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FINAL PALYNOLOGY OF BHPP MINERVA #1,

OFFSHORE OTWAY BASIN, VICTORIA, AUSTRALIA

BY

ROGER MORGAN AND NIGEL HOOKER

for BHP PETROLEUM

September 1993

REF:OTW.RPMINRVA

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I SUMMARY

563.0m(swc) 1% dinos, 594.0m(swc) 3% : middle *diversus* Zone : Early Eocene : marginally marine

617.0m(swc) 6% dinos : lower *diversus* Zone : Early Eocene : marginally marine

627.0m(swc) 10% dinos, 651.0m(swc) 4% : upper *balmei* Zone : late Paleocene : nearshore marine

760.0m(swc) 3% dinos : lower *balmei* Zone : early Paleocene : very nearshore marine

783.0m(swc) 42% dinos, 810.0m(swc) dinos absent, 838.5m(swc) 6% : *longus* Zone (783m *druggii* dino Zone) : Maastrichtian : marginal, non-marine and nearshore upsection

897.0m(swc) 2% dinos, 954.0m(swc) 2%, 991.0m(swc) 14% : upper *senectus* Zone (897 upper *australis* dino Zone, 954m, 991m lower *australis* dino Zone) : Campanian : very nearshore marine

1054.0m(swc) 4% dinos, 1105.5m(swc) 6%, 1149.0m(swc) 8% : middle *senectus* Zone (all upper *aceras* Zone) : Campanian : very nearshore marine

1166.0m(swc) 13% dinos : lower *senectus* Zone (middle *aceras* dino Zone) : Campanian : nearshore marine

1179.0m(swc) 7% dinos, 1193.0m(swc) 17%, 1220.0m(swc) 12%, 1260.0m(swc) 16%, 1271m(cutts) (19%), 1298.0m(swc) 21% : upper *apoxyexinus* Zone (*aceras* dino Zone) : latest Santonian : nearshore marine

1325m(cutts) (15% dinos), 1351.0m(swc) 18%, 1398.0m(swc) 13%, 1410m(cutts) (24%), 1453.0m(swc) 8% : upper *apoxyexinus* Zone (1325m, 1351m upper *cretacea* dino Zone, 1398m, 1410m, 1453m lower *cretacea* dino Zone) : Santonian : nearshore marine

1502.0m(swc) 16%, 1510m(cutts) (31%), 1562.0m(swc) 8%, 1597.0m(swc) 8% : middle *apoxyexinus* Zone (1502m, 1510m upper *porifera* dino Zone : Santonian : nearshore marine

1616m(cutts) (26% dinos), 1629.0m(swc) 12%, 1647.0m(swc) 22%, 1660.0m(swc) 7%, 1690.0m(swc) 14%, 1699m(cutts) (24%), 1723.0m(swc) 12%, 1747.0m(swc) 14%, 1766.0m(swc) 14%, 1790m(cutts) (22%), 1805.0m(swc) 15% : lower *apoxyexinus* Zone : Santonian : nearshore marine

1820m(cutts) (17% dinos), 1837.3m(CORE) dinos absent, 1838.1m(CORE) 3%, 1839.7m(CORE) 16%, 1840.3m(CORE) 13% dinos, 1872.5m(swc) 2%, 1889m(cutts) (5%), 1916m(cutts) (13%), 1947.5m(swc), dinos absent, 1949m(cutts) (4%), 2003m(cutts) (11%), 2027m(cutts) (14%), 2035.0m(swc) 33%, 2061.0m(swc)

12%, 2084m(cutts) (5%) : *mawsonii* Zone (2084m *infusorioides* dino Zone : Coniacian-Turonian : mixed nearshore to non-marine

2089.0m(swc) 1% dinos, 2093m(cutts) (17%), 2101.0m(swc) 16%, 2102m(cutts) (15%), 2105m(cutts) (15%), 2117m(cutts) (15%), 2123.0m(swc) 5%, 2142.0m(swc) 1% : *distocarinatus* Zone (2089m, 2093m, 2101m, 2102m, 2105m all *infusorioides* dino Zone) : Cenomanian : nearshore and marginal marine

2150m(cutts) dinos absent, 2157.5m(swc) absent, 2180m(cutts) (trace dinos) apparently *distocarinatus* Zone but markers could be caved in the cuttings and are absent from the swc : apparently Cenomanian : non-marine but possibly brackish at 2180m but marine indicators could be caved

2212.5m(swc) almost barren, 2222m(cutts) (4% dinos but most are clearly caved), 2261m(cutts) (2% dinos possibly caved), 2270m(cutts) (trace dinos possibly caved) : zone indeterminate : swc almost barren, cuttings lack diagnostic markers : possibly brackish to very nearshore but saline markers may be caved

2294.0m(swc) trace spiny acritarchs, 2318m(cutts) (1% dinos clearly caved), 2321.0m(swc) trace spiny acritarchs, 2324m(cutts) (1% dinos mostly clearly caved), 2333m(cutts) (dinos absent), 2354m(cutts) (dinos absent), 2360.0m(swc) trace spiny acritarchs, 2392.5m(swc) dinos absent, 2408m(cutts) (dinos absent), 2412.0m(swc) almost barren, 2425m(cutts) (dinos absent) : possibly *paradoxa* Zone but not typically so : possibly Albian : non-marine to slightly brackish : depends on richer assemblages at 2294.5m, 2321.0m, 2324m, 2392.5m.

II INTRODUCTION

During drilling three batches of cuttings (12 samples) were studied on an urgent basis at Maitland. Following this, a two person team was placed offshore on the Byford Dolphin and studied a further 16 cuttings over eight days. These samples were reported in 10 faxed reports. After well completion, a further fifty four samples (50 swcs, 4 from core) were submitted for detailed study. All results are summarised herein.

Palynomorph occurrence data are shown as Appendix I and include the urgent and followup samples and form the basis for the assignment of the samples to sixteen spore-pollen and dinoflagellate units of Early Eocene to Cenomanian age.

Specimen counts were made on all assemblages and expressed in the raw data as percentages. In the running text, percentages from cuttings are always bracketed (5%) to show that they may be inaccurate due to caving.

The Cretaceous spore-pollen zonation is essentially that of Dettmann and Playford (1969), but has been significantly modified and improved by various authors since, and most recently discussed in Helby et al (1987), as shown on Figure 1. The Late Cretaceous zonation has been modified by Morgan (1992) in project work for BHPP (Figure 2). Tertiary zones are essentially those of Partridge (1976).

Maturity data was generated in the form of Spore Colour Index, and is plotted on Figure 3 Maturity Profile of Minerva #1. The oil and gas windows on Figure 3 follow the general consensus of geochemical literature. The oil window corresponds to spore colours of light-mid brown (Staplin Spore Colour Index of 2.7) to dark brown (3.6). These correspond to vitrinite reflectance values of 0.6% to 1.3%. Geochemists argue variations on kerogen type, basin type and basin history. The maturity interpretation is thus open to reinterpretation using the basic colour observations as raw data. However, the range of interpretation philosophies is not great, and probably would not move the oil window by more than 200 metres.

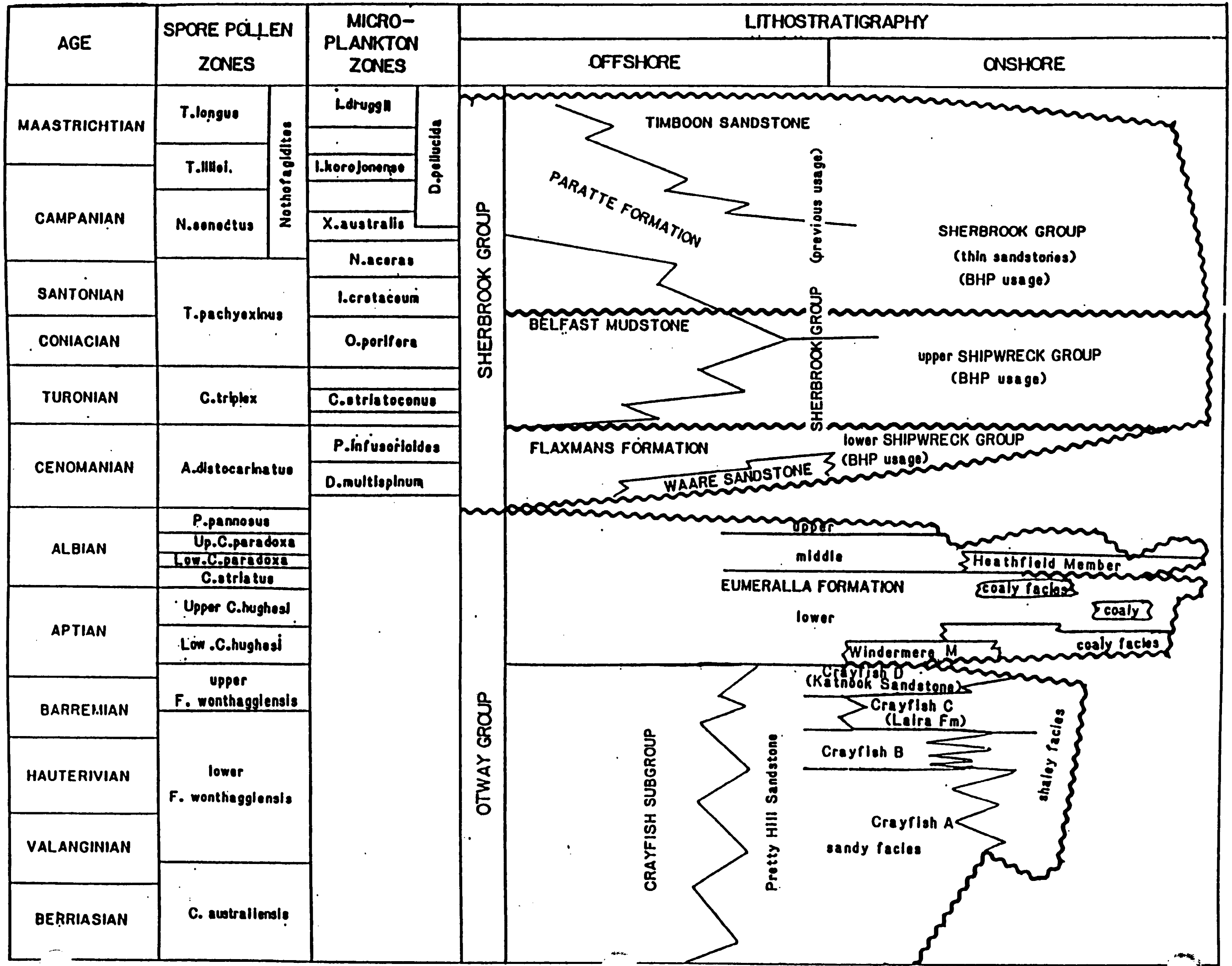

FIG. 1. CRETACEOUS REGIONAL FRAMEWORK, OTWAY BASIN

SPORE-POLLEN ZONES		SPORE-POLLEN HORIZONS	DINOFLAGELLATE ZONES		DINOFLAGELLATE HORIZONS
LONGUS	upper	T. confessus / T. sectilis 1; G. rudata ● 1b	DRUGGII		M. conorata 1a; M. conorata 1c
LONGUS	lower	N. senectus ● 1d; T. sabulosus 2a; T. longus 2b	DRUGGII		M. druggii 1e; I. pellucida 2
LILLEI	upper	T. sectilis 3a	KOROJONENSE		I. korojonense / I. cretacea 3
LILLEI	lower	T. lillei 3b	KOROJONENSE		I. korojonense / I. pellucida 3c
SENECTUS	upper	G. rudata 7a	AUSTRALIS	upper	X. australis / X. ceratoides / A. wisemaniae 4; A. suggestium 4a
SENECTUS	upper		AUSTRALIS	lower	N. aceras 5 / N. semireticulata / X. australis ⬤ 6
SENECTUS	middle	T. sabulosus 7e	ACERAS	upper	N. tuberculata 7; X. australis 7b; N. tuberculata / N. semireticulata 7c; O. obesa 7d
SENECTUS	lower	N. senectus 9a	ACERAS	middle	T. suspectum / Heterosphaeridium 10%+ 8
SENECTUS	lower		ACERAS	lower	Heterosphaeridium 20%+ 9; N. aceras 9b
APOXYEXINUS	upper	A. cruciformis 1%	CRETACEA	upper	I. belfastense / A. denticulata 10; Heterosphaeridium 20%+ 10a; I. belfastense / A. denticulata 11a
APOXYEXINUS	middle	A. cruciformis 1-4% 11; 12	CRETACEA	lower	I. cretacea 11b
APOXYEXINUS	lower	A. cruciformis 10%+; 12a A. cruciformis 10%+	PORIFERA		O. porifera 12b
MAWSONII		A. distocarinatus 12c; consistent A. distocarinatus 13; P. mawsonii 15a	STRIATOCONUS		
MAWSONII			INFUSORIOIDES		C. edwardsii 14; C. edwardsii ● 15; C. edwardsii ● 15b
DISTOCARINATUS		common saccates A. cruciformis			dinoflagellates

FIGURE 2 ZONATION USED HEREIN SHOWING THE NUMBERED HORIZONS AGAINST THE EXISTING FORMAL ZONATION.

