SLAVE POINT DATUM PROJECT

PHASE II INVESTIGATION OF CORES

by

Raasch and Associates, Ltd.

May 25, 1971

Raasch and Associates
(Geological Consultants) Ltd.
CALGARY, ALBERTA
440 - 17 AVENUE S.W.
TELEPHONE 245-4277

May 25, 1971

Primary Clients
Re: "An Examination into a Northwesterly Extension of a Slave Point Baseline"

cc: R. L. Evans Amoco Petroleum Co. Ltd.
A. Dumestre Aquitaine Co. of Canada Ltd.
E. Spurgeon Canadian Fina
J. A. Minchin Central Del Rio Oils Ltd.
P. F. Moore Shell Canada Ltd.

Gentlemen:

The enclosed represents the second interim report of our three phase project.

The core study represents the bulk of the project in so far as time is concerned. Work has commenced on Phase 3 of the project, with the result that studies of the faunas taken from the cores are about one-third completed. The results have been added to the report and are reflected in the summaries of a number of the wells.

It is gratifying to be able to report that only a few of the cores examined proved abortive in so far as significant faunal recovery is concerned, and in no case do these have any important bearing on the results.

As work on the cores progressed, it became apparent that the regional aspects of the geology were more complex than originally anticipated, and to secure meaningful results, it was desirable, where possible, to extend the study much deeper stratigraphically, namely to the top of the Hume and its equivalents, the Nahanni, Lonely Bay, and Lower Keg River.

Thus the scope of the project was extended from the original objective of tracing the Slave Point equivalents northwestward, to an interpretation of the highly significant relationships between the younger sequence of Slave Point (Early Frasnian) age and the older, Givetian sequence down to the platform carbonates of Hume-equivalent age.

Phase 3, the final report, will include the following major items:

1) The remainder of the palaeo studies necessary to establish a firm dating.

2) Plotting of the core descriptions on strip logs, by L. E. Workman, according to C. S. S. standards. (This work is already underway).

3) Preparation of a regional cross-section involving these logs and the surface sections of Phase 1.

4) A discussion of the relations of litho-and fauni-facies along the line of section, and their correlation, including an evaluation of significant unconformities.

5) Reviews of several pertinent publications and theses that, being on the problems of the area, have appeared since inauguration of the project.

Finally, we wish to express our appreciation for valuable additional faunal evidence supplied us by Dr. A. E. H. Pedder, who has permitted us to incorporate it in Phase 2 of the report.

Sincerely,

Gilbert O. Raasch

Gilbert O. Raasch

GOR/pb

Encl.

SLAVE POINT DATUM PROJECT

PHASE II INVESTIGATION OF OUTCROPS CORES

Table of Contents

200

1966

MCDERMOTT ET AL HAY RIVER #1 I-41

MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 61° 00' 37"N; 115° 37' 58" W.

CORE 1 185-195' Rec. 9.8/10'

Box 1 of 2

Ls., lt. brown, fine xln. matrix of cgl. of pellets small pebbles, and fossils. Msv. but cut by wavy arg laminae. Passes down below top few inches to a pelletoid ls. Several pebbly bands occur lower; also bands with small brach. & small gastropod sections which do not break free. Small gastropod or Plectogyra* 4" below top. Possible microforams & calcispheres. Some pebbles are also composed of pellets. Fine sucrose porosity in upper 2'. *185.5'

Box 2 of 2

Top 6". Ls. full of small massive stroms; matrix as above. Next 4". Ls. dove, dull, earthy, cptxln., originally finely vesicular but voids completely dk. bn. xln. calcite. Next 16". Ls., dove grey brown, fine xln. & finely laminated. Some laminae are micropelleted. Rest of box. Ls., lt brown, micropelleted, some intergranular porosity. Spaghetti Amphipora sparsely throughout, and small massive stroms at base.

CORE 2 195-205' Rec. 10/10'

Box 1 of 2

Top 2.5'. Ls. as above with massive stroms. plus sparse *Cladopora, Rest of box. Brach. sections do not break free; Cladopora. Ls. fine xln. lt brown, sucrosic, with intergranular porosity.

Box 2 of 2

Ls., grey bn., cptxln., finely laminated. Small smooth brach. sections in lower part do not break free. Rest of box: Ls., grey bn., mxd. fine xln. & bioclastic; more massive; brach. sections of small smooth brach. do not break free; macaroni-Amphipora disseminated, well preserved.

CORE 3 205-215' Rec. 10/10'

Box 1 of 2

Lt. grey bn. ls., rather msv. with close arg. laminae in zones; fn xln. with high bioclastic content; in places pelletoid. Spaghetti-Amphipora & small smooth brach* common. *205-208.5'

Box 2 of 2 (badly mixed)

Similar to preceding. Pebbles in pelletoid ls. near base are also pelletted. Small brach. sections* ostracods (?)*, & small Amphipora (sparse).

CORE 4 215-225' Rec. 10/10'

Box 1 of 2

Similar to preceding, bioclastic in places, in others a layering of aphanitic & fn. xln. sucrose textures. Fossils as above, incl. small brachs.* and spaghetti Amphipora which forms a stromatoporoidal frame in lower 9". Above middle of box color changes from grey bn. to bn. grey. Many areas with original minutely vesicular structure have voids filled by white opaque mineral. *219'

Box 2 of 2

Top 3.5'. Similar ls., med. grey bn. with same fossils. Top 5" is continuation of Amphipora ls. Brachs. (Ladjia?)* fairly common. Few ostracods. Wavy argillaceous seams & partings. Minor stylolites. Next 12". Ls. pale brown, vaguely stromatolitic in aphanitic & fn. xln. sucrosic laminae. Bottom 6". Similar pale ls. but msv., aphanitic with bioclastic fraction & abundant spaghetti Amphipora.

CORE 5 225-235' Rec. 9.5/10'

Box 1 of 2

Top 3'. Continuation of above, lt. to med. bn. with rather high bioclastic content. Scattered spaghetti-Amphipora throughout & small massive forms in lower foot. Small brachs.* and ostracods as usual. Next 3.5'. Ls., pale bn., fn. xln. to microxln., sucrosic, finely laminated. Bottom 15". Similar but msv. & non-laminated, porous; small massive strom. near top. *225'

Box 2 of 2

Similar, with same laminated ls. interbedded.

CORE 6 235-245' Rec. 9.5/10'

Box 1 of 2

Ls., grey brown, aphanitic to cptxln., cloudy-mottled, with some stylolites. Brachs. (Ladjia)* collected. *236-237.5' *238'

Box 2 of 2

Similar, but greyer; thin-bedded. Ladjia & micro.* 245

CORE 7 245-255' 9.5/10'

Box 1 of 2=top 8'

Ls. dove bn., aphanitic, in upper 5' with bands of small brachs. Ladjia * plus bioclastic fraction. In lower 3' are frequent thin bands of sucrosic, fine xln. ls. 250
Rock thin-bedded along stylolitic partings. *245'

Box 2 of 2

Similar aphanitic dove ls., with darker laminae and closely spaced microstylolites. Sucrosic band in basal 5". 255

CORE 8 255-265' Rec. 10.3/10'

Box 1 of 2

Top 4'. Similar to preceding cores. Ladjia common; 260
Leiopteria*.

Box 2 of 2

Bottom 6' of Core 8. Similar, but with increase in the bioclastic fraction and somewhat mottled. Small massive stroms. and spaghetti-Amphipora appear at about 261'. Next 2' rock 263
is greyer & highly bioclastic, inc. Ladjia and a micro-gastropod. Bottom 2' of core are evenly aphanitic. 265

CORE 9 265-275' Rec. 10/10'

Box 1 of 2

Top 17". Aphanitic ls. as above but darker bn., with scattered Ladjia but no bioclastic fraction. Next 9". Conglomerate of subrounded ls. pebbles of dense, aphanitic, dull grey ls. with pale haloes, in bioclastic matrix with abundant Ladjia Next 6". Similar aphanitic ls. with very-high bioclastic fraction & Ladjia . Next 15". Ls., med. grey, aphanitic, thin bedded & with close wavy dark partings. Ladjia Next 10". Aphanitic med. bn. ls. with very high bioclastic fraction. Stachyoides, gastropods, & Ladjia & micro.*. Next 20". Ls., dark brown, calcarenite, very poorly sorted lime sand; massive. *269.5' 270

page 4.

Box 2 of 2

Top 10". Calcarenite, but finer and better sorted. Next 15". Unsorted aggregation of pebbles & stroms. in calcarenite matrix. Stachyoides, Amphipora & massive types. Basal contact irregular at 40° angles. A small piece of rock like the next underlying adheres. 274

CORE 10 274-284' Rec. 10/10'

Box 1 of 2

Ls., dove, aphanitic, with slight fine granular fraction which may be bioclastic. In fine, varve-like laminae; about 3' below top for next 18" bioclastic bands are present with a few small pebbles & some Ladjia? 279

Box 2 of 2

Top 19". Similar to preceding portion with a bioclastic fraction. Have Ladjia & ostracods. Microstylolited partings cause thin-bedding. Next 15". High-energy ls., mixed calcarenitic, pelletoid, & conglomeratic bn. ls. Bottom 25". Ls., dove bn., aphanitic, with pale or black disseminated color specks. Thin-bedded, as above. 284

CORE 11 284-294' Rec. 9.9/10'

Box 1

Top 28". Ls., lt. to dk. bn. in alternating laminae; aphanitic. Next 11". Non-laminated, with small bioclastic fraction. Ladjia . Next 14". Aphanitic med. grey bn. ls. clouded with irregular dark films. Next 13". Bioclastic & conglomeratic fragments in aphanitic matrix like above. Microfauna (ostracods)*. Bottom 13". Similar ls. in alternating aphanitic and bioclastic (fine) bands. *286.5 *288.5' 289

CORE 12 294-304' Rec. 10/10'

Box 1 of 2

Top 6" as above. Next 4". Similar aphanitic bn. ls. clouded with irregular wavy dark films. Rest of box. Med. gry. bn. aphanitic ls. with varying bioclastic fraction & a few pebbles. Ostracods* microforams? and brach. sections* Ladjia? A few vermicelli-Amphipora near bottom. *295' *298' 299

Box 2 of 2

Top 1'. Similar to preceding. Fine Ladjia dorsal collected. Next 22". Ls., top earthy greyish white, fine xln. in chalky matrix; becoming lt. gry., denser, with higher bioclastic fraction downward. Abundant calcispheres in upper part. Thin-bedded on microstylolited films. Next 4". Med. bn. calcarenite, bioclastic. Next 12.5" Ls., dove bn., aphanitic, conchoidally fracturing; with small, disseminated fine bioclastic content. Basal ½". Layer of black bituminous shale. 304

CORE 13 304-314' 10.1/10'

Box 1 of 2

Top 10". Ls. dove bn., aphanitic with varying bioclastic content. ¼" parting of bn. blk. shale. Bottom 15". Ls. pale bn. to bnish white, aphanitic, with some bioclastic bands. 309

Box 2 of 2

Top 9". Ls., aphanitic, dove bn., msv. with small, disseminated bioclastic content. Next 21". Similar ls. but with zones of wavy blk. films and bands of chalky pellets, up to pebble size. Some bioclastic content in lower part. Next 3'. Ls., dark dove bn., aphanitic, massive, with very slight bioclastic content. Bottom 12". Ls., similar but with high bioclastic content. Ladjia sections & ostracods. 314

CORE 14 314-324' Rec. 10/10'

Box 1

Ls., v. dk. bn. aphanitic, massive with disseminated bioclastic fraction and minute horizontal borings filled by earthy pale ls. Next 36". Ls., aphanitic, lt. bn. gy. laminated, with fairly high bioclastic content in some bands, increasing downward. Good Ladjia *ventral collected. Next 8". Dk. bn. calcarenite, with small scattered pebbles. Next 9". Ls., dirty white, chalky, with pellets, fragments and seams of darker dull ls. Next 21'. Ls., similar but dirty grey; inclusions rare to dominant; in places laminated; few small vugs completely filled by coarse calcite. Bottom 10". Ls., cptxln., msv. med. brown, brittle. *316' 324

CORE 15 324-334'

Box 1 of 2

Top 6". Same as preceding. Next 5". Similar bn. ls. with very closely spaced wavy black arg films. Next 20". Ls., pale grey, earthy, microxln. matrix with varying amounts of bioclastic to pelletoid material and numerous calcispheres. Also variously oriented borings filled by ashy grey to dark grey ls. Next 12". Ls., dove, aphanitic, in upper part interlaminated with finely bioclastic ls., lower has disseminated bioclastic fraction. Ostracods. Macaroni & spaghetti Amphipora and small massive stroms. Passes to next with sharp contact. Bottom 9". Ls., lt. grey, fine grained bioclastic calcarenite, msv. Stroms. as above. 329

Box 2 of 2

Top 6". Same as preceding. Next 36". Ls., mixed microxln. to finely xln., med. dk. bn., with macaroni & spaghetti Amphipora and massive stroms., disseminated. One very large massive strom near base. Massive except for zones full of dark argillaceous films. Small brachs.*. Bottom 13.5". Ls., aphanitic to fine xln., dove bn., in extremely fine laminae separated by dark argill. films. 334

CORE 16 334-344' Rec. 10/10'

Box 1 of 2

Top 18". Ls., pale bn. gry, microxln., massive to poorly laminated; massive strom. Next 30". Ls., dk. med. bn. basically aphanitic, but with varying fine bioclastic content becoming dominant toward base. Few msv. stroms. & Stachyoides. Next 25". Ls., pelleted, with pale brown pellets and abundant dark argillaceous films. Stroms abundant, large massive and Amphipora.

Box 2 of 2

Top 9". Same as preceding. Next 5". Stromatoporoidal ls. but with matrix pale bn., fine xln. ls. Rest of core shattered & ground to gravel, but seems to have been like portion just described. Part of a small horn coral (340').

CORE 17 344-354' Rec. 10/10'

Box 1 of 2

Stromatoporoidal ls. Top 2' almost entirely of cabbage stroms. in excellent preservation, with scant matrix of pelletoid ls. with black arg. seams as in core 17. Lower down stroms. are

less dense with higher percentage of Amphipora & Stachyoides. Matrix dk. bn., fine xls. ls. Some bioclastic with few brachs.* & ostracods. *347'

Box 2 of 2

Ls., med. bn. mxd. fn.-xln. & micro-xln., massive, with zones full of dk. arg. films. Stroms. more scattered. Spaghetti-Amphipora most common; also Stachyoides & massive. In basal 1', fragments of thick-shelled brachs.*; scattered ostracods. *353'

CORE 18-20 354-384'

Stromatoporoidal ls. essentially a continuation of that in Core 17 and the lower part of Core 16. Varying concentrations of stroms.; where massive stroms. are abundant pellet ls. with blk. arg. films forms matrix. Elsewhere is mainly fn. xln. to micro-xln., med. bn. ls. Bioclastic content not high; few brach. sections are largely medium-sized Atrypa* difficult to collect. *380'

CORE 21 384-394'

Top 20". Ls., dull, lt. gry., xln., with pebble-like inclusions of paler cptxln. ls. Cloudy mottling & irreg. arg. films. Next 2". Ls., lt. gry., cptxln., vitreous, with high bioclastic content including crinoid ossicles & small brachs.; Amphipora. Next 8". Conglomerate. Rounded pebbles mainly lead grey cptxl. ls. in coarse bioclastic & highly fossiliferous grey to white specked matrix. Atrypa* & other brachs.*, crinoid ossicles, Amphipora etc. 'Worm' borings are filled with pale marlstone. Rest of core. Ls., or marlstone, dull grey, aphanitic, irregularly banded and mottled lighter & darker; no fossils. *386'

CORES 22-24 *394-422'

Similar marlstone or arg. ls. which divides by imperceptible transition into two units. Upper 26' like rock above and essentially unfossiliferous except for a few stringers of crinoid joints. Remainder down to bottom of Core 24 has fairly thick bands which are cptxln. and cleaner with a small bioclastic fraction, including rare brach.* sections and ostracods*. Sparse Amphipora appears at about 418'. A microgastropod was noted near base. (422') *418-422'

CORE 25 422-423' Rec. 1.2

Box 1

Similar to preceding, but clean bands thinner with little bioclastic, and marlstone bands thicker and full of dk. bn. shale films. 423

CORE 26 423-424'

Box 1

Similar to preceding. Micro-borings are filled by marl or calcite. Brach. sections few; do not break free. 424

CORE 27 424-434' Rec. 9.9/10'

Box 1 of 2

Similar ls. dove gry. cptxln. to aphanitic, in bands several inches thick between thinner bands of marlstone, brown, full of argillaceous films. Some internodular relationship. Small but constant bioclastic fraction; nothing identifiable except common calcispheres and rare ostracod sections, except crinoid* calyx or asteroid at 429' and possible Hadrorhynchia* at 431'. Microborings filled by ashy marl, calcite, rarely pyrite. *429' *431' 429

Box 2 of 2

Similar but nodular structure more prominent. Calcispheres common, few crinoid joints. A minute diameter Amphipora colony just above 434'. Smooth fat brachs.* at 433.5'. *433.5' 434

CORE 28 434-444' Rec. 9.8/10.0'

Box 1 of 2 439

Similar to above. Few brachs. near top.

Box 2 of 2

Similar including calcispheres, few crinoid joints. Local microboring. Marlstone now dull grey. 444

CORE 29 444-454' Rec. 10/10'

Box 1 of 2

Similar but ls. becomes more marly; increase in micro-borings & "bottom-eating" activity; decrease in bioclastic content. 451

Nothing identifiable.

Box 2 of 2

Similar. Bioclastic content negligible; calcispheres. Smooth brach.* at 458.5' probably same as at 433.5'. Wide & fairly high ventral cardinal area; sinus present. 459

CORE 30 454-464' Rec. 9.9/10'

Box 1 of 2

Becoming more argillaceous, so that whole should probably be called marlstone; but there is still banding & nodular separation into lighter, more calcareous & darker more argillaceous portions (no shaliness). No fossils except limited boring activity. 459

Box 2 of 2

Similar but darker, more argillaceous portion becomes dominant. 469

CORE 31 464-474' Rec. 10/10'

Box 1 of 2

Similar. Very slight bioclastic content; calcispheres. 469

Box 2 of 2

Similar. Minute branching bryozoan* at 473'. 474

CORE 32 474-484' Rec. 10/10'

Box 1 of 2

Similar marlstone. Few calcispheres. 479

Box 2 of 2

Increasingly argillaceous (but non-shale) with differential of two rock types less distinct. No fossils other than calispheres & micro-borings, both sparse. 484

CORE 33 484-490' Rec. 6.1/6' 489

Same as preceding. No fossils.

CORE 34 490-494' Rec. 4/4' 494

Same.

CORE 35 494-504' Rec. 10/10'

Box 1 of 2 499

Same.

Box 2 of 2 509

Same.

CORE 36 504-514' Rec. 10/10' 519

Same.

CORE 37 514-524' Rec. 10/10'

Similar. Very rare calispheres and a few microborings. In lower part are scattered white nodules of gypsum up to 1.5" diam. 524

CORE 38 524-534'

Box 1 of 2

As above. Some micro-borings as previously. Few gypsum nodules. 529

Box 2 of 2

Same. No gypsum. Proportion of ls. vs. marlstone increases. 534

CORE 39 534-544' 10/10'

Box 1 of 2

Similar. Minute crinoid ossicles rare. Few brach. (?)* sections. 539

Box 2 of 2

Similar grading to more highly calcareous beds with nodular-mottled structure and fossiliferous. Small, smooth brachs.*, Cymostrophia?*, minute crinoid joints, etc. Variable bioclastic fraction. 544

CORE 40 544-554' Rec. 10/10'

Box 1 of 2

Similar; some portions banded, others nodular-mottled. Fossil-

iferous with probable Emanuella sublineata*, most abundant. 549
*544.5' *547.5' *549.0'

Box 2 of 2

Resumes vague banding of higher cores & more argillaceous (non-shaly) with slight or no bioclastic fraction. Emanuella* 5.4
in upper few inches. *549'

CORE 41 554-559.5' Rec. 5.3/5.5'

Passes to dk. med. bn. grey, cptxln. marlstone with vague and incipient laminae. Emanuella* fairly common. *556.5' 559

CORE 42 559.5-564' Rec. 4.2/4.5'

Alternation of zones of dk. marlstone and more calcareous nodular-mottled beds with high bioclastic fraction. Above middle a portion of the core is recrystallized to med.-xln. lt.-bn. ls. and has good minutely-vesicular porosity. Small brachs. and/or ostracods*, silicified (?). *562' 564

CORE 43 564-574' Rec. 10/10'

Box 1 & 2

Dark marlstone, incipiently laminated, as higher in core. 574
Nothing definitely organic observed.

CORE 44 574-584' Rec. 9.5/10

Box 1 & 2

584

Same as above.

CORE 45 584-594' Rec. 9.8/10'

Box 1 & 2

Similar, verging in places to calc. shale. A few rather large 594
filled borings.

CORE 46 594-604' Rec. 10/10'

Box 1 & 2

609

Similar. Filled borings rather common in top.

page 12.

CORE 47 604-614'

Box 1 of 2

609

Similar.

Box 2 of 2

614

Same, marlstone & marly shale.

CORE 48 614-620' Rec. 6/6'

620

Similar marlstone, becoming darker grey.

622

CORE 49 620-622' Rec. 0/2'

CORE 50 622-624' Rec. 2/2'

621

Same as Core 48.

CORE 51 624-634' Rec. 10/10'

631

Same.

644

CORE 52 634-644' Rec. 10/10'

CORE 53 644-654' Rec. 10/10'

Badly jumbled. Top 5'. Marly shale, grading (next 4') to lighter grey aphanitic marlstone. Bottom 1'. Dk. grey, dull, somewhat silty (?) micro-xln. ls., full of Emanuella sublineata*. 654
Sharp contact at top of ls. *653.5'

CORE 54 654-664' Rec. 10/10'

Top 2'. Sandstone fine, angular, brown, highly calcareous. Next 3'. Marlstone, dk. bn.-grey, and ls. aphanitic, dk. bn., with fair finely bioclastic fraction. Following 5' is attempted restoration of a badly jumbled core. Mudstone & marlstone as above. Next 20". Encrinite-pelletite, highly crinoidal, large & small ossicles, rounded; coarsely pelletted; possibly a few ooids. Matrix scant, aphanitic, dark. Rock has pepper & salt appearance. A few poor Emanuella. Next 6". Ls., med. grey, optxln., hard. Few Emanuella. Bottom 10". Marly clay-shale, grey bn., tan weathering. Brach. frags.*, Styliolina*, ostracods*. 664

E 55 664-672.5'

RE 56 672.5-674'

These cores are completely jumbled in a single box, fragmented and inseparable. Top 7.5'. Seem to be same rock. Marlstone, dark, brown grey, with microfauna, Leiorhynchus, etc.*, and marly shale. Speckled with minor, fine, bioclastic fraction. Next 1.5'. Shale marly to marlstone, dark grey, full of Styliolina*, etc., mainly not well preserved. Basal 1', hard grey marlstone & platy shale. *664-69' *670-672'

ORE 57 674-678.5'

ORE 58 678.5-680"

These two cores are fragmented and completely jumbled together. They seem to be similar bn.-gry. marly shales & grey marlstones and shales as in overlying cores. Shales have abundant very small Styliolina* and marlstone bands are full of Leiorhynchus castanea*. *674-80'

ORE 59 680-684'

Completely jumbled. Similar but now completely dark grey shale, with numerous Enanuella* and Leiorhynchus*. *680-684'

CORE 60 684-690' jumbled.

Similar shale, with a few brachs.

CORE 61 690-694' No recovery.

CORE 62 694-700'

Completely fragmented and jumbled. Otherwise like core 60, but with some marlstone bands. Few brachs: Lingula and Leiorhynchus.

CORE 63 700-701' No recovery.

CORE 64 701-704'

Similar to Core 62, but becoming more fissile. No marlstone. Pterochaenia?* *701-704'

page 14.

CORE 65 704-711'

Jumbled. Shale similar to above but not fissile and lighter colored; lower part marly with numerous brachs.*: Leiorhynchus, etc.; minute Lingula*, and ostracods. *709-711' 711

CORE 66 711-721' Rec. 10/10' 721

CORE 67 721-724' Rec. 2/3'

All jumbled and indistinguishable. Shale moderately dark grey, hard & marly to decrepitating. Leiorhynchus fragment. 724

CORE 68 724-733' Rec. 10/9'

Similar shale, dk. medium grey, laminated; disseminated pyrite in places. Upper 2/3 with minute Lingula* common; lower 1/3 with Styliolina* and ostracods*. *724-730' 730-733'

CORE 69 733-743' Rec. 10.3/10.0'

Same shale. Styliolina abundant*; ostracods common, poor; few Chonetes* and Leiorhynchus 742

CORE 70 743-746'

Upper 5'. Dk. grey to black bituminous hard, laminated shale, with Tentaculites* Styliolina* ostracods and pelecypods*, Leiorhynchus*. 746

CORE 71 746-754' 7.5/8'

Similar hard black bituminous and calcareous banded to laminated shale (non-fissile), with some cross-lamination. Pale grey aggregations of crse. carbonate xls. form lenticular aggregates or thin bands. Also barite (?) rosette of similar color. These minerals seem to have grown at the expense of the matrix. Packed with crushed Styliolina*. Strong "oil-rock" odor. *750-754' 754

CORE 72 754-764' Rec. 10/10'

Same. Same fossils and Leiorhynchus.* *754-759' 759

CORE 73 764-774' Rec. 10/10'

Same. Same fossils *. *767' 774

RE 74 774-784' Rec. 10/10' 784

Same but less banded and more indurated, with a few bands of med. grey optxln. marlstone or limestone.

ORES 75-76 784-795.5' 5.8'/11.5' 796

Similar. Styliolina.

ORE 77 795.5-804' 8/8.5' 804

Similar but higher calcareous content. Some marlstone concretions exceed 1" diameter. Dip up to 5°. Some partings are Styliolina matts.

CORE 78 804-814' Rec. 9.8/10' 814

Same. Styliolina sparse. Calcite-lined vug has tarry coating.

CORE 79 814-824' Rec. 10/10'

Top 3'. Similar, but in broad interbands with ls., dk. grey, microxln., massive, with Leiorhynchus in lower 1'. Rest of core: Leiorhynchus limestone, black aphanitic speckled by fine to crsc. lt. grey, bioclastic fraction and abundant. L. castanea*. Warrenella kirki* also found. *820-824' 824

CORE 80 824-834' Rec. 10/10'

Ls., nodular- mottled, lt. to dk. grey, aphanitic but full of bioclastic material, some very coarse, and abundant fossils including Productella*, E. meristoides*, small pelecypods*, large crinoid ossicles etc. 834

CORE 81 834-837' (end)

Upper 17". Similar ls., a few pebbles in base; basal few inches, dolomitic ls. Basal 4". Dolomite, evenly medium xln., med. grey, massive; few crinoid ossicles. 837

SUMMARY

MCDERMOTT ET AL HAY RIVER I-41

Slave Point	185-656' Core top
Watt Mt. Ss.	656-658'
M. Pine Point (Hare Indian)	658-824'
L. Keg River (Hume)	824' plus

MURPHY CANADA ALEXANDRA FALLS NO. 2
MACROFAUNA NOTES G. C. KAASCH

LOCATION: 60° 15' 30.80"N 116° 34' 40"

CORE 1

Box 1 of 2

Rather dark grey, mod. arg. cptxln. ls. Sampled at intervals for brachs.*: Atrypa Ladjia Sampled: 1896', 1896.5' 1897', 1898', 1898.5', 1899', 1900.5'

Box 2 of 2

Same. Sampled: 1902, 1903, 1905.

