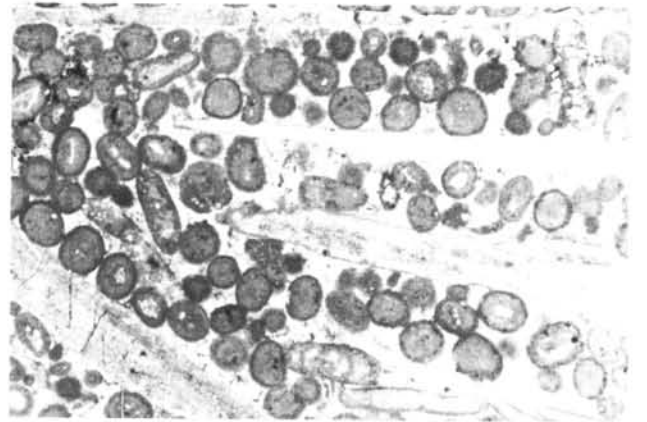
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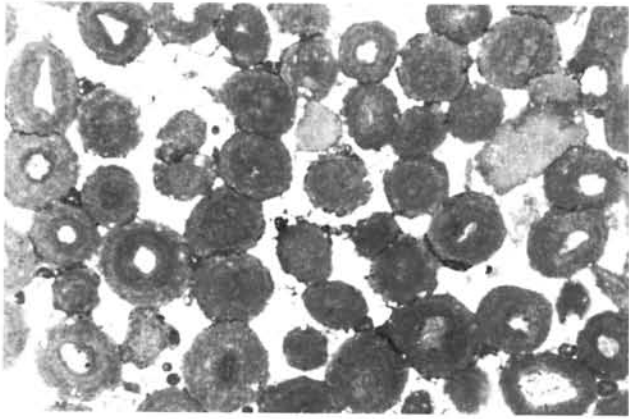
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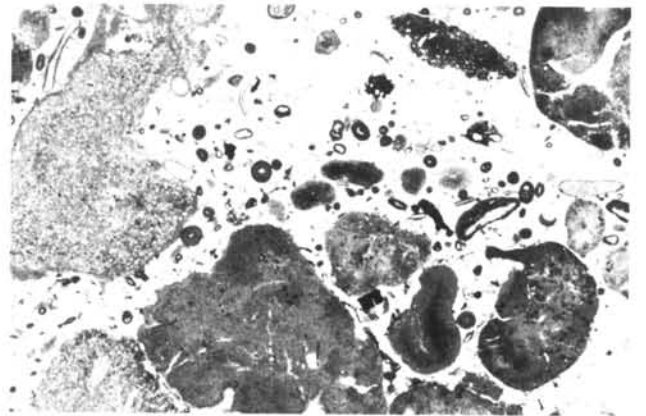
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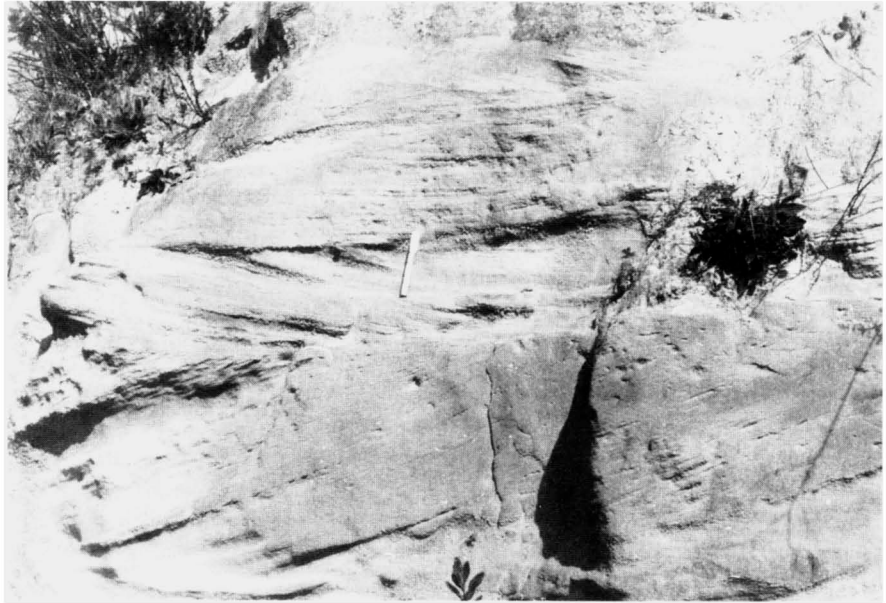
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## Plate 3

### Siliciclastics of the Sobral formation (outcrops)

- Fig. 1: Distributive delta channel with erosional lower surface and faint fining upward of components. Via Galega, NW Sobral de M. Agraço; diameter of coin is 2.5 cm.
- Fig. 2: Large scale bidirectional cross-stratification. Note different dip angles of individual sets. Possibly subaqueous levee/shoreface deposit. NW Alenquer; size of marker stick is 14 cm.
- Fig. 3: Low angle cross-stratification. Possibly beach deposit. Via Galega, NW Sobral de M. Agraço; length of hammer is 28 cm.
- Fig. 4: Point bar sandstone, superimposed on oyster reef (below hammer). Reactivated submarine delta channel. Silveira, W Sapataria; length of hammer is 28 cm.





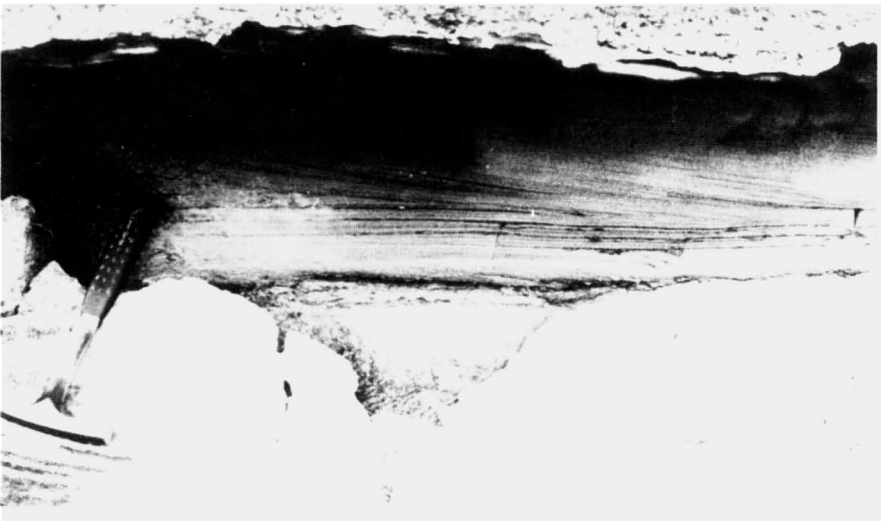
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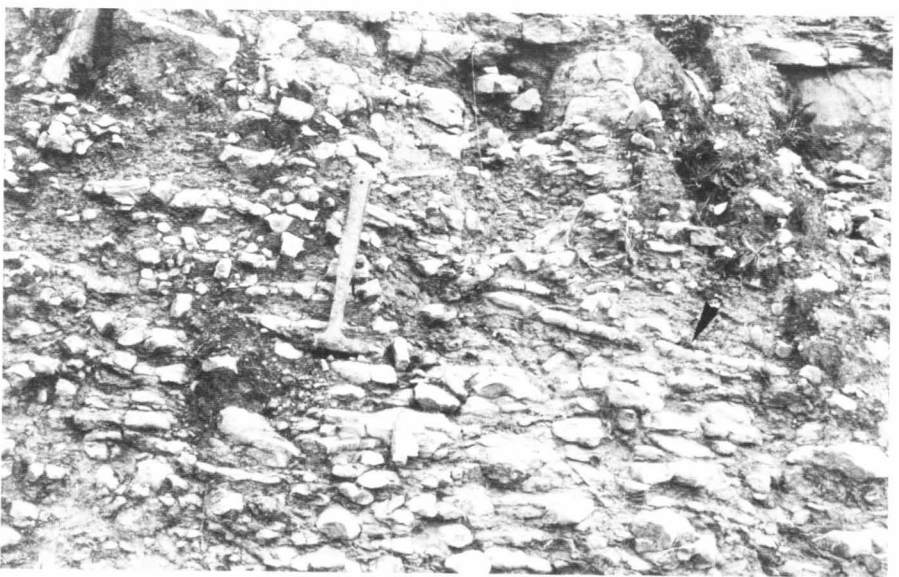
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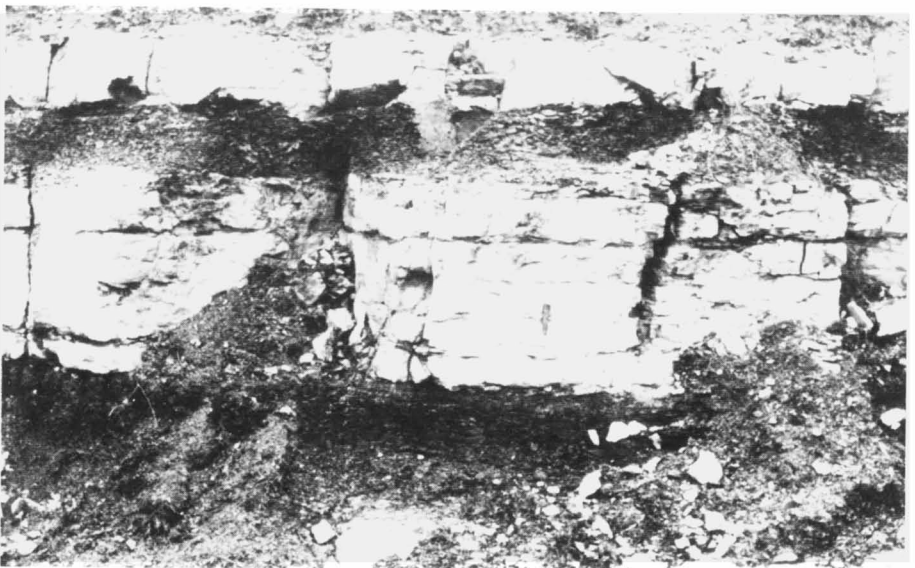
»Pteroceriano« formation: *Arcomytilus* limestones (1–4), *Trichites* limestones (5); (outcrops)

