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PALYNOLOGY OF MESOZOIC CORE SAMPLES FROM SVERDRUP BASIN OF ARCTIC CANADA

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CONTENTS

INTRODUCTION

Palynological assemblages from 50 cores in 27 different wells in the Sverdrup Basin of Arctic Canada are described in this report. They are chiefly of Jurassic age, but include three of Triassic and one of Cretaceous age.

The cores examined are from Andreason L-32 core 1; Depot Island C-44 core 1; Drake D-73 core 2; Drake E-78 core 1; Drake F-16 core 1; Drake I-55 core 1; Drake N-67 core 1 and core 2; East Drake P-40 core 1; Dumbbells E-49 core 1 and core 2; Elve M-40 core 1; Emerald K-33 core 1 and core 2; Graham C-52 core 2; Hecla C-32 core 1; N.W. Hecla M-25 core 1 and core 2; W. Hecla C-05 core 1; W. Hecla N-52 core 1; Helicopter J-12 core 1; King Christian N-06 core 1; Kristoffer Bay B-06 core 1; Pedder Point D-48 core 1; Romulus C-42 core 1; Sandy Point L-46 core 1; Sherard Bay F-14 core 1 and core 2; Sirius K-28 core 1 and core 2; Thor P-38 core 1; Wallis K-62 core 1 and core 2, and Wilkins E-60 core 1.

A summary of the ages of the assemblages is given overleaf (see Table 1 and Chart 1) and each sample is discussed in detail in the following section. The appendix contains a list of palynomorphs recorded from each sample.

Several different assemblages are present. A Karnian, an early Rhaetian dinoflagellate assemblage and a non-marine Rhaetian assemblage from Drake N-67 and Drake F-16 respectively, are the only Triassic cores described here. The majority of the samples examined here are of early Liassic age. Many of these contain large quantities of recycled Rhaetian and Devonian spores. Evidence of reworking is sometimes so overwhelming that

Jurassic species form only a very small proportion of the assemblage. The exact position of some of these samples in the early Liassic was difficult to ascertain especially when the sample was non-marine. This is because the pre-late Pliensbachian floras are still poorly defined and there seem to be few species with stratigraphic potential present.

Other assemblages from the Early, Middle and Late Jurassic age are described here along with a single sample of Hauterivian-Barremian age.

Table 1 SUMMARY OF RESULTS

Well Locations	Depth	GSC Loc. No.	Age	Environment of deposition *
ANDREASEN L-32				
Core 1	not available	C-53291	early Liassic	M
DEPOT ISLAND C-44				
Core 1	2080'	C-85232	? late Pliensbachian	M
Core 1	2135'	C-85232	early Liassic	M
DRAKE D-73				
Core 2	4057'	C-77599	early Liassic, pre-late Pliensbachian	NM
Core 2	4075'	C-77599	early Liassic, pre-late Pliensbachian	NM
DRAKE E-78				
Core 1	4120'	C-64159	possibly Hettangian	M
DRAKE F-16				
Core 1	3510'	C-67700	late Toarcian or Aalenian	M
Core 1	3550'	C-67700	probably pre-late Pliensbachian	M
Core 1	3588'	C-67700	probably pre-late Pliensbachian	M
Core 1	3626'	C-67700	Rhaetian or ? early Liassic	NM
Core 1	3720'	C-67700	early Rhaetian	M
DRAKE I-55				
Core 1	3594'	C-85225	? late Pliensbachian	M
Core 1	3660'	C-85225	early Liassic, pre-late Pliensbachian	NM
DRAKE N-67				
Core 1	3158'	C-85226	late Toarcian	M
Core	4090'	C-30239	probably Karnian	M
EAST DRAKE P-40				
Core 1	3175'	C-85231	early Liassic, ? late Pliensbachian	M
DUMBBELLS E-49				
Core 1	4902'	C-46848	Hauterivian-Barremian	M
Core 2	8494'	C-46848	early Oxfordian	M
ELVE M-40				
Core 1	10' from top of core	C-46844	? late Pliensbachian	M
EMERALD K-33				
Core 1	2105'	C-30844	mid Kimmeridgian	M
Core 2	4015'	C-30844	late Pliensbachian	M
GRAHAM C-52				
Core 2	not available	C-46846	Middle to Late Jurassic	M

Table 1 SUMMARY OF RESULTS

Well Locations	Depth	GSC Loc. No.	Age	Environment of deposition
HECLA C-32				
Core 1	3410'	C-85228	late Toarcian or Aalenian	M
Core 1	3443'	C-85228	late Pliensbachian	M
Core 1	3470'	C-85228	early Liassic, pre-late Pliensbachian	M
NW HECLA M-25				
Core 1	3195'	C-77598	late Pliensbachian	M
Core 2	3285'	C-77598	late Pliensbachian	M
Core 2	3357'	C-77598	probably Sinemurian or early Pliensbachian	M
Core 2	3371'	C-77598	early Liassic, pre-late Pliensbachian	NM
Core 2	3458'	C-77598	early Liassic, pre-late Pliensbachian	NM
W. HECLA C-05				
Core 1	3621'	C-85227	early Liassic	NM
Core 1	3636'	C-85227	early Liassic	NM-(M)
Core 1	3645'	C-85227	early Liassic	NM-(M)
W. HECLA N-52				
Core 1	2735'	C-77597	early Liassic	NM
HELICOPTER J-12				
Core 1	12,497'	C-46867	Indeterminate	-
KING CHRISTIAN N-06				
Core 1	2000'	C-39376	late Pliensbachian - early Toarcian	M
KRISTOFFER BAY B-06				
Core 1	4770'	C-48846	late Pliensbachian - early Toarcian	M
PEDDER POINT D-48				
Core 1	5500'	C-85229	Oxfordian, probably early	M
Core 1	5518'	C-85229	early Middle Jurassic at the oldest	M
ROMULUS C-42				
Core 1	4145'	C-53429	Middle to Late Jurassic	M
SANDY POINT L-46				
Core 1	1940'	C-30224	late Toarcian or Aalenian	M
SHERARD BAY F-14				
Core 1	3822'	C-80209	late Pliensbachian	M

Table 1 SUMMARY OF RESULTS

Well Locations	Depth	GSC Loc. No.	Age	Environment of deposition
SHERARD BAY F-14				
Core 1	3860'	C-80209	early Liassic	M
Core 2	3880'	C-80209	early Liassic	NM
SIRIUS K-28				
Core 1	2930'	C-55435	Liassic ? pre-late Pliensbachian	M
Core 2	4700'	C-55435	early Liassic	M
THOR P-38				
Core 1	not available	C-46843	Indeterminate	-
WALLIS K-62				
Core 1	5435'	C-85230	late Callovian	M
Core 2	6500'	C-85230	late Sinemurian-early Pliensbachian	M
WILKINS E-60				
Core 1	not available	C-30221	possibly Hettangian	M

* M.....marine environment of deposition
NM.....non-marine

CHART I. PALYNOLOGICAL CORRELATION OF CORES

DISCUSSED IN TEXT (in alphabetical order)

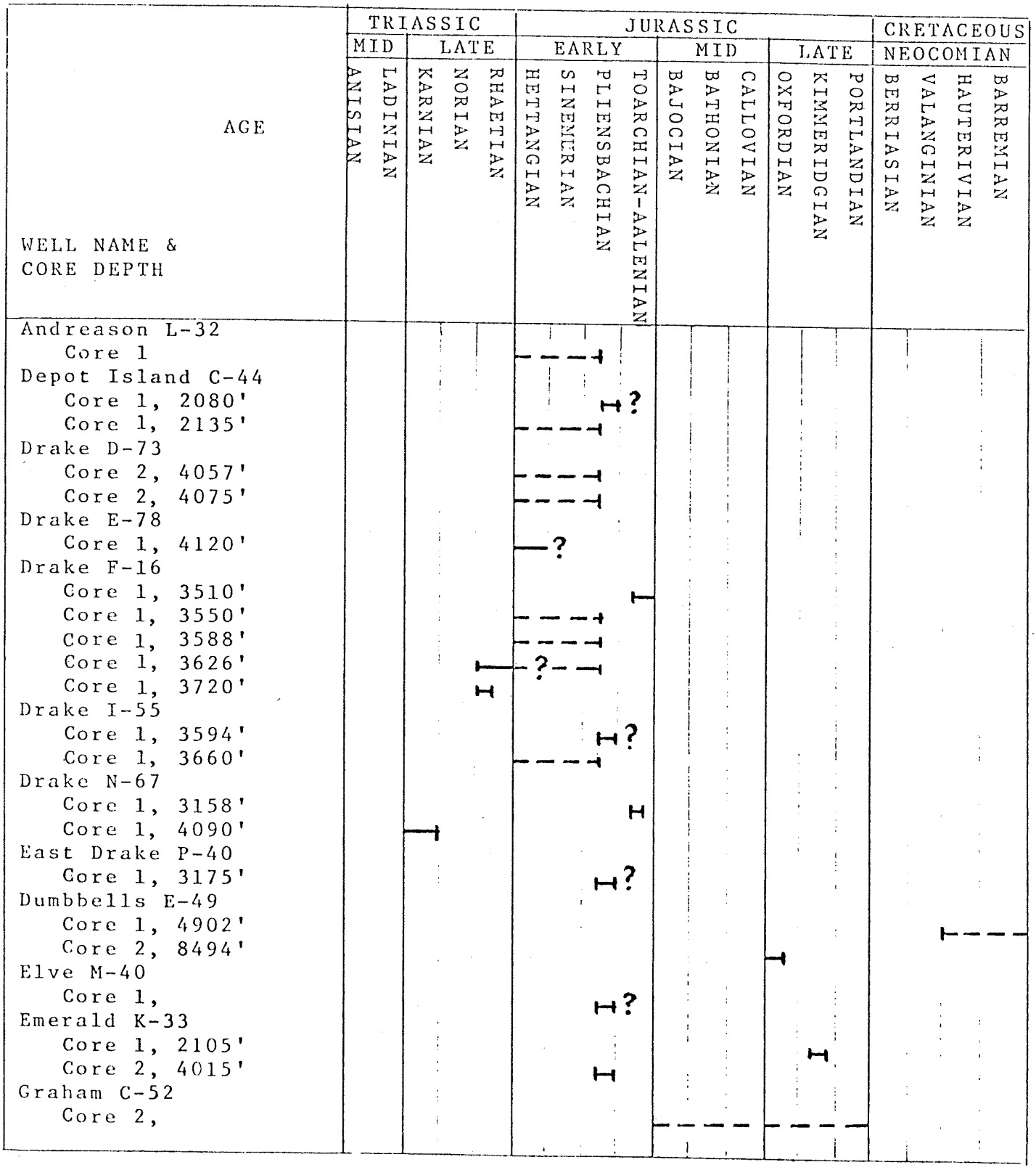

CHART I. (continued)