MACROFAUNA NOTES

HB CAMERON HILLS A-05

G. O. RAASCH

LOCATION: 60° 10'N, 117° 30'W

Completed March /68 T. D. 4969'

CORE NO. 1 (3½ in. non-slabbed) 4443-4503' 60/59 13 boxes=4.6' per. (60)

Box No. 1 Top foot. Ls., med. brown-grey, fine xln/cptxln., with good-sized vugs filled by barite. Full of Amphipora & massive stroms. Next 18". Ls., fn. xln. grainstone, med. bn.-grey, with bands of pale grey aphanitic ls., which tends to develop sedimentary boudinage and locally, flat-pebble cg. Next 9". Stromatoporoidal ls. like that above. Rest of box (15"); grainstone with pale aphanitic bands, as above. 47.7

Box No. 2 Top 41". Ls., lt. dove grey, aphanitic with varying fraction of fine biocl. materials. Some vague banding & a few dns. pebbles. Med. to thick bedded, with black partings giving rough bedding planes. 4449' few brachs. (Emanuella?). Next 12". Ls., med. brown grey, aphanitic with fine calcarenitic fraction. Single msv. bed. Browner nodules show on cored surface but not on fresh. Fossils numerous, Emanuella* vernilis. Bottom inch (like next). *4451' 52.+

Box No. 3 Ls., banded to laminated dk. med. bn. grey to lt. dove grey, aphanitic to finely calcarenitic, the two types largely in separate bands; bands & laminae may be wavy, with intersecting laminae, and lamination dip up to 5°. Increasingly arg. downward with increase in dark, arg. laminae. E. vernilis* etc., at several horizons. *4454-55' 57.1

Box No. 4 Similar banded ls., but with anhydrite appearing 6" below top, and occurring sparsely throughout as thin, irreg. bands or as lumps. No visible biota. 61.5

Box No. 5 Top 33". Similar to preceding. Rest of box largely anhydrite, dk, resinous, to dove brown-grey alabaster-like, with bands and patches of med-xln., dk. grey brown ls. 66.2

Box No. 6 Ls., light med. bn./grey, mixed aphanitic and med. grey calcarenitic, mainly separated in bands. Brachiopods common (E. vernilis etc.)*, in places forming coquina. A little anhydrite in top few inches. Basal 6" with much interlaminated dark shale. *4466-67' *4469' 70.9

Box No. 7 Top 20". Anhydrite, dark, resinous, intermottled with pale grey, aphanitic ls. specked with fine med. xls. Massive. Next 22". Similar ls. below ½ dk. shale band. The coarser xln. fraction is variously distributed as "phenocrysts", birds eyes, or bands. Rest of box: Ls., med. grey, cptxln., with darker, arg. birds eyes. Massive. Little anhydrite at bottom. 75.6

Box No. 8 Top 7". Ls., light dull grey, laminated, marly. Next 8". Ls., dove, lithographic, conch. fract., msv. with small E. vernilis*and very good ostracods*. Dark shale partings at top and base. Next 18". Ls. similar to above but with "phenocrysts" of coarse, brown calcite. Scattered good ostracods* and small brachs. (Emanuella vernilis?)*. A few birdseyes may be remains of small branching stroms. Next 12". Ls., dark, med. brown grey, fine xln. matrix full of branching stroms. and some large massive stroms largely replaced by brown coarse calcite. Massive. Good E. vernilis* collected at base. Next 10". Ls., dove, cptxln. msv., very clean. Rest of box. Stromatoporoidal ls. like that 10" above. *4475' *4476' *4476' *4477.5' 80.3

Box No. 9 Top 3". Strom. ls. as above. Next 17", ls. cptxln., lt. med. brown-grey, cptxln. peppered with coarser xls. of calcite (like 18" unit above). Msv. Smooth brachs. incl. Emanuella vernilis*. Rest of box. Dol., dull grey, microxln. spotted by darker birdeyes and mottled by areas of grey, resinous anhydrite. *4480' 85.0

Box No. 10 Top 5". Similar to preceding; prominent shale parting at base. Next 17". Ls., lt. grey, dull, aphanitic, with darker birdseyes (as above) and peppered with dk., coarse xls. (of calcite?). A little anhydrite mottling. Massive concentration of dark shale laminae in base and strong basal shale parting. Next 3.5". Ls., fine xln. dark brown-grey, full of coarse-branching & massive stroms. Next 12". Grades to ls., med. brown-grey, aphanitic, lightly peppered with coarse xls. of calcite. Few smooth brachiopods. Coarse to very coarse anhedral xls. of coffee-brown dol. in scant matrix of aphanitic, bn.-grey ls. 89.7

Box No. 11 Top 10" (does not seem to connect with bottomoof Box 10). Ls., med. brown-grey, cptxln.-microxln., with scattered coarse anhedral xls of (calcite?). Few poor fossils (brachs?). Massive. Rest of box. Dolostone, pale grey, microxln., massive, with darker birdseyes showing on core surface. Contact with overlying is very hummocky and covered with black shale coating. 94.4

page 3.

Box No. 12 Top 5" like above, grading to next 33". Dolomite, microxln., dull med. grey, with arg. content in indistinct lighter & darker bands. Thick-bedded. Next 6.5". Dol., dull lt. grey, microxln. with coarser bioclastic fraction. Core surface shows nodular-mottled to sed.-brecciated structure. Msv. frags. of coarsely plicated brachs, unidentifiable. Rest of box. Dolostone, pale grey, microxln., chalky, with dark mottling; massive. 99.1

Box No. 13 Top 5". Similar. Rest of core (42"). Ls., med. grey, microxln., with some zones mottled, others laminated by darker, more argillaceous areas and seams. Becomes anhyriditic downward, to dominance in basal foot. 03.0

CORE NO. 2 4602-4627' 29/24 5.5' per box.

Box No. 1 Top 13". Cgl.; small subrounded pebbles of lt. dense ls. in matrix of dark green-grey non-clc. clay. Contact at base shows 1.5" of relief. Next 7". Regolithic zone, with somewhat disoriented large pieces and small fragments of dolostone like underlying separated in lower part of solid arg. dol. and in upper part by green-grey "glassy" shale with slickensides. Next 12". Dolomite, pale grey brown, mixed xl-size; upper part cloudy-laminated, showing dip. Next 27" to end of box: Dolostone dark brown, med. to fine xln.; rare lamination shows steep & varied inclination; syngenetic brecciation locally has voids filled by white gypsum. Some anhydrite inclusions near bottom. 07.5

Box No. 2 Top 30". Anhydrite, purplish grey, massive, thickly interbedded with dol. like that above. Rest of box. Dolostone, lt. bn., fine xln., finely porous with good light oil or gas odor; indistinctly laminated; laminae horizontal. 12.0

Box No. 3 Top 4'. Dolostone as above, with same porosity and odor. Laminae become wavy toward base. Bottom 18". Anhydrite, massive, light & dark mottled. 16.5

Box No. 4 Top 50". Similar anhydrite with minor inclusions and interbands of dns. light brown dol. Rest of box. Dol., micritic, with dissem. fine xls.; lt. bn., fairly massive, dense. 21.0

Box No. 5 Top 12". Dol. as above. Rest of core; anhydrite, nodular-banded, to nodular brecciated; thus white to yellowish mottled against dark brown background. Some light brown, brown dol. interbanding in basal 6". 25.5

Box No. 6 Remaining 15" of core. Anhydrite as above, irregularly interbanded and intermottled with dol. like that above. 27.0

CORE NO. 3 4875-4903' 4.7' per box (33)

Box No. 1 Top 15". Dolostone, dark, med. brown, microxln., Next 40" to base. Dolostone, calc., fine xln., med. grey to dark grey, with stylolited partings as dark films. Large vertical vein is filled by calcite. One polished surface shows angular pale dol. clasts, plus open birdseyes with drusy lining. 79.7

Box No. 2 Dol., calc., fine xln., lt. brown to med. & dark grey; small calcite veins; medium-bedded due to dark, micro-stylolited parting films. 84.4

Box No. 3 Dol., some slight calc.; med. to dark grey brown; fine to med. xln. Some small to large vuggy porosity. 89.1

Box No. 4 Top 5", similar; dark med. grey, fine xln.; prominent black shale parting at base. Next 27". Dol., sl. calc., med. grey brown, microxln., numerous small nut-sized vugs; msv. with few incipient wavy black film-partings. Basal 2" are more argillaceous. Next 14": Similar dol., but lt. grey brown; vugs mustard seed size. Basal portion more arg. to darker. Black shale parting at base. Bottom 12". Similar dol, but vugs fewer; top & bottom portions darker & somewhat arg. Good black shale parting at base. 93.8

Box No. 5 Top 30". Dol., lt. med. brown-grey; fine xln/microxln., massive; mottled by dark birdseyes. Rest of box: Dol., med. grey, fine xln., msv. a few vugs, filled by calcite. 98.5

Box No. 6 Top 32 inches. Similar to above. Good black shale parting at base. Next 20". Similar dolostone, fairly vuggy, presumably due to removal of small to fairly large brachs. and branching stroms. or tabulates. Bottom 5". Similar dol. but darker, with poorly preserved brach. & Amphipora sections preserved in whitish dol. 103.2

Box No. 7 Top 21". Dol., fine xln., med.-dark brown grey, mottled or clast-brecciated, full of spaghetti stroms. and some good Stringocephalus* sections. Kerogenic odor. Rest of box. Dol., dark med. grey, fine xln., very vuggy, some connected vuggy porosity; dol-druze lining cavities. Poorly pres. spaghetti Amphipora, etc. 108.0
*4900'

SUMMARY

HB CAMERON HILLS A-05

Slave Point	4443-4499.5 core top
(L. vernilis	4451-4480')
Fort Vermilion	4499.5-4503'
gap	4503-4602'
Watt Mt. Cgl. on regolith	4602-4604'
Muskeg	4604-4627'
gap	4627-4875'
Presqu'ile	4875-4905' (end of core)
Stringocephalus	4900'

BRIGGS TATHLINA LAKE NO. 3 - MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 60o 40.5'N; 117o 31'W

CORE 1. 2565-68' Rec. 1' 2"

CORE 2. 2568-71' Rec. 1' 6"

CORE 3. 2571-76' Rec. 1' 6"

CORE 4. 2576-77' Rec. 1'
Possible calcispheres.

1" diamond core extremely incomplete not suited macro recovery.

SUMMARY

BRIGGS TATHLINA LAKE # 3

negligible and abortive

BRIGGS W. TATHLINA LAKE #3 - MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 60o 40'N; 117° 43'W

CORE 1. 2706-2731'

2706-2711'
Ls. med. bn.-grey, mxd. microxln. and crse. biocl., massive, few zones with wavy and discontinuous arg. laminae. Numerous msv. stroms. of a single type, up to baseball size; suspended in matrix.

2711-2713'
Ls. med. bn. gry., highly biocl, with bands of small brachiopods (Ladjia)*. Good lt. oil odor. L. vernilis.

2713-2714.3'
Ls., similar to 2706-11' interval with large massive stroms.; a few brachs. (Ladjia) and Amphipora. Sharp basal contact.

2714.3'-2716.2'
Ls., med. bn. gry.; spaghetti stone (Amphipora) with few included cabbage stroms.

2716.2-2718.2'
Ls., lt. med. bn., mxd. fn. xln. & biocl. with numerous cabbage stroms. Few brachs. (Ladjia) (circled in red at 2717').

2718.2'-2718.6'.
Ls., lt. med. bn., mxd. fn. xln. & biocl., roughly laminated, with inclined laminae up to 5°. Some small brachs.

2718.6'-2719.1'
Ls., spaghetti-stone as at 2714-16'.

2719.1'-19.3'
Ls., with small msv. stroms. Sharp basal contact.

2719.3'-2720.5'. Ls., med. dk. bn., pelletoid up to small lenticular ls. clasts; micro-voids. Slight cross-lamination.

2720.5-2722.8'
Ls., med., bn.-grey fn. xln., compact, as matrix of spaghetti-stone. In addition to conventional Amphipora is a dominance of of a hollow-stemmed loose-structured form with peripheral spinules. (collect at 2721'; (16' marker) as marked in red crayon).

2722.8'-2724.6'
Ls., med. dk. bn., pelletoid, with zones crammed with massive stroms., different from those above in having horizontal elements dominant.

page 2.

2724.6-2725.8'
Ls., lt. med. bn.-grey, micro-xln., compact, with the 'hollow Amphipora' described above, plus some small massive stroms.

2725.8-2728.4'
Ls. as above with massive stroms. (some species as in upper part of core), a branching tabulate (Thamnopora or Coenites) and a few brachs. (Ladjia?) (recommend collecting from corals & brachs. at 2727.5' as marked in red crayon).

2728.4-2730.3'
Similar ls., but with fine bioclastic fraction; massive. With varying abundance of the hollow-stemmed "Amphipora" which ranges from spaghetti to vermicelli size; plus scattered small massive stroms.

2730.3-2731'
Ls., lt. med. bn.-grey, cptxln., locally clouded by arg. matter. Few scattered brachs. (Ladjia)*. Basal ½ inch highly argillaceous with small brachs. and Amphipora. L.? vernilis

SUMMARY

BRIGGS W. TATHLINA LAKE # 3

2706-2731' Core top & bot.
2711-2730'

Slave Point
L.? vernilis

[illegible] MATHILDA LAKE #2 - MACROFAUNA NOTES - G. O. RAASCH

[illegible]ION: 60° 38'N; 117° 47.5'W

[illegible]. 542-563'

[illegible]marmorized, lt. grey and white mottled; some areas coarse-[illegible], others lithographic; inclusions of coarse spparry calcite. [illegible]brecciated zones in aphanitic matrix.

[illegible]ish grey greasy clay partings. Gn.-grey irregular argillaceous [illegible]sions increase downwards, where rock has a generally darker [illegible]. Small-scale stylolites closely spaced throughout. Stromato-[illegible]e white areas are massive to laminar stroms.; large diameter [illegible]oid columns at intervals throughout. Bands of brachiopods [illegible]y common; collected at 552' (fine-ribbed Atryna, etc.) and [illegible]554.5'. Orthoconic cephalopods? (549') and possible Poter-[illegible]ras. A large massive Phillipsastraea (to be collected) at [illegible].5'.

[illegible] 2. 2880-2895'

[illegible]0-2881'
[illegible]., med. bn.-grey, fine xln., with marcaroni Amphipora [illegible]massive stroms.

[illegible]81-2881.8'
[illegible]milar ls. with hollow-stemmed spaghetti stroms. Black shaly [illegible]rtings in middle. Also some small algal (?) masses

[illegible]881.8'-2883.2'
[illegible]., lt. gry., cptxln., dull, massive, basal 3" with small brachs* [illegible]Ladjia landesi) and the hollow-stemmed Amphipora.

[illegible]883.2-2884.6'
[illegible]milar ls. with spaghetti Amphipora and brachs. (Ladjia?) cross-[illegible]sections. Basal 8" a spaghetti-stone of the hollow-stemmed [illegible]mphipora.

2884.6'-2886.8'
ls., med. bn.-gry., micro.-xln. to fn. xln., massive with macaroni Amphipora & massive stroms. to cobble size.

2886.8'-2889.0'
ls., med. lt. grey, cryptocrystalline, vitreous, with fine lamination and birdseye vesicles filled by calcite. Near base is 3" band more argillaceous with small hollow-stemmed Amphipora. Small brachs. (L. landesi) in basal 3" (collected at 2889').

2889-2895'
Ls., lt. bn.-grey, mixed fn. xln. & bioclastic, massive, full of small massive stroms. up to cobble size, with zones including spaghetti Amphipora. Rare small brachs. (Ladjia?).

CORE 3. 3140-3155'

3140-3151'
Breccia-conglomerates and dolomite. Latter is massive, lt. grey, cryptoxln. to sparry. Vaguely laminated in places; in others with birdseye vesicles or curdy. Conglomerate of dol. fragments, angular, variously sized; some up to 4" max. diam. show in-situ separation and random orientation. Presumably a regolithic accumulation.

3151'-3155'
Similar dolomite lacking inter-bedded conglomerate, with some massive stroms. in lower part. Calcite vug-filling.

End

SUMMARY

	2880-2895' Core top & bot.
Slave Point	2883-2895'
Ladjia landesi	2895-3140'
gap	3140-3151'
Watt Mt. cgl. & regolith	3151-3155' plus
Presqu'ile (dol.)	

BRIGGS FOETUS LAKE NO. 1 - MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 60° 55' 13"N; 118° 31' 49"W

CORE 1. 2252-2278' (6 boxes incl. box 1 which is missing)

2257-61'.
Ls., nodular-mottled; nodules pale tan, cptxln. mxd. subpelletoid; matrix fine xln., bn.-blk., bit. Full of macaroni to spaghetti Amphipora, some loose-textured and hollow-stemmed; few branching tabulates; in lower part few pebble-size massive stroms.

2261-62'
Ls., pale tan, pelletoid in micritic matrix, like nodules above. Fairly common disseminated small Amphipora. Rare small brach. sections.

2262-2270.5'
Alternation of lithologies like the two units above with numerous zones of spaghetti stone. Probable Ladiia at 2265'*(collected). Bands of Amphipora included loose-textured, hollow-stemmed type. A few massive stroms. up to cobble size. L. landesi, micro-ostracods.

2270.5-2272.2'
Ls. massive, pale tan, cptxln; with birdseye voids filled with sparry calcite. Few small brachs. (Ladiia)*, collected at 2271'. Horn coral collected at 2272'

2272.2-2278'
Complex of lithologies as in interval 2262'-2270.5' above. 2276-77' is spaghetti-stone with loose textured, hollow-stemmed Amphipora; also at 2278-78.5'

CORE 2. 2278-2317'

2278-2279'
Similar to bottom of preceding core.

2279-81'
Ls., pale grey, sub-lithographic, upper part laminated, with zones of small birdseye vesicules; grading downward to massive with Amphipora common. A low-spired gastropod at 2280.5'*, collected.

2281-2286'
Similar ls., but with concentrations of irreg. argill. seams giving a sub-nodular structure. Pelletoid fraction present. Amphipora disseminated; also few small brachs. (Ladiia)*, coll. at 2282.5'). Massive stroms. at 2283-2284.5', including one 8" high.

2286-2296.2'
Ls., lt. bn.-gry., cptxln., with small bioclastic fraction. Dense to scattered Amphipora in much of core. 88-89' has birdseye vesicularity. Small massive stroms are scattered, and large mass occurs at 95'. Sharp basal contact.

2296.2-2298'
Ls., pale grey, laminated fine xln., somewhat curdy, and minutely vesicular with sparry fill.

2298-2298.7'
Ls., pale grey, fine xln., msv., with bioclastic fraction & vermicelli Amphipora.

2298.7-2299'
Ls., dk. bn.-gry., with arg. laminae; a spaghetti-stone of the hollow-stemmed Amphipora.

2299-2299.7'
Ls., lt. grey, lam. like interval 2296-98'.

2299.7-2303'
Ls., pale grey, sublithographic, massive, with scattered Stachyoides and spaghetti Amphipora.

2303-2303.5'
Ls. darker with arg. seams and abundant spaghetti Amphipora.

2303.5-2304.5'
Ls., sublithographic, pale grey; birdseye vesicularity in upper part; increase in hollow-stemmed Amphipora downward.

2304.5-04.8'
Darker ls., a spaghetti-stone of same Amphipora.

2304.8-2305'
Similar with small msv. stroms.

2305-2307.5'
Ls. dove grey, lithogr., vaguely lam., with birdseye vesicularity & few small Amphipora.

2307.5-2307.9'
Darker ls., with arg. seams; a spaghetti stone.

2307.9-2311'
Ls., pale bn.-gry., sublithogr., msv. with spaghetti stroms. throughout and also cobble size msv. stroms. and macaroni Amphipora in upper 8". Small brach. at 2310', collected.

2311-2312.2'
Ls., darker & more arg.; spaghetti-stone with large msv. stroms. in base.

2312.2-2317'
Ls., pale grey, lithogr., laminated, few arg. seams; very sparse Amphipora and brachs.

CORE 3. 2317-2356'

2317-18.2'
Similar to bottom of core No. 2. Brachs. as above, collected at 2318'. L. landesi, L.? vernilis.

2318.2-19.2'
Ls., lithographic with small bioclastic fraction; med. dark grey-bn., clouded by zones of argill. seams. Bands of spaghetti stroms.

2319.2-2320.9'
Ls., dk. med. grey-bn., strongly pelletoidal, with sparse spaghetti stroms.; marble-size massive stroms. & brachs. L. landesi collected 2320'.

2320.9-2328'
Ls., pale grey, mxd. aphanitic & microxln., sparry; scattered spaghetti Amphipora, rare cobble to pebble-sized massive stroms. & small brachs. Much of rock has birdseye vesicles with sparry fill. Laminia landesi collected 2324'.

2328-30'
Ls., mxd. aphanitic & fine xln., ddd., med. brown, full of thee hollow-stemmed spaghetti Amphipora. Has zones of wavy argillaceous seams.

2330-2338.3'
Ls., interbedded rock like interval above and like that of preceding interval (2320.9-2328). Bands of spaghetti- & macaroni-stone. Very few brachs., small, collected 2331'. 2335-37' is pale grey & lithographic with macaroni Amphipora.

2338.3-2356'
Ls., very pale grey, lithographic; some portions laminated (esp. top 2'), others massive with or without sparse Amphipora; others esp. basal 8' has birdseye vesicles with sparry fill. Small massive stroms. at rare intervals. A few areas show pale mottling.

CORE 4 2356-2395'

2356-60.5'
Ls., lt. grey, mxd. microxln. & coptxln., massive with numerous

cabbage stroms. and Thamnopora (½ inch av. diam). with Amphipora in upper part. Rock Type 1.

2360.5-2362.0'
Ls., lt gry., aphanitic to lithographic., some zones laminated, others massive and full of birdseye vesicles with sparry fill. Rock typeII. NOTE: Remainder of core is an alternation of the above two rock types & will be so designated.

2362-2371.5'
Rock Type 1, but cgtxln. to fn. xln. Full of massive cabbage stroms. and Thamnopora (Coll. 2364') and a few small brach. fragments.

2371.5-2374.5'
Rock Type 2, here largely msv. with birdseyes & scattered Amphipora.

2374.5-76.5'
Rock type I with msv. to fimbriate stroms.

2376.5-2385.5'
Rock type II, laminated to massive with birdeyes. Few zones with scattered Amphipora. A few small msv. stroms. in base.

2385.5-2387.0'
Ls., med. bn.-gry, mxd. aphanitic & microxln. (sparry) with sub-nodular structure due to irregular arg. seams. Mainly solidly packed with cabbage stroms.

2387.0-2395'
Rock type II. Laminated & massive-birdseye zones. Very rare small brachs.

CORE 5 2395-2433'

2395 to 2397.2'
Rock Type II. With a few v. small massive stroms. & rare smooth brachs. * brach (collected 2396').

2397.2-2398.4'
Rock type I, with a few Amphipora. L. landesi.

2398.4-2402'
Rock type II. Lower part with variously oriented argillaceous films with scattered spaghetti Amphipora.

2402'-2403'
Rock type I. Darker than preceding. Nodulation due to abundant irregular arg. seams.

2403-2415'
Rock type II, Stachyoides in U. part. Macaroni stroms. from 2404' to 2405⅓' (concentrated here). At 2405⅓ to 2407⅓' concentration of dark arg. seams creates nod. structure. Scattered Amphipora; small bioclastic fraction. Brachs. just below 2407⅓' (brachs. collected 2407⅓). From 2409-2410' rock is full of birds-eye vesicles with sparry filling. From 2910⅓' to 2912⅓' massive with a few small scale stylolites 2912⅓' to 2915' has scattered spaghetti Amphipora & a few Stachyoides. Ladjia? vernilis.

2415-2421'
Rock type I with massive stroms., Stachyoides & sparse Amphipora. Closely packed calc. algae in upper 1'. Some portions nodular due to irreg. arg. seams.

2421'-2433'(bottom)
Rock type II. Band of Leperditia (at 2425' coll.) Leperditia (at 2432½' coll.)

CORE 6 2433-2470'

2433-2437½'
Rock type II. Massive with nod. structure resulting in wavy arg. seams. A few small Amphipora in basal 6".

2437½-2443'
Rock type I. Darker ls. full of stroms. including large massive forms, abundant Stachyoides & small Amphipora. Large gastropods at (2439' coll & 2443' coll.).

2443-2461'
Rock type II. Mainly massive with birds-eye vesicles with sparry fill plus somelarger vugs lined with white calcite. Some seams of green clay at 2457'. Leperditia disseminate throughout (coll. at 2455').

2461-2471'
Ls. lt. grey, lithographic with minor bioclastic fraction. With thin arg. seams producing lamination or nod. structure. Minute birds-eye vesicles with sparry fill common. Sparsely disseminated Amphipora, few small massive stroms. Leperditia diss. throughout. Thick, irreg. seams of green clay shale common from 2462' to 2462½'. A few small massive stroms. Smooth brachs. rare (coll. 2462½'). Leperditia (2464' coll.). Thamnopora? abundant in basal 6", coll. 2470½'.

2471-2472'
Ls. med.-gry. aphanitic with bioclastic fractions & including pellets & small dark ls. clasts. Leperditia present. Seams of greenish clay shale. Thamnopora as above. Aberration of 2' due to boxing measurements.

CORE 7 2470-2509'

2470-2472'
Ls. congl. Clasts & granules fairly well rounded, dk. gry. to med. grey, crypt. limestone in matrix of pale grey lithographic ls. or of grey green clay shale. Some frags. are cobble sized.

CORE 7 2470-2509'

Correction: correct 2474' to 2472'. Taking this as beginning box no. 50 = 2nd box of Core No. 7 marked 2471' in red.

2472-2474'
Ls. regolith of irregular masses of pale grey, cptxln. ls. in matrix of grey-gn. clay full of small clasts of similar ls. and of black ls. Appearance of "mantle rock".

2474-2476'
Ls., cptxln to microxln., lt grey, msv., with crevices filled by lt. grey clay with ls. clasts (evidently an infiltration on a paleo-erosional surface). Ls. has Thamnopora (3/8" diam.) (coll. at 2474') near top. Basal 4" fairly highly fossiliferous in rock and matrix, with Thamnopora, small horn coral (coll.) and a rather coarse-ribbed Atrypa (coll.)

2476-2498.5'
Ls., microxln. med. grey in upper 3', grading to medium red-brown and dark bn.-grey mottled, the red-brown portion being more highly argillaceous. Rather highly fossiliferous: crinoid ossicles disseminated, prob. small Stringocephalus at 2477' (coll.)

2478'
(coll.) large horn coral & brachs., incl. Stringocephalus (small).

2483.5'
(red) punctate brachs. fragments are prob. Stringocephalus.

2484-2484.5'
Abundant Thamnopora (coll.)

2485'
Abundant small-diam. Cladopora & coarse-ribbed Atrypa.

2486-2487'
The large Pine Point Atrypa (coll.) plus a large Schizophoria (coll.) Cladopora (coll.) continues abundant with first appearance of Amphipora.

2487-2489'
Cladopora continues.

page 7.

2488'
A ramose, cyclostomatous bryozoan very well preserved (coll.)

2491'
Alveolites?