- Fig. 1: Very thick-bedded *Arcomytilus* mudstone in marly sequence. Note transitions from calcareous marl to marly mudstone.  
E Sapataria, road to Cabeda; length of hammer is 28 cm.
- Fig. 2: Nodular *Arcomytilus* limestone, composed of very thin horizons in marly sequence. Note distinct burrows of *Rhizocorallium irregulare* and *Thalassinoides* sp. (e.g., arrow) besides nodules.  
Road bifurcation to Alrota, S Arranhó; length of hammer is 32 cm.
- Fig. 3: *Rhizocorallium irregulare*.  
Upper surface of bed at m 82.5, section Bom Jesus.  
W Alhandra (Tejo); diameter of objective cap is 5 cm.
- Fig. 4: *Rhizocorallium irregulare*, spiral burrow.  
Isolated block, S Batalha, along road S.Tiago dos Velhos – Sobral; diameter of objective cap is 5 cm.
- Fig. 5: *Trichites* limestone, grading into micritic rhodolith rudstone. Black shells = *Trichites* aff. *saussurei*, white spots = *Marinella lugeoni*. Note reworking of semi-firm *Trichites* hostrock by rhodolith facies, causing large floating lithoclasts (upper part).  
Weathered outcrop, W Boieiro hilltop, x 0.25





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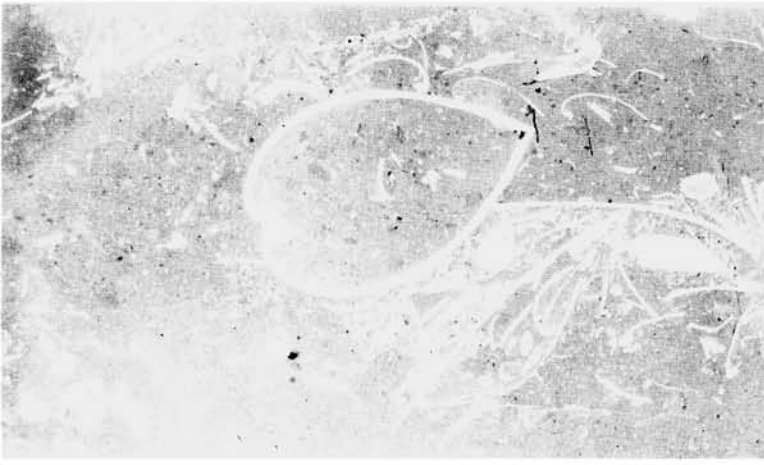


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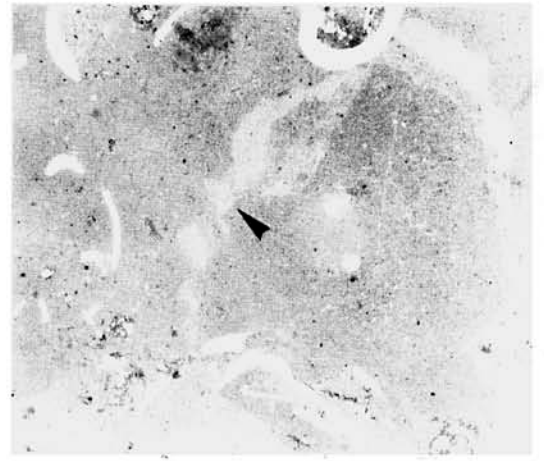
## Plate 5

»Pteroceriano« formation: *Arcomytilus* limestones (1, 2), coral and calcisponge limestones (3, 4; 6, 9), reefoid skeletal debris facies (5, 7, 8);(microfacies).

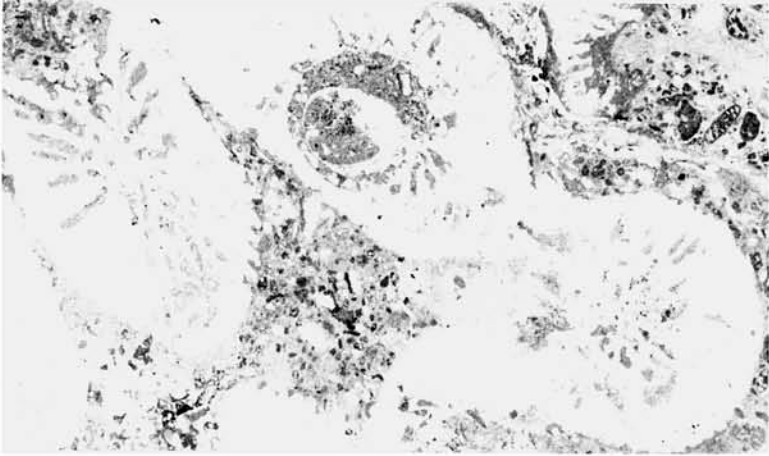
- Fig. 1: Bioclastic (mud)/floatstone with debris of bivalves, gastropods; ostracods, algal spores, etc.. Note imbricated bedding of clasts (lower part) due to bioturbation, double-valved bivalve, probably *Protopocardia* sp., and mottled matrix.  
Section Alcubela–Freixial, thin–section FXS5, x 3.5
- Fig. 2: Bioclastic mud/floatstone with debris of bivalves and gastropods; *Everticyclammina virguliana* (base), etc.. Note selective microsparitization, starting from early diagenetic compactional microfault system (arrow).  
Cabreira, SW Alenquer, thin–section CB1, x 6.8
- Fig. 3: Coral bafflestone; interstitial sediment is a peloidal packstone. Note boring bivalve, preserved in its bore–hole.  
Section Arranhó–Bemposta, thin–section AH–X, x 6.5
- Fig. 4: Coral framestone with long acicular cements.  
Alrota sections, thin–section ALR23, x 12
- Fig. 5: Mixed bioclastic facies. Micritic rudstone with fragments of corals (a), oysters (b), echinids (spine of *Pseudocidaridius lusitanicus*, c), terebratulids (d), lituolids (e), serpulids (f), bryozoans (g), ooids (h). Note bioerosion (e.g., b), spar in sheltered pores (below c) and stylolites (arrow).  
Section Tesoureira–C.da Serra, thin–section TS2, x 4.0
- Fig. 6: Calcisponge framestone. Note oyster attached on sponge.  
Section Bom Jesus, thin–section J6, x 5.0
- Fig. 7: Coralgal debris facies. Microsparitic rudstone with common cortoid fragments of corals, *Marinella lugeoni* (arrow), echinoids, gastropods, ooids, etc..  
Alrota sections, thin–section ALR27, x 3.4
- Fig. 8: Densely packed coral debris packstone. Further rare elements are fragments of echinoids (arrow) and bivalves. Note microsparitic matrix.  
Alrota sections, thin–section ALR16, x 9.7
- Fig. 9: Calcisponge framestone. Figure shows interstitial sediment between two calcisponges (arrows). Early hardening indicated by boring bivalve. Serpulids below bivalve clast (base). Common solution vugs in groundmass and bivalve shells, covered by vadose cements and partially filled with primary sediment or crystal silt.  
Section Alcubela–Freixial, thin–section FX58, x 4.0



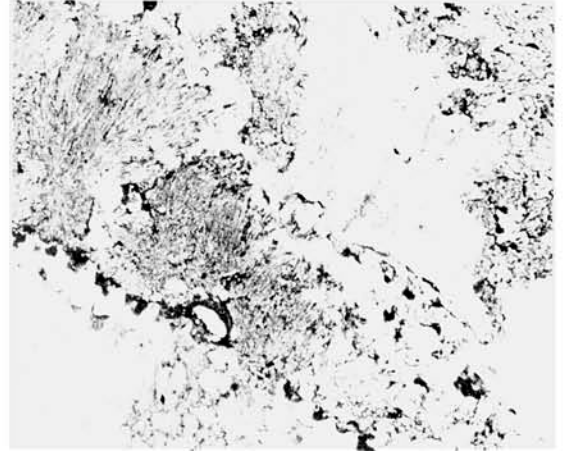
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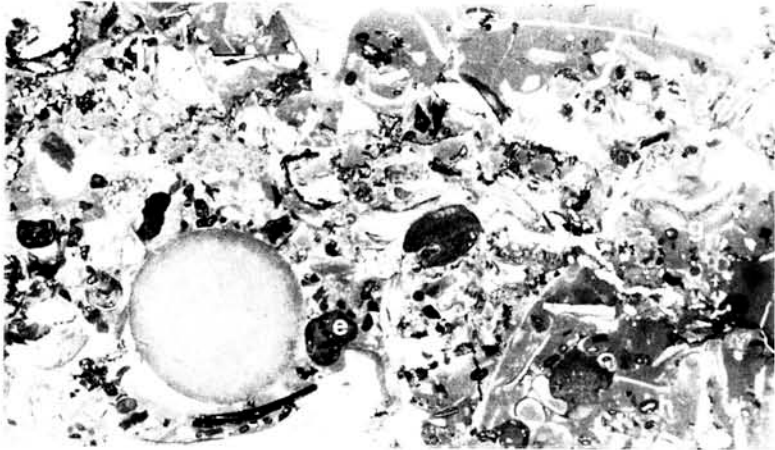
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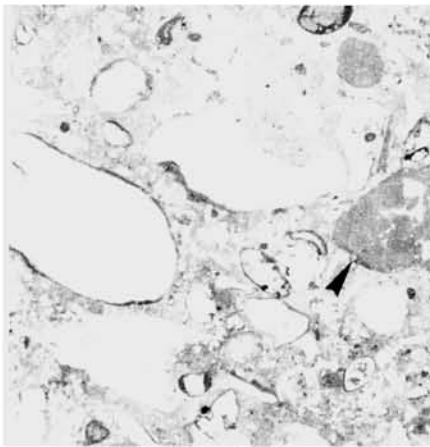
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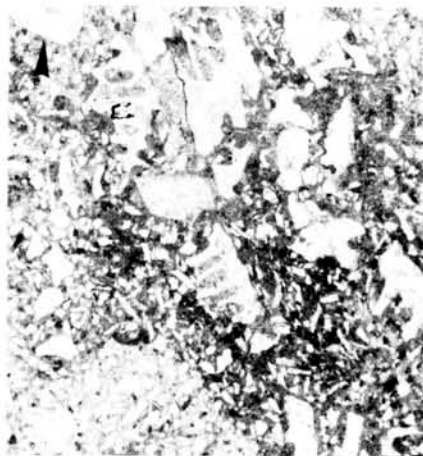
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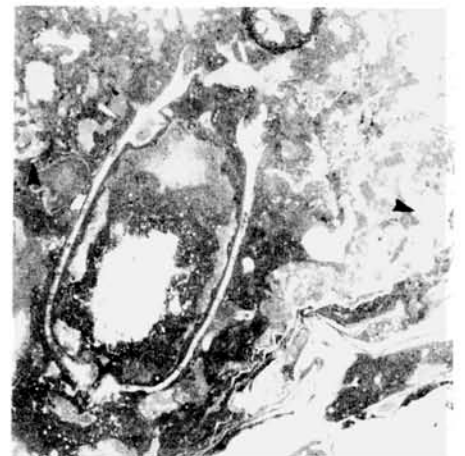
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## Plate 6

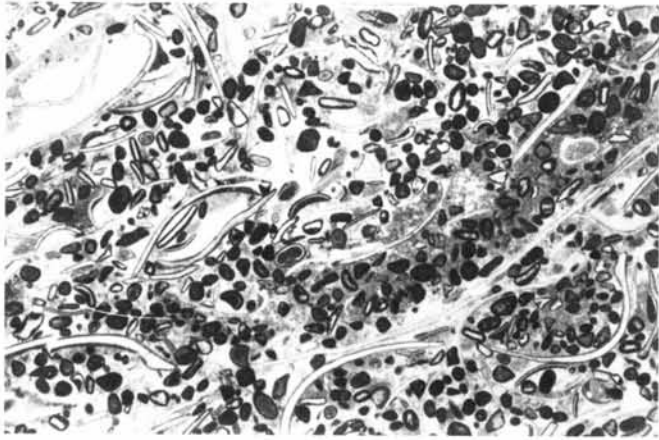
»Pteroceriano« formation: Oolitic facies (1–4 outcrops and microfacies); cortoid limestones (5–7, microfacies).

