Megascopic Description of Split Core

Latitude:	10°11'N	Longitude:	78°30'W
Corr. depth:	1798 M	P.D.R. depth:	963 fm.
Date taken:	9 Nov 1958	Date opened:	20 Feb 1961
Described by:	T. Willis		
Core length:	551 cm	Flow-in:	—

0-42 cm — Brown silty calcilutite containing about 10% forams, becoming generally lighter with depth. Top 10 cm a disturbed gray and light brown mixture. Manganese appears to constitute an important part of the silt fraction, with a 1mm manganese nodule appearing at 14 cm. A reworked layer of dark brown calcilutite containing an increased fraction of manganese occurs at 16-18 cm. The layer is indistinctly burrow mottled with lighter brown material in the upper section and with gray material in the lower section. Lower contact gradational and arbitrary.

42-348 cm — Gray silty calcilutite containing about 10% forams and occasional pteropods, becoming slightly greener with depth. The layer, which was stored in the first tube (0-300) has been almost completely oxidized to a light brown color with a watery texture, while the rest of the core is in reasonably good condition. Burrow mottling is evident in the section after 300 cm, and, since there is no material change, by inference, in the 42-300 cm zone as well, although it cannot be readily seen. The burrows are filled with generally darker, coarser material. Prominent burrows occur at 295-315 cm, and at 335 and 344 cms. Black streaks of a sulfide material, probably ferrous sulfide, occur irregularly through the layer, with slight concentrations at 60-92cm, 124 cm, 168-175 cm and 224-228cms. Well defined streaks occur in the second section from 295-351 cm. Irregular orange brown streaks of hydrotroilite also appear, generally in the form of poorly defined faint horizontal bands. These irregular bands occur at 54, 76, 124, 131. 217 and 319 cms.

348-355 cm — Fine white ash in a highly disturbed state, probably due to the impact of the core pipe on the firm layer. The ash occurs in three large pockets intermixed with clay material. The pocket at 353 cm seems to be the least disturbed and from it can be inferred that the layer was 1.5-2 cm thick and occured at approximately that level.

355-551 cm — Gray green silty calcilutite somewhat darker than 42-351 cm, but essentially similar. Well defined lamina of hydrotroilite occur at 399 and 400 cm, with a less well defined band at 415 cm. Horizontal

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Megascopic Description of Split Core continued

streaked lamina of ferrous sulfide occur at 459 and 482 cms. These lamina, as well as the hydrotroilite bands, seem to be associated with a slight increase in the foram fraction. The layer is burrow mottled.

Observations: The ash layer appears to be the eastern counterpart of the Worzel ash layer on the west coast.

Lamont Geological Observatory
of
Columbia University
Preliminary Description
NOT FOR PUBLICATION

V 15-30

Megascopic Description of a Split Core

Latitude:	04 15'N	Longitude:	85 06'W
Corr. depth:	3266 M	P.D.R depth:	1750 fm
Date taken:	1 December 1958	Date opened:	--
Described by:	C. Fray	Flow-in:	280 cm.
Core length:	959 cm.		

0-120 cm.- Lutite, grayish-green with slight purplish tint, fairly soft. Color is mottled indicating material reworked by burrowing organisms except between 93 and 101 cm. where there is no clear evidence of mottling. Lutite contains numerous foraminifera. Bottom contact horizontal and distinct due to color change.

120-123 cm.- Brown lutite containing foraminifera. May have greater silt content than sections above and below. Bottom contact horizontal and sharp due to color change. Slight mottling due to burrowing.

123-143 cm.- Lutite, grayish-green with purplish tint. Color mottled due to burrowing. Lutite contains foraminifera. From 140-143 cm. sediment is darker green and oxidizes to a greenish-brown instead of to a brown as do the sections above. Bottom contact horizontal and distinct due to color change.

143-155 cm.- Lutite, light grayish-green with purplish tint which oxidizes to a light brown. Color is mottled. Lutite contains foraminifera. Bottom contact horizontal and distinct due to color change.

155-302 cm.- Lutite, grayish-green with purplish tint. Color mottled due to burrowing. Lutite contains foraminifera throughout section. This section is similar to 0-120 cm. Bottom contact horizontal and distinct due to color change and material. A patch of clean white volcanic ash (Worzel Ash?) 1 x 3 cm. occurs at 156-159 cm. This ash does not form a layer but is surrounded by lutite. No similar material is apparent in this section. The possibility exists that the clay surrounding the patch of ash at 156 cm. may have been introduced as a result of organisms burrowing through the ash and that the ash represents a distinct layer.

