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Supplementary report on the Palynology:

Interval 8400-8600 feet.

2560 - 2612 m

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by

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Location: NOCS 7/9-1 W23
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1. Summary

Based on the examination of a supplementary set of ditch cuttings samples the following stages would appear likely to occur in the interval 8000 - 8600 feet:-

Valenginian - Berriasian	8050 feet	2454 m
Lower Kimmeridgian	8270 feet	2521 m
Bathonian/Bajocian ?	8340 - 60 feet	2542 - 2548 m
Lias	8560 feet	2609 m
? Trias		

2. Introduction

Arising from the palynological investigation of the interval 8000 to 8400 feet, which was described in an earlier report (January, 1972), the section 8220-8390 was tentatively assigned to Upper Oxfordian and the lowest sample examined (8400 feet) not dated. Strong caving effects from the overlying Kimmeridge section were basically the problem.

The present supplementary report is based on the examination of twelve further horizons in the lower interval of 8410-8600 feet.

The composition of the assemblages and their stratigraphic significance is given below.

3. Palynological Assemblages.

Sample Horizon 8410 feet

i. Microplankton:

Gonyaulacysta sp. B (Gitmex). - L. Kimm.

<i>Gonyaulacysta scarburghensis</i>	-	Oxf. to Kimm.
<i>Cannosphaeropsis caulleryi</i>	-	Oxf. to L. Cret.
* <i>Micrhystridium fragile</i>	-	Lias to Oxf.

Plankton not common: probably little indigenous except possibly M. fragile.

ii. Pollen and Spores

<i>Cerebropollenites mesozoicus</i>	-	Lias to Alb.
<i>Cyathidites australis</i>	-	Lias to Cenoman.
<i>C. minor</i>	-	Lias to Alb.
<i>Classopollis classoides</i>	-	Rhaetic to Cenoman
<i>Vitreisporites pallidus</i>	-	Trias to Cretaceous
<i>Alisporites thomasi</i>	-	Lias to Portland
<i>A. robustus</i>	-	Lias to Kimm.

Assemblage with abundant small disaccate pollen: notable absence of Callialasporites and Inaperturopollenites - common genera in post-Bajocian assemblages.

iii. Age: probably Lias

iv. Environment: Brackish marine.

Sample Horizons: 8430, 8440, 8450 feet.

i. Microplankton:

<i>Gonyaulacysta</i> sp. A. Gitmez	-	L. Kimm.
<i>G.</i> sp. B. Gitmez	-	L. Kimm.
<i>Cyclonephelium downei</i>	-	Kimm.
<i>Scriniodinium pygodesmium</i>	-	U. Kimm.
<i>Gonyaulacysta longicornis</i>	-	U. Kimm.
<i>G. scarburghensis</i>	-	U. Oxf. to L. Kimm.

* <i>Micrhystridium fragile</i>	-	Lias to Oxf.
* <i>Baltisphaeridium diversispinosum</i>	-	Lias
* <i>Veryhachium formosum</i>	-	Trias to Lias
* <i>Metaleiofusa</i> sp.	-	Lias
* <i>Concentrisporites hallei</i>	-	Lias to Callov.

Assemblage characterised by caved Kimmeridge dinoflagellates; rarer, but persistent, simple Liassic acritarchs.

ii. Pollen and Spores:

<i>Cerebropollenites mesozoicus</i>	-	Lias to Alb.
<i>Cyathidites australis</i>	-	Lias to Cenoman
<i>C. minor</i>	-	Lias to Alb.
<i>Todisporites</i> sp.	-	Lias to Kimm.
<i>Lycopodiumsporites</i> sp.	-	Jurassic to Cretaceous
<i>Classopolis classoides</i>	-	Rhaetic to Cenoman
<i>Vitreisporites pallidus</i>	-	Trias to Cretaceous.
<i>Alisporites thomasii</i>	-	Lias to Portland
<i>Sulcatisporites quadratus</i>	-	Lias
<i>Abietineaepollenites minimus</i>	-	Lias to Oxford.
<i>Protopicae</i> sp.	-	-

Small disaccate pollen common throughout and providing a Liassic aspect.

iii. Age: Lias

iv. Environment: Brackish marine.

Sample Horizons: 8470, 8480, 8490, 8500, 8540, 8560 feet.

i. Microplankton.

<i>Gonyaulacysta</i> sp. A. Gitmez	-	L. Kimm.
<i>G.</i> sp. B. Gitmez	-	L. Kimm.

<i>G. longicornis</i>	-	U. Kimm.
<i>G. scarburghensis</i>	-	U. Oxf. to L. Kimm.
<i>Concentrisporites hallei</i>	-	Lias to Callov.
* Dinoflagellate type A.	-	Lias (?)
* <i>Dapcodinium priscum</i>	-	Lower Lias
* <i>Baltisphaeridium delicatum</i>	-	Lias
* <i>Micrhystridium fragile</i>	-	Lias to Oxf.

Many elements continue to be due to caved Kimmeridge; presence of Dapcodinium priscum introduces a simple distinctive Liassic dinoflagellate. Dinoflagellate Type A (first seen at 8400 feet) probably also Liassic in view of its morphological similarity to Dapcodinium

ii. Pollen and Spores.

