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NEW MAASTRICHTIAN AND ALBIAN PALYNOLOGY OF BELFAST 4, BELFAST 11, KILLARA 1, KOIROIT 10, NTH EUMERALLA 1 AND PRETTY HILL 1, ONSHORE OTWAY BASIN, VICTORIA

BY

ROGER MORGAN

for VICTORIAN DEPARTMENT OF MINES NOVEMBER 1994

NEW MAASTRICHTIAN AND ALBIAN PALYNOLOGY OF BELFAST 4, BELFAST 11, KILLARA 1, KOIROIT 10, NTH EUMERALLA 1 AND PRETTY HILL 1, ONSHORE OTWAY BASIN, VICTORIA

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I SUMMARY

Belfast-4
890-92m(Core) : upper *longus* Zone (*druggii* Dino Zone) : late Maastrichtian : nearshore marine : usually topmost Sherbrook

911-14m(Core) : middle *longus* Zone (*druggii* Dino Zone) : Maastrichtian : very nearshore marine : usually top Sherbrook Group.

Belfast-11
937-41m(Core) : upper *longus* Zone (*druggii* Dino Zone) : late Maastrichtian : very nearshore marine : usually topmost Sherbrook Group.

Killara-1
501m(cutts) : apparently *pannosus* Zone with caved middle *apoxyexinus* Zone, but could conceivable be middle *apoxyexinus* with reworked *pannosus* Zone : apparently Albian with caved Santonian : non-marine or brackish : apparently Eumeralla

585m(cutts) : *pannosus* Zone : late Albian : non-marine : usually Eumeralla

597m(cutts), 642m(cutts) : upper *paradoxa* Zone : late Albian : brackish marine : usually Eumeralla.

Koroit-10
846-53m(Core) : upper *longus* Zone (*druggii* Dino Zone) : late Maastrichtian : intermediate marine : usually topmost Sherbrook Group

901-07m(Core) : lower *longus* Zone (*druggii* Dino Zone) : Maastrichtian : very nearshore marine, possibly brackish lake : usually top Sherbrook Group.

North Eumeralla-1
1003m(cutts) : indeterminate but full of immature tracheid suggesting a Tertiary age.

Pretty Hill-1
649-51m(cutts) : upper *longus* Zone (*druggii* Dino Zone) : latest Maastrichtian : nearshore marine : usually Sherbrook Group.

II INTRODUCTION

This sample suite was submitted by Steve Ryan of the Victorian Department of Energy and Minerals as part of a study of the onshore Otway Basin , This is complimentary to an earlier study by Morgan 1994 for BHP Petroleum in the same area.

Palynomorph occurrence data are shown as Appendix 1 and from the basis for the assignment of the samples to the Early and Late Cretaceous Zones.

The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969) combined with Stover and Evans (1973) and Stover and Partridge (1973). This framework has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), and modified in the Early Cretaceous by Morgan (1985) for application in the Otway Basin.

Sample processing usually involves the following steps. Extra techniques are only used if required:

(a) digest about 10gm of crushed rock in 50% HF overnight.
(b) wash out several times over 10 micron polyester sieve. Acidify with conc HCl if fluorosilicate gel forms
(c) heavy liquid separation used concentrated ZnBr2 with SG of 2.0
(d) wash out float fraction over 10 micron polyester sieve. Acidify if Zn(OH)2 precipitate forms.
(e) mount a sieved kerogen slide.
(f) oxidise in Schultze Solution (conc 30% HNO3 with crystalline KClO3).
(g) wash out over 10 micron polyester sieve.
(h) add 5% KOH to dissolve humic acids
(i) wash out over 10 micron polyester sieve
(j) examine under microscope for satisfactory oxidation. repeat steps (f) to (i) if required.
(k) heavy liquid separation using ZnBr2 solution (SG of 2.0)
(l) wash out float fraction using polyester sieve. Acidify if Zn(OH)2 precipitate forms.
(m) dehydrate onto coverslip.
(n) mount microscope slides using Eukitt medium