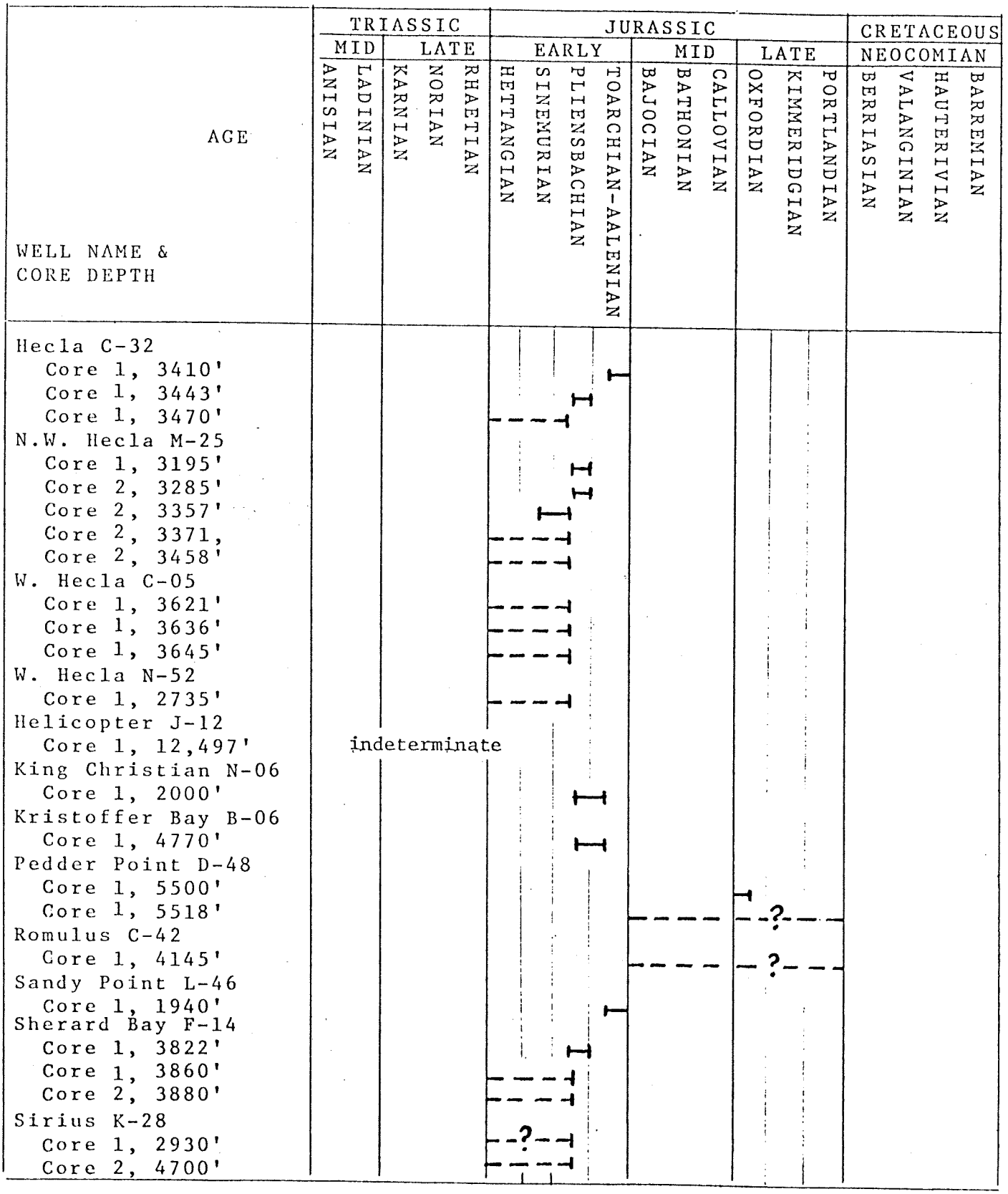

CHART I. (continued)

AGE	TRIASSIC				JURASSIC									CRETACEOUS			
	MID		LATE		EARLY				MID			LATE		NEOCOMIAN			
WELL NAME & CORE DEPTH	ANISIAN	LADINIAN	KARNIAN	NORIAN	RHAETIAN	HETTANGIAN	SINEMURIAN	PLIENSBACHIAN	TOARCHIAN-AALENIAN	BAJOCIAN	BATHONIAN	CALLOVIAN	OXFORDIAN	KIMMERIDGIAN	PORTLANDIAN	BERRIASIAN	VALANGINIAN	HAUTERIVIAN	BARREMIAN
Thor P-38 Core 1	indeterminate																		
Wallis K-62 Core 1, 5435'																			
Core 2, 6500'																			
Wilkins E-60 Core 1						?													

INDIVIDUAL SAMPLE

DESCRIPTION, AGE AND ENVIRONMENT

(in alphabetical order)

ANDREASEN L-32

Depth: Core 1, no depth available C-53291

Age: early Liassic,

Environment: marine

Remarks: Abundant carbonised spores, pollen and dinoflagellates are present amongst inertinite fragments. An early Liassic is proposed because of the occurence of Lycopodiumsporites semimuris, L. austroclavatidites, Stereisporites sp. and Classopollis classoides. Undescribed simple dinoflagellates are common but only one specimen of Mancodinium sp. was recognised. Palaeozoic reworking is present.

DEPOT ISLAND C-44

Depth: 2080' Core 1, very top of core. C-85232

Age: ? Late Pliensbachian

Environment: marine

Remarks: Infrequent thin microfossils are interspersed with abundant inertinite in this marine sample. A late Pliensbachian age is tentatively assigned on the basis of rare specimens of Maturodinium sp., Mancodinium sp. and a questionable Nannoceratopsis sp. Small specimens of the genus Micrhystridium are abundant, probably indicating a restricted marine environment such as a tidal lagoon. Small indeterminate dinoflagellates and foraminiferal tests are also common. Some Devonian, Norian and Rhaetian forms are present, together with a poor assemblage of long-ranging Jurassic pollen. Spheripollenites spp. which are fre-

quently abundant in the Late Pliensbachian to early Toarcian are absent.

Depth: 2135' Core 1, at base of core C-85232

Age: early Liassic

Environment: marine

Remarks: Large plant fragments, inertinite and infrequent spores, pollen and dinoflagellates make up this assemblage. An early Liassic age is indicated by occasional specimens of Stereisporites perforatus and Polycingulatisporites sp. The remaining species are Rhaetian with Cingulizonates rhaeticus being the most common form. Riccisporites tuberculatus is strangely rare. Palaeozoic, including Famennian reworked forms are present as are rare in situ dinoflagellates, one of which is probably a new genus.

DRAKE D-73

Depth: 4057' Core 2 C-77599

Age: early Liassic, pre late Pliensbachian

Environment: slight marine influence

Depth: 4075' Core 2 C-77599

Age: early Liassic, pre late Pliensbachian

Environment: non marine

Remarks: Both assemblages are impoverished and contain abundant inertinite. However, forms commonly found in the early Jurassic

are present in small numbers eg. Lycopodiumsporites semimuris, Stereisporites perforatus. The absence of late Pliensbachian index fossils points to an earlier Jurassic date. Also present are Rhaetian forms such as Riccisporites tuberculatus, which is more common in the lower sample (4075'), and Cingulizonates sp.. Palaeozoic reworking is more pronounced in the lower sample. An early Liassic age, ie. pre late Pliensbachian is proposed for both samples.

DRAKE E-78

Depth: 4120' Core 1 C-64159

Age: early Liassic, possibly Hettangian

Environment: marine

Remarks: An early Liassic age is indicated for the carbonised marine sample by Lycopodiumsporites semimuris and L. austroclavatidites. Specimens resembling Cleistosphaeridium sp. which Morbey (1975) recorded from the Hettangian of Europe suggests a Hettangian age for this sample. A few indeterminate dinoflagellates and representatives of the Norian genera Sverdrupiella, Noricysta and Hebecysta are present. The latter are considered to have been reworked. Foraminifera occur frequently in this sample. The non-marine element consists of some bisaccates, tetrads of Granuloperculatisporis rudis and a few Rhaetian and Norian forms. This sample is probably of the same age as Core 1 in Wilkins E-60.