● =frequent (4–10%) ⬤ =common (11–30%)

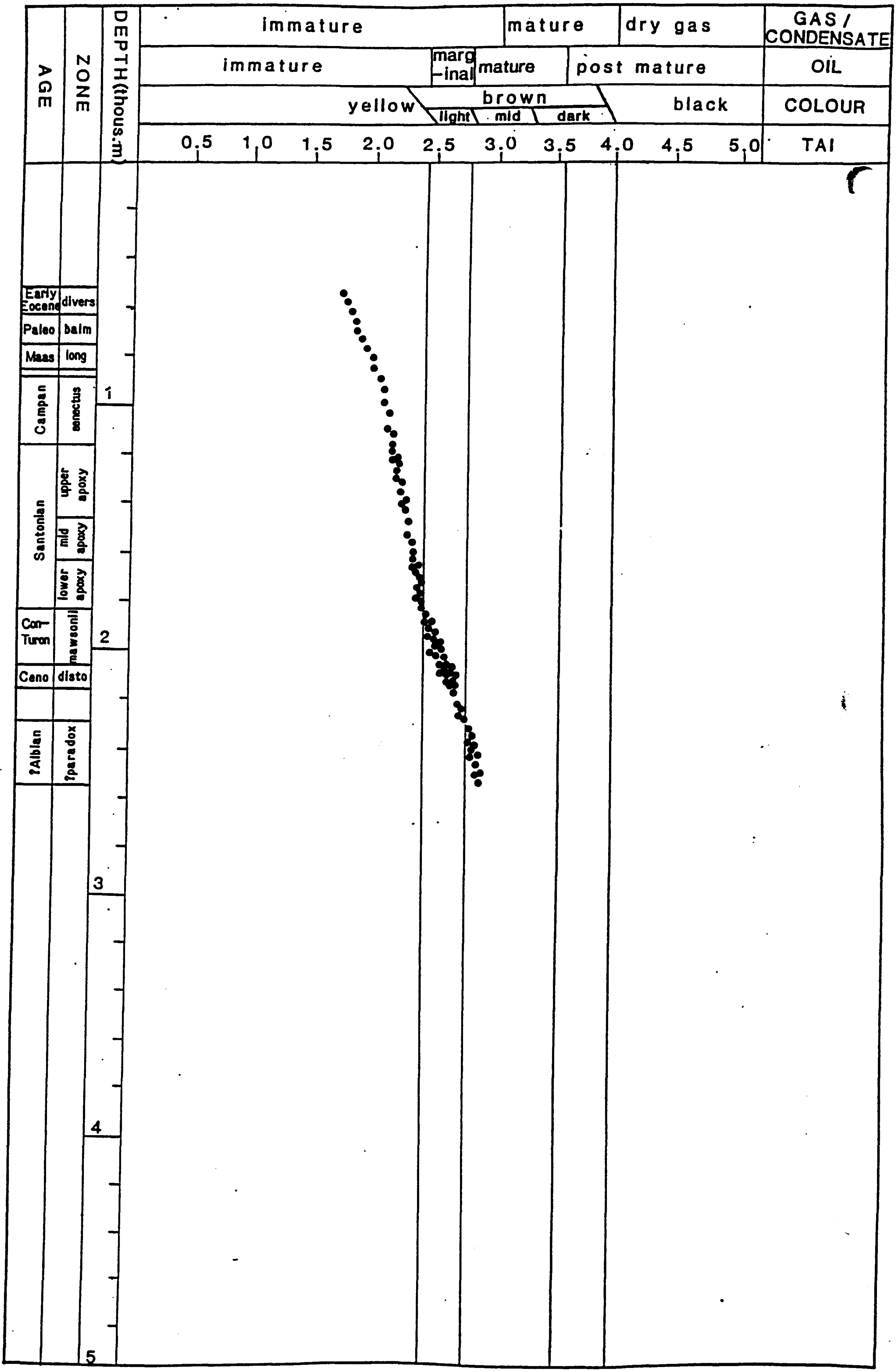

FIGURE 3 MATURITY PROFILE : MINERVA # 1

III PALYNOSTRATIGRAPHY

A 563.0m(swc), 594.0m(swc) : middle *diversus* Zone

Assignment to the middle *Malvacipollis diversus* of Early Eocene age is indicated at the top by the absence of younger indicators and at the base on oldest *Banksieaeidites arcuatus*, *Proteacidites tuberculiformis* and *Triporopollenites ambiguus*. Common species are *Falcisporites similis* and *Dilwynites granulatus*, with frequent *Lygistepollenites florinii*, *Haloragacidites harrisii*, *Podosporites microsaccatus* and *Proteacidites* spp. Minor Permian and Cretaceous reworking was seen.

Amongst the rare dinoflagellates, *Deflandrea pachyceros* and *D. obliquipes* are consistent with the Early Eocene age.

Marginally marine environments are indicated by the dominant and diverse spore-pollen, abundant cuticle fragments, and rare (1% and 3% downhole) dinoflagellates and their low diversity. Freshwater algae (*Botryococcus* 6% and 3% downhole) indicate significant lacustrine influence.

Colourless palynomorphs indicate immaturity for hydrocarbons.

B 617.0(swc) : lower *diversus* Zone

Assignment to the lower *M. diversus* Zone of Early Eocene age is indicated at the top by the absence of younger indicators and at the base on oldest *Periporopollenites demarcatus* and *Malvacipollis diversus*. Minor downhole mud contamination is considered responsible for a single *Proteacidites pachypolus* specimen. Common taxa are *Proteacidites*, *Dilwynites* and *Falcisporites* while frequent taxa are *Cyathidites* and *P. microsaccatus*. Minor Permian reworking was seen.

Amongst the very scarce dinoflagellates, *D. obliquipes* is consistent with the Early Eocene age.

Marginally marine environments are indicated by the minor (6%) dinoflagellates and their low diversity, together with the dominant and diverse spore-pollen.

Colourless palynomorphs indicate immaturity for hydrocarbons.

C 627.0m(swc), 651.0m(swc) : upper *balmei* Zone

Assignment to the upper *Lygistepollenites balmei* Zone of late Paleocene age is indicated at the top by youngest *Gambierina rudata*, *G. edwardsii* and *L. balmei*, and at the base by oldest *Proteacidites grandis*. Common taxa are *Dilwynites* and *Falcisporites* while frequent taxa include *Proteacidites*, *Gleicheniidites* and *Cyathidites*. Minor Permian reworking was seen.

Amongst the dinoflagellates, *Deflandrea speciosus*, *D. truncata* and *D. dilwynensis* with *Alisocysta margarita* (627m only) and without *Apectodinium* spp, are consistent with the spore-pollen zone.

Nearshore marine environments are indicated by common and diverse spore-pollen and rare dinoflagellates (10% and 4% downhole) with frequent cuticle.

Colourless spores and pollen indicate immaturity for hydrocarbons.

D 760.0m(swc) : lower *balmei* Zone

Assignment to the lower *L. balmei* Zone of early Paleocene age is indicated at the top and base by the absence of younger and older indicators respectively. *Falcisporites* and *Dilwynites* are very common with *Proteacidites* frequent. *G. edwardsii*, *G. rudata* and *L. balmei* are consistent and indicate the zone. Very minor Eocene caving and mud contamination is evident by the presence of *Anacolosidites acutullus*.

Very rare dinoflagellates include *D. speciosa* and *D. dilwynensis*, consistent with the spore-pollen zone. *Thalassiphora delicata* and *Hafniasphaera septata* are rare distinctive elements.

Very nearshore marine environments are indicated by the dominant and diverse spore-pollen, abundant cuticle, and rare (3%) dinoflagellates of low to moderate diversity.

Colourless spore colours indicate immaturity for hydrocarbons.

E 783.0m(swc), 810.0m(swc), 838.5m(swc) : *longus* Zone

Assignment to the *Tricolpites longus* spore-pollen Zone of Maastrichtian age is indicated at the top by youngest *T. longus* supported by the dinoflagellates and at the base on oldest *T. longus* and *Tetracolporites verrucosus*. All three samples are lean of palynomorphs and dominated by inertinite. At 783m, oldest *Stereisporites punctatus* and the dominance of *G. rudata* over *Nothofagidites endurus* indicate the upper *longus* Zone while at 838.5m, *N. endurus* dominance over *G. rudata* indicates the lower *longus* Zone. Common are *Falcisporites*, *Dilwynites* and *Proteacidites*. *Tricolporites lillei* is very rare at 838.5m only. Very minor Permian and Triassic reworking were seen.

At 783m, abundant *Manumiella coronata* indicates the *druggii* dinoflagellate Zone of latest Maastrichtian age, correlative with the upper *longus* spore-pollen Zone. At 838.5m, the rare presence of *Isabelidinium korojonense* and *Isabelidinium cretacea* indicates the *I. korojonense* Zone of Campanian to early Maastrichtian age. This zone is usually seen up to the top of the *T. lillei* spore-pollen Zone but is here associated with the *T. longus* Zone. The difference is minor, and may represent minor caving or reworking, or fine tuning of the zonation.

Environments are different in all three samples. At 838.5m, marginal marine environments are indicated by dominant and diverse spore-pollen, minor low diversity dinoflagellates (6%) with significant freshwater algae (10%). At 810m, non-marine lacustrine environments are suggested by the dominant and diverse spore-pollen, absence of dinoflagellates, common freshwater algae (16%) and frequent cuticle. At 783m, nearshore marine environments are indicated by the very common dinoflagellates (42%) despite their low diversity, and frequent and diverse spore-pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

F 897.0m(swc), 954.0m(swc), 991.0m(swc) : upper *senectus* Zone

Assignment to the upper *Nothofagidites senectus* Zone of lower Campanian age is indicated at the top by the absence of younger markers and confirmed by the dinoflagellates, and at the base by oldest *Gambierina rudata*, also confirmed by the dinoflagellates. The apparent absence of the *T. lillei* Zone of mid Campanian to early Maastrichtian age may be caused by unconformity or condensation, or it may exist unsampled in the 58.5m sample gap. *Nothofagidites* are frequent to common (5-13%) in this subzone, but scarce (1% or less) beneath. Rare but consistent are *Tricolpites sabulosus*, *T. confessus* and *G. rudata* and *Tricolporites apoxyexinus* is present at 897m only. Overall, *Falcisporites* and *Proteacidites* are common, with *Dilwynites*, *Microcachryidites* and *Nothofagidites* frequent. At 991m, *T. sabulosus* is unusually frequent at 6% of the assemblage. Rare Permian reworking was seen.

Amongst the dinoflagellates, the upper *Xenikoon australis* dinoflagellate Zone is indicated at 897m by youngest *X. australis* above youngest *Nelsoniella aceras* and *N. semireticulata*. *X. australis* is rare but still the most consistent dinoflagellate species. At 954m and 991m lower *X. australis* Zone is indicated at the top by youngest *N. semireticulata* and at the base by the absence of older indicators and the continued presence of frequent *X. australis*, the only frequent dinoflagellate. Youngest *Areosphaeridium suggestium* at 954m is consistent with the assignment.

Environments are very nearshore marine as shown by the low dinoflagellate content (2%, 2% and 14% down section) and low dinoflagellate diversity. Clearly 991m is the most marine with highest dinoflagellate content and diversity.

Yellow spore colours indicate immaturity for hydrocarbons.

G 1054.0m(swc), 1105.5m(swc), 1149.0m(swc) : middle *senectus* Zone

Assignment to the middle *N. senectus* Zone of early Campanian age is indicated at the top by the absence of younger indicators and is confirmed by dinoflagellate data and at the base by oldest *T. sabulosus*, also confirmed by dinoflagellate data. Common are *Falcisporites* and *Proteacidites* with frequent *Cyathidites*, *Dilwynites*, *Microcachryidites* and *Phyllocladidites mawsonii*. Consistent are *Amosopollis cruciformis*, *N. endurus*, *N. senectus*, *T. confessus*, *Tricolpites gillii* and *T. sabulosus*. At 1149m, *T. apoxyexinus* occurs. Rare Triassic, Permian and Early Cretaceous reworking was seen.

Amongst the dinoflagellates, *Nelsoniella tuberculata* occurs in all samples, indicating the upper *Nelsoniella aceras* dinoflagellate Zone, correlative with the middle *senectus* spore-pollen Zone. Further, the presence of *X. australis* to the base indicates the upper part of this subzone. The most frequent taxa are *Spiniferites*, *Heterosphaeridium* and *X. australis* with *N. aceras* and *N. tuberculata* rare but consistent.

Very nearshore marine environments are indicated by the rare low diversity dinoflagellates (4%, 6% and 8% downhole), abundant and diverse spore-pollen, common cuticle and significant freshwater algae (1%, 5% and 2% downhole).

Yellow spore colours indicate immaturity for hydrocarbons.

H 1166.0m(swc) : lower *senectus* Zone

Assignment to the lower *N. senectus* Zone of earliest Campanian age is indicated at the top by the absence of younger indicators and at the base on oldest *N. endurus*. Very common is *Falcisporites* while *Cyathidites*, *Dilwynites*, *Gleicheniidites*, *Microcachryidites* and *Proteacidites* are frequent. *N. endurus* is rare. Minor Permian reworking was seen.

Amongst the dinoflagellates, the presence of *Nelsoniella aceras* without *N. tuberculata* and the presence of common *Heterosphaeridium* (10%) indicate the middle *aceras* dinoflagellate Zone. *Heterosphaeridium solida* and *H. heterocanthum* are the only frequent dinoflagellates.

Nearshore marine environments are indicated by the low dinoflagellate content (13%) and their low to moderate diversity, coupled with the dominant and diverse spores and pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

I 1179.0m(swc), 1193.0m(swc), 1220.0m(swc), 1260.0m(swc), 1271m(cutts), 1298.0m(swc) : upper *apoxyexinus* Zone (*aceras* dino Zone)

Assignment to the upper *Tricolporites apoxyexinus* Zone is indicated at top and base by very rare *Amosopollis cruciformis* (1% or less) without younger or older markers, and is confirmed by dinoflagellate data. Large nondescript *Proteacidites* spp occur to the base of this interval, but not below it. A further interval of upper *apoxyexinus* Zone occurs below this point associated with the *cretacea* dino Zone. Overall, the assemblage is fairly bland with *Falcisporites* and *Dilwynites* common and *Cyathidites*, *Microcachryidites* and *Proteacidites* frequent. *Australopollis obscurus* is consistent at 1-2% of the assemblage to the interval base but very rare beneath. A single specimen of *N. senectus* at 1220.0m suggests extension of the *senectus* Zone down to this point, but may also represent minor mud contamination. Minor Permian and Triassic reworking were seen.

Amongst the dinoflagellates, *N. aceras* occurs to the interval base without younger indicators and indicates the *N. aceras* dinoflagellate Zone. The subzone cannot be determined from these swc samples where *Heterosphaeridium* content is 3-7%. The major acme of *Heterosphaeridium* (20%+) may only be visible in cuttings. Of the dinoflagellates, only *Heterosphaeridium* and *Trithyrodinium* are frequent. Rare but consistent are *N. aceras* and *Odontochitina porifera* while rare but inconsistent are *Isabelidinium cretaceum* (1298m), *Odontochitina obesa* (1220 and 1260m) and *Areosphaeridium suggestium* (1193m).

Environments are nearshore marine with low dinoflagellate content (7%, 17%, 12%, 16%, (19%), 21% downhole) and low to moderate diversity, abundant and diverse spore-pollen and rare algal acritarchs (absent to 3%).

Yellow spore colours indicate immaturity for hydrocarbons.

J 1325m(cutts), 1351.0m(swc), 1398.0m(swc), 1410m(cutts), 1453.0(swc) : upper *apoxyexinus* Zone (*cretacea* dino Zone)

Assignment to the upper *T. apoxyexinus* Zone is indicated by rare *A. cruciformis* (1% or less) without younger or older markers and is confirmed by dinoflagellate data. Large *Proteacidites* spp are absent here, but consistent above. *A. obscurus* occurs rarely (1% or less) to the interval base but not below. Otherwise the assemblage is nondescript with very common *Falcisporites*, common *Dilwynites* and frequent *Cyathidites*, *Microcachryidites*, *Podosporites microsaccatus* and *Proteacidites*. Small *Proteacidites* comprise 2-7% of the assemblage but are extremely rare or absent in section beneath. *T. apoxyexinus* occurs at 1398m and 1453m.

