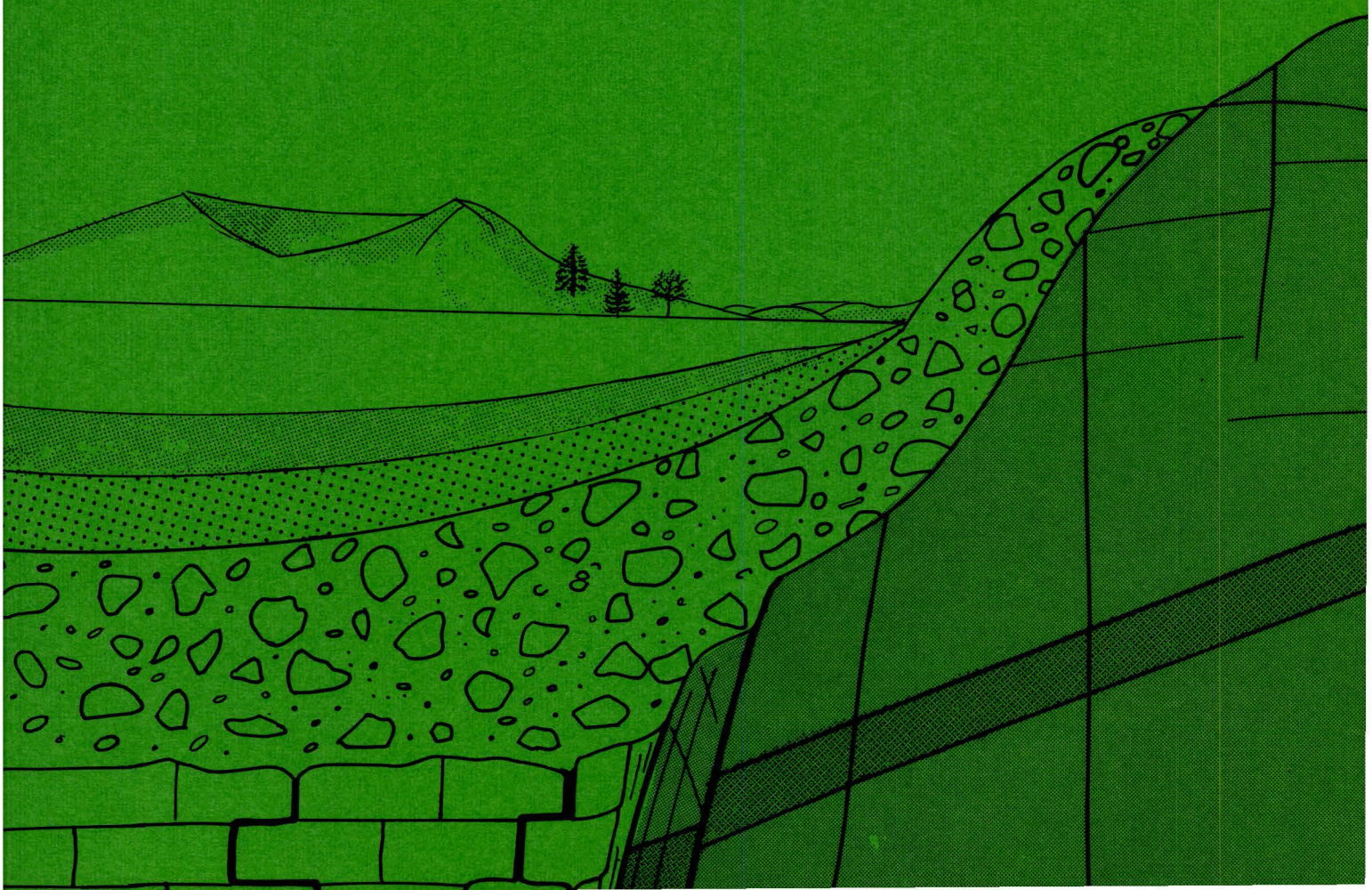
SVERIGES GEOLOGISKA UNDERSÖKNING
Rapporter och meddelanden nr 11

Dorothy Guy-Ohlson

Jurassic biostratigraphy of three borings in NW Scania

(A brief palynological report)

Stockholm 1978



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JURASSIC BIOSTRATIGRAPHY OF THREE BORINGS IN NW SCANIA

(A brief palynological report)

A contribution to PROJECT TORNQUIST

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FOREWORD

Generally speaking, the Mesozoic geology of NW Scania has been regarded as fairly well known. This is true of the western and central parts of the map district 3B/3C Höganäs NO/Helsingborg NV. Within this region, the mining of coal, sandstones and fire-clays during nearly 200 years has resulted in a fairly detailed stratigraphical knowledge, particularly concerning the Triassic - Jurassic transitional beds.

Due to a thick Pleistocene cover, the eastern part of the map district has been, however, less attractive for the prospecting and mining of sedimentary rocks. Consequently, few borings have been drilled in this region, and the bedrock geology has been very little known.

Much increased knowledge of the Jurassic geology of the region in question resulted from Dorothy Guy-Ohlson´s doctoral thesis (1971). This palynological work revealed the presence of Middle Jurassic strata in NW Scania, viz. some 75 m of limnic sediments succeeding the marine Lias in the Vilhelmsfält core (Fig. 1).

In her work for the Geological Survey of Sweden (SGU), Dorothy Guy-Ohlson has contributed to the geological mapping of the NW Scanian sedimentary rocks by palynological and biostratigraphical dating. This work has been of great use since the Mesozoic stratal sequence includes alternating limnic and marine sediments.

The present report indicates an extension of the Middle Jurassic at Vilhelmsfält towards the south-east. Along with lithostratigraphical correlation and seismic profiling the biostratigraphy reported herein will much increase our knowledge of the geology of the "Ängelholm Trough". The report is, however, not only of local interest, but the palynological records presented will certainly find applications to the Middle Jurassic geology of the North Sea and elsewhere in NW Europe.

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Geological Survey of Sweden

CONTENTS

ABSTRACT

The dispersed palynomorphic content of samples from three borings in north-west Scania has been examined. Biostratigraphical determinations suggest a Middle Jurassic age. Where possible the palynomorphic content has been compared with the previously investigated Middle Jurassic sediments of Eriksdal and Vilhelmsfält.

INTRODUCTION

In the geological map district 3 C NV of north-west Scania three wire line borings, namely Härninge Bore no. 159, Härninge Bore no. 64 and Rosenhäll Bore no. 62, have been investigated (see Fig. 1 for geographical positions). These borings are situated, generally speaking, in the Ängelholm Basin in a particular district devoid of previous biostratigraphical investigation.

Jurassic sediments from the Ängelholm Basin have been examined by BÖLAU (1959). He studied and described the so called Vilhelmsfält Beds at the localities of Vilhelmsfält and Humlarp (BÖLAU, l.c., p. 184-186). This sequence in the Vilhelmsfält core, ranging from 140 m to 65 m, was regarded by BÖLAU as Lower Jurassic - Middle Jurassic transitional beds (BÖLAU, l.c., pp. 180, 188). The same sequence was investigated palynologically by the present author (GUY, 1971) who referred the whole sequence to the Middle Jurassic. The purpose of the present investigation is to examine the dispersed palynological content of the three borings and from this, if possible, establish biostratigraphically the age of the sediments sampled.