2496'
Small smooth brach. (Emanuella?) (coll.); rock in this vicinity very arg., Hare Indian type lithology. This rock is brown black, red-bn. weathering, bituminous. This rock from 2495-2498.5'.

2498.5'-2500'
Dark limestone as described higher in core; rock is fine xln. to msv. with large scattered clasts of light bn., fine xln. ls. & of highly biocl. ls.

This seems to be end of Core No. 7, followed by a 9-foot gap to Core No. 8.

CORE 8 2509-2543'
Note: on basis of markings on core this series (box no. 61) starts at 2519' corresponding to 2509' as marked in red on box. We will follow the latter numbers .

2509-2521.5'
Pine Point to Hare Indian type dark arg. ls., like that in Core No. 7.
Top 3' is in Hare Indian lithology with abundant brachs. including Emanuella, Chonetes, Leiorhynchus, small Gypidula?_____ etc. (large coll. 2509-11'). Also a few slender Cladopora. At just below 2511' are several inches of clean bioclastic ls. with Rhysso-chonetes aurora, Emanella, etc. First massive stroms appear.

From 2512.4 to 2514' return to Hare Indian lithology; increase in abundance of a small type of crinoid ossicle, abundant brachs. including Emanuella, Schizophoria, "Chonetes" aurora, Warrenella? Cladopora, and excellent ostracods. 2518.5' Atrypa, large (coll.)

2521.5-2532' (figure on box)
Ls. med. grey, mixed texture with high to very high bioclastic content and low argillaceous content. Top few feet are nodular masses of ls. in arg. dark ls. like rock above. Below this rock becomes more massive. A 2" intraformational cgl. with large rounded pebbles in a crse biocl. matrix at 2527.7. Fossils include various types of Thamnopora & Cladopora, large horn corals, Emanuella, Warrenella (?) Devonoproductus; Hadrorhynchia, (coll. 2522-23', 2524, 2525-26 & 2529-30). At around 2528 rock is full of large light brown clastics of earthy pelletoid ls. Similar clasts but smaller and lt. grey around 2527'.

2528.5-2530.5' rocks again more argillaceous, and has flattened Warrenella, Leiorhynchus on partings, also Chonetes aurora, (coll. 2531') (coll. 2529-30'). Rhyssochonetes.

2532-37' Ls., lt. grey, bioclastic, mixed medium to very coarse, massive, full of sections of Stringocephalus (coll. 33-35'). Rock also includes large clasts of pale bn. fn. xln. & bioclastic ls.

(NOTE) Top of Presqu'ile at 2532' according to red figures; above bottom of core. Red figures give bottom of Core at about 38.5' instead of 43' Latter should put Presquile top at 36.5'.

CORE 9 2548-2566'

2548-2550.3'
Ls., dark grey, med. to crse. xln. with high bioclastic content & an abundance of small brachiopods. Upper 15" is full of microscopic hollow rods. Clasts of dull, fine, brownish ls. appear about 15" below top and become larger and more common downward. Some interbedded arg. ls. in lower part. Lower 6" is a microcoquina of minute brachs. (Emanuella?) (coll. 2550').

2550.3-2550.8'
Ls. conglomerate, with semi-residual masses of lt. grey-brown, sparry, fine xln. in matrix of darker, more arg. & bioclastic ls. Rock appears to be more or less in place and cgl. may mark facies change to reef-bank carbonate above. Fossils, in matrix, include Cladopora, a horn coral*, large massive stroms., and brachiopods* (Leiorhynchus & Emanuella?) (coll. 2550.3'). Crinoid ossicles scattered. Bottom of bed highly unconformable with a 2" vertical contact with underlying.

2550.8-2552.5'
Ls., lt. bn.-grey, cptxln., homogeneous, non-lam. Grades to underlying by interbanding.

2552.5-2566'
Typical Pine Point Hare Indian lithology. Interbanding of ls. dk. grey, cptxln., arg., and shale, very dark grey, calcareous. Some ls. accumulations are highly nodular. Bioclastic content lacking to negligible. A few scattered small brachs. (Leiorhynchus, Emanuella? Chonetes?) (coll. 2558.5)

CORE 10 2566'-2605'
Similar to lower part of preceding core, and typical Hare Indian lithology. A 1" coquina band of brachiopods at 2571' (coll.) includes Leiorhynchus castanea. Marked increase in bioclastic fraction from 2573.5'-2580.5'. Fossils mainly L. castanea* & a Limula* (coll. 2578.5) become more numerous. Coquinoid L. castanea bands at 2592', 2595' (coll.), 2602' (coll.) and in basal foot of core 10 (2605' coll.).

CORE 11 2605-2644'

2605-2612'

Typical dark ls. & very dark calc. shale, typical Hare Indian lithology as in Core No. 10. Shale greatly predominant except near base. Top 2" a L. castanea coquina continuous with that at base of Core 10. L. castanea* coquina common in upper 3 feet but flattened; associated with Lingula* & large Orbiculoidea* (coll. 2606'). More disseminated and fragmentary in rest of section; also a productid*, etc. (coll. 2611-2612').

2612'-2618.5'
Ls., nodular-mottled, cptxln. with bioclastic fraction; nodular masses med. grey, compact. Massive stroms. at top. Bands of wavy films. Crinoid ossicles sparsely disseminated. Calcareous algal masses. Small to micro-gastropods. Brachiopod (Schizophoria?) near base (2618' coll.).

2618.5'-2628.5'
Ls., med grey, xln. & bioclastic, full of minute white crinoid ossicles. Fairly massive. Atrypa arctica at 2623' (red figures) or 2622' (black figures). (coll). Also at 2625.5' & 2626' (coll.) & 2628' (coll.).

2628.5-2636.5 (end of core)
Ls., fine xln., lt. to dk. bn.-grey, nodular mottled, massive, fairly high bioclastic fraction. Tabular Alveolites at 2630.5'. Minute crinoid ossicles sparsely scattered throughout. Few small brachs. Excellent A. arctica at 2628')

END

SUMMARY

BRIGGS FOETUS LAKE # 1

Slave Point	2252-2470' Sched. top 2252'
Ladjia landesi	2265-2324'
Ladjia? vermilis 2318	2318-2407.5'
Lepocaltia down to	2469'
Watt Mtn. cgl. and regolith	2470-2474'
Pine Point Tongue	2474-2532'
Rhyssochonetes	2509-2531'
Presqu'ile (Sulphur Pt.)	2532-2552'
Stringocephalus	2532-2537'
Hare Indian (N. Pine Pt.)	2552-2612'
Leiorhynchus castanea	2558-2608'
Lower Keg River (Hume)	2612 plus
Atrypa arctica	2623-2628'

MACROFAUNA NOTES

BRIGGS RABBIT LAKE NO. 2

LOCATION: 60° 55' N; 118° 50'W

CORE 1 2495-2534'

2495-2505.5'
Ls., med.-dk. to med. bn.-gry.; microxln. to aphanitic, fairly msv. except for zones of closely spaced dark arg. films. Scattered small Amphipora throughout, small msv. stroms. increase to abundant downward. More thick-shelled brachs. with calcite replacement prob. not Stringocephalus. Few minute gastropods. At 2500' coll. micro-striate Emanuellids & Leperditia. Ladjia n. sp. Slave Point; L. landesi

2505.5-2506'
Ls., bn. xln., dark resinous 5" single layer full of pebble-sized stroms., vermicelli to spaghetti stroms., and rare small diam. Thamnopora coll. at 2506'. Sharp upper & lower contacts.

2506-2513'
Ls., banded tan & dk. med. bn., aphanitic with sparry inclusions & films. Sebka-like lamination. Top foot full of spaghetti Amphipora & with dark arg. films. 2'-2.5' below top is dark band full of tan ls. nodules or in-situ clasts; the dark matrix is full of spaghetti Amphipora. Below this Amphipora becomes sparse but increases in abundance downward.

2513-2514.3'
Ls., tan aphanitic as large nodules or residual clasts in bn.-black matrix full of spaghetti Amphipora and large worn masses (cobbles) of massive stroms.

2514.3-2516.3'
Ls., pale grey, lithogr., banded & laminated by black sparry streaks, some of which form drusy openings.

2516.3-2517'
Similar pale grey lithogr. ls. with calcitic stringers and fairly common spaghetti Amphipora.

2517.0-2517.5'
Dark aphanitic ls., spaghetti-stone.

2517.5-2519.7
Ls., lt. to pale grey, lithographic, upper 6" laminated, rest massive but with calcitic streaks variously-oriented, birdseye.

2519.7-2534'
Alternation of banded, laminated lithogr. ls. like that higher in core, and of spaghetti-stone, mainly dark but pale grey in some instances. At 2525.5 is top of a 6" band of cobble-sized

msv. stroms. in a spaghetti-stone matrix.

CORE 2 2534-2555'. Rec. 21'. Succession of lithologies similar to that in lower part of Core No. 1. Emanuellid brachs. 2543-2514', collected. L. landesi, micro-ostracods.

CORE 3 2555'-2577' Rec. 21'

2555'-2562'
Similar alternation of dark spaghetti-stone and pale grey lithographic laminated ls., the latter predominant.

2562-2569'
Almost entirely med. bn.-grey massive mixed xln. ls. full of mararoni Amphipora. Rare pebble-sized massive stroms.

2569-2571'
Ls., pale grey, lithogr., laminated.

2571-2573'
Ls. dark, micro-crystalline, massive, full of large massive stroms.

2573-2575'
Lithographic pale grey ls. as higher in core.

2575-2577'
Ls., med. bn. grey, aphanitic, upper 1/3 full of Thamnopora, coll., (diam. ¼ inch), remainder with moderately abundant spaghetti Amphipora.

CORE 4 2577-2608' Rec. 31'

2577-2580'
Similar to preceding but mainly zones of vermicelli-to spaghetti-stone.

2580-2581.5'
Ls., pale tan, lithographic, msv., with small vertical spar-filled fissures. A few Amphipora.

2581.5-2583'
Dk. ls., with large msv. stroms. in spaghetti-stone matrix.

2583-2584'
Ls., lt. bn. grey., cptxln., msv., with sparse Amphipora and a few brachs collected near base (Ladjia, n. sp. "Slave Point"), coll. 2584'.

2584-2585.5'
Similar ls. with irregular stroms. with core of Stachyoides

2585.5-2587.3'
Ls., dk. microxln., msv., full of cobble-size massive stroms., Stachyoides, large diam. Amphipora, small Thamnopora (¼' average diam). and a few poor horn corals.

2587.3'-2590.5'
Ls., aphanitic, banded lt. & dark, much of it a spaghetti stone of packed Amphipora; minor portions without fossils & finely laminated. Near base some lam. ls pieces are isoriented. A cobble-sized msv. strom. in base.

2590.5-2592.7'
Ls., tan, lithographic, msv. with sparse Amphipora.

2592.7-2596.5'
Core shattered; alternation of light & to dark spaghetti stone and med. lt. grey lithographic ls., some with emanuellids , coll. at 2595'.

2596.5-2600.5'
Ls., med. dk. bn. grey, pelletoid with some small lt. ls. clasts.

2600.5-2602.5'
Ls., aphanitic, med. grey, full of bands of spaghetti-stone. Rock finely laminated where non-fossiliferous.

2602.5-2608'
Pelletoid ls. like that higher in core with some bands of spaghetti stone.

CORE 5 2608-2648' Rec., 40'

2608-2610'
Similar to preceding.

2610-2614.8'
Ls., aphanitic, lt. med. to dk. grey, with spaghetti Amphipora disseminated at intervals. A few massive stroms. and some nodular zones.

2614.8-2617.3'
Ls., dove colored, lithogr.; upper part laminated; lower part with abundant spaghetti Amphipora.

2617.3-2619.5'
Similar Amphipora ls. but darker.

2619.5-2624.0'
Dark aphanitic ls. full of massive stroms. up to cabbage size.

page 4.

2624.0-2626.0'
Ls., aphanitic, tan, msv., with scattered Amphipora. A cabbage strom. in the base.

2626.0-2629.0'
Ls., med. bn., grey, aphanitic matrix with some pelletoid fraction. Amphipora. Some nodular zones and zones of dark arg. films. Becomes darker & more arg. downward.

2629.0-2632.5'
Ls., pale grey, lithographic, top and base massive, but much of interval finely laminated by dark arg. films.

2632.5-2634.0'
Ls., nodular; lt. med. aphanitic ls. nodules separated by grey-black arg. ls. with Amphipora.

2634-2642.5'
Nodular and pelletoid limestones like those described above. Nodular ls., below 2635-37' has massive stroms. & Stachyoides.

2642.5-2644.5'
Ls., pale grey, lithogr., laminated by lighter & darker laminae.

2644.5-2645.5'
Ls., pale grey, aphanitic, massive & curdy. Full of variously oriented shell fragments and abundant small ostracods.

2645.5-2647.0
Ls., nodular, with curdy nodules of med. grey dense ls. in dark argillaceous matrix. Ostracods extremely abundant in top 6". Spl. 2646'.

2647-2648.5'
Conglomerate, regolithic; subangular fragments to black aphanitic ls. with white crinoid ossicles; fragments variously oriented in matrix of lt. grey marly ls. with some soapy ashy grey-gn. clay. Basal few inches an in-situ erosion-breccia. Base of Watt Mt. Complex.

CORE 6 2648-2672' Rec. 24'

2648-2652'
Ls. microxln. to cptxln., med. grey, nodular, with partings coated with putty-colored clay. Small white crinoid ossicles abundant. Sections of a few small thick-shelled brachs., coll. 2649'

2652-2656.5
Ls., lt.-med. bn.-gry., aphanitic to cptxln., with indistinct arg. laminae. Brachiopods common including Chonetes aurora, Leiorhynchus Airyne, Productella; large collection at 2656'.

2656.5-2658.5'
Marlstone, dull greenish grey, with calc. bands of encrinal ls. or of brach. fragment coquina. Uppermost few inches include hard black shale.

2658.5-2662.5'
Ls., pale grey mottled, sparry textured, varied grains size micro to med. xln., much of rock a coquina of broken Stringocephalus shells, in bands oriented up to 15° from horizontal. (Good specimens seem to have been previously collected). Basal contact sharp and steeply dipping. Some large pockets & streaks of dull grey soft clay.

2662.5-2672'
Ls., matrix lt. grey, mixed xln., sparry, with many sub=conglomerate inclusions of somewhat darker ls. up to small cobble size as well as massive stroms. (in lower part), Amphipora (scattered) and brach sections. Reefoid structure. Small vuggy openings in upper part evidently held live oil stain. Much core removal. A high energy deposit.

CORE 7 2672-2694' Rec. 22'

2672'-2674' Similar to bottom of Core 6, but fragments smaller.

2674-2686'
Ls., pale gry, lithogr., curdy, msv., with vesicular openings filled by cream-colored microxln. ls. in upper part and open in low part. No stain. Interbedded with clastic reef-rock as at 2662-2674'. Contacts inclined up to 20°

2686-2694' Missing.

CORE 8 2694-2707' Rec. 13'

2694-2700'
Ls. pale creamy grey, fn. xln. with some darker mottling & substantial bioclastic fraction. Upper part of core much broken. Msv.

2700-2705'
Ls., bn.-blk to med. grey, cptxln., with few thick dark marlstone bands. Leiorhynchid & other brachs; 2703', abundant but fragmentary; spl. 2704'.

2705-2707'
Similar dark ls. but full of corals & stroms.; corals; abundant large diam. Cladopora, plus common, large, Hume-type horn

corals; spl. 2707'. Stroms. of small msv. and tabular types, plus Stachyoides (?) near base.

CORE 9 2708-2746' Rec. 38'

2708-2717'
Same with similar fossils. Small horn corals coll.; spl. 2717'.

SUMMARY

BRIGGS RABBIT LAKE NO. 2

Slave Point	2495-2647' Sched. top 2492'
Ladjia n. sp. "Slave Point"	2500-2584'
Ladjia landesi	2500-2543'
Leperditia	2500'
Watt Mtn. regolith	2547-2548.5'
Pine Point Tongue	2548.5-2658.5'
Rhyssochonetes	2652-2656'
Presqu'ile (Sulphur Pt.)	2658.5-2700'
Stringocephalus	2658.5-2662'
Hare Indian (M. Pine Pt.)	2700-2705'
Lower Keg R. (Hume)	2709 plus

MACROFAUNA NOTES

BRIGGS RABBIT LAKE NO. 1

LOCATION: 60° 56'N; 118° 45.5'W

CORE 1 2382-2462' Rec. 80'
This core is a single unit of alternating zones of thick-bedded to massive stromatoporoidal ls. and laminated unfossiliferous to poorly fossiliferous ls.
The environment seems to be an interfingering of back reef and lagoonal restricted marine environments.
Matrix in both cases pale grey cptxln. ls. Stromatoporoidal content is chiefly spaghetti Amphipora from sparse to spaghetti-stone concentrations. In addition are zones including msv. stroms. up to cobble-size and local occurrence of Stachyoides.
In places rock is mottled by lighter nodular areas otherwise identical with rest of lithofabric, but lacking interstitial dark material.
Non-stromatoporoidal rock is basically pale brown-grey and cptxln. but may be finely interlensed by darker and coarser ls. Some portions have a birdseye vesicularity.
Fossils: in addition to the stroms. only a single Thamnopora colony was seen, at 2461' (not collected).

CORE 2 2467-2507' Rec. 40'

2467-2473.5'
Amphipora ls. like that above. Thamnopora up to 3/8 inch diameter about in darker zone near middle).

2473.5-2496.0'
Stromatoporoidal ls. in various concentrations of abundance and variety among Amphipora, Stachyoides, cobble-sized massive stroms. and Thamnopora; collected at 2482' and 2495'. Few emanuellids at 2495'. Ladjia landesi Crickmay.

2496-2505'
Ls., med.-dk. bn.-gry, interbedded pelletoid and stromatoporoidal. Pelletoid ls. from fn. to med. with included small ls. clastics; much of rock had open micro-vesicular structure since filled by calcite. Few ostracod sections (2497-8'). Stromatoporoidal zones with small msv. growths, spaghetti Amphipora, Stachyoides and Thamnopora (same species as above). Brachs. (Leiorhynchus & Strophodonta?) at 2502', collected. Rock cptxln. Ladjia landesi Crickmay.

2505-2507'
Ls., pale grey, aphanitic, with filled micro-vesicularity; stromatoporoidal; some pelletoid bands. Mainly spaghetti Amphipora, plus Thamnopora & small irregular msv. types.

CORE 3 2511-2563' Rec. 52'

2511-2520'
Ls. similar to above, aphanitic, dove to lt. grey with scattered

very small Amphipora. Msv. stroms. mainly concentrated in bands darker in color. Some zones of calcispheres. Emanuellid brachs. fairly common throughout; collected at 2512'. Some portions vaguely laminated, some massive. Core much broken. Leperditia, small ostracods & brachs. (cf. Ladjia landesi) near base; collected at 2519'.

2520-2530'
Ls., med. to dk. bn. gry. aphanitic & biocl. fraction. Zones of wavy, irregular arg. partings produce a nodular structure and knobby bedding planes. Ostracods (micro) fairly common; collected at 2523', 2529'. Zones of spaghetti stroms. and of Thamnopora; few massive stroms. Brach. sections sparse.

2530-2533'
Ls., lt. grey, cptxln., finely laminated except upper part which has a pseudo-boudinage structure.

2533-2542'

Ls., nodular on a small scale due to irregular, wavy arg. concentrations. Nodules pale grey aphanitic, matrix dark. Abundant ostracods and calcispheres near top. Coquina of emanuellids in lower 6 '; plus some larger thick-shelled pelecypods
near base; collected at 2538-2539.5'; 2541.5'. Few thin zones of vermicelli Amphipora in upper part. L. landesi Crickmay.

2542-2546'
Ls., dk. bn.-grey, mxd. fn to crse. bioclastic, obscurely laminated. Evidently a lime sand. Scattered throughout is a minute Amphipora with a very large central canal; also few calcispheres. Same larger thick-shelled pelecy.; collected 2543-2544; as above plus a few emanuellids. L. landesi Crickmay.
Forms a sharp contact with the Watt Mt. crinoidal ls.; contact inclined at 25°; rock above horizontally lineated; rock below inclined.

2546-2555'
Regolith; of large irregular masses of encrinite limestone, groundmass light grey microcrystalline, studded with small smooth whitish crinoid ossicles; brachiopod debris and calcispheres a minor constituent. Matrix is a dull grey to greenish grey, water-soluble more or less waxy clay. Evidently a subaerial residual-weathering product. Surfaces of some encrinite blocks studded with clusters of pyrite (marcasite) crystals.

2555-2563'
Clay shale, dull grey, laminated, full of disseminated pyrite and bioclastic detritus, with fewer and smaller pieces of crinoidal ls. (as above) decreasing in abundance downward.

CORE 4 2568-2592'

Note: There is a discrepancy in the marking of the core in so far as Cores 4 and 5 are concerned. On Core 4 box 1 is painted:"6 boxes Core 4 lost". Actually only Box 1 of Core 4 is present; the next box having been altered to read box 1 of 7, Core 5, 2606-2646'; the third box has been similarly altered to read box 2 of 7.
The fact is all three boxes are a continuous core. The question is, is all of Core 4 missing, i. e. the interval 2568-92' or do all three boxes belong to core 4. We are assuming that all belong to Core 5, with top at 2606.

CORE 5?

2606-2610.5'
Ls., microxln., dk. bn.-grey, with high bioclastic fraction, including abundant small crinoid ossicles. Some thin interbeds of black calc. shale. Fossils common including Thamnopora* (about 3/8" diam.), Cladopora* (about 3/4" diam.), horn corals*, Emanuella cf. sublineata*, Atrypa giant species cf. perfimbriata*, and fragments of a small Warrenella. (*Collected at 2606-2608.5').

2610.5-2614.5'
Similar to preceding, but a coquina of small Warrenella* and crinoid ossicles. Atrypa perfimbriata also present; Emanuella sublineata* Eostrophalosia?* etc.; collected at 2611.5'-2613.5'

2614.5-2616'
Shaly marlstone, cptxln., subfissile, indistinctly laminated. Sharp, clean contact with underlying.

2616-2619'
Ls., dove, cptxln, very compact & msv. Lower 18" with corals and bioclastic fraction. Dialythophyllum* and Alveolites* Probably top of Hume/Nahanni; collected 2615'. Also a few Emanuella collected at 2616'. About 4" of black bn., bit.-smelling subfissile shale with brach. fragments., possibly Leiorhynchus

End of Study .....

*indicates Collected.

SUMMARY

BRIGGS RABBIT LAKE NO. 1

Slave Point	2382-2546'	Sched. top 2380'
Ladjia landesi	2495-2544'	
Leperditia	2512-2519'	
Watt Mtn. regolith	2546-2555'	
Clay shale (Pine Pt. Tongue?)	2555-2563'	
gap (Core 4??)	2563-2606'	
Hare Indian	2606-2617.5'	
Atrypa perfimbriata	2606-2612'	
Hume top	2617.5'	

MACROFAUNA NOTES

IMPERIAL TRIAD WILLOW LAKE B-28

LOCATION: 62° 17'N; 119° 04'W

CORE 1 1881-1900' Rec. 16'
Shale med. to dk. grey., fissile, pyritic, non-calcareous, becoming darker downward. No fossils noted. Canol Shale.

CORE 2 2003-2042' Rec. 39'
As Core No. 1, but uniformly grey-black. Canol Shale.
From 2003' to 2038.5' microfauna reported by Braun (in G. S. C. Paper 70-15) as pyritized sponge spicules and conodont fragments.
A Canol-equivalent age was assigned.

CORE 3 2080-2099' Rec. 19'
Ls., med. bn. gry., micritic groundmass with bioclastic fraction; irregular stylolitic films give a nodular structure. White crinoid ossicles more or less common, also ostracods., etc.
Sponges, white, calcareous at 2083' and 2084'; collected. Atrypa cf. arctica at 2086'; collected. Small brachs. collected at 2086' and 2088'.

2096.5-2098'
Ls., pale to med. grey "laminite", lithographic; some bands with filled micro-vesicles.

2098-2099'
Ls., lt. to med. bn., lithogr., msv. Lower Keg to 2096.5. Rest Chinchaga transition.

CORE 4 2226-2239' Rec. 19' ?
Sequence of laminites, massive lithogr. ls., coarsely birdseye-blotched ls., and toward base, light-colored microxln. highly porous stromatolites (sebka-structures?). A few thin bands may be evaporitic breccias.
Lower Keg-Chinchaga transition.

CORE 5 3000-3019'

3000-3008.5'
Ls., irregularly interbanded, dark brown, microxln., v. compact resinous, and medium brown aphanitic, resinous. The resinous lustre suggests ls. may be anhydritic.

3008.5-3016'
Similar dark brown ls. but massive and full of small grey birdseyes of more soluble ls.

3016-3019'
Anhydrite, laminite, med. to light grey.

CORE 6 3219-3223'
All dark, dark red spotted, microxln. igneous rock; most probably a pneumatolized flow rock.

SUMMARY

Canol Shale ("Ft. Simpson")	2003-2042' Core top
	2042-2080'
gap	2080'-core top
Hume top	
Atrypa arctica 2086'	
(see also G. S. C. Paper 70-15, p. 15)	

MACROFAUNA NOTES

IMPERIAL REDKNIFE N-6

LOCATION: 60° 56'N; 119° 16'W

CORE No. 1 2877-2912' Rec. 35'

2877-2888.25'
Ls., med. gry., microxln., msv., stromatoporoidal incl. Stachyoides, Amphipora, and massive types up to small cobble size. Thamnopora with 3/8" max. diam. at 2884' and 2886.5'; coll. Small Atrypa at 2883.5', coll.; and emanuellid at 2888' ,otherwise brachs. are rare. L. landesi.

2888.25'-2895.0'
Ls., pale grey, aphanitic with lamination resulting from horizontal sparry stringers of fn. xln. calcite which also fills the limited development of micro-vesicularity ("birdseyes"). Zones with fairly common spaghetti Amphipora, plus rare pebble-size msv. stroms. Grading and inter-bedded downward with darker & more massive beds, but thin bedding is maintained by irregular zones of argillaceous films.

2895.0-2898.25'
Ls., v. dk. grey, cptxln., massive; dominantly an Amphipora spaghetti-stone, but with zones of large msv., stroms.

2898.25-2904.0'
Ls., lt. grey, aphanitic, varied from "laminite" like that described above, to light and dark laminated ls., to more msv. ls. with birdseye vesicularity largely sparry-filled. Amphipora present in much of rock and locally concentrated as spaghetti-stone. Few large emanuellids collected at 2898.5'. Ladjia landesi.

2904-2907'
Ls., lt. grey, lithographic, with numerous bands of spaghetti-stone & with Amphipora throughout; upper foot has pale ls. clasts. Few ostracods. (small Leperditia?)

2907-2912'
Ls., dark grey, pelletoidal evidently a ls. clast arenite. Vesicular zones have white sparry fill. Vermicelli to macaroni Amphipora at different levels. Small, variously oriented pale ls. clasts common. Large argillaceous laminae concentrated in bands 1.5' to 2.5' above base. Rock otherwise rather massive. Few Thamnopora as above.

CORE 2 2969-3009' Rec. 40'

2969.0-2975.5'
Ls., dk grey, cptxln., massive with local zones of dark argill. bands. Compact. Large massive stroms. & macaroni Amphipora common. Few Thamnopora collected at 2973'. Scattered Ladjia landesi collected at 2969', 2973', 2974'.