Amongst the dinoflagellates, youngest *Amphidiadema denticulata* and *Isabelidinium belfastense* at 1325m(cutts) and oldest *A. denticulata* and *I. belfastense* at 1351.0m(swc) indicate the upper *Isabelidinium cretaceum* dinoflagellate Zone. Youngest *Chatangiella victoriensis* and *Trithyrodinium glabrum* at 1351m are consistent. Below this, the absence of younger indicators at the top and oldest *I. cretaceum* at the base indicates assignment of 1398-1453m to the lower *cretaceum* dinoflagellate Zone. *Heterosphaeridium* spp continue to be the most frequent dinoflagellate, but with consistent diverse *Trithyrodinium* spp.

Nearshore marine environments are indicated by low dinoflagellate content ((15%), 18%, 13% (24%), 8% downhole) and low to moderate diversity, coupled with dominant and diverse spore-pollen assemblages.

Yellow spore colours indicate immaturity for hydrocarbons.

K 1502.0m(swc), 1510m(cutts), 1562.0m(swc), 1597.0m(swc) : middle *apoxyexinus* Zone

Assignment to the middle *T. apoxyexinus* Zone is indicated at the top by youngest consistent to frequent *A. cruciformis* (2-4% compared with 1% or less above), and at the base by the absence of older markers. Within the interval, *Cyathidites, Dilwynites, Falcisporites* and *Microcachryidites* are all common to very frequent. *A. cruciformis* is frequent (4%) in all except the shallowest sample (2%). *Ornamentifera sentosa* occurs at 1502.0 and 1510m. *Proteacidites* are extremely rare to absent. Minor Permian reworking was seen.

Amongst the dinoflagellates, *Isabelidinium rectangulare* occurs at 1502 and 1510m, indicating the upper *porifera* dinoflagellate Zone. Youngest *Circulodinium deflandrei* occurs at 1510m and confirms the spore-pollen subzone. Oldest *O. porifera* occurs in swc at 1453m. *Heterosphaeridium* and *Trithyrodinium* are the most common dinoflagellates.

Environments are nearshore marine as shown by the low dinoflagellate content (16%, 31%, 8%, 8% downhole) and their low to moderate diversity, with dominant and diverse spore-pollen.

Yellow spore colours indicate immaturity for hydrocarbons.

L 1616m(cutts), 1629.0m(swc), 1647.0m(swc), 1660.0m(swc), 1690.0(swc), 1699m(cutts), 1723.0m(swc), 1747.0m(swc), 1766.0m(swc), 1790m(cutts), 1805.0m(swc) : lower *apoxyexinus* Zone

Assignment to the lower *T. apoxyexinus* Zone of Santonian age is indicated at the top by the downhole influx of *A. cruciformis* ((11%), 4%, 9%, 8%, 9%, (15%), 3%, 1%, 9%, (12%), 8%) compared with 2-4% above, and at the base by the base of this acme and the absence of older indicators. Within the interval, saccate pollen are common to very common, especially *Falcisporites* and *Microcachryidites*. *Dilwynites* are frequent to common towards the top (5-15% in the interval 1616-1723m) but are common to very common towards the base (24-40% in the interval 1747-1805m). *A. curciformis* is very frequent to common in most samples although apparently more common in the cuttings than the swcs. *Cicatricosisporites australiensis* is rare but consistent. A single specimen of *Appendicisporites distocarinatus* occurs at 1805m but may be slightly reworked. *T. apoxyexinus* was not seen but is always extremely rare.

Amongst the dinoflagellates, *Heterosphaeridium* spp and *Circulodinium* spp are the most frequent with *Trithyrodinium* spp fairly consistent to the interval base. Single specimens of *Cribroperidinium edwardsii* at 1647m and 1747m are considered reworked. Youngest *Aptea* sp occurs at 1747m and youngest *Chlamydophorella ambigua* at 1790m and are consistent with the spore-pollen zone. *Conosphaeridium* spp occur rarely as single specimens (*C. striatoconus* at 1616m and 1790m both cuttings, *C. tubulosum* at 1647.0m swc) are presumably in place and consistent with the spore-pollen zone. The existing formal dinoflagellate zones cannot be crisply recognised on these criteria.

Environments are nearshore marine with low dinoflagellate content ((26%), 12%, 22%, 7%, 14%, (24%), 12%, 14%, 14%, (22%), 15%) and low to moderate diversity, coupled with abundant and diverse spores and pollen and mostly inertinite dominated kerogen, occasionally with frequent cuticle.

Yellow to light brown spore colours indicate immaturity for hydrocarbons.

M 1820m(cutts), 1837.3m(CORE), 1838.1m(CORE), 1839.7m(CORE), 1840.3m(CORE), 1872.5m(swc), 1889m(cutts), 1916m(cutts), 1947.5m(swc), 1949m(cutts) 2003m(cutts), 2027m(cutts), 2035.0(swc), 2061.0m(swc), 2084m(cutts) : *mawsonii* Zone

Assignment to the *Phyllocladidites mawsonii* spore-pollen Zone of Coniacian-Turonian age is indicated at the top by youngest consistent *Appendicisporites distocarinatus* (supported by the decline in *A. cruciformis)* and at the base on oldest *P. mawsonii*, supported by oldest *Clavifera triplex* in swcs at 2101.0m. Within the interval, saccate pollen often dominate with *Falcisporites*, *Microcachryidites* and *Podosporites* all common. *Cyathidites* and *Dilwynites* are also frequent to common, although many samples in this interval are of cuttings and may be contaminated. *A.*

distocarinatus, *C. triplex* and *P. mawsonii* are rare but consistent and *Cyatheacidites tectifera* and *Coptospora pileosa* are extremely rare. *A. cruciformis* is rare to frequent (2-5%) in cores and swcs above 1872.5m, and very rare to absent beneath. In cuttings, *A. cruciformis* can be common but is is considered caved.

Dinoflagellates are generally scarce with *Heterosphaeridium* spp the most frequent but with age diagnostic taxa generally absent. Caving from younger zones is consistent in this largely cuttings sampled interval including *N. aceras*, *A. denticulata*, *O. porifera*, *I. rectangularis* and *Trithyrodinium* spp. At the base, youngest *C. edwardsii* at 2084m indicates the *Palaeohystrichophora infusorioides* dinoflagellate Zone for that sample only.

Environments appear to be mostly nearshore to very nearshore with occasional non-marine beds. Dinoflagellate content is generally low ((17%), absent, 3%, 16%, 13%, 2%, (5%), (13%), absent, (4%), (11%), (14%), 33%, 12%, (15%)) with low to moderate diversity, but this could be an overestimate caused by caving of richer overlying marine section. Environments may therefore be largely non-marine to marginal marine. Spores and pollen are common and diverse with common to abundant cuticle, and significant to common freshwater algae (often 3-10% *Botryococcus*).

Light brown spore colours indicate marginal maturity for oil generation, but immaturity for gas/condensate.

N 2093m(cutts), 2098.0m(swc), 2101.0m(swc), 2102m(cutts), 2105m(cutts), 2117m(cutts), 2123.0m(swc), 2142.0m(swc) : *distocarinatus* Zone

Assignment to the *A. distocarinatus* spore-pollen Zone of Cenomanian age is indicated by the presence of *A. distocarinatus* without younger or older indicators. Within the interval, swc yields are variable. In the swcs, *Falcisporites* are very common with *Cyathidites* and *Microcachryidites* common and *Dilwynites* frequent. In the cuttings, *Dilwynites* tend to be more common but are considered caved. Oldest *C. triplex* in swcs occurs at 2101m. *A. distocarinatus*, *A. tricornitatus* and *A. cruciformis* are consistent throughout. Minor Permian and Early Cretaceous reworking was seen.

Amongst the dinoflagellates, *C. edwardsii* occurs in the upper part of the section indicating that 2089, 2093, 2101, 2102 and 2105m all belong to the *P. infusorioides* dinoflagellate Zone. *C. edwardsii* is most common in the cuttings at 2102m. Of the other taxa, *Heterosphaeridium* and *Spiniferites* are the most frequent.

Nearshore and marginal marine environments are indicated by the low to very low dinoflagellate content (1%, (17%), 16%, (15%), (15%), (15%), 5%, 1% downhole) and their low diversity. These dinoflagellate contents may be too high, as most of the higher values are from cuttings and may be caved. Other features include the dominant and diverse dinoflagellates, comon cuticle and significant freshwater algal content (5%, 4%, 1%, 7%, 4%, 12%, 3%, absent downhole).

Light brown spore colours indicate marginal maturity for oil but immaturity for gas/condensate.

O 2150m(cutts), 2157.5m(swc), 2180m(cutts) : apparently *distocarinatus* Zone.

The swc is very lean and lacks zone markers and the two cuttings samples contain *A. distocarinatus* without younger or older markers, suggesting the *distocarinatus* spore-pollen Zone of Cenomanian age. This marker could however be caved into these cuttings. *Phyllocladidites eunuchus* also occurs to the interval base but not below. Overall, *Cyathidites*, *Falcisporites* and *Microcachryidites* are the common taxa with the simple fern spores *Gleicheniidites* and *Laevigatosporites* common in the swc only. Minor Permian reworking was seen.

Dinoflagellates only occur at 2180m in cuttings, consist of a single species (*C. edwardsii* suggesting the *infusorioides* dino Zone) but may well be caved.

Non-marine environments with strong lacustrine influence are suggested by the frequent to common freshwater algae (6%, 14% and 4% *Botryococcus* downhole), absence of dinoflagellates (except for 2 possibly caved specimens in cuttings at 2180m) and dominance of rich and diverse spore pollen.

Light brown spore colours indicate marginal maturity for oil and immaturity for gas/condensate.

P 2212.5m(swc), 2222m(cutts), 2261m(cutts), 2270.0m(swc) : indeterminate

The swc is extremely lean, almost barren, and cannot be assigned. The cuttings contain a fair assemblage lacking *A. distocarinatus* and the spore influx seen below and so are very nondescript and not similar to the interval above or the one below. They are considered indeterminate here. *Falcisporites similis* is abundant with common *Cyathidites* spp and *Microcachryidites* and frequent Araucarian pollen and *Osmundacidites wellmanni*. Minor Permian reworking was seen.

Dinoflagellates occur in all three cuttings samples but include obviously caved taxa such as *O.porifera* and *Trithyrodinium* spp. Clearly the entire assemblage may be caved.

Environments appear to be brackish to very nearshore marine with dinoflagellate content of barren, (4%), (2%), (trace) downhole, but the presence of frequent freshwater algae (barren, (4%), (absent), (8%) *Botryococcus* downhole) suggests possible non-marine environments with the dinoflagellates all caved. Common cuticle and dominant and diverse spore-pollen are consistent.

Light brown spore colours indicate marginal maturity for oil, but immaturity for gas/condensate.

Q 2294.0m(swc), 2318m(cutts), 2321.0m(swc), 2324m(cutts), 2333m(cutts), 2354m(cutts), 2360.0m(swc), 2392.5m(swc), 2408m(cutts), 2412.0m(swc), 2425m(cutts) : possibly *paradoxa* Zone

Assignment of this interval is not straight forward. Several samples within the interval (2294.5m swc, 2321.0m swc, 2324m cutts, 2392.5m swc) contain richer spore assemblages than above, including youngest *Coptospora paradoxa* (in 3 swcs only), *Crybelosporites striatus*, *Foraminisporis asymmetricus*, *Trilobosporites tribotrys*, *T. trioreticulatus*, *Triporoletes reticulatus* as well as a downhole influx of *Cicatricosisporites australienesis* (5-10%). The swcs also lack *A. distocarinatus*. Usually this richer spore flora is associated with a change to spore dominated assemblages at the top of the Otway Group. Here, however, spores are still mostly minor with assemblages still dominated by saccate pollen (*Falcisporites* and *Microcachryidites*). Thus, although the assemblage is not typical, assignment to the Albian *Coptospora paradoxa* Zone is possible. The unusual assemblages may be related to the lean and unusual sandy lithologies.

Cuttings in this interval generally do contain *A. distocarinatus* and do not contain *C. paradoxa* or the spore influx, and so favour *distocarinatus* zonal assignment. These may however be largely caved into the lean sandy lithologies. The swc at 2412.0m is extremely lean reflecting the unfavourable lithologies. If shale interbeds had occurred, the data may have been more definitive.

Dinoflagellates are extremely rare, present only in the cuttings samples and are probably all caved. Many are obviously caved, including *C. striatoconus* and *Isabelidinium* spp.

Environments are non-marine to slightly brackish as shown by the total absence of dinoflagellates or spiny acritarchs from some samples, and the presence of only very rare spiny acritarchs in others. The rare dinoflagellates are almost certainly all caved. Spores and pollen are common and diverse in most microfloras.

Light to mid brown spore colours indicate early maturity for oil and early marginal maturity for gas/condesnate.

IV CONCLUSIONS

At the top, the sampled section is Tertiary (Paleocene to Early Eocene) in very nearshore marine and marginally marine environments. Conformably beneath this, the entire Late Cretaceous appears to present although the mid Campanian to earliest Maastrichtian *lillei* Zone is either condensed or lost by unconformity. This section is mostly very nearshore marine to non-marine towards the base (Cenomanian to Coniacian *distocarinatus* to *mawsonii* Zones) and nearshore marine above (Santonian to Maastrichtian *apoxyexinus* to *longus* Zones). At the base, the Albian *paradoxa* Zone usually seen in the Otway Group may be present but unfavourable lithofacies preclude confident assignment.

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26th May, 1994

NOTE TO: FILE

FROM: SIMON HORAN

OUR REF: sth.012:tt

COPIES:

PALYNOLOGICAL SAMPLES PROCESSING AND SAMPLE EXAMINATION METHODOLOGY

Following discussion with Roger Morgan, the sample processing techniques and sample examination methodology used in palynological studies of the Fergusons Hill-1, Ross Creek-1, Mussel-1, Pecten-1A, Triten-1ST, La Bella-1, Eric the Red-1, Minerva-1, Minerva-2A and Loch Ard-1 is listed below.