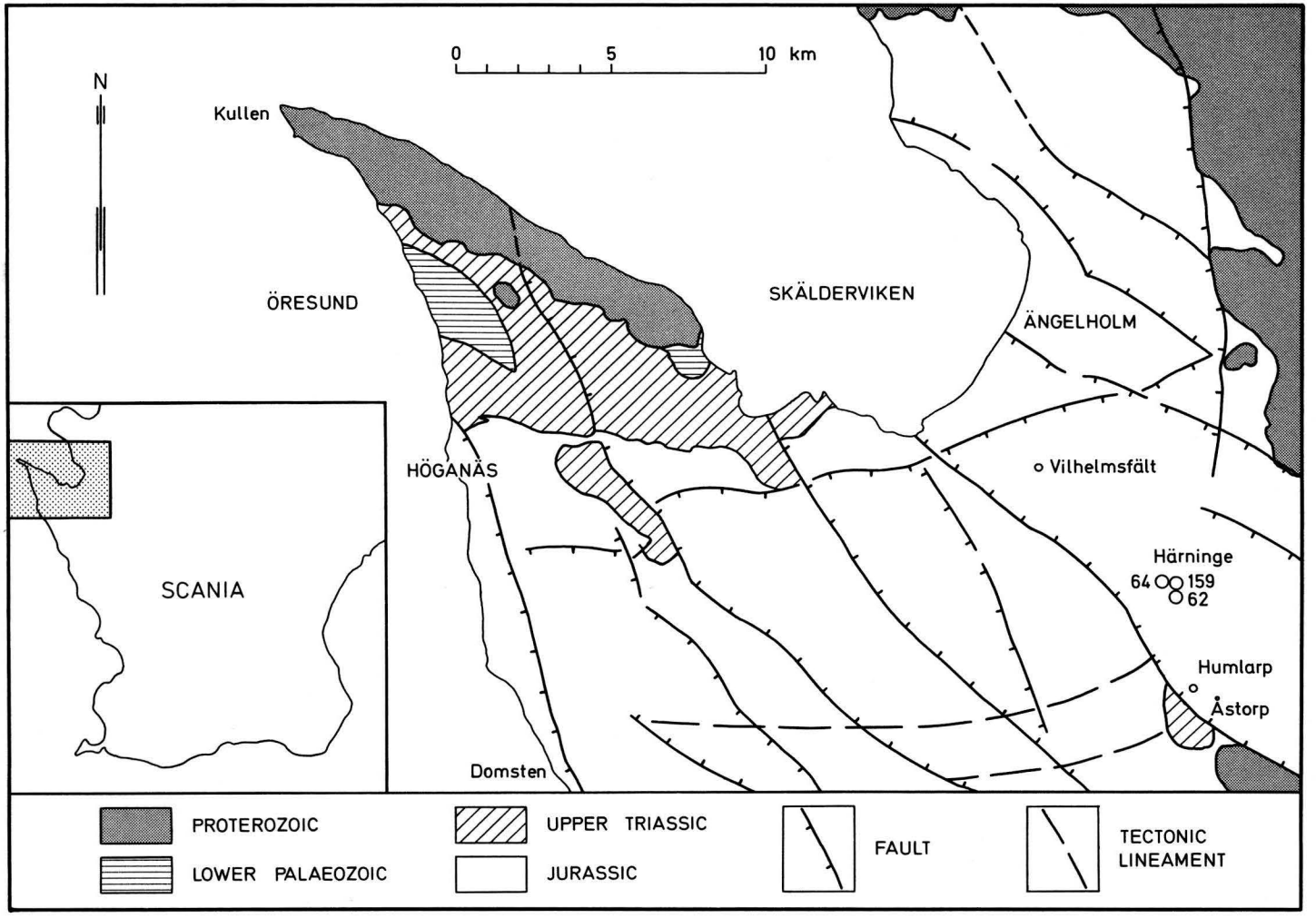
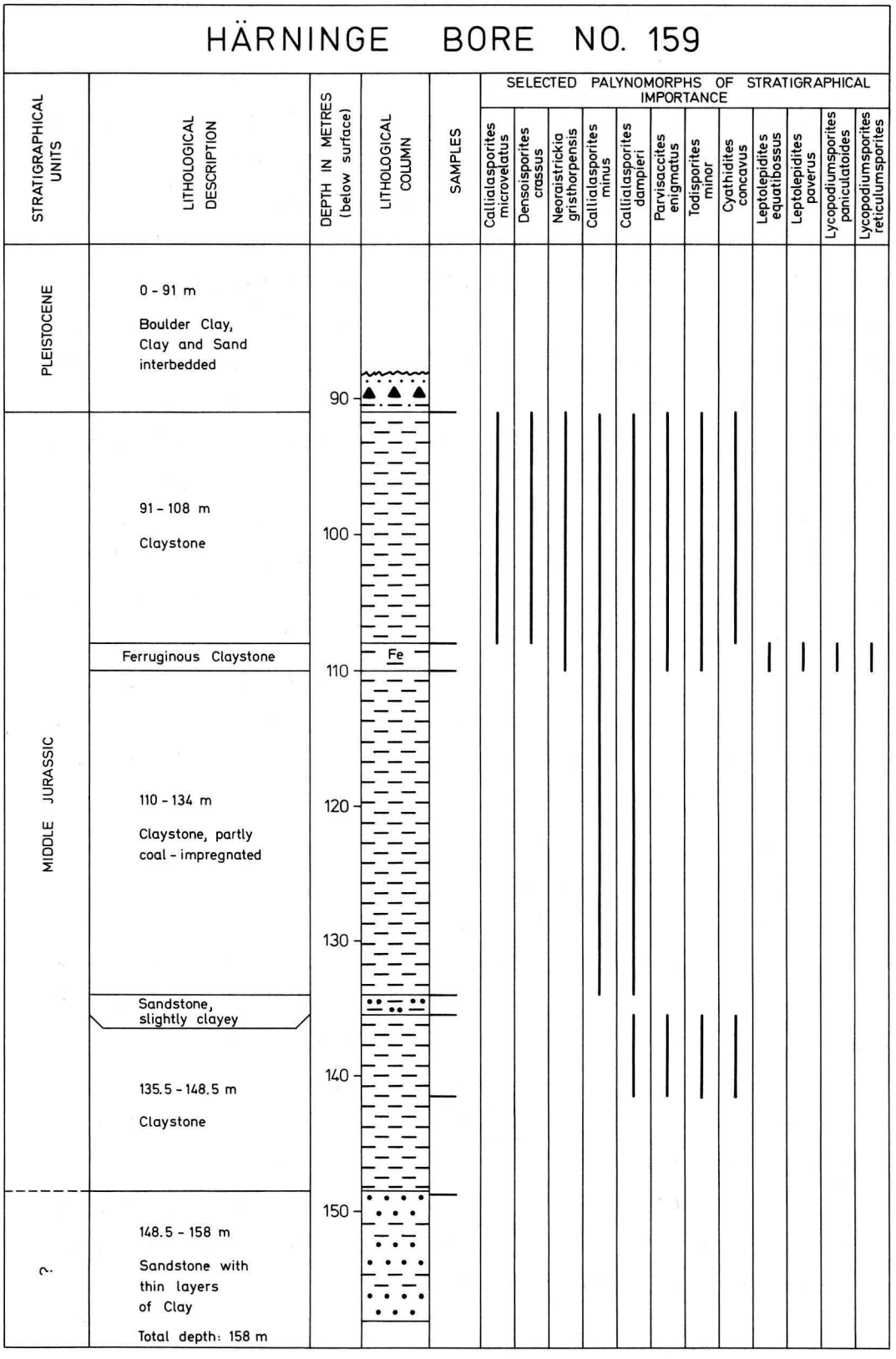


Fig. 1. Simplified geological sketch map showing the location of the borings treated in the text.

THE PALYNOLOGICAL INVESTIGATIONS

The investigations have involved first the preparation of the samples by the method outlined by MÄDLER, 1964, p. 34, thereafter the prepared slides have been examined microscopically (GUY, 1971, p. 12) and the palynomorphs present in each slide recorded. The actual work carried out has been summarized in tabular form. Thus in Table I it is possible to obtain for each boring the following information: the number of samples examined; the depth at which those samples were made; the number of slides examined for each sample and the total number of palynomorphs recorded for each sample. When necessary, some explanatory comments have also been added. Where possible also the probable stratigraphical age has been deduced and given in Table I for each sample. This age assignment is based on the actual stratigraphical ranges of the palynomorphs found present in each sample. For each boring the palynomorphic content of each sample is recorded in Table II along with the stratigraphical range for each species present. Examination of the stratigraphical ranges for the palynomorphic content of each boring reveals that certain species are of wide-spread distribution, others of more particular and a few of rather limited distribution. Species of known limited stratigraphical distribution are valuable as so called key forms or species and their presence used to deduce the age of the sediments in which they are found to be present. The key forms or species used for this report are based on those already established in previous palynological investigations in the Swedish Mesozoic (TRALAU, 1968, pp. 99-105; GUY, 1971, pp. 73-88). From an examination of Table II it is thus possible for any one of the three borings to obtain a list of palynomorphs present for each sample together with their known stratigraphical ranges and where such a sample contains so called key forms or species, it is then possible to deduce a specific age for the sample in question.

Fig. 2


HÄRNINGE BORE NO. 159
STRATIGRAPHICAL UNITS
LITHOLOGICAL DESCRIPTION
DEPTH IN METRES (below surface)
LITHOLOGICAL COLUMN
SAMPLES
SELECTED PALYNOMORPHS OF STRATIGRAPHICAL IMPORTANCE
Callialasporites microvelatus
Densoisporites crassus
Neoraistrickia gristhorpensis
Callialasporites minus
Callialasporites dampieri
Parvisaccites enigmatus
Todisporites minor
Cyathidites concavus
Leptolepidites equatibossus
Leptolepidites peverus
Lycopodiumsporites paniculatoides
Lycopodiumsporites reticulumsporites
PLEISTOCENE
0 - 91 m
Boulder Clay, Clay and Sand interbedded
MIDDLE JURASSIC
91 - 108 m
Claystone
Ferruginous Claystone
Fe
110 - 134 m
Claystone, partly coal - impregnated
Sandstone, slightly clayey
135.5 - 148.5 m
Claystone
?
148.5 - 158 m
Sandstone with thin layers of Clay
Total depth: 158 m
90
100
110
120
130
140
150

THE STRATIGRAPHICAL RESULTS

The lithological columns and descriptions for the three borings, Härninge Bore no. 159, Härninge Bore no. 64 and Rosenhäll no. 62 together with the samples investigated, the stratigraphical units represented and the European stratigraphical distributions of certain selected palynomorphs of stratigraphical importance are given respectively in Figs. 2, 3 and 4. The palynomorphic content of the three borings is illustrated and included as an appendix. The biostratigraphical results for each boring are considered separately as follows:

Bore no. 159

From the results summarized in Table II it can be seen that a Middle Jurassic age may be proposed for the following samples, respectively nos. 32190, 32191 and 32192 as each contain a number of known Middle Jurassic key species. Sample no. 32191 contains the richest and most abundant microflora. No identifiable palynomorphs were encountered in sample 32193, thus no definite age is proposed for this sample. Middle Jurassic key species are again found present in sample no. 32194, but thereafter there is a definite decline both in the numbers of Middle Jurassic key species and in the total number of palynomorphs present. The final sample of boring no. 159, i.e. no. 32196, contains very few palynomorphs but may be said to be of Lower-Middle Jurassic age because of the presence of *Callialasporites turbatus* (BALME) SCHULZ and *Perinopolleintes elatoides* COUPER, both being European key species of Lower-Middle Jurassic age.

Bore no. 64

As seen from both tables the first 10 samples examined contain few palynomorphs of value as far as stratigraphy is concerned. Those which do have a palynomorphic content contain only stratigraphically long ranging species, while samples no. 24611 and 24613 are almost devoid of palynomorphs. The presence of *Calamaspora mesozoicus* COUPER and *Cerebropollenites mesozoicus* (COUPER) NILSSON in sample no. 24615 suggest at least a Jurassic age.

