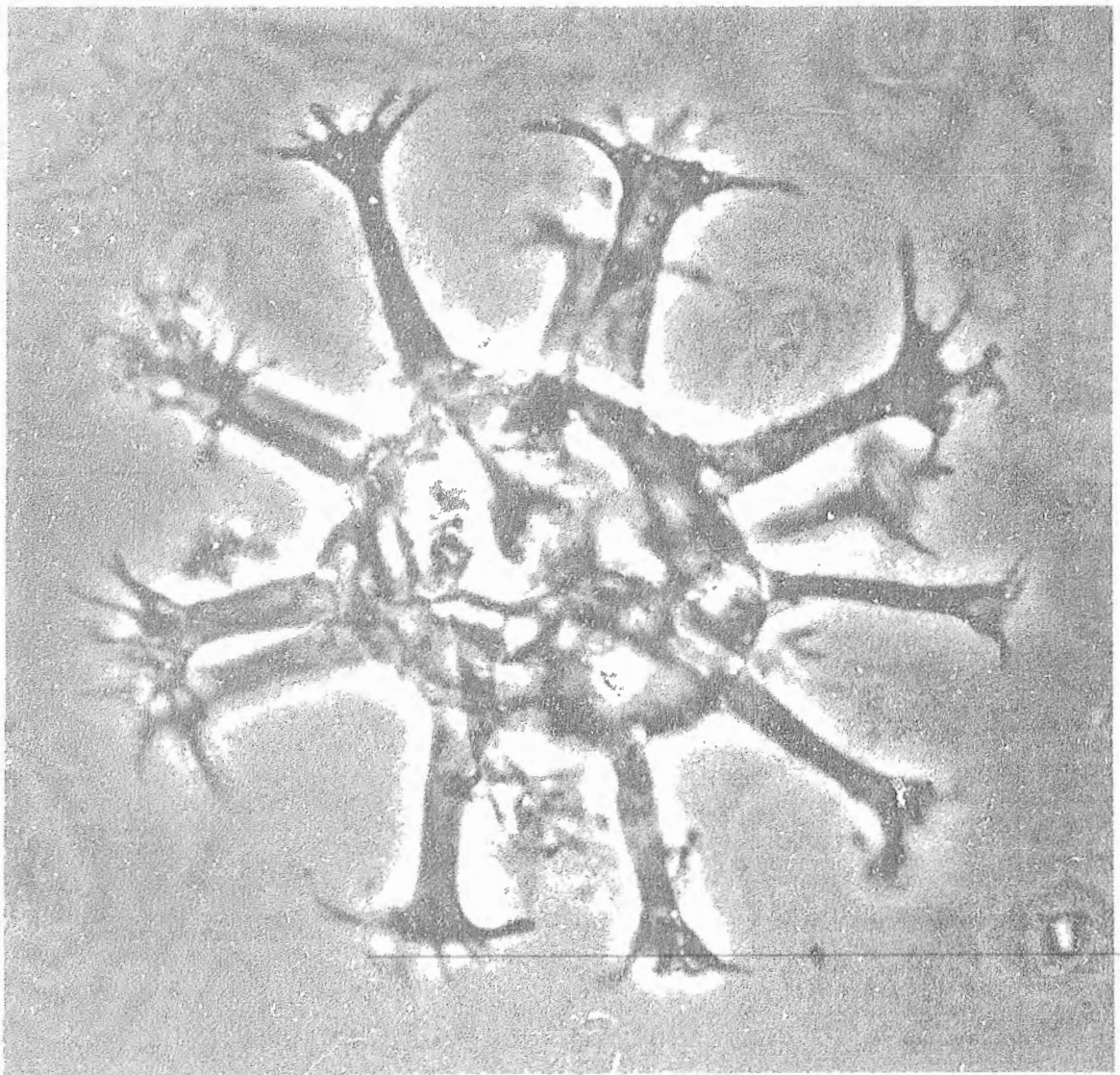


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BIOSTRATIGRAPHIC AND MATURATION STUDIES
OF THE SCOTIAN SHELF
PART 3
UNION ET AL. SAMBRO I 29