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 HCI if fluorosilicate gel forms
c) heavy liquid separation used concentrate $ZnBr_2$ 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 Schutze Solution (conc 30% HNO_3 with crystalline $KClO_3$)
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 (g) if required
k) heavy liquid separation using $ZnBr_2$ solution (SG of 20.)
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

Sample examination usually involved the following steps:

a) scan two traverses at a x10 to log the bulk of the assemblage and get some idea of age
b) scan at x40 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 x10 to scan at least two large coverslips to log rare species, and finalise age conclusions. Log more slides if required

d) develop "Salines Microplankton Diversity" by counting up total species identified of dinoflagellates plus spiny acritarchs, as a second index of marine influence. This count includes species seen both inside and outside the court

e) develop "Freshwater Microplankton Content" by totally all freshwater algal elements (*Botryococcus, Schizosporis, Paralecaniella, Leiosphaeridia, Nummus*)

f) examine sieved kerogen slide for specimens of *Cyathidites* to establish spore colour for Spore colour Maturity Index

BASIN: OTWAY SPORE-POLLEN ZONES ELEVATION: KB:________ GL:________

WELL NAME: MINERVA-1 TOTAL DEPTH:________

AGE		PALYNOLOGICAL ZONES	HIGHEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg
NEOGENE	Plei	T. pleistocenicus								
	Plio	M. lipsus								
	Mio	C. bifurcatus								
		T. bellus								
	Olig	P. tuberculatus								
PALEOGENE		upper N. asperus								
	L.Eo	mid N. asperus								
	Mid Eo	lower N. asperus								
		P. asperopolus								
	Earl Eo	upper M. diversus								
		mid M. diversus ♀/✲	563	2			594	0		
		lower M. diversus ♀/✲	617	2			617	0		
	Pale	upper L. balmei ♀	627	0			651	0		
		lower L. balmei ♀/✲	760	2			760	0		
LATE CRETACEOUS	Maas	upper T. longus ∅/	783	0						
		lower T. longus /♀					839	0	870	?
		T. lillei								
	Camp	N. senectus ✲/♀	897	2			1166	0		
	Sant	up T. apoxyexinus ♀	1179	2			1453	2		
		mid T. apoxyexinus ♀	1502	1			1597	2		
	Con	low T. apoxyexinus ♀	1616	3			1805	1		
	Tur	P. mawsonii ∅/♀	1820	3			2089	0		
	Ceno	A. distocarinatus ✲/♀	2098	2			2142	0	2279	4
EARLY CRETACEOUS	Alb	P. pannosus								
		upper C. paradoxa ✲	?2294							
		lower C. paradoxa ✲					?2425			
		C. striatus								
	Apt	upper C. hughesi								
		lower C. hughesi								
	L.Neo	F. wonthaggiensis								
	E.Neo	up C. australiensis								

Environments :

- o lacustrine (algal acritarchs).
- ∅ non-marine (no or very few 5% algal acritarchs).
- ✲ brackish (spiny acritarch, no or very few dinoflagellates 1%).
- ✲/♀ marginal marine (1-5% very low diversity dinoflagellates).
- ♀ nearshore marine (6-30% low to medium diversity dinoflagellates).
- ♀/♀♀ intermediate marine (31-60% medium diversity dinoflagellates).
- ♀♀ offshore marine (61%-80% medium to high diversity dinoflagellates).
- ⊖ far offshore marine/oceanic (81%-100% high diversity dinoflagellates and/or planktonic forams).

Confidence Ratings :

0 : good to excellent with numerous zone fossils in core/swc.
1 : fair with rare zone fossils in core/swc.
2 : poor with non-diagnostic assemblage in core/swc. Often occurs next to a distinctive 0 to 1 rating, lacking the zone fossil seen adjacent.
3 : good with extinction event (top range) in cuttings.
4 : poor to fair with inception event (base range) in cuttings and therefore may be picked too low if caved or too high if swamped by cavings.
5 : poor with non-diagnostic assemblage in cuttings. Usually seen adjacent to a higher rating and picked on the absence of key zone fossil.
? : no confidence. Picked as a best guess in very poor data.

Data recorded by : Roger Morgan and Nigel Hooker Sept 83

Data revised by : Roger Morgan April 94

PALYNOLOGICAL DATA SHEET

BASIN: OTWAY DINOFLAGELLATE ZONES ELEVATION: KB: ______ GL: ______

WELL NAME: MINERVA-1 TOTAL DEPTH: ______

AGE		PALYNOLOGICAL ZONES	HIGHEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg	LOWEST DATA Preferred Depth	Rtg	Alternate Depth	Rtg
LATE CRETACEOUS	Maas	M. druggii	783	0			783	0		
		I. korojonense								
	Camp	upper X. australis	897	0			897	2		
		lower X. australis	954	1			991	0		
	Sant	N. aceras	1054	1			1298	0		
		I. cretaceum	1325	3			1453	0		
	Con	O. porifera	1502	2			1510	4		
	Turo	C. striatoconus								
	Ceno	P. infusorioides	2084	0			2105	4	2101	0

Environments :

- o lacustrine (algal acritarchs).
- non-marine (no or very few 5% algal acritarchs).
- brackish (spiny acritarch, no or very few dinoflagellates 1%).
- marginal marine (1-5% very low diversity dinoflagellates).
- nearshore marine (6-30% low to medium diversity dinoflagellates).
- intermediate marine (31-60% medium diversity dinoflagellates).
- offshore marine (61%-80% medium to high diversity dinoflagellates).
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3 : good with extinction event (top range) in cuttings.
4 : poor to fair with inception event (base range) in cuttings and therefore may be picked too low if caved or too high if swamped by cavings.
5 : poor with non-diagnostic assemblage in cuttings. Usually seen adjacent to a higher rating and picked on the absence of key zone fossil.
7 : no confidence. Picked as a best guess in very poor data.

Data recorded by : Roger Morgan and Nigel Hooker Sept 83

Data revised by : Roger Morgan April 94

MINERVA #1 - palynological data -

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C L I E N T: BHPP
W E L L: MINERVA #1
F I E L D / A R E A: OTWAY

A N A L Y S T: ROGER MORGAN
D A T E: JULY '93

N O T E S: ALL DEPTHS ARE IN METRES
FIGURES REPRESENT PERCENTAGES BASED ON 100 SPECIMEN COUNT
"X" INDICATES RARE PRESENCE OUTSIDE THE COUNT
IN UNCOUNTED SAMPLES "A"= ABUNDANT "C"= COMMON "F"= FEW
"R"= RARE "X"= VERY RARE