DRAKE F-16

Depth: 3510' Core 1 C-67700

Age: Late Toarcian or Aalenian

Environment: marine

Remarks: Finely dispersed sapropel is interspersed amongst thin and poorly preserved spores, pollen and dinoflagellates. Nannoceratopsis gracilis in association with N. senex indicates a Toarcian or Aalenian date and the lack of Spheripollenites clumps further restricts the age to post early Toarcian. Undescribed dinoflagellates are common, together with infrequent specimens of the late Pliensbachian-Aalenian form Scriniocassis cf. weberi. The acritarch genera Micrhystridium and Veryhachium are rare. The non-marine element consists of common bisaccate pollen including Alisporites robustus and infrequent Lycopodiumsporites spp. and Classopollis classoides.

Depth: 3550' Core 1 C-67700

Age: probably pre late Pliensbachian

Environment: marine

Remarks: Abundant inertinite is intermingled with very thin and often corroded palynomorphs in this impoverished assemblage. A marine environment is indicated by the rare undescribed dinoflagellates and Micrhystridium sp., but none of the stratigraphically useful plankton species is present. A pre-late Pliensbachian age is tentatively assigned.

Depth: 3588' Core 1 C-67700

Age: probably pre late Pliensbachian

Environment: marine

Remarks: Abundant inertinite and thin, sometimes pyretised microfossils characterise this sample, as in the previous one (3550'). The non marine element is more abundant than in 3550' and indicates an early Jurassic age. The absence of late Pliensbachian index forms indicates a pre-late Pliensbachian age as in the previous sample.

Depth: 3626' C-67700

Age: Raetian or ? early Liassic

Environment: non marine

Remarks: This sample is poorly preserved with much inertinite. Abundant Riccisporites tuberculatus and recycled Palaeozoic spores dominate the assemblage, but other Rhaetian species and a specimen of the Norian dinoflagellate Sverdrupiella are also present. This sample is overtly Rhaetian but as there frequently is reworking at the base of the Liassic, this assemblage could consist totally of material recycled into basal Liassic sediments.

Depth: 3720' Core 1 C67700

Age: early Rhaetian

Environment: marine

Remarks: The abundance of Sverdrupiella species including S. usitata, S. mutabilis, S. ornaticingulata, indicates a strong Norian influence. The associated pollen and spores are typically

Rhaetian but sometimes occur in the late Norian. Lycopodium-sporites semimuris is not generally found in samples older than the Rhaetian so an early Rhaetian age is assigned. Bujak and Fisher, 1976, recorded Norian dinoflagellates from 3721' in this well, ie. immediately below the sample examined here.

DRAKE I-55

Depth: 3594' Core 1 C-85225

Age: ? late Pliensbachian

Environment: marine

Remarks: Abundant inertinite, carbonised plant debris and infrequent, poorly preserved palynormorphs characterise this sample. The spore-pollen assemblage is typical of the early Jurassic, but unfortunately the few dinoflagellates present are of little stratigraphic use. One questionable specimen of Mancodinium sp. may indicate a late Pliensbachian age but this is obviously highly tentative. Recycled Devonian, often Famennian spores and megaspores are common.

Depth: 3660' C-85225

Age: early Liassic, pre late Pliensbachian

Environment: non-marine

Remarks: Abundant inertinite is intermixed in this non-marine sample with a fairly diverse assemblage of carbonised early Jurassic and Rhaetian spores and pollen. The younger element is typified by Lycopodiumsporites austroclavatidites, Stereisporites

perforatus and S. cicatricosus. Rhaetian species constitute the bulk of the assemblage with Riccisporites tuberculatus abundant. Reworked Palaeozoic spores and megaspores are common.

DRAKE N-67

Depth: 3158' Core 1 C-85226

Age: late Toarcian

Environment: marine

Remarks: Core 1 contains a carbonised, poorly preserved marine assemblage of late Toarcian age. This is indicated by the approximately equal numbers of Nannoceratopsis gracilis and N. senex and the lack of Spheripollenites spp. Scriniocassis weberi and indeterminate dinoflagellates comprise the remainder of the marine element. Bisaccate pollen, Classopollis classoides and Devonian spores and megaspores form a large percentage of the non-marine fraction. Some early-middle Triassic forms are also present in small numbers.

Depth: 4090' Core C-30239

Age: probably Karnian

Environment: marine

Remarks: Sparse, thin, poorly preserved, palynomorphs are found amongst abundant sapropel and less frequent inertinite. The occurrence of Granosaccus ornatus and forms resembling Camerosporites secatus indicates a probable Karnian age. Also present are Ovalipollis sp, and possible Rimaesporites sp., Corisaccites

sp., Infernopollenites sp. and Riccisporites umbonatus. Tasmanites sp. is relatively common suggesting a marine or marginal environment of deposition.

EAST DRAKE P-40

Depth: 3175' Core 1 C-85231

Age: early Liassic - ? late Pliensbachian

Environment: marine

Remarks: Pollen and spores are abundant but poorly preserved in this inertinite-rich marine sample. The dinoflagellates are chiefly indeterminate although there are rare, questionable specimens of Pareodinia sp. and Mancodinium sp. which may indicate a late Pliensbachian age. This is very tentative as Nannoceratopsis spp. are absent. The sample could be older ie. early Pliensbachian or Sinemurian. The land-flora contribution to the assemblage is chiefly in the form of Alisporites spp., Chordasporites sp. and Cerebropollenites mesozoicus. The limited number of spores include Lycopodiumsporites semimuris, L. austroclavatidites, Stereisporites cicatricosus and Aratrisporites sp.

DUMBBELLS E-49

Depth: 4902' Core 1, from top of core. C-46848

Age: early Cretaceous, Hauterivian-Barremian

Environment: marine

Remarks: Bisaccate pollen belonging to the genera Alisporites and Podocarpidites forms 95% of this assemblage. Oligospaeridium cf. complex, which ranges from the Valanginian to the Eocene, is the most abundant dinoflagellate present, but it is a specimen of Pseudoceratium nudum which indicates a Hauterivian or Barremian age. Also present are representitives of the genera Gonyaulacysta, Scriniodinium and possibly Hexagonifera. Cicatricosisporites spp. are also present in small numbers.

Depth: 8494' Core 2, from top of core C-46848

Age: early Oxfordian

Environment: marine

Remarks: Numerous clumps of partially decomposed organic debris and poorly preserved pollen and dinoflagellates are present in this sample. Pareodinia ceratophora is the most common dinoflagellate, but it is specimens of Gonyaulacysta jurassica var. longicornis, Acanthaulax sp. and Scriniocassis dictyotum which indicate an early Oxfordian age. Also present are specimens of Sentusidinium sp., Nannoceratopsis pellucida and Gonyaulacysta sp. aff. cladophora.

ELVE M-40

Depth: Core 1, 10' from top of core C-46844

Age: ? late Pliensbachian

Environment: marine

Remarks: Large carbonised fragments of plant tissue and infrequent pollen, spores, and rare dinoflagellates constitute this assemblage. A specimen of Nannoceratopsis senex, the only dinoflagellate of stratigraphic use, suggests a late Pliensbachian age. This is highly tentative due to the paucity of the assemblage. The non-marine element consists of bisaccate pollen including Alisporites grandis and several specimens of Chordasporites sp..

EMERALD K-33

Depth: 2105' Core 1 C-30844

Age: mid-Kimmeridgian

Environment: marine

Remarks: This core contains abundant pollen and dinoflagellates intermixed with inertinite and some plant tissue. The most common dinoflagellates in the assemblage are Scriniocassis dictyotum and Paragonyaulacysta capillosa. The latter species is recorded from the middle Kimmeridgian and younger sediments by Brideaux and Fisher, 1976, from Arctic Canada. The presence, in small numbers, of Gonyaulacysta cladophora, Paragonyaulacysta borealis, Scriniodinium crystallinum, Scriniocassis dictyotum, and

Sirmiodinium grossii supports a middle or late Kimmeridgian age. However, a mid Kimmeridgian age is thought more likely as there are several specimens of Scriniodinium luridum present. Brideaux and Fisher, 1976, found this species occuring regularly in the early Kimmeridgian and only rarely and sporadically in the higher Kimmeridgian. Palaeozoic reworking is quite common in this sample.

Depth: 4015' Core 2 C-30844

Age: Late Pliensbachian

Environment: marine

Remarks: This sample, rich in plant debris, is dominated by Spheripollenites spp., simple, undescribed dinoglagellates and Devonian spores. Nannoceratopsis senex, Mancodinium semitabulatum, and Maturodinium sp. together with abundant Spheripollenites spp. are typical of the late Pliensbachian - early Toarcian. However, the Toarcian-Bajocian index form, Nannoceratopsis gracilis is absent and a late Pliensbachian age is therefore indicated. Also present in this sample are Contignisporites sp., foraminiferal tests, and rare acritarchs.

GRAHAM C-52

Depth: Core 2 C-46846

Age: Middle - Late Jurassic

Environment: marine

Remarks: Infrequent, poorly preserved, often broken microfossils are interspersed amongst carbonised clumps of organic matter. A

number of specimens resembling dinoflagellates are present including one possible Gonyaulacysta sp. which would indicate a Middle to Late Jurassic age. The non-marine element consists chiefly of long-ranging bisaccate pollen, Cerebropollenites mesozoicus and various spores.

HECLA C-32

Depth: 3410' Core 1 C-85228

Age: late Toarcian or Aalenian

Environment: marine

Remarks: Pollen, spores and dinoflagellates are abundant in this sapropel rich sample. The presence of specimens of Nannoceratopsis gracilis and the lack of N. senex and Spheripollenites spp. indicates a late Toarcian or Aalenian age. Mancodinium semitabulatum, Maturodinium inornatum and dinoflagellates resembling Pareodinia sp. are associated with abundant undescribed, simple dinoflagellates and rare acritarchs belonging to the genus Micrhystridium. The non-marine fraction is quite diverse, containing such forms as Alisporites grandis, A. robustus, Cerebropollenites mesozoicus, tetrads of Classopollis classoides, Contignisporites sp. and Quadreculina anellaeformis. Late Devonian spores are also present.