BIOSTRATIGRAPHIC AND MATURATION
STUDIES OF THE
SCOTIAN SHELF

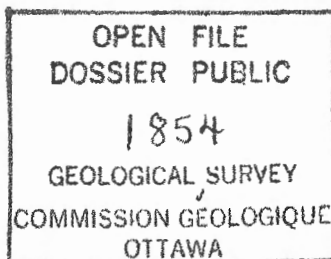
- PART 3 -

UNION et al. SAMBRO I--29

BY

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PALYNOLOGY DISTRIBUTION CHART SAMBRO I-29

MICROPALAEO. DISTRIBUTION CHART SAMBRO I-29

BIOSTRATIGRAPHIC AND MATURATION STUDIES

OF THE SCOTIAN SHELF

PART 3

UNION et al. SAMBRO I-29

GSC locality: D129

Location: 43 38'35.04"N; 62 48'17-04"W

R.T. elevation: 29.9m Water depth: 193.5m

Casing set at: 416.4m, 1041.8m, 1957.5m.

Total depth: 3069.6m Interval studied: 1430'-10070'

Palynology by: S. de Gasparis

Micropaleontology by: S. E. Cameron

INTRODUCTION

This is the third in a series of five reports detailing the palynology, micropaleontology, kerogen and fluorescence analysis on four wells on the Scotian Shelf. Each specialty is presented in separate chapters in each of the well reports. Rangecharts graphically integrating the three parts of the studies are included in a pocket at the back of each report. The fifth and final report will compare and correlate the four wells.

Species cards with photographs of all the palynological taxa will be presented with the final report. Appendix A of each well report contains a complete list of photographs of palynomorphs from that well. All foraminifera taxa are represented by at least one specimen, stained green and attached to a designated square in the assemblage slides. The depth and square number is given following the taxon names in Appendix B.

CHAPTER 1

PALYNOLOGY

Forty-six cuttings samples and five sidewall core samples were analyzed from this well. All of the samples contained palynomorphs, with the exception of samples 4750-4780', 5450-5480' and 5750-5780'. The following biostratigraphic zonations and age determinations have been made:

1430-1640' Late Cretaceous Undifferentiated

1700-2120' O. pulcherrimum Zone (Coniacian)

-Unconformity-

2180-2390' K. williamsii Zone (Cenomanian)

-Unconformity-

2450-3380' S. perlucida Zone (Aptian)

34 2385-3980' Barremian

4040-5780' Early Cretaceous Undifferentiated

5780-9860' No samples available

9860-10070' Jurassic Undifferentiated

A single *Mendicodinium groenlandicum* and a single *Senoniasphaera jurassica*, identified in sample 9860-10070', date this level as Jurassic undifferentiated. In the upper part of the well, down to the base of the Coniacian, the record is extremely confused and difficult to interpret due to an overabundance of Tertiary contaminants. An unconformity appears to be present below 2120', causing Coniacian sediments to rest on Cenomanian sediments. Another unconformity, located below 2390', is responsible for the absence of Albian deposits in this well. The Upper Cretaceous sediments are in excess of 1230', the Lower Cretaceous sediments are at least 3060' thick. The Jurassic sediments penetrated in this well are at least 210' thick. Extensive reworking was observed throughout the well.

There is some evidence of marine sedimentation during the Jurassic. The interval between 4040' and 5780' was probably deposited in non marine to marginal marine conditions. The remainder of the well appears to have been deposited under marine conditions.

SELECTED PALYNOMORPHS:

1430-1640' : Late Cretaceous Undifferentiated.

Chatangiella spectabilis, *Appendicisporites cristatus*, *Spiniferites ramosus*, *Hystriosphæridium tubiferum*. *Operculodinium centrocarpum*, *Batiacasphaera sphaerica*, *Diphyes colligerum*, *Impagidinium pallidum*, *Kallosphaeridium biornatum*, *Kallosphaeridium capulatum* and *Operculodinium centrocarpum* are caved from higher up in the well.

1700-2120' : *O. pulcherrimum* Zone (Coniacian).

Canningia ringnesiorum, *Chatangiella victoriensis*, *Cyclonephelium vannophorum*, *Cyclonephelium distinctum*, *Oligosphaeridium anthophorum*, *Spiniferites speciosus*, *Appendicisporites problematicus*, *Appendicisporites auritus*, *Florentinia ferox*, *Oligosphaeridium pulcherrimum*, *Oligosphaeridium complex*, *Xenascus ceratioides*, *Odontochitina costata*, *Rugubivesciculites reductus*.

2180-2390' : *K. williamsii* Zone (Cenomanian).