302-312 cm.- Greenish-brown silty lutite containing foraminifera. Color mottled due to burrowing. Bottom contact fairly distinct due to color and material change.

312-549 cm.- Similar to sections 0-120 cm. and 155-302 cm. Bottom contact sharp and horizontal due to color and material change. Between 382-548 cm. sediment is a more dark green in color but there does not appear to be any change in material.

V 15-30 (cont'd)

549-582 cm.- Brown foraminiferal lutite. Mottling indicates material reworked by burrowing. Bottom contact sharp and essentially horizontal due to color and material change.

Piston effect occurs between 551-560 cm.

582-611 cm.- Similar to 0-120 cm. section.

611-612 cm.- Light brown lutite. Bottom contact above and below is horizontal and distinct. No mottling evident. It probably represents oxidation of the overlying lutite at the contact with the ash during storage as a result of the greater porosity of the ash allowing the circulation of air.

612-616 cm.- Volcanic ash, grayish-white with a somewhat purple tint. Contact with underlying lutite sharp and horizontal.

616-632 cm.- Similar to section 582-611 and 0-120 cm.

632-716 cm.- Similar to 616-632 cm. layer except it oxidizes to a lighter brown giving it the appearance of a distinct layer.

716-772 cm.- Similar to section 0-120 cm. except it is darker in color and oxidizes to a greenish-brown.

772-828 cm.- Similar to 632-716 cm. layer.

828-845 cm.- Lutite, dark grayish-green with purple tint. Color is mottled. Contains foraminifera. Two possible incipient manganese nodules occur at 838 and 839 cm. Bottom contact sharp and horizontal due to color change.

845-959 cm.- Similar to 772-828 cm. layer.

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Latitude:	11°05'S	Longitude:	82°31'W
Corr. depth:	4470 M	P.D.R. depth:	2380 fm.
Date Taken:	11 Dec. 1958	Date Described:	22 June 1961
Described By:	D. Bauchelle	Flow-in:	0
Core Length:	1662 cm.		

General Description: This core falls in the red-clay category. Various shades of beige and brown define the layers. Many show reworking by burrowers. The bottom 20 feet± have the texture associated with diatoms, volcanic glass, or radiolarians. This type material also occurs scattered at higher levels. There is a 9-10 cm. layer of manganese grains at ~21 ft.

0-~29 cm.

A grey-brown lutite speckled by dark brown manganese stains above 18 cm. Part of the manganese has been oxidized to orange. Burrows of two sizes mottle this layer - some with diameters of ~1 cm., others with burrows of 1 mm. size. The top 5 cm. may be another layer of lighter lutite also marked by dark brown manganese coloring. Bottom contact burrowed but clear by color.

29-32 cm.

Slightly lighter grey-brown than above. Burrowed and reworked. Contacts irregular but clear.

32-37 cm.

Grey-brown color of 5-28 cm. zone. Slightly darker though. Both large and small burrows as all above layers.

37-58 cm.

Lighter beige lutite. Not so grey as above. Burrow mottled, few small burrows, many large. One large ($1\frac{1}{2}$ x 2 cm.) burrow between 54 and 56 cm. is greenish and flecked with manganese grains. Surface of sliced core shows some small tears usually characteristic of a coarser material in the lutite, seems to be volcanic glass and/or radiolaria. Radiolaria have been identified lower in the core. The concentration here does not justify a search. Contact burrowed.

58-332 cm.

Grey-brown lutite. Color is graded and changed by iron oxide stains from the core pipe. Section reworked by large burrowers. Surface of core shows some small tears characteristic of gritty lutite especially between 100-140 cm. and 170-250 cm. Five "proto-manganese nodules" about pea size occur in a chain at 234 cm.

332-353 cm.

Beige lutite, lighter and less grey than above, very disturbed by burrowers of large size. Tiny manganese specks are visible against lighter lutite of this layer. Contact arbitrary at gradual, burrowed color change.

353-370 cm.

Greyer brown lutite than above. Burrowed. Little segregations of fibrous material which are light cream in color and are usually 1-10 mm. in diameter appear in random fashion toward bottom of layer. Possibility of being diatomaceous. Bottom contact by color, irregular.

370-444 cm.

Generally lighter, buff-colored lutite. Heavy concentration of creamy, soft fibrous balls from 378-392 cm. Layer burrow mottled. Some rust stains.

444-548 cm.

Light tan grading to greying lutite and back again. Burrowed. Bottom contact sharp by color and lithology.

548-555 cm.

Light grey-brown lutite containing radiolaria and diatoms (?). A few small white worm tubes. No burrow mottling visible. Bottom contact sharp.