Depth: 3443' Core 1 C-85228

Age: late Pliensbachian

Environment: marine

Remarks: Thin spores and pollen, abundant dinoflagellates and

recycled Devonian species are associated with sapropel. Rare Nannoceratopsis senex and Maturodinium inornatum, combined with frequent Mancodinium semitabulatum, are typical of the late Pliensbachian. Spheripollenites spp., which are often abundant, are absent. Instead, bisaccate pollen grain's are common with representitives of the genera Alisporites, Podocarpidites and Quadreculina. This "upland or inland" flora is intermixed with marine fossils including the genus Micrhystridium, suggesting that the "lowland flora" (Spheripollenites spp. etc) had been inundated and was no longer contributing pollen.

Depth: 3470' Core 1 C-85228

Age: early Liassic, pre-late Pliensbachian

Environment: marine

Remarks: This sample differs from the overlying ones in that the organic residue consists largely of inertinite rather than sapropel. The rare, poorly preserved spores indicate a Liassic age and the few dinoflagellates suggest a pre Late-Pliensbachian age. Acritarchs belonging to the genus Micrhystridium out-number the dinoflagellates. Well preserved Devonian spores again dominate the assemblage.

N.W. HECLA M-25

Depth: 3195' Core 1 C-77598

Age: late Pliensbachian

Environment: marine

Remarks: Spheripollenties spp. and bisaccate pollen are abundant

in this sapropel rich sample. A late Pliensbachian age is indicated by the dinoflagellates Nannoceratopsis senex, Maturodinium inornatum, Mancodinium semitabulatum and the abundant Spheripollenites spp. The absence of Nannoceratopsis gracilis in this otherwise fairly rich marine sample indicates a pre-Toarcian age.

Depth: 3285' Core 2 C-77598

Age: late Pliensbachian

Environment: marine

Remarks: This assemblage is more limited than the overlying one (3195') and the preservation is poorer. Many of the palynomorphs are unidentifyable. The contents differ significantly in that the lowland element (Spheripollenites spp. and Lycopodiumsporites spp. etc.) is absent, but has been replaced by acritarchs and some dinoflagellates which represent a restricted, probably marginal-marine environment. Numerous bisaccates and other pollen represent the "upland or inland" suite. This assemblage appears to represent the initial stages of the Savik incursion when the low lying Spheripollenites-Lycopodiumsporites flora was inundated so that only the upland flora is represented together with the marine elements. The marine fraction consists chiefly of undescribed dinoflagellates and the acritarch Micrhystridium sp.. A late Pliensbachian age is indicated by Nannoceratopsis senex and Maturodinium cf. inornatum.

Depth: 3357' Core 2 C-77598

Age: probably Sinemurian or early Pliensbachian

Environment: marine

Remarks: This interval yielded a small poorly preserved assemblage amongst inertinite and rounded grains of amorphous organic matter. The rare dinoflagellates are of no stratigraphic help and the pollen is composed of long ranging forms. The absence of Spheripollenites spp. and late Pliensbachian dinoflagellates is used to date this sample as probably Sinemurian or early Pliensbachian. It must be noted that this is based on chiefly negative evidence.

Depth: 3371' Core 2 C-77598

Age: early Liassic, pre late Pliensbachian

Environment: non-marine

Remarks: This non-marine sample contains much carbonised plant tissue, frequent well preserved Devonian spores as well as Rhaetian and early Liassic forms. The younger date is suggested by rare specimens of Stereisporites antiquasporites, Classopollis classoides and Alisporites cf. robustus. Recycled Rhaetian forms occur frequently with the most abundant species being Ricci-sporites tuberculatus. Simple apiculate, granulate and verrucate spores are a noticeable feature.

Depth: 3458' Core 2 C-77598

Age: early Liassic, pre late Pliensbachian

Environment: non-marine

Remarks: This assemblage has many similarities with the previous

one (3371'). It is non marine, rich in plant debris and contains rare early Liassic forms such as Stereisporites spp. and Lycopodiumsporites sp. Recycled Devonian spores are more pronounced in this sample, as are Rhaetian species.

WEST HECLA C-05

Depth: 3621' Core 1 C-85227

Age: early Liassic

Environment: non marine

Remarks: In situ palynomorphs are comparitively rare in this sample but there is much carbonised plant tissue and abundant recycled Devonian, especially Famennian spores. An early Liassic age is indicated by rare specimens of Lycopodiumsporites austroclavatidites, Stereisporites sp. and Annulispora sp. Recycled Rhaetian taxa are also present in significant numbers including Riccisporites tuberculatus and Cingulizonates rhaeticus. As no microplankton are present, a more refined date is impossible.

Depth: 3636' Core 1 C-85227

Age: early Liassic

Environment: marginal marine

Remarks: A large amount of carbonised plant debris is intermixed with inertinite and a fairly diverse pollen-spore assemblage. Rare acritarchs and the absence of dinoflagellates indicates a marginal or restricted marine environment of deposition. The early Liassic element, consisting of Lycopodiumsporites

austroclavatidites, Stereisporites perforatus, S. sp. and Annulispora sp., forms a small percentage of the total assemblage. Recycled Rhaetian forms, especially Riccisporites tuberculatus and Cingulizonates rhaeticus, together with Devonian spores form the bulk of the assemblage. The precise position of the sample in the early Liassic is uncertain because of the absence of dinoflagellates.

Depth: 3645' Core 1 C-85227

Age: early Liassic

Environment: Slight marine influence

Remarks: The general character of this sample is much the same as the overlying one, although early Liassic forms are less frequent here, being represented by Stereisporites perforatus only. Recycled Rhaetian species are again very significant and Devonian spores are even more abundant than in the 3636' sample. A few indeterminate dinoflagellates and a single Micrhystridium sp. suggest slight marine influence, but do little to help stratigraphically.

WEST HECLA N-52

Depth: 2735' Core 1 C-77597

Age: early Liassic

Environment: non-marine

Remarks: Carbonised spores, pollen and plant fragments are abundant in this non-marine sample. An early Liassic age is indicated by infrequent specimens of Lycopodiumsporites

austroclavatidites, Stereisporites spp., Classopollis classoides and Polycingulatisporites sp. Many Rhaetian species are present but Riccisporites tuberculatus and Cingulizonates rhaeticus are the most abundant. Numerous, well preserved representitives of Devonian genera are also present.

HELICOPTER J-12

Depth: 12,497' Core 1, top of core C-46867

Age: indeterminate

Environment: indeterminate

Remarks: Totally carbonised clumps of organic matter and very rare sporomorphs are the sole contents of this Core. There is nothing to give any indication as to the age of the sample.

KING CHRISTIAN N-06

Depth: 2000' Core 1 C-39376

Age: late Pliensbachian - early Toarcian

Environment: marine

Remarks: This sample contains highly carbonised palynomorphs, inertinite and some plant fragments. The abundant Spheripollenites spp. are characteristic of the late Pliensbachian - early Toarcian. Questionable specimens of Nannoceratopsis sp. and Maturodinium sp. tend to support this date, but the preservation of the palynomorphs is too poor to refine the date further. Recycled Devonian spores are also present.

KRISTOFFER BAY B-06

Depth: 4770' Core 1 C-48846

Age: late Pliensbachian - early Toarcian

Environment: marine

Remarks: Strongly carbonised sporomorphs are dispersed amongst inertinite and some plant tissue. The few forms which can be identified include Stereisporites sp. Lycopodiumsporites sp., a few possible Spheripollenites sp. and rare, indeterminate dinoflagellates. A late Pliensbachian or early Toarcian age is suggested but this is obviously highly tentative.

Depth: 5500' Core 1 C-85229

Age: Oxfordian, probably early

Environment: marine

Remarks: This sample is overwhelmingly dominated by recycled Devonian spores, vitrinite, structured plant tissue and some inertinite. Dinoflagellates are rare and generally poorly preserved and often broken. The presence of Gonyaulacysta jurassica var. longicornis indicates an Oxfordian age and the presence of possible specimens of Lithodinia sp. and Acanthaulax sp. suggests that this may be early Oxfordian.

PEDDER POINT D-48

Depth: 5518' Core 1 C-85229

Age: early Middle Jurassic at the oldest

Environment: marine

Remarks: A depauperate assemblage of highly carbonised pollen and dinoflagellates is intermixed with inertinite and amorphous plant debris. The only identifyable dinoflagellates, Pareodinia ceratophora and possible Paragonyaulacysta specimens delimit the age to some extent to an early Middle Jurassic age at the oldest. Cerebropollenites mesozoicus is the most frequent pollen present.

ROMULUS C-42

Depth: 4145' Core 1, near top C-53429

Age: Middle to Late Jurassic

Environment: marine

Remarks: Core 1 contains a very limited assemblage of carbonised and frequently unidentifyable microfossils. A few very poorly preserved dinoflagellate cysts are present, some of which appear to resemble Gonyaulacysta sp. This would indicate a Middle to Late Jurassic age range.