- Fig. 1: Bioclastic oolite exhibiting low angle cross-stratification. Note wavy surface of individual laminae and their current outwedging (arrow).  
Lateral accretion deposit.  
Alrota sections, sub-section A, m 1.5–4.5
- Fig. 2: Same horizon, 530 m further south.  
Burrows of crustaceans(?) on lower bedding surface.  
Diameter of objective cap is 5 cm
- Fig. 3: Oolitic–cortoid packstone. Bivalve clasts preserved as ghost structures. Note double-valved bivalves and geopetal microspar.  
Lower part of outcrop as shown in fig.1.  
Thin-section ALR4, x 8.5
- Fig. 4: Same outcrop as figs.1, 3, middle part.  
Compare to fig.3 and note admixture of intraclasts, superficial oncoids and debris of echinoids, corals, *Marinella lugeoni*, etc.. Oncoid on upper right corner exhibiting nucleus composed of echinoid clasts which is bored by lithophagous bivalve; cavity later inhabited by serpulids.  
Thin-section ALR5, x 3.5
- Fig. 5: Same locality as fig.2.  
Cortoid–intraclastic–oncolitic packstone. Same particles as fig.3, but note decrease of ooids, increase of oncoids, microsparitic matrix and lack of sorting.  
Thin-section ALR22, x 8.1
- Fig. 6: Cortoid wackestone with scattered cortoids, small oncoids, intraclasts and litiolids. Note common inter- and circumgranular cracks indicating early subaerial exposure.  
W Alverca, thin-section AV22, x 5.8
- Fig. 7: Foraminiferal cortoid packstone, mainly composed of microbored bivalve clasts and *Everticyclamina virguliana* in micritic matrix.  
Section Enxara do Bispo, thin-section EB8, x 11





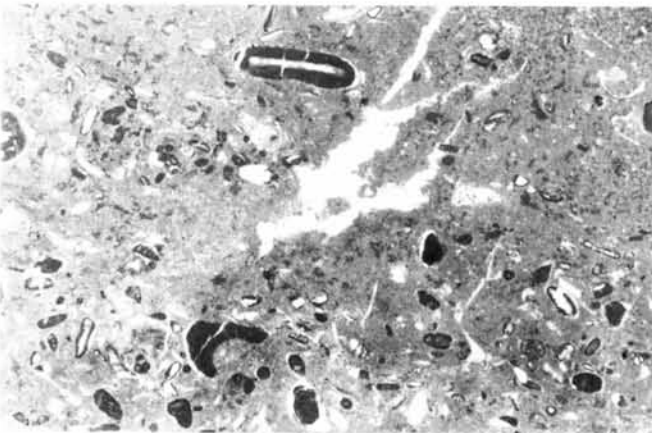
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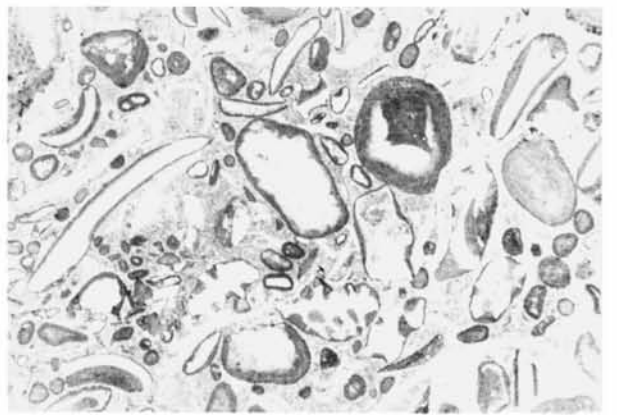
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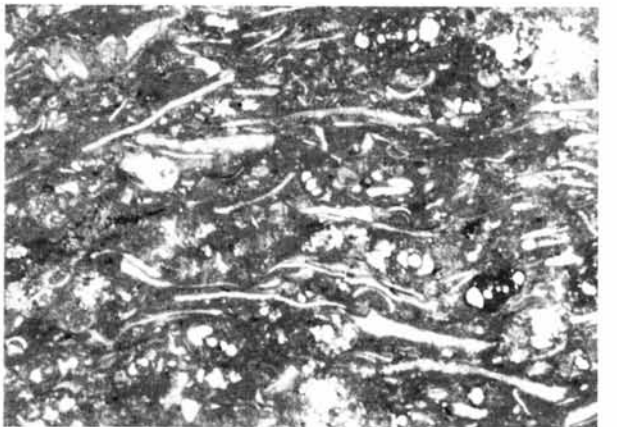
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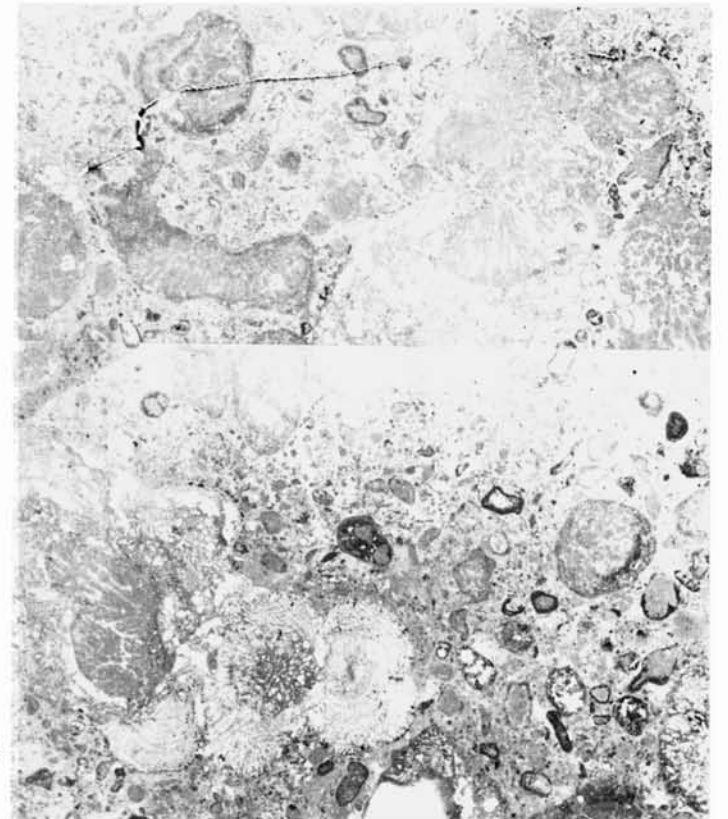
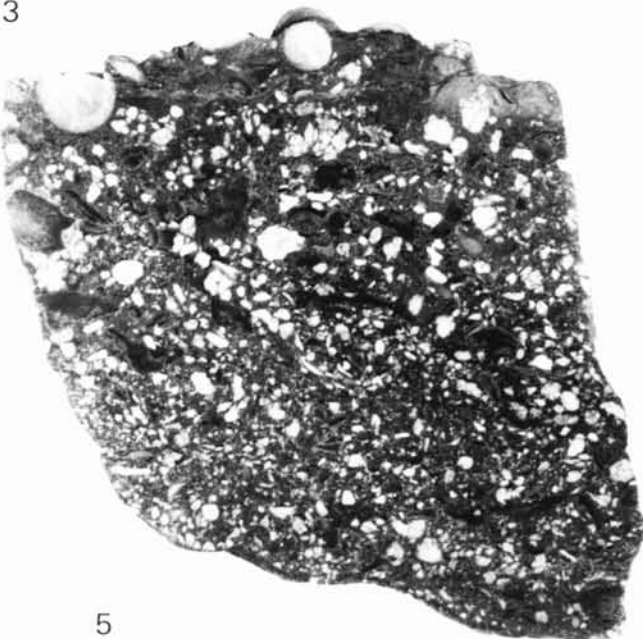
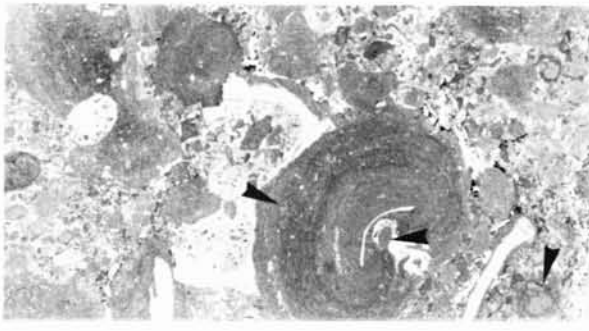
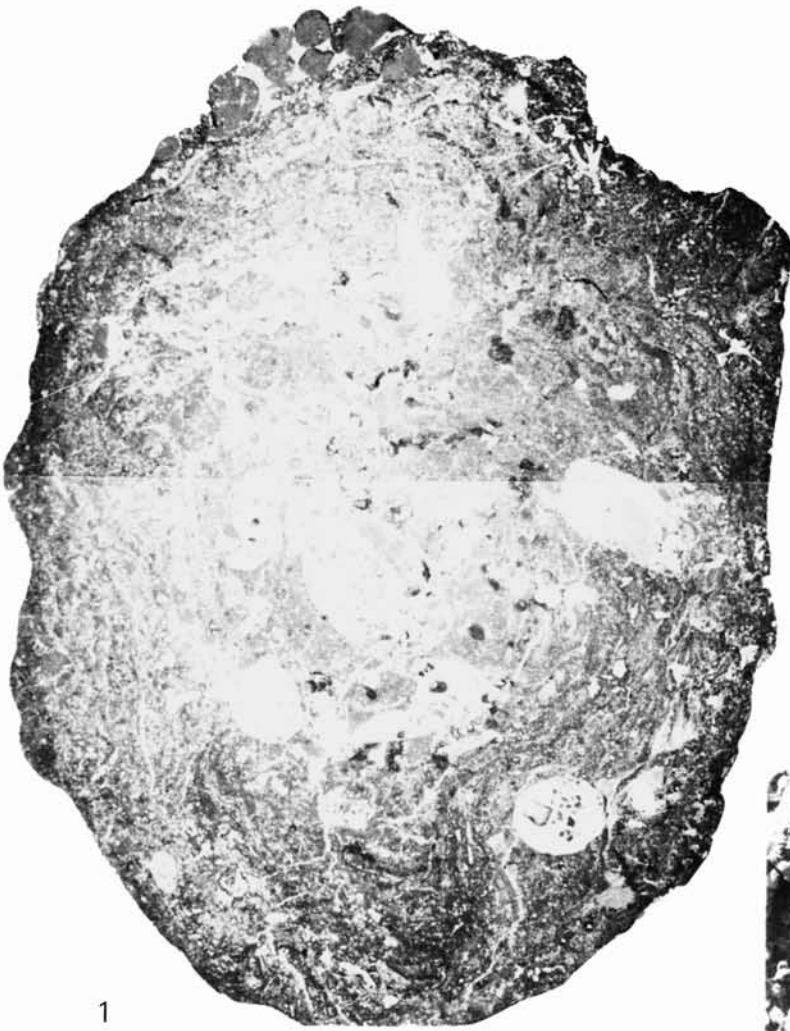