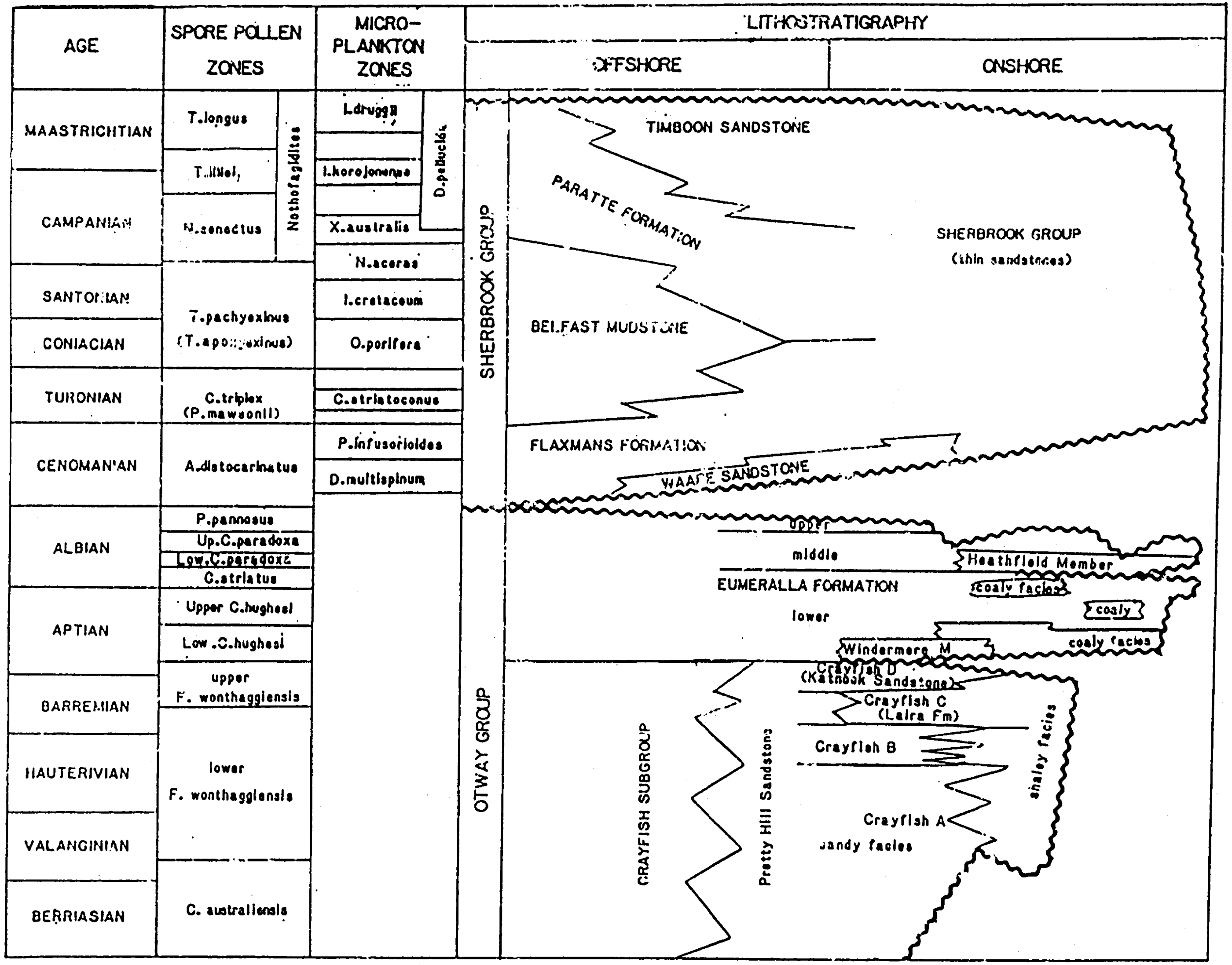

FIGURE 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

Sample examination usually involves the following steps:

(a) scan two traverses at x 10 to log the bulk of the assemblage and get some idea of age.
(b) scan at x 40 and count the first 100 specimens to get percentage contents for each species. From this, "Saline Microplankton Content" (%) can be developed to provide an index of marine influence. Where the sample is too lean to provide 100 specimens, frequency is estimated from the specimens seen with A=abundant, C=common, F=frequent, R=rare
(c) return to x 10 to scan at least two large coverslips to log rare species, and finalise age conclusions. Log more slides if required.
(d) examine sieved kerogen slide for specimens of *Cyathidites* to establish spore colour for Spore
Colour Maturity Index

III PALYNOSTRATIGRAPHY

A BELFAST 4

1 ?90-92m (core) : upper *longus* Zone (*druggi* Dino Zone)

Assignment to the upper *Tricolporites longus* Zone of late Maastrichtian age is indicated at the top by youngest *T. sabulosus*, *T. apoxyexinus* and *T. sectilis* and at the base by oldest frequent *G. rudata* and *S. punctatus*. *Proteacidites* spp are common with frequent *Cyathidites*, *D. granulatus* and *S. antiquasporites*. Rare elements include *N. endurus*, *S. regium* and *T. gillii*. Rare Early Cretaceous reworking is seen in an assemblage dominated by inertinite.

The rare dinoflagellates includes frequent *M. druggii* and rare *Manumiella coronata* indicating the *M. druggii* Dino Zone.

Very nearshore marine environments are indicated by the low dinoflagellate content (8%) and diversity and the frequent fresh water algae (7%). Spores and pollen are abundant and diverse.

These features are usually seen in the topmost Sherbrook Group, often in a thin claystone.

2 **911-14m (core) : middle *longus* Zone (*druggii* Dino Zone)**

Assignment to the middle *T. longus* Zone is indicated at the top by *T. longus* without *S. punctatus* and at the base by common *G. rudata* and *N. endurus*. *Proteacidites* spp are very common with common *G. rudata* and *N. endurus* and frequent *P. mawsonii*, *F. similis*, *M. antarcticus* and *S. antiquasporites*. Rare elements include *L. balmei*, *P. palisadus*, *T. verrucosus*, *T. confessus*, *T. longus*, *T. waipawaensis*, *T. lilliei* and *T. sectilis*. Very rare early Cretaceous reworking was seen.

Amongst the rare dinoflagellates, *A. acutula*, *C. bretonica*, *M. coronata* and *M. druggii* indicate the *druggii* Dino Zone.

Very nearshore marine environments are indicated by the low dinoflagellate content (<1%) and diversity and significant fresh water algal content (4%). Spores and pollen are dominant and diverse.

These features are usually seen close to the top of the Sherbrook group

B **BELFAST 11**

1 **937-41m (core) : upper *longus* Zone (*druggii* Dino Zone)**

Assignment to the upper *T. longus* Zone of latest Maastrichtian age is indicated at the top by youngest *T. confessus*, *T. longus*, *T. lilliei* and *T. seculis*, and at the base by oldest *S. punctatus* and common *G. rudata*..*Proteacidites* spp are very common with *G. rudata* common, *N. endurus* and *S. antiquasporites* very frequent . Other elements are rare and include *A. obscuris*, *G. wahooensis*, *L. balmei and S. punctatus* . Rare Permian reworking was seen.

Amongst the very rare dinoflagellates, *A. acutula*, *C. bretonica*, *M. coronata* and *M. druggii* indicate the *druggii* Dino Zone.

Very nearshore environments are indicated by the very low dinoflagellate content (<1%) and diversity. Spores and pollen are abundant and diverse.

These features are usually seen in the top most Sherbrook Group.