SANDY POINT L-46

Depth: 1940' Core 1 C-30224

Age: late Toarcian or Aalenian

Environment: marine

Remarks: Pollen, spores and dinoflagellates are thin and often broken in this marine sample. Nannoceratopsis senex and N. gracilis occur frequently with N. gracilis being slightly more abundant. This indicates a late Toarcian to Aalenian age. Mancodinium sp., other underscribed dinoflagellates, foraminiferal

tests and occasional specimens of Micrhystridium fragile comprise the remainder of the marine fraction. The most frequent non-marine species are Alisporites spp., Cerebropollenites mesozoicus and tetrads of Classopollis classoides. Rare specimens of Spheripollenites spp. occur in clumps of disintegrated organic matter and appear to have been reworked. A small number of recycled, Palaeozoic and Rhaetian forms are also present.

SHERARD BAY F-14

Depth: 3822' Core 1 C-80209

Age: late Pliensbachian

Environment: marine

Remarks: This sample contains much sapropel and numerous very thin palynomorphs. Abundant specimens of Spheripollenites spp. together with Nannoceratopsis senex and Mancodinium semitabulatum and the absence of Nannoceratopsis gracilis indicate a late Pliensbachian age. Also present in the sample are abundant undescribed dinoflagellate cysts and a single specimen of Pareodinia sp.. The terrestrial fraction of the assemblage consists of long-ranging bisaccates and specimens of Contignisporites sp. Recycled Rhaetian forms and late Devonian spores are very much in evidence.

Depth: 3860' Core 1 C-80209

Age: early Liassic, pre late Pliensbachian

Environment: marine

Remarks: The preservation and contents of this sample differ

greatly from the previous one (3822'). Fragments of inertinite and reworked late Devonian spores dominate this assemblage, whilst in situ material is very rare, poorly preserved and largely unidentifyable. Rare indeterminate dinoflagellates, Leofusa jurassica and Micrhystridium sp. indicate a marine influence. The lack of the genera Nannoceratopsis and Spheripollenites suggests a pre late Pliensbachian age. A tentative Sinemurian age is therefore proposed.

Depth: 3880' Core 2 C-80209

Age: early Liassic

Environment: non-marine

Remarks: Spores and pollen are frequent in this plant-tissue rich, non marine sample although they are poorly preserved. Recycled late Devonian spores are abundant and dominant, but the typically Rhaetian species Riccisporites tuberculatus is also common. Other species often encountered in Rhaetian sediments are less frequent eg. Limbosporites lundbladii, Lunatisporites rhaeticus and Cingulizonates rhaeticus. The presence of rare Lycopodiumsporites sp., Alisporites sp. cf A. robustus and Iraquispora laevigata indicate a Jurassic influence ie. Hettangian or Sinemurian and it is on the basis of these that the sample is dated. Rhaetian palynormorphs are most likely recycled.

SIRIUS K-28

Depth: 2930' Core 1, 20' below top of core C-55435

Age: Liassic, ? pre Late Pliensbachian

Environment: marine

Remarks: Abundant inertinite, highly carbonised plant debris and a large number of corroded or disintegrated palynomorphs are present in this core sample. Indeterminate dinoflagellates indicate a marine environment but are unhelpful concerning the stratigraphic position of the sample. Various long-ranging bisaccate pollen and spores represent the land flora contribution. The lack of typical late Pliensbachian index forms suggests a pre late Pliensbachian age.

Depth: 4700' Core 2, from top of core. C-55435

Age: early Liassic

Environment: marine

Remarks: Inertinite, frequent woody fragments, together with carbonised spores, pollen and rare dinoflagellates are present in this sample. An early Liassic age is indicated by specimens of Lycopodiumsporites austroclavatidites, L. sp., Stereisporites sp., and Polycingulatisporites sp. Recycled Rhaetian forms, especially Riccisporites tuberculatus and Cingulizonates rhaeticus, occur frequently in the assemblage. The dinoflagellates together with foraminiferal tests indicate marine influence but are of no stratigraphic significance.

THOR P-38

Depth: Core 1, no depth available C-46843

Age: indeterminate

Environment: indeterminate

Remarks: A few totally carbonised sporomorphs and some plant debris are the only contents of Core 1. There is nothing to indicate the age of this sample.

WALLIS K-62

Depth: 5435' Core 1 C-85230

Age: late Callovian

Environment: marine

Remarks: This core yielded a rich a well preserved Middle Jurassic dinoflagellate assemblage. Lithodinia jurassica and L. deflandrei are particularly abundant, a feature which is characteristic of the Callovian. Other important species present include Nannoceratopsis pellucida (a predominantly Callovian species in the Sverdrup Basin) and the Middle Jurassic species Pareodinia prolongata and Paragonyaulacysta sp. cf. calloviense.

The earliest described species of Chlamydophorella and Heslertonia are recorded in Oxfordian strata, and the presence of a number of specimens of Chlamydophorella sp. and a single specimen of Heslertonia may indicate some Oxfordian influence. Acanthaulax spp. are also typical of late Callovian and early Oxfordian sediments. The age of this sample is therefore considered to be late Callovian.

Other important taxa present, which range beyond the limits of the Callovian include Valensiella ovula (which is abundant here), Hystrichogonyaulax cladophora, Endoscrinium eisenackii var. oligodentatum, Gonyaulacysta jurassica and Ctenidodinium ornatum.

Pollen and spores form less than 10% of the total assemblage and consist chiefly of long-ranging bisaccate pollen. Small numbers of recycled Devonian and Rhaetian spores are also present.

Depth: 6500' Core 2 C-85230

Age: late Sinemurian or early Pliensbachian

Environment: marine

Remarks: Large bisaccate pollen grains such as Alisporites grandis, A. giganteus, Chordasporites spp., Podocarpidites spp., Pityosporites dividuus, Sulcatisporites sp. and Cerebropollenites mesozoicus form the bulk of this carbonised marine assemblage. A specimen of Sentusidinium psilatum which Tan (1979 unpub. thesis) records from the late Sinemurian to Toarcian, combined with the absence of Nannoceratopsis senex indicates a late Sinemurian or early Pliensbachian age.

WILKINS E-60

Depth: Core 1, no depth available C-30221

Age: possibly Hettangian

Environment: marine

Remarks: Poorly preserved sporomorphs and inertinite characterise this marine sample. The dinoflagellates Comparodinium sp. and Hystrichosphaeridium ? langii are closely related to those described by Morbey (1975) from the late Rhaetian and Hettangian of Austria. The non-marine element in the assemblage

includes early Liassic forms such as Lycopodiumsporites semimuris, L. austroclavatidites, Stereisporites cicatricosus, Classopollis classoides and Alisporites sp. cf. A. grandis. Rhaetian forms are rare. An Hettangian age is therefore tentatively assigned to this core. This assemblage resembles that found in the 4120' sample in Drake E-78.

A P P E N D I X

Species lists for each sample

(cores listed alphabetically)

KEY TO FREQUENCY COUNTS

(A)	... Abundant	20+	specimens	recorded	from	1	slide	
(C)	... Common	6 - 20	"	"	"	"	"	
(R)	... Rare	2 - 5	"	"	"	"	"	
(VR)	... Very rare	1	"	"	"	"	"	

ANDREASEN L-32

Depth
Core 1 (No depth available) — GSC Loc. No. C-53291

Spores and pollen:
- Alisporites spp. (C)
- Acanthotriletes sp. (R)
- Bisaccates indet. (R)
- Cerebropollenites mesozoicus (C)
- Classopollis classoides (C)
- Foveotriletes sp. (VR)
- Lycopodiumsporites austroclavatidites (R)
- L. semimuris (C)
- Perinopollenites sp. (R)
- Platysaccus sp. (R)
- Stereisporites sp. (VR)
- Reworked Palaeozoic spores (C)

Plankton:
- Dinoflagellates indet. (C)
- Mancodinium sp. (VR)
- Micrhystridium fragile and M. sp. (R)

Other Fossils:
- Foraminiferal tests (R)

Age:
- early Liassic

DEPOT ISLAND C-44

Depth
2080' Core 1 — GSC Loc. No. C-85232

Spores and pollen:
- Alisporites sp. (R)
- Bisaccates (R)
- Cerebropollenites sp. (R)
- Perinopollenites sp. (VR)
- Recycled Palaeozoic spores (R)
- Recycled Riccisporites tuberculatus (R)
- Recycled Sverdrupiella sp. (VR)

Plankton:
- Dinoflagellates indet. (R)
- Mancodinium sp. (VR)
- Maturodinium sp. (VR)
- Micrhystridium sp. (R)
- ?Nannoceratopsis sp. (VR)

Other Fossils:
- Foraminiferal tests (R)

Age:
- ?Late Pliensbachian

DEPOT ISLAND C-44

Depth
2135' Core 1 C-85232

Spores and pollen:

Aratrisporites fimbriatus & A. sp. (R)
Camarozonosporites rudis (VR)
Carnisporites sp. (VR)
Cingulizonates rhaeticus (R)
Lunatisporites sp. cf. L. rhaeticus (VR)
Perinopollenites sp. (R)
Polycingulatisporites sp. (VR)
Riccisporites tuberculatus (VR)
Stereisporites perforatus (VR)
Zebrasporites laevigatus (VR)

Plankton:

Indeterminate dinoflagellates (R)

Reworking:

Late Devonian (R)

Age:

early Liassic

DRAKE - 73

Depth
4057' Core 2 C-77599

Spores and pollen:

Alisporites sp.(R)
Apiculatisporis sp. (VR)
Aratrisporites sp. (VR)
Cingulizonates sp. (R)
Polycingulatisporites sp. (VR)
Riccisporites tuberculatus (R)
Stereisporites perforatus & S. sp. (R)
Verrucosisporites sp. (VR)
Recycled Paleozoic spores (R)

Plankton:

Dino. indet. (VR)