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## Plate 7

»Pteroceriano« formation: Oncolite facies (1–4), rhodolith facies (5, 6); (outcrops, microfacies)

- Fig. 1: Large nucleus—lacking oncolite; cortical structure composed of spongiostromate and porostromate cyanophytes, *Bacinella irregularis*, *Lithocodium* sp., bryozoans (not or hardly visible at this scale) and *Marinella lugeoni* (e.g., arrow). Bioerosion by lithophagous bivalves.  
Silveira, E Sapataria, thin—section Si8, x 3.1
- Fig. 2: Oncolitic floatstone with irregular, in part superficial, micritic oncolites which are intensively stained by iron hydroxide. Note incorporation and attachment of bryozoans (Mikroproblematikum 4 WERNER, arrow), serpulids, non—encrusted bioclasts, intragranular solution and cracking of oncolites and their nuclei, and inhomogeneous distribution of particles.  
Section Arranhó—Bemposta, thin—section AH13, x 5.1
- Fig. 3: Micritic oncolitic rudstone exhibiting cyanophyte oncolites and bioclasts of bivalves, echinids and *Marinella lugeoni*. Note overgrowth by *M. lugeoni* within and on outer side of cortices (arrows), oncolite—attached oysters and bioerosion by lithophagous bivalves.  
Section Bom Jesus, thin—section J9a, x 3.3
- Fig. 4: Same bed as fig.3. Note cidaroid spine and attachment of oysters (arrow). Upper surface of bed. Diameter of objective cap is 5 cm
- Fig. 5: Red algal pack/micritic rudstone displaying the typical porcellaneous appearance of the coralline alga *Marinella lugeoni*. Spines of *Pseudocidaris lusitanicus* on top of sample (arrows).  
Section Cavalha W, polished slab CV16, x 0.8
- Fig. 6: Micritic red algal rudstone with branching *Marinella lugeoni* (a) and large nodules composed of *Solenopora cayeuxiformis* n.sp. (b) and *Lithocodium* sp. (c). Further particles are intraclasts, peloids, cyanophyte oncolites, bioclasts and lenticles.  
Section S'Tiago dos Velhos, thin—section SV26a, x 3.1

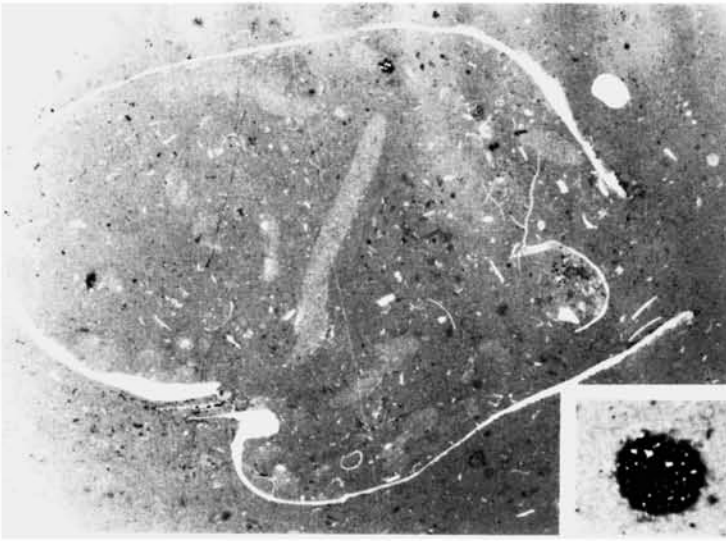




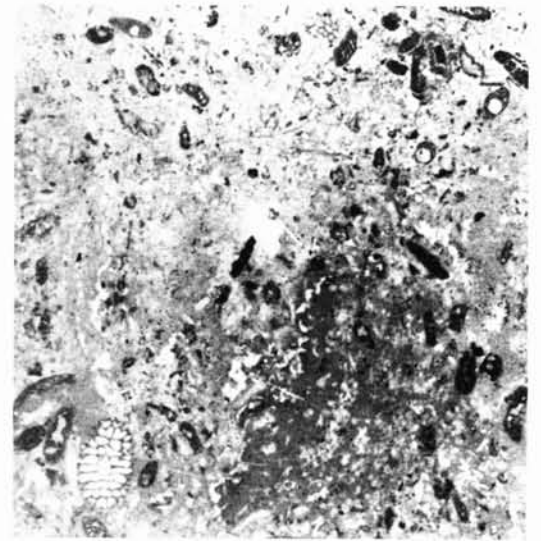
## Plate 8

Freixial formation: Mudstones (1), foraminiferal limestones (2, 3), diagenetic features (4–6); (microfacies)

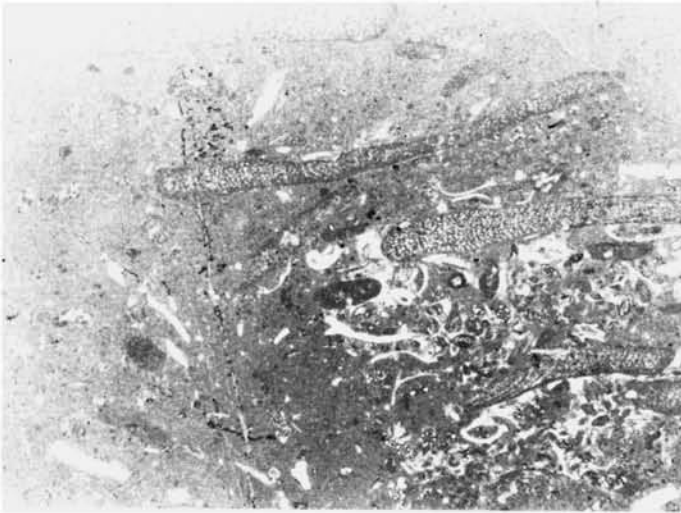
- Fig. 1: Bioturbated mudstone with small bioclasts and large double-valved bivalve. Note distinct burrows; small burrows partly filled with bitumen-stained faecal pellets (enlargement).  
Section S'Tiago dos Velhos, thin-section SV17, x 3.2, enlargement x 28
- Fig. 2: *Anchispirocyclus* – *Quinqueloculina* limestone. Foraminiferal wacke/floatstone with large lituolids (*Anchispirocyclus lusitanica*) and common miliolids (»*Quinqueloculina*«) besides bivalve bioclasts and rare dasycladacean debris.  
Section Alcubela–Freixial, thin-section FX9c, x 6.3
- Fig. 3: Bioclastic–foraminiferal floatstone with nerineids, bivalve clasts, *A. lusitanica* and common miliolids (white spots). Note inhomogenous distribution of particles due to bioturbation.  
Section Alcubela–Freixial, polished slab FX9d, x 1.2
- Fig. 4: Gradual recrystallization: upper part, lituolids (mainly *Anchispirocyclus lusitanica*) floating in sparitic (i.e., neosparitic) groundmass. Below, *Macroporella espichelensis* in inhomogenous micritic matrix.  
Section Alcubela–Freixial, thin-section FX12, x 6.4
- Fig. 5: Caliche nodule displaying the typical pedogenetic cracking and solutional vugs, partially filled with crystal silt.  
Coteina, N Meca (»Bombarral formation«), thin-section BR6, x 4.0
- Fig. 6: Oyster float/rudstone. Note partial recrystallization of oysters (mainly upper part) and neosparitization of groundmass.  
Boundary between »Pteroceriano« formation and Freixial formation, section Alcubela–Freixial, thin-section FX41, x 4.1



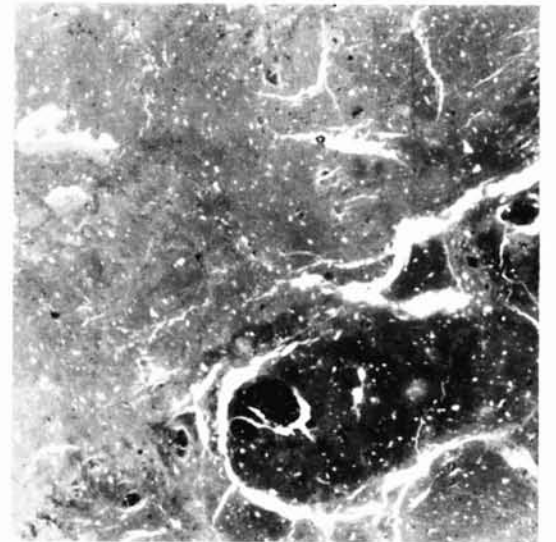
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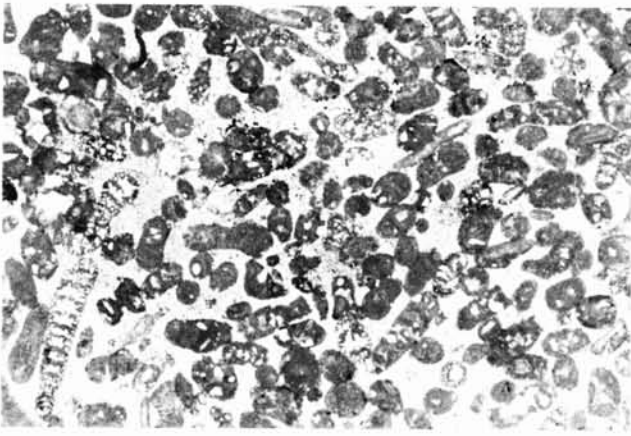


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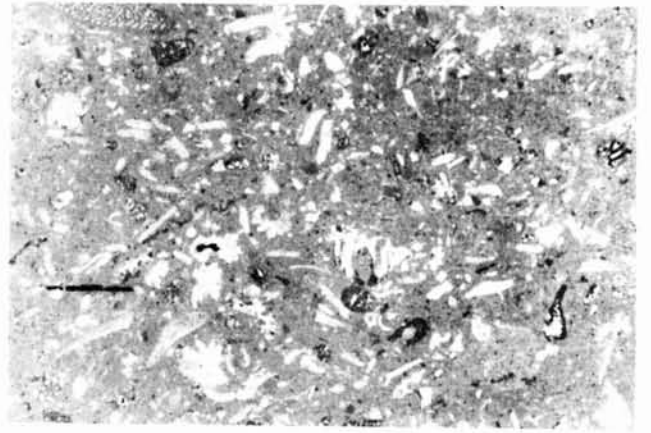
## Plate 9