Fig. 3

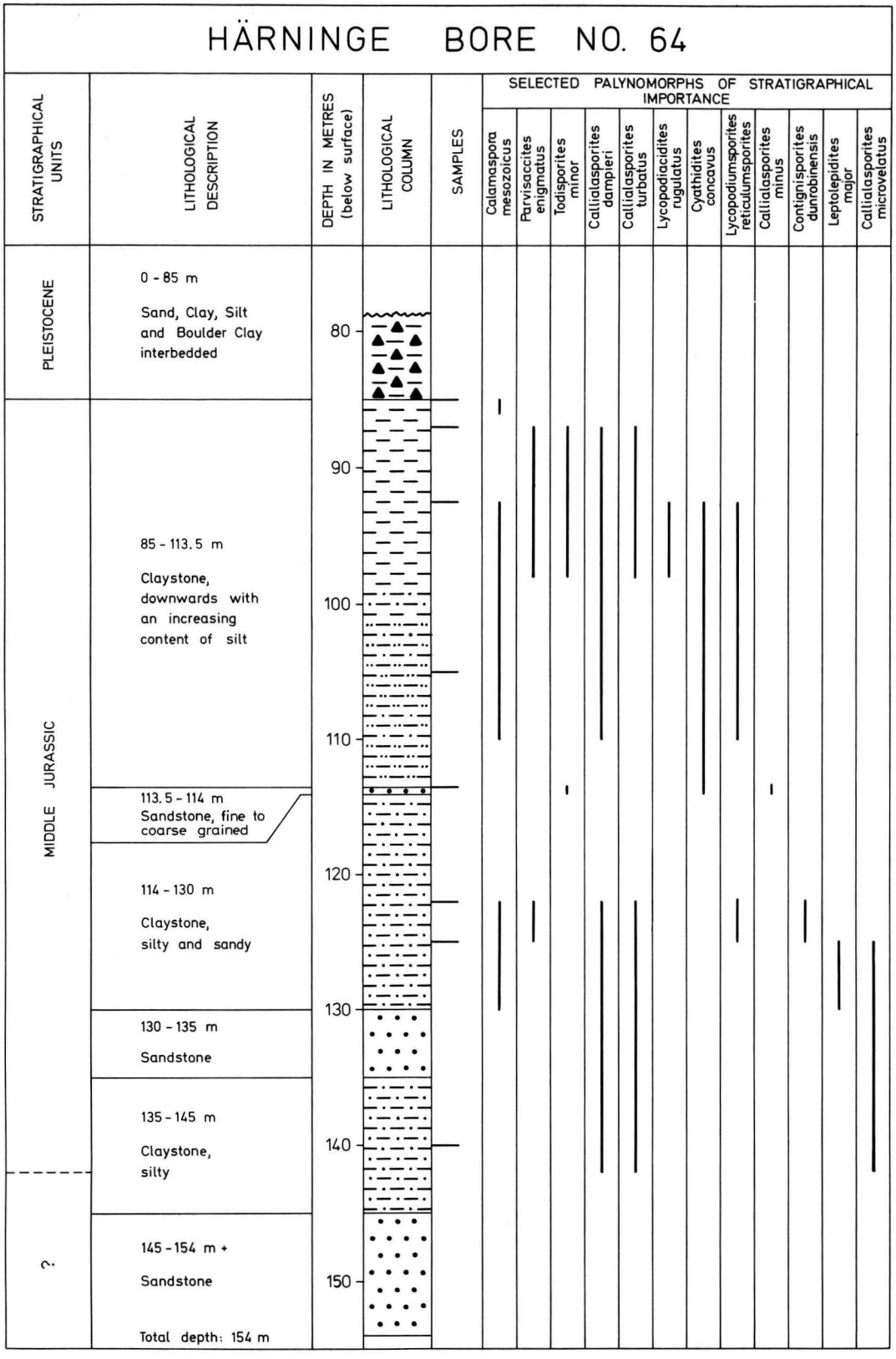
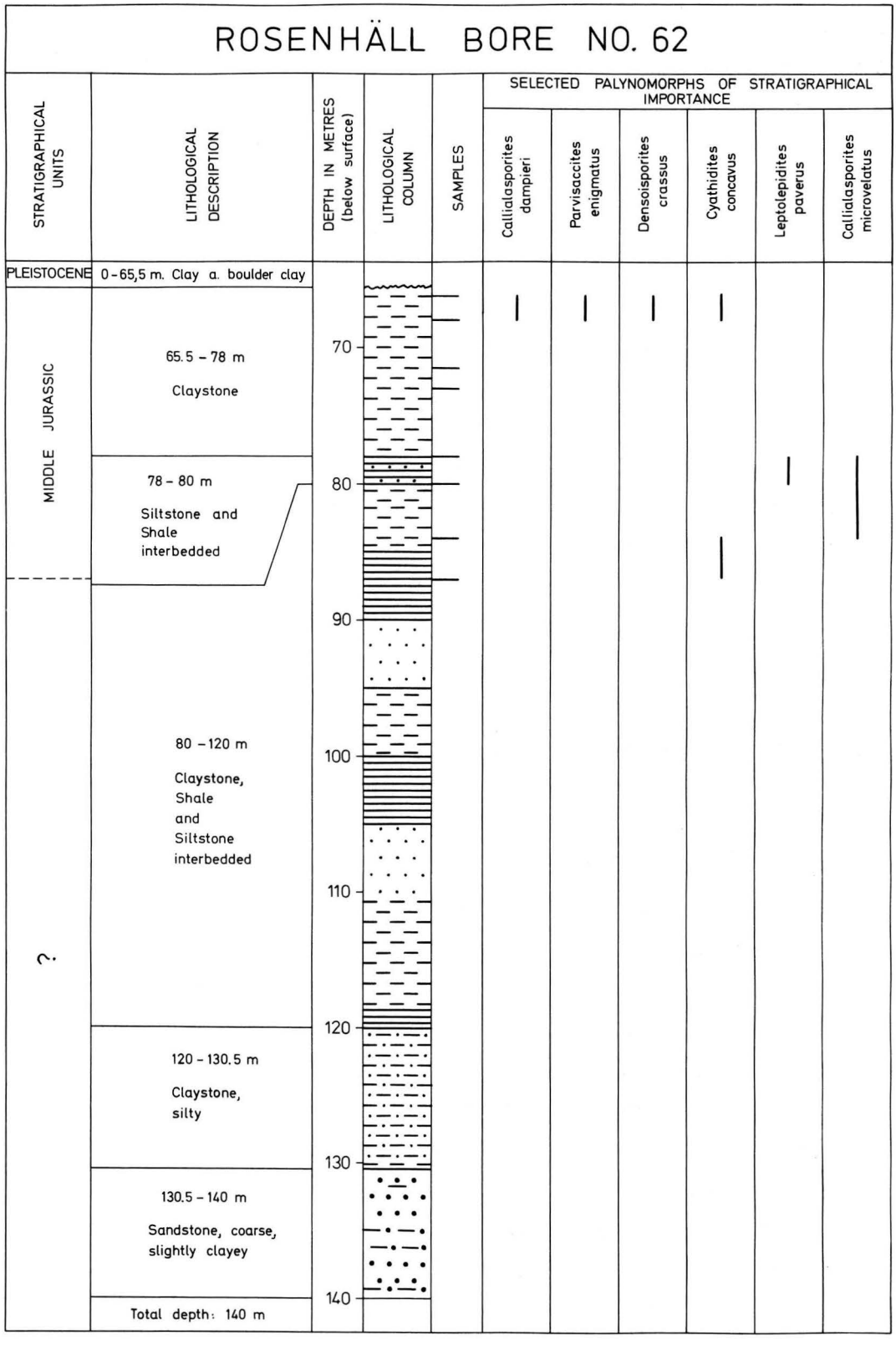

HÄRNINGE BORE NO. 64
STRATIGRAPHICAL UNITS
LITHOLOGICAL DESCRIPTION
DEPTH IN METRES (below surface)
LITHOLOGICAL COLUMN
SAMPLES
SELECTED PALYNOMORPHS OF STRATIGRAPHICAL IMPORTANCE
Calamaspora mesozoicus
Parvisaccites enigmatus
Todisporites minor
Callialasporites dampieri
Callialasporites turbatus
Lycopodiacidites rugulatus
Cyathidites concavus
Lycopodiumsporites reticulumsporites
Callialasporites minus
Contignisporites dunrobinensis
Leptolepidites major
Callialasporites microvelatus
PLEISTOCENE
0 - 85 m
Sand, Clay, Silt and Boulder Clay interbedded
MIDDLE JURASSIC
85 - 113.5 m
Claystone, downwards with an increasing content of silt
113.5 - 114 m
Sandstone, fine to coarse grained
114 - 130 m
Claystone, silty and sandy
130 - 135 m
Sandstone
135 - 145 m
Claystone, silty
?
145 - 154 m +
Sandstone
Total depth: 154 m
80
90
100
110
120
130
140
150

Fig. 4


ROSENHÄLL BORE NO. 62
STRATIGRAPHICAL UNITS
LITHOLOGICAL DESCRIPTION
DEPTH IN METRES (below surface)
LITHOLOGICAL COLUMN
SAMPLES
SELECTED PALYNOMORPHS OF STRATIGRAPHICAL IMPORTANCE
Callialasporites dampieri
Parvisaccites enigmatus
Densoisporites crassus
Cyathidites concavus
Leptolepidites paverus
Callialasporites microvelatus
PLEISTOCENE
0 - 65,5 m. Clay a. boulder clay
MIDDLE JURASSIC
65.5 - 78 m
Claystone
78 - 80 m
Siltstone and Shale interbedded
?
80 - 120 m
Claystone, Shale and Siltstone interbedded
120 - 130.5 m
Claystone, silty
130.5 - 140 m
Sandstone, coarse, slightly clayey
Total depth: 140 m
70
80
90
100
110
120
130
140

Sample nos. 24617, 24619, 24621, 24623, 24626 and 24627 each contain a number of known key species, which confine the age of these samples to the Middle Jurassic. The following were recorded in the above mentioned samples: *Callialasporites dampieri* (BALME) DEV, *Callialasporites microvelatus* SCHULZ, *Cyathidites concavus* (BOLKHOVITINA) DETTMAN, *Lycopodiumsporites vilhelmi* GUY, *Lycopodiumsporties reticulumsporites* (ROUSE) DETTMAN, *Leptolepidites rotundus* TRALAU, *Monolites couperi* TRALAU, *Parvisaccites enigmatus* COUPER and *Todisporites minor* COUPER. (For specific occurrence in samples refer to Table II.) Only two Middle Jurassic key species, namely *Callialasporites dampieri* (BALME) DEV and *Callialasporites microvelatus* SCHULZ, have been found in sample no. 24630, whereas several Lower-Middle Jurassic key species (*Callialasporites turbatus* (BALME) SCHULZ, *Perinopollenites elatoides* COUPER, *Ischyosporites variegatus* (COUPER) SCHULZ and *Calamaspora mesozoicus* COUPER) have been recorded, thus the age might be ? Middle Jurassic - but definitely Lower-Middle Jurassic.