2975.5-2977.5'
Ls., med. grey, aphanitic matrix with high content of granule-size pale ls. clasts. A minute Amphipora with large clear central canal scattered throughout. Massive.

2977.5-2979.0'
Ls., grey-black, msv., cptxln., full of spaghetti Amphipora, very small msv. stroms., & Cladopora coated with encrusting strom. collected at 2978.5'.

2979.0-2983.0'
Ls., similar to interval 2975.5-2977.5' above but darker. Some portions laminated by dark arg. films, some with small amgydaloid filled vesicles, but mainly massive. Minute Amphipora is less common. Ladjia landesi scattered or concentrated in bands, collected at 2983'.

2983-2985'
Ls., pale bn.-grey, lithographic micro-curdy texture with clear sparry base. Pale ls. clasts as above. The minute Amphipora common near base. A few small brach. sections.

2985-2987'
Ls., dark bn.-grey, like 2979-2983' but lamination more prevalent. Minute Amphipora concentrated near top.

2987'-2994.5'
Ls., lt. to med. bn-grey, basically lithographic, with varied bioclastic content. Amphipora concentrated in top 2'. Some portions laminated by thin dark films, others massive & clouded. Basal few inches full of lime-sand; microfauna present. Scattered Ladjia landesi, collected at 2994'.

2994.5-2996.5'
Ls. & clay. Ls., light grey, lithographic, mainly as large in-situ nodules in green to grey clay, the lamination of which appears independent of the ls. A few ls. frags are disoriented. Band of coarse macaroni Amphipora about a foot below top. A very large

massive strom. occurs immediately below this. Near base microfauna of trochiliscids and microostracods run in streaks from clay directly into ls. laterally, not collected.

2996.5-3008.7'
Ls., lt bn.-grey, lithographic; in upper part nodular-mottled by irregular gn.-grey arg. films; interbedded with darker dull grey marlstone. Lower down lithogr. ls. is massive, in places with birdseye vesicularity. Ls. has small massive stroms., the minute Amphipora occurring higher. Stachyoides, and Cladopora. Rich microfaunal content, ostracods and trochiliscids(?). Few small brach. sections. (Microfaunal spls. not collected as fossils do not break free of matrix. Forms horizontal knife-edge contact with underlying.

3008.7-3009.0'
Ls., pale buffy grey as in Core No. 3.

CORE 3 3009-3035' Rec. 26' 5.2' per box

3009-3031'
Breccia, regolithic. Masses of pale buffy grey, fine-med. xln. marmoric ls. some several feet across (vertically); separated by slaking green-grey clay which in upper part is full of angular bioclastic material. Clay proportion decreases downward as does its bioclastic content. In places breccia blocks are entirely fossil material (stroms.); in others largely the "country rock". Especially prominent is a strom. with a columnar structure imitating a ceriod coral. In addition are large massive strom. Stachyoides, coarse Amphipora and Cladopora. A few poor gastropods noted. Brachiopods are fairly common incl. Atrypa but no Stringocephalus. Many of the stroms. show penicontemporaneous brecciation; evidently unit is all reef-rock.

3031-3035.0'
Similar stromatoporoidal massive limestone but lacking regolithic brecciation. Among fossils present are Cladopora and the massive-columnar stromatoporoid.

CORE 4 3035-3075' Rec. 40'

3035-3038'
Similar to bottom of core 3, basal foot a strom. breccia with much green grey clay in matrix. Cladopora and the columnar-massive strom. present.

3038-3049'
Ls., lt. grey, fine xln., rather thin-bedded and clouded by irregular microstylolites. Small bioclastic fraction increases downward. Sparse Cladopora and frag. of a large horn coral.

3049-3072'
Similar light fn. xln. ls., but massive and reefoid with large "intra-formational" rounded ls. clasts at numerous levels. Strat. planes range from horizontal up to 15°. Fossils include scattered small and large Thamnopora, Cladopora, fairly common brachs., collected brach. at 3066'; coral at 3069'; possible Geranocephalus at 3070'.

3070.5-3074.5'
Similar ls. but sl. darker with a high, finely calcarenite bioclastic fraction. Macrofossils rare, a Cladopora at base. Microstylolited bedding planes show inclination up to 10o. Basal contact irregular.

3074.5-3075.0'
Conglomerate with subangular (corners rounded) large, interlocked pebbles of med. grey, microxln. ls. in green-grey clay matrix.

CORE 5 3167-3197'

3167-3174.6'
Fine med. bn.-blk. marlstone, thin-bedded with high bituminous-argillaceous content and numerous brachs., (previously collected and published). Hare Indian equivalent with Leiorhynchus castanea

3174.6-3197'
Ls., nodular-mottled, med. to dark brown-grey. Typical Upper Hume/Upper Nahanni lithology with Atrypa arctica, etc. (see G. S. C. Paper 70-15, p. 9). (Fossils previously collected by me as published).

SUMMARY

IMPERIAL REDKNIFE N-6

	2877-3009' Core top
Slave Point	2888-2994'
Ladjia landesi	3009-3031'
Watt Mtn. regolith	3031-3075'
Presqu'ile (Sulphur Pt.)	3070'
Geranocephalus? (conglomerate at base)	3075-3167'
gap	3167-3175'
Hare Indian ("Horn River")	
Leiorhynchus castanea	3175-3197' plus
Lower Keg River (Hume)	
Atrypa arctica found	

(for further information on faunas see G. S. C. Paper 70-15, pp. 9-10).

MACROFAUNA NOTES

IMPERIAL ISLAND RIVER NO. 1

LOCATION: 60° 9.5'N; 121° 08'W

CORES NOS. 1-23 .....not significant

CORE 23 6929-6949'
Note: Core is much broken and disturbed and footages are necessarily approximate.

6929-6931'
Ls., black, aphanitic matrix with sparry & bioclastic inclusions. Scattered Amphipora. Little filled-birdseye vesicularity.

6931-6943.5'
Ls. bn. black to grey black, aphanitic with sparry-filled birdseye vesicularity to micro-vesicularity ; mid-portion has macaroni Amphipora, lower portion has small Amphipora with large central canal, locally concentrated as spaghetti-stone. Small massive stroms. near base.

6943.5'-6945.0'
Ls., white and dark grey mottled, being a frame spaghetti stone with 40% void filled by sparry calcite. Zone with irregular black argillaceous films.

6345- 6349'
Ls. med. to dark bn.-grey, microxln. to cptxln, with abundant macaroni Amphipora. Possible ramose bryozoan common in basal few in ches.; collected 6948.5'. A few small unrecoverable gastropods.

CORE 24 7090-7133'

7090-7099'
Ls., lt. to med. gry-bn., cptxln to microxln., in thick massive bed with roughly stylolited bedding planes. Scattered Amphipora. Few unrecoverable gastropods.

7099-7100.5'
Similar limestone much cut by black wavy arg. seams which produce a pseudo-boudinage (pseudoconglomerate) in the basal 6 inches. Few large Amphipora.

7002.5-7017.0'
Ls., lt bn.-grey, with zones of closely spaced micro-stylolites. Much coarse birdseye vesccularity with sparry fill. Also some linear "sebka-type" vesicularity. No effective porosity. Few

scattered Amphipora. Stachyoides near base.

7017-7025'
Ls., microxln. to cptxln., med.-dark grey, downward to med. grey. Few small msv. algae and Amphipora.

7025-7033'
Similar ls. as nodules in matrix of black bituminous (?) marlstone. Much broken in coring.

CORE 25 7133-7183' Rec. 50'

7133-7137'
Ls., cptxln., lt. grey, fairly msv. with zones of sparry-filled birdseyes. Core much broken.

7137-7141.0'
Ls., very dark, cptxln., with abundant Amphipora, becoming minute in lower part.

7141.0-7157'
Ls., lt. grey, fine xln., with bioclastic content. Amphipora common in local concentrations. Ostracods common near top. A few small massive stroms. Massive calc. algae rather common throughout. Ramose bryozoa (?) present. Some zones without fossils show close micro-styloliting.

7157.0-7158.0'
Similar ls. in nodular pseudo-breccia due to microstyoliting in diverse directions.

7158-7168' (5½' to end of run =64.5' @ box 105)
Limestone similar to that higher in core. Fairly thin bedding resulting from zones on dark arg. films. Full of Amphipora and calc. algae up to cobble diam. Some ramose bryozoa. Ostracods common at some horizons; collected 7160'. Medium sized brachs. with strong median septa. (Stringocephalus??) at 7161.5 and 7164', collected. Medium-sized gastropods in lower part. Abundant scattered very small Amphipora with large axial canal.

7168-7183'
Ls., lt. grey, micro-xln., with scattered Amphipora. Microstyloliting produces thin-bedding. Zones of small birdseye vesicles with sparry fill.

CORE 26 7183-7215' Rec. 32'

7183-7215'
Ls. as in bottom of Core No. 5, becoming browner & dark about 7190'. Microstylolites become more irregular, with large scale styloliting near base. Spaghetti stone at base & up to 6' higher.

CORE 27 7216-7261' Rec. 45'

7216-7250'
Ls. as in Core No. 26. Small massive stroms 7217-21' Algae largely lacking, but a packed mass occurs at 7249' Amphipora lacking to fairly common.

7250-7262'
Ls., lt. dove grey, aphanitic, with irregular styloliting & zone of birdseye vesicles with sparry fill. Scattered Amphipora, most numerous toward top.

CORE 28 7262-7312'

7262-78.5'
Similar ls. full of stroms. much of it forming spaghetti-stone. Small algal masses are included. Packed cobble-sized massive stroms. at 7266'. Stachyoides fairly common. Rock becomes dark grey at 7272' with spaghetti-stone, and a large algal mass present. Nodular at 7274' (base of dark) with dk. bn.-grey ls. in black bit. marlstone matrix. Amphipora in matrix only. From 74.5 to 77' rock is light grey with spar-filled vesicles. Very dark and bit. at base with dark marlstone invading crevices in underlying rock to a depth of 6 inches. Cemented contact.

7278.5-7281.0'
Ls. med. gry., lithographic, some zones finely laminated by dark arg. films.

7281.0-7293.0'
Ls., med. to fairly dark bn. grey, cptxln, stromatoporoidal ls. Zones of diagenetic breccia related to styloliting. Stachyoides abundant; large massive strom. & small diam. Thamnopora at 7291'

7293.0-99.5'
Ls., dk. gry., fn. xln. to microxln., nodular mottled, especially upper part. Stachyoides, algae, and gastropods become more numerous downward. Some msv. stroms. in lower part. Rich in micro-ostracods at 7298.5; collected. Thamnopora coll. at 7299'.

7299.5-7302'
Complex of ls. masses medium grey cptxln. to lithogr., with birds-eye vesicles minute with sparry fill, in unbedded mass of water-slaking dull grey clay. Unit appears to be regolithic. No fossils in the ls. (Corrected top prob. should be 7295'; see Schedule). Top of "Watt Mtn."?

7302-08'
Ls., med grey, cptxln. to aphanitic, msv.; abundant Amphipora,

locally as spaghetti-stone; Stachyoides, prob. Stringocephalids at 7304'; collected and 7307'. Large gastropods at 7306'. Ostracods at 7305.5' probably not well preserved. Few massive stroms.

7308-7314' (into Core 29, 7313-7363')
Ls., fn. xln. dull-sparry, fairly porous, lt. grey with dark "fungoid" mottling, evidently a dead oil stain. Med. xln. toward base. Some large amplitude styloliting. Few crinoid ossicles at base.

CORE 29 7313-7363'

7314-7316'
Ls. lt. grey, med grained, bioclastic, massive. Large massive stroms. & few Stachyoides. Thamnopora near base; coll. 7316'. Abundant small fossils incl.ostracods, minute gastropods, brach. fragments, etc. in matrix.

7316-7325'
Ls., med. grey, cptxln. to aphanitic, with some bio. fraction; vaguely nodular mottled by darker, more arg. areas. Massive stroms, Thamnopora, brach. fragments, ostracods. Amphipora abundant from 7319-21', a vermicelli type.

7325'-7350'
Ls., black, aphanitic, nodular mottled. Nodules with a brownish cast msv. A few unrecoverable brachs. incl. at top, specimens with dimensions suitable for L. castanea. A small lower-spired gastropod fairly common; plus one minute "Murchisonia". Crinoid ossicles rare. A few massive stroms and Stachyoides. A small "amplexoid" coral at several horizons; collected 7349', Cladopora, large massive Alveolites, collected at 7349', and Thamnopora, collected at 7349'. Crickmay (1960) reports Atryna perfimbriata and Stringocephalus cf. sapiens from 7350'

7350-7351.5'
Shale, dark grey, medium-grey weathering, chippy, non-calcareous. Few frags. of smooth and plicate brachs.

7351.5-7356'
Ls., mod.-dk. grey, microxln with biocl. fraction, msv. Thumb-size Thamnopora, and macaroni Amphipora, fairly common. A small gastropod, few small brachs., Stringocephalus sections (very large) at 7353' and 7354; small horn coral collected at 7352.5'.

7356-7357.5'
Single massive strom. 18" high and beautifully preserved.

7357.5-7363'
Ls., med. gry, microxln., msv. Stringocephalus common in top 2'. Massive & tabular stroms., Amphipora, Thamnopora, Cladopora. Bottom foot has very strong development of thick masses of tabular stroms.

CORE 30 7364-7402'

7364-7365'
Same as above.

7365'7374'
Ls., blk., microxln., massive, shot with small blebs of pyrite. Small biocl. content increases downward. Very sparse Stachyoides and Amphipora. In lower part rock approaches a pisolite. Here pyrite concretions are shown to have a calcareous nucleus that is a cysto-cellular organism; collected 7371-72'.

7374-7380'
Ls., grey-black, microxln. with biocl. fraction increasing in abundance downward. A worn fragment of Amphipora, Stachyoides, msv. stroms., Thamnopora, and thick-shelled brachs. These are sub-spherical and up to 1 cm. in diam.

7380-7382'
Similar ls. but fossils reach larger size and are less worn, forming a stromatoporoidal ls. of Amphipora, Stachyoides, and amoeboid massive corals. Small horn coral at 7380', collected.

7332-7383'
Brachs. incl. Stringocephalus, coll.

7383-7401'
Ls., dk, cptxln. to aphanitic, sub-horizontal clouding of grey black and brown black, more argillaceous ls.
Fossils fairly scattered:

Stringocephalus
Thamnopora
brach frags., crinoid ossicles
Emanuella cf. sublineata
Stachyoides
small amplexoid corals
Atrypa
Schizophoria
Syringopora
Large horn coral
tabular stroms.
small horn coral

7384-85,86'
7385,90, 91, 92, 95, 98, 100'

7387.5' collected
90, 91, 92, 100'
93.5-94.5, coll.; 98' coll.
94.5'; coll.
94.5'; coll.
94.5'; coll.
95.5'; coll.
99'
7401'; coll.

CORE 31 7729-7740'

Ls., nodular mottled, nodules dark grey, microxln., matrix black marlstone. Fossils sparse except for numerous small white crinoid ossicles. Few emanuellids; coll. 7732' and 7737' and a small Spinatrypa coll. at 7732'

CORE 32 7848-7865'

7848-7852.5'
Ls., dark grey, similar to preceding. Msv. stroms; brachiopods locally abundant, but all shells replaced by drusy calcite and unidentifiable.

7852.5-7858'
Siltstone dull dark grey, sl. calcareous; at base are pebbles of white med. grey sandstone.

7858-7865'
Sandstone, fine, dirty.

CORE 33 no footage marked
Sandstone.

CORE 34 8228-8233'
igneous basement.

SUMMARY

IMPERIAL ISLAND RIVER # 1

Canol Shale	
Slave Point	down to - 6929'
Watt Mtn. regolith	6929-7299.5'
	7299.5-7302'

Note: Schedule 3, p. 10, places top at 7295' and base at 7300'. This is an electric log pick, and probably refers to same zone).

Presqu'ile (Sulphur Pt.")	
Stringocephalus	7302-7402'
(includes a Hare Indian tongue)	7304-7386'
gap	7365-7380'
Hume (Lower Keg River)	7402-7729'
(includes basal siltstone and sandstone)	7729-7865' core top
	7852.5-7865'

Note: ignore reference to "(Stringocephalus??)" at 7161.5 and 7164'. Being re-examined.

IMP.-SUN NETLA RAVEN F 73

MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 60° 50' N 122° 50' W

CORE 1 1733-1783' Rec. 50'=4.5' per box

Boxes 1-3
Missing

Box 4 of 11
Shale, grey black, non-calc., fairly fissile, and siltstone, dull light grey, non-calc., some mica. Shale and siltstone interbanded and/or intermottled, latter due to scavenging mud-eaters. Medium-to thin-bedded. Beddings planes commonly marked by furrows and trails ("fucoids").

Boxes 5-11
Similar.

CORE 2 6886-6939' Rec. 53'=4.8' per box

Box 1 of 11 -90.8
Ls., dark grey, aphanitic, massive; occasional gash-veins, filled by white sparry calcite. Stachyoides abundant in some zones along with lesser am't. of small msv. stroms. Other zones have little other than sparse calcispheres. A 1" band of dark, sl. calc. shale 5" below top.

Box 2 of 11 -95.6
Top 3'. Similar stromatoporoidal ls.
Rest of box. Similar aphanitic ls. but with a sl. brownish cast. Very massive.

Box 3 of 11 -6900.4
Similar. Few fossils, mainly crinoid joints (very sparse).

Box 4 of 11 -05.2
Similar.

Box 5 of 11 -10.0
Similar, with increase in fossils, principally Amphipora, small gastropod sections, and crinoids. Fossils irregular in abundance, and not readily separating from matrix.

Box 6 of 11 -14.8
Similar ls. Obscurely pelletoid in places, with obscure mottling of a nodular type.

Box 7 of 11 -19.6
Top half. Similar to above.
Bottom half. Similar dark, more or less mottled ls. with large dark chert nodules, with ls. inclusions.

Box 8 of 11 -24.4
Top 1'. Similar cherty ls.
Rest. Similar ls. without chert. One X-section of ambocoelid brach at 6919.5'.

Box 9 of 11 -29.2
Similar to above; no fossils evident above basal few inches which has an abundance of minute Amphipora.

Box 10 of 11 -39.0
Similar ls. with Amphipora, few random sections of medium-sized gastropods and sparse frags. of msv. stroms. including highly mamellose type.

Box 11 of 11 -39.0
Top 1.5'. Similar to above with same stroms.
Next 4". Siltstone like Core No. 1 and probably out of place.
Rest of box. Dark cherty ls. as in Boxes 7-8, but chert dense & very dark.

CORE 3 6939-6989' Rec. 47-50'=5' per box

Box 1 of 10 -44.0
Similar ls. without chert and moderately fossiliferous. Scattered small stroms., mainly Amphipora, and a few gastropods* filled with coarse calcite, and one or two brach sections. Fossils are difficult to isolate because of dense rock and incipient sheer planes. Nodular structure more strongly developed. *6940'

Boxes 2 & 3 -54.0
Top few inches like above, with stroms. Rest of box similar grey black ls., but msv. and homogeneous with some large chert nodules, which are lighter and have ls. inclusions as in cores 7-8. No fossils observed.

Box 4 of 10 -59.0
Similar ls. but without chert below top few inches, and some portions mottled.

Box 5 of 10 -64.0
Similar.

Box 6 of 10 -69.0
Similar. A few chert nodules

Box 7 of 10 -74.0
Same. No chert observed.

Box 8 of 10 -79.0
Ls., dark brown-grey, aphanitic like above with thick bands full of Amphipora between unfossiliferous bands. Appearance of thin beading may be due to sheer strain.

Boxes 9 & 10 -89.0
Similar, with Amphipora; Atrypa? section near base of core does not separate from matrix.

CORE 4 6989-7039' Rec. 2 boxes 10/50'

Box 1 of 2 99.0
Top 2'. Like bottom of preceding core.
Bottom 3'. Aphanitic/lithogr. black msv. ls. with incipient dynamic brecciation and some white calcite veining.

Box 2 of 2 99.0
Top half as above.
Bottom half Amphipora-ls. as in top of Box 1 and also showing incipient shear.

CORE 5 7039-7087' Rec. 45-48=5' per box (approx.)

Box 1 of 10 43.8
Ls., dark brown-grey, aphanitic, with incipient horizontal shear. Zones with minute crinoid ossicles alternate with unfossiliferous zones. Some large calcite veins. A few very small Amphipora in basal inch.

Box 2 of 10 48.6
Similar ls. with abundant Amphipora and minute crinoid ossicles. Part of a massive strom near top.

Box 3 of 10 53.4
Top 6". Similar Amphipora ls. with a few slender Coenites?
Next 2.5'. Ls., brown-black, aphanitic, msv., no fossils.
Next 2' to bottom: Similar ls., a spaghetti-stone of little other than Amphipora from 1/8 to 3/16 inches diameter.

Box 4 of 10 58.2
Similar spaghetti-stone.

Box 5 of 10 63.0
Similar spaghetti-stone, with addition of Stachyoides and a few tabular stroms (horiz. orientation). This spaghetti-stone seems to be a frame-structure in situ.

67.8

Box 6 of 10
Similar ls. but alternation of thick zones of spaghetti-stone and unfoss. dense ls. Contacts strongly stylolited.

72.6

Box 7 of 10
Top 3'. Similar spaghetti-stone; bottom foot includes rounded pebbles up to 3" diam., of ls. like underlying. Basal contact very irregular, showing amplitude of 3" in the core; contact has heavy coating of black shale.
Bottom 2'. Ls., brown-black, aphanitic, msv., with horizontal fracturing. No fossils.

77.9

Box 8 of 10
Top 1'. Similar ls., unfos.
Next 1.5'. Similar ls. with scattered v. small diam. Amphipora (probably a distinct species), rare tabular stroms., and fairly common small crinoid ossicles.
Bot. ½. Black arg. ls., thin-bedded, aphanitic, with brachiopods*, common (Ladogioides? Atrypa, Hadrorhynchia?, etc.); sparse Amphipora (v. slender) and crinoidal debris at base.
*7076.5' *7077-8' *7078-9'

82.2

Box 9 of 10
Top 1'. Similar arg. ls. with brachs*., few Amphipora & crinoidal debris.
Next 1.5'. Ls., less arg., more msv. brown black, mixed aphanitic & bioclastic. Schizophoria?* & other brachs., few small Amphipora, and crinoidal debris. Small rounded pebbles like underlying ls. in basal 1'. Few small msv. stroms.
Bottom ½. Ls., brown black, cptxln., msv., with dark siliceous mottling. *7079-80' *7080-81'

87.0

Box 10 of 10
Same as above to end of core.

CORE 6 7087-7089' 89.0

Ls., black, cptxln., msv., with scattered small msv. stroms., small Amphipora, small-diam. Cladopora.* *7088'

CORE 7 7089-7139' Rec. 48'=4.5' per box.

93.5

Box 1 of 11
Ls., black, microxln. to cptxln., more or less arg. but msv. thick bands full of branching stroms. & corals (Amphipora, Stachyoides, Cladopora) alternating with barren or poorly fossilif. bands. Rugose solitary and other corals collected*. Small crinoid joints scattered throughout. A few small msv. stroms. *7093'

page 5.

Box 2 of 11 98.1
Same.

Box 3 of 11 7,02.6
Same. Increase in Cladopora* *7999'

Box 4 of 11 07.2
Similar but branching corals & stroms. in reduced numbers; mainly crinoid debris or barren.

Box 5 of 11 11.7
Top 2' similar ls. with band of brachiopods* (Productella and "Radiomena?) 0.5'-1.0' below top; grading to black fissile calc. shale with brachs. (Productella)*. Contact with underlying ls. strongly slickensided. Remainder of box: stromatoporoidal ls. similar to that higher in core but with addition of tabular stroms. and increase in Cladopora*. Rare solitary rugose corals*. Frame-building fossils seem to be in original growth position and in places sedimentary infilling is absent and voids are filled by sparry calcite. *7108' *7109' *7111'

Box 6 of 11 16.3
Top 3'. Similar reefoid stromatoporoidal ls. with addition of small massive stroms. with highly dumose surface and structure. Cladopora* still common. Rest of box. Same ls. with only sparse stroms. and bioclastic debris. Small solitary rugose coral*. *7112.5' *7115'

Box 7 of 11 20.8
Top 2'. Same as above. Rest of box. Ls. med. pearly grey, mixed particle size, bioclastic, sparry; composed largely of v. closely packed, small-diam. Amphipora plus minor crinoidal debris; msv., non-argill. Minor Cladopora & small solitary corals. Top few transitional inches with tabular stroms.

Box 8 of 11 25.4
Top 2.5'. Similar, with basal few inches darker grading to next. Original frame void in places filled by sparry white calcite. Cladopora* fairly common. Rest of box. Black arg. msv. aphanitic ls. A few obscure brach. sections. *7122.5'

Box 9 of 11 29.9
Similar, becoming increasingly argillaceous, to marlstone. Minute ramose bryozoan* near top; Productids* throughout probable Warrenella occidentalis* ("timetea").

Box 10 of 11 34.5
Similar black marlstone with fossils other than crinoid ossicles rare; some of these have double axial canal*.

Warrenella* rare. Near base, a thin band of minute ramose bryozoa*? *7133' *7134' *7136'

Box 11 of 11 39.0

Top 2". Similar to preceding. Next 1' to bottom of core. Black arg. msv. ls. as higher in core with numerous Amphipora and Cladopora* (=Thamnopora?) (mural pores present)

CORE 8 7139-7189' Rec. 50'=5.4' per box

Box 1 of 12 43.2

Ls. msv. black arg. aphanitic like above; numerous Stachyoides Amphipora, lamellar, and digital-massive stroms., Cladopora* Thamnopora*, rare solitary corals.* *7139.5'

Box 2 of 12 47.4

Similar ls, grading downward through diminishing fossils to rock with little more than scattered crinoidal detritus and an occasional thin band with Stachyoides & Cladopora.

Box 3 of 12 51.5

Top 8". Same as above. Next 18". Same ls. full of stromatoporoids including tabular types (up to 1" thick) in uniformly inclined position. A few brachs.* and small solitary corals*. Rest of box: Black arg. ls. or marl., msv. with sparsely scattered small Amphipora & crinoidal debris.

Box 4 of 12 55.7

Top 18". Same as overlying. Rest of box: Ls., ± argillaceous, black to dark grey, microxln. to aphanitic, msv. to laminated; bands with corals and stroms., mainly Stachyoides, Thamnopora, and Amphipora, between more arg. bands mainly with scattered crinoidal debris and few strom. branches. Top band has laminar stroms. in variously inclined orientation. A crinoid calyx (not identifiable) at 7154.5.

Box 5 of 12 59.9

Similar, and in alternating bands as above. Few brachs. incl. "Leptostrophia"*. Thamnopora* especially abundant; laminar stroms. have random orientation, up to vertical. Few small solitary corals*. Bottom 5' barren. *4159' *4160'

Box 6 of 12 64.0

Similar. Top 7" barren as above. Next 38" closely packed stromatoporoidal ls. with Amphipora, Stachyoides, Thamnopora and laminar stroms., apparently in original growth position. Rare solitary corals*. Bottom 10". Barren black. ls. with crinoidal debris disseminated or in bands. *7165'

Box 7 of 12 68.2

Similar black to dark grey ls. with scattered stroms.,

Thamnopora and crinoidal debris in the lighter colored, less argillaceous portions. A large mass of Alveolites "vallorum" near base (not collected as too damaging to core).