Freixial formation: Foraminiferal limestones (1), algal limestones (2–9); (microfacies)

- Fig. 1: Foraminiferal–intraclastic grainstone with strongly uncoiled conical forms of aff. *Everticyclammina* sp..  
Section Alcubela–Freixial, thin–section FX27, x 10
- Fig. 2: Algal wackestone with debris of dasycladaceans and occasional *Anchispirocyclina lusitanica* (upper left corner).  
Section Tesoureira–C.da Serra, thin–section CM18, x 9.8
- Fig. 3: Algal wacke/packstone with *Permocalculus* n.sp. besides dasycladacean debris. *Permocalculus* fragments occasionally impregnated by iron hydroxide.  
Section Alcubela–Freixial, thin–section FX–II, x 20
- Fig. 4: Very sandy limestone with *Permocalculus* n.sp. (arrow).  
Section Tesoureira–C.da Serra, thin–section CM11, x 14
- Fig. 5: Fragments of *Permocalculus* n.sp., exhibiting exteriorly widening pores (asexual form).  
Section Alcubela–Freixial, thin–section FX–I, x 19
- Fig. 6: Entire thallus of *Permocalculus* n.sp., exhibiting waxing–and–waning form, in bioclastic wacke/floatstone.  
Section S'Tiago dos Velhos, thin–section SV14, x 12
- Fig. 7: Very silty, bioclastic wackestone with fragment of *Permocalculus* n.sp. exhibiting sporangia (arrow).  
Section Alcubela–Freixial, thin–section FX1, x 16
- Fig. 8: *Permocalculus* n.sp., bulbous form, in silty limestone.  
Section Alcubela–Freixial, thin–section FX–VI, x 19
- Fig. 9: Oblique cross–section of *Permocalculus* n.sp. with spar–filled pores, exhibiting polygonal cross–section in lower part.  
Section Alcubela–Freixial, thin–section FX28, x 33



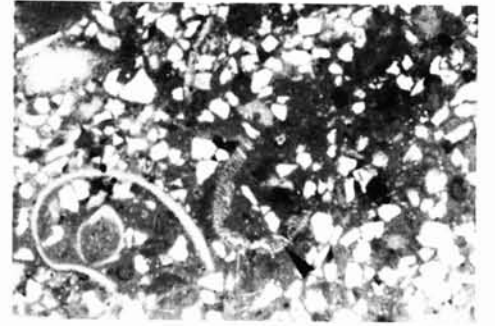
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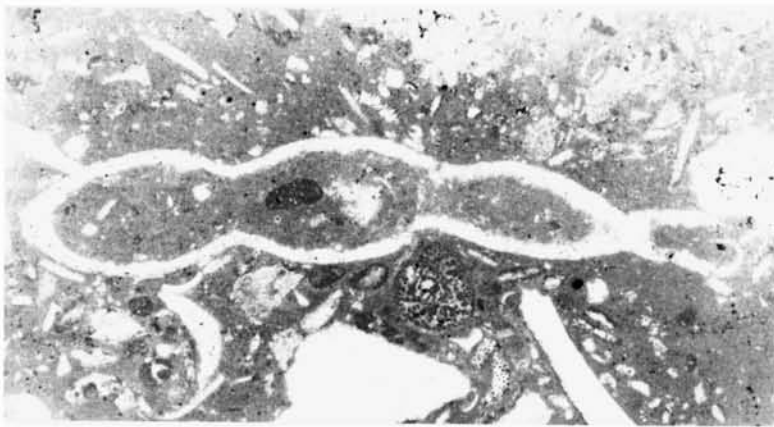
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## Plate 10

### *Marinella lugeoni* PFENDER (1–5), *Solenopora* sp. (6)

- Fig. 1: Subspherical compact rhodolith with knobby surface, formed by *Marinella lugeoni*. Sobral formation, section Boieiro, sample Bo8a, nat. size
- Fig. 2: Large thallus of *Marinella lugeoni*. Basal part with subconcentric growth habit, grading into highly branching, digitiform growth. Note common conceptacles. *Lithocodium* sp. in right upper corner. »Pteroceriano« formation, section S'Tiago dos Velhos, thin—section SV26, x 12
- Fig. 3: Enlargement of same thallus. Note marginal position of conceptacles. x 52
- Fig. 4: Microstructure of *Marinella lugeoni*. Thallus composed of fine undular filaments with occasional branchings (lower arrow) and rarely preserved cross—partitions (upper arrow). »Pteroceriano« formation, W Alverca, thin—section AV26, x 115
- Fig. 5: Partially collapsed thallus of *Marinella lugeoni*, exhibiting polyperforate conceptacle Sobral formation, section Boieiro, thin—section Bc9, x 66
- Fig. 6: *Solenopora* sp.  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin—section SV9, x 23

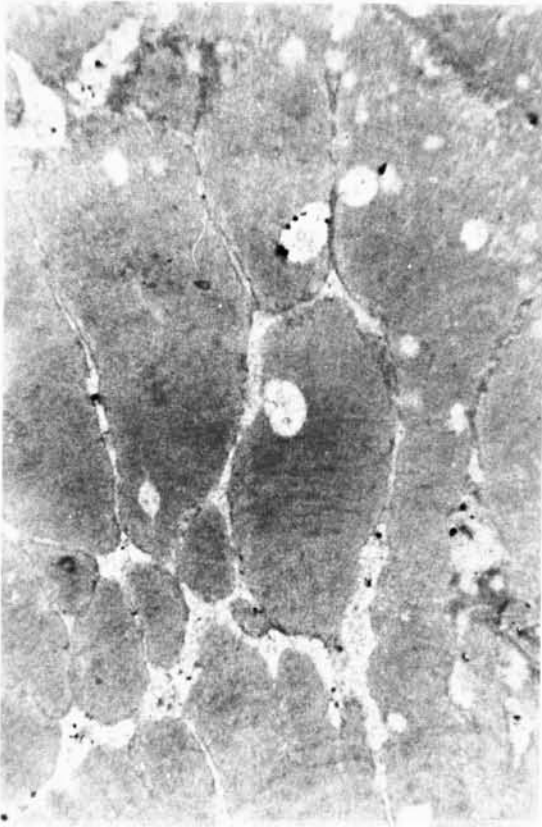




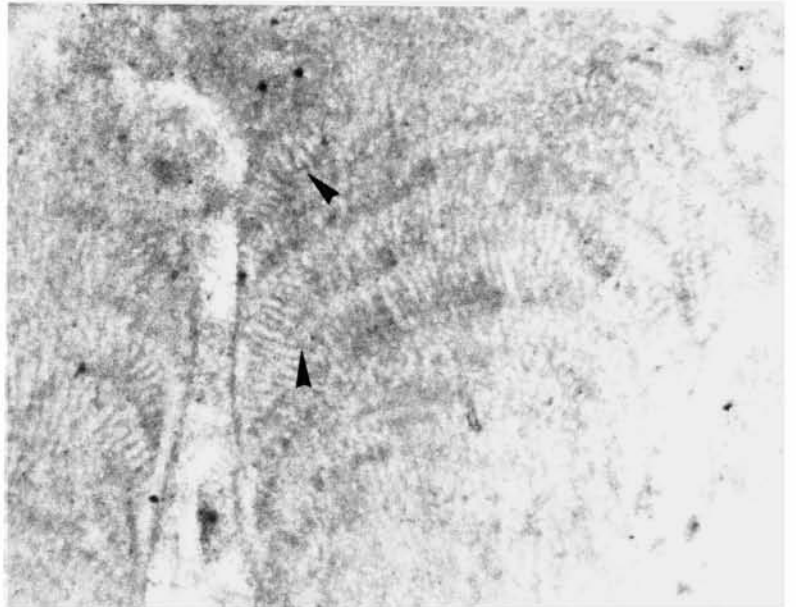
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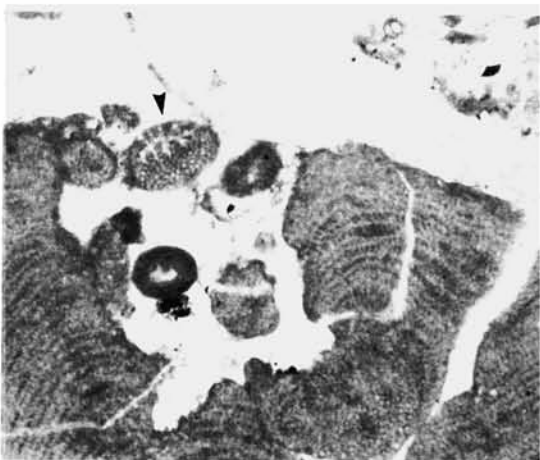
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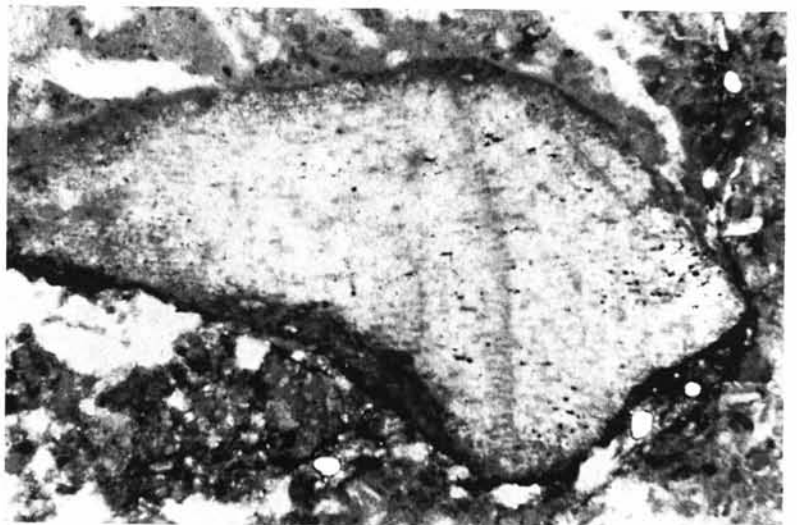
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## Plate 11

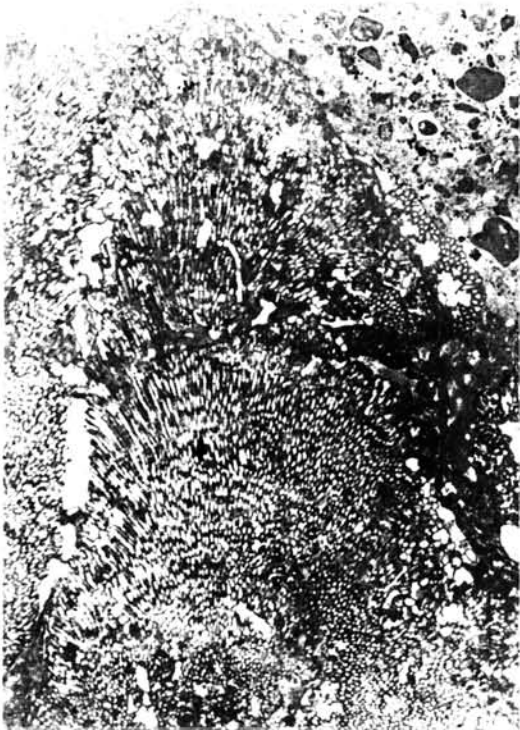
### *Solenopora cayeuxiformis* n.sp.