Oligosphaeridium totum, *Ginginodinium evittii*, *Palaeoperidinium cretaceum*, *Kiokansium williamsii*, *Xenascus gochti*, *Callaiosphaeridium asymmetricum*, *Dinopterygium cladoides*, *Pseudoceratium pelliiferum*. *Subtilisphaera perlucida* is reworked at this level.

2450-3380' : *S. perlucida* Zone (Aptian).

Subtilisphaera perlucida, *Oligosphaeridium asterigerum*, *Vesperopsis nebulosa*, *Pseudo-ceratium retusum*, *Muderongia parvata*, *Odontochitina rhakodes*, *Cymososphaeridium validum*, *Costatoperforosporites foveolatus*, *Trilobosporites marylandensis*, *Cribooperdinium cooksoniae*, *Florentinia mantellii*, *Chichaouadinium cf. vestitum*, *Tehamadinium cf. tenuiceras*.

3485-3980' : Barremian.

Systematophora silyba, *Callaiosphaeridium trycherium*, *Achomospaera verdieri*, *Aptea anaphrissa*, *Hystriosphærina schindewolfii*, *Odontochitina athabaskensis*, *Odontochitina imparilis*, *Meiourogonyaux stoveri*, *Cerbia tabulata*, *Cribooperidinium*

edwardsii, *Gonyaulacysta diutina*, *Oligosphaeridium diluculum*, *Palaeoperidinium* sp. A of Williams, *Odontochitina ancala*, *Vesperopsis mayi*, *Vesperopsis vitrea*, *Callialasporites trilobatus*, *Concavissimisporite apigranulosum*, *Pilosporites trichopapillosus*, *Vitreisporites pallidus*, *Microreticulatisporites diatretus*, *Cicatricosisporites sprumontii*, *Apteodinium granulatum*, *Stiphrosphaeridium dictyophorum*.

4040-5780' : Early Cretaceous Undifferentiated

This interval contains the highest occurrences of *Cicatricosisporites sprumontii*, *Apteodinium granulatum* and *Stiphrosphaeridium dictyophorum*, however, they are all single occurrences, and are therefore considered insufficient for a precise age determination.

9860-10070' : Jurassic Undifferentiated.

Senoniasphaera jurassica, *Mendicodinium groenlandicum*.

CHAPTER 2

MICROPALAEONTOLOGY

Fifty cuttings samples were studied for micropaleontology for Sambro I-29. The following biostratigraphic zonations have been made:

1430-1460'	Early Campanian
1520-1640'	Santonian
1700-2000'	Coniacian
2030-2300'	Coniacian or Turonian
2360-2480'	Turonian
2540-2570'	Cenomanian
2630-3290'	Albian
3350-3580'	Aptian
3640-5280'	Aptian to Hauterivian
5350-5980'	Age Uncertain

The lower portion of this well, up to 5350' was probably deposited in a brackish or freshwater swamp. During Hauterivian to Aptian times, conditions were brackish swamp to marginal marine. During the Aptian and the early part of the Albian, a very shallow neritic to marginal marine environment existed in the area. The upper part of the Albian sediments were deposited under normal marine, inner neritic conditions with noticeable terrestrial influence. During the Cenomanian conditions did not change, except for an increase in the terrestrial input. The Turonian was deposited under shallow inner neritic conditions. A shallowing episode brought shallow neritic to marginal marine conditions which lasted until the upper part of the Coniacian. In the top of the Coniacian interval, outer to middle neritic conditions prevailed. During the Santonian and the Campanian intervals, the depositional environment was outer neritic.

SELECTED FOSSILS:

1430-1460' : Early Campanian.

FORAMINIFERA: *Marginotruncana marginata*, *Gaudryina austinana*, *Neoflabellina deltoidea*, *Kyphopyxa christneri*, *Vaginulina wadei*, *Nodosaria affinis*, *Lenticulina munsteri*, *Epistomina stelligera alveolata*, *Hoeglundina supracretacea*, *Arenobulimina subsphaerica*, *Marginulina silicula*.

OSTRACODES: *Haplocytheridea globosa*, *Cythereis ornatissima*.

ENVIRONMENT OF DEPOSITION: Inner part of the outer neritic is suggested by low planktonic diversity, fairly common ostracodes and yet relatively high benthonic diversity.

1520-1640' : Santonian.