555-627 cm.

Greyish-buff lutite. Inconspicuous burrow mottling. A shattered and semi-consolidated manganese nodule and grains + lutite occur between 602 and 612 cm. Burrowing more conspicuous in this layer below level of manganese. Bottom contact burrowed but clear by color.

627-~680 cm.

Light buff lutite with burrow mottling. Some surface tears indicating gritty material in lutite. Large burrow at 659 cm. filled with coarser sediment. Bottom arbitrary by color.

680-746 cm.

Creamy grey and creamy brown lutite. Zone of greenish color at 700-702 cm. Contacts, top and bottom, show gradual color change. Burrowed.

746-892 cm.

Includes several zones differentiated by color varying from light buff to medium grey-buff. All burrowed. A few zones show slightly more gritty matter. Some few burrows have concentrated the gritty material (radiolaria and diatoms, some volcanic glass (?)). Bottom contact burrowed, by color and lithology. There is a piece of manganese nodule alongside at 880 cm., probably in situ.

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892-1163 cm.

Light orange-brown lutite containing gritty material which is a mixture of radiolaria, diatoms (?) and volcanic glass (?). There is a higher percentage of this matter than in any zone above. Very few burrows visible, some of the larger type containing material of coarser texture. Between 1005 and 1030 cm. there are several, mostly non-parallel, curved bands of grey (apparently manganese-rich layering). A piece of the manganese nodule mentioned at 880 cm. in the above layer has been dragged to 915 cm. leaving a smear all along one side of the core. Core couple and piston effect (removed) at 1052 cm. Apparently the material from 1052-1058 cm. has been artifically disturbed.

1163-1350 cm.

Slightly greyer than above orange-brown lutite. Layer is heavily impregnated with gritty silicates. Surface is very "torn". Knife occasionally cuts through little silicate-lined worm (?) tubes. Zone between 1250 and 1260 is medium umber in color. Same color appears lower in core. Bottom contact is vague and arbitrary, by color and lithology.

1350-1385 cm.

Zone of light brown lutite banded and mottled by light cream silicious material thought to be mostly volcanic glass and radiolaria. Three distinct layers.

1385-~1420 cm.

Zone same as 1163-1350 cm. Bottom grades into umber brown. Arbitrary. Usual silicate-rich lutite.

1420-1662 cm.

Layer composed of medium orange-brown and umber-brown lutite in irregular mottled areas. 1420-1432 cm. has lenses and layers of silicate fragments (radiolaria and volcanic glass (?)). Rest of layer also heavily impregnated with silicates.

No flow-in.

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Megascopic Description of a Split Core

Latitude:	09°31' S	Longitude:	87°22' W
Corr. depth:	4277 M	P.D.R. depth:	2280 fms.
Date taken:	22 December 1958	Date opened:	25 March 1963
Described by:	L. Burckle	Flow-in:	395 cm.
Core length:	665 cm.		

General:- Lutite with varying amounts of silt and some layers rich in manganese. As much of core was dried, completely or in part, it was necessary to saw through it. Consequently the sawed portions may bear pseudo-laminae that were caused by sawing. Other portions of the core in drying, became friable and were difficult to keep in one piece.

0-28 cm.- Dark yellowish brown lutite (10 YR 4/2) with minute disseminations of manganese. Some burrowing in the upper 5 cm. gives a light gray (N7) mottling to this portion of the layer. This mottling at 3-4 cm. almost gives the appearance of a lutite breccia. There are some manganese nodules (largest about 2 cm. in diameter) within the bottom 6 cms. Radiolarians are quite abundant (about 5%) but appear to decrease slightly in number toward the bottom. No forams were observed, but they may exist in greatly diminished numbers. Lutite fraction amounts to about 80-90%; silt fraction from 10-20%. Radiolarians present are usually large enough to be included among the silts. The carbonate fraction increases toward the bottom, but never exceeds more than 10%. According to Campbell this may be called a radiolarian ooze. Bottom contact is gradational marked by a slight color change and an increase in burrowing activity.