- Fig. 1: Holotype, vertical to oblique section, exhibiting occasional branching of filaments and common cross-partitions. Connection of neighboured lumina is interpreted as diagenetic feature (cf. to fig.6).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV4, x 14
- Fig. 2: Another part of same nodule, vertical to oblique section, exhibiting slightly diverging growth habit. Overgrown by *Lithocodium* sp. on its right part.  
x 50
- Fig. 3: Horizontal section of small nodule. Large inner cavity due to recrystallization or representing channel system, eventually evidencing a stromatoporoid origin? Compare also with »algue? labyrinthique« (RAMALHO 1971:pl.33/8).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV26a, x 22
- Fig. 4: Paratype, central section through nodule. Thallus exhibiting slightly undular growth habit of filaments, closely resembling *Cayeuxia piae* FROLLO. Only occasional preservation of cross-partitions (arrow).  
Freixial formation, section Alcubela-Freixial, thin-section FX-I, x 9.3
- Fig. 5: Paratype, central section through hemispherical thallus. Cross-partitions only rarely preserved (e.g., arrow). *Lithocodium* sp. on right side.  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV26, x 19
- Fig. 6: Paratype, oblique vertical section, demonstrating disguise of original structure due to partial recrystallization, occasionally resulting in *Bacinella irregularis*-like structure (center).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV26a, x 19
- Fig. 7: Large red algal nodule, composed of *Marinella lugeoni* (center, right part), surrounded by *Lithocodium* sp. and *Solenopora cayeuxiformis* (paratype, left side of figure). Central filaments of *Solenopora* nodule filled with micrite; note faint growth zones (arrow).  
Same sample as fig.6, x 6.3

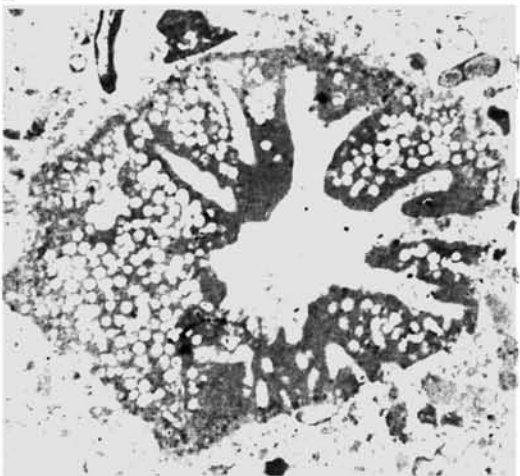




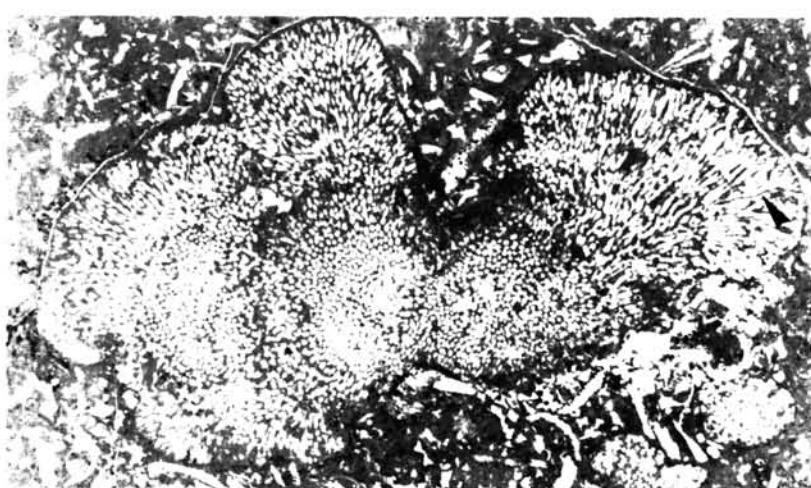
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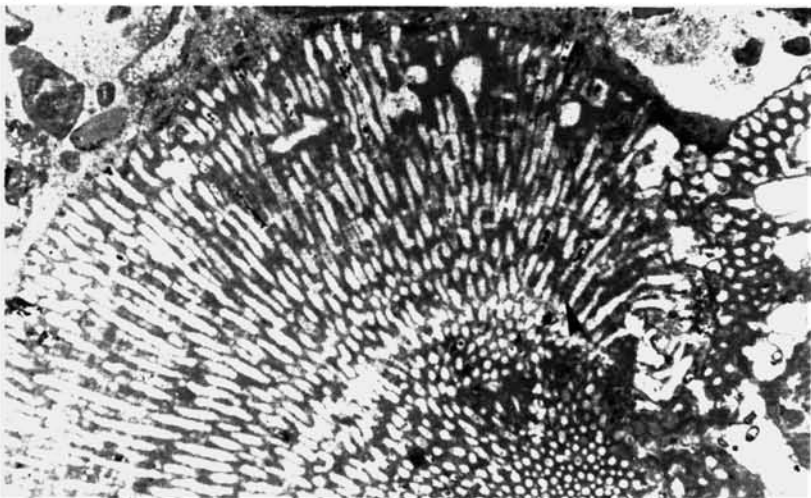
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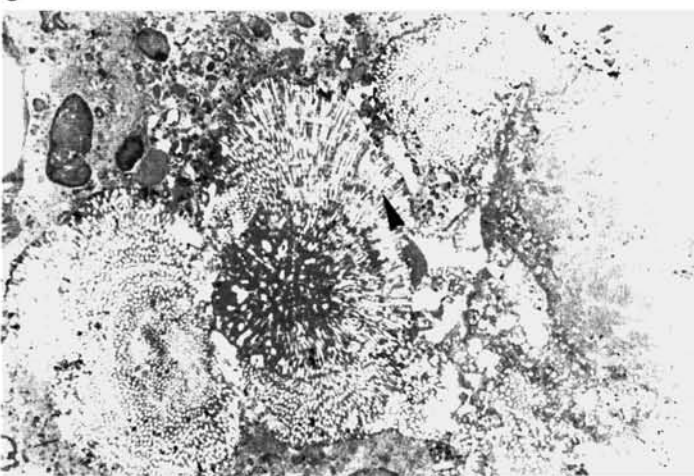
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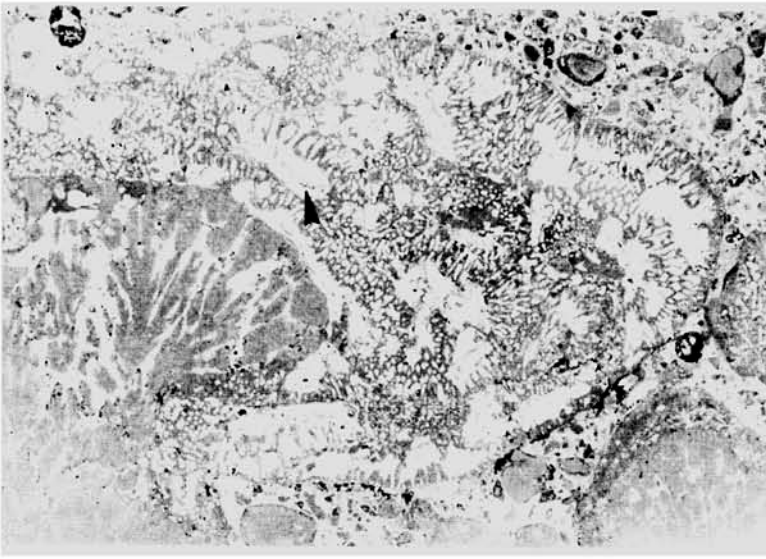


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## Plate 12

### Encrusting organisms and forms of uncertain origin

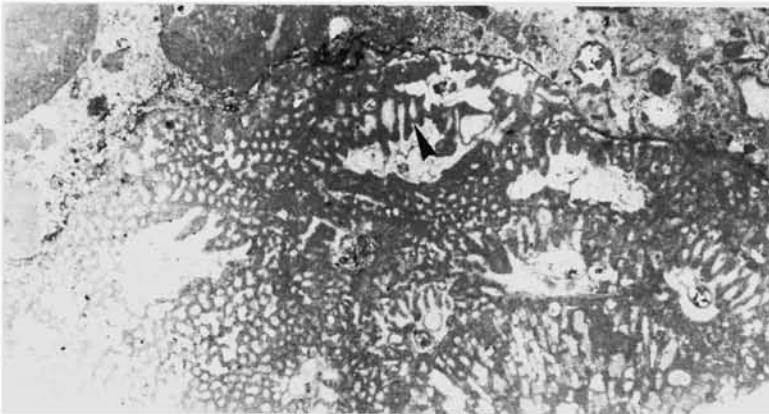
- Fig. 1: Thick crust of *Lithocodium* sp., overgrowing *Marinella lugeoni* (left). Note highly porous structures due to a subregular filament framework and large cavities with interior irregular walls (arrow). Cavities possibly representing water channel system (stromatoporoid origin?) or conceptacles (red algal origin?).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV26a, x 7.9
- Fig. 2: *Lithocodium* sp., overgrowing *Solenopora cayeuxiformis* n.sp. (lower right part). Note cross-partitions in *Lithocodium* filaments (e.g., arrow).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV4, x 14
- Fig. 3: *Lithocodium* sp., strongly altered specimen. Large cavities, partly inhabited by serpulids (center) and filled with sediment. Serpulid attachment also on outer side of specimen (right part of figure).  
»Pteroceriano« formation, section S'Tiago dos Velhos, thin-section SV6a, x 8.3
- Fig. 4: Bryozoan, encrusting coral.  
»Pteroceriano« formation, Alrota sections, thin-section ALR11, x 21
- Fig. 5: Calcisponge (stromatoporoid), exhibiting dark central line within walls. Note attachment of *Dorso-serpula* sp. and *Mikroproblematikum* 4 WERNER (arrow) on oyster shell.  
»Pteroceriano« formation, W Alverca, thin-section AV16, x 9.0
- Fig. 6: Possible codiacean alga.  
»Pteroceriano« formation, Alrota sections, thin-section ALR37, x 31
- Fig. 7: Encrusting foraminifer on bivalve shell. Note intensive formation of neospar.  
»Pteroceriano« formation, section Arranhó-Bemposta, thin-section AH6, x 17
- Fig. 8: Two different kinds of sessile foraminifers on coral fragment. Left, highly irregular, interwoven chamber arrangement of nubeculariid foraminifer. Right, coiled foraminifer; younger chambers enormously increasing in size and growing away from substratum.  
»Pteroceriano« formation, section Batalha, thin-section BT49, x 29