Archaeoglobigerina blowi, *Dorothia conula*, *Vaginulina texana*, *Gyroidinoides globosa*, *Gavelinella stephensoni*.

OSTRACODES: *Brachycythere sphenoides*.

ENVIRONMENT OF DEPOSITION: The inner part of the outer neritic realm is suggested by low planktonic diversity, fairly common ostracodes and yet relatively high benthonic diversity.

1700-2000' : Coniacian.

FORAMINIFERA: *Whiteinella paradubia*, *Epistomina stelligera stelligera*, *Vaginulina cretacea*, *Gyroidinoides depressa*, *Globorotalites multiseptus*, *Gavelinella ammonoides*.

OSTRACODES: *Neocythere annulospinata*.

ENVIRONMENT OF DEPOSITION: The top of interval, with highly diversified benthonic foraminifers, few planktonics and rare ostracodes suggests an outer to middle neritic environment. This changes abruptly to an inner neritic and marginal marine facies towards the base of the interval, where the diversity is much reduced, and coal and goethite become quite common. The lower part of the interval has much later Cretaceous caving.

2030-2300' : Coniacian or Turonian.

No specific age diagnostic taxa were found in this interval, although later Cretaceous caved taxa are fairly common.

ENVIRONMENT OF DEPOSITION: Shallow neritic to marginal marine conditions are indicated by abundant bryozoa, fish teeth and vertebrae, goethite and some coal. *In situ* foraminiferal diversity is very low.

2360-2480' : Turonian.

FORAMINIFERA: *Dicarinella algeriana*, *Hedbergella delrioensis*, *Whiteinella paradubia*, *Ammobaculites comprimatus*.

ENVIRONMENT OF DEPOSITION: Shallow inner neritic environment suggested by few (and immature) planktonic foraminifers and low diversity of benthonic forms. Goethite, coal and other indicators of terrestrial influence are lacking. This suggests a normal marine but shallow environment for this interval.

2540-2570' : Cenomanian.

FORAMINIFERA: *Ammobaculites comprimatus*.

ENVIRONMENT OF DEPOSITION: Low benthonic diversity, few and immature planktonic species of foraminifera suggest an inner neritic environment. Common coal and goethite suggest a relatively strong terrestrial influence.

2630-3290' : Albian.

FORAMINIFERA: *Whiteinella baltica*, *Epistomina cretosa*, *Ammobaculites reophacoides*.

OSTRACODES: *Protocythere alexanderi*, *Neocythere annulospinata*, *Schuleridea jonesiana*, *Protocythere speetonensis*.

ENVIRONMENT OF DEPOSITION: Top of interval has fair diversity of benthonic forms, suggesting a normal marine inner neritic environment. However, a strong terrestrial influence is indicated by common coal and goethite. This relatively shallow water environment is also suggested by a high diversity of ostracodes. Within the lower part of the interval, somewhat shallower, marginal marine conditions are indicated by increased frequency of coal, goethite and frosted sand along with a marked reduction in marine microfossils.

3640-5280' : Aptian to Hauterivian.

Recurvoides sp. and *Trocholina* cf. *infragranulata* in the interval

5250-80' suggest an age no older than Hauterivian.

ENVIRONMENT OF DEPOSITION: Marginal marine and brackish swamp throughout, with common coal, goethite and frosted sand.

5350-5980': Undiagnostic.

No age diagnostic fossils are present.

ENVIRONMENT OF DEPOSITION: Most of the interval represents a brackish or fresh water swamp. Coal, goethite and frosted sand are common.

CHAPTER 3

INTRODUCTION

Kerogen analysis was carried out on five samples, spaced approximately 600' apart. The following determinations were carried out: kerogen type, determination of the thermal alteration index (TAI), and epifluorescence. The data from these analyses are presented on analysis sheets provided by the Geological Survey and are included as Appendix C. A summary of each analysis follows.

KEROGEN

A significant proportion of the kerogen in the samples down to 2930' consists of finely degraded phyrogen and possibly some undigested clay minerals. The two samples studied below this level (3680' and 4180') are dominated by phyrogen, particularly the lower one.

Recognizeable algae and amorphous sapropelic material were not seen in the slides and the hylogen (spores, pollen, dinocysts and cuticle) varied from trace amounts at 4180' to 15% at 2930'.