Box 8 of 12 72.4
Same alternation as above with same corals, stroms. and crinoidal debris. A few brachs.* Lighter, less arg. portions are nodular-mottled in the darker matrix. *7176'

Box 9 of 12 76.5
Top 20". Same as above. Rest of core. Similar but predominantly stromatoporoidal. A 2½" tabular strom. in inclined position at top. Tabular stroms. dominant for next 3'.

Box 10 of 12
Similar, but dominantly non-stromatoporoidal. Top 1', stromatoporoidal, next 14" dark crinoidal msv. marlstone; rest of box, dark arg. barren marlstone. 86.1

Box 11 of 12
Top 3'. Dark marlstone as above with sparse crinoidal debris, Cladopora, Amphipora. Rest of core. Dark crinoidal ls., microxln. mxd. bioclastic. Few brachs.* *7183' *7186-86.5' 89.9

Box 12 of 12
Top 8". Similar crinoidal ls. Fos.* Few ostracods present. Black marlstone with mxd. fos. debris. Crinoid ossicles, brachs., etc. (Schizophoria). *7187' *7188' 718?.0

do.

CORE 9 7536-7571' Rec. 35'

Box 1 of 9 39.9
Ls., dark grey, microxln., msv. to coarsely laminated; grading to ls. dark grey aphanitic, vaguely nodular-mottled. Few cross-sections of minute ambocoelid(?) brachs. in upper part. Band of Schuchertella adocetaa 3' below top. Few gastropod sections in lower 2'. *7539'

Box 2 of 9 43.8
Same ls. Gastropods and S. adocetaa* at top; gastropods in bands are steinkerns lined with drusy calcite; small to medium size, not collected.

Box 3 of 9 97.7
Same ls. S. adocetaa as low as 7547. Few gastropod and pelecypod (aff. Dimondia)* steinkerns. Small diam. "worm" castings (horizontal) here as in boxes above. *7548'

Box 4 of 9 51.6
Top 3.25'. Similar ls. with a few gastropod steinkerns.

Bottom 1': An algal biostrome of pebble to cobble lt. grey algal masses in dark aphanitic arg. ls.

Box 5 of 9 55.5

Top 2". Algal ls. as above. Rest of box. Dark ls. similar to that in core above, but more conspicuously nodular-mottled. Gastropods* throughout & algal masses occur locally. *7557'

Boxes 6-9 7571.0

Similar nodular mottled dark ls. with some fauna (gastropods & algae chiefly) plus very few branching stroms. Basal 3' of core: More massive homogeneous ls., with fairly high crinoidal content.

CORE 10 7737-7787' Rec. 50'=4.5' per box.

Boxes 1 & 2 of 11 41.5 + 4.6 = 46.1

Bear Rock Breccia. Dominantly mineral replacement white v. coarse dol. of dark highly altered and completely dolomitized carbonate.

Box 3 of 11 50.6

Toward base, the dark carbonate becomes aphanitic and curdy. Basal few inches has pebbles of dove-brown aphanitic ls., sub-rounded. Basal contact at about 7798' in Box 3; contact sharp, irregular, somewhat stylolited.

Box 4 of 11 56.2

Rest of box 3 and all of Box 4 is basically light grey, microxln. clean, homogeneous dolostone which has been greatly altered both by soft-rock flowage and by subsequent hydrothermal (?) mineralization, resulting in a complex of brecciation. Sharp basal contact.

Boxes 5 to 11 87.0

Dolostone, lt.-med. grey, aphanitic, dull, very dense (probably original dolomite), in curdy masses or well-defined laminae which show dips up to 15°. At about 7775' is a 7-inch sedimentary breccia with small frags. of parent light dol. in matrix of darker aphanitic dol. Local evidences of syngenetic deformation become more prominent toward base. (Beautiful case of microfaulting at 7786-87'). Dynamic brecciation 5-10' above bottom of core has same coarse xln. white dolomite in-filling as in upper part of core.

CORE 11 7943-7950' Rec. 15'=4.3' per box

Sandstone, greyish white, v. poorly sorted from flour to coarse-medium grains; larger grains well-rounded and frosted. Some lamination and a little cross-lamination. Included in sand are masses of dark, fine, compact dolostone, which may be present as chips oriented with the lamination to large unoriented angular masses up to 8" vertical diameter which

seem to have had the sand deposited around and over them. These look like fragments that have fallen off a cliff into the sand.

SUMMARY

Omitted pending restudy of faunas in upper portion.

MACROFAUNA NOTES

MURPHY-B. O. C. - ARROWHEAD R. NO. 1.

LOCATION: 60° 50'N; 122° 06'W

CORE 1 5694-5743' Rec. 49'

5694-5714'
Ls., med. grey fn. xln.; stromatoporoidal, with macaroni Amphipora abundant, plus some massive & massive-cerioid types. Thamnopora appears at 5706', also tabular strom. & med. diam. horn coral, coll. 5706.5'. At 5707' practically solid, packed stroms., mainly Amphipora. At 5708' large, thick-shelled brach sections. Rock shows more matrix and broken stroms. 5710-11' matrix highly pelletoid. Basal 6" in-situ Stachyoides.

5714-5743'
Ls., lt. grey, pelletoid to med. xln., streaked by black bituminous-stained ls. Stromatoporoidal with branching, tabular & massive types. 5718' in-situ Stachyoides. 5720'; some black ls. clasts. 5727' matrix is coarsely bioclastic. 5730'; many large angular fragments of massive stroms.

5734-5743'
Dominantly tabular stroms.

CORE 2 5743-5792' Rec. 49'

5743-5746'
Some tabular stroms. with minor dk. ls. laminae between.

5746-5758'
Ls., dk. gry., fn. xln., stromatoporoidal similar to Core No. 1. Tabular stroms. prevalent but some zones have fragmented massive stroms., other branching stroms. 5748' in-situ Stachyoides colonies. Cabbage stroms. prominent 5751-5758'.

5758-5792'
Similar stromatoporoidal ls. but fragmented mixture of massive, branching and tabular types. Very coarse biocl. fraction in lower part, medium sized brachs. coll. 5783.5'. Medium sized brachs. incl. Atrypa common, coll.; = Atrypa sp. "Slave Point". Abundant med-sized smooth brachs., coll. at 5790-91', including terebratuloids. At 5791.5' horn corals collected. Check for "Alaiophyllum" mackenziense.

CORE 3 6178-6253'

6178-6191'
Ls., marly, nodular-mottled, black (matrix) and bn.-black (nodules and bands), cptxln, with bioclastic fraction. Pelecypods abundant at some levels. Thin-bedded, Pelecypods collected at 6179-6180', 6182.5' 6188'.

Gastropods, mainly small murchisonids abundant at 6184-6186'.

6191-6222'
Similar dark nodular ls., but massive with msv. and branching strom., branching tabulates. Collected cerioid corals at 6195'. Rock becomes lighter and coarser (to fine xln.), downward, with increased bioclastic fraction. Some pelecypods, brach. frags. and rare crinoid ossicles. Large angulated Euomphalus at 6226'

6222-6240'
Top of dove-colored lithogr. ls. as in I46 well. This lithology prevails through into top of Core No. 4.
Some darker interbeds are nodular with massive strom. and Amphipora, pelecypods, gastropods, and small brachs., collected at 6231'.
Most prominent is a 5' zone from 6235-6240'.

SUMMARY

Slave Point Formation	5694-5792'
Atrypa n. sp. "Slave Point" at	5783.5'
cf. Grypophyllum mackenziense	5791.5'
gap	5792-6178'
Hume (S. Keg R.)	6178'-

Note: schedule 3, p. 25, gives limestone top ("Sulphur Point") as 5694'.
Note: Atrypa n. sp. "Slave Point" is an Upper Slave Point species.

Imperial Sun Arrowhead I 46
60°45'N., 122°22.5'W.

Study begins with Core No. 4 (in Canol Shale) and runs continuously to Core No. 15 (in Nahanni Formation).

6,096'-6,137'

Shale, black, hard, non-calcareous, with finely disseminated pyrite. Basal contact irregular and very sharp, with relief up to 4 inches.

Braun, in Norford et al (GSC Paper 70-15) reports pyritized sponge spicules, conodont fragments (including a palmetolapid) and goniatite anaptychi; he postulates a Frasnian age equivalent to the 'h-fauna' of the Canol Formation of the Norman Wells area.

6,137'-6,142'

Limestone, dark brown-grey, cryptocrystalline; nodular-mottled texture, nodules slightly lighter grey-brown; some nodules may be algal. Lower 3 feet full of cabbage stroms.

6,142'-6,213'

Limestone, light-medium grey, microcrystalline with bioclastic fraction. Stromatoporoidal; top 5 feet closely-packed tabular forms; next 9 feet dominantly frame-sited Stachyoides with rarely massive stroms, down to 6,156 feet. Below this is an alternating succession of tabular and branching strom zones; tabular forms show deposition orientation up to 30°. A medium-sized brachiopod at 6,157 feet*.

Below 6,170 feet the stroms are less abundant, with zones of in-situ Stachyoides and occasional cabbage stroms; and rock is dominantly bioclastic, very fine at top, coarsening downward, where Stachyoides diminishes in numbers, but tabular zones continue to occur at intervals.

A few small gastropods around 6,167 feet.

Below 6,184 feet, Amphipora becomes common; at 6,189 feet Stachyoides again becomes dominant; at 6,195 feet cabbage stroms are conspicuous along with the Stachyoides to 6,201 feet. Broken Stachyoides and "amoeboid" massive growths predominate to 6,207 feet. Below this to 6,213 feet (base) stroms are less common and almost wholly are cabbage types. Medium-sized brachiopod at 6,202 feet*

6,213'-6,224.5'

Limestone, dull light grey, bioclastic, medium-fine, massive. Fragments of massive stroms and Stachyoides. Large, low-spired gastropod with angulated whorls at 6,214 feet.

6,224.5'-6,236'

Limestone, light-medium grey, mixed fine and medium crystalline and bioclastic; stromatoporoidal. Cabbage stroms, tabular stroms, branching and "cerioid" Stachyoides, Amphipora. Basal 6 inches coarsely bioclastic.

Large brachiopod at 6,225 feet*.

---

* in Institute collections.

6,236'-6,242'
Limestone, medium light grey, finely crystalline, dull and sucrosic, vaguely stratified.

6,242'-6,243.5'
Limestone, dark-medium grey, bioclastic, chiefly crinoid ossicles, in cryptocrystalline matrix; massive.

6,243.5'-6,246'
Limestone, black brown, lithographic with zones of spar-filled "birdseye" vesicles. Some coarsely pelletoidal limestone interstratified near bottom.

6,246'-6,284'
Limestone alternation in 4' to 15' bands of 1) medium grey, microcrystalline limestone, stromatoporoidal; and 2) medium grey to dark brownish grey aphanitic limestone with pseudolamination resulting from closely spaced microstylolites; some portions show sparry-filled birdseye vesicularity.
Stromatoporoidal bands are chiefly Amphipora spaghetti-stone, with minor content of Stachyoides and a few massive stroms.

6,284'-6,319'
Stromatoporoidal limestone like strom bands above; chiefly an alternation of "marcaroni-stone" and relatively barren zones.
circa 6,300' - cabbage stroms
" 6,308' - Stachyoides in-situ colonies
6,309'-6,311' - cabbage stroms
6,318' - a large gastropod

6,319'-6,413'
Limestone, stromatoporoidal, medium grey passing downward to pale grey, microcrystalline and cryptocrystalline.
Top 14 feet "macaroni-" to "spaghetti-stone" with in situ colonies of branching stroms in upper 5 feet. Below this is dominance of in situ colonies of Stachyoides, with tabular stroms increasing proportionally downward to dominance. Other fossil occurrences include:
smooth and plicate brachiopods, 6,350 feet*
horn coral, 6,350 feet*, 6,377 feet*, 6,398.5 feet*, 6,408 feet*
Cladopora, 6,319'-6,333' (few), 6,373 feet, 6,408 feet.
Thamnopora, large diam. 6,384 feet, 6,388 feet, 6,410 feet
minute gastropods, common
ostracods, 6,383 feet*, etc.
Emanuella sp., 6,371-6,372 feet*, 6,376 feet*, 6,378.5 feet*, 6,380.5 feet*, 6,382 feet*, 6,384.5 feet*, 6,391.5 feet*, 6,395 feet*, 6,397 feet*, 6,398.5 fe
pelecypod, 6,378.5 feet*
Atrypa sp., 6,382 feet*, 6,385.5 feet*, 6,391.5 feet*, 6,395 feet*, 6,397 feet*, 6,409 feet*.

* in Institute collections.

cf. "Alaiophyllum", 6,397 feet*
Ladilla sp. "Slave Point", 6,397 feet*
Warrerella? (small species), 6,407 feet*

Tabular stroms first appear about 6,392 feet and increase in abundance downward, although Stachyoides persists to base, many of the tabular fragments are disoriented up to near-vertical, but as matrix is a lime-mud, these attitudes must reflect fallen pieces.

6,413'-6,443'

Limestone, black, marly, full of branching stroms. (Stachyoides) and great numbers of branching tabulate corals (Thamnopora, Cladopora, Coenites), as well as massive Alveolites. Small horn corals are also common and (according to Pedder, personal communication) include his Grypophyllum ("Alaiophyllum") mackenziense and a Temnophyllum close to Lenz."Micrea cf. gallica Smith" of the Kee Scarp at Norman Wells. G. mackenziense ranges at least from 6,415 feet to 6,431.5, according to Pedder

In addition, the following fossils are recorded:
brachiopod, plicate, 6,420 feet*
crinoid ossicles with stellate axial canal
massive stroms - a few as worn fragments.

6,443'-6,469'

Similar dark limestone but passing to a "spaghetti-stone" of worn and broken Amphipora, plus some tabular stroms, Stachyoides, and few branching tabulates. Below 6,455 feet, Stachyoides and the tabular stroms become dominant. Virtually no matrix is present.

6,449'-6,476'

Similar to the preceding, but rock becomes lighter colored as matrix increases, as a pale grey, dull, mixed crystalline and bioclastic limestone.

Tabular stroms are dominant and up to 1 foot thick; they are horizontal in upper part of unit but lower down reach inclinations up to 45°. Between the tabular bands are zones of Stachyoides and Amphipora plus a few Cladopora. A small horn coral at 6,474.5 feet*.

6,476'-6,496'

Continuation of the stromatoporoidal limestone, but for next 8 feet a "macaroni-stone" of Stachyoides + Amphipora, as the matrix darkens through light-medium to medium-dark brownish grey, with a finely crystalline texture. Tabular stroms, few and variously oriented in upper 8 feet, in lower 12 feet alternate with bands of Stachyoides which are in original growth position.

6,496.0'-6,509'

(A very sharp lithologic change, although exact contact has been removed; however the gap cannot be great. There is evidence neither of transition nor of unconformity).

Shale, grey black, calcareous, fissile, with bands of dark, mixed bioclastic and aphanitic limestone with minute white crinoid ossicles, Amphipora fragments and rare treptostome bryozoa.

---

* in Institute collections.

Banks of marly limestone have scattered Stachyoides, very small diameter Thamnopora, Cladopora and large Warrenella. In the shale bands a pentangular, stellate, rayed crinoid ossicle is abundant.

Other fossils also abundant include:

"Hexastrophia" sp. 6,493 feet*

cf. Nervostrophia 6,499 feet*

large Warrenella 6,497 feet*, 6,499.5 feet*

At 6,501 feet variously oriented pieces of stroma, mainly Stachyoides and thick tabular types occur among rounded clasts of dark brown limestone.

6,509'-6,519'

Limestone, dark, cryptocrystalline to microcrystalline with high to moderate fraction of coarse bioclastic lime-sand. Appears to have graded bedding as lime-sand and brown rounded pebbles, in places forming conglomerate, increase downward.

Stachyoides, tabular stroma, and Thamnopora, mainly encrusted by stroma or algae occur in zones of concentration and in distorted orientations.

Brachiopods, 6,513 feet*

Branching Alveolites, 6,516-6,518 feet

6,519'-6,551'

Limestone, dark grey, aphanitic groundmass with high bioclastic fraction. Beds 1 inch to 1 foot thick, between shale partings. Fossils, especially brachiopods, common, including:

Leiorhynchus (totiplicate species), 6,519.5 feet*, 6,222-6,223.5 feet*

Hadrorhynchia, 6,519.5 feet*, 6,530 feet *

?Ladjia landesi, 6,522-6,523.5 feet*

Ilmenia? 6,533-6,534 feet*

Spinatrypa, 6,528 feet*

Cyrtina, giant species 6,529 feet*

small crinoid ossicles, common

ostracods, scattered

brachiopods, misc. 6,525-6,526 feet*, 6,528 feet*, 6,530 feet*, 6,533-6,534 feet*, 6,536-6,537.5 feet*, 6,547-6,548 feet*, 6,550-6,551 feet*

Warrenella, small 6,550-6,551 feet*

Ladogioides?? 6,547-6,548 feet*

calcispheres? abundant at 6,544 feet

Cladopora, small diam., 6,542.5 feet

Note: fossil determinations are highly tentative, pending laboratory study; but as they stand they reflect an "Upper Ramparts-Lower Slave Point, rather than a Hare Indian (Middle Pine Point) affinity.

6,551'-6,620'

Limestone, black, cryptocrystalline, with varied bioclastic content, and with a nodular - mottled structure developed in certain zones. In these cases, irregular nodules of brown-black limestone are in a scanter matrix of black, more marly limestone. At 6,592-6,594 feet, the nodules have been reworked to form an "intraformational conglomerate" Corals are especially abundant at certain horizons, as follows:

---

* In Institute collections.

Favosites, digitate, common 6,551-6,557 feet* etc.
horn corals 6,551-6,552 feet, 6,559 feet*, 6,563 feet*, 6,605.5-6,606 feet*
Alveolites, massive, 6,603 feet
Alveolites, tabular, 6,551-6,557 feet, fairly common
Favosites, massive 6,604.5 feet
Syringopora sp. 6,604.5 feet and lower
cf. Sociophyllum glomeralatum 6,596 feet*, 6,599 feet
cerioid coral, 6,593 feet*, 6,641.6 feet
Microplasma cf. fongi 6,596 feet*, 6,602 feet*, etc.
Cladopora sp. 9,696-9,698 feet
Among other fossil types, the following were noted:
sponges, calcareous, 6,551.5-6,557 feet*, 6,575 feet
Emanuella? 6,558-6,559 feet, 6,563 feet*, 6,570 feet*, 6,584 feet,
6,596-6,587 feet*, 6,588 feet*
Atrypa cf. arctica, 6,570 feet*, 6,584 feet*
dechanellid trilobites, 6,561.5 feet*, 6,570 feet, 6,584 feet
gastropod, euomphalid 6,563 feet*
large crinoid ossicles 6,585 feet downward
gastropods, small 6,592-6,620 feet
cabbage stroma (few) 6,598 feet
Stachyoides (few) 6,603 feet
massive stroma 6,605-6,620 feet
Note: The rock from 6,551-6,620 feet is a unit which we place at the top of the Nahanni (equals Hume) Formation, although on casual examination satisfactorily diagnostic fossils (?Sociophyllum glomeruliatum, Microplasma fongi) were not found until 6,596 feet; although the Atrypa cf. arctica at 6,570-6,584 is also significant.

The 69-foot unit of dark fossiliferous limestone is underlain by 15 feet of dove, lithographic limestone with included bands of a small Amphipora. This rock in turn was underlain by fossiliferous limestone similar to that of the 69-foot interval. At this level, our examination was terminated, the objective being the determination of the top of the Hume/Nahanni lime-rock unit.

---

* In Institute collections.

page 6.

SUMMARY

Imperial Sun Arrowhead I-46

	down to 6137'
Canol Shale	6137-6551'
Slave Point Formation (Beavertail Facies 6413-6443')	
Leiofia n. sp. "Slave Point"	6397'
Cryophyllum ("Alaiophyllum") mackenziense	6415-6439.5
Warrenella cf. occidentalis	6497-6499.5'
giant Cyrtina (Beavertail fossil)	6529'
?Leiofia landesi	6522-6523.5'
Hume (Lower Keg River)	6551-6620' plus
Atrypa cf. aretica	6570-6584'
cf. Sociophyllum glomerulatum	6596-6599'
Microplasma fossi	6596-6602'

NOTE: This is first well, going west, which encounters Mackenzie Valley faunas and facies in relation to Slave Point faunas and facies. Therefore despite very important study (appended) by A. E. H. Pedder, and published studies (G. S. C. Paper 70-15, pp. 15-17), a further extensive faunal study of core material collected will be made.

Report on 15 Devonian fossil lots from the Imperial Sun Arrowhead I-46 well (60°45'37"N, 122°22'47"W; NTS 95B).

The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Western Paleontology Section, Calgary, for possible revision.

Stratigraphy	Fauna	GSC Loc. No.
"Beavertail Fm."; 1 1/2' below top, 28 1/2' above base. Depth 6414 1/2'	Thamnopora sp. undet.	C-8860
"Beavertail Fm."; 2' below top, 28' above base. Depth 6415'	Stachyodes verticillata (McCoy) Thamnopora sp. undet. Temnophyllum(?) sp. nov. Grypophyllum mackenziense (Pedder) Cyrtina sp. indet.	C-8859
"Beavertail Fm."; 11' below top, 19' above base. Depth 6424'	Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum(?) sp. nov. Grypophyllum sp. indet. Cyrtina sp. indet.	C-8861
"Beavertail Fm."; 13' below top, 17' above base. Depth 6426'	Grypophyllum mackenziense (Pedder)	C-8862
"Beavertail Fm."; 14 1/2' below top, 15 1/2' above base. Depth 6427 1/2'	Alveolites sp. undet. Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum(?) sp. nov. Grypophyllum sp. indet.	C-8865
"Beavertail Fm."; 15 1/2' below top, 14 1/2' above base. Depth 6428 1/2'	Thamnopora sp. undet. Temnophyllum(?) sp. indet.	C-8863
"Beavertail Fm."; 16' below top, 14' above base. Depth 6429'	stromatoporoids, not studied Thamnopora sp. undet. Temnophyllum(?) sp. nov.	C-8864

Stratigraphy	Fauna	GSC Loc. No.
"Beavertail Fm."; 18' below top, 12' above base. Depth 6431'	Thamnopora sp. undet. Temnophyllum(?) sp. nov.	C-8867
"Beavertail Fm."; 18 1/2' below top, 11 1/2' above base. Depth 6431 1/2'	Thamnopora sp. undet. Temnophyllum(?) sp. nov. Grypophyllum mackenziense (Pedder)	C-8866
"Beavertail Fm."; 19' below top, 11' above base. Depth 6432'	Alveolites sp. undet. Thamnopora sp. undet. Temnophyllum(?) sp. nov.	C-8868
"Beavertail Fm."; 22' below top, 8' above base. Depth 6435'	Thamnopora sp. undet. Temnophyllum(?) sp. nov.	C-8870
"Beavertail Fm."; 23' below top, 7' above base. Depth 6436'	Alveolites sp. undet. Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum(?) sp. nov. Grypophyllum sp. nov.	C-8869
"Beavertail Fm."; 26' below top, 4' above base. Depth 6439'	Thamnopora sp. undet. Temnophyllum(?) sp. nov.	C-8872
"Beavertail Fm."; 26 1/2' below top, 3 1/2' above base. Depth 6439 1/2'	Stachyodes verticillata (McCoy) Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum(?) sp. nov. Grypophyllum mackenziense (Pedder)	C-8871
"Beavertail Fm."; 29 1/2' below top, 1/2' above base. Depth 6442 1/2'	Stachyodes verticillata (McCoy) Thamnopora sp. undet. Temnophyllum(?) sp. nov. Grypophyllum sp. indet.	C-8873

Remarks

Probably the entire 30-foot interval, which for want of a better term is referred to the "Beavertail Formation", is referable to the mackenziense Zone. Elsewhere, notably at Powell Creek, Grypophyllum mackenziense occurs with conodonts, identified by T.T. Uyeno as being diagnostic of the upper hermanni-cristatus Zone. This part of the zone has generally been regarded as latest Middle Devonian in North America (Klapper School), but in Europe (Ziegler School) it is considered to be the earliest Upper Devonian conodont horizon.

In terms of local stratigraphy it should be older than the Waterway Formation of northeastern Alberta and younger than the Stringocephalus-bearing beds of the Sulphur Point Formation of southern Great Slave Lake. It is certainly not as old as the Pine Point Formation of that area.

A.E.H. Pedder

Western Paleontology Section
Institute of Sedimentary and Petroleum Geology
Calgary, 25 March, 1971

MACROFAUNA NOTES

IMPERIAL SUN ARROWHEAD AURORA M-47

LOCATION: 60° 40'N; 122° 30'W

CORE 1 1605-1649'
Not examined.

CORE 2 1650-1700'
Not examined.
CORE 3 7223-7273 Rec. 50'

7223-7253.5'
Ls., dk.-med. grey, fn. xln., msv. stromatoporoidal with numerous cobble-sized msv. stroms. and Stachyoides, macaroni Amphipora, calc. algal masses, and Coenites, latter almost always as nucleus for stroms. or algae. Zones of black marly ls. in irregular pattern produce a nodular structure. Smooth brach with spires at 7233'. Strobeus-like large gastropod at 7240'. Below 7248' massive stroms. are much less common, and Stachyoides and a minute Amphipora with prominent central canal become abundant. A fairly large smooth brach. section at 7252'.

7253.5-7263'
Ls., dk gry., microxln., msv., gradational contacts. Fossils not common, mainly Amphipora, spaghetti plus minute type, rare Stachyoides, Cladopora. Strobeus-like gastropod at 7253.5; coll., low-spired at 7259'; coll.; few pieces of massive stroms. including a semi cerioid type; rare crinoid ossicles; Atrypa at 7359', coll.

7263-7273'
Similar dark ls. but stromatoporoidal zones interfingered with relatively unfossiliferous zones. Stroms. and Cladopora as above, Stachyoides more common. Large massive stroms. at intervals esp. in basal 2 feet. Msv. calc. algae at 7267'. Cladopora fairly common. Rare tabular stroms. Horn coral, small at 7264'; coll.

CORE 4 7274-7324' Rec. 50'

7274-7284'
Ls. dark, cptxln., msv., relatively few fossils other than Amphipora and Coenites scattered or in concentrated bands. Rare small-diam. Thamnopora. Tabular strom. at 7281'.

7284-7285.5'
Ls., aphanitic, mod. dk. gry; some portions show filled micro-vesicularity.

7285.5-7290.5'
Ls., grey-black cptxln., massive, largely unfossiliferous but with bands of spaghetti stone plus Coenites near top and cobble-sized msv. stroms at 86-87', incl. pseudo-cerioid type.

7290.5-7293.5'
Similar ls., almost entirely of stroms., a coquina of Stachyoides & Cladopora with scattered cabbage stroms. Basal contact very irregular.

7293.5-7296.5'
Ls., nodular, nodules dk. grey bn., lithogr., in matrix of black hard marlstone; some diagenetic breccia by movement of ls. in the marlstone, near base.

7296.5-7309.5'
Dark cptxln stromatoporoidal ls. 7296.5-7299' branching forms, Amphipora, Stachyoides, small diam. Thamnopora sometimes in exclusive bands.

7299-7301'
Mainly cabbage stroms. 01-04' mainly branching types ; microgastropods at 04' ; 04-05' cabbage stroms.; 05.5-08.5', mainly branching with scattered pieces of massive stroms.; 08.5-09.5', packed vermicelli Amphipora with prominent axial canal; includions of Thamnopora and Stachyoides.