RANGE CHART OF OCCURRENCES BY % & LOWEST APPEARANCE: grouped

	1 DINOFLAGELLATE CONTENT	2 REWORKING : CRETACEOUS	3 REWORKING : PERMIAN	4 REWORKING : TRIASSIC	5 SCHIZOSPORIS RETICULATUS	6 BOTRYOCOCCUS	7 FROMEA FRAGILIS	8 NUMMUS MONOCULATUS	9 SCHIZOSPORIS PARVUS	10 SCHIZOSPORIS	11 SCHIZOSPORIS PSILATA	12 PALAMBAGES	13 PARALECANIELLA	14 CRASSOSPHAERA CONCINNA	15 VERYHACHIUM	16 CAUCA SP	17 HETEROSPHAERIDIUM HETEROCANTHUM	18 HETEROSPHAERIDIUM SOLIDA	19 ISABELIDINIUM CRETACEUM	20 MICRHYSTRIDIUM	21 OLIGOSPHAERIDIUM COMPLEX	22 CONOSPHAERIDIUM STRIATOCONUS	23 CRIBROPERIDINIUM SP	24 PALAEOPERIDINIUM CRETACEUM	25 CIRCULODINIUM DEFLANDREI	26 EXOCHOSPHAERIDIUM PHRAGMITES	27 ODONTOCHITINA OPERCULATA	28 ODONTOCHITINA PORIFERA	29 OVOIDINIUM VERRUCOSUM	30 TRITHYRODINIUM GLABRUM	31 CHLAMYDOPHORELLA NYEI	32 HETEROSPHAERIDIUM CONJUNCTUM	33 SPINIFERITES FURCATUS RAMOSUS	34 TRITHYRODINIUM MARSHALLII PSILATE	35 HYSTRICHODINIUM PULCHRUM	36 ODONTOCHITINA COSTATA	37 [illegible]EISTOSPHAERIDIUM	38 FLORENTINIA DEANEI
0563.0 SWC	1	.	X	.	X	6	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
0594.0 SWC	3	X	X	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
0617.0 SWC	6	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
0627.0 SWC	10	.	.	.	.	2	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.
0651.0 SWC	4	.	X	.	.	3	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
0760.0 SWC	3	.	.	.	.	1	.	.	.	.	.	.	2	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
0783.0 SWC	42	.	.	.	.	.	.	1	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
0810.0 SWC	.	.	1	.	.	.	.	11	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	6	.	1	.	.	3	.	7	.	.	.	.	1	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0897.0 SWC	2	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	2	.	X	.	X	4	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
0991.0 SWC	14	.	X	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	X	.	.	.	.	.
1054.0 SWC	4	X	.	X	X	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.
1105.5 SWC	6	X	X	.	.	4	.	1	.	.	.	.	.	.	1	.	3	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.
1149.0 SWC	8	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.
1166.0 SWC	14	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	6	4	.	.	.	.	X	.	.	.	1	.	.	.	.	.	.	1	.	.	1	.
1179.0 SWC	7	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.
1193.0 SWC	20	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	5	1	.	.	1	.	.	.	.	1	X	X	.	.	.	.	.	5	.	1	.	.
1220.0 SWC	12	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	3	X	.	.	.	.	X	.	.	.	1	1	.	.	.	.	1	1	.	.	1	.
1260.0 SWC	16	.	X	.	.	1	.	2	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	X	1	1	.	.	.	.	1	2	.	.	.	.
1271 CUTTS	19	.	X	.	.	3	.	.	.	.	.	.	.	.	.	.	1	4	3	.	.	.	.	.	.	X	X	X	.	.	.	.	.	X	.	1	.	.
1298.0 SWC	21	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	7	.	X	.	.	.	.	.	.	.	3	1	.	.	.	.	1	1	.	.	1	.
1325 CUTTS	15	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	12	X	.	.	.	.	.	.	.	X	1	.	.	.	.	1	X	.	.	.	.
1351.0 SWC	18	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	6	2	X	.	.	.	.	.	.	.	1	.	.	3	.	.	1	1	.	.	.	.
1398.0 SWC	12	X	X	.	.	1	1	.	.	.	.	.	.	.	.	.	5	X	1	.	.	.	.	.	.	X	.	.	.	X	.	.	1	X	.	.	1	1
1410 CUTTS	24	.	.	.	.	1	.	X	.	.	.	.	.	.	.	.	1	4	X	.	1	.	.	.	.	1	1	1	.	X	.	.	2	.	.	2	.	.
1453.0 SWC	8	.	2	.	.	1	.	.	.	.	.	.	.	.	.	.	1	2	?	.	.	.	.	.	.	.	.	X	.	.	.	.	1	2	.	.	.	.
1502.0 SWC	16	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	6	1	.	.	1	.	.	.	.	1	.	.	.	.	.	.	1	.	1	.	.	.
1510 CUTTS	31	.	X	.	.	3	.	.	.	.	.	.	.	.	.	.	8	5	X	.	.	.	.	.	X	.	1	1	.	1	.	.	2	X	.	2	.	.
1562.0 SWC	8	.	X	.	.	.	.	.	.	.	.	.	.	.	2	.	2	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	X	.	.	.	.
1597.0 SWC	9	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	1	.	1	.	.	.	.	.	2	2	.	.	.	.
1616 CUTTS	1	.	.	.	.	2	.	X	.	.	.	.	.	.	1	.	4	2	.	.	1	1	.	.	1	X	1	X	.	X	.	.	2	.	X	.	.	.
1629.0 SWC	12	.	X	.	.	.	.	.	.	.	.	.	.	.	1	.	4	1	.	.	.	.	.	.	2	1	X	.	.	.	.	.	3	.	.	.	.	.
1647.0 SWC	22	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	6	.	.	.	1	.	.	.	1	2	.	.	.	.	.	.	5	.	.	.	.	.
1660.0 SWC	7	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	X	.	.	.	.	.	2	.	.	.	.	.
1690.0 SWC	14	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	8	X	.	.	1	.	.	.	1	X	.	.	.	.	.	.	2	.	.	.	.	.
1699 CUTTS	24	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	5	3	?	.	X	.	.	.	2	.	2	.	.	.	.	.	6	1	1	.	.	.
1723.0 SWC	12	.	X	.	.	1	.	1	.	.	.	.	.	.	.	.	2	X	.	.	1	.	1	.	1	X	X	.	.	.	.	.	3	1	.	.	.	.
1747.0 SWC	14	.	X	.	.	1	.	1	.	.	X	.	X	.	1	.	3	1	.	.	X	.	.	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.
1766.0 SWC	14	.	.	.	.	3	.	X	.	.	.	.	.	.	.	.	3	.	.	.	1	.	X	.	1	1	X	.	.	.	.	X	4	.	.	.	.	.
1790 CUTTS	22	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	1	4	.	.	.	X	.	.	.	.	1	.	.	.	1	.	1	X	1	.	.	.
1805.0 SWC	15	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	8	X	.	.	2	.	.	.	.	X	1	.	.	.	1	.	X	.	X	.	.	.
1820 CUTTS	17	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	4	.	1	.	X	X	.	.	.	4	X	.	X	.	.	1	1	.	X	.	.
1837.3 CORE	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	3	.	.	.	.	8	.	X	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	16	.	.	.	.	8	.	1	.	.	.	.	.	.	.	.	11	.	.	.	X	.	.	1	X	1	.	.	.	.	.	.	2	.	.	.	.	.
1840.3 CORE	13	.	.	.	.	5	.	2	.	.	.	.	.	.	.	.	5	2	.	.	3	.	X	.	2	.	.	.	.	.	.	.	1	.	.	.	.	.
1872.5 SWC	2	.	1	.	.	4	.	.	.	.	.	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.
1886-89 CUTTS	5	.	X	.	.	3	.	2	.	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	X	.	X	.	.	.	.	.	2	.	1	.	.	.
1910-16 CUTTS	13	.	.	.	.	5	.	2	.	.	.	.	.	.	.	.	7	1	.	.	X	.	.	.	1	.	1	.	.	X	.	.	X	.	.	.	.	.
1943-49 CUTTS	4	.	1	.	.	6	.	.	.	.	.	.	.	.	.	.	1	.	X	.	.	.	X	.	X	.	X	.	.	X	.	X	1	.	.	1	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	11	.	.	.	.	6	.	X	.	.	.	.	.	.	.	.	2	3	.	.	.	.	1	.	.	X	X	.	.	X	.	.	1	.	1	1	.	.
2021-27 CUTTS	14	.	X	.	.	10	.	.	.	.	.	.	.	.	.	.	9	1	.	.	1	.	.	.	2	.	X	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	33	.	X	.	.	X	.	X	.	.	1	.	.	.	.	.	17	.	.	.	3	.	.	3	X	2	.	.	.	.	X	2	2	.	X	.	.	.
2061.0 SWC	12	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	2	.	.	.	X	.	.	X	X	2	X	.	.	.	1	.	.	.	.	.	.	1
2084 CUTTS	5	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	2	1	.	.	X	.	.	.	.	.	1	X	.	.	.	.	X	.	.	.	.	.
2093 CUTTS	17	.	.	.	.	5	.	X	.	.	.	.	.	.	.	.	3	2	1	.	5	.	X	.	.	1	.	X	.	X	.	.	2	.	.	2	.	.
2098.0 SWC	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
2101.0 SWC	16	.	.	.	.	1	.	X	.	.	.	.	.	.	.	.	X	.	.	.	1	.	.	.	X	X	.	.	.	.	5	X	6	.	.	.	2	X
2102 CUTTS	15	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	3	2	.	.	X	.	2	.	.	X	X	.	.	.	.	X	1	.	.	X	.	.
2105 CUTTS	15	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	3	4	.	.	2	.	.	.	.	1	X	.	.	.	.	.	3	.	1	X	.	.
2117 CUTTS	15	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.
2123.0 SWC	5	.	2	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	1	1	1	.	.	.	.	.
2142.0 SWC	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	X	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	4	.	X	.	.	4	.	.	.	.	.	.	.	.	.	.	.	X	.	.	1	.	.	.	X	1	2	1	X	X	.	.	.	.	.	.	.	.
2261 CUTTS	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2270 CUTTS	.	.	.	.	.	8	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2294.5 SWC	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	X	.	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	1	.	X	.	X	1	.	.	.	.	.	.	.	.	.	1	X	X	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	X	X	.	.	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	5	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	39 KIOKANSIUM POLYPES	40 OLIGOSPHAERIDIUM PULCHERRIMUM	41 CALLAOISPHAERIDIUM ASYMMETRICUM	42 MICRODINIUM ORNATUM	43 ODONTOCHITINA STUBBY	44 PALAEOHYSTRICHOSPHORA INFUSORIOIDES	45 ISABELIDINIUM COOKSONAE	46 CYMATIOSPHAERA	47 MILLIOUDIDINIUM	48 PTEROSPERMELLA AUSTRALIENSIS	49 XIPHOPHORIDIUM ALATUM	50 APTEODINIUM GRANULATUM	51 CHODASPINERA HALOSA	52 MICRODINIUM SP	53 NELSONIELLA ACERAS	54 ODONTOCHITINA NO HORNS	55 CYCLONEPHELIUM COMPACTUM	56 ISABELIDINIUM BELFASTENSE	57 ODONTOCHITINA CRIBROPODA	58 CASSIDIUM SP	59 OCCISUCYSTA SP	60 ODONTOCHITINA VERY STUBBY	61 TRITHYRODINIUM RETIC "THICK"	62 APTEA SP	63 ISABELIDINIUM RECTANGULARE	64 AMPHIDIADEMA DENTICULATA	65 CHLAMYDOPHORELLA AMBIGUA	66 CIRCULODINIUM SOLIDA	67 CORONIFERA	68 ISABELIDINIUM KOROJONENSE	69 TRITHYRODINIUM SUSPECTUM	70 TRITHYRODINIUM THICK VERMIC	71 OLIGOSPHAERIDIUM DICTYOPHORUM	72 CANNINGIA SPINOSA	73 ODONTOCHITINA OBESA	74 ESCHARISPHAERIDIUM SP	75 ISABELIDINIUM SP	76 TRICHODINIUM
0563.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0617.0 SWC	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
0627.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
0760.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	?	.	.	.	.	.	.	X
0897.0 SWC	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	.	.	.	.	2	.	.	.	.	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1166.0 SWC	X	.	.	.	.	1	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1179.0 SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220.0 SWC	.	.	.	.	.	X	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
1260.0 SWC	1	.	1	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.
1271 CUTTS	X	.	.	.	.	4	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
1298.0 SWC	.	.	.	.	.	1	.	1	.	.	.	.	.	.	1	.	.	.	X	.	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1325 CUTTS	.	.	.	.	.	X	.	.	.	.	.	.	.	.	4	.	.	X	4	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	X	.	.	.
1351.0 SWC	.	.	.	.	4	X	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
1398.0 SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	4	1	.	.	.	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1502.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
15[illegible] CUTTS	.	.	1	.	3	.	.	.	.	.	.	.	.	.	1	.	.	X	1	.	.	.	1	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
15[illegible] SWC	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
155[illegible] SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X
1616 CUTTS	.	.	.	.	.	X	.	.	.	.	.	X	.	.	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	.	X	.	.	.	.	.	.	1
1629.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X
1647.0 SWC	.	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	.	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
1699 CUTTS	1	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	1
1723.0 SWC	1	.	X	.	.	.	.	.	1	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	X	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	X	1
1766.0 SWC	1	.	.	.	.	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	1	.	.
1790 CUTTS	2	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	1	2	.	.	.	.	.	X	X	.	.	.
1805.0 SWC	X	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	1	.	.	.	.	.	.	X	.	.	.	4	.	.	.	.	X	.	.	.	.	.
1820 CUTTS	X	X	X	.	X	X	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	?	X	.	X	3	X	?	X	3	.	.	.	.	.	.
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	1	.	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	.	.	.	.	X	.	.	.	.	.	.	.	.	.	X	.	.	.	.	1	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	X	.	1	.	.	.	.	.	.	.	.	.	1	.	1	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	X	.	X	.	.	.	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	3	.	X	.	.	X	.	.	X	.	X	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	1	.	.	.	.	.	.	1	X	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	X	X	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
227[illegible] CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	77 HYSTRICHODINIUM FURCATUM	78 ISABELIDINIUM BALMEI	79 TRITHYRODINIUM FINE GRANULATE	80 XENASCUS CERATOIDES	81 CHATANGIELLA SVERDRUPIANA	82 DISPHAERIA MACROPYLA	83 CONOSPHAERIDIUM TUBULOSUM	84 TRITHYRODINIUM MARSHALLII	85 TRITHYRODINIUM PUNCTATE	86 XENIKOON AUSTRALIS	87 CHATANGIELLA TRIPARTITA	88 CHATANGIELLA VICTORIENSIS	89 SPINIDINIUM SP	90 ISABELIDINIUM RECTANGULARE CONTRACTUM	91 TANYOSPHAERIDIUM SALPINX	92 GILLINIA HYMENOPHORA	93 HETEROSPHAERIDIUM LATEROBRACHIUS CI	94 ISABELIDINIUM THOMASII	95 ISABELIDINIUM TRIPARITA	96 ODONTOCHITINA OBESOPORIFERA	97 DICONODINIUM PUSILLUM	98 DINOGYMNIUM ACUMINATUM	99 TRITHYRODINIUM	100 AREOSPHAERIDIUM SUGGESTIUM	101 MADURADINIUM PENTAGONUM	102 EUCLADINIUM MADURENSE	103 NELSONIELLA TUBERCULATA	104 NELSONIELLA SEMIRETICULATA	105 AREOLIGERA SP	106 ISABELIDINIUM PELLUCIDUM	107 KIOKANSIUM SP	108 MANUMIELLA CORONATA	109 MANUMIELLA DRUGGII	110 TANYOSPHAERIDIUM "GRANULATUM"	111 CORDOSPHAERIDIUM INODES	112 DEFLANDREA DILWYNENSIS	113 DEFLANDREA SP [illegible]SA	114 EUCLADOPYXIS PENICULATA
0563.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0594.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.
0617.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
0627.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	1	.
0760.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	1	?
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	30	1	X	.	.	.	.
0838.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0897.0 SWC	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	2	.	.	.	.	.	.	.	.
0954.0 SWC	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	.	.	.	.	.	.	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.
1166.0 SWC	.	.	.	.	.	.	.	.	X	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1179.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	?	.	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.
1220.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	?	.	.	X	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1271 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1351.0 SWC	.	.	.	.	.	.	.	.	X	.	.	X	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1502.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1510 CUTTS	X	.	.	.	.	.	.	.	.	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1562.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1616 CUTTS	.	.	.	X	.	.	.	.	.	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1629.0 SWC	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1647.0 SWC	.	.	.	.	.	.	X	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	.	.	.	.	X	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699 CUTTS	X	X	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1766.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1805.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2270 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2294.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	115 HAFNIACYSTA SEPTATA	116 OPERCULODINIUM	117 THALASSIPHORA DELICATA	118 DEFLANDREA TRUNCATA	119 GLAPHYROCYSTA DIVARICATUM	120 ALISOCYSTA MARGARITA	121 DIPHYES COLLIGERUM	122 FIBROCYSTA VECTENSE	123 GLAPHYROCYSTA cf MEDUSETTIFORMIS	124 APECTODINIUM HOMOMORPHUM	125 DEFLANDREA OBLIQUIPES	126 FIBROCYSTA BIPOLARIS	127 HYSTRICHOSPHAERIDIUM TUBIFERUM	128 DEFLANDREA PACHYCERAS	129 APTEODINIUM AUSTRALENSE	130 AREOSPHAERIDIUM CAPRICORNUM	131 AEQUITRIRADITES VERRUCOSUS	132 ARAUCARIACITES AUSTRALIS	133 CALLIALASPORITES DAMPIERI	134 CALLIALASPORITES TURBATUS	135 CICATRICOSISPORITES LUDBROOKIAE	136 CRYBELOSPORITES STRIATUS	137 CYATHIDITES AUSTRALIS	138 CYATHIDITES MINOR	139 FALCISPORITES GRANDIS	140 FALCISPORITES SIMILIS	141 KLUKISPORITES SCABERIS	142 MICROCACHRYIDITES ANTARCTICUS	143 OSMUNDACIDITES WELLMANII	144 PEROTRILETES JUBATUS-MORGANII	145 PODOSPORITES MICROSACCATUS	146 RETITRILETES AUSTROCLAVATIDITES	147 TRILOBOSPORITES TRIORETICULOSUS	148 TRIPOROLETES RETICULATUS	149 VELOSPORITES TRIQUETRUS	150 AEQUITRIRADITES SPINULOSUS	151 BALMEISPORITES HOLODICTYUS	152 BIRETRISPORITES
0563.0 SWC	.	.	.	.	.	.	.	.	.	.	X	.	.	.	X	X	.	.	.	.	.	.	3	4	1	18	.	.	.	.	4	1	.	.	.	.	.	.
0594.0 SWC	.	1	.	X	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.	.	2	1	3	21	.	7	2	.	6	1	.	.	.	.	.	.
0617.0 SWC	.	1	.	.	.	.	.	.	.	X	X	2	1	.	.	.	.	1	.	.	.	.	2	5	2	9	.	3	.	.	4	X	.	.	.	.	.	.
0627.0 SWC	1	3	.	X	.	X	X	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	2	11	.	2	.	.	3	1	.	.	.	.	.	.
0651.0 SWC	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	3	4	14	.	6	2	.	2	1	.	.	.	.	.	.
0760.0 SWC	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	1	4	3	24	.	2	2	.	4	1	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	.	.	.	2	2	X	9	.	2	2	.	2	1	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	.	.	.	3	7	12	17	.	.	4	.	.	3	.	.	.	.	.	.
0838.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	4	5	2	15	.	6	2	.	4	2	.	.	.	.	.	.
0897.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	2	2	7	15	.	2	3	.	3	4	.	.	.	.	.	.
0954.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	2	5	3	16	.	9	1	.	7	3	.	.	.	X	.	.
0991.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	3	14	.	12	1	.	4	2	.	.	.	.	.	.
1054.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	3	11	4	17	.	11	2	.	.	1	.	1	.	.	.	.
1105.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	6	5	12	1	3	1	.	5	X	.	.	.	.	.	.
1149.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	4	5	20	.	6	1	1	10	1	.	.	.	.	.	.
1166.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	3	9	2	21	.	7	3	.	4	1	.	.	.	.	.	.
1179.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	9	3	21	.	9	1	.	3	4	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	5	5	18	.	9	2	.	3	1	.	.	.	.	.	.
1220.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	X	.	.	.	6	8	5	15	.	12	1	.	2	2	.	.	.	.	.	.
1260.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	8	3	16	.	8	4	.	5	2	.	.	.	.	.	.
1271 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	5	12	1	10	.	7	1	1	11	2	.	1	.	.	.	.
1298.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	1	6	2	11	.	8	1	.	5	1	.	.	.	.	.	.
1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.	.	.	5	3	4	10	.	11	1	.	2	3	.	.	.	.	.	.
1351.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	1	7	3	14	.	8	2	1	7	2	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	.	.	3	11	1	16	.	5	2	.	6	1	.	1	.	1	.	.
1410 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	2	11	3	19	.	6	X	.	8	1	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	7	5	19	.	11	1	1	11	2	.	.	.	1	.	.
1502.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	3	5	1	17	.	11	1	.	2	4	.	.	.	1	.	.
1510 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	4	13	1	5	.	9	3	.	3	4	.	.	.	.	.	.
1562.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	14	3	13	.	13	3	.	2	1	.	.	.	.	.	.
159?.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	1	8	3	26	.	13	3	.	4	2	.	.	.	X	.	.
161? [illegible]TTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	2	11	.	13	.	10	2	.	3	3	.	1	.	.	.	.
162? SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	2	.	2	.	.	1	5	3	28	.	15	2	1	2	1	.	.	.	.	.	.
164?.. SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	5	2	19	.	14	1	.	2	1	.	.	.	.	.	.
1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	7	1	17	.	21	.	.	1	2	.	.	.	.	.	.
1690.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	2	.	.	2	.	3	6	3	24	.	10	2	.	.	1	.	.	.	.	.	.
1699 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	4	10	2	14	.	11	2	X	2	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10	.	.	.	X	2	5	4	18	.	18	2	.	4	1	.	.	.	.	.	.
1747.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	.	.	.	3	10	4	15	.	7	2	.	2	1	.	.	.	.	.	.
1766.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	X	.	2	6	8	19	.	12	1	.	.	1	.	.	.	.	X	.
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	.	.	3	10	2	11	.	13	2	.	2	.	.	X	.	.	.	.
1805.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	X	1	2	15	.	8	1	.	.	X	.	.	.	.	.	.
1820 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	6	.	15	.	16	.	.	3	.	X	.	.	X	X	.
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	X	11	1	17	.	17	X	.	27	1	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	7	.	.	5	9	2	13	.	11	1	.	9	1	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	1	14	3	15	.	15	1	.	5	1	.	.	.	.	.	.
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	X	2	.	.	4	5	2	20	.	14	2	.	10	X	.	.	.	X	X	.
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	2	8	27	.	6	2	.	3	X	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	4	8	.	.	4	8	1	11	.	15	3	.	11	X	.	.	.	.	.	.
1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	3	.	.	3	2	1	13	.	14	9	.	4	X	.	.	.	.	.	.
1943-49 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	?	.	6	8	3	17	.	20	1	.	8	1	.	.	.	.	.	.
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	3	31	3	5	.	8	.	.	6	1	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	4	6	1	14	.	10	2	.	7	.	.	2	.	.	.	.
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	2	1	.	.	4	4	2	14	.	14	2	.	4	X	.	.	.	.	X	.
2035.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	.	1	.	.	2	3	4	12	.	9	1	X	9	1	.	X	.	.	X	.
2061.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	.	2	1	.	4	11	2	10	.	18	.	.	4	2	.	X	.	.	.	.
2084 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.	.	.	3	7	1	25	1	17	1	.	2	.	.	X	.	.	X	.
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	5	13	2	19	.	17	3	.	3	X	.	X	.	.	.	.
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	1	1	.	X	12	19	9	27	.	12	5	.	.	1	1	.	.	.	X	.
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	1	.	.	5	7	3	21	.	7	X	.	3	X	.	.	.	.	.	.
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	.	3	.	.	7	6	6	12	.	13	1	.	2	X	.	1	.	.	.	.
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	3	.	.	.	7	11	2	19	.	12	3	.	.	.	.	.	.	.	.	.
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	1	X	.	11	12	8	17	1	5	.	.	4	1	.	.	.	.	.	.
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	1	1	1	.	4	6	4	21	.	16	3	.	4	1	.	.	.	.	.	.
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	15	6	6	24	X	10	2	X	2	5	.	.	.	.	.	.
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	1	4	.	.	12	10	12	31	1	5	1	.	.	1	.	.	.	.	.	.
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	1	.	5	7	8	18	.	6	2	.	.	1	.	.	.	.	.	.
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	3	6	1	.	6	10	13	21	.	14	3	.	1	.	X	.	X	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	3	.	.	11	10	8	32	.	4	10	.	.	2	.	1	.	.	.	.
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	2	4	X	.	9	13	12	33	.	12	6	.	1	X	.	.	.	.	.	.
2270 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	1	8	.	.	7	5	6	35	.	8	2	.	2	2	.	.	.	.	.	.
2294.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	X	9	27	8	29	X	15	5	1	.	1	X	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	R	R	.	.	F	R	F	C	.	X	X	.	.	R	.	.	.	.	.	.
232? SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	5	.	.	.	1	7	29	.	2	.	3	16	1	1	1	X	2	.	.	X	2
232? [illegible]TTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5	.	3	6	X	7	15	5	8	.	10	7	X	.	8	X	10	.	.	X	.
2333 [illegible]UTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	1	2	2	.	8	13	4	16	1	12	8	X	.	4	1	10	.	.	X	X
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	6	2	.	7	12	11	16	.	10	11	.	.	2	.	9	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	X	.	.	3	2	14	48	.	18	4	.	2	1	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	X	10	16	.	1	.	.	12	32	.	1	.	X	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	1	1	2	5	X	6	22	1	11	.	16	13	X	.	3	X	4	.	X	X	X
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	2	2	3	X	22	26	7	15	1	7	4	X	1	2	1	5	X	.	.	.