Bore no 62

The first four samples numbered consecutively from 24514 to 24517 each contained so few palynomorphic specimens that no evidence whatsoever could be supplied even to suggest a tentative age assignment. Likewise is it just as difficult to suggest an age for samples 24518, 24519 and 24520, the first of which contains only long ranging species, while the other two samples are almost devoid of palynomorphic content. Mention should perhaps be made of the find in sample 24519 of *Oculopollis cardinalis* WEYLAND et KRIEGER with a stratigraphical range indicating a Cretaceous age, but as only one specimen of the said species was found to be present, it is unrealistic to attach any real significance to its presence, which might as well have arisen due to contamination. A complete and abrupt change in palynomorphic content occurs in sample 24521. From Table II it is possible to infer a Middle Jurassic age for this sample due to the presence of the following key species, namely *Callialasporites dampieri* (BALME) DEV, *Callialasporites microvelatus* SCHULZ, *Cyathidites concavus* (BOLKHOVITINA) DETTMAN, *Densoisporites crassus* TRALAU, *Parvisaccites enigmatus* COUPER, and substantiated also by the additional presence of several so called Lower-Middle Jurassic key forms or species. Few palynomorphs are present in samples 24522

and 24523 and those in fact only long-ranging, thus no definite age is suggested for either of these samples. The next few samples numbered consecutively 24524 to 24527 can be assigned a Middle Jurassic age owing to the presence of several indicative key species, namely *Callialasporites microvelatus* SCHULZ, *Callialasporites minus* (TRALAU) GUY, *Cyathidites concavus* (BOLKHOVITINA) DETTMAN, *Ischyosporites granulosus* TRALAU and *Leptolepidites paverus* LEVET-CARETTE. Very few palynomorphs were found present in sample no. 24528 and as these were only stratigraphically long-ranging species, no definite age assignment could be made for the final sample of boring no. 62.

COMPARISON OF PALYNOMORPHIC CONTENT

In each of the three borings investigated the microflora was rich and well preserved. Boring no. 159 contained the greatest number of identifiable species, i.e. 60, whereas boring nos. 64 and 62 contained respectively 48 and 40 identifiable species. Table III has been composed in order to facilitate comparison of the palynomorphic content in each of the 3 borings, and these in turn can be compared with other previously investigated Jurassic microfloras in Scania, namely those Middle Jurassic microfloras described from Eriksdal and from the Vilhelmsfält Beds. These latter two dispersed microfloras are somewhat richer in content (i.e. total number of species encountered) than the three borings of the present report. In the Eriksdal microflora TRALAU, 1968 pp. 18-23, described 78 dispersed species whereas that of Vilhelmsfält contained 94 dispersed species (GUY, 1971 p. 90, GUY-OHLSON, 1976, p. 81). Some 53 species of those found at Vilhelmsfält also occurred at Eriksdal. It is of interest therefore to note that 17 palynomorphs are common to all 5 localities, and of these seventeen, four are known to be of restricted European Middle Jurassic age (Bajocian-Bathonian). Many further detailed comparisons may be made with reference to Table III. The most striking similarity among the microfloras is that between Bore no. 159 and Vilhelmsfält which have some 50 species in common. (Those palynomorphic species recorded only at Eriksdal or only at Vilhelmsfält have been omitted. Note that no quantitative comparison has been attempted. For more detailed comparison of the Eriksdal and Vilhelmsfält floras see GUY, 1971, pp. 73-90).

CONCLUSION

The three borings have been investigated by examining their palynomorphic content. Difficulty has arisen in determining the age of certain sediments in each boring due to the fact that they either contained too few specimens and/or those which are present belong only to long ranging species which give no certainty of any particular age assignment. On the other hand it is possible to determine biostratigraphically the samples from the remaining sediments rather more accurately, due to the presence of acceptable key species which narrow the age assignment to Middle Jurassic. The thus assigned Middle Jurassic microfloras are compared in the 3 borings and also with the previously investigated Middle Jurassic sediments of the Eriksdal and Vilhelmsfält Beds. This comparison reveals a good number of similarities and in particular it is most striking to notice that the microflora of boring no. 159 has no less than 50 species in common with that of the Vilhelmsfält Beds, suggesting perhaps that a more direct correlation, at least speaking from a biostratigraphical point of view, is justifiable for these two localities in particular.

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(NB. Taxonomic literature used for systematic determinations of palynomorphic species has been excluded from this reference list.)

TABLE NO I RECORD OF WORK

Bore no.	Sample no.	Depth (m)	Total no. of palynomorphs	No. of slides examined	Probable stratigraphical age of sample (see table II)	Comments
159	32190	91-108	355	2	Middle Jurassic	
	32191	108-110	499	5	Middle Jurassic	
	32192	110-134	101	1	Middle Jurassic	
	32193	134-135.5	0	2	-	No identifiable palynomorphs encountered
	32194	135.5-141.5	225	1	Middle Jurassic	
	32195	141.5-148.5	45	1	Middle Jurassic	Reduction in no. of species present
	32196	148.5-158	20	2	Lower-Middle Jurassic	Very few palynomorphs present L+M Jur. key spec.
64	24599	40-45	52	2	Unable to establish w. any certainty	Only long ranging species present
	24601	47	52	2	?	"-
	24602	47-50	54	1	?	"-
	24603	50-50.5	45	2		No evidence
	24604	50.5-55	50	2	?	Only long ranging species present
	24605	55-57	4	1	?	Slide almost empty
	24607	61-64	79	1	?	Long ranging species present
	24609	68-72	56	1	?	Slides almost empty
	24611	76-79	8	1	?	"-
	24613	79.5-83	6	1	?	"-
	24615	85-86	23	1	Jurassic	
	24617	87-90	114	2	Probably Middle Jurassic	
	24619	92.5-98	225	1	Middle Jurassic	Presence of I "Middle Jurassic key species"
	24621	105-110	124	1	Middle Jurassic	"-
	24623	113.5-114	58	1	Middle Jurassic	
	24626	122-125	124	1	Middle Jurassic	
	24627	125-130	178	1	Middle Jurassic	
	24630	140-142	70	1	Lower-Middle Jurassic	? Few Middle Jur. species - mainly L-M key species

TABLE NO I RECORD OF WORK

Bore no.	Sample no.	Depth (m)	Total no. of palyno-morphs	No. of slides exa-mined	Probable stra-tigraphical age of sample (see table II)	Comments
62	24514	39-44	8	1	Not sufficient evidence to suggest a par-ticular age	Hardly any paly-nomorphs present
	24515	44-50	1	1		"-
	24516	50-52	1	1	"-	"-
	24517	52-57	1	1	"-	"-
	24518	57-60	23	1	Only long ranging spe-cies present	
	24519	60-63	12	1	?	Presence of Oculo-pollis indicates Cret. (N.B. only 1 specimen found)
	24520	63-65.5	6	1	?	
	24521	65.5-68	100	1	Middle Jurassic	Complete & abrupt change in palyno-morphic content
	24522	68-71.5	25	1	Only long ranging	
	24523	71.5-73	17	1	"-	Few palynomorphs present
	24524	73-78	48	1	Middle Jurassic	
	24525	78-80	74	1	"-	
	24526	80-84	37	1	"-	
	24527	84-87	34	1	"-	
	24528	87-90	8	1	? Only long ranging species present	Very few palyno-morphs present

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN							
		Sample no.	32190	32191	32192	32193	32194	32195	32196
BORE NO 159	TRIAS / JURASSIC (L, M, U) / CRETA-CEOUS	Depth (m)	91-108	108-110	110-134	134-135.5	135.5-141.5	141.5-148.5	148.5-153
Alisporites robustus			+		+	-			
Araucariacites australis			+	+	+		+	+	+
Auritulinasporites scanicus			+	+					
Baculatisporites comaumensis			+	+	+		+	+	
Brachysaccus microsaccus			+						
Calamaspora mesozoicus					+				
Callialasporites dampieri			+	+	+		+	+	
" microvelatus			+						
" minus			+	+	+				
" turbatus			+	+	+		+		+
Caytonipollenites pallidus			+	+	+			+	
Ceratosporites spinosus							+		
Cerebropollenites mesozoicus			+	+	+		+	+	+
Chasmatosporites apertus				+					
Classopollis chateaunovi							+		
Classopollis classoides			+	+				+	+
Contignisporites dunrobinensis						+			
" problematicus				+			+		
" rugulatus				+					

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE					PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN							
						Sample no.	32190	32191	32192	32193	32194	32195	32196
BORE NO 159	TRIAS	JURASSIC L	JURASSIC M	JURASSIC U	CRETA-CEOUS	Depth (m)	91-108	108-110	110-134	134-135.5	135.5-141.5	141.5-148.5	148.5-153
Corollina meyeriana								+					
Cyathidites australis							+	+	+		+	+	
" concavus							+				+		
" minor							+	+	+		+	+	
Densoisporites crassus							+						
" velatus								+				+	
"Dino" I								+	+				
Exesipollenites scabrosus							+						
Gleicheniidites senonicus								+				+	
Ginkgocycadophytus nitidus							+	+				+	
Ischyosporites variegatus								+			+		
Leiofusa jurassica							+						
Leptolepidites bossus								+					
" equatibossus								+					
" major								+				+	
" paverus								+					
" rotundus								+			+		
" sp								+					
Lophotriletes							+						

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN							
		Sample no.	32190	32191	32192	32193	32194	32195	32196
BORE NO 159	TRIAS / JURASSIC L M U / CRETA-CEOUS	Depth (m)	91-108	108-110	110-134	134-135.5	135.5-141.5	141.5-148.5	148.5-153
Lycopodiumsporites clavatoides			+	+	+		+		
" reticulumsporites				+					
" vilhelmi				+			+		
" paniculatoides				+					
Marattisporites scabratus			+	+					
Murospora florida			+						
" sp			+	+					
Nannoceratopis sp			+						
Neoraistrickia gristhorpensis			+	+					
Osmundacidites wellmanii				+					
Parvisaccites enigmatus			+	+			+		
Perinopollenites elatoides			+	+	+		+	+	+
Podocarpidites sp.				+					
Protopinus scanicus			+						
Sestrosporites pseudoalveolatus				+					
Spheripollenites scabratus?							+		
" subgranulatus				+				+	
Todisporites major			+	+			+		
" minor			+	+			+		

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE					PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN							
						Sample no.	32190	32191	32192	32193	32194	32195	32196
BORE NO 159	TRIAS	JURASSIC L	JURASSIC M	JURASSIC U	CRETA-CEOUS	Depth (m)	91-108	108-110	110-134	134-135.5	135.5-141.5	141.5-148.5	148.5-153
Undulatisporites concavus		—	—				+	+			+		
" mesozoicus								+					
Uvaesporites puzzlei			—					+					
Unidentified													