C KILLARA 1

1 **501m (cutts) : mixed *pannosus* Zone with middle *apoxyeximus* Zone.**

Two assemblages are seen in this cuttings sample. The P *pannosus* Zone of latest Albian age is indicated by *C. paradoxa*, *C. striatus*, *F. asymmetricus* and *P. pannosus*. The middle *P. apoxyeximus* Zone is indicated by consistent *A. cruciformis* and *P. mawsonii* without other markers. On face value a *pannosus* Zone assignment seems likely with the middle *apoxyeximus* Zone being caved, however it is possible that the *pannosus* Zone elements are reworked into the middle *apoxyeximus* Zone. Common are *Cyathidites*, *Falcisporites* and *Microcachryidites*. Frequent is *P. microsaccatus*. Rare elements include *T. trioreticulosus* and *T. reticulatus*. Triassic and Permian taxa are reworked.

The rare dinoflagellates are mostly non-descript but include *C. deflandrei* and *T. marshallii* consistent with the middle *apoxyeximus* Sporepollen Zone

Very nearshore marine environments are suggested by the dinoflagellates but these seem likely to be caved. The *pannosus* Zone is usually non-marine or brackish.

The *pannosus* Zone is normally seen in the topmost Eumeralla Formation. The middle *apoxyeximus* Zone is normally seen in the middle Sherbrook Group.

2 **585m (cutts) : *pannosus* Zone.**

Assignment to the *P. pannosus* Zone of latest Albian age is indicated at the top by youngest *C. paradoxa* and at the base by oldest *P. pannosus*, although this could be caved in these cuttings. Also age diagnostic is *P. grandis*. Dominant is *Cyathidites* with *C. australiensis*, *Falcisporites*, *Microcachryidites* and *Steriesporites* frequent. Rare elements include *C. striatus*, *F. asymmetricus* and *T. reticulatus*. No caving or reworking was seen.
Environments are probably non-marine as the minor dinoflagellates (*Spiniferites*) are probably caved.

These features are usually seen in the topmost Eumeralla Formation.

3 **597m (cutts), 642m (cutts) : upper *paradoxa* Zone.**

Assignment to the upper *C. paradoxa* Zone of late Albian age is indicated at the top by *P. grandis* without younger markers and at the base by oldest *P. grandis* and *C. paradoxa*. Dominant is *Cyathidites* with frequent *C. australiensis, Falcisporites, Microcachryidites, P. microsaccatus* and *S. antiquasporites*. Rare elements include *A. tilchaensis, B. holodictyus, C. penolaensis, C. striatus, F. asymmetricus, T. trioreticulosus* and *T. reticulatus*. No caving or reworking was seen.

Brackish marine environments are indicated by the very rare spiny acritarchs and consistent freshwater algae. The very rare dinoflagellates are considered caved.

These features are usually seen in the middle Eumeralla Formation. of Kopsen and Scholefield (1990)

KOIROIT 10

1 **846-53m (core) : upper *longus* Zone (*druggii* Dino Zone)**

Assignment to the upper *T. longus* Zone of latest Maastrichtian age is indicated at the top by youngest *T. sectilis* and at the base by oldest *S. punctatus*. Spores and pollen are subordinate with *Dilwynites, P. mawsonii* and *Proteacidites* frequent. Rare elements includes *G. rudata* and *L. florinii*.

Amongst the dominant dinoflagellates *M. coronata* and *M. druggii* are very common with *micrhystridium* also common and indicating assignment to the *druggii* Dino Zone. Rare elements include *A. acutula* and *C. fragile*.

Intermediate marine environments are suggested by the dominant dinoflagellates (57%) although their low diversity suggests that nearshore environments may be more likely.

These features are usually seen in the topmost Sherbrook Group.