Age:

early Liassic, pre late Pliensbachian

DRAKE D-73

Depth
4075' Core 2 C-77599

Spores and pollen:
Alisporites sp. (R)
Aratrisporites sp. (R)
Cingulizonates sp. (R)
Camarozonosporites rudis (R)
Deltoidospora sp. (VR)
Densoisporites sp. (R)
Lycopodiumsporites semimuris (VR)
L. sp. (VR)
Riccisporites tuberculatus (C)
Stereisporites sp. cf. S. punctus (VR)
Zebrasporites laevigatus (VR)
Recycled Late Devonian spores & megaspores (C)

Plankton:
absent

Age:
early Liassic, pre late Pliensbachian

DRAKE E-78

Depth
4120' Core 1 C-64159

Spores and pollen:
Alisporites sp. (R)
Aratrisporites sp. (R)
Granosaccus ornatus (VR)
Granuloperculatipollis rudis (R)
Lycopodiumsporites austroclavatidites sp. (R)
L. semimuris (R)
L. sp. (R)
Pinuspollenites minimus (R)
Riccisporites tuberculatus (R)
Semiretisporis sp. cf. S. gothae (VR)
Tetrads indet. (R)

Plankton:
cf. Cleistosphaeridium sp. (R)
Dinoflagellates indet. (R)
Noricysta sp. (VR)
Sverdrupiella ornaticingulata (VR)
S. usitata (VR)

Other Fossils:
Foraminiferal tests (C)

Age: early Liassic, possibly Hettangian

DRAKE F-16

Depth
3510' Core 1

GSC Loc. No.
C-67700

Spores and pollen:

Alisporites spp. (C)
A. robustus (R)
Cadargasporites cf. verrucatus (VR)
Chasmatosporites hians (R)
Classopollis classoides (R)
Lycopodiumsporites austroclavatidites (R)
L. semimuris (VR)
Pinuspollenites sp. cf. P. minimus (VR)
Quadraeculina anellaeformis (R)
Rhaetipollis germanicus (VR)
Recycled Palaeozoic spores (C)

Plankton:

Acritarch sp. (VR)
Dinoflagellates indet. (C)
Micrhystridium sp. (R)
Nannoceratopsis gracilis (VR)
N. cf. senex (VR)
Scriniocassis sp. cf. S. weberi (R)

Age:

Toarcian (mid to upper) or Aalenian

DRAKE F-16

Depth
3550' Core 1

GSC Loc. No.
C-67700

Spores and pollen:

Alisporites spp. (R)
cf. Classopollis sp. (VR)
Lycopodiumsporites sp. (R)
Pinuspollenites sp. cf. P. minimus (VR)
Quadraeculina anellaeformis (VR)
Recycled Palaeozoic spores (R)

Plankton:

Indeterminate dinos (R)
Micrhystridium sp. (VR)

Age:

Early Jurassic, pre late Pliensbachian

DRAKE F-16

Depth 3588' Core 1 — GSC Loc. No. C-67700

Spores and pollen:

Alisporites spp. (A)
Cerebropollenites mesozoicus (R)
Chordasporites singulichorda (R)
Lycopodiumsporites austroclavatidites (R)
L. semimuris (R)
Perinopollenites sp. (R)
Recycled Palaeozoic spores (R)

Plankton:

Indet. dinos (C)
Micrhystridium sp. (R)

Age:

Early Jurassic, pre late Pliensbachian

DRAKE F-16

Depth 3626' Core 1 — GSC Loc. No. C-67700

Spores and pollen:

Alisporites sp. (R)
Cingulizonates rhaeticus (R)
Limbosporites lundbladii (VR)
Lunatisporites sp. cf. L. rhaeticus (VR)
Riccisporites tuberculatus (A)
Recycled Devonian/early Carboniferous spores (V.A)
Recycled Norian plankton (VR)

Plankton:

absent

Age:

Rhaetian or ? early Liassic

DRAKE F-16

Depth
3720' Core 1 — GSC Loc. No. C-67700

Spores and pollen:

Alisporites sp. (R)
Deltoidospora sp. (VR)
cf. Granuloperculatipollis sp. (R)
Lycopodiumsporites semimuris (R)
Paracirculina sp. (VR)
Polycingulatisporites sp. (VR)
Rhaetipollis germanicus (VR)
Riccisporites tuberculatus (R)
Zebrasporites interscriptus (VR)
Z. sp. cf. laevigatus (VR)
Recycled early or middle Triassic pollen (VR)

Plankton:

Sverdrupiella mutabilis (R)
S. ornaticingulata (R)
S. usitata (A)

Age:

early Rhaetian

DRAKE I-55

Depth
3594' Core 1 — C-85225

Spores and pollen:

Alisporites sp. (R)
A. radialis (R)
Classopollis sp. (VR)
Lycopodiumsporites austroclavatidites (R)
L. semimuris (R)
Ovalipollis sp. cf. O. pseudoalatus (R)
Quadraeculina annellaeformis (R)
Stereisporites sp. (VR)
Recycled late Devonian spores & megaspores (C)

Plankton:

indet. dinos. (R)
? Mancodinium sp. (VR)

Age:

Early Jurassic, ? Late Pliensbachian

DRAKE I-55

Depth
3660' Core 1 C-85225

Spores and pollen:

Alisporites spp. (C)
Aratrisporites sp. cf. A. fimbriatus (C)
Cingulizonates rhaeticus (R)
C. sp. cf. C. inequalis (R)
Densoisporites sp. (R)
D. irregularis (R)
Deltoidaspora sp. (R)
Limbosporites lundbladii (R)
Lunatisporites sp. cf. L. rhaeticus (VR)
Lycopodiumsporites austroclavatidites (R)
cf. Quadraeculina sp. (R)
Riccisporites tuberculatus (A)
R. sp. (smooth) (VR)
Semiretisporis sp. cf. S. gothae (R)
Stereisporites cicatricosus (R)
S. perforatus (VR)
S. sp. (R)
Recycled Palaeozoic spores & megaspores (C)

Plankton:

Indet. dino (VR)

Age:

early Liassic, pre late Pliensbachian

DRAKE N-67

Depth
3158' Core 1 C-85226

Spores and pollen:

Alisporites spp. (C)
Cerebropollenites sp. (VR)
Classopollis classoides (R)
Lycopodiumsporites sp. (R)
Recycled Devonian spores & megaspores (C)
Recycled Triassic pollen (R)

Plankton:

Nannoceratopsis gracilis (R)
N. senex (R)
Scriniocassis weberi (R)
S. cf. weberi (R)
Indet. dinos (R)

Age:

late Toarcian

DRAKE N-67

Depth
4090'

C-30239

Spores and pollen:
Alisporites sp. (R)
cf. Camerosporites secatus (R)
Granosaccus ornatus (VR)
G. sp. (VR)
cf. Infernopollenites sp. (VR)
cf. Rimaesporites sp. (R)
cf. Triadispora sp. (R)
cf. Riccisporites sp. cf. umbonatus (R)
Ovalipollis sp. (R)
Recycled Palaeozoic spores (VR)

Plankton:
absent

Others:
Tasmanites sp. (R)

Age:
Probably Karnian

EAST DRAKE P-40

Depth
3175' Core 1

C-85231

Spores and pollen:
Alisporites spp. (C)
Aratrisporites sp. (VR)
Cerebropollenites mesozoicus (R)
Chordasporites spp. (R)
Classopollis classoides (VR)
Lycopodiumsporites austroclavatidites (R)
L. semimuris (R)
Perinopollenites elatoides (R)
Podocarpidites sp. (VR)
cf. Riccisporites sp. (VR)
Stereisporites cicatricosus & S. sp. (R)
Recycled Palaeozoic spores & megaspores (R)

Plankton:
Dinoflagellates indet. (R)
?Mancodinium sp. (VR)
?Pareodinia sp. (VR)

Age:
early Liassic, ? late Pliensbachian

DUMBBELLS E-49

C-46848

Depth
4902' Core 1

Spores and pollen:
Abiespollenites sp. (R)
Alisporites grandis, A. bilateralis, A. spp. (A)
Cerebropollenites mesozoicus (R)
Cicatricosisporites cf. hallei & C. sp. (R)
Perinopollenites elatoides (R)
Platysaccus sp. (R)
Podocarpidites elipticus & P. spp. (A)
Stereisporites antiquasporites (R)
Sulcatisporites sp. (R)
Trilobosporites cf. crassus (R)
Recycled Palacozoic spores (R)

Plankton:
Gonyaulacysta sp. (VR)
cf. Hexagonifera sp. (VR)
Oligosphaeridium sp. cf. O. complex. (C)
O. sp. (R)
Pseudoceratium nudum (VR)
Scriniodinium sp. (VR)

Other Fossils:
Foraminiferal tests (R)

Age:
early Cretaceous, Hauterivian-Barremian

DUMBBELLS E-49

Depth
8494' Core 2 — C-46848

Spores and pollen:
- Bisaccate pollen (C)
- Cerebropollenites mesozoicus (R)

Plankton:
- Acanthaulax sp. (R)
- Gonyaulacysta jurassica (R)
- G. jurassica var. longicornis (VR)
- G. sp. aff. cladophora (VR)
- G. sp. (R)
- cf. Lithodinia sp. (VR)
- Nannoceratopsis pellucida (VR)
- Pareodinia ceratophora (C)
- P. ceratophora cf. var. scopaea (R)
- Scriniocassis dictyotum (VR)
- Sentuisidinium sp. (R)
- Sirmiodinium grossi (VR)

Age:
- early Oxfordian

ELVE M-40

Depth
Core 1. 10' from top of core — C-46844

Spores and pollen:
- Alisporites grandis (VR)
- A. spp. (R)
- Abietinaepollenites sp. (R)
- Bisaccates indet. (C)
- Contignisporites sp. (VR)
- Chordasporites sp. (R)