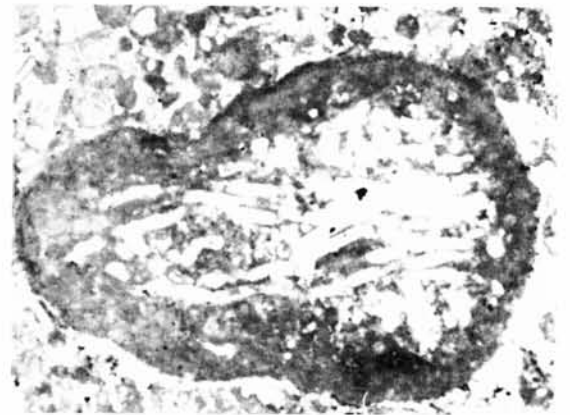
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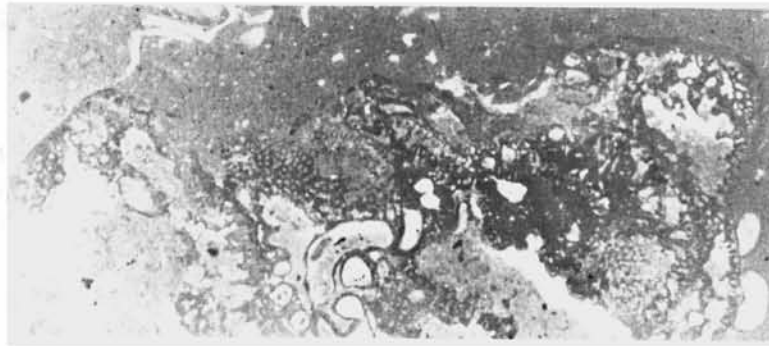
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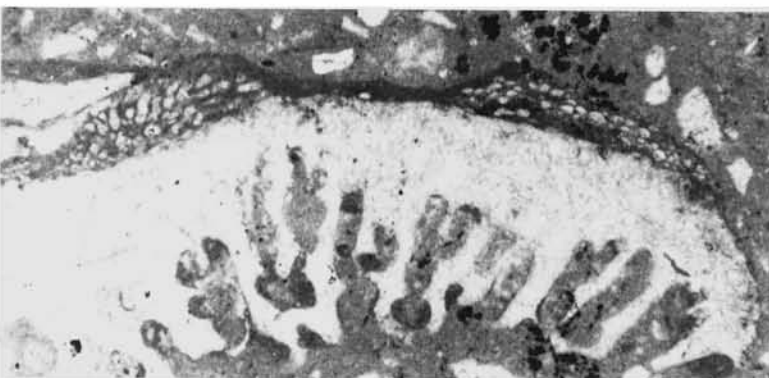
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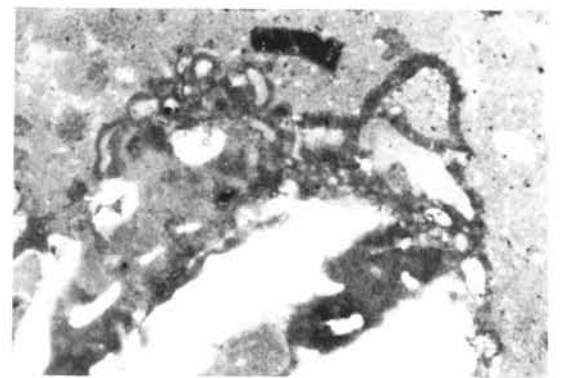
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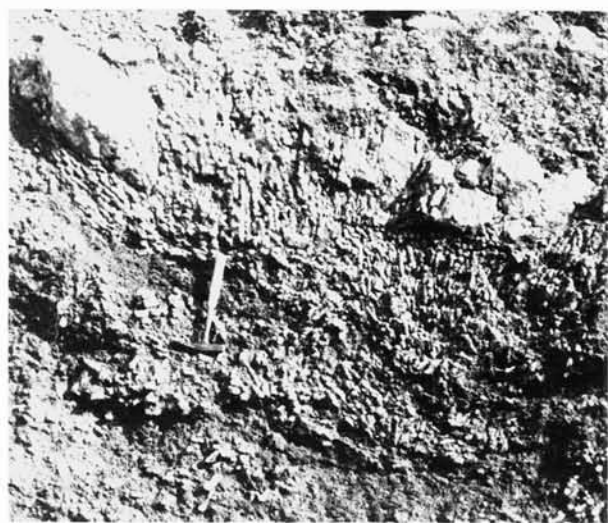
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## Plate 13

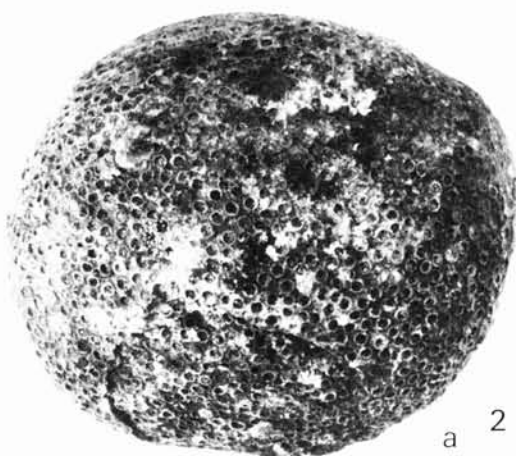
### Corals of the Sobral formation (4, 12) and the »Pteroceriano« formation

- Fig. 1: Marly patch reef, mainly composed of *Stylina (Convexastrea) sexradiata* (GOLDFUSS). Note occasional gradations into lime bafflestone.  
Northern entrance to Alrota, length of hammer 32 cm
- Fig. 2: *Stylina tubulosa* (GOLDFUSS), subspherical large colony (a), x 0.4; note deep calical floors (b), x 1.5.  
Alrota, ALR44
- Fig. 3: *Thamnasteria pseudarachnoides* (BECKER), large columnar colony composed of stacked layers.  
Alrota, ALR44, x 0.7
- Fig. 4: *Cyathophora* cf. *bourgueti* (DEFrance), platy upright growth habit (corallites also on back side). Note attachment of oysters.  
Section Boieiro, Bo8a, x 0.7
- Fig. 5: *Cyathophora bourgueti* (DEFrance), small hemispherical colony. Note deep calical valleys.  
N S'Tiago dos Velhos, SV32, x 1.7
- Fig. 6: Mushroom-like colony of *Amphiastrea piriformis* GREGORY, the most widespread coral species of the study area.  
Section Calhandriz, CZ5, x 1.2
- Fig. 7: Mushroom-like colony of *Actinastrea trochiformis* (MICHELIN).  
Alrota, ALR3, x 0.8
- Fig. 8: Crustose *Comoseris meandrinoides* (MICHELIN), exhibiting broad calical valleys and very frequent septae. Note attachment of serpulids and *Nanogyra nana* (lower right part).  
Alrota, ALR44, x 2.0
- Fig. 9: *Stylina (Heliocoenia) choffati* (KOBY), exhibiting elevated corallites.  
W Alverca, AV3, nat. size
- Fig. 10: *Axosmilia carapateirensis* (KOBY), exhibiting very deep calical valley.  
W Alverca, AV3, nat size
- Fig. 11: *Axosmilia* cf. *crassa* (MILASCHEWITSCH), with extratentacular budding, resulting in branching of the normally solitary form.  
Carvalha, CV71, x 0.7
- Fig. 12: *Axosmilia crassa* (MILASCHEWITSCH), curved specimen.  
Section Boieiro, Bo2, x 0.7





1



a

2



b



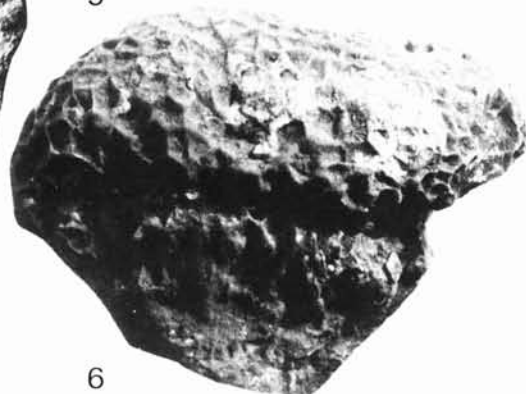
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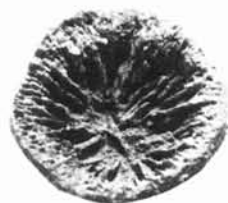
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11



12

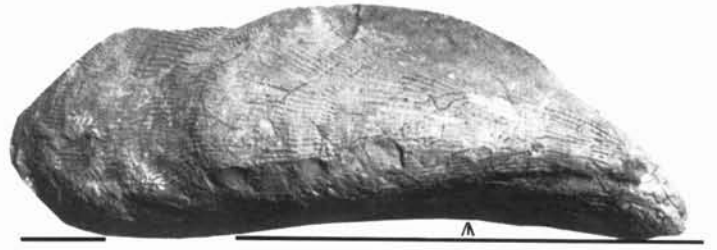
## Plate 14

### Life habit of the mytilid bivalve *Arcomytilus morrisi* (SHARPE)

- Fig. 1: Coquina of single- and double-valved *Arcomytilus morrisi*. At base and top oyster patch reefs, arising from overgrowth of *Arcomytilus* valves.  
W Boieiro hilltop, length of chisel is 12 cm
- Fig. 2: Elongated form; epifaunal growth on firm ground.  
Section Gottleis, GT7, x 0.8
- Fig. 3: Normal shape; epifaunal growth on semi-firm ground.  
W Batalha hilltop, BT01, nat.size
- Fig. 4: Ventral side, exhibiting byssal notch (arrow).  
W Batalha hilltop, BT02, x 1.2
- Fig. 5: Large specimen, curved shape with posterior broadening. Semi-infaunal growth, also indicated by overgrowth of *Praeexogyra pustulosa*, *Nanogyra nana* and *Plicatula* sp. lacking on beak.  
W Boieiro hilltop, Bo01, x 0.7
- Fig. 6: Normal dwelling habit in sets of two specimens, reclining upon each other.  
W Batalha hilltop, BT03, x 0.8
- Fig. 7: Curved shape with pronounced posterior broadening; semi-infaunal growth habit.  
W Batalha hilltop, x 0.8