2 **901-07m (core) : lower *longus* Zone (*druggii* Zone)**

Assignment to the lower *T. longus* Zone of Maastrichtian age is indicated at the top by youngest *Q. brossus. T. confessus. T. longus. T. waipawaensis and T. lilliei* without younger markers and at the base by oldest *Q. brossus, T. longus* and *T. verrucosus*. *P. microsaccatus* is common with *Cyathidites, Dilwynites, Falcisporites*, *Laevigatosporites*, *Microcachryidites* and *Proteacidites* frequent. *G. rudata* is very consistent and more frequent than *N. endurus*.

Amongst the rare dinoflagellates *M. coronata*, *M. druggii* and *I. pellucida* indicate the *druggii* Dino Zone.

Very nearshore marine environments are indicated by the low dinoflagellate content (1%) and diversity and the high freshwater algal content (12%). Nearshore brackish lake environments are possible.

These features are normally seen near the top of the Sherbrook Group.

E **NORTH EUMERALLA 1**

1 **1003m (cutts) : indeterminate, possibly Tertiary.**

This sample is almost barren of identifible palynomorphs but contains a vast amount of plant fresh tracheid. The spores and pollen seen includes *C. striatus* and long ranging Creteacous/Tertiary taxa. The tracheid seen is light coloured and fresh suggesting a Tertiary age but could be lost circulation material (LCM) introduced to the hole during drilling problems. Overall, too few forms were seen for age assignment.

F **PRETTY HILL 1**

1 **649-51m (cutts) : upper *longus* Zone (*druggii* Dino Zone).**

Assignment to the upper *T. longus* Zone of Maastrichtian age is indicated at the top by youngest *T. lilliei* and *T. sectilis* and at the base by oldest *S. punctatus*. *Proteacidites* spp are very common with *Dilwynites* and *Falcisporites* frequent. Rare elements include *A. cruciformis*, *N. endurus*, *P. mawsonii* and *T. gillii*. *G. rudata* at 4% is much more common than *N. endurus* at 1%. Inertinite dominates the assemblage.

Amongst the rare dinoflagellates *M. coronata* and *M. druggii* indicate the *druggii* Dino Zone. Rare elements include *A. acutula* and *A. senonensis*.

Nearshore environments are indicated by the low dinoflagellates content (6%) and low diversity. Significant freshwater influence is shown by the frequent freshwater algae (4%). Spores and pollen are abundant and diverse.

These features are usually seen in the topmost Sherbrook Group

IV CONCLUSIONS

The majority of these samples were considered to be from to the Pebble Point Formation. However, all of them yielded latest Maastrichtian ages suggesting the topmost Sherbrook Group instead. Previous experience in exploration wells including Henke-1 has shown this palynclogical Zone associated with a thin claystone overlying the sandy Sherbrook Group and looking more akin to the overlying Tertiary. It may represent a terminal Cretaceous flooding claystone in a sequence stratigraphic sense.

The remainder of the samples that could be assigned are from Killara-1 and indicate Eumeralla Formation assignment.

Nearshore environments are indicated by the low dinoflagellates content (6%) and low diversity. Significant freshwater influence is shown by the frequent freshwater algae (4%). Spores and pollen are abundant and diverse.

These features are usually seen in the topmost Sherbrook Group.

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E VICTORIAN SURVEY – MULTI WELLS 1994

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C L I E N T: VICTORIAN DEPARTMENT OF MINES
W E L L: MAASTRICHTIAN & ALBIAN PALYNOLOGY OF : BELFAST-4, BELFAST-11, KILLARA-1, KOIROIT-10, NTH EUMERALLA-1 & PRETTY HILL-1

FIELD: ONSHORE OTWAY BASIN, VICTORIA

A N A L Y S T: ROGER MORGAN DATE : NOVEMBER, 1994
N O T E S: ALL DEPTHS ARE IN METRES
ALL FIGURES ARE PERCENTAGES BASED ON 100 SPECIMEN COUNT AND
"X" REPRESENTS RARE PRESENCE OUTSIDE THE COUNT
"A"= ABUNDANT, "C"= COMMON, "F"= FEW, "R" = RARE