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN																			
		Sample no.	24599	24601	24602	24603	24604	24605	24607	24609	24611	24613	24615	24617	24619	24621	24623	24626	24627	24630
BORE NO 64	TRIAS / JURASSIC (L, M, U) / CRETA-CEOUS	Depth (m)	40-45	47	47-50	50-50.5	50.5-55	55-57	61-64	68-72	76-79	79.5-83	85-86	87-90	92.5-98	105-110	113.5-114	122-125	125-130	140-142
Alisporites robustus														+	+	+	+	+	+	
Araucariacites australis														+	+	+	+	+	+	+
Baculatisporites comaumensis															+	+	+	+	+	
Brachysaccus microsaccus																				+
Calamaspora mesozoicus													+		+	+		+	+	
Callialasporites dampieri														+	+	+		+	+	+
" microvelatus																			+	+
" minus																	+			
" turbatus														+	+			+	+	+
Caytonipollenites pallidus													+		+			+	+	
Cerebropollenites mesozoicus									+				+	+	+	+	+	+	+	+
Chasmatosporites apertus														+	+	+				
Contignisporites dunrobinensis																		+		
" mesozoicus?																		+		
" problematicus																				+
Crassospahera															+					
Cyathidites australis			+						+					+	+	+	+	+	+	+
" concavus															+	+	+			
" minor			+	+	+						+			+	+	+	+	+	+	+

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN																			
		Sample no.	24599	24601	24602	24603	24604	24605	24607	24609	24611	24613	24615	24617	24619	24621	24623	24626	24627	24630
BORE NO 64	TRIAS / JURASSIC (L, M, U) / CRETACEOUS	Depth (m)	40-45	47	47-50	50-50.5	50.5-55	55-57	61-64	68-72	76-79	79.5-83	85-86	87-90	92.5-98	105-110	113.5-114	122-125	125-130	140-142
Deltoidospora minor																+		+		
Densoisporites velatus															+	+				
"Dino" I																+				
Exesipollenites scabrosus																+				
Gleicheniidites senonicus																+				
Ginkgocycadophytus nitidus																				+
Ischyosporites variegatus																				+
Klukisporites neovariagatus																+				
Leptolepidites major																			+	
" rotundus																	+			
" sp.			+																	
Lycopodiacidites rugulatus															+					
Lycopodiumsporites clavatoides			+												+	+		+	+	
" reticulumsporites															+	+		+		
" vilhelmi																		+		
" sp.																				
Marattissporites scabratus			+																	
Monolites couperi															+				+	

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN																			
		Sample no.	24599	24601	24602	24603	24604	24605	24607	24609	24611	24613	24615	24617	24619	24621	24623	24626	24627	24630
BORE NO 64	TRIAS / JURASSIC L M U / CRETA-CEOUS	Depth (m)	40-45	47	47-50	50-50.5	50.5-55	55-57	61-64	68-72	76-79	79.5-83	85-86	87-90	92.5-98	105-110	113.5-114	122-125	125-130	140-142
Neoraistrickia gristophorpensis	M		+																	
" sp.			+																	
Osmundacidites wellmanii	L M U CRETA															+		+	+	
Parvisacites enigmatus	M													+	+			+		
Perinopollenites elatoides	L M																+		+	+
Sestrosporites pseudoalveoalatus	M U CRETA														+					
Spheripollenites subgranulatus	L M U CRETA														+	+	+	+	+	+
Todisporites major	L M													+			+			
" minor	M													+	+		+			
" sp.										+										
Undulatisporites concavus	L M														+					
Unidentified				+	+	+	+	+	+	+	+	+	+	+	+	+					

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN															
		Sample no.	24514	24515	24516	24517	24518	24519	24520	24521	24522	24523	24524	24525	24526	24527	24528
BORE NO 62	TRIAS / JURASSIC L M U / CRETA-CEOUS	Depth (m)	39-44	44-50	50-52	52-57	57-60	60-63	63-65.5	65.5-68	68-71.5	71.5-73	73-78	78-80	80-84	84-87	87-90
Alisporites robustus										+	+	+		+			
Araucariacites australis										+	+	+	+	+	+	+	+
Baculatisporites comaumensis										+							
Brachysaccus microsaccus															+		
Calamaspora sp.																	+
Callialasporites dampieri										+							
" microvelatus														+	+		
" minus															+	+	
" turbatus										+			+	+		+	
Caytonipollenites pallidus										+			+			+	
Ceratosporites spinosus										+							
Cerebropollenites mesozoicus										+	+		+	+		+	
Cingutriletes clavus										+							
Classopollis classoides										+		+	+	+	+	+	+
Contignisporites problematicus										+					+		
Cyathidites australis							+			+	+	+	+	+	+	+	
" concavus										+						+	
" minor				+			+			+	+	+	+	+	+	+	+
Densoisporites crassus										+							

TABLE NO II

PALYNOMORPHIC CONTENT	STRATIGRAPHICAL RANGE	PRESENCE OF PALYNOMORPHS IN SAMPLE INDICATED BY "+" SIGN																
		Sample no.	24514	24515	24516	24517	24518	24519	24520	24521	24522	24523	24524	24525	24526	24527	24528
BORE NO 62	TRIAS / JURASSIC L M U / CRETA-CEOUS	Depth (m)	39-44	44-50	50-52	52-57	57-60	60-63	63-65.5	65.5-68	68-71.5	71.5-73	73-78	78-80	80-84	84-87	87-90
"Dino" 1										+	+						
"Dino" 2										+				+	+		
Eucommiidites troedsonii																+	+
Exesipollenites scabrosus			+														
Ginkgocycadophytus nitidus							+			+	+	+	+	+	+		+
Ischyosporites granulosus														+		+	
Leptolepidites major										+							
" paverus														+			
Marattisporites scabratus										+	+		+	+	+		
Oculopollis cardinalis								+									
Osmundacidites wellmanii										+							
Parvisaccites emigmatus										+							
Perinopollenites elatoides										+		+		+	+	+	
Todisporites major													+			+	
Spheripollenites scabratus?							+						+		+	+	
" subgranulatus																	
" sp.																	
Uvaesporites argenteaeformis													+				
Megaspore																	
Unidentified																	

TABLE NO III: Comparison of palynomorphic content of the three borings with other previously investigated Jurassic sediments in Scania. Presence at any one locality is indicated by a "+" sign (those species recorded only at Eriksdal or only at Vilhelmsfält have been omitted)

PALYNOMORPHIC CONTENT	KNOWN STRATIGRAPHICAL DISTRIBUTION					BORE 159	BORE 64	BORE 62	Eriks-dal	Vilhelms-fält
	Tr.	L.J.	M.J.	U.J.	Cr.					
Alisporites robustus						+	+	+	+	+
Araucariacites australis						+	+	+	+	+
Auritulinasporites scanicus						+				+
Baculatisporites comaumensis						+		+	+	+
Brachysaccus microsaccus						+	+	+	+	+
Calamaspora mesozoicus						+	+	+	+	
Callialasporites dampieri						+	+	+	+	+
" microvelatus						+	+	+		+
" minus						+	+	+	+	+
" turbatus						+	+	+	+	+
Caytonipollenites pallidus						+	+	+	+	+
Ceratosporites spinosus						+		+		+
Cerebropollenites mesozoicus						+	+	+	+	+
Chasmatosporites apertus						+	+		+	
Cingutriletes clavus								+		+
Classopollis classoides						+		+	+	+
" chateaunovi						+				
Contignisporites dunrobinensis							+			+
" problematicus						+	+	+	+	+
" rugulatus						+	+			
Coralllina meyeriana						+				+
Crassosphaera							+			+
Cyathidites australis						+	+	+	+	+
" concavus						+	+	+	+	+
" minor						+	+	+	+	+
Deltoidospora minor							+			
Densoisporites crassus						+		+	+	+
" velatus						+	+		+	+
"Dino" -1						+	+	+		
"Dino" -2								+		
Exesipollenites scabrosus						+	+	+		+
Eucommiidites troedsonii								+	+	+

TABLE NO III: Comparison of palynomorphic content (continued)

PALYNOMORPHIC CONTENT	KNOWN STRATIGRAPHICAL DISTRIBUTION					BORE 159	BORE 64	BORE 62	Eriks-dal	Vilhelms-fält
	Tr.	L.J.	M.J.	U.J.	Cr.					
Ginkgocycadophytus nitidus						+	+	+	+	+
Gleicheniidites senonicus						+	+		+	+
Ischyosporites granulosus								+	+	+
" variegatus						+	+			+
Klukisporites neovariegatus							+			
Leiofusa jurassica						+				+
Leptolepidites bossus						+				+
" equatibossus						+			+	+
" major						+	+	+	+	+
" paverus						+		+		+
" rotundus						+	+		+	+
" sp.						+	+			
Lophotriletes sp.										
Lycopodiacidites rugulatus							+		+	+
Lycopodiumsporites clavatoides						+	+		+	+
" paniculatoides						+	+		+	+
" reticulumsporites						+	+		+	+
" sp.						+	+			
" vilhelmi						+				+
Marattisporites scabrosus						+	+	+	+	+
Monolites couperi							+		+	+
Murospora florida						+				+
" sp.						+				+
Nannoceratopsis spiculata						+				
Neoraistrickia gristhorpensis						+	+		+	+
" sp.							+			
Oculopollis cardinalis								+		
Osmundacidites wellmanii						+	+	+	+	+
Parvisaccites enigmatus						+	+	+		+
Perinopollenites elatoides						+	+	+	+	+
Podocarpidites sp.						+				+
Protopinus scanicus						+			+	+
Sestrosporites pseudoalveolatus						+	+		+	+
Spheripollenites scabratus						+		+	+	+
" subgranulatus						+	+	+	+	+
" sp.								+		

TABLE NO III: Comparison of palynomorphic content (continued)

PALYNOMORPHIC CONTENT	KNOWN STRATIGRAPHICAL DISTRIBUTION					BORE 159	BORE 64	BORE 62	Eriks-dal	Vilhelms-fält
	Tr.	L.J.	M.J.	U.J.	Cr.					
Todisporites major		—	—			+	+	+	+	+
" minor			—			+	+		+	+
" sp.							+			
Undulatisporites concavus		—	—			+	+			+
" mesozoicus						+				
Uvaesporites argenteaeformis		—	—	—	—			+	+	+
" puzzlei			—			+				+
Megaspore?								+		
Unidentified						+	+	+		

APPENDIX

(1) All photographs have been taken at a magnification of x 1000 under oil immersion with a Leitz camera mounted on the Leitz Wetzlar microscope no. 890784 at the Swedish Geological Survey, Stockholm.