1



2



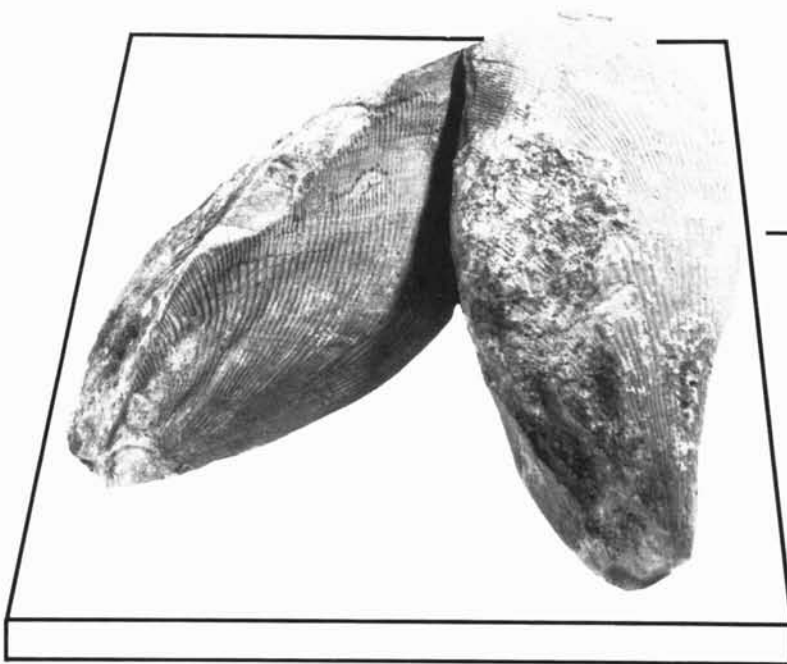
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5



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6



7



## Plate 15

Fauna and flora of the Sobral formation (1, 3, 4, 6) and the »Pteroceriano« formation (2, 5, 7, 8)

- Fig. 1: *Nerinea turbinata* SHARPE.  
Boieiro, BR4, x 1.4
- Fig. 2: Club-shaped spine of the regular echinid *Pseudocidaris lusitanicus* LORIOI.  
Section Engenheiro, EN7, x 1.5
- Fig. 3: *Gnathichnus pentax* BROMLEY, echinid scratchmarks, on shell of *Gervillia sobralensis* SHARPE.  
Boieiro, BR–IV, x 6.7
- Fig. 4: *Gervillia sobralensis* SHARPE, right valve; note attachment of serpulids (arrow).  
Boieiro, BR–IVa, x 0.7
- Fig. 5: *Gervillella aviculoides* (SOWERBY), left valve.  
Boieiro, BR–VIII, x 0.6
- Fig. 6: Conifer wood of the *Taxodioxydon* group, transverse section, exhibiting well preserved wood rays and xylem parenchyma. Faint growth ring (arrows) indicates seasonal weather differentiation.  
W Alenquer, thin–section TX, x 23  
(sampled by K.Orschied, Mainz).
- Fig. 7: Giant *Protocardia* sp.A, partly overgrown by *Nanogyra nana* (SOWERBY).  
S Batalha hilltop, BT30, x 0.6
- Fig. 8: Bivalve coquina composed of Sobral and »Pteroceriano« fauna, e.g., *Myophorella lusitanica* (SHARPE) (upper arrow), *Isognomon* sp. (middle arrow), *Eomiodon securiformis* (SHARPE) (lower arrow).  
N Cucos (E Torres Vedras), diameter of objective cap is 5 cm



1



2



3



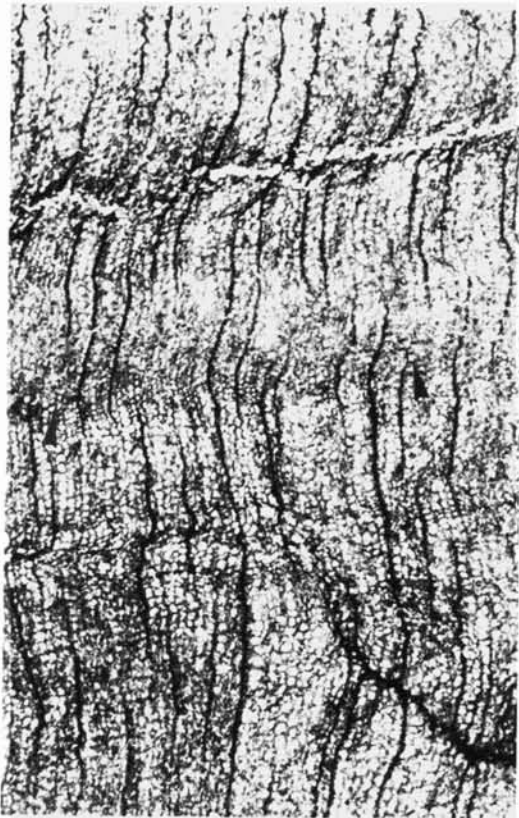
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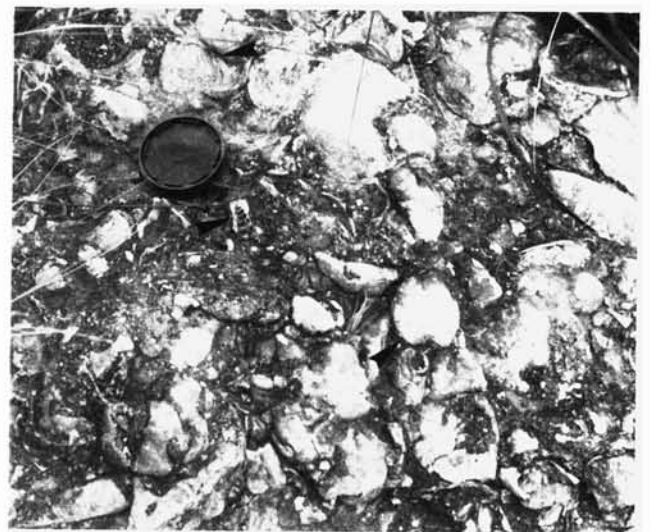
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## Plate 16

### Fauna of the »Pteroceriano« formation

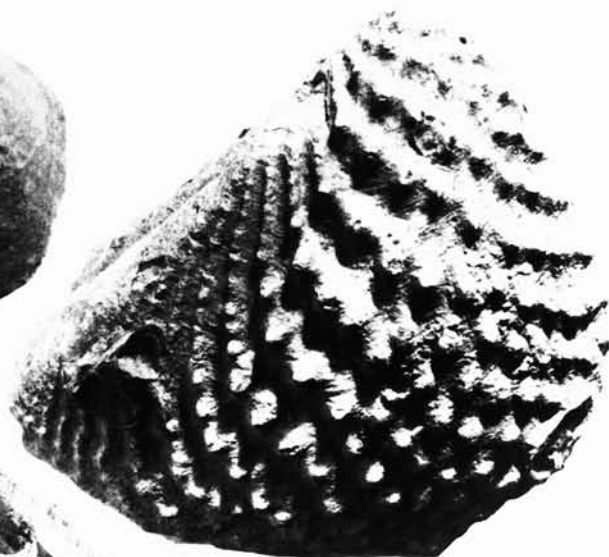
- Fig. 1: *Mactromya concentrica* (MÜNSTER), right valve.  
Batalha hilltop, BT–A, x 1.5
- Fig. 2: *Unicardium crassum* (CHOFFAT), right valve.  
N S'Tiago dos Velhos, SV35, nat. size
- Fig. 3: *Isognomon flambarti* (DOLLFUSS), right valve, inner surface.  
N S'Tiago dos Velhos, SV32, x 0.6
- Fig. 4: *Myophorella lusitanica* (SHARPE)  
a) right valve, outer surface  
b) right valve, inner surface, with attached *Praeexogyra pustulosa* (SHARPE)  
N S'Tiago dos Velhos, SV32a, nat. size
- Fig. 5: Fragment of filled burrow with attached oysters on upper surface, indicating outdigging of burrow due to winnowing of sediment.  
Section Batalha, BT36, nat. size
- Fig. 6: *Trichites* aff. *saussurei* (DESHAYES), roughly in life position. Note attack by boring *Lithophaga* sp.  
W Boieiro, limestone outcrop, diameter of objective cap is 5 cm
- Fig. 7: *Coelastarte discus* (SHARPE), in limestone outcrop. W Alhandra, diameter of objective cap is 5 cm
- Fig. 8: Calcisponge (stromatoporoid) indet.  
a) transverse section, entire colony, x 2.5  
b) enlargement, displaying fibrous wall structure, x 12.5  
Alrota, coral patch reef as figured in plate 13/1; thin–section ALR–S
- Fig. 9: *Trigonia freixialensis* CHOFFAT, right valve.  
Section Alcubela–Freixial, FX7, nat. size



1



2



3



a

4

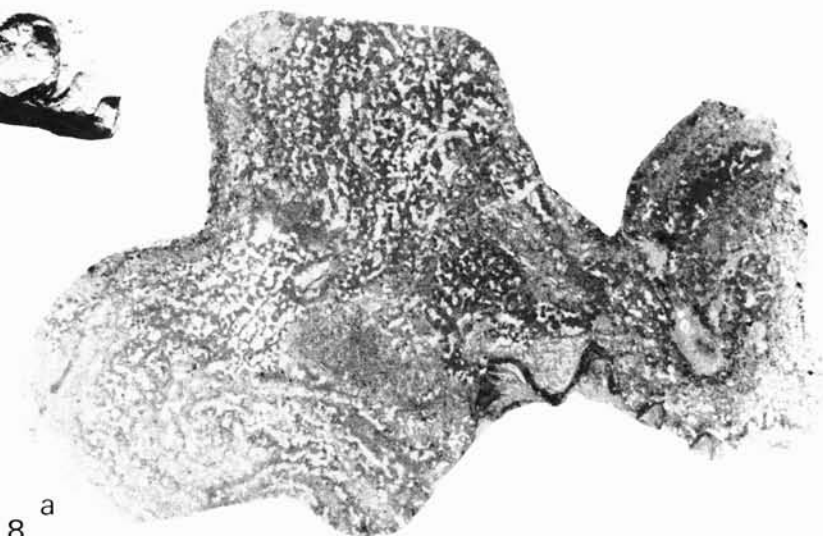
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6

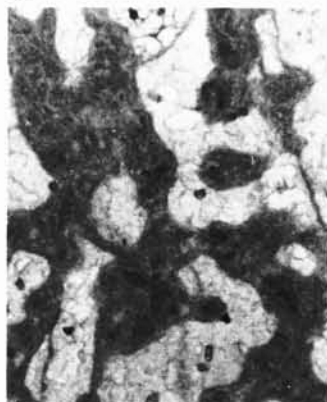


8 a

b



7



9