Sample	153 CICATRICOSISPORITES AUSTRALIENSIS	154 CONTIGNISPORITES COOKSONIAE	155 COPTOSPORA WRINKLY	156 COROLLINA TOROSUS	157 DICTYOPHYLLIDITES	158 DILWYNITES GRANULATUS	159 FORAMINISPORIS ASYMMETRICUS	160 FORAMINISPORIS WONTHAGGIENSIS	161 PEROTRILETES WHITFORDENSIS	162 SENECTOTETRADITES VARIRETICULATUS	163 TRILOBOSPORITES TRIBOTRYS	164 TRIPOROLETES SIMPLEX	165 BALMEISPORITES TRIDICTYUS	166 CERATOSPORITES EQUALIS	167 COPTOSPORA PARADOXA	168 CYCADOPITES FOLLICULARIS	169 FOVEOTRILETES PARVIRETUS	170 LEPTOLEPIDITES VERRUCATUS	171 TRIPOROLETES BIRETICULATUS
0563.0 SWC	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.	.	1	.	.
0594.0 SWC	.	.	.	1	.	17	.	.	.	.	.	.	.	1	.	.	.	.	.
0617.0 SWC	.	.	.	.	.	14	.	.	.	.	.	.	.	.	.	.	.	.	.
0627.0 SWC	.	.	.	.	.	20	.	.	.	.	.	.	.	.	.	.	X	.	.
0651.0 SWC	.	.	.	X	.	19	.	.	.	.	.	.	.	1	.	.	.	.	.
0760.0 SWC	.	.	.	.	.	21	.	.	.	.	.	.	.	1	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	3	.	.	.	.	.	.	.	1	.	.	.	.	.
0810.0 SWC	.	.	.	5	.	9	.	.	.	.	.	.	.	1	.	.	.	.	.
0838.5 SWC	.	.	.	X	.	6	.	.	.	.	.	.	.	2	.	.	.	.	.
0897.0 SWC	.	.	.	.	.	9	.	.	.	.	.	.	.	3	.	1	.	X	.
0954.0 SWC	X	.	.	1	.	4	.	.	.	.	.	X	.	3	.	.	.	.	.
0991.0 SWC	.	.	.	.	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.
1054.0 SWC	X	X	.	1	.	2	.	.	.	.	.	.	.	3	.	.	.	.	.
1105.5 SWC	1	.	.	.	.	4	.	.	.	.	.	.	.	3	.	2	1	1	.
1149.0 SWC	1	.	.	1	.	6	.	.	.	.	.	.	.	3	.	1	.	.	.
1166.0 SWC	.	.	.	1	.	5	.	.	.	.	.	.	.	3	.	.	.	.	.
1179.0 SWC	1	.	.	1	.	11	.	.	.	.	.	.	.	.	.	1	.	X	.
1193.0 SWC	1	.	.	1	.	15	.	.	.	.	.	.	.	1	.	.	.	.	.
1220.0 SWC	2	.	.	.	.	10	.	.	.	.	.	.	.	2	.	.	.	1	.
1260.0 SWC	X	.	.	1	.	7	.	.	.	.	.	.	.	1	.	.	.	1	.
1271 CUTTS	1	.	.	.	.	4	X	.	.	.	.	.	.	2	.	.	.	1	.
1298.0 SWC	X	1	.	.	.	8	.	.	.	.	.	.	.	1	.	.	.	.	.
1325 CUTTS	.	.	.	1	.	6	.	.	.	.	.	.	.	1	.	.	.	.	.
1351.0 SWC	1	.	.	1	.	11	.	.	.	.	.	.	.	1	.	.	.	.	.
1398.0 SWC	.	.	.	1	.	10	.	1	.	.	.	.	.	2	.	2	.	.	.
1410 CUTTS	.	.	.	1	.	9	.	.	.	.	.	.	.	1	.	X	.	.	.
1453.0 SWC	.	.	.	1	.	13	1	.	.	.	.	.	.	1	.	.	.	.	.
1502.0 SWC	1	1	.	1	.	20	.	.	.	.	.	.	.	1	.	1	.	.	.
1510 CUTTS	.	.	.	.	.	7	.	X	.	.	.	.	.	X	.	1	.	.	.
1562.0 SWC	1	.	.	1	.	12	.	.	.	.	.	.	.	2	.	2	.	.	.
1597.0 SWC	.	.	.	1	.	10	.	.	.	.	.	.	.	.	.	.	.	.	.
1616 CUTTS	1	.	.	X	.	7	.	.	.	.	.	.	.	1	.	1	.	.	.
1629.0 SWC	.	.	.	.	.	12	.	.	.	.	.	.	.	.	.	3	.	.	.
1647.0 SWC	1	.	.	1	.	13	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	X	X	.	1	.	14	.	.	.	.	.	.	.	2	.	1	.	.	.
1690.0 SWC	1	.	.	1	.	8	.	.	.	.	.	.	.	2	.	.	.	1	.
1699 CUTTS	.	.	.	.	.	5	.	.	.	.	.	.	.	1	.	1	.	.	.
1723.0 SWC	1	.	.	1	1	8	.	.	.	.	.	.	.	1	.	.	.	.	.
1747.0 SWC	1	.	.	X	.	24	.	.	.	.	.	.	.	.	.	1	.	.	.
1766.0 SWC	X	1	.	X	.	22	.	.	.	.	.	.	.	1	.	.	.	.	.
1790 CUTTS	X	.	.	.	.	12	.	.	.	.	.	.	.	1	.	2	.	.	.
1805.0 SWC	.	.	.	X	.	40	.	.	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	X	.	.	.	.	22	.	.	.	.	.	.	.	.	.	1	.	.	.
1837.3 CORE	.	.	.	2	.	11	.	.	.	.	.	.	.	.	.	2	.	.	.
1838.1 CORE	1	.	.	1	.	12	.	.	.	.	.	.	.	.	.	1	.	.	.
1839.7 CORE	.	.	.	1	.	5	.	.	.	.	.	.	.	1	.	.	.	.	.
1840.3 CORE	.	.	.	X	1	6	.	.	.	.	.	.	.	X	.	2	.	X	.
1872.5 SWC	.	.	.	1	.	29	.	.	.	.	.	.	.	X	.	.	.	.	.
1886-89 CUTTS	.	.	.	X	1	6	.	.	.	.	.	.	.	X	.	2	.	.	.
1910-16 CUTTS	.	1	.	1	.	5	.	1	.	.	.	.	.	1	.	2	.	.	.
1943-49 CUTTS	X	.	.	X	.	7	.	.	.	.	.	.	.	.	.	X	.	.	.
1947.5 SWC	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	X	.	9	.	.	.	.	.	.	.	2	.	.	.	.	.
2021-27 CUTTS	.	.	.	2	.	5	.	.	.	.	.	.	.	.	.	2	.	.	.
2035.0 SWC	2	X	.	.	.	5	.	1	.	.	.	.	.	.	.	1	.	.	.
2061.0 SWC	3	.	.	.	.	8	.	.	.	.	.	.	.	1	.	.	.	X	.
2084 CUTTS	1	.	.	1	3	12	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	.	1	.	6	.	.	.	.	.	.	.	.	X	.	.	X	.
2098.0 SWC	.	X	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	X	.	.	X	.	24	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	X	.	.	.	.	13	.	.	.	.	.	.	.	2	.	.	.	.	.
2105 CUTTS	1	X	.	1	.	6	.	.	.	.	.	.	.	1	.	1	.	.	.
2117 CUTTS	1	X	.	X	3	9	1	.	.	.	.	.	.	1	.	.	.	.	.
2123.0 SWC	3	.	.	2	.	3	.	.	.	.	.	.	.	.	.	.	.	1	.
2142.0 SWC	.	.	.	3	.	9	.	.	.	.	.	.	.	1	.	3	.	.	.
2150 CUTTS	.	.	.	1	.	4	.	.	.	.	.	.	.	.	.	1	1	.	.
2157.5 SWC	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
2180 CUTTS	2	.	.	2	1	1	.	.	.	.	.	.	.	1	.	1	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	X	1	X	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.
2261 CUTTS	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.
2270 CUTTS	1	.	.	1	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.
2294.5 SWC	.	.	.	.	.	.	X	.	.	.	.	.	.	X	X	.	X	1	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.
2321.0 SWC	23	.	X	.	.	.	3	.	.	.	X	.	.	1	X	.	.	1	.
2324 CUTTS	5	X	X	.	.	.	1	.	.	.	.	.	.	2	?	X	.	.	.
2333 CUTTS	12	.	X	.	.	.	1	.	.	.	.	.	.	2	?	.	.	.	.
2354 CUTTS	2	.	.	3	.	.	.	.	.	.	.	.	2	.	.	3	.	.	.
2360.0 SWC	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.
2392.5 SWC	10	.	.	1	.	1	X	.	.	.	.	X	X	X	X	2	3	1	X
2408 CUTTS	10	X	X	2	1	1	1	X	X	?	X	X	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Sample	172 TRIPOROLETES RADIATUS	173 DICTYOTOSPORITES COMPLEX	174 GLEICHENIIDITES	175 ISCHYOSPORITES PUNCTATUS	176 VITREISPORITES PALLIDUS	177 APPENDICISPORITES DISTOCARINATUS cf	178 AEQUITRIRADITES TILCHAENESIS	179 LYCOPODIACIDITES ASPERATUS	180 CICATRICOSISPORITES FOVEOAUSTRALIENSIS	181 PILOSISPORITES NOTENSIS	182 CONCAVISSIMISPORITES PENOLAENSIS	183 CINGUTRILETES CLAVUS	184 FORAMINISPORIS DAILYI	185 LEPTOLEPIDITES MAJOR	186 PEROTRILETES MAJUS	187 PETITRILETES FACETUS	188 STERIESPORITES ANTIQUASPORITES	189 AMOSOPOLLIS CRUCIFORMIS	190 CALLIALASPORITES TRILOBATUS
0563.0 SWC	.	.	3	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
0594.0 SWC	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0617.0 SWC	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.
0627.0 SWC	.	.	2	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.
0651.0 SWC	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.
0760.0 SWC	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.
0783.0 SWC	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.
0810.0 SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
0838.5 SWC	.	.	5	.	.	.	.	.	.	.	.	.	.	.	.	.	3	1	.
0897.0 SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	X
0954.0 SWC	.	.	5	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.
0991.0 SWC	.	.	6	X	.	.	.	.	.	.	.	X	.	.	.	.	X	2	.
1054.0 SWC	.	.	6	.	1	.	.	.	.	.	.	1	X	.	.	.	X	1	.
1105.5 SWC	.	1	3	.	.	.	.	.	.	.	.	X	.	.	.	.	X	1	.
1149.0 SWC	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.
1166.0 SWC	.	.	6	.	1	.	.	.	.	.	.	.	.	.	.	.	X	.	.
1179.0 SWC	X	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
1193.0 SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1220.0 SWC	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	1	1	.
1260.0 SWC	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.
1271 CUTTS	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.
1298.0 SWC	.	.	7	.	.	.	.	.	.	.	.	.	.	.	.	.	4	1	.
1325 CUTTS	.	.	3	.	1	.	.	.	.	.	.	X	.	.	1	.	3	1	.
1351.0 SWC	.	.	3	.	3	.	.	.	.	.	.	1	.	.	.	.	.	X	.
1398.0 SWC	.	.	5	.	1	.	.	1	.	.	.	.	.	.	.	.	1	X	.
1410 CUTTS	.	.	5	.	.	.	.	.	.	.	.	.	X	.	.	.	1	3	.
1453.0 SWC	.	.	5	.	1	.	.	.	.	.	.	1	1	.	.	.	.	X	.
1502.0 SWC	.	.	3	.	4	.	.	.	.	.	.	.	.	.	.	.	.	2	.
1510 CUTTS	.	.	4	.	.	.	.	.	.	.	.	X	.	.	.	.	.	4	.
1562.0 SWC	.	.	11	.	2	.	.	.	.	.	.	.	X	.	.	.	4	4	.
1597.0 SWC	.	.	5	.	1	.	.	.	.	.	.	1	1	.	.	.	.	4	.
1616 CUTTS	.	.	7	.	.	.	.	1	.	.	.	X	.	.	.	.	2	7	.
1629.0 SWC	.	.	3	.	1	.	.	.	.	.	.	1	.	.	.	.	1	4	.
1647.0 SWC	.	.	3	.	.	.	.	.	.	.	.	1	.	.	.	.	1	9	.
1660.0 SWC	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	3	8	.
1690.0 SWC	.	.	4	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	.
1699 CUTTS	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	14	.
1723.0 SWC	.	.	3	.	1	.	.	1	.	.	.	X	.	.	.	.	1	3	.
1747.0 SWC	.	.	2	.	1	.	.	.	.	.	.	.	X	.	.	.	1	1	.
1766.0 SWC	.	.	X	.	X	.	.	.	.	.	.	.	.	.	.	.	X	9	.
1790 CUTTS	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	12	.
1805.0 SWC	.	.	X	.	X	X	.	.	.	.	.	.	.	.	.	.	X	8	.
1820 CUTTS	.	.	2	.	1	X	.	.	.	.	.	.	.	.	.	.	.	8	.
1837.3 CORE	.	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.
1838.1 CORE	.	.	4	.	.	X	.	.	.	.	.	.	.	.	.	.	.	4	.
1839.7 CORE	.	.	5	.	1	.	.	.	.	.	.	.	.	.	.	.	1	4	.
1840.3 CORE	.	.	2	.	X	X	.	2	.	.	.	.	.	.	.	.	X	2	.
1872.5 SWC	.	.	2	.	1	1	.	1	.	.	.	X	.	.	.	.	X	5	.
1886-89 CUTTS	.	.	2	.	.	X	.	X	.	.	.	.	.	.	.	.	1	6	.
1910-16 CUTTS	.	.	1	.	.	.	.	1	.	.	.	X	.	.	.	.	.	13	.
1943-49 CUTTS	.	.	4	.	.	?	.	1	X	.	.	X	.	.	.	.	.	1	.
1947.5 SWC	.	.	33	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	7	.	1	X	.	1	.	.	.	.	.	.	.	.	1	3	.
2021-27 CUTTS	.	.	3	.	.	2	.	.	.	.	.	X	.	.	.	.	X	2	.
2035.0 SWC	.	.	7	.	.	X	.	X	1	.	.	.	.	.	.	.	1	.	.
2061.0 SWC	.	.	3	.	.	X	.	2	.	.	.	1	.	.	.	.	.	.	.
2084 CUTTS	.	.	7	3	.	X	.	1	.	.	.	.	.	.	.	.	.	X	.
2093 CUTTS	X	.	3	X	.	X	.	.	.	.	.	.	.	.	.	.	1	X	.
2098.0 SWC	.	.	3	.	.	X	.	1	.	X	.	1	.	.	.	.	.	.	.
2101.0 SWC	.	.	5	.	.	.	.	.	.	X	.	X	1	.	.	.	.	1	.
2102 CUTTS	.	.	3	.	.	2	.	.	.	.	.	.	.	.	.	.	.	1	.
2105 CUTTS	.	.	2	.	.	2	.	1	.	.	.	.	.	.	.	.	.	2	.
2117 CUTTS	.	.	6	.	.	3	.	1	.	.	X	.	.	.	.	.	.	1	.
2123.0 SWC	1	.	3	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	1	.	4	.	.	.	.	1	.	.	.	.	.	.	.	X	.	.	.
2150 CUTTS	.	.	.	1	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.
2157.5 SWC	.	.	15	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.
2180 CUTTS	.	.	4	1	.	1	.	.	.	X	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	?	1
2261 CUTTS	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2270 CUTTS	.	.	4	.	.	.	.	.	.	.	.	.	1	.	.	.	1	.	.
2294.5 SWC	.	.	1	X	.	.	.	.	.	.	.	1	X	X	1	X	.	.	.
2318 CUTTS	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	X	.	.	1	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.
2324 CUTTS	1	.	X	1	.	X	1	.	1	X	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	X	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	1	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	X	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