RANGE CHART OF OCCURRENCES BY ALPHABETICAL BY GROUP

	1 DINO CONTENT %	2 BOTRYOCOCCUS	3 ALTERBIA ACUTULA	4 APTEODINIUM GRANULATUM	5 AREOLIGERA SENONENSIS	6 CANNINGINOPSIS BRETONICA	7 CASSIDIUM FRAGILE	8 CIRCULODINIUM DEFLANDREI	9 CIRCULODINIUM SOLIDA	10 CLEISTOSPHAERIDIUM SPP	11 GLAPHYROCYSTA DIVARICATUM	12 HETEROSPHAERIDIUM HETERACANTHUM	13 ISABELIDINIUM CF PELLUCIDUM	14 ISABELIDINIUM PELLUCIDUM	15 KENLEYIA LOPHOPHORA	16 MANUMIELLA CORONATA	17 MANUMIELLA DRUGGII	18 MICRHYSTRIDIUM	19 NUMMUS MONOCULATUS	20 OLIGOSPHAERIDIUM COMPLEX	21 OPERCULODINIUM	22 PARALECHNIELLA
BELFAST #4																						
0890-92 CORE	8	6									X					2	6					
0911-14 CORE	<1	2	X			X										X	X	1	2		X	
BELFAST #11																						
0937-41 CORE	<1		X			X										X	X		X			
KILLARA #1																						
0501 CUTTS	7	1		1	X			X	X	X		X						3				
0585 CUTTS	2																					
0597 CUTTS	<1																	X				
0642 CUTTS	<1	1																				
KOROIT #10																						
0846-53 CORE	57	5	1				X									14	20	21				
0901-07 CORE	1	11											X	X		X	X		1		1	X
N.EUMERALLA 1																						
1003 CUTTS																						
PRETTY HILL#1																						
0649-51 CUTTS	6	3	X	X	X										X	1	3	1	1	1	X	

	23 PERTHOSTINUM	24 POLYSPHAERIDIUM SP1	25 SCHIZOSPORIS PSILATA	26 SCHIZOSPORIS RETICULATA	27 SPINIFERITES FURCATUS/RAMOSUS	28 CRIBROPERIDINIUM MURSPINULLII	29 CRIBROPERIDINIUM RETICULATE	30 VERYHACHIUM	31 AEQUITRIRADITES SPINULOSUS	32 AEQUITRIRADITES TILCHAENSIS	33 AEQUITRIRADITES VERRUCOSUS	34 ANNSAPOLLIS CRUCIFORMIS	35 ARAUCARIACITES AUSTRALIS	36 AUSTRALOPOLLIS OBSCURUS	37 BALMEISPORITES HOLODICTYUS	38 BALMEISPORITES TRIDICTYUS	39 CAMEROZONOSPORITES BULLATUS	40 CAMEROZONOSPORITES OHAIENSIS	41 CERATOSPORITES EQUALIS	42 CICATRICOSISPORITES AUSTRALIENSIS	43 CINGUTRILETES CLAVUS	44 CLAVIFERA TRIPLEX
BELFAST #4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0890-92 CORE	1	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	1	4	.	.	.
0911-14 CORE	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	2	1	.	.	.
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0937-41 CORE	.	.	.	.	X	.	.	.	.	.	.	X	.	X	.	.	X	1	3	X	2	.
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KILLARA #1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0501 CUTTS	.	.	.	.	2	X	.	1	1	.	X	2	1	1	.	1	.	.	.	2	X	.
0585 CUTTS	.	.	.	.	2	.	.	.	.	1	1	.	1	.	.	X	.	.	.	8	X	.
0597 CUTTS	.	.	X	X	.	.	1	.	.	1	X	.	1	.	X	.	.	.	.	8	1	.
0642 CUTTS	.	.	3	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	5	1	.
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KOROIT #10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0846-53 CORE	.	1	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	1	2	.	1	.
0901-07 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	1
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N.EUMERALLA 1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1003 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.
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PRETTY HILL#1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0649-51 CUTTS	.	.	.	.	X	.	.	.	.	.	.	1	1	.	.	.	.	2	3	.	1	.