(2) The slides are the property of the Swedish Geological Survey and are at present to be found at the Stockholm address. Together with the slides is deposited a reference table containing the figure numbers from this manuscript, the corresponding slide numbers and likewise the appropriate co-ordinate reference numbers.

Plates I - VI

Plate I

Figs: 1 & 2 *Alisporites robustus* NILSSON

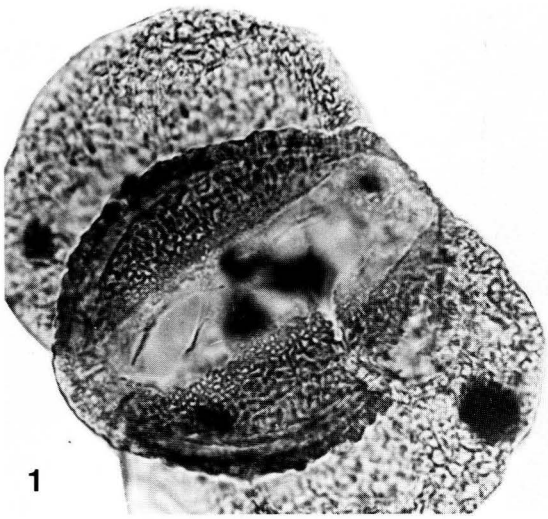
3 *Araucariacites australis* COOKSON

4 *Baculatisporites comaumensis* (COOKSON) POTONIÉ

5 & 6 *Brachysaccus microsaccus* (COUPER) MÄDLER

7 *Calamaspora mesozoicus* COUPER

8 *Callialasporites dampieri* (BALME) DEV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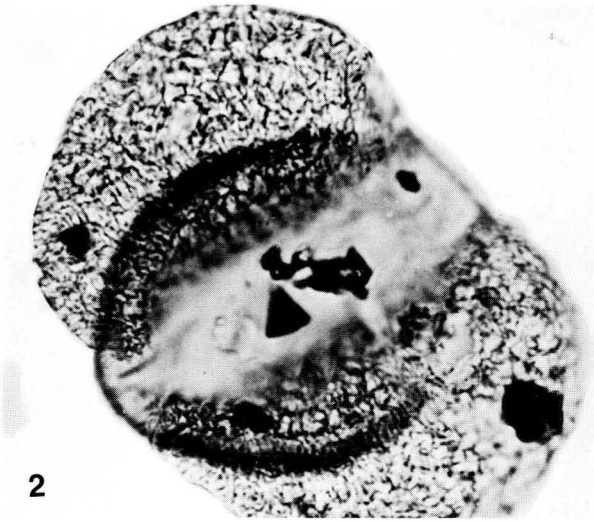
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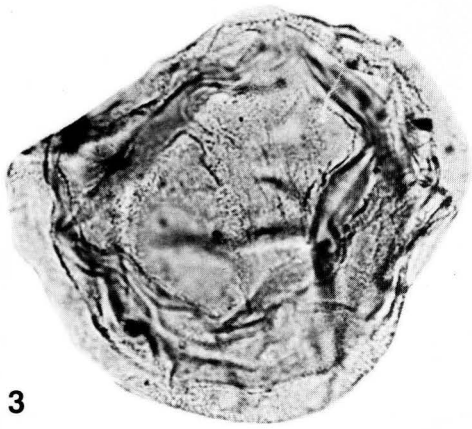
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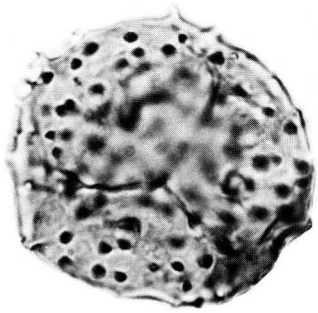
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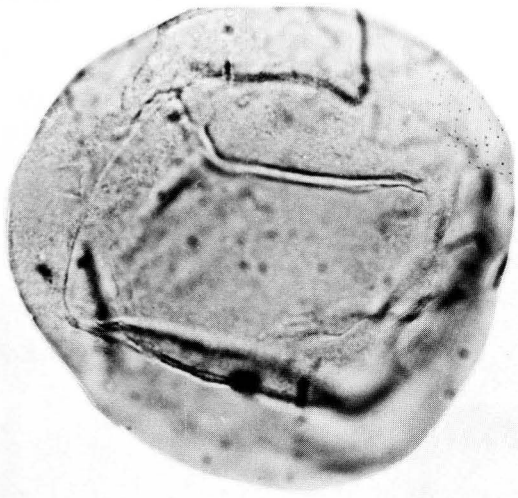
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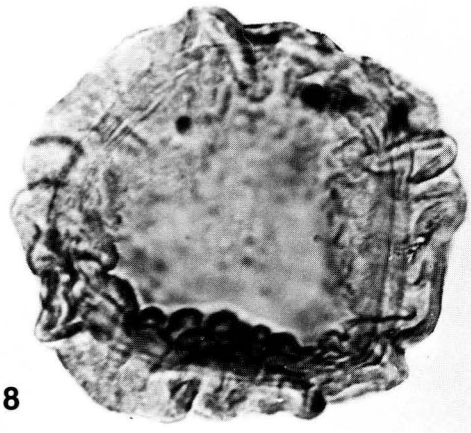
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Plate II

Figs:

9 *Callialasporites microvelatus* SCHULZ

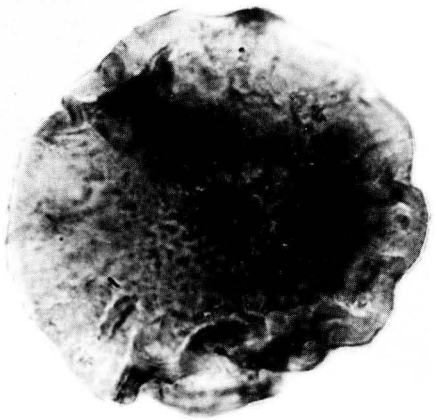
10 *Callialasporites minus* (TRALAU) GUY

11 *Callialasporites turbatus* (BALME) SCHULZ

12 & 13 *Cerebropollenites mesozoicus* (COUPER) NILSSON

14 & 15 *Ceratosporites spinosus* SCHULZ

16 & 17 *Classopollis chateaunovi* REYRE



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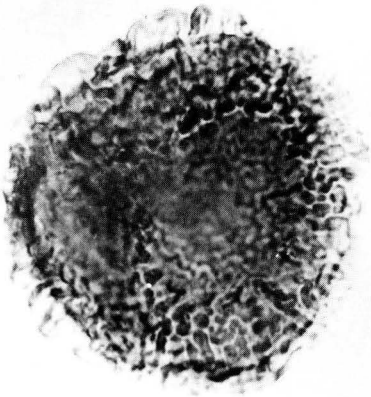

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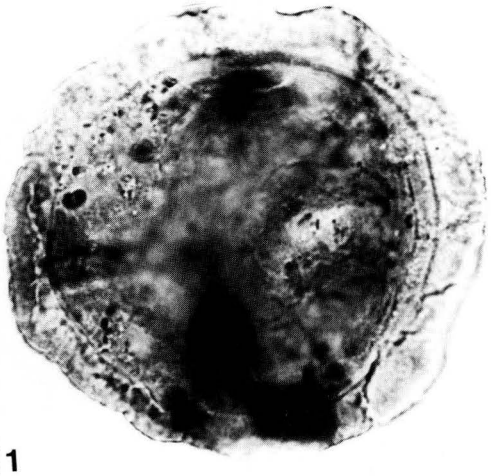

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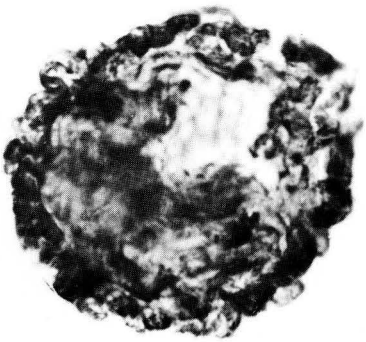

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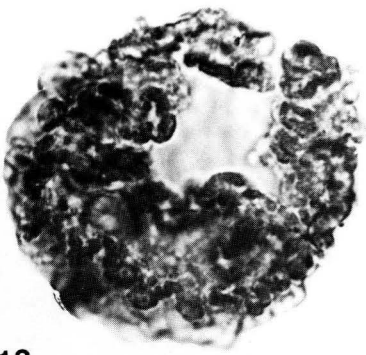

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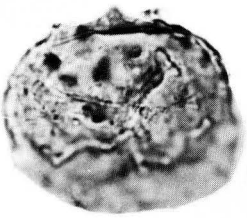

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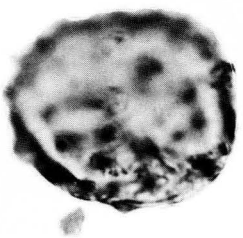

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17

Plate III

Figs: 18 & 19 *Chasmatosporites apertus* (ROGALSKA) NILSSON

20 *Cingutriletes clavus* (BALME) DETTMAN

21 *Contignisporites dunrobinensis* (COUPER) SCHULZ

22 & 23 *Contignisporites problematicus* (COUPER) DÖRING

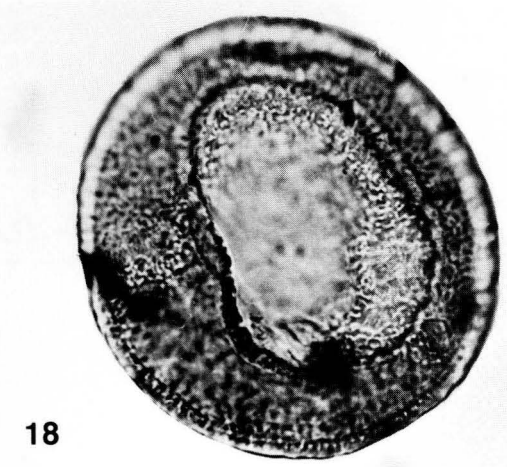
24 *Corallina meyeriana* (KLAUS) VENKATACHALA et GÓCZÁN