28-148 cm.- Lutite marked by several layers showing color change. Burrowing is very evident throughout. The first 4 cm. are a moderate yellowish brown (10 YR 5/4) lutite grading. To 48 cm. is pale yellowish brown (10 YR 6/2) lutite with large mottlings of very pale orange (10 YR 8/2) lutite. Within the mottles are disseminated specks of lighter colored material. From 48-72 cm. is pale yellowish brown lutite but the mottlings are yellowish gray (5 Y 8/1) in color. From 72-83 cm. is a moderate yellowish brown lutite mottled with a slightly lighter color. From 83-106 cm. is a light moderate yellowish brown lutite with very pale orange mottlings to 86 cm. and light gray mottlings from 96 to 106 cm. at 88 cm. is a lutite nodule (about 1 cm. in diameter) coated with manganese. The zone 106-114 cm. is similar to the above except that there are numerous micronodules and minute disseminations of manganese. From 114-143 cm. is a light moderate yellowish brown lutite with mottlings both lighter and darker than the matrix. From 143-148 cm. is a light olive gray (5 Y 6/1) to olive gray (5 Y 4/1) lutite with some mottling in the

upper 1 cm. This entire layer is predominantly lutite (about 85%) with a slight increase in the silt fraction toward the top. The silt fraction amounts to about 15%. There appears to be a minute increase in the disseminations of manganese micronodules toward the top. The calcareous content never exceeds more than 20% but there are measureable increases in its amount below 90 cm. and below 140 cm. Diatoms and radiolarians are present (about 2%) and appear to increase in numbers toward the top where they comprise about 5% of the total layer. The bottom contact is moderately sharp and is marked by a color and lithic change.

148-172 cm.- Moderate yellowish brown (10 YR 5/4) lutite burrowed with a very pale orange (10 YR 8/2) lutite in the upper 5 cm. Remainder of layer is lightly mottled with slightly lighter color than the matrix. Lutite amounts to about 90% with the silt content slightly higher in the upper 5 cm. Silt fraction is about 10%. The calcareous content amounts to about 5% in the upper 5 cm. and is almost nil below that. Very minor disseminations of manganese micronodules throughout. Diatom and radiolarians are present throughout (more than 3%) but are probably most numerous in the upper 5 cm. No forams. The bottom contact is sharp and marks a change in color and composition.

172-245 cm.- Dusky yellowish brown (10 YR 2/2) lutite mottled with moderate yellowish brown (10 YR 5/4) lutite. The dark color (manganese rich) increases toward the bottom. Burrowing is evident down to about 220 cm. Manganese micronodules are disseminated throughout, but increase markedly toward the bottom. There are extremely minute disseminations of ash (white?) throughout. Although the carbonate content is small (less than 5%) there is a slight increase around 210 cm. Lutite fraction amounts to about 80% and the silt fraction about 20%. There is an increase in the silt content toward the bottom . Bottom contact is moderately sharp and is marked by a color and compositional change.

245-248 cm.- Dark yellowish orange (10 YR 6/6) to moderate yellowish brown (10 YR 4/2) lutite with moderately dense nodules and micronodules of manganese. There are very minor disseminations of ash (white?) throughout the layer. Lutite fraction amounts to about 90% and silt fraction about 10%. Carbonate content is practically nil. Bottom contact is moderately sharp and is marked by a color and compositional change.

248-337 cm.- Dusky yellowish brown (10 YR 2/2) lutite with mottlings of dark yellowish orange (10 YR 6/6) lutite. This core is similar in color and composition to the lower part of the 172-245 cm. layer. The bottom contact is

moderately sharp and marked by a change in color and composition. Some of the dark lutite is carried down into the layer below by burrowing.

337-665 cm.- Core couple occurs at 420 cm. Pale yellowish brown (10 YR 6/2) to grayish orange (10 YR 7/4) to yellowish gray (5 Y 7/2) lutite. Layer is well burrowed, particularly from 337-380 cm., 435-455 cm., 555-575 cm. Manganese filled burrows are present in the upper 10 cm. and nodules of manganese are present at 354 cm., 362 cm., 384 cm., 386 cm., 388 cm., 393 cm. and 505 cm. Discoaster challengeri and Discoaster broweri observed under highpower from sample taken at 360 cm. Also coccoliths. Below 500 cm. there are large pale yellowish orange (10 YR 8/6) mottlings whose length runs parallel to the length of the core. This may be flow-in, but there is evidence of burrowing below it. Thrgughout are very minute and very scattered micronodules of manganese. This manganese is denser in the upper 20 cm. Lutite fraction predominates from 85-90%. Silt fraction is about 10-15%. Carbonate content varies but is relatively high (about 30-40%). Some forams are present as well as radiolarians and diatoms. Some sponge spicules are present as well as very minor dissemination of ash (white?).

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Addenda

Sample taken from 378 cm. and examined by Dr. Saito contained Globorotalia fohsi barisanensis, G. mayeri and Globoquadrina rohri. Conclusion based on above foraminifera dates this zone as Lower Miocene (Aquitanian).