	45 CONCAVISSIMISPORITES PENOLAENSIS	46 CONTIGNISPORITES COOKSONIAE	47 COPTOSPORA PARADOXA	48 COPTOSPORA [illegible]	49 COROLLINA TOROSUS	50 CRYBELOSPORITES STRIATUS	51 CYATHIDITES AUSTRALIS	52 CYATHIDITES MINOR	53 CYCADOPITES FOLLICULARIS	54 DICTYOTOSPORITES COMPLEX	55 DILWYNITES GRANULATUS	56 ERICIPITES [illegible]	57 FALCISPORITES GRANDIS	58 FALCISPORITES SIMILIS	59 FORAMINISPORIS ASYMMETRICUS	60 FORAMINISPORIS DAILYI	61 FORAMINISPORIS WONTHAGGIENSIS	62 FOVEOTRILETES PARVIRETUS	63 GAMBIERINA RUDATA	64 GEPHYRAPOLLENITES WAHOOENSIS	65 GLEICHENIIDITES	66 HERKOSPORITES ELLIOTTII
BELFAST #4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0890-92 CORE	.	.	.	.	.	.	4	8	.	.	8	.	.	4	.	.	.	.	4	.	1	2
0911-14 CORE	.	.	.	.	.	.	.	1	.	.	4	2	.	5	.	.	.	.	12	.	.	1
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BELFAST #11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0937-41 CORE	.	.	.	.	.	.	1	2	1	.	2	1	.	3	.	.	.	.	23	X	.	1
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KILLARA #1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0501 CUTTS	X	.	X	.	1	1	11	20	1	X	1	.	2	15	X	.	.	1	.	.	1	.
0585 CUTTS	.	1	1	.	3	1	15	29	1	.	.	.	.	6	X	.	.	2	.	.	2	.
0597 CUTTS	X	.	X	.	2	2	14	29	1	.	.	.	2	8	X	X	X	X	.	.	5	.
0642 CUTTS	X	.	.	1	.	2	9	23	.	.	.	.	2	10	2	.	.	X	.	.	2	.
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KOROIT #10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0846-53 CORE	.	.	.	.	.	.	3	2	.	.	5	.	1	4	.	.	.	.	X	.	2	.
0901-07 CORE	.	.	.	.	.	.	2	8	.	.	4	X	.	7	.	.	.	.	4	.	3	.
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N.EUMERALLA 1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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0649-51 CUTTS	.	.	.	.	2	.	4	4	.	.	9	.	1	5	.	.	.	.	4	.	1	.