THERMAL ALTERATION INDEX

A series of color readings was taken on spores wherever possible and the results are presented on the chart. Where maturation levels fall between two TAI values, both are plotted.

Values in the 1620'-2930' interval are in the 1 to 1+ range although there is a distinct TAI 2 component which is interpreted as the result of recycling. Spores and pollen are extremely rare at 3680' and 4180' but the TAI values appear to be slightly higher, in the 1+ to 2- range. Some reworking is also evident here.

FLUORESCENCE

As the TAI values would predict, the fluorescence colors are predominantly bright, pale yellow to greenish yellow. The latter component appears to be absent at 4180' but fluorescent debris is extremely rare in this sample. Throughout the section a distinctly duller yellow -orange fraction confirms the presence of reworking.

In all slides the mounting medium fluoresces strongly.

At 4180', the lowest sample available for study, the oil window has not been reached.

APPENDIX A

PHOTOGRAPHIC RECORD

Sambro I-29

#	Name	Well #	Depth	Coordinate
S-350	<i>Chatangiella spectabilis</i>	D129	1430-1460'	42.0 x 110.0
S-351	<i>Operculodinium</i> sp. #TD	D129	1430-1460'	44.9 x 104.7
S-353	<i>Kallosphaeridium capulatum</i>	D129	1610-1640'	40.0 x 91.2
S-354	<i>Sentusidinium</i> sp. #TD	D129	1610-1640'	37.3 x 94.7
S-355	<i>Areoligera</i> sp. #TB	D129	1610-1640'	37.4 x 94.2
S-356	<i>Phelodinium</i> sp. #TA	D129	1610-1640'	34.6 x 94.5
S-357	<i>Impagidinium pallidum</i>	D129	1610-1620'	49.1 x 97.8
S-358	<i>Batiacasphaera</i> sp. #TA	D129	1610-1640'	44.0 x 99.6
S-359	<i>Batiacasphaera sphaerica</i>	D129	1610-1640'	40.5 x 103.6
S-360	<i>Kallosphaeridium biornatum</i>	D129	1610-1640'	39.0 x 102.8
S-361	<i>Batiacasphaera</i> sp. #TB	D129	1610-1640'	32.9 x 102.7
S-362	<i>Odontochitina</i> cf. <i>imparilis</i>	D129	1610-1640'	33.2 x 98.3
S-368	<i>Ceratiopsis</i> cf. <i>granulostriata</i>	D129	1610-1640'	38.9 x 106.2
S-369	<i>Canningia</i> sp. #TF	D129	1700-1730'	40.6 x 92.6
S-370	<i>Alterbidium minor</i>	D129	1700-1730'	30.7 x 93.6
S-371	<i>Chatangiella victoriensis</i>	D129	1700-1730'	33.3 x 99.7
S-372	<i>Cyclonephelium clathromarginatus</i>	D129	1700-1730'	42.0 x 101.3

S-373	Chichaouadinium sp. #TA	D129	1700-1730'	32.8 x 107.6
S-374	Trithyrodinium evittii	D129	1790-1820'	41.0 x 94.4
S-375	Homotryblium abbreviatum	D129	1790-1820'	33.0 x 94.0
S-376	Renidinium cg. sp. #TA	D129	1790-1820'	35.3 x 108.0
S-377	Florentinia ferox	D129	1850-1880'	39.5 x 104.0
S-378	Hemicystodinium sp. #TA	D129	1850-1880'	38.5 x 106.6
S-379	Canningia sp. #TG	D129	2030-2060'	31.2 x 98.0
S-380	Cannosphaeropsis sp. #TC	D129	2030-2060'	33.2 x 102.3
S-381	Kallosphaeridium sp. #TB	D129	2090-2120'	39.0 x 96.5
S-382	Canningia reticulata	D129	2090-2120'	43.7 x 96.8
S-383	Cribroperidinium sp. s. WB/75	D129	2090-2120'	40.5 x 103.7
S-384	Stiphrosphaeridium arbustum	D129	2180-2210'	46.2 x 106.4
S-385	Dinopterygium cladoides	D129	2270-2300'	42.3 x 94.7
S-386	Alterbidium sp. #TA	D129	2270-2300'	34.4 x 100.4
S-388	Leptodinium sp. #TC	D129	2450-2480'	35.3 x 94.2
S-387	Trithyrodinium sp. #TC	D129	2270-2300'	41.0 x 106.5
S-389	Ctenidodinium sp. #TA	D129	2450-2480'	46.1 x 96.8
S-390	Appendicisporites sp. #TG	D129	2810-2840'	33.1 x 93.5
S-391	Alterbidium acutulum	D129	2810-2840'	28.2 x 101.4
S-392	Stephodinium coronatum	D129	2810-2840'	28.5 x 107.2
S-393	Florentina sp. #TC	D129	2990-3020'	40.5 x 98.4