Plankton:
- Dinoflagellates indet. (R)
- Nannoceratopsis senex (R)

Age:
- ? late Pliensbachian

EMERALD K-33

Depth
2105' Core 1 C-30844

Spores and pollen:

Alisporites grandis (R)
A. spp. (C)
Cerebropollenites mesozoicus (C)
Chordasporites sp. (R)
Lycopodiumsporites semimuris & L. sp. (R)
Podocarpidites sp. (R)
Stereisporites cicatricosus (VR)
Recycled Palaeozoic spores (C)

Plankton:

Gonyaulacysta cf. cladophora (R)
Paragonyaulacysta borealis (R)
P. capillosa (R)
Scriniodinium crystallinum (R)
S. luridum (R)
Scriniocassis dictyotum (C)
Sentusidinium sp. (R)
Sirmiodinium grossi (VR)
cf. Valensiella sp. (R)

Age:

mid-Kimmeridgian

EMERALD K-33

Depth
4015' Core 2 C-30844

Spores and pollen:

Alisporites spp. (R)
Apiculatisporis sp. (R)
Cerebropollenites sp. (R)
cf. Callialasporites sp. (VR)
Classopollis sp. (VR)
Chordosporites sp. (R)
Contignisporites sp. (C)
Foveosporites sp. (VR)
Granulatisporis sp. (R)
Inaperturopollenites sp. (VR)
Lycopodiumsporites sp. (VR)
Perinopollenites sp. (VR)
Podocarpidites sp. (VR)
Polycingulatisporites sp. (VR)
Spheripollenites spp. (A)
Recycled Palaeozoic spores including Late Devonian (A)

C-30844

Plankton:

Small indet. dinoflagellates (A)
Mancodinium semitabulatum (R)
Maturodinium inornatum (R)
Micrhystridium fragile (R)
Nanneceratopsis senex (R)

Other Fossils:

Foraminiferal tests (R)

Age: late Pliensbachian

GRAHAM C-52

Depth
Core 2 (No depth available) C-46846

Spores and pollen:

Alisporites spp. (C)
Apiculatisporis sp. (R)
? Aratrisporites sp. (VR)
Bisaccates (C)
Cerebropollenites mesozoicus (R)
Recycled Palaeozoic spores (R)

Plankton:

? Dinoflagellates (R)
? Gonyaulacysta sp. (VR)

Age:

Middle to Late Jurassic

HECLA C-32

Depth
3410' Core 1 C-85228

Spores and pollen:

Alisporites grandis (R)
A. robustus (R)
A. spp. (A)
Cerebropollenites mesozoicus (C)
Chasmatosporites sp. (VR)
Classopollis sp. (C)
Contignisporites sp. (R)
Lycopodiumsporites semimuris (VR)
Quadraeculina anellaeformis (R)
Recycled Palaeozoic spores including Late Devonian (C)

C-85228

Plankton:

Dinoflagellates indet. (A)
Micrhystridium fragile & M. sp. (R)
Nannoceratopsis gracilis (R)
Mancodinium semitabulatum (R)
Maturodinium inornatum (R)
cf. Pareodinia sp. (R)
cf. Sentusidinium sp. (R)

Age:

late Toarcian or Aalenian

HECLA C-32

Depth
3443' Core 1 C-85228

Spores and pollen:

Alisporites lowoodensis (R)
A. robustus (R)
A. spp. (C)
Classopollis classoides (R)
Lycopodiumsporites semimuris (R)
Podocarpidites sp. (R)
Quadraeculina anellaeformis (R)
Stereisporites sp.
Recycled Palaeozoic spores (A)

Plankton:

Mancodinium semitabulatum (C)
Maturodinium inornatum (VR)
Micrhystridium fragile & M. sp. (C)
N. senex (R)
Indet. dinoflagellates (C)

Age:

late Pliensbachian

HECLA C-32

Depth
3470' Core 1 C-85228

Spores and pollen:

Bisaccates indet. (R)
Cerebropollenites mesozoicus (R)
Classopollis sp. (VR)
Lycopodiumsporites semimuris (VR)
Riccisporites tuberculatus (VR)
Recycled Palaeozoic spores (C)

C-85228

Plankton:

Dinos. indet (R)
Micrhystridium sp. (C)

Age:

early Liassic, pre late Pliensbachian

N.W. HECLA M-25

Depth
3195' Core 1 C-77598

Spores and pollen:

Alisporites spp. (A)
Concavisporites sp. (R)
Contignisporites sp. (R)
Fungal spores (R)
Lycopodiumsporites semimuris (VR)
Neoraistrickia sp. cf. N. elongata (VR)
Podocarpidites sp. (R)
Spheripollenites clumps (A)
Todispora sp. (VR)
Tsugaepollenites sp. (R)
Recycled Late Devonian spores (R)

Plankton:

Dino. indet (C)
cf. Gonyaulacysta sp. (R)
Maturodinium inornatum (VR)
Mancodinium semitabulatum (R)
Nannoceratopsis senex (C)

Age:

late Pliensbachian

N.W. HECLA M-25

Depth
3285' Core 2 C-77598

Spores and pollen:

Alisporites spp. (C)
Araucariacites sp. (VR)
Bisaccates indet. (C)
Cerebropollenites sp. (R)
Perinopollenites sp. (R)
Pinuspollenites minimus (VR)
Recycled Late Devonian spores (C)

C-77598

Plankton:

Dinoflagellates indet. (R)
cf. Maturodinium sp. (VR)
Micrhystridium sp. (R)
Nannoceratopsis senex (VR)

Age:

late Pliensbachian

N.W. HECLA M-25

Depth
3357' Core 2

C-77598

Spores and pollen:

Alisporites sp. (R)
A. sp. cf. A. radialis (VR)
Bisaccates indet. (R)
Cerebropollenites sp. (R)
Lycopodiumsporites sp. (VR)
Perinopollenites sp. (VR)
Platysaccus sp. (VR)
Quadraeculina anellaeformis (VR)
Recycled Devonian spores (R)

Plankton:

Dinos. indet. (R)
Micrhystridium sp. (VR)

Age:

Probably Sinemurian or early Pliensbachian

N.W. HECLA M-25

Depth
3371' Core 2

C-77598

Spores and pollen:

Acanthotriletes sp. (R)
Apiculatisporis sp. (C)
Alisporites sp. cf. A. robustus (VR)
Cingulizonates inequalis (R)
Classopollis classoides (VR)
Conbaculatisporites mesozoicus (R)
Contignisporites sp. (R)
Iraquispora sp. (VR)
Neoraistrickia sp. (R)
Perinopollenites elatoides (C)
cf. Rhaetipollis sp. (VR)
Riccisporites tuberculatus (C)

C-77598

Spores and pollen (cont'd)
Semiretisporis sp. (R)
Stereisporites antiquasporites (R)
Verrucosisporites sp. (R)
Recycled Devonian spores & megaspores (C)

Plankton:
absent

Age:
early Liassic, pre late Pliensbachian

N.W. HECLA M-25

Depth
3458' Core 2 C-77598

Spores and pollen:
Alisporites sp. (R)
Camerozonosporites rudis (R)
Cingulezonatis sp. cf. C. inequalis (R)
C. rhaeticus (R)
Densoisporites sp. (VR)
Limbosporites lundbladii (R)
Lycopodiumsporites sp. (VR)
Lunatisporites rhaeticus (VR)
Ovalipollis sp. (VR)
Perinopollenites sp. (R)
Riccisporites tuberculatus (A)
Semiretispora gothae (VR)
S. sp. (R)
Stereisporites stereoides (R)
S. antiquaspora (VR)
S. perforatus (VR)
Recycled Late Devonian spores (A)

Plankton:
absent

Age:
early Liassic, pre late Pliensbachian

WEST HECLA C-05

Depth
3621' Core 1 C-85227

Spores and pollen:
Annulispora sp. (VR)
Camerosporites rudis (VR)
Cingulizonates rhaeticus (C)
Densoisporites sp. (R)
Limbosporites lundbladii (VR)
Lycopodiumsporites austroclavatidites (R)
Polycingulatisporites sp. (VR)
Perinopollenites sp. (R)
Riccisporites tuberculatus (C)
Stereisporites sp. (R)
Zebrasporites interscriptus (R)
Recycled Late Devonian spores (A)

Plankton:
Absent

Other Fossils:
Tytthodiscus sp. (VR)

Age:
early Liassic

WEST HECLA C-05

Depth
3636' Core 1 C-85227

Spores and pollen:
Alisporites sp. (R)
Annulispora sp. cf. A. folliculosa (VR)
Aratrisporites fimbriatus (VR)
Camerozonosporites laevigatus (VR)
Cingulizonates rhaeticus (C)
Lunatisporites sp. (R)
Limbosporites lundbladii (R)
Lycopodiumsporites austroclavatidites (R)
Lycopodiacidites rugulatus (VR)
Polycingulatisporites sp. cf. P. triangulatus (VR)
Riccisporites tuberculatus (C)
Semiretisporis maljavkinae (R)
Stereisporites perforatus, S. sp. (R)
Vesicaspora sp. (R)
Zebrasporites interscriptus (VR)
Recycled Late Devonian spores (C)

Plankton:
Micrystridium sp. (VR)

Age: early Liassic

WEST HECLA C-05

Depth
3645' Core 1 C-85227

Spores and pollen:

Alisporites spp. (C)
A. sp. cf. A. lowoodensis (R)
Aratrisporites fimbriatus (R)
Camarozonosporites sp. cf. C. rudis (VR)
Cingulizonates rhaeticus (C)
Concavisporites crassexinus (VR)
Limbosporites lundbladii (R)
Lycopodiacidites sp. (VR)
Riccisporites tuberculatus (C)
Semiretisporis sp. (VR)
Stereisporites perforatus (R)
Vesicaspora fuscus (R)
Zebrasporites laevigatus (VR)
Recycled Late Devonian spores (A)
Recycled Triassic pollen (R)

Plankton:

Dinos. indet. (R)
Micrhystridium sp. (VR)

Age:

early Liassic

WEST HECLA N-52

Depth
2735' Core 1 C-77597

Spores and pollen:

Alisporites robustus & A. sp. (R)
Aratrisporites sp. (R)
cf. Brachysaccus sp. (R)
Camerozonosporites rudis (R)
Cingulizonates rhaeticus (R)
C. inequalis (R)
Classopollis classoides (VR)
Densoisporites cavernatus & D. sp. (R)
Lycopodiumsporites austroclavatidites (VR)
Limbosporites lundbladii (R)
Ovalipollis sp. (VR)
Polycingulatisporites sp. (R)
Riccisporites tuberculatus (A)
Semiretisporis sp. (R)
Stereisporites cicatricosus, S. stereoides (R)
Zebrasporites interscriptus (R)
Recycled Sverdrupiella sp. (Norian) (VR)
Recycled Late Devonian spores & megaspores (VA)

C-77597

Plankton:
absent

Other Fossils:
Tytthodiscus sp. (R)

Age:
early Liassic

HELICOPTER J-12

Depth
12,497' Core 1 C-46867
Spores and pollen:
Some totally carbonised sporomorphs present including bisaccate pollen

Age:
indeterminate

KING CHRISTIAN N-06

Depth
2000' Core 1 C-39376
Spores and pollen:
Apiculatisporites sp. (VR)
Classopollis sp. (VR)
Spheripollenites spp. (A)
Sporomorphs indet. (A)
Palaeozoic spores (R)

Plankton:
? Dinoflagellates (R)
cf. Maturodinium sp. (VR)
? Nannoceratopsis sp. (VR)

Age:
Late Pliensbachian - early Toarcian

KRISTOFFER BAY B-06

Depth
4770' Core 1 C-48846

Spores and pollen:

Bisaccates indet.(R)
Chordasporites sp. (VR)
Lycopodiumsporites sp. (VR)
Sporomorphs indet. (R)
Stereisporites sp. (VR)
cf. Spheripollenites spp. (R)

Plankton:

Dinoflagellates indet. (R)
Veryhachium valensii (VR)

Age:

late Pliensbachian - early Toarcian

PEDDER POINT D-48

Depth
5500' Core 1 C-85229

Spores and pollen:

Apiculatisporis sp. (R)
Aratrisporites sp. (R)
Bisaccates indet. (R)
Cerebropollenites mesozoicus (C)
Lycopodiumsporites sp. (VR)
Recycled Palaeozoic spores including late Devonian (A)

Plankton:

cf. Acanthaulax sp. (R)
Dinoflagellates indet. (R)
Gonyaulacysta sp. cf. jurassica (R)
G. jurassica var. longicornis (VR)
? Lithodinia sp. (VR)
Micrhystridium fragile & M. sp. (VR)
Nannoceratopsis senex (R)
Pareodinia ceratophora (R)

Age:

Oxfordian, probably early

PEDDER POINT D-48

Depth
5518' Core 1 C-85229

Spores and pollen:
- Alisporites sp. (R)
- Bisaccates indet. (R)
- Cerebropollenites mesozoicus (C)
- Recycled Palaeozoic spores (R)

Plankton:
- Dinoflagellates indet. (R)
- Gonyaulacysta sp. (VR)
- ? Paragonyaulacysta sp. (R)
- Parcodinia ceratophora (R)

Age:
early Middle Jurassic at the oldest

ROMULUS C-42

Depth
4145' Core 1 C-53429

Spores and pollen:
- Foveosporites sp. (VR)
- Sporomorphs indet. (R)
- Recycled Palaeozoic spores (R)

Plankton:
- Dinoflagellates indet. (R)
- ? Gonyaulacysta sp. (R)

Age:
Middle to Late Jurassic

SANDY POINT L-46

Depth
1940 Core 1 C-30224

Spores and pollen:
- Alisporites spp. (A)
- Chordasporites sp. (R)
- Cerebropollenites mesozoicus (C)
- Classopollis sp. (R)
- Granulatisporis sp. (R)
- Inaperturopollenites sp. (VR)
- Podocarpidites sp. (R)
- Spheripollenites spp. (C)
- Stereisporites sp. (VR)
- Recycled Palaeozoic & Rhaetian spores (R)

C-30224

Plankton:

Simple dinoflagellates indet. (R)
Micrhystridium spp. (R)
Mancodinium sp. (R)
Nannoceratopsis gracilis (R)
N. senex (C)

Other Fossils:

Foraminiferal tests (R)

Age:

Late Toarcian or Aalenian

SHERARD BAY F-14

Depth
3822' Core 1

C-80209

Spores and pollen:

Alisporites spp. (C)
Cycadopites sp. (R)
Cyclogranisporites sp. (VR)
Contignisporites sp. (R)
Limbosporites lundbladii (VR)
Lunatisporites sp. (VR)
cf. Riccisporites sp. (VR)
Semiretisporis gothae (VR)
Spheripollenites spp. (A)
Recycled Devonian/Carboniferous spores (C)

Plankton:

Micrhystridium sp. (VR)
Mancodinium semitabulatum (VR)
Nannoceratopsis senex (R)
Pareodinia sp. (VR)
Indeterminate dinoflagellates (A)

Other Fossils:

Foraminiferal test (VR)

Age:

Late Pliensbachian

SIRIUS K-28

Depth
2930' Core 1 C-55435

Spores and pollen:

Alisporites sp. (R)
Apiculate spores (R)
Bisaccates indet. (C)
Spores indet.(R)
"Stereisporites" aulosenensis (VR)

Plankton:

Indet. dinos. (R)

Age:

Liassic ? pre late Pliensbachian

SIRIUS K-28

Depth
4700' Core 2 C-55435

Spores and pollen:

Alisporites sp. (R)
Aratrisporites sp. (VR)
Cingulizonates rhaeticus (C)
C. inequalis (R)
Densoisporites sp. (VR)
Limbosporites lundbladii (VR)
Lunatisporites rhaeticus (VR)
Lycopodiumsporites austroclavatidites (R)
L. sp. (R)
Polycingulatisporites sp. (VR)
Riccisporites tuberculatus (A)
Semiretisporis maljavkinae (R)
S. sp. (VR)
Stereisporites sp. (VR)
Zebrasporites interscriptus (VR)

Plankton:

Dinos. indet. (R)

Other Fossils:

Foraminiferal tests (R)

Age:

early Liassic

THOR P-38

Depth
Core (no depth available) C-46843

Spores and pollens:
Few totally carbonised sporomorphs

Age:
Indeterminate

WALLIS K-62

Depth
5435' Core 1 C-85230

Spores and pollen:
Alisporites of lowoodensis, A. medius,
A. spp. (C)
Cerebropollenites mesozoicus (R)
Classopollis classoides (R)
Pinuspollenites sp., Podocarpidites sp. (C)
Spores - several genera (R)

Plankton:
Acanthaulax cf. scarburgensis (R)
A. cf. venusta & A.sp. (R)
Chlamydophorella sp. (A)
Ctenidodinium ornatum (R)
Gonyaulacysta jurassica (R)
Heslertonia sp. (R)
Hystrichogonyaulax cladophora (C)
Lithodinia deflandrei (A)
L. jurassica (A)
Nannoceratopsis pellucida (R)
Pareodinia ceratophora (R)
P. prolongata (R)
Paragonyaulacysta sp. cf. P. calloviense (R)
Scriniodinium cf. crystallinum (R)
S. cf. luridum (R)
Sentusidinium sp. (R)
Sirmiodinium grossi (VR)
Valensiella ovula (A)

Acritarchs:
Micrhystridium sp. (VR)

Reworking:
Palaeozoic including Famennian (R)
Triassic including Rhaetian (R)

Age: late Callovian

WALLIS K-62

Depth
6500' Core 2 C-85230

Spores and pollen:

Alisporites giganteus, A. grandis,
A. robustus (C)
A. spp. (A)
Aratrisporites sp. (VR)
Cerebropollenites mesozoicus (R)
Chordasporites singulichorda & C. sp. (C)
Inaperturopollenites (sp.)
Pityosporites dividuus (R)
Perinopollenites sp. (VR)
Podocarpidites sp. (R)
Quadraeculina anellaeformis (VR)
Vitreisporites pallidus (VR)

Plankton:

Dinoflagellates indet. (R)
Sentusidinium psilatum (VR)

Reworking:

Palaeozoic spores (R)

Age:

late Sinemurian or early Pliensbachian

WILKINS E-60

Depth
Core 1 (No depth available) C-30221

Spores and pollen :

Alisporites sp. cf. A. grandis (R)
Apiculatisporis sp. (R)
Bisaccates indet. (C)
Camarozonosporites rudis (VR)
Classopollis classoides (VR)
Lophotriletes sp. (VR)
Lycopodiumsporites austroclavatidites (R)
L. semimuris (R)
Stereisporites cicatricosus (VR)
Vitreisporites pallidus (R)
Zebrasporites interscriptus (VR)

Plankton:

Comparodinium sp. (C)
Hystrichosphaeridium sp. (R)
M. sp. (R)

C-30221

Other Fossils:
Foraminiferal tests (R)

Age:
possibly Hettangian