25 *Crassosphaera sp.*

26 *Cyathidites australis* COUPER

27 *Cyathidites concavus* (BOLKHOVITINA) DETTMAN

28 *Cyathidites minor* COUPER



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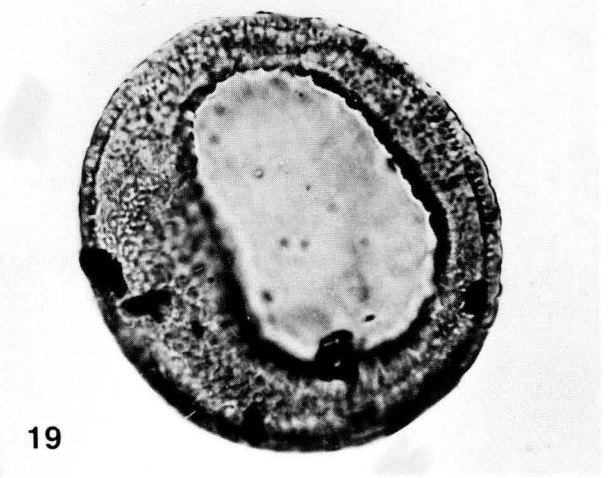

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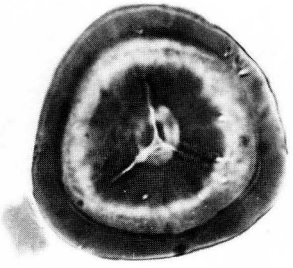

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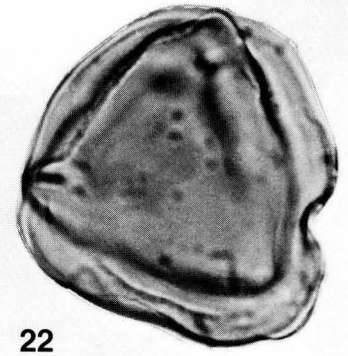

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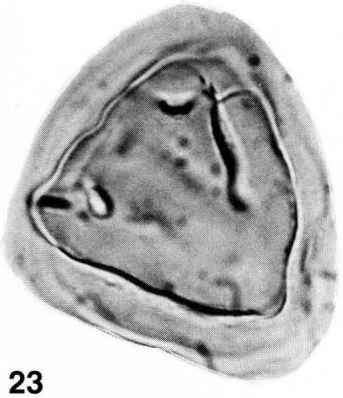

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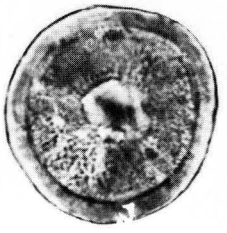

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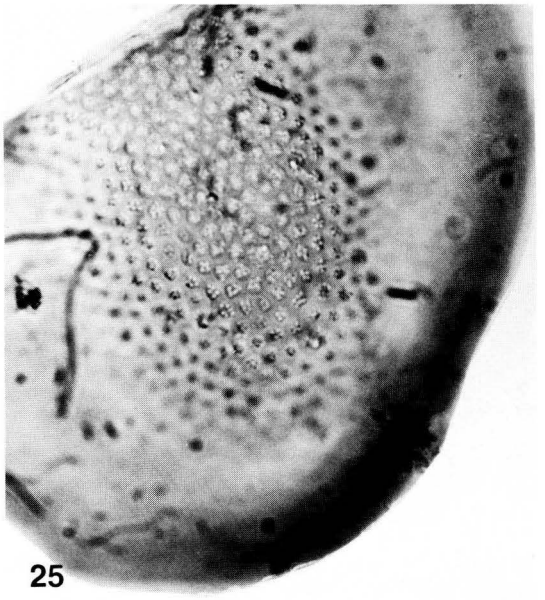

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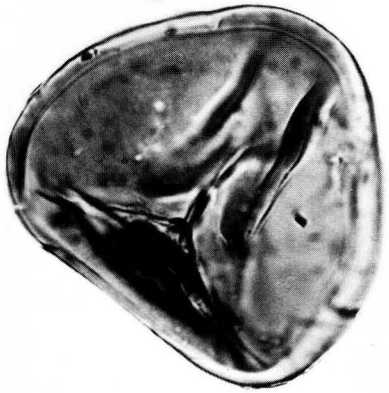

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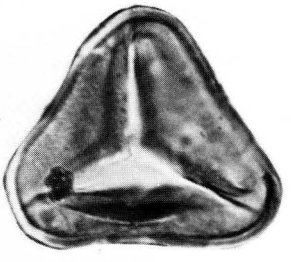

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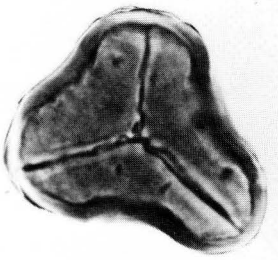


27

Plate IV

Figs: 29 & 30 *Densoisporites velatus* WEYLAND et KRIEGER

31 "Dino" 1

32 "Dino" 2

33 *Exesipollenites scabrosus* NORRIS

34 *Eucommiidites troedssonii* ERDTMAN

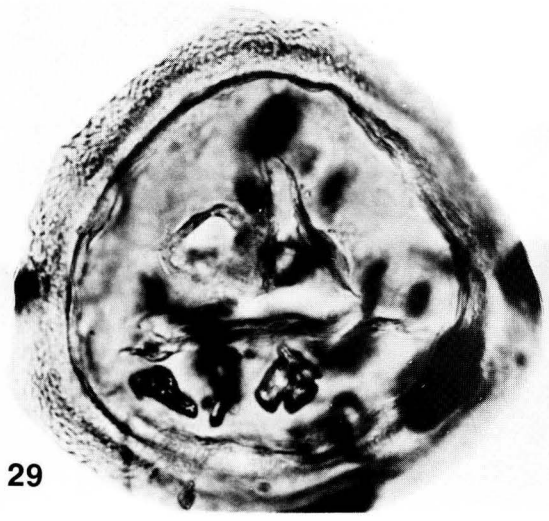
35 *Ginkgocycadophytus nitidus* (BALME) de JERSEY

36 & 37 *Gleicheniidites senonicus* ROSS

38 *Ischyosporites granulosus* TRALAU

39 & 40 *Ischyosporites variegatus* (COUPER) SCHULZ

41 *Leptolepidites bossus* (COUPER) SCHULZ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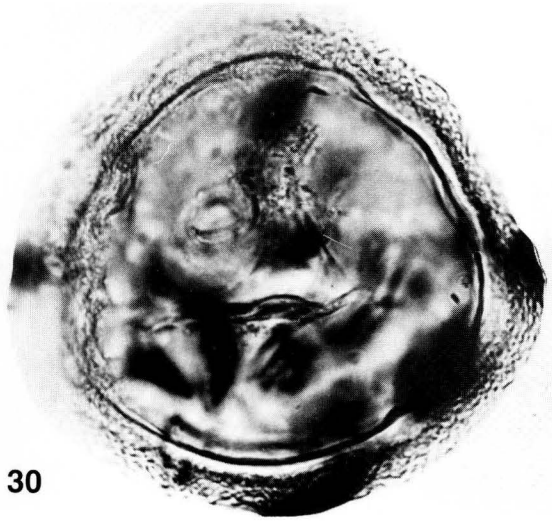
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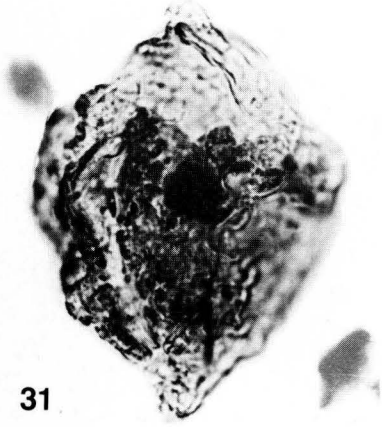
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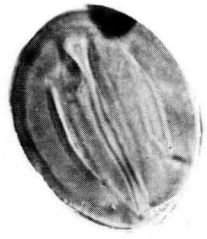
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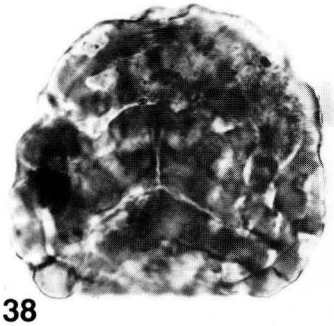
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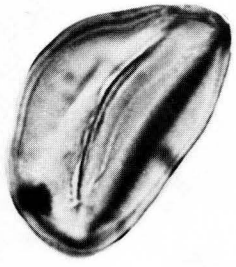
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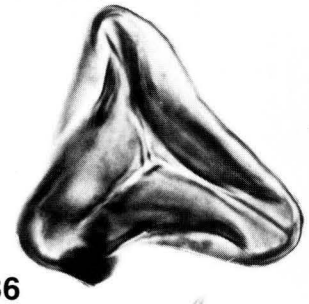
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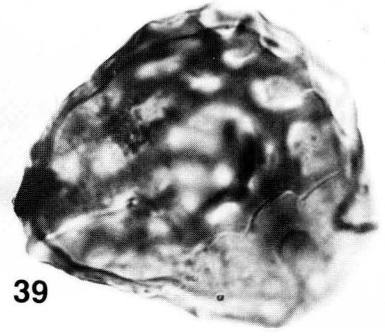
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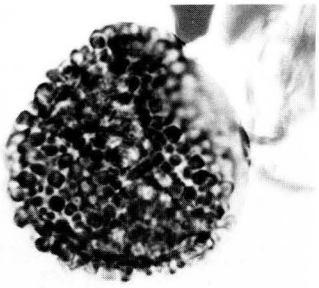
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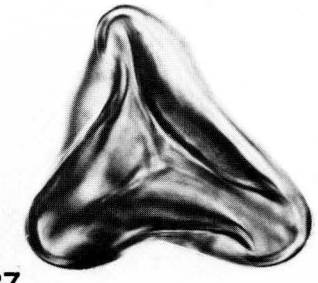
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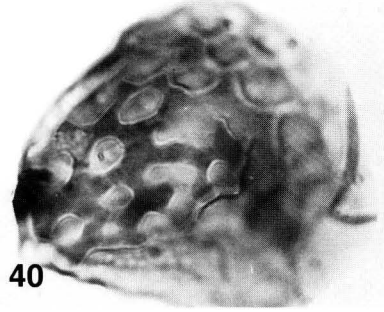
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Plate V