S-394	Trilobosporites cf. bernissartensis	D129	3080-3110'	31.4 x 108.4
S-395	Odontochitina sp. #TB	D129	2368-swc	38.2 x 93.1
S-396	Vesperopsis nebulosa	D129	2368'	47.4 x 102.7
S-397	Acanthaulax cf. aculeata	D129	2645'	45.6 x 92.5
S-398	Pseudoceratium retusum	D129	2645'	48.0 x 97.6
S-399	Kleithriasphaeridium loffrense	D129	2645'	47.0 x 105.0
S-400	Coronifera oceanica	D129	2645'	42.0 x 107.6
S-401	Systematophora silyba	D129	3485'	49.1 x 92.4
S-402	Gonyaulacysta diutina	D129	3485'	41.0 x 93.8
S-403	Apteodinium grande	D129	3485'	41.1 x 110.5
S-404	Muderongia sp. #TA	D129	3515'	41.6 x 91.0
S-405	Nyktericysta vitrea	D129	3515'	37.4 x 91.1
S-406	Ephedripites sp. #TA	D129	3515'	40.0 x 93.0
S-407	Vitreisporites pallidus	D129	3515'	46.2 x 93.4
S-408	Afropollis sp. #TA	D129	3535'	44.8 x 95.6
S-409	Muderongia sp. #TB	D129	3515'	47.7 x 100.0
S-410	Odontochitina imparilis	D129	3600'	48.8 x 99.7
S-411	Odontochitina athabaskensis	D129	3600'	48.0 x 102.0
S-412	Meiourogoniaulax stoveri	D129	3640-3681'	45.1 x 99.0
S-413	Laciniadinium sp. #TA	D129	4650-4680'	39.3 x 98.8
S-414	Apteodinium granulatum	D129	5150-5180'	31.9 x 108.8
S-415	Mendicodinium groenlandicum	D129	9860-10070'	42.4 x 112.3

S-416	Senoniasphaera jurassica	D129	9860-10070'	34.5 x 110.9
S-417	Cleistosphaeridium sp. #TC	D129	5250-5280'	36.9 x 98.5

APPENDIX B

LOCATION OF FORAMINIFERA AND OSTRACOD SPECIES

1430-1460': Early Campanian

Marginotruncana marginata (1430-60, sq. 31)
Gaudryina austinana (1430-60, sq. 9)
Neoflabellina deltoidea (1430-60, sq. 8)
Kyphopyxa christneri (1430-60, sq. 19)
Vaginulina wadei (1430-60, sq. 7)
Nodosaria affinis (1430-60, sq. 6)
Lenticulina munsteri (1430-60, sq. 30)
Epistomina stelligera alveolata (1430-60, sq. 42)
Hoeglundina supracretacea (1430-60, sq. 43)
Arenobulimina subsphaerica (1430-60, sq. 44)
Pseudolamarckina (?) sp. #CA (1430-60, sq. 18)
Marginulina silicula (1430-60, sq. 32)

OSTRACODES:

Haplocytheridea globosa (1430-60, sq. 20)
Cythereis ornatissima (1430-60, sq. 21)
Brachycythere cf. *ovata* (1430-60, sq. 33)

1520-1640': Santonian

FORAMINIFERA:

Archaeoglobigerina blowi (1610-40, sq. 6)
Lenticulina munsteri
Dorothia conula (1520-50, sq. 7)
Vaginulina texana (1520-50, sq. 8)
Gyroidinoides globosa (1520-50, sq. 20)
Gavelinella stephensoni (1520-50, sq. 19)

OSTRACODES:

Veenia sp. #CA (1520-50, sq. 9)
Brachycythere sphenoides (1610-40, sq. 7)

1700-2000': Coniacian

FORAMINIFERA:

Whiteinella paradubia (1790-1820, sq. 9)