	67 LAEVIGATOSPORITES OVATUS	68 LEPTOLEPIDITES VERRUCATUS	69 LYGISTEPOLLENITES BALMEI	70 LYGISTEPOLLENITES FLORINII	71 MICROCACHRYIDITES ANTARCTICUS	72 NEORAISTRICKIA TRUNCATA	73 NOTHOFAGIDITES EMARCIDUS	74 NOTHOFAGIDITES ENDURUS	75 ORNAMENTIFERA SENTOSA	76 OSMUNDACIDITES WELLMANII	77 PERIPOROPOLLENITES POLYORATUS	78 PEROTRILETES MAJUS	79 PHIMOPOLLENITES PANNOSUS	80 PHYLLOCLADIDITES MAWSONII	81 PHYLLOCLADIDITES VERRUCATUS	82 PILOSISPORITES GRANDIS	83 PODOSPORITES MICROSACCATUS	84 PROTEACIDITES	85 PROTEACIDITES HAPUKUI	86 PROTEACIDITES PALISADUS	87 QUADRAPLANUS BROSSUS	88 RETITRILETES AUSTROCLAVATIDITES
BELFAST #4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0890-92 CORE	1	.	.	.	3	.	.	2	.	.	.	.	1	2	.	.	1	22	.	.	.	2
0911-14 CORE	2	.	X	1	6	.	.	9	.	.	3	.	.	7	1	.	2	21	X	X	.	.
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BELFAST #11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0937-41 CORE	.	.	X	X	2	.	.	12	.	.	1	.	X	2	.	.	2	27	2	X	.	X
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KILLARA #1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0501 CUTTS	1	.	.	X	13	X	X	.	.	4	.	.	1	X	.	.	7	.	.	.	.	2
0585 CUTTS	.	X	.	.	6	.	.	.	.	4	.	.	X	.	.	X	4	.	.	.	.	.
0597 CUTTS	.	.	.	.	8	.	X	.	.	3	.	X	.	.	.	X	6	.	.	.	.	2
0642 CUTTS	.	.	.	.	11	.	.	.	.	7	.	.	.	.	.	X	7	.	.	.	.	4
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KOROIT #10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0846-53 CORE	.	.	.	1	1	.	.	.	.	.	.	.	.	4	.	.	.	5	.	.	.	2
0901-07 CORE	8	.	.	X	6	.	.	2	1	.	1	.	.	5	.	.	17	5	.	.	X	.
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1003 CUTTS	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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PRETTY HILL#1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0649-51 CUTTS	1	1	X	.	4	.	.	1	.	2	X	.	.	1	.	.	.	28	.	.	.	5

	89 STERIESPORITES ANTIQUASPORITES	90 STERIESPORITES PUNCTATUS	91 STERIESPORITES REGIUM	92 TETRACOLPORITES VERRUCOSUS	93 TRICOLPITES CONFESSUS	94 TRICOLPITES GILLII	95 TRICOLPITES LONGUS	96 TRICOLPITES SABULOSUS	97 TRICOLPITES WAIPAWAENSIS	98 TRICOLPORITES APOXYEXINUS	99 TRICOLPORITES LILLIEI	100 TRILOBOSPORITES PAPILLATUS	101 TRILOBOSPORITES TRIORETICULOSUS	102 TRIPOROLETES RADIATUS	103 TRIPOROLETES RETICULATUS	104 TRIPOROPOLLENITES GEMMATUS	105 TRIPOROPOLLENITES SECTILIS	106 VITREISPORITES PALLIDUS	107 REWORKING : CRETACEOUS	108 REWORKING : PERMIAN	109 REWORKING : TRIASSIC
BELFAST #4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0890-92 CORE	4	X	1	.	.	1	.	3	.	1	.	.	.	.	.	.	X	2	X	.	.
0911-14 CORE	4	.	2	.	2	1	X	.	1	.	X	.	.	.	.	.	2	1	X	.	.
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BELFAST #11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0937-41 CORE	9	X	.	.	1	.	X	.	.	.	X	.	.	.	.	X	2	.	.	.	.
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KILLARA #1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0501 CUTTS	2	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	X	X
0585 CUTTS	8	.	.	.	.	.	.	.	.	.	.	.	.	2	2	.	.	.	.	.	.
0597 CUTTS	5	.	.	.	.	.	.	.	.	.	.	.	1	X	X	.	.	.	.	.	.
0642 CUTTS	5	.	.	.	.	.	.	.	.	.	.	.	X	.	1	.	.	1	.	.	.
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KOROIT #10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0846-53 CORE	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.
0901-07 CORE	1	.	.	5	X	X	X	.	2	.	X	X	.	.	.	.	.	2	.	.	.
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PRETTY HILL#1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0649-51 CUTTS	4	X	.	.	.	X	.	.	.	.	X	.	.	.	.	.	1	4	.	.	.

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