<i>Cerebropollenites mesozoicus</i>	-	Lias to Alb.
<i>Cyathidites australis</i>	-	Lias to Cenoman
<i>Osmundacidites</i> sp.	-	Jurassic
<i>Deltoidopora</i> spp.	-	Jurassic
<i>Murospora</i> cf. <i>florida</i>	-	L. - M. Lias.
<i>Classopollis classoides</i>	-	Rhaetic to Cenoman
<i>Lycopodiacidites rugulatus</i>	-	Lias
<i>Abietinaepollenites dunrobinensis</i>	-	Lias to Callov.
<i>Sulcatisporites pinoides</i>	-	Lias
<i>S. quadratus</i>	-	Lias
<i>Vitreisporites pallidus</i>	-	Trias to Cretaceous
<i>Alisporites thomasii</i>	-	Lias to Portland
<i>Calamospora mesozoica</i>	-	Lias to Alb.

Disaccate pollen most abundant element of the assemblages and provide a general supporting role for Liassic assignment.

iii Age: Lias, probably Lower.

iv. Environment: Brackish, Marine

Sample Horizons: 8580, 8600 feet.

i. Assemblages. The residues obtained from these samples contained a mixture of Lower Kimmeridge and Lias microplankton and spore/pollen.

No new elements were observed.

ii. Age: Not Determined.

3. Stratigraphic Significance of the Microfloras

The microflora of this supplementary batch of samples between 8410 and 8500 feet is essentially uniform in that the assemblages contain two basic groups of palynomorphs as follows:-

i. A distinctive microplankton association, clearly of Kimmeridge age in which dinoflagellates - particularly Gonyaulacysta spp. - are outstanding. This type of assemblage has been recorded between 8060 - 8200 feet and is considered to be cavings at these current, lower levels.

ii. An indigenous assemblage of palynomorphs which is dominated by disaccate pollen, and contains species of Dapcodinium, Michrhystridium and Baltisphaeridium. In the present association these are considered to indicate a Liassic age. The simple dinoflagellate - Dinoflagellate Type A - first recorded at 8400 feet is now considered to be Lias in age in view of its morphological similarity and association with the genus Dapcodinium.

Two other factors are supporting a Lias age for this section. Firstly the Liassic elements are generally darker in colour (reflecting a more severe thermal history associated with deeper burial) and secondly, below 8360 feet certain Bajocian or younger elements i.e. Callialasporites and Inanerturonollenites - become extremely rare.

Conclusions

1. The sample at 8400 feet can now be placed with confidence in the Lias (probably Lower) and the top of the Liassic section can probably be raised to 8360 feet.

2. Between 8360 feet and 8260 feet the Lower Kimmeridge cavings could obscure the presence of Bathonian which is implied by the absence of Lias species and the infrequent occurrence of such elements as Valensiella ovulum, Pareodinia ceratophora and Nannoceratopsis pellucida.

3. The tentative assignment of the interval 8270 - 8390 feet to Upper Oxfordian (see Figure 1 - main report) should now be discarded as reflecting basal Kimmeridge caving on a weakly productive Middle Jurassic and Lias section.

<u>Sample Depth</u> (cuttings)	<u>Age</u>	<u>Depositional</u> <u>Environment</u>	<u>Colour</u>	<u>Thermal Index</u>
8000	Valanginian/Berriasian	Marine, open sea	Yellow amber	2.5
8020	"	"	"	2.5
8040	"	"	"	2.5
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8060	L. Kimmeridgian	Marine, restricted circulation	Yellow amber	2.5
8080	"	"	"	2.5
8100	"	"	"	2.5
8120	"	"	"	2.5
8140	"	"	"	2.5
8160	"	Deltaic; prodelta	"	2.5
8180	"	"	"	2.5
8200	"	"	"	2.5
8220	"	"	"	2.5
8240	"	"	"	2.5
8260	"	"	"	2.5
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8280	Bathonian/Bajocian	"	"	2.5
8300	"	"	"	2.5
8320	"	"	"	2.5
8340	"	"	"	2.5
8360	"	"	"	2.5
8380	Lias	Brackish marine	"	2.5
8400	Lias	"	Amber-yellow	2.5 - 2.6
8410	"	"	"	2.5 - 2.6
8440	"	"	"	2.5 - 2.6
8470	"	"	"	2.5 - 2.6
8500	"	"	"	2.5 - 2.6
8540	"	"	"	2.5 - 2.6
8560	"	"	"	2.5 - 2.6

8580	Not determined	Organic material	Specimen
8500	-	all caved	Number
7.1	Under water	non-ferrous	0.1
7.2	"	"	0.1
7.3	"	"	0.1
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7.4	Under water	ferrous	0.1
7.5	"	"	0.1
7.6	"	"	0.1
7.7	"	"	0.1
7.8	"	"	0.1
7.9	"	"	0.1
7.10	"	"	0.1
7.11	"	"	0.1
7.12	"	"	0.1
7.13	"	"	0.1
7.14	"	"	0.1
7.15	"	"	0.1
7.16	"	"	0.1
7.17	"	"	0.1
7.18	"	"	0.1
7.19	"	"	0.1
7.20	"	"	0.1
7.21	"	"	0.1
7.22	"	"	0.1
7.23	"	"	0.1
7.24	"	"	0.1
7.25	"	"	0.1
7.26	"	"	0.1
7.27	"	"	0.1
7.28	"	"	0.1
7.29	"	"	0.1
7.30	"	"	0.1
7.31	"	"	0.1
7.32	"	"	0.1
7.33	"	"	0.1
7.34	"	"	0.1
7.35	"	"	0.1
7.36	"	"	0.1
7.37	"	"	0.1
7.38	"	"	0.1
7.39	"	"	0.1
7.40	"	"	0.1
7.41	"	"	0.1
7.42	"	"	0.1
7.43	"	"	0.1
7.44	"	"	0.1
7.45	"	"	0.1
7.46	"	"	0.1
7.47	"	"	0.1
7.48	"	"	0.1
7.49	"	"	0.1
7.50	"	"	0.1