Figs: 42 *Lycopodiacidites rugulatus* (COUPER) SCHULZ

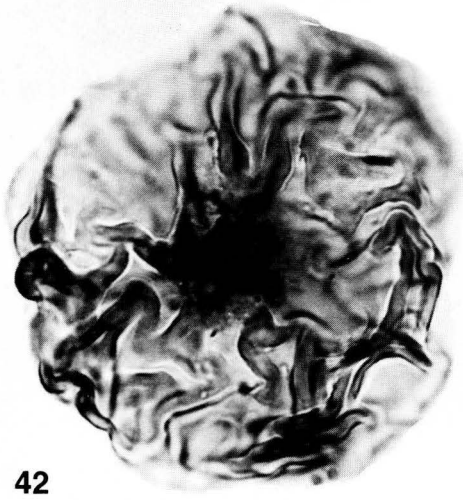
43 & 44 *Lycopodiumsporites clavatoides* (COUPER) TRALAU

45 *Lycopodiumsporites reticulumsporites* (ROUSSE) DETTMANN

46 *Lycopodiumsporites vilhelmi* GUY

47 & 48 *Murospora florida* (BALME) POCOCK

49 & 50 *Neoraistrickia gristhorpensis* (COUPER) TRALAU



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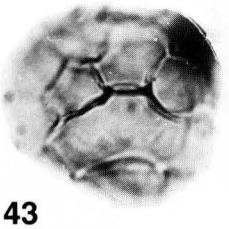

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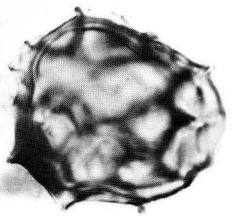

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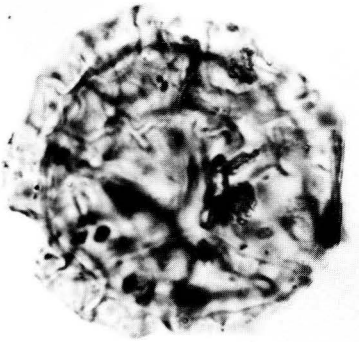

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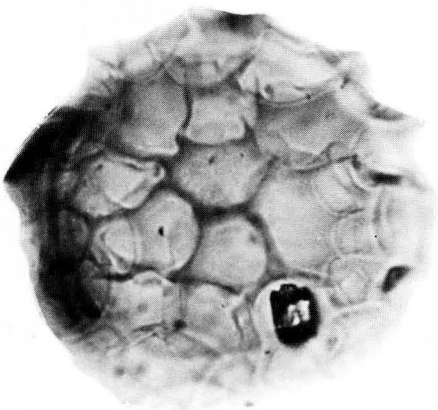

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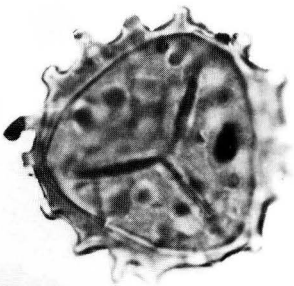

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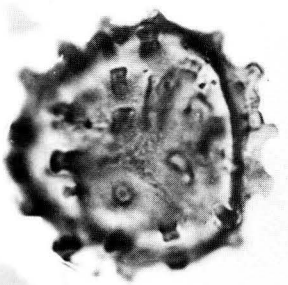

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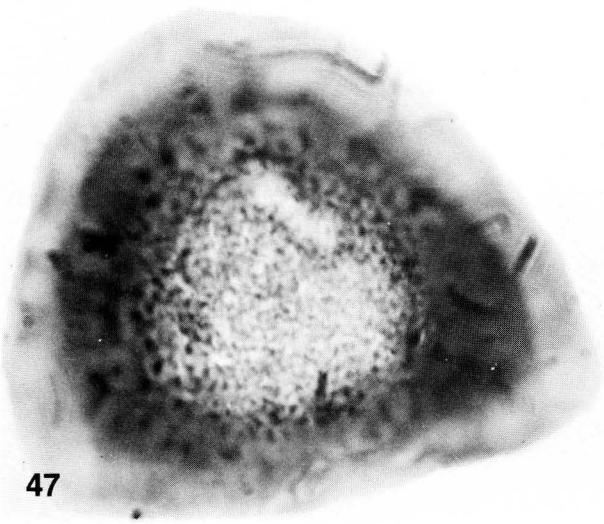

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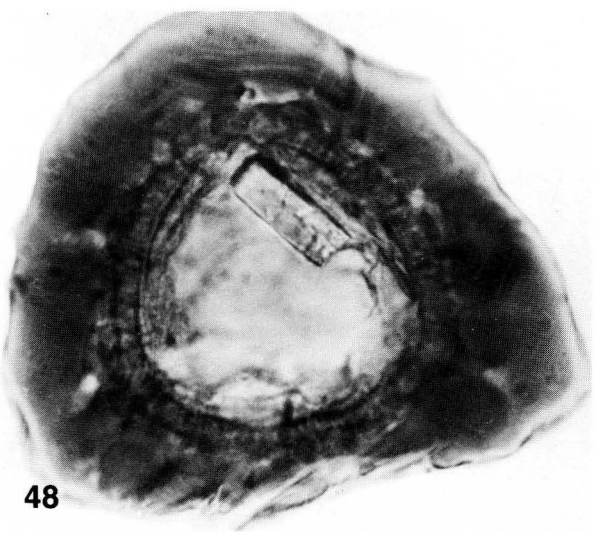

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Plate VI

Figs: 51 & 52 *Parvisaccites enigmatus* COUPER

53 *Perinopollenites elatoides* COUPER

54 *Podocarpidites sp.*

55 *Sestrosporites pseudoalveolatus* (COUPER) DETTMANN

56 *Spheripollenites scabratus* COUPER

57 *Spheripollenites subgranulatus* COUPER

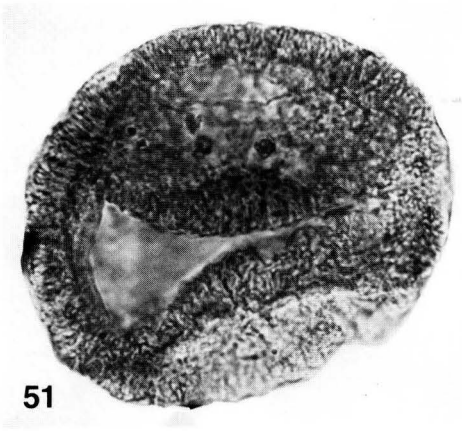
58 *Todisporites major* COUPER

59 & 60 *Oculopollis cardinalis* WEYLAND et KRIEGER

61 & 62 *Uvaesporites argenteaeformis* (BOLKHOVITINA) SCHULZ

63 *Undulatisporites concavus* KEDVES

64 *"Undulatisporites mesozoicus"*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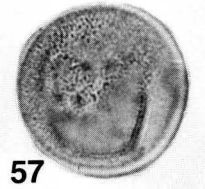
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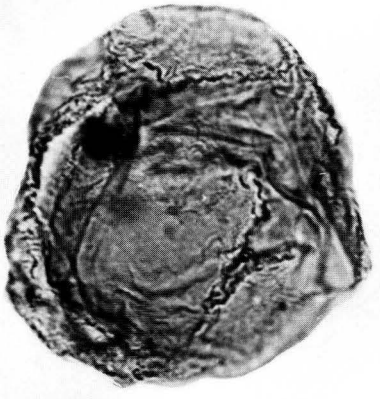
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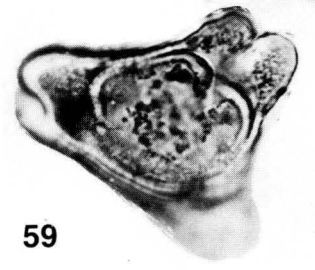
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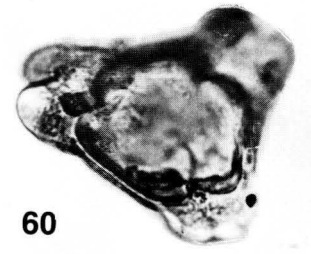
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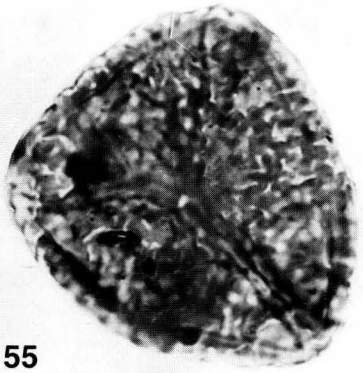
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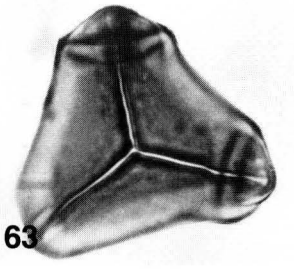
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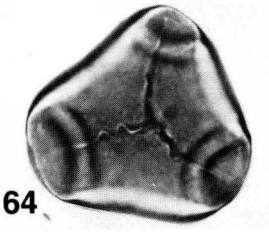
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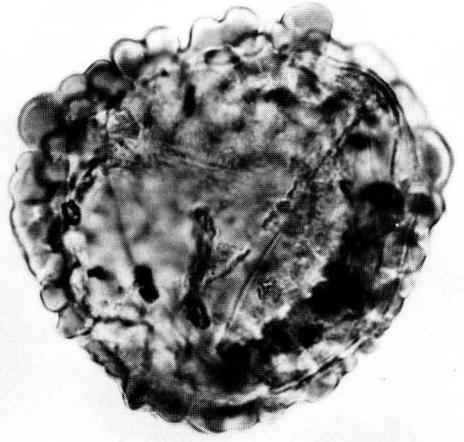
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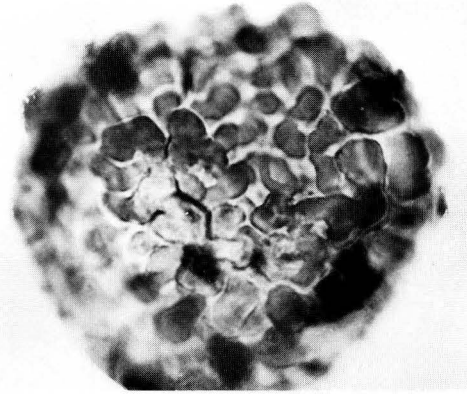
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