7309.5-7313.0
Ls., brown blk., lithogr., grading downward to med. bn.; some areas have rather coarse birdseye vesicularity. Scattered macaroni Amphipora.

7313-7324'
Ls., lithographic in alternating black, more arg. bands and med. bn. clean bands. Very few fossils except spaghetti Amphipora near top.

CORE 5 7326-7355' Rec. 7'/29'
Black to dove brown lithographic ls. with sparse Amphipora like rock above. Some zones with filled birdseye vesicularity. Core loss seems to be from bottom of core and log should be checked here for washed out clay (i. e. 7330-7355').

CORE 6 7356-7406' Rec. 50'

7356-7396.5'
Ls., dark, microxln. to cptxln., msv. stromatoporoid, with massive stroms. (to cabbage size) and branching types: Amphipora,

Stachyoides, Cladopora coll. at 7358'; Thamnopora. Small solitary coral at 7358'; coll.. From 7362½ to 7367 rock is a Stachyoides coquina with some included msv. stroms.; 7367' to 7374 cabbage stroms. with few emanuellids in matrix, collected at 7310'. 7374-7378½' Amphipora spaghetti-stone with included cobble-sized msv. stroms., plus small-diam. Amphipora. 7378½-90 dominantly cobble-sized msv. stroms., secondarily spaghetti Amphipora & Thamnopora. Small brachs. fairly common at 7381'; coll.

7390-7396½ dominantly with Amphipora, plus secondary Thamnopora many with strong algal incrustation; small massive stroms. are scattered. Small smooth brachs. fairly common. Large, heavy-shelled brachiopod. Small horn coral ; coll at 7391.5-7393'

7396½-7400'
Ls., dark bn.-grey, lithographic clouded by black arg. stringers, to nodular structure locally. Disseminated small brachs.; coll. at 9398.5' and very sparse Amphipora.

7400-7404.5'
Dark ls., microxln. to cptxln., full of Amphipora concentrated in spaghetti-stone bands.

7404.5-7406'
Ls., blk., lithogr. with rare Amphipora.

CORE 7 7408-7458'

7408-7414'
Ls., bn. blk. & blk. mottled, cptxln. to lithogr., sparse Amphipora & small msv. stroms. and few small brachs. coll. at 7408.5'. Around 7412' is an 8" zone with rounded pebbles of indigenous bn. blk. ls., plus large (up to 2.5" diam.) angular disoriented impure bn. chert clasts.

7414-7417'
Similar blk. lithogr. ls. in continuity with preceding but showing a bioclastic fraction and scattered stroms.

7417-7423'
Black cptxln-aphanitic ls., stromatoporoidal, upper part full of cabbage stroms. and lower part with small massive stroms. & Amphipora.

7423-7441'
Vermicelli-stone. Ls. dk. grey, cptxln., full of thick bands packed with a minute ("vermicelli") Amphipora. Some included Coenites, cobble-sized msv. stroms., and medium-sized brachs replaced by crse. xln. calcite. Lower few feet Amphipora structure is poor. Few small smooth brachs.; coll. at 7439'.

7441-7442.6'
Ls. black, lithographic, glassy, with syngenenetic brecoia in base.

7442.6-7452'
Vermiccili stone as in 7423'-7441' interval.

7452-7458'
Ls., dark grey, biocl. fraction in micritic groundmass. Thick-bedded. Fairly abundant spaghetti Amphipora with hollow central can l, plus rare very small massive types. Brachiopods, Ladjia landesi Crickmay common and well preserved; large coll. made at 7452-7454.5'.

CORE 8 7459-7509' Rec. 50'

7459-7466'
Similar to bottom of Core 7, with disseminated minute Amphipora and L. landesi as above, coll. at 7460-65'

7466-7476'
Ls., dark, aphanitic with small bioclastic fraction; stromatoporoidal. Amphipora (different species) form macaroni- and spaghetti-stone. Massive stroms. secondary. Few small-diam. Thamnopora coll. at 7471'; thick-shelled, low- spired gastropods fairly common, coll. at 7471'. L. landesi to 7470', coll. 7469'

7476-7477.5'
Dark ls., with cloudy sub-lamination microxln. to cptxln.

7477.5-7480'
Dk. fn. xln. ls. full of cabbage stroms.

7480-7488'
Ls., cptxln. dk. grey., mixed stromatoporoidal; with concentrations from fairly heavy to sparse. Large macaroni Amphipora and minute Amphipora generally segregated. Massive stroms. to cobble size secondary, Gastropods. Thamnopora (few). Probably L. landesi near top.

7488-7501'
Ls., similar to preceding. Some zones with dominant massive stroms., some with Amphipora, and some up to 3' relatively barren. Stachyoidea locally common and thick-shelled, medium-sized gastropods fairly common. Smooth brachs. rare; coll. at 7499'.

7501-7509'
Similar dk. cptxln. to aphanitic ls. with fairly common brachiopods (Ladjia?), coll. at 7504', small-diam. Amphipora locally common. Few minute gastropods.

CORE 9 7767-7817'

7767-7771'
Ls., very dark grey, more or less nodular mottled, with a coarse bioclastic fraction of broken shells & stroms.

7771-7777'
Ls., fn. xln., lt. grey; mainly nodular grading to a diagenetic breccia, with angular pieces of ls. as above in matrix of dk. marlstone. Large to very large msv. stroms. form part of breccia. Also disoriented tabular stroms. and white crinoid ossicles. Minute gastropods common. Basal foot darker.

7777-7781'
Ls., lt. grey, fn.-med. xln. massive, with crse. bioclastic fraction.

7781-7783'
Ls., dk-med. grey, fn. xln. & coarsely biocl. with frags. of stroms. incl. Stachyoides & tabular types. Also white crinoid ossicles. Obscurely nodular-mottled.

7783-7788.5'
Ls., med. gry., coarse-biocl., msv., enclosing disoriented pieces of msv. & tabular stroms.; "cerioid" to "phaceloid" Stachyoides, calc. algae, thick-fingered Thamnopora and a possible Atrypa.

7785.5-7794'
Ls., dk. grey, mxd. aphanitic & bioclastic with piece of a very large Stringocephalus (showing median septum) near top Amphipora and small branching Coenites common. Upper foot a bioclastic cgl. with frags. of stroms. & tabulates; rest a a vaguely banded alternation of lighter crinoidal bioclastic ls. and dark marly ls. with fewer fossils. Small smooth brachs. uncommon.; coll. at 7790'

7794-7817'
Similar dk. to med. grey crinoidal ls. but as matrix for diagenetic breccia of ls. fragments & pieces of stroms. with depositional lineation of 10-15°.
Lower 2.5' full of corals including thick-fingered Thamnopora, Alveolites, Hexagonaria, very coarse crinoid columns small Amplexoid, etc. Much of core has been removed from this interval.

Fossils as follows:
1. Laminar algal? structure (Receptaculites??), 7804, 8; 11*; 12

2. 3/8" crinoid ossicles with large serrate canal, 7805; 6, 8, 9; 10, 11; 12, 13, 14, 16

3. Favosites sp., 7805; 12

4. Thick-fingered Thamnopora 7806, 7*; 8; 9; 10, 11, 12, 14*, 16

5. massive cerioid coral, 7807*, 9* 10, 11*; 13*, 14*; 15, 16

6. small "amplexoid" coral, 7813*

7. small horn coral, 7814*

8. Alveolites sp., 7814*

9. pieces of msv. stroms. 7815'

*indicates collected.

Possible Nahanni Top at 7794'

CORE 10 8042-8092'

8042-8054'
Mottled medium dk. grey, bn. xln. dol. grey-blk. aphanitic ls. Quartz gash veins possibly related to dolomitization. Cladopora, Syringopora, small thick-shelled gastropods; small smooth brach. sections, tabular Alveolites. Fossils chiefly in calcareous portion; not well preserved.

8054-8059'
Dominantly ls., bn.-blk., lithographic, with zones of filled vesicular birdseyes and some vaguely curdy structure.

8059-8060.5'
Med. dk. grey, fn. xln. to microxln. dolo. ls.

8065.5-8068'
Similar to 8054-8059' interval.

8068-8075'
Similar blackish lithographic ls. but without birdseyes and with scattered small msv. stroms., Amphipora concentrations, and rare small gastropods. Abundant ostracods in a few zones, coll. 8068'

8075-8085'
Intermottled blk. ls. and dark dol. as in interval 8042-8054', but veins few. Stroms. as above. Zone of abundant small brachs. at 8080.5', but all are replaced by drusy calcite; collected. Zones of small gastropods in lower 5 feet.

8085-8087.5'
Med. grey-bn. litho. ls., with zones of spar-filled birdseye vesicularity.

8087.5-8092'
Similar bnish lithogr. to aphanitic ls. but with zones of abundant

small gastropods in upper 2'. Rest is sub-nodular due to variously oriented microstylolites. Little birdseye vesicularity.

CORE 11 8480-8490'

8486-8490'
Beautiful sharpstone chert conglomerate-breccia (no-rounding) overlain by hard silt with few stringers of sharp-stone cgl.
Presumably basal Paleozoic deposits.

SUMMARY

IMPERIAL SUN ARROWHEAD AURORA M-47

Slave Point	7223-7509'
Ladjia landesi	7452-7504'?
gap	7509-7767'
Presqu'ile (Sulphur Point)	7767-7794'
Stringocephalus	7786'
Hume (L. Keg River)?	7794-7817'

B. A. - TEXACO ARROWHEAD B76 - MACROFAUNA NOTES - G. O. Raasch

LOCATION: 60° 30'N; 122° 45'W

CORE 1 8697-8747' (unslabbed 4" core)

Box 1
Ls., blk., aphanitic, bituminous, massive; a few strongly stylolited films. Fossil content varies from low to very high; stromatoporoids abundant, especially Amphipora concentrated as spaghetti-stone or disseminated. Also large to small massive types. A Coenites is common. Gastropods, medium-sized, low-spired to very high-spired occur throughout. (8701' high spired gastropod coll.) (8702' Coenites? sp. coll.).

Box 2
Lithologically as above; medium bedded with separation surfaces undulating to strongly stylolited. Fossil content various from high to scant. Spaghetti-Amphipora as above; increase in large massive stroms.; Coenites?? common. Few small smooth brachs. (Brach. coll. at 8707'). Gastropods common as above.

Box 3
Similar faunally and lithologically (small smooth brach. coll. at 8707.5'). 8707-8709.5' has abundant stroms. macaroni-Amphipora and cabbage stroms. Sparse fauna below this lower 15" is mass of vermicelli Amphipora.

Box 4
Similar lithology but less fossiliferous, chiefly small massive and vermicelli stroms. plus medium-sized thick-shelled, low-spired gastropods.

Box 5
Top 3' similar lithologically to above. Also faunally except increase in cabbage stroms. Important contact at 8720'. Below this lowest foot of core is ls., cptxln., med. dark grey, indistinctly laminated and unfossiliferous except for scattered vermicelli Amphipora.

Contact suggests underlying was lithified previous to deposition of overlying as surface shows sub-regolithic breaking-up of the rock for a depth of several inches. No evidence of reworking.
NOTE: Core no. 1 shows only a 50% recovery. From top at 8697' down core appears to be continuous, but the base is abraded and it is assumed that lower 25' is lost due to non-recovery.

CORE 2 8747-8748'

Limestone, grey-black, aphanitic, more bituminous and/or argillaceous than Core 1. Massive. Bands of spaghetti stroms. suggest lineation of 50-100. Small massive stroms. and gastropods similar to those in Core No. 1 are locally common. Small smooth brachs. (Emanuella?) common in lower part, but do not break free. Rare sections of larger brachs. (Warrenella? coll.).

CORE 3 8910-8960' Rec. 50' 11 boxes=4 6/11' per box.

Top 3 boxes. 13.5'
Dolomite, chalky whitish, alabaster-like, extremely vuggy. Dark mottling in stylolited zones. Some vugs lined with small bladed dolomite xls. and larger tabular calcite xls. Possibly a replacement deposit, but seems to make a sharp but highly inclined (35°?) contact with underlying. In very bottom of the box (8923' ±) a large massive strom. directly underlies the contact. The rock below the contact (basal 1.5"-3") although grading to the underlying limestone (of box 4) is a coarse xln. dark dolomite. Above contact is a possible conglomerate, highly altered.

Box 4 8923.5-8928'
Limestone, medium grey, very coarsely xln. and very coarsely bioclastic. Some very large crinoid ossicles. Evidently a "high energy" deposit. Includes large massive stroms. 18"-24" below top thinner bedded due to styloliting & with thick-shelled brachs. which do not break free. 3' below top is an abundance of thick-branched Thamnopora (coll. at 8927'). Six inches of base; lithologic change to ls., grey black, aphanitic with small bioclastic fraction, argillaceous, with good L. castanea (coll. at 8927.5') (or L. hippocastanea).

Box 5 8928-8932.5'
Similar to bottom of box no. 4 with varied but commonly high bioclastic fraction, especially crinoid ossicles. Thamnopora abundant in upper 18". 18"=30" below top, (Coll. 8928+) Warrenella cf. occidentalis is common, with Thamnopora, Favosites, crinoid ossicles, etc. (Coll. at 8930-8930.5' Warrenella cf. occidentalis, Atrypa, large plicate rhynchonellid Favosites, etc. Interbedded with layers that are primarily extremely coarse bioclastic.
NOTE: strong shale parting at 2" above an undulating contact & change from very crse. bioclastic to med.-fine. Thamnopora, horn coral (very good), Cladopora, etc. (coll. 8931.5')

Box 6 8932.5-8937'
Similar, but interbanded coarse-bioclastic, medium-bioclastic, and foliated-shaly. Section of brachs., probably Leiorhynchus, etc.

Box 7 8937-8941.5'
Similar to preceding, but without coarse bioclastic bands. Thick zones of medium sized crinoid ossicles in black marly matrix and thin zones of black shaly marl. Other fossils mainly scattered Warrenella & Leiorhynchus. Also rare Thamnopora and Atrypa (coll. 8940').

Box 8 8941.5-8946'
Similar, but grading to marly shale with crinoidal marlstone bands. Fossils other than corals few, Thamnopora, Leiorhynchus, Warrenella Atrypa. Brachs. coll. at 8943'; brachs. incl. rhynchonellid coll. at 8946'.

Box 9 8946-8950.5'
Similar, black marlstone full of crinoid ossicles and fairly common brachiopods. Thamnopora in basal 5 inches. One good horn coralcollected at 8950.5'. Brachiopods chiefly Warrenella cf. kirki, plus rare Atrypa. Warrenella kirki collected 8946.5'. Warrenella kirki 8950-50.5'.

Box 10 8950.5-8955'
Similar lithology. Brachs. very common: W. kirki; L. castanea Emanuella sp., Spinatrypa sp., Atrypa, plus the large Thamnopora previously seen at 8930'. Fossils collected at 8951 and 8952'. L. castanea at 8954'.

Box 11 8955-8959.5'
Top 27" similar to preceding. Large hollow calcareous sponge at 8955'; also at 8956'. (both left in core). Also a few brachs. (L. castanea) and scattered crinoid ossicles. Basal foot crinoidal ls.

Rest of box:
Shows sharp lithologic change; upper few inches have steep initial dip (30o), emphasized by calcite bands. Below this, lineation becomes essentially horizontal.

Dolmite, crse-med., light grey, with inter-xln. spaces filled by black bituminous matter. Massive with stylolited-nodular structure.

CORE 4 8960-9010' Rec. 50/50

Box 1 8960-8965'

Box 1
Similar coarsely mottled carbonate; coarse dol. xls. in calcitic, dark-colored binder material. Has appearance of original Hume-type nodular-mottled structure altered by low-grade hydrothermal activity. Any fossils that may have been present would have been destroyed.

Box 2 8965-70'
Top 10". Similar.
Rest of box. Ls., nodular mottled, pale-grey, coarse-xln. carbonate as above but limestone, not dolomite, in dominant matrix of black marlstone. Fossils reasonably well-preserved in latter, mainly

stroms. (cabbage stroms. abundant at 68-72'), scattered small gastropods, Syringopora collected at 8966'.

Box 8970-75'
Similar to preceding, but carbonate nodules in proportional increase although still minor. Large carbonate masses are dolomite. Fossils as above plus thick-stemmed Amphipora, a few crinoid ossicles, a probable Dendrostella trigemme (poor, at 8971') and good Microplasma fongi at 8973.7*, and Coenites. *collected.

Box 4 8975-80'
Similar to preceding cores. Where carbonate nodules are dominant rock is dolomitic, highly altered, with fossils obliterated. In more marly portions alteration is less or lacking, and fossils are recognizable, including small-massive and branching stroms., Coenites, small gastropods, and a good M. fongi colony at 8977.5' not collected.

Box 5 8980-85'
Similar, but 80% light-colored carbonate, highly altered, mainly coarse xln. dolomite but including some immense anhedral crystals of calcite. Fossils destroyed except some "ghosts" of massive stroms.

Box 6 8985-90'
Top 2'2" similar to above, with greater percentage of light-colored dolomite. "Ghost fossils" increase, especially small brachs. A few small vugs. 8986-87'. Basal contact gradational.
Rest of box: Limestone, medium dark grey, medium & fine xln., massive, with zones of corals & brachs. Thamnopora (thumb-thick) most common (collected; 8989') also Microplasma fongi (very good Alveolites suborbicularis collected at 8989). Also Syringopora colony with corallite diam. 3/16" at 8989.5, collected). Abundant small smooth brachs., prob. Emanuella meristoides, do not break free (coll. with corals at 8989*). Also one poor coarse-plicated small Atrypa. Few large crinoid ossicles and small gastropods. Piece of core taken 8989.1" to 8939'.8", full of corals and brachs. Some nodular-mottled structure but nodular portion in minority.

Box 7 8990-95'
Similar ls., but dominantly black, fn. xln. to cptxln., probably somewhat bituminous; thick-bedded, with few fossils; bands of ls. like that above have similar corals and brachs. Alveolites, small massive stroms. (few), Microplasma fongi (collected 8992') Thamnopora (collected 8992') and Emanuella meristoides (?) cf. Dialythophyllum fultum collected 8994.6. Large-diameter Amphipora in basal 4".

Box 8 8995-9000'
Similar lithologically to the preceding, with large numbers of corals and stroms. Dendrostella trigemme (collected at 8995.2'), Alveolites suborbicularis, Microplasma fongi, Thamnopora (coll. at 8995'), massive stroms., sparse Amphipora, very common masses which may be calcareous sponges, small gastropods. Syringopora collected at 8997'. D. trigemme is heavily encrusted by a stromatoporoid. Some mineralization along vertical joints.

Boxes 9 & 10 9000-9010'
Similar lithologically and faunally with: problematical calc. sponges, Cladopora 9000.5' not coll., gastropods (med. size) small massive stroms., Microplasma fongi coll. at 9000.8', large cystiphyllid coral coll. at 9001.4', large massive stroms. at 9003' spaghetti Amphipora, sparse at 9106', cf. Emanuella meristoides at 9107', encrusting stroms. on Thamnopora (9107'), Thamnopora sp. 9107', Alveolites suborbicularis 9108', cerioid coral (excellent; collected at 9108-08.4), fossils listed in order of appearance. Increase in white, calcite-filled gash veins downward.

_ END _

SUMMARY

B. A. - TEXACO ARROWHEAD B-76

Slave Point	Core top 8697-8927.5
(Schedule top=	
Beavertail	
(Warrenella cf. occidentalis 8928-8930.5)	
Hare Indian	8932.5-8957'
Hume (Nahanni)	8957-9010' plus
(Dendrostella trigemme 8971-8995')	
(Microplasma fongi 8974-9001).	

Determinations above Hume are tentative pending further study of fossils.

B. A. TEXACO ARROWHEAD N 2

LOCATION: 60° 31' 46" N; 123° 01' 18"W Core has been slabbed.

CORE 1 8604-8642'

Box 1
Marlstone, arg., black with brownish lustre, greasy and water repellant, thin-bedded on phyllitic partings. More calcareous bands are full of fragments of small massive stroms. More calcareous bands are grey-black and peppered with anhedral carbonate. Some fairly high amplitude stylolites. Very sparse spaghetti Amphipora.

Box 2
Similar but argillaceous fraction reduced and rock grading to dark grey. Some bioclastic fraction appears in lower part. No stroms. Less greasy in lower third.

Box 3
Top foot in box. Similar but grading to dark grey, compact, fine xln. ls., much less argillaceous. Bands with Stachyoides, small massive stroms., and Alveolites?

Rest of box and core.
Limestone, macadamized in coring, medium grey, compact, fine xln in aphanitic groundmass; few branching stroms. noted near base.

CORE 2 8650-8702'
11 boxes = 4.75' per box
Top 7'. Limestone, dark medium grey, bioclastic fraction, highest coarsest downward in dark aphanitic matrix. Abundant large massive stroms. are light grey. Also present: Coenites, with encrusting stroms., Stachyoides or algae.

8657-8669'
Limestone, dark-medium grey, fine xln. with aphanitic binder; massive, compact, with peculiar festooned fracture pattern. Essentially unfossiliferous.

8669-8685'
Limestone, stromatoporoidal. Matrix dark grey to grey black aphanitic limestone peppered with coarse pale-grey bioclastic fraction. Massive. Zones of massive stroms. of coarse-branching and anastomosing frame-builders (including Coenites cf. verruculosus Crickmay, frequently strom-encrusted) and barren zones up to 15" thick. Fossils include tabular and massive Alveolites. A single horn coral collected at 8677' is Alaiophyllum mackenziense Pedder. Caunopora is also present. Sharp, stylolited basal contact, 8685-870

8685-8700'
"Spaghetti-stone". Dominantly spaghetti to macaroni branching stroms. in matrix or binder of grey black aphanitic limestone with bioclastic content finer than above. At 8791' and 8797', however, spaghetti stone frame has voids filled by white sparry calcite.
One or two thin bands have massive and laminar stroms. apparently in growth position.
Amphipora is a prominent component. Lineation horizontal to 5o.

8700-8702'
Dark aphanitic limestone peppered with minor fraction of light bioclastic material.

CORE 3 8702-8708'
Much broken, but evidently rock similar to that described above, including spaghetti-to macaroni-stone and some dark bioclastic limestone.

CORE 4 10010'-10014'. Rec. 4'
Dolostone, marly & sandy, cptxln., dull light grey, very compact. Sandy portions in stringers with assorted, mainly medium to fine, well-rounded to subangular quartz sand, floating in the dolostone matrix. No bedding planes, but horizontal fracture-partings.

CORE 5 10014'-10047 32/33

10014'-10014.5'
Sandy and marly dolostone as above, with lt. & med. grey "zebra" banding.

10014.5-10020.5'
Dolostone, light grey, cptxln., with concealed but high quartz-silt content, & somewhat argillaceous. Some portions birdseye mini-vesicular with sparry fill; other portions show brecciation ranging from incipient to detrital. Fairly massive, with a few strongly stylolited partings. Compact with no effective porosity. Some floating quartz sand 10018-19'.

10020.5'-10027.0'
Similar lithologies but units are thinner, rock thinner-bedded, with a vague banding of light to medium grey.

10027.0-10028'
Similar dolostone, but massive with a finely mottled pattern of light & medium grey, with a high content of quartz sand and dolostone clasts.

10028.0-10029'
Similar dolostone but banding prominent.

-end-

SUMMARY

B. A. TEXACO ARROWHEAD N 2

Slave Point in core
Alaiophyllum mackenziense

Core top 8604-8708+
8677'

MACROFAUNA NOTES

I. O. E. TRIAD EBBUTT D-50

LOCATION: 62° 20'N; 122° 15'W

CORE 4 1489-1533-10"

1489-1532'
Canol shale, brown black, hard fissile non-calcareous.

1531-10"-1533'3"
Ls., dark, nodular mottled, in top 3 inches nodules have been separated and recompacted as an in-situ conglomerate. Upper contact with Canol Shale very uneven and sharp. Near top nodules are silicified and full of small non-recoverable gastropods. Nodules are separated by scant black "bituminous" marlstone matrix. Fossils include massive stroms., massive Alveolites, Microplasma fongi. Hume Formation.

1533'3"-1534"
Ls., pale dove colour, lithographic, with sparry-filled birdseye vesicularity. In top close microstylolites produce lamination. Hume.

- end -

SUMMARY

Canol Shale	Core: 1489-1532'
Hume (Nahanni)	1532-1834' plus
Microplasma fongi	1533'

(see also Norford et al, Geol. Surv. Canada, paper 70-15)

SUMMARY

I. O. E. TRIAD EBBUT J-70

Omitted because of evidence of absence of Slave Point equivalents in Ebbut D-50 core.

MACROFAUNA NOTES

FPC-Tenneco Root River I-60

LOCATION: 62° 40'N; 123° 25'W

CORE 1 2825-2845'

2825-2845'
Ls., dk gry., microxln., as nodules partially separated by darker, more marly ls. Small whitish crinoid ossicles dissem.; *Microplasma fongi* at 2826', 2828'.
Also scattered horn corals and branching tabulates. Small gastropods locally common. Massive stroms. from 2836-2845', fairly common.
Brach. fragments
Ostracods (cf. 2528')

CORE 2 3033-3053'

3033-3053'
Similar dark mottled ls., but higher bioclastic fraction and increase in gash-veining. Fossils chiefly small crinoid ossicles, small gastropods and corals incl. *Billingsastraea*? *Taimyrophyllum* coll. at 3052', cystiphyllid and small septate horn corals, *Favosites*, branching tabulates.

CORE 3 3534-3554'
Zebra-stone dolomite.

SUMMARY

Hume (Nahánni) top of core) 2825'-3053' +
"*Microplasma fongi* 2826-2828')
(*Taimyrophyllum* 3052'
(log and samples to be checked to determine position of Canol Shale)

MACROFAUNA NOTES

IMPERIAL CARTRIDGE F-72

LOCATION 63° 11' N; 120° 29'W

CORE 1 655-674' Rec. 14'
"Microfauna equivalent to h-fauna of Canol" Typical non-calc. Canol-type Shale. No macrofossils observed.

CORE 2 756-779' Rec. 21/23'
Ls., lt. grey, aphanitic, dull, upper 4" with calcite-filled birdseye vesicles, but most of core, cloudy-mottled by darker marly rock. Irregular black shale partings. White, small crinoid ossicles disseminated; few small gastropods; brachiopods difficult to isolate except near shale partings.
Brachs., coll. at 765.5', 771-773.5
Lingula cf. spatulata 760.5', 773'
Warrenella? about 771'
cf. Ladogicides 772'

CORE 3 785-823' Rec. 35/38'

785-800'
Ls., dk. gry. bn, aphanitic; conchoidal fracture; no bedding but vague color-banding and clouding. Lingula cf. spatulata (Vanuxem) coll. 788'

800-802'
Ls., an interlaminated pelletoid grey lime-sand, and black marly ls. Conspicuous syngenetic (?) brecciation. Some cross-lamination.

802-823'
Ls., nodules of med. bn., cptxln. with bioclastic fraction, separated by dark marlstone in a nodular-mottled pattern. Somewhat conglomeratic toward top. Some levels showing boring activity. Evidently abundant micro incl. ostracods, etc. Few coral frags., small brach. sections; tabular Alveolites at 809'. Disseminated white, minute, crinoid ossicles. Rayed calc. sponge spicules at 822.5'.