Heterohelix cf. *moremani* (1970-2000, sq. 21)
Epistomina stelligera s.s. (1700-30, sq. 8)
Vaginulina cretacea (1700-30, sq. 20)
Praebulimina cf. *reussi* (1790-1820, sq. 8)
Gyroidinoides depressa (1970-2000, sq. 8)
Gyroidinoides cf. *umbilicatus* (1970-2000, sq. 20)
Globorotalites multiseptus (1970-2000, sq. 32)
Gavelinella ammonoides (1970-2000, sq. 33)

OSTRACODES:

Haplocytheridea cf. *plummeri* (1700-30, sq. 7)
Neocythere annulospinata (1970-2000, sq. 18)

2030-2300': Coniacian or Turonian

FORAMINIFERA:

No specific age diagnostic taxa were found in this interval, although later Cretaceous caved taxa are relatively common.

2360-2480': Turonian

FORAMINIFERA:

Dicarinella algeriana (2450-80, sq. 8)
Hedbergella delrioensis (2450-80, sq. 20)
Whiteinella paradubia
Ammobaculites comprimatus (2450-80, sq. 19)
Palmula cf. *cushmani* (2360-90, sq. 31)
Coscinophragma (?) sp. #CA (2360-90, sq. 19)

2540-2570': Cenomanian

FORAMINIFERA:

Hedbergella cf. *delrioensis*
Ammobaculites comprimatus

OSTRACODES:

Cythereis af. *eaglefordensis* (2540-70, sq. 17)

2630-3290': Albian

FORAMINIFERA:

Whiteinella baltica (3080-3110, sq. 19)
Dorothia af. *filiformis* (2630-60, sq. 31)
Epistomina cretosa (2630-60, sq. 20)
Ammobaculites reophacoides (2630-60, sq. 19)
Lenticulina cf. *gaultina* (2630-60, sq. 32)

OSTRACODES:

Protocythere alexanderi (2720-50, sq. 20)
Eocytheropteron (?) sp. #CA (2720-50, sq. 19)
Alatocythere sp. #CA (2720-50, sq. 32)
Neocythere annulospinata (2810-40, sq. 19)
Rehacythereis af. *dentonensis* (2810-40, sq. 19)
Schuleridea jonesiana (3080-3110, sq. 18)
Protocythere speetonensis (3170-3200, sq. 19)
Orthonatocythere sp. #CA (3170-3200, sq. 18)

3350-3580': Aptian

FORAMINIFERA:

Epistomina sp. #CA (3350-80, sq. 31)
Lenticulina nodosa (3540-80, sq. 20)
Ceratolamarckina (?) sp. #CA (3540-80, sq. 20)
Gaudryinella tealbyensis (3540-80, sq. 19)

3640-5280': Aptian to Hauterivian

FORAMINIFERA:

Gaudryinella cf. *tealbyensis*
Lagenammina sp. #CA
Trochammina sp. #CA
Recurvoides sp. #CA
Trocholina cf. *infragranulata* (5250-80, sq. 4)

5350-5980': Age Uncertain

No age diagnostic fossils are present.

PREP. NO.	DEPTH	TYPE OF		COLOR OF		STATE OF		MATURATION INDEX	DEPOSITIONAL ENVIRONMENT
		ORGANIC MAT.	ORGANIC MAT.	ORGANIC MATTER	ORGANIC MATTER				
SAMBRO I-19									
		REMARKS							
		PARTICLE SIZE							
		PRESERVATION							
		MODERATELY ALTERED							
		STRONGLY ALTERED							
		SEVERELY ALTERED							
		METAMORPHOSED							
		OFFSHORE MARINE							
		NEARSHORE MARINE							
		RESTRICTED MARINE							
		LACUSTRINE NEARSHORE - MARSH							
		CONTINENTAL							
P 9991	1610-40	101540	35	X	X	X	X	X	TRT 2 material, Riv
P 10000	2270-2300	050214	80	X	X	X	X	X	Indet. prob. collinite, + clay
P 10007	2930	11514025	20	X	X	X	X	X	"
P 10005	3640-80	048808		X	X	X	X	X	Much large coaly + vitrinite frags
P 10020	4440-80	11001		X	X	X	X	X	Riv TRT 2 component
				X	X	X	X	X	Mainly vitrinite
									Mainly vitrinite.

GEOLOGICAL SURVEY OF CANADA - QUALITATIVE FLUORESCENCE ANALYSIS SHEET

[illegible]