	229 LYGISTIPOLLENITES FLORINII	230 TRICOLPITES CONFESSUS	231 PERIPOROPOLLENITES POLYORATUS	232 PHYLLOCLADIDITES VERRUCATUS	233 LILIACIDITES	234 NOTHOFAGIDITES PROTO ENDURUS	235 TRICOLPITES SABULOSUS	236 GAMBIERINA TWISTED	237 NOTHOFAGIDITES ENDURUS	238 SESTROSPORITES PSEUDOALVEOLATUS	239 ERICIPITES SCABRATUS	240 TRICOLPITES "MINOR"	241 HERKOSPORITES ELLIOTTI	242 DICTYOTOSPORITES FILOSUS	243 GAMBIERINA RUDATA	244 GAMBIERINA EDWARDSI	245 LYGISTIPOLLENITES BALMEI	246 NOTHOFAGIDITES FLEMINGII	247 TETRACOLPORITES VERRUCOSUS	248 TRICOLPITES LONGUS	249 TRICOLPORITES LILLIEI	250 TRIPOROPOLLENITES SECTILIS	251 PROTEACIDITES HAPUKUI	252 PROTEACIDITES RETICULOCONCAVUS	253 STERIESPORITES PUNCTATUS	254 TRILETES TUBERCULIFORMIS	255 ANACOLOSADITES ACUTULLUS	256 CYATHIDITES GIGANTIS	257 NOTHOFAGIDITES BRACHYSPINOLOSUS	258 TRICOLPITES WAIPAWAENSIS	259 VERRUCOSISPORITES KOPUKUENSIS	260 CAMEROZONOSPORITES BULLATUS	261 HALORAGACIDITES HARRISII	262 NOTHOFAGIDITES EMARCIDUS	263 PROTEACIDITES ANNULARIS	264 PROTEACIDITES GRANDIS	265 CAMEROZONOSPORITES LATROBENSIS	266 MALVACIPOLLIS SUBTILIS
	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0563.0 SWC	4	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	.	1	.	.	.	8	1	.	X	.	1
0594.0 SWC	9	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	X	.	X	.	4	.	X	X	.	X
0617.0 SWC	1	.	1	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	.	2	.	X	.	1	.	1	1	.	3
0627.0 SWC	1	.	1	.	.	.	.	.	.	.	1	.	.	.	X	X	X	X	.	.	.	.	.	.	1	1	.	X	2	.	.	.	1	1	1	1	X	3
0651.0 SWC	1	.	1	.	.	.	.	.	.	.	1	.	.	.	1	.	3	1	.	.	.	.	.	.	X	X	X	.	1	.	X	X	1	1	X	X	.	.
0760.0 SWC	1	.	.	.	.	.	.	.	.	.	1	.	1	.	1	X	X	.	.	.	.	.	.	.	1	.	X	X	2	X	X	.	.	.	.	.	.	.
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	X	.	2	.	X	X	.	.	.	.	.	.	X	X	X	1	.	.	.	.	.	.	.	.	.	.	.	.
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0838.5 SWC	.	.	2	.	.	.	.	.	4	.	1	.	.	.	1	X	.	1	X	X	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0897.0 SWC	.	1	.	.	.	.	X	.	9	.	.	.	X	.	2	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0954.0 SWC	X	2	.	.	.	.	X	.	4	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0991.0 SWC	.	.	.	.	.	.	6	.	4	.	1	2	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1054.0 SWC	.	1	X	.	.	.	X	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1105.5 SWC	X	.	1	.	.	.	4	.	X	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1149.0 SWC	.	?	1	.	.	.	1	.	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1166.0 SWC	.	.	1	1	.	.	.	X	2	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1179.0 SWC	.	.	X	.	.	X	?	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1193.0 SWC	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1220.0 SWC	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1260.0 SWC	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1271 CUTTS	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1298.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1351.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1410 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1502.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1510 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1562.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1616 [illegible]TS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
162[illegible] [illegible]WC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
164[illegible] [illegible]WC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1699 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1766.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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0594.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	.
0617.0 SWC	1	.	.	.	.	.	1	.	.	.	.	.	22	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	4	.
0627.0 SWC	2	.	.	.	.	.	3	.	.	.	.	1	6	1	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.
0651.0 SWC	2	.	.	.	.	.	1	.	.	.	.	.	7	1	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	3	.
0760.0 SWC	1	.	.	.	.	.	4	.	.	.	.	.	7	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	3	.
0783.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	20	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	2	.
0810.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	6	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	1	.
0838.5 SWC	.	.	.	.	.	.	2	.	.	.	.	.	7	.	1	1	.	.	.	.	.	.	.	X	.	.	.	.	.	1	.	.	.	.	.	2	2	.
0897.0 SWC	1	.	.	.	.	.	1	.	.	.	.	.	14	.	1	.	.	.	.	.	.	.	.	4	.	.	.	.	.	X	X	2	.	.	.	3	1	.
0954.0 SWC	1	.	.	.	.	.	3	.	.	.	.	.	16	X	X	X	.	.	.	.	.	.	.	3	.	X	.	.	.	.	.	X	.	.	.	1	2	.
0991.0 SWC	.	.	.	.	.	.	4	.	.	.	.	.	4	X	1	1	X	.	.	.	.	.	.	1	.	X	.	.	.	1	.	X	.	.	.	4	.	.
1054.0 SWC	1	.	.	.	.	.	7	.	.	.	X	.	7	3	1	1	.	.	.	.	.	.	.	X	.	.	.	.	.	2	.	X	.	.	.	2	2	.
1105.5 SWC	.	.	.	.	.	.	5	.	1	.	.	.	10	1	3	1	.	.	.	.	.	.	.	?	.	X	.	.	.	1	.	.	.	.	.	1	5	.
1149.0 SWC	1	.	.	.	.	.	.	.	.	.	.	.	6	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	X	1	.	.	.	2	2	.
1166.0 SWC	X	.	.	.	.	.	1	.	.	.	.	.	2	1	3	X	X	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	1	2	.	.
1179.0 SWC	2	.	.	.	.	.	2	1	.	.	.	.	3	1	2	1	1	.	.	.	.	.	.	.	.	1	.	1	.	.	.	.	.	.	.	X	2	.
1193.0 SWC	1	.	.	.	.	.	3	.	.	.	.	.	3	.	3	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	5	.
1220.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	6	1	1	.	.	.	.	.	X	.	.	X	.	.	.	.	.	.	.	.	.	.	X	1	1	.
1260.0 SWC	1	.	.	.	.	.	2	.	.	.	.	.	2	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2	4	.
1271 CUTTS	.	.	.	.	.	.	9	.	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	X
1298.0 SWC	.	.	.	.	.	.	4	1	.	.	.	.	5	1	1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	5	.	.	1	.
1325 CUTTS	.	.	.	.	.	.	4	.	.	.	.	.	5	1	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	.	.	.	X	.	.
1351.0 SWC	.	.	.	.	.	.	3	.	.	.	.	.	4	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	6	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	1	2	.	.	.	.
1410 CUTTS	.	.	.	.	.	.	1	.	.	.	.	.	4	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	X	.	.	.	.	.	.
1453.0 SWC	.	.	.	.	.	.	4	.	.	.	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	X	.	.	.	.	.	.	.
1502.0 SWC	.	.	.	.	.	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.
1510 CUTTS	.	.	.	.	.	.	5	.	.	.	.	.	3	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	1	X	.	.	.	.	.	.	.	.
1562.0 SWC	1	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1597.0 SWC	.	.	.	.	.	.	3	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1616 CUTTS	.	.	.	.	.	.	3	.	2	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1629.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1647.0 SWC	.	.	.	X	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1660.0 SWC	1	.	.	.	.	.	3	2	.	.	.	.	.	4	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1690.0 SWC	1	.	.	.	.	.	2	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.
1699 CUTTS	.	.	.	.	.	.	1	.	.	.	.	.	.	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1747.0 SWC	2	.	.	X	.	.	1	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.
1766.0 SWC	.	.	.	.	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.
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1805.0 SWC	X	.	.	.	.	.	.	.	.	.	.	.	.	X	X	.	.	.	.	.	.	.	.	.	X	7	.	.	.	.	.	.	.	.	.	.	.	.
1820 CUTTS	.	1	.	?	.	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1837.3 CORE	.	.	.	.	.	.	2	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1838.1 CORE	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1839.7 CORE	.	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1840.3 CORE	.	1	.	?	.	.	?	.	2	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1872.5 SWC	.	X	X	.	.	.	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1886-89 CUTTS	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1910-16 CUTTS	.	.	.	.	.	.	2	.	.	.	.	.	2	.	1	.	X	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1943-49 CUTTS	2	.	.	.	1	.	4	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1947.5 SWC	4	1	.	.	X	.	2	.	.	.	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1997-03 CUTTS	.	.	.	.	.	.	7	.	.	.	.	.	1	1	X	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2021-27 CUTTS	.	.	.	.	1	.	5	.	.	.	.	.	.	X	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2035.0 SWC	1	1	.	.	X	.	X	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2061.0 SWC	5	2	X	.	.	.	X	.	.	.	.	.	.	X	.	.	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2084 CUTTS	.	.	.	X	.	.	X	.	.	.	.	.	1	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2093 CUTTS	.	.	.	X	.	1	X	.	.	.	.	.	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2098.0 SWC	.	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2101.0 SWC	.	.	X	2	.	.	.	.	.	.	.	.	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2102 CUTTS	.	.	.	7	.	.	1	.	.	.	.	.	.	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2105 CUTTS	.	.	.	1	.	.	3	.	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2117 CUTTS	1	X	.	.	.	X	X	.	.	X	X	1	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2123.0 SWC	1	.	.	.	X	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2142.0 SWC	4	X	X	.	X	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2150 CUTTS	.	X	.	.	2	?	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2157.5 SWC	11	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2180 CUTTS	1	X	X	X	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2222 CUTTS	X	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2270 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2294.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Sample	267 PROTEACIDITES BUN GRANDIS	268 PROTEACIDITES OTHAYENSIS	269 TETRACOLPORITES OAMARUENSIS	270 MALVACIPOLLIS DIVERSUS	271 PERIPOROPOLLENITES DEMARCATUS	272 PROTEACIDITES INCURVATIS	273 PROTEACIDITES ORNATUS	274 PROTEACIDITES PACHYPOLUS	275 BANKSIEAEIDITES ARCUATUS	276 CUPANEIDITES ORTHOTEICHUS	277 PROTEACIDITES KOPIENSIS	278 TRICOLPORITES	279 TRIPOROPOLLENITES AMBIGUUS	280 BEAUPREADITES TRIGONALIS	281 PERIPOROPOLLENITES VESICUS	282 PROTEACIDITES TUBERCULIFORMIS	Sample
0563.0 SWC	.	.	1	2	1	X	?	.	X	.	X	1	X	X	1	X	0563.0 SWC
0594.0 SWC	.	.	1	1	.	X	.	.	1	X	1	1	X	.	.	.	0594.0 SWC
0617.0 SWC	.	.	.	X	1	1	1	1	.	.	.	.	.	.	.	.	0617.0 SWC
0627.0 SWC	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	0627.0 SWC
0651.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0651.0 SWC
0760.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0760.0 SWC
0783.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0783.0 SWC
0810.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0810.0 SWC
0838.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0838.5 SWC
0897.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0897.0 SWC
0954.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0954.0 SWC
0991.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0991.0 SWC
1054.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1054.0 SWC
1105.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1105.5 SWC
1149.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1149.0 SWC
1166.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1166.0 SWC
1179.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1179.0 SWC
1193.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1193.0 SWC
1220.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1220.0 SWC
1260.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1260.0 SWC
1271 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1271 CUTTS
1298.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1298.0 SWC
1325 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1325 CUTTS
1351.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1351.0 SWC
1398.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1398.0 SWC
1410 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1410 CUTTS
1453.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1453.0 SWC
1502.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1502.0 SWC
1510 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1510 CUTTS
1562.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1562.0 SWC
1597.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1597.0 SWC
1616 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1616 CUTTS
1629.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1629.0 SWC
1647.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1647.0 SWC
1660.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1660.0 SWC
1690.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1690.0 SWC
1699 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1699 CUTTS
1723.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1723.0 SWC
1747.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1747.0 SWC
1766.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1766.0 SWC
1790 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1790 CUTTS
1805.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1805.0 SWC
1820 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1820 CUTTS
1837.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1837.3 CORE
1838.1 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1838.1 CORE
1839.7 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1839.7 CORE
1840.3 CORE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1840.3 CORE
1872.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1872.5 SWC
1886-89 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1886-89 CUTTS
1910-16 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1910-16 CUTTS
1943-49 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1943-49 CUTTS
1947.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1947.5 SWC
1997-03 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1997-03 CUTTS
2021-27 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2021-27 CUTTS
2035.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2035.0 SWC
2061.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2061.0 SWC
2084 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2084 CUTTS
2093 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2093 CUTTS
2098.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2098.0 SWC
2101.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2101.0 SWC
2102 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2102 CUTTS
2105 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2105 CUTTS
2117 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2117 CUTTS
2123.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2123.0 SWC
2142.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2142.0 SWC
2150 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2150 CUTTS
2157.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2157.5 SWC
2180 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2180 CUTTS
2212.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2212.5 SWC
2222 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2222 CUTTS
2261 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2261 CUTTS
2270 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2270 CUTTS
2294.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2294.5 SWC
2318 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2318 CUTTS
2321.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2321.0 SWC
2324 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2324 CUTTS
2333 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2333 CUTTS
2354 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2354 CUTTS
2360.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2360.0 SWC
2392.5 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2392.5 SWC
2408 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2408 CUTTS
2412.0 SWC	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2412.0 SWC
2425 CUTTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2425 CUTTS