CORE 4 835-869' 24/34'

835-840.5'
Similar bn. nodular ls. Horn corals coll. 839' Massive stroms. at 840'

840.5'-842.5
Ls., pale grey, lithographic, with spar-filled birdseyes. Fossils increase downward incl. Amphipora, Dendrostella trigemme and micro-ostracods.

842.5-845'
Lt. & dk. mottled ls. with Amphipora. Stachyoides common plus Dendrostella trigemme, coll. at 843', and near base broken gastropods.

845-869'
Mainly pale lithogr. ls., some with vesicular birdseyes, some with abundant Amphipora etc.; but with bands of brown nodular fossiliferous limestone. Lower 2' of Core 4 and top of Core 5 have the lithographic ls. finely laminated by lighter and darker laminae.
Immense Dialythophyllum? coll. at 850'
Stachyoides present and ostracods (micro) locally common.

SUMMARY

Canol Shale	655-674'
gap	674-756'
Waterways? (Simpson)	756-802'
Hume (Lonely Bay)	Top 802-823' plus
(Dendrostella trigemme	841-844')

Tentative, pending study of fossils from interval 756-802'.
(See also Norford et al, G. S. C. Paper 70-15, pp. 13-15).

MACROFAUNA NOTES

IMPERIAL REDSTONE NO. 1

LOCATION: 64o 12'N; 124o 38'W

CORE 1 1657-1676' 17/19'
Ss., v. fine, & siltstone, medium grey, laminated. Ghosts of plant frags.

CORE 2 2061-2075' 7/24'
Top few inches, v. fn. ss. to siltstone, lt. grey, indurated. Rest of core shale, light grey, fairly soft, with a little marlstone toward top. Ostracods, Buchiola, Stylliolina. Misc. small pelecypods, and frags. of small orthoconic cephalopods common. Collections made.

CORE 3 2680-2720' 12/40'
Limestone, dk. grey, cptxln. with bioclastic fraction. Medium-bedded, with bedding planes inclined about 25o Alveolites (msv.), Thamnopora,

Fossils as follows:

Alveolites (tabular), Box 1A
Alveolites (msv.), Box 1A, 1B
Thamnopora (small diam.), Box 1A, 2A
Ostracods, Box 1A*, 2A*
brachs. small, smooth, Box 1A*
stroms. msv., Box 1B
crinoid ossicles, small, white; 1A, 1B, 2A, 3A
trilobite (Otarion?), 2A*
cf. Sociophyllum glomerulatum, 2A*, 3A*
stroms., tabular, Box 2B
Syringopora 2A

* indicates collected.

Top 8' seem to be in place, after which core degenerates to a rubble. Here some med.-dk. grey shale also seems to be present

CORE 4 3536-3576' 10/40
Top shows dk. grey marly shale (4') with bedding dips as in Core 3. No fossils observed. A : mixed breccia (solution breccia?) chiefly of dark cptxln limestone. Some coarse sparry cement.

SUMMARY

Waterways? (Simpson) 2061-2075'
(fauna to be studied)
gap 2075-2680'
Hume Cored 2680-2720'
(Schedule top 2640?)
Canol

MACROFAUNA NOTES

IMPERIAL CANOL BLUEFISH 1A

LOCATION: 64° 56'N; 125° 51'W

CORE 1 840-845' Rec. 3'
Shale, med. grey clay-shale, non-calcareous, decrepitating.

CORE 2 1087-1100' Rec. 10'
Shale, med. grey, subfissile, non-calcareous; decrepitated.

CORE 3 1228-1245' Rec. 13'

1228'-1232'
Shale, black, hard, very fissile, non-calcareous; subdivides with melanteritic decomposition; interbanded with clay, plastic, light grey.

1232-1245'
Same black shale, without the clay interbands; except for a few of latter toward base.

CORE 4 1638-1653' Rec. 8'
Upper 3/5 of Core. Ls., med.-lt. grey, microxln., in nodular lumps separated by marly gn.-grey shale.
Lower 2/5 of Core. Shale, lt. med. grey, clayey fairly hard, slightly calc., somewhat micaceous. No fossils observed in Core no. 4.

CORE 5 2056-2066' Rec. 5'
Ls. lt. med. grey, microxln., hard; with some zones having lamination by darker, more arg. ls.

CORE 6 2452-2472' Rec. 5'
Shale, bn. blk, hard, fissile, brown black, with cannel coal-like texture.

CORE 7 2553-2565 Rec. 9'
Ls., dk to med. gry, Aphanitic to cptxln., to microxln. downward. Fossils not common. Favosites at 2556'. Brachs. and ostracods collected at 2558' and Bracns. collected at 2562'.

Generally msv. with few strong, wavy partings of black hard shale. Top few inches is balled grey clay, below which ls. shows dynnamic brecciation and much white calcite veining.

CORE 8 2964-2980'
Anhydrite on dolomite

SUMMARY

IMPERIAL CANOL BLUEFISH 1A

Imperial Formation	cored: 1638-1653'
gap	1653-2056'
Imperial Formation Formation (ls.)	cored: 2056-2066'
gap	2066-2553'
Canol Shale	2452-2472'
gap	2472-2553'
Hume (Schedule top)	2520' (cored: 2553-2565')
(further study of Hume fossils planned)	

MACROFAUNA NOTES

IMPERIAL NORMAN WELLS # 37X

LOCATION: 65o 17'N; 126° 52'W

CORE 1 1032-1057'
Microxln., very porous, tan, with oil stain. Very soft. Massive stroms. common, up to cabbage size-1032-1045' Few small brachs at 1032.5'; coll.
Bioclastic fraction varies. Stachyoides prominent 1045-1057'.

CORE 2 1057-1082' Rec. 23.9'
Similar ls. 1057-70' very large massive stroms.

1070-1082'
Chiefly Stachyoides, rare branching tabulate corals.

CORE 3 1082-1107' Rec. 26.6'
Similar ls. but slightly less friable and color from tan to reddish brown. Few fossils except in top 10' and basal few inches, where Stachyoides is abundant.

CORE 4 1107-1122' Rec. 15'
Similar ls. with few fossils in upper 2/3 of core and Stachyoides abundant in lower 1/3, with rare small msv. stroms., much rolled and broken.

CORE 5 1122-1147' Rec. 25.5'
Similar ls. with abundant small pebble-sized stroms. mainly parts of Stachyoides and msv., types. Bioclastic content, incl. crinoidal debris increases. At 1129', large cabbage stroms. Below this to 1147', is an Amphipora macaroni-stone. Locally inter-fragmental voids have sparry fill.

CORE 6 1147-1172' Rec. 25+.5'
Similar ls. Upper 15' largely barren but with bands of Amphipora macaroni-stone. At about 1162' brach. frags. appear, and very good Laddia cf. caliciae collected at 1164-1165'.
At 1168' beds again stromatoporoidal with small massive stroms., macaroni-Amphipora, Stachyoides, and brach. fragments to 1172'

CORE 7 1172-1197' Rec. 26.4
Similar to preceding, but mostly well indurated by sparry filling. Entirely an Amphipora macaroni-stone, with a few other stroms. and interstitial small brachs.

CORE 8 1197-1227' Rec. 25'
Similar ls. but generally porous but Amphipora largely disseminated.

with a few concentrated bands. Small massive stroms. also present. Cabbage stroms. at 1213'. A few well indurated streaks.

CORE 9 1227-1252' Rec. 25'4"

1227-1229'
Similar to preceding.

1229-1239'
Bed of cabbage stroms. which are indurated; matrix remains porous.

1239-1252'
Similar ls. but up to 50% is compact. Stachyoides and large Amphipora disseminated. Cabbage strom. bed. 1245-1250'.

CORE 10 1252-1277' Rec. 25'8"

1252-1272'
Stromatoporoidal ls. like the overlying with cabbage stroms., small massive stroms., Stachyoides and large diameter Amphipora.

1272-1274'
Similar ls. An Amphipora spaghetti-stone. At base an irregular band of black shale about 1/8 inch thick.

1274-1277'
Ls., lt. buffy grey, highly porous, chalky textured, locally indurated and tan in color. Possible Stringocephalus at 1276' Few small msv. stroms.

CORE 11 1277-1302'
Ls., similar to preceding; stromatoporoidal with cabbage stroms., smaller msv. stroms., Stachyoides and Amphipora. Section of large brachiopod possibly Renssalaeria or Germanocephalus collected at 1278'. Zones of Stringocephalus at 1289', coll. and 1296-1299', etc. Also zones of cabbage stroms.

CORE 12 1302-1327' Rec. 25'5"

1302-1310'
Similar, with stroms. as above.

1310-1312'
Core has been removed.

1312-1320'
Amphipora spaghetti-stone with mxd. fine-med. somewhat sparry matrix. Few ostracods, coll. 1315'.

1320-1327'
Similar ls. but Stachyoides dominant.

CORE 13 1327-1352' Rec. 25'7"

1327-1332'
Similar.

1332-52'
Similar, but with large msv. stroms. dominant; Stachyoides present; few poor small brach sections. Small orthoid brach at 1337'. Crinoid ossicle become numerous at 1344'. At 1346, becomes dominantly branching stroms. Small diameter Thamnopora common near base.

CORE 14 1352-1377' Rec. 25'7"

1352-1357'
Similar, Amphipora spaghetti-stone with few Cladopora.

1357-1372'
Similar but mixed cabbage and branching stroms. Some Cladopora and small diam. Thamnopora. Schizophoria, coll. at 1363'. Small horn corals coll at 1369'. Lower 15' dominantly Stachyoides. Rock becomes firmly indurated and mottled: light grey fossils in darker grey matrix.

CORE 15 1377-1400 Rec. 25'4"
Ls., matrix lt.-med. gry.-bn., fine xln., fairly porous; full of Stachyoides & tabular stroms. Small-diam. Thamnopora fairly common. Alveolites becomes common at 1394', both as small masses and tabular. About 1390-1400', matrix dominates fossils.

CORE 16 1400-1425' Rec. 25'6"
Similar but rock adds fine-med. biocl. fraction. Narrow bands have black marlstone matrix with abundant angular crse.-med. bioclastic. Fossils make up from 10% to 70% of rock, chiefly Thamnopora, and branching Alveolites; some tabular stroms. Compound Alveolites coll at 1409' and small horn coral coll. at 1423'

CORE 17 1425-1435' Rec. 12'
Similar ls. but matrix lt. gry., fine xln. with biocl. fraction; some bands of black marly ls. as above. Fossils chiefly branching to lumpy Alveolites and Stachyoides with pieces of massive stroms. toward base. Few brachs., Schizophoria coll. at about 1430'

CORE 18 1435-1439'
Recovery little. Similar stromatoporoidal ls. with dark matrix.

SUMMARY

IMPERIAL NORMAN WELLS 37X

"Upper Key Scarp"	cored: 1032-1274'
Ladjia cf. *caligatae*	(1023')
Schedule top	1274'
Black shale on undulating surface	1274-1439' plus
"Lower Ramparts"	1276-1299'
Stringocephalus	1278'
Rensselandia?	

MACROFAUNA NOTES

IMPERIAL CANOL BEAR ISLAND #4

LOCATION: 65° 15'N; 126° 51'W

CORE 1 1935-1995'
Shale, grey non-calcareous, laminated and fissile, becoming darker downward. A few thin marly zones. Anaptychus coll. 1913.5' At 1928' becomes lighter & less fissile but still non-calc. Sparse small marcasite nodules.

CORE 2 2019-2044'
Shale, black to dark grey, very hard, with a few solid bands which are v. fine xln. but not calcareous. Typical Canol Shale.

CORE 3 2162-2193

2162-2181'
Ls., lt. gry., finely bioclastic, with scattered to abundant spaghetti Amphipora & Cladopora, coll. at 2170'. Bands of black marlstone with Thamnopora up to 5/8" diam., plus small horn corals (coll. 2163'). Much core loss in this interval.

2181-2186'
Great core loss here. Ls., black, mixed fn. xln. & cptxln., with Thamnopora as above, small-pored Cladopora? and few crinoid ossicles. Cladopora coll. at 2182'.

2186-2193'
Fair recovery here. Dark ls. as above, in places argillaceous with fine-pored "Cladopora" tabular Alveolites and small diam. Thamnopora, coll. at 2189' and scattered crinoid ossicles, and small horn coral, collected 2189', also at 2192'.

CORE 4 2305-2315'
Shale, dull grey, lumpy, calc., with a few indurated bands. Only fossil seen, a fragment of a dechenellid trilobite pygidium.

SUMMARY

IMPERIAL CANOL BEAR ISLAND # 4

Imperial grading to Canol	1785-2044' plus
gap	2044-2162'
*"Upper Key Scarp" top (Schedule 3)	2108'
*"Upper Key Scarp"?	cored: 2162-2193'
gap	2193-2305'
Hare Indian	2305-2315'
Schedule 3 top 2272'	

MACROFAUNA NOTES

IMPERIAL CANOL BEAR ISLAND NO. 7

LOCATION: 65° 15.5'N; 126° 53'W
(very poor core recoveries)

CORE 1 1779-1785' Rec. 2½' (gravel)
Ls., microxln., dull, porous, oil-stained. Some portions indurated and light grey. Fragments of msv. stroms.

CORE 2 1785-1802' Rec. 2½' (gravel)
Same.

CORE 3 1802-1813' Rec. 2½' (gravel)
Same.

CORE 4 1813-1823' Rec. 2' (gravel)
Same.

CORE 5 1823-1833' Rec. 2½ (gravel)
Same.

CORE 6 1833-1843' Rec. 2½ (gravel)
Similar but predominantly indurated, aphanitic, lt. grey to lt. brown.

CORE 7-9 missing

CORE 10 1870-1885' Rec. 14'
(but only about 10' present).
Ls., lt. bn., microxln, dull, v. porous, very soft; unfossiliferous.

CORE 11 1885-1890' Rec. 5'
Same.

CORE 12 1890-1904' Rec. 6'
Same.

CORE 13 1904-1920'
("only top 3' known")
Similar but irregular induration has nodular effect. Some msv. stroms

CORE 14 1920-1933' Rec. 2½' (cobbles)
Similar but Amphiphipora common, to spaghetti stone.

CORE 15 1933-1948' Rec. 10'
Spaghetti stone; lt. dull bn., matrix fn. & porous, plus much sparry in-fill.

CORE 16 1948-1963' Rec. 2½' (gravel)
Some rock like preceding; plus lt. grey, cptxln. & micro sparry ls., with few Amphipora and a high-spired gastropod (coll.).

page 2.

CORE 17 1963-1978' Rec. (gravel) 2'
Largely dark grey aphanitic to cptxln. ls. with msv. stroms. fairly common.

CORE 18 1978-1993' Rec. 2' (cobbles)
Similar lt. grey dense ls. with Massive stroms.

CORE 19 1993-2008' Rec. 2' (cobbles)
Similar ls. with Amphipora msv. stroms. and a few med. sized brach. sections.

CORE 20 2008-2223' Rec.' 2'
Similar ls. with Amphipora, locally concentrated in spaghetti-stone bands. One large thick-shelled peleoypod, section.

CORE 21 2023-2038' Rec. 2¼' (mostly cobbles)
Similar; Amphipora increases in abundance.

CORE 22 2038-2052' Rec. 2'
(change here to smaller diam. core; 2½ inch)
Ls., mainly aphanitic lt. grey to med. bn. grey; polished pieces shows common very small diam. Amphipora and small msv. stroms. Bioclastic content fairly high in the brownish rock.

CORE 23 2052-2067' Rec. 2½'
Ls., cptxln., med. bn., much of it an Amphipora spaghetti-stone; some portions barren. Some msv. stroms.

CORE 24 2067-2081' Rec. 10'
All Amphipora spaghetti-stone, plus a few msv. stroms. Matrix as above.

CORE 25 2081-2100' Rec. 10'
All Amphipora spaghetti-stone; matrix becomes lighter and more calcitic.

CORE 26 2100-2114' Rec. 8'
Similar. Spaghetti- to vermicelli-stone in top part. Rest dominantly macaroni Amphipora, with rare Atrypa; coll. at 2111'

SUMMARY

IMPERIAL CANOL BEAR ISLAND NO. 7

This proved to be very poorly cored, recovering only 92 out of 244', much of that as lumps of "gravel". No diagnostic fossils were observed.

MACROFAUNA NOTES

IMPERIAL LOON CREEK #1

LOCATION 65° 20'N; 126° 45'W

CORES 1 & 2
Not examined.

CORE 3 515-533' Rec. 14'
Shale and siltstone, medium to lt. grey, much of it highly micaceous; some surfaces show dark flecks which may be plant fragments. Non-calcareous. Imperial.

CORE 4 2912-2924'
Shale, med. grey, dull, rather flaky; surfaces with pyrite-coated trails. Hare Indian.

CORE 5 3196-3219' Rec. 6'
Upper 3/4 of Core.

Ls. nodular-mottled, with cobble-like nodules of med. bn. grey aphanitic ls. with small bioclastic fraction in matrix of black fossiliferous marlstone. Small smooth brachs common in marlstone; also Thamnopora, Cladopora, Alveolites. Hume

Lower ¼ of core.

Ls., pale grey cptxln to lithographic, with minute irregular openings in some portions, with sparry fill. Hume.

-end-

SUMMARY

Imperial Formation	Cored 513-533'
("Keé Scarp Tongue", Sched. 3)	(2890-2924')
Hare Indian	Cored 2912-2924'
Hume; Sched. 3)	Top 3160'
Hume	Cored 3196-3219'

MACROFAUNA NOTES

IMPERIAL SEEPAGE LAKE 1A

LOCATION: 65° 18' N; 126° 50.5'W

CORE 1 985-1011' Rec. 20'

985-988'
Shale, black, hard, fissile, non-calc. Typical Canol shale.

988-1000'
Shale, lt med. grey, calcareous, somewhat micaceous; pyrite clusters; A few bands of lt. grey, fn. xln. marlstone. Fossils very rare, pyritized crinoid ossicle, brach. fragment, etc.

1000-1002'
Much core loss at bottom. Ls., lt. med. grey., v. fin xln., with productella abundant in top 3 inches coll. at 1000'. P. gulosi Crickmay, crin. ossicles., Emanuella sp., Paracyclas sp.

1002-1002.5'
Shale like that from 988-1000'

1002.5'-end
Ls. rubble, much core loss here, Ls., is pale grey, sub-lithographic, with minute irregular openings with sparry fill.

-end-

SUMMARY

IMPERIAL SEEPAGE LAKE 1 A

Canol Shale	985-988'
Beavertail	988-1002.5'
(Productella gulosi 1000')	
Key Scarp	1002.5-1011.0

IMPERIAL GOOSE ISLAND #19 E67

Macrofauna Notes

G. O. Raasch

LOCATION: 65° 16' 20"; 126° 57' 46.5"

CORE NO. 1 2135-2180' Rec. 17/45=11' per box

Boxes 1 to 4 Limestone, lt. tan, fn. xln., dull, intergran. pososity general. Stromatoporoids: - Amphipora, Stachyoides, laminar, small-massive, encrusting- are present throughout in varying concentrations from sparse to forming solid conglomerates. Lineation of stroms. up to 45° dip or more. Minutely vesicular texture, particularly in strom.concentrations has sparry fill, but intergranular porosity persists. Light kerogen stain throughout.

CORE NO. 2 2180-2229' Rec. 29/49'

Similar matrix to that of Core No. 1 but stroms. much more abundant making virtual coquina nearly throughout. Many concentrations are pebbly, fragmented with some rounding. Others frame structures making spaghetti-(Amphipora) and macaroni-(Stachyoides & Amphipora); few included small-massive types. Very steep lineation of organisms in places at least 70°. One or two fragments of large brachiopods (Atrypa?). Kerogens as above. (Rarely strom.-conglomerate matrix is filled by black, argillaceous material).

CORE NO. 3 2229-2243' Rec. 14/14'

Similar porous ls., but in places darker to medium brown probably due to argillaceous content. Stromatoporoids may be sparse with vermicelli to spaghetti Amphipora and macaroni Stachyoides, or may be in coquinoid concentrations, mainly of Stachyoides. Lineation continues very steep. A horn coral fragment pebble and a large brachiopod fragment only other fossils. Kerogens more or less as above.

CORE NO. 4 2249-2278' Rec. 11/35'

Rock becoming much darker, to black-brown near bottom of core; and darker portions are compact with some bioclastic fraction (crinoidal debris). Lineation of strom. branches ranges from horizontal (rarely) through 45° to 70°. Stroms more or less as above, but making up less of the rock and ranging from sparse to conglomerates of about 60% matrix. Kerogens much less, in isolated streaks.

CORE NO. 5 2278-2292' Rec. 11/14'

Similar to core above, rock light brown to black brown; increase in kerogens. Stroms. in varied concentrations, mainly Stachyoides, some spaghetti-Amphipora and scarce small-massive types. Where lineation is evident it is mainly very steep (about 70o). A couple horn coral fragments at 2281' collected. Some silicification (of Stachyoides) near bottom of core.

CORE NO. 6 2292-2320' Rec. 19/25 4 boxes (25)=6'

Similar to preceding except becoming somewhat lighter brown and finer in lower part. Steep lineation (45°-70o) of rock & fossils continues. (There has been no visible bedding since top of core). Stroms. still abundant chiefly spaghetti and macaroni Amphipora, Stachyoides, and fewer small massive types. Scarce additional fossils include crinoid ossicles, worn horn-coral fragments, a large fusispiroid gastropod* (2297'), a tabular Alveolites* (2299') and ramose bryozoan or Cladopora* (2308'; some of these also seen in higher cores). Slight incipient silicification of some fossils. Nearly all of core shows good odor and stain of light oil

CORE NO. 7 2320-2335' Rec. 15/15=5' per box
Samples: 2324' Alveolites
2329'-2330' Alveolites & Cladopora
2334.5 Alveolites, Cladopora & thick calc. sponge spicules.

Similar ls., porous, fine xln. dull, lt. med. bn. to dk. med. bn. Upper 4' chiefly macaroni Amphipora sparsely scattered; rest of core chiefly abundant tabular Alveolites plus some irregularly massive stroms. Lineation of stroms. varied, chiefly at 60°-70°. Also abundant in patches is a Coenites. Crinoidal debris sparse. Coarse spindle-shaped fossils abundant in bottom of core could be calcareous sponge spicules.

CORE NO. 8 2586-2613' Rec. 23/27'

Limestone, med. brown to tan, fine medium, intergranular porosity, no bedding but lamination and fossil lineation show steep initial dip up to 60°. Interval between 2595-98' has only a few small brachs. Argillaceous

streaks show dip of about 55°. Rest of core similar with scattered stroms., Amphipora (macaroni & spaghetti) and Stachyoides. Coarse branching Alveolites collected at 2610'.

CORE NO. 9 2613-2663'

Ls., pale tan, finely xln., dull, porous, non-bedded; very minor bioclastic fraction includes a few ostracods & crinoidal & brach. debris. Top 9' has a few brach. sections and one thin band with coarse Amphipora & Thamnopora. Lineation of rare dark laminae indicates dip around 60°. Next 15' similar rock with scattered Amphipora plus rare Stachyoides, Coenites, & brach. sections; bioclastic fraction as above. Dip indicated at about 40°-65°. Trachonemopsis and Emanuella cf. vernilis from about 2635'. At 2637' is a contact at about 70° dip, underlain by a couple inches of dark marly ls., laminated, with psuedo-boudinage plus incipient brecciation along the contact. Rest of core is similar ls., but sparingly fossiliferous with sparse Amphipora and rare brach. sections (Emanuella), Stachyoides, Trupetostroma? and small fragments of massive stroms. Lineation is indicated by rare dark films and some incipient lamination from 20°-70° dip. Some steep surfaces (70°) are distinctly stylolited. (therefore is this initial or tectonic dip?).

CORE NO. 10 2663-77' Rec. 14'

Top 4'. Similar to preceding. Rare massive strom. fragments and a large lenticular gastropod (at 2665'). Lower foot is darker, to medium brown. Basal contact at about 35° and hummocky. Change to black-brown fine-grained, dull, dirty ls. with good intergranular porosity with same steep lineation as above. Scattered Amphipora (macaroni), massive strom. fragments, rare lenticular gastropods and probable large calcareous sponge spicule (as higher in core), plus less rare cladoporoid corals. At about 2670-71' is a lighter band with large pieces of an Alveolites* and a 3" lighter band occurs 18" above bottom of core. These light bands have horizontal contacts.

CORE NO. 11 2677-2704' Rec. 22/27'

Top 6.5' brown-black limestone as above with a few

page 4.

microstylolites that are oriented from 0° to 50°. Fossils are white in black matrix. Crinoid ossicles increase in abundance downward. Few Coenites*, Alveolites* and small pieces of massive stroms. Basal contact missing. Next 8.5'. Similar but lighter, grading to medium brown. Lineation not indicated; massive. Fossils more common, especially crinoid ossicles, Alveolites*, Coenites; some fairly large massive stroms., plus a rare segmented branching strom. Some brachiopod (small) cross-sections would not break out. Basal contact missing. 4". Diagenetic breccia of grey bn. fn. xln. ls. in pseudo-boudinage structure with black argillaceous films and partings. Lineation 60°-75° with strong stylolites normal to the dip. Crinoid ossicles, Coenites, Amphipora fairly common. Rest of core ll. Ls., fine xln., lt. bn., dull, somewhat porous with zones of black partings dipping 60°-80°. Some strong stylolites normal to this (see spl. 2700') Amphipora, Cladopora*, Coenites* (2701') and rare brachs., including a productid* (2703') with wavy longitudinal sculpture.

CORE NO. 12 2704-2735' 27/31'

Similar to preceding with alternated light and dark brown zones which are intergrading. Steep dip continues. Stylolites as above. (see excellent examples in top of core) 2706'* - Emanuella*
2707'* - Productid* with fine wavy radial ornament and minute spine bases. Same as at 2703'

Same Amphipora, Coenites (very small diameter), and Cladopora as above, but sparser. Increase in small & medium sized brachs. Ostracods sparsely present.
2721' Warrenella occidentalis*
very good; in sections could be confused with Stringocephalus.
2722' Emanuella cf. vernilis, etc.
2732.5' Emanuella cf. vernilis
Megastrophia? sp.? etc.

SUMMARY

IMPERIAL GOOSE ISLAND # 19

"Upper" Kee Scarp	2135-2735'*
(Emanuella vernilis	2589-2732.5')
(Warrenella occidentalis	2592-2721')

*Excessive thickness of "Upper" Kee Scarp in this well is probably result of an exaggeration of thickness due to steep dip, which ranges from 45° to 80°. This also should explain low position of the "Upper" Kee Scarp relative to surrounding wells and outcrops.

PACIFIC WESTCOAST OSCAR CREEK H-77

MACROFAUNA NOTES - G. O. RAASCH

LOCATION: 65° 26' 22"N; 127° 28' 15"W

CORE 1 1661-1682' Rec. 21'

Box 1 of 3

Top 1.5'. Ls., med. dark grey brown microxln. Thin-bedded due to thick black shale partings; some with woody fragments. Spaghetti-stroms. in upper part of ls. Next 0.5'. Inter-banded ls., dk. grey, fine xln., bioclastic, with Leiorhynchus castanea* or hippocastanea* and black fissile shale with compressed ostracods. Next 8". Ls., arg. fnxln., dark brown grey, massive; a coquina of Emanuella meristoides*. Next 26". Ls., arg? grey black, fn. grained, somewhat cal-carenitic. Studded with large Alveolites* colonies; dissemin-ated E. meristoides* possible sponge*, Coenites*, Thamnopora, etc. Next 4". Shale, brown-black, fissile, bituminous (?); microfossils*, Coenites*. Rest of box. Ls., marly, black, similar to that higher in core, but more argillaceous. Studded with large, well-preserved masses of Alveolites; etc. Few brach. sections (Atrypa?). *1663.5' *1664' *1665' *1666.5'

Box 2 of 3

Similar black marly ls., studded with masses of Alveolites* throughout. Also disseminated Coenites, Thamnopora* and Amphipora-like sponge (?)*. A few thick bands of dark shale. *1668.5 *1671-72'

Box 3 of 3

Top 1.5'. Similar to preceding; abundance of Alveolites* and a few brach. sections (Spinatrypa)*. Next 22". Shale, grey black, moderately calcareous, with fairly high white bio-clastic content in some zones; little in others, except microfauna*. Few Alveolites*, Coenites, crinoid joints and a giant Cyrtina*. Rest of box. Dark to black ls. & marlstone; upper part chiefly tabular Alveolites; lower part full of massive Alveolites and "Amphipora-like sponge" as in high parts of core. *1675.5'

CORE 2 1682-1702' Rec. 20'

Box 1 of 3

Similar to preceding but varying from med. bn., cptxln., clean ls., to grey black marly ls.. A few thick black shale partings. Massive Alveolites common in more arg. zones; tabular Alveolites* sparser, in cleaner ls. Also a coarse-ribbed Atrypa* (not A. awatica), Coenites, Thamnopora*. Nodular-mottled structure with lighter ls. masses & darker

marlstone binding developed below top 2 feet. *1683' *1686.5' *1689'

Box 2 of 3

Similar Alveolites "reef" but rock cleaner, qptxln., med. bn. Alveolites* & few Coenites*. *1695.5*

Box 3 of 3

Similar. Basal few inches have black marlstone matrix.

SUMMARY

PACIFIC WEST COAST OSCAR CREEK H-77

"Upper Ramparts"	1661-1702'
(Leiorhynchus-hippocastanea	1662.5')
(Cyrtina sp. "giant"	1675.5)

MACROFAUNA NOTES

IMPERIAL JUDILE # 1

LOCATION: 65° 29.5° N; 127° 36' W

CORE 1 1321-1362' Rec. 16' (cobbles)
Ls., Med. grey. aphanitic, with small bioclastic fraction; to cptxln. and microxln.; compact. Amphipora & small msv. stroms. appear at 1324'. A few minute gastropods and ostracods above this. Amphipora locally concentrated into thin spaghetti-stone bands. Rare ostracods. Possible horn coral below 1325' (collected), Brach sections, ostracods, and minute brachs. coll. below 1340' a few thin porous streaks have oil stain.

Core 2 1589-1605' Rec. 6'
Upper 3/5 of core

Spaghetti-stone of white Amphipora in dark ls. matrix, cptxln. Also present few Cladopora (coll. about 1590'), thin tabular stroms., small diam. Thamnopora, and small and large horn corals (coll. about 1590')

Lower 2/5 of Core 2: Ls., med. bn., microxln., dense to porous, latter with oil stain. Few Amphipora.

CORE 3 2307-2348' Rec. 18'

Ls., nodular-mottled, with nodules of lt. grey ls., aphanitic with high bioclastic content; in dark marly ls. Dendrostella trigemme and cystiphyllid corals common in upper part (coll. 2315' ±); disseminated Amphipora and pieces of massive stroms. throughout. Few small smooth brach. sections and an Atrypa fragment (not A. arctica). Hume.

SUMMARY

Note: Cores 1 (1321-62') and 2 (1589-1605') have very poor recovery, and age determination is deferred pending study of fossils collected.

Cored: 2307-2348'

Hume
(Sched. 3 top 2302')
(Dendrostella trigemme 2315')

MACROFAUNA NOTES

IMPERIAL MORROW CREEK 1

LOCATION: 65° 23'N; 127° 28'W

CORE 1 1090-1099' Rec. 5'
Ls., lt buffy grey, fn. xl. with sparry inclusions.

Fossils include thin tabular stroms., small smooth brachs., ostracods, small horn coral. In mid-portion of core, a Amphipora spaghetti-stone in dark marly matrix. Coll. at 1090-1093' brachs, corals, ostracods. Coll 1096-1099', brachs. Base of core has large mass of balled grey clay.

CORE 2 1596-1616' Rec. 13"

1596-1608'
Shale, black, to brown black, non-calc. but with marly bands. Abundant Stylioliina, Tentaculites and Buchiola, minute orthoconic cephalopods. Lingula, other phosphatic brachs and misc. pelecypods.
Collections:
1596-1599' coll.
1600-1603' coll.
1603-1604' coll.
1603-1616'. Marlstone & marly ls., dark, dull, cptxln; few poor fossils, unidentifiable.

CORE 3 1694-1714'
Ls., med. lt. grey, cptxln. to aphanitic, compact, massive. Birdseye vesicles have sparry fill. Checked by combination of horizontal and vertical microstylolites.
Rare obscure Amphipora & ostracods(?).

SUMMARY

Determinations deferred pending laboratory study of fossils.

MACROFOSSIL NOTES

IMPERIAL CANOL FOOTHILLS RIDGE NO. 2

LOCATION: 65° 25'N; 127° 32'W

CORE 1 928-953' Rec. 7' of rubble
Ls., lt. grey, microxln, porous, soft, locally better indurated. Anastomosing common, also small msv. and thin tabular stroms. Crinoidal fragments. Possible ostracods and small brachs. coll. near bottom of core-rubble.

CORE 2 1199-1209' Rec. 1'
Ls., lt. grey bn., microxln. with rather high bioclastic fraction. Msv., non lam. No macro or microfossils observed.

CORE 3 2018-2028' Rec. 9'
Marly shale and shaly marlstone, bn. blk. without parting or bedding-cleavage; cannel coal texture. Local slickensiding. Tentaculites & Styliolina rare; too poor for collection.

CORE 4 2051-2137' Rec. 60'
Fairly rubbly.

2051-2135'
Shale dk. grey to grey black, hard to decrepitating; bedding indistinct at least 2100. Calcareous. Flattened Leiorhynchus and locally abundant Styliolina, in upper 3'; also latter at about 2063' Interbedded dark marlstone from 2065-68', etc. Around 2075' (est.) partings are horizontal. Much slickensiding throughout and Core No. 4 may represent a faulted and crumpled interval of unreliable stratigraphic thickness. Some slickensides are vertical. Around 2095' Leiorhynchus and Pterochaenia-like pelecypods coll. Here bedding planes are about 45°. Excellent Cornellites collected at about 2115'. From around 2100' to base shale shows little disturbance and only little slickensides, on bedding planes. Pyrite (marcasite) nodules fairly common in this interval. Only fossils seen were the Cornellites and a few minute orthoconic cephalopods.

CORE 5 2168-2178' Rec. 2' of rubble.
Typical fume nodular-mottled light ls. nodules and clasts in black hard marlstone matrix. Dendrostella trigemme common, collected; also piece of a large cystiphyllid coral.

-end-

SUMMARY

IMPERIAL CANOL HOSSIER RIDGE NO. 2

Upper cores determination deferred pending labortory study of fossils.

Hume (cored 2168-2178'
(Sched. 3 top 2160')
(Dendrostella trigemme, 2168-2178')

MACROFAUNA NOTES

IMPERIAL SANS SAULT # 1

LOCATION: 65° 43'N; 128° 49'W

CORE 1 1409-1423' Rec. 4' of rubble
Upper 2/3, ls., blk. aphanitic, resembling L. hippocastanea Zone at Carcajou Rock. Brown black cast & streak.

Lower 1/3 dark microxln. ls. mottled by light-colored stroms., including Amphipora and massive.

CORE 2 1710-1728' Rec. of rubble 5'
Ls., grey black, cptxln., hard, much of it with stroms.; spaghetti Amphipora, msv. cobble stroms., and less common Stachyoides.

CORE 3 1942-1991' Rec. 49'
Ls., med.-lt. grey, cptxln, roughly and thickly laminated by darker streaks.

Bands of minute crinoid ossicles. Brachs. associated, chiefly Atrypa coll. 1940-1950'.
Rock becomes more argill. and closely laminated below 1950' and only very sparse micro-ossicles were observed. Rock resembles upper part of Hare Indian Formation as developed at the Ramparts and at Powell Creek.

CORE 4 2531-2549'
Shale, med. grey, decrepitated, calc. Some pale grey mottling. No fossils observed.

CORE 5 2531-2540' Rec. 18'
Ls., nodular-mottled, with nodules med. grey aphanitic, in black marlstone matrix. Except for crinoid ossicles disseminated throughout, fossils are not common. Ossicles are of two types, minute and large-discoid. Amphipora in top few inches. Few micro-gastropods. Micro- [illegible] ostracods coll. at 2786'; also two-pronged dechenellid pygidium characteristic of Hume; also probable Dendrostella trigemme. Small smooth brach. section (Emanuella) could not be separated from matrix.

-end-

SUMMARY

IMPERIAL SANS SAULT # 1

"Beavertail"	1409-1419'
(Leiorhynchus hippocastanea)	
"Upper" Ramparts	cored 1419-1424'
gap	1424-1710'
Carbonate (poor recovery)	1710-1991'
gap	1991-2531'
Hare Indian	cored 2531-2549'
gap	2549-2782'
Hume	cored 2782-2801'
Dendrostella trigemme	2786'

MACROFAUNA NOTES

ATLANTIC SW AIRPORT CREEK # 1

LOCATION: 66o 21'N; 129o 15'W

CORE 1 370-400'

370-400'
Ls., chalky matrix, pale buffy grey; full of Alveolites. Very high bioclastic fraction. Massive Alveolites abundant; "Cenatopora" in top few inches. Very small diameter Thamnopora fairly common. Atrypa and ? Ladjia common at 371' (coll.), 376' (coll.) Small horn coral 378.5 '; coll. Also abundant is a branching Alveolites. Crinoid ossicles disseminated. Coarse Spinatrypa at 379'. Sparse small diam. Stachyoides. Large diam. Thamnopora at 381'. Possible large Warrenella frags. at 382', 387'. Thamnopora cequina at 382'; coll. Thick partings of black shale with pseudo-boudinage ls. stringers begin at 382', giving thin bedding. Large diam. Thamnopora is now the dominant fossil Few horn corals. Marble-sized calc. algae at 386'. Thick tabular stroms. 386.5'. Horn corals, Thamnopora coll. 387.' Horn coral coll. 388', 390-391'. 393-394' many tabular stroms. Amphipora vermicelli-stone interbanded with tabular stroms. at 394'. Cystiphyllid coral coll. here; also at 397.5-398.5'

Fauna - 371'
Spinatrypa sp. PC 5
Ladjia of. caligatae Crickmay
Thamnopora sp. (diam. up to 5.5 mm.)
Emanuella n. sp. "mackenzie"

Fauna 376
Productella sp. (dorsal)
Ladjia n. sp. "mackenzie"
Thamnopora sp. (diam up to 6 mm.)
Spinatrypa sp. undet.

CORE 2 1355-1367' Rec. 12'
Ls., dk., cptxln. to microxln., msv., full of light colored stroms. incl. msv. cabbage stroms., tabular stroms., and Amphipora; also tabular and branching Alveolites. Dendrostella trigemme fairly common; coll. at 1355-1356' and 1359'. Hume..

-end-

SUMMARY

ATLANTIC S. W. AIRPORT CREEK NO. 1

Top "Upper" Ramparts (Sched. 3)	362'
	Cored 370-382'
"Upper" Ramparts	371-376'
Ladjia sp.	371-378.5'
(Grypophyllum mackensiense ident. by Pedder)	
Thick black shale partings	382'
	382-400'
"Lower" Ramparts	388'
Temnophyllum sp. nov.	390-391'
Temnophyllum richardsoni	400-1355'
	Cored 1355-1367'
gap	
Hume	
(Dendrostella trigemme)	
(Billingstraea)	
(Schedule 3 top 1275')	

(see also appended by A. E. H. Pedder)

Report on 12 lots of Devonian fossils from the Atlantic S.W. Airport Creek No. 1 Well (66°21'10"N, 129°14'44"W; NTS 106 I); District of Mackenzie

The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Western Paleontology Section, Calgary, for possible revision.

Stratigraphy	Fauna	GSC Loc. No.
Ramparts Fm., 114' above base, 9' below top; depth 371'	Thamnopora sp. undet. Spinatrypa sp. indet. Ladjia ? sp. indet., ex gr. L. landesi Crickmay age: Early Frasnian, mackenziense Zone?	C-9107
Ramparts Fm., 109' above base, 14' below top; depth 376'	Alveolites sp. undet. Spinatrypa sp. indet. Emanuella ? sp. undet. age: Pre Famennian Devonian	C-9108
Ramparts Fm., 106 1/2 ' above base, 16 1/2' below top; depth 378 1/2'	Alveolites sp. undet. Thamnopora sp. indet. Grypophyllum mackenziense (Pedder) Emanuella ? sp. undet. age: Early Frasnian, mackenziense Zone	C-9109
Ramparts Fm., 103' above base, 20' below top; depth 382'	Thamnopora sp. undet. age: Silurian to pre Famennian Devonian	C-9110
Ramparts Fm., 98' above base, 25' below top; depth 387'	Thamnopora sp. undet. Moravophyllum sp. nov. age: Givetian?	C-9102
Ramparts Fm., 97' above base, 26' below top; depth 388'	Thamnopora sp. undet. Temnophyllum sp. nov. age: Givetian or Frasnian	C-9111
Ramparts Fm., 94-95' above base, 28-29' below top; 390-391'	Thamnopora sp. undet. Temnophyllum richardsoni (Meek) T. sp. nov. Disphyllum ? sp. undet. Grypophyllum sp. indet. Tabulophyllum sp. indet. age: Givetian, aleskanus Zone	C-9112

Ramparts Fm., 91' above base, 32' below top; 394'	Plasmophyllum sp. indet. age: Lower or Middle Devonian	C-9113
Ramparts Fm., 86 1/2-87 1/2' above base, 35 1/2 - 36 1/2' below top; 397 1/2 - 398 1/2'	Amphipora sp. undet. Thamnopora sp. undet. Plasmophyllum sp. indet. Emanuella sp. indet. age: Lower or Middle Devonian	C-9114
Hume Fm., 274-275' above base, 80-81' below top; 1,355-56'	stromatoporoids, not studied tetracorals, indet. age: not determined	C-9104
Hume Fm., 271' above base 84' below top; 1,359'	Sociophyllum glomerulatum (Crickmay)? age: Eifelian?, adoceta or dysmorphostrota Zone	C-9105
Hume Fm., 265' above base, 90' below top; 1,365'	Radiastraea verrilli (Meek) age: Eifelian, adoceta or dysmorphostrota Zone	C-9106

Remarks

The upper 17 feet (C-9107 to C-9109) of the Ramparts Formation (broad sense) in this well are referable to the mackenziense Zone. The underlying aleskanus Zone is present 28 feet below the top of the Ramparts (C-9112) and may extend to within 25 feet of the top (C-9102) as Moravophyllum has not previously been found in beds as young as the mackenziense Zone. The new species of Temnophyllum present in C-9112 is well known to me and is not conspecific with another new species that commonly occurs with Grypophyllum mackenziense.

Sociophyllum glomerulatum (Crickmay), which may be present in C-9105 (single small corallite only), and Radiastraea verrilli (Meek) are common in the upper Hume dysmorphostrota Zone, but also occur in the lower Hume adoceta Zone. On the basis of conodonts T.T. Uyeno now considers the entire Hume to be Eifelian.

A.E.H. Pedder

Western Paleontology Section
Institute of Sedimentary and Petroleum Geology
Calgary, April 23, 1971

MACROFAUNA NOTES ON UNION PAN. AM. TRAINOR L-59 - G. O. Raasch

LOCATION: 60° 28' 33" - 120° 40' 50"

CORE 1. Footage 5750-5830'

Box 1 of 13. 5770 - 74.6
Top: Limestone conglomerate oralgal pellets in bands; rather well preserved; calcareous algae; calcite-filled borings?

Bot.: Similar; Chara present

Box 2 of 13. 5774.6 - 79.2
Top: Same as preceding.

Bot.: Scattered algal* pellets. * or amphipora

Box 3 of 13. — 83.8
Top: Masses of branching algae or stromatoporoids (in bands); Chara present.
Bot.: Same; possible cephalopod section-calcite filled; poor

Box 4 of 13. — 88.4
Top: Branching algae or stromatoporoids; large, massive strom.; closely packed algal? masses.

Bot. Same massive stroms. and branching stroms.

Box 5 of 13. — 93.0
Top: Branching algae and/or stroms. in sparse bands.

Bot.: Same; closely packed in basal foot.

Box 6 of 13. 97.6
Top: Branching algae and/or Amphipora, closely packed. Section of probable *Stringocephalus. Remainder with sparse and local "sphagetti" algae,*(5798').

Bot.: -

Box 7 of 13. 5797.6 - 5802.0
Top: Abundant stroms. and/or algae

Bot.: Same.

Box 8 of 13. — 5806.6
Top: Small-slender & irreg.-massive algae. A few poor X-sections of small brachs.

Bot.: Similar, plus Auloporoid coral in top block, and massive strom. at base.

* Collected specimen

Box 9 of 13. — 5811.2

Top: Packed algal-nodular ls. with a few small stroms. *A solitary rugose coral at top (5811').

Bot.: Same.

Box 10 of 13. — 15.8

Barren above, passing down to close-packed, small-branching algae and/or stroms.

Box 11 of 13. 20.4

Similar. The auloporoid of Box 8 again present at one horizon. Few massive stroms. near base; few small brachs.; plus large but very poor, possible Stringocephalus* (5821').

Box 12 of 13. 25.0

Dominantly irreg. to massive stroms. Lower foot has large, low, ventricose gastropod (incomplete) and large *Stringocephalus*(5825').

Box 13 of 13. 30.0

Top: Alternation of small-branching and irreg.-massive bands of stroms. and algae; gastropod (Fusispira-like).

Bot.: Massive stroms. and large gastropods.

CORE 2. Footage 5830'-5890'

Box 1 of 13. 34.6

Top: Almost solidly stromatoporoidal with segregation into large massive and small branching forms.

Bot.: At top inch and below a fine-pebble ls. cgl. "Cladopora" appears in a still dominantly stromatoporoidal ls. A possible large Spinatrypa*. Below grit-cgl., matrix changes to black, v. arg. ls. *(5833')

Box 2 of 13. — 39.2

Top: Return to lt. gry., pure ls. near bottom of top half. All highly stromatoporoidal with potpourri of forms.

Bot.: "Cerioid coral?" in base of lower half. Large gastropod* (5838').

Box 3 of 13. — 43.9

"Cerioid coral" in top. Also near base. These are revealed to be actually massive stroms. with a highly nodose growth. They have been returned to boxes. Core is marvelous with medley of stroms. of many types.

Box 4 of 13. – 48.5
Top: Various stroms. in abundance including pseudo-cerioid.

Bot.: Similar with large massive forms predominating.

Box 5 of 13. – 53.1
Top: Similar to preceding including pseudo-cerioid, which becomes dominant in bottom

Box 6 of 13. – 57.7
Top: Intricately branching strom. is frame builder. Some vuggy porosity, asphalt residue.

Bot.: Pseudo-cerioid strom. Dominant vuggy porosity with asphalt. Amphipora-like forms also common.

Box 7 of 13. – 62.4
Top: Similar with largely branching amphiporoid forms. One example of "Cladopora".

Bot.: Mainly intricately branching, framebuilding form.

Box 8 of 13. – 67.0
Top: Dominantly amphiporoid stroms.; plus massive types in light grey limestone with crevice injections of black shale; with stromatoporoid fragments. A few "Cladopora".

Bot.: Similar with increase in black shale injections. Core much broken.

Box 9 of 13. – 71.6
Top: Similar stromatoporoidal breccia with black clay matrix. Mainly amphiporoid types.

Bot.: Entirely amphiporoid types in matrix of massive limestone, light grey, somewhat argillaceous.

Box 10 of 13. – 76.3
Top: Similar to preceding with inclusion of a few massive stroms.

Bot.: Same.

Box 11 of 13. – 80.8
Top: Same a preceding

Bot.: Same

Box 12 of 13. – 85.4
Top: Same.

Bot.: Same.

Box 13 of 13. -90.0
Top: Similar to preceding.

Bot.: Similar to preceding, plus a few "Cladopora". Note: for last 20' Amphipora-like stroms. increase in diam. to about 1 cm. & many have segmented appearance.

CORE 3. Footage 5890-5950'

Box 1 of 13. -99.6
Top: Similar to preceding plus substantial addition of laminar stroms.

Bot.: Segmented Amphiporoid types; latter dominant with sparse "Cladopora" and a few pseudo-cerioid stroms.

Box 2 of 13. -99.2
Top: Dominantly segmented amphiporoids plus a few laminar stroms.

Bot.: Similar.

Box 3 of 13. -5903.8
Top: Dominantly Amphiporoid types with some laminar stroms. and rare "Cladopora".

Mid.: Brecciated in black shale matrix.

Bot.: Dominance of laminar stroms. with Amphiporoids minor in quantity.

Box 4 of 13. -08.5
Top: Laminar and segmented Amphiporoid types in varying proportion plus a few "Cladopora".

Bot.: Coarse, segmented Amphiporoids dominant.

Box 5 of 13. -13.1
Top: Amphiporoid types dominant, "Cladopora" fairly numerous.

Bot.: Increasing in laminar types.

Box 6 of 13. -17.7
Top: Dominantly Amphiporoid types; plus laminar types and "Cladopora".

Bot.: Mixture of Amphiporoid types and variously oriented laminar types. Solitary rugose coral* (5917').

Box 7 of 13. -22.3
Top: Dominantly Amphiporoid types with minor content of laminar stroms. and "Cladopora" plus one small Thamnopora and a solitary rugose coral* (5920').

page 5.

Box 7 of 13.
Bot: Almost entirely Amphiporoids. Basal 3" has black shale matrix.

Box 8 of 13. - 27.0
Top: Dominantly Amphiporoids plus a few small-massive & laminar types in grey, limestone matrix.

Bot: Below top 6" matrix changes to black marly ls. with a medley of stroms. of many types plus numerous "Cladopora" A few crinoid joints.

Box 9 of 13. 31.6
Top: Black, marly limestone matrix with abundant small Amphipora & "Cladopora".

Bot: Same plus small stromatolitic types.

Box 10 of 13. - 36.2
Top: Matrix as above; stroms. as above; plus a few crinoid joints.

Bot: Same as above. Many "Cladopora" are encrusted by stroms. Laminar types common in basal part.

Box 11 of 13. - 40.8
Top: Similar to preceding. "Cladopora" increasingly abundant. Few brachiopod cross sections".

Bot: Same matrix "Cladopora" abundant, with Amphiporoid laminar-small-massive and encrusting stroms. Few poor brachs.*
*(5936') *(5940*)

Box 12 of 13. - 45.4
Top: Same black, marly limestone matrix. Abundant "Cladopora" mainly encrusted; abund. stroms., largely laminar or small scale stromatolitic, are inclined in position. Bottom 4" (and top of bottom ½) is grey limestone with (segmented) Amphiporoid.

Bot: Top 4" as indicated above. Next 2" black marly limestone with "Cladopora" & small stroms. Next 15", grey limestone with segmented Amphipora. Next 3" massive & laminar stroms. Bottom 8" black marly ls. with abundant Thamnopora, Amphipora, laminar stroms. etc.

Box 13 of 13. -5D,o

Top: Black, marly limestone matrix full of "Cladopora", Amphipora and laminar stroms. A few rather poor brachiopods* (thin-shelled) & one solitary rugose coral*.

Bot: Matrix as above. Fauna similar with increase in "Cladopora". *(5944').

SUMMARY

Union-Pan Am Trainor L-59

Slave Point Core top 5750-5950', Plus
(Incl. Beavertail Facies 5923'-5950')
(Grypophyllum mackenziensis 5867-5942')

See also Norford et al, Geol. Surv. Canada, Paper 70-5, p. 12)
See also appended report forwarded to us by A. E. H. Pedder, April 8, 1971; appended).

Report on 17 Devonian fossil lots from the Union Pan Am. Trainor Imbe L-59 well (60°28'33"N, 120°40'50"W; NTS 95A); District of Mackenzie.

The relevant parts of any manuscript prepared for publication that paraphrase or quote from this report should be referred to the Western Palentology Section, Calgary, for possible revision.

Depth	Fauna	GSC Loc. No.
5,831 1/2'	Grypophyllum 2 spp. or subsp. nov.	C-8981
5,838 1/4'	Grypophyllum sp. indet.	C-8982
5,867 1/2'	Grypophyllum mackenziense (Pedder)	C-8983
5,870'	Grypophyllum mackenziense (Pedder)	C-8984
5,880'	Grypophyllum mackenziense (Pedder)	C-8985
5,882 1/2'	Grypophyllum mackenziense (Pedder)	C-8986
5,901 1/2'	Grypophyllum mackenziense (Pedder)	C-9005
5,927'	Stachyodes verticillata (McCoy) Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum (?) sp. nov. Grypophyllum mackenziense (Pedder)	C-9006
5,927 1/2'	Thamnopora sp. undet. Grypophyllum mackenziense (Pedder)	C-9007
5,933'	Thamnopora sp. undet. Temnophyllum (?) sp. nov. Cyrtina sp. indet.	C-9008
5,935'	Thamnopora sp. undet. Temnophyllum (?) sp. nov. atrypid, indet.	C-9009
5,937'	Stachyodes sp. indet. Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum (?) sp. nov. Grypophyllum sp. indet. Cyrtina sp. indet.	C-9010

Depth	Fauna	GSC Loc. No.
5,938 1/2'	Alveolites sp. undet. Grypophyllum mackenziense (Pedder)?	C-9011
5,939 1/2'	Stachyodes verticillata (McCoy) Thamnopora sp. undet. Temnophyllum (?) sp. nov. Grypophyllum sp. indet. Cyrtina sp. indet.	C-9012
5,940'	Alveolites sp. undet. Thamnopora sp. undet. Temnophyllum (?) sp. nov. Grypophyllum mackenziense (Pedder)	C-9013
5,942'	Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum (?) sp. nov. Grypophyllum mackenziense (Pedder)	C-9014
5,949'	Alveolites sp. undet. Thamnopora sp. undet. Cladochonus sp. indet. Temnophyllum (?) sp. nov. Grypophyllum sp. indet. Cyrtina sp. indet.	C-9015

Remarks

Grypophyllum mackenziense, which is an important index to at least part of the post - Stringocephalus and pre Waterways interval in western Canada, occurs from 5,867 1/2 to 5,942 feet (C-8983 to C-9014). This coral is also believed to be a megafossil index to the conodont zone of hermanni-cristatus, which in Germany is now taken as the lowest Upper Devonian zone.

The black micritic beds between 5,923 and 5,950 feet (C-9005 to C-9015) appear to be identical in both age and facies to the interval between 6,413 and 6,443 feet in the Imperial Sun Arrowhead I46 well (see Pal. Rept. HRB 30 AEHP 71). Although these intervals have been assigned to the Pine Point Formation in the past, THERE CAN NOW BE NO DOUBT THAT THEY ARE YOUNGER THAN BOTH THE SULPHUR POINT AND PINE POINT EXPOSURES ON THE SOUTH SHORE OF GREAT SLAVE LAKE.

Alan Pedder

A. E. H. Pedder

Western Paleontology Section
Institute of Sedimentary and Petroleum Geology
Calgary, April 8, 1971