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213	CONTIGNISPORITES GLEBULENTUS
167	COPTOSPORA PARADOXA
207	COPTOSPORA PILEOSA
155	COPTOSPORA WRINKLY
111	CORDOSPHAERIDIUM INODES
156	COROLLINA TOROSUS
67	CORONIFERA
14	CRASSOSPHAERA CONCINNA
194	CRIBROPERIDINIUM EDWARDSII
23	CRIBROPERIDINIUM SP
136	CRYBELOSPORITES STRIATUS
276	CUPANEIDITES ORTHOTEICHUS
198	CYATHEACIDITES TECTIFERA
137	CYATHIDITES AUSTRALIS
256	CYATHIDITES GIGANTIS
138	CYATHIDITES MINOR
168	CYCADOPITES FOLLICULARIS
55	CYCLONEPHELIUM COMPACTUM
46	CYMATIOSPHAERA
112	DEFLANDREA DILWYNENSIS
125	DEFLANDREA OBLIQUIPES

53	NELSONIELLA ACERAS
104	NELSONIELLA SEMIRETICULATA
103	NELSONIELLA TUBERCULATA
210	NEORAISTRICKIA
208	NEVESISPORITES
257	NOTHOFAGIDITES BRACHYSPINOLOSUS
262	NOTHOFAGIDITES EMARCIDUS
237	NOTHOFAGIDITES ENDURUS
246	NOTHOFAGIDITES FLEMINGII
234	NOTHOFAGIDITES PROTO ENDURUS
224	NOTHOFAGIDITES PROTO SENECTUS
214	NOTHOFAGIDITES SENECTUS
8	NUMMUS MONOCULATUS
59	OCCISUCYSTA SP
73	ODONOTCHITINA OBESA
36	ODONTOCHITINA COSTATA
57	ODONTOCHITINA CRIBROPODA
54	ODONTOCHITINA NO HORNS
96	ODONTOCHITINA OBESOPORIFERA
27	ODONTOCHITINA OPERCULATA
28	ODONTOCHITINA PORIFERA
43	ODONTOCHITINA STUBBY
60	ODONTOCHITINA VERY STUBBY
21	OLIGOSPHAERIDIUM COMPLEX
71	OLIGOSPHAERIDIUM DICTYOPHORUM
40	OLIGOSPHAERIDIUM PULCHERRINUM
116	OPERCULODINIUM
225	ORNAMENTIFERA MINIMA
220	ORNAMENTIFERA SENTOSA
143	OSMUNDACIDITES WELLMANII
29	OVOIDINIUM VERRUCOSUM
44	PALAEOHYSTRICHOSPHORA INFUSORIOIDES
24	PALAEOPERIDINIUM CRETACEUM
12	PALAMBAGES
13	PARALECANIELLA
199	PERINOPOLLENITES ELATOIDES
271	PERIPOROPOLLENITES DEMARCATUS
231	PERIPOROPOLLENITES POLYORATUS
281	PERIPOROPOLLENITES VESICUS
144	PEROTRILETES JUBATUS/MORGANII
186	PEROTRILETES MAJUS
161	PEROTRILETES WHITFORDENSIS
211	PHIMOPOLLENITES PANNOSUS
192	PHYLLOCLADIDITES EUNUCHUS
197	PHYLLOCLADIDITES MAWSONII
232	PHYLLOCLADIDITES VERRUCATUS
181	PILOSISPORITES NOTENSIS
145	PODOSPORITES MICROSACCATUS
203	PROTEACIDITES SP
263	PROTEACIDITES ANNULARIS
267	PROTEACIDITES BUN GRANDIS
264	PROTEACIDITES GRANDIS
251	PROTEACIDITES HAPUKUI
272	PROTEACIDITES INCURVATIS
277	PROTEACIDITES KOPIENSIS
226	PROTEACIDITES LARGE
273	PROTEACIDITES ORNATUS
268	PROTEACIDITES OTWAYENSIS
274	PROTEACIDITES PACHYPOLUS
252	PROTEACIDITES RETICULOCONCAVUS
282	PROTEACIDITES TUBERCULIFORMIS
48	PTEROSPERMELLA AUSTRALIENSIS
146	RETITRILETES AUSTROCLAVATIDITES
217	RETITRILETES CIRCOLUMENUS
187	RETITRILETES FACETUS
2	REWORKING : CRETACEOUS
3	REWORKING : PERMIAN
4	REWORKING ; TRIASSIC
10	SCHIZOSPORIS
9	SCHIZOSPORIS PARVUS
11	SCHIZOSPORIS PSILATA
5	SCHIZOSPORIS RETICULATUS
162	SENECTOTETRADITES VARIRETICULATUS
238	SESTROSPORITES PSEUDOALVEOLATUS
89	SPINIDINIUM SP
33	SPINIFERITES FURCATUS/RAMOSUS
209	SPINOZONOCOLPITES PROMINATUS
188	STERIESPORITES ANTIQUASPORITES
253	STERIESPORITES PUNCTATUS
110	TANYOSPHAERIDIUM "GRANULATUM"
91	TANYOSPHAERIDIUM SALPINX
269	TETRACOLPORITES OAMARUENSIS
247	TETRACOLPORITES VERRUCOSUS
117	THALASSIPHORA DELICATA

125	DEFLANDREA OBLIQUIPES
128	DEFLANDREA PACHYCERAS
113	DEFLANDREA SPECIOSA
118	DEFLANDREA TRUNCATA
201	DENSOISPORITES VELATUS
97	DICONODINIUM PUSILLUM
157	DICTYOPHYLLIDITES
173	DICTYOTOSPORITES COMPLEX
242	DICTYOTOSPORITES FILOSUS
216	DICTYOTOSPORITES SPECIOSUS
158	DILWYNITES GRANULATUS
227	DILWYNITES TUBERCULATUS
1	DINOFLAGELLATE CONTENT
98	DINOGYMNIUM ACUMINATUM
121	DIPHYES COLLIGERUM
82	DISPHAERIA MACROPYLA
114	EOCLADOPYXIS PENICULATA
239	ERICIPITES SCABRATUS
74	ESCHARISPHAERIDIUM SP
102	EUCLADINIUM MADURENSE
26	EXOCHOSPHAERIDIUM PHRAGMITES
139	FALCISPORITES GRANDIS
140	FALCISPORITES SIMILIS
126	FIBROCYSTA BIPOLARIS
122	FIBROCYSTA VECTENSE
38	FLORENTINIA DEANEI
159	FORAMINISPORIS ASYMMETRICUS
184	FORAMINISPORIS DAILYI
160	FORAMINISPORIS WONTHAGGIENSIS
202	FOVEOGLEICHENIIDITES
169	FOVEOTRILETES PARVIRETUS
7	FROMEA FRAGILIS
244	GAMBIERINA EDWARDSI
243	GAMBIERINA RUDATA
236	GAMBIERINA TWISTED
92	GILLINIA HYMENOPHORA
119	GLAPHYROCYSTA DIVARICATUM
123	GLAPHYROCYSTA cf MEDUSETTIFORMIS
174	GLEICHENIIDITES
115	HAFNIACYSTA SEPTATA
261	HALORAGACIDITES HARRISII
241	HERKOSPORITES ELLIOTTI
32	HETEROSPHAERIDIUM CONJUNCTUM
17	HETEROSPHAERIDIUM HETEROCANTHUM
93	HETEROSPHAERIDIUM LATEROBRACHIUS cf
18	HETEROSPHAERIDIUM SOLIDA
77	HYSTRICHODINIUM FURCATUM
35	HYSTRICHODINIUM PULCHRUM
127	HYSTRICHOSPHAERIDIUM TUBIFERUM
223	INTERULOBITES INTRAVERRUCATUS
78	ISABELIDINIUM BALMEI
56	ISABELIDINIUM BELFASTENSE
45	ISABELIDINIUM COOKSONAE
19	ISABELIDINIUM CRETACEUM
68	ISABELIDINIUM KOROJONENSE
106	ISABELIDINIUM PELLUCIDUM
63	ISABELIDINIUM RECTANGULARE
90	ISABELIDINIUM RECTANGULARE CONTRACTUM
75	ISABELIDINIUM SP
94	ISABELIDINIUM THOMASII
95	ISABELIDINIUM TRIPARITA
175	ISCHYOSPORITES PUNCTATUS
39	KIOKANSIUM POLYPES
107	KIOKANSIUM SP
141	KLUKISPORITES SCABERIS
191	LAEVIGATOSPORITES OVATUS
185	LEPTOLEPIDITES MAJOR
170	LEPTOLEPIDITES VERRUCATUS
233	LILIACIDITES
196	LILIACIDITES KAITANGATAENSIS
179	LYCOPODIACIDITES ASPERATUS
245	LYGISTIPOLLENITES BALMEI
229	LYGISTIPOLLENITES FLORINII
101	MADURADINIUM PENTAGONUM
270	MALVACIPOLLIS DIVERSUS
266	MALVACIPOLLIS SUBTILIS
108	MANUMIELLA CORONATA
109	MANUMIELLA DRUGGII
20	MICRHYSTRIDIUM
142	MICROCACHRYIDITES ANTARCTICUS
42	MICRODINIUM ORNATUM
52	MICRODINIUM SP
47	MILLIOUDIDINIUM
53	NELSONIELLA ACERAS

117 THALASSIPHORA DELICATA
76 TRICHODINIUM
240 TRICOLPITES "MINOR"
230 TRICOLPITES CONFESSUS
222 TRICOLPITES GILLII
248 TRICOLPITES LONGUS
235 TRICOLPITES SABULOSUS
218 TRICOLPITES SP
212 TRICOLPITES VARIVERRUCATUS
258 TRICOLPITES WAIPAWAENSIS
278 TRICOLPORITES
221 TRICOLPORITES APOXYEXINUS
249 TRICOLPORITES LILLIEI
254 TRILETES TUBERCULIFORMIS
163 TRILOBOSPORITES TRIBOTRYS
147 TRILOBOSPORITES TRIORETICULOSUS
171 TRIPOROLETES BIRETICULATUS
172 TRIPOROLETES RADIATUS
148 TRIPOROLETES RETICULATUS
164 TRIPOROLETES SIMPLEX
279 TRIPOROPOLLENITES AMGIBUUS
250 TRIPOROPOLLENITES SECTILIS
99 TRITHYRODINIUM
79 TRITHYRODINIUM FINE GRANULATE
30 TRITHYRODINIUM GLABRUM
84 TRITHYRODINIUM MARSHALLII
34 TRITHYRODINIUM MARSHALLII PSILATE
85 TRITHYRODINIUM PUNCTATE
61 TRITHYRODINIUM RETIC "THICK"
69 TRITHYRODINIUM SUSPECTUM
70 TRITHYRODINIUM THICK VERMIC
149 VELOSPORITES TRIQUETRUS
259 VERRUCOSISPORITES KOPUKUENSIS
15 VERYHACHIUM
176 VITREISPORITES PALLIDUS
80 XENASCUS CERATOIDES
86 XENIKOON AUSTRALIS
49 XIPHOPHORIDIUM ALATUM