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Megascopic Description of a Split Core

Latitude:	11°12' S	Longitude:	84°48' W
Corr. depth:	4460 M	P.D.R. depth:	2375 fms.
Date taken:	23 December 1958	Date opened:	21 March 1963
Described by:	L. Burckle	Flow-in:	225 cm.
Core length:	907 cm.		

General:- Since gutter pipes were rusted open and outer paper around core broken in many places, much of the material was dry, friable and difficult to handle. The continuity of the friable portions of the core and the total core length itself should be held in question. Piston effect, if it occurred, could not be observed in the core due to its condition.

0-110 cm.- A very pale orange (10 YR 8/2) lutite with varying amounts of silt. Some staining of grayish prange (10 YR 7/4) in the upper 50 cms. Abundant burrowing in the upper 50 cms; only scattered burrows below. Burrow mottling usually slightly lighter in color than pale orange. Because the gutter pipe was opened by rust this layer has dried and indurated. It was necessary to cut it with a saw. Material is almost entirely non-calcareous. Some diatoms and radiolarians and occasional fragments of larger invertebrates. Lutite fraction amounts to 75-80%; silt fraction, less than 25%; and coarser fraction biogenic fragments less than 1%.

About 2 cms. from the base there is a rapid color change to moderately yellowish brown (10 YR 5/4). The silt content may increase slightly and is slightly less indurated. Some evidence of burrow mottling with mottling color slightly lighter than moderate yellowish brown. The composition of entire layer is probably silicates or aluminates. The bottom contact is gradational.

110-120 cm.- A moderate yellowish brown lutite (10 YR 5/4) with burrow mottling of slightly lighter color. This layer is well indurated though not as hard as the 0-110 cm. layer. It was necessary to cut it with a saw. Burrows tend to elongate perpendicular to the length of the core. Diatoms and radiolarians (less than 5%). Lutite fraction predominates with 70-80%; silt fraction less than 30%. Layer is almost entirely non-calcareous and is probably made-up of aluminates and silicates. Bottom contact is gradational in color but sharp in induration; the lower layer is quite friable.

120-261 cm.- A pale yellowish brown (10 YR 6/2) lutite with varying amounts of silt. Evidence for burrowing from 120-180 cm. Radiolarians and diatoms (less than 5%). Silt content appears to increase slightly toward the bottom. Lutite fraction ranges from 80% near the top and grades

to about 70% at the bottom of the layer. Silt fraction ranges from 20% to 30%, fine sand is less than 1%. Occasional small (less than 1 cm.) stringers of white ash. These are not readily observable from a megascopic examination of the layer, but can sometimes be seen as disseminated white specks under a magnifying glass. Friability of layer increases toward bottom. Bottom contact sharp.

261-324 cm.- A pale orange (10 YR 8/2) lutite with grayish orange staining around the periphery and grading into a moderate yellowish brown (10 YR 5/4) lutite beginning at about 308 cm. Little evidence for burrowing—perhaps because the burrow mottling has the same color as the layer matrix. This layer is similar in composition to the 0-110 cm. layer except that the carbonate content has increased to about 20%. Bottom contact gradational in color but sharp in the degree of induration with the lower layer being very friable.

324-540 cm.- A dark yellowish orange (10 YR 6/6) lutite becoming lighter in color toward the bottom. Mottlings of light brown (5 YR 5/6) in the top 40 cms. Layer is very friable; it is difficult to see burrowing or any other structures in it. There are exceedingly small stringers and disseminated flecks of white ash through this layer. Lutite fraction amounts to 65-80% with no apparent gradation in size from top to bottom. Silt fraction equals less than 40% and fine sand fraction less than 1%. The calcareous content amounts to about 25%; the remainder probably consists of aluminates or silicates. Occasional flecks of mica. No radiolarians or diatoms, but they probably exist beyond the competence of the microscope. There are, near the bottom, occasional micronodules of what may be diatomaceous material. Bottom contact is gradational.

540-730 cm.- A light yellowish orange lutite with dark yellowish brown (10 YR 6/2) mottlings. Below 560 the dark yellowish brown predominates and is mottled by a light yellowish orange. It seems that the dark color in the layer is caused by concentration and minute disseminations of manganese. This dark color increases toward the bottom. As the layer is extremely friable, it is difficult to see burrowing or other structures in it. There is some suggestion, however, that burrowing exists. There are occasional minute disseminations of white ash throughout the layer. Also at about 650 cm. and 660 cm. there are some white micronodules that may be diatomaceous. The lutite fractions of the layer comes to about 60-80%, the silt fraction, to less than 40%, and the fine sand less than 3%. Small numbers of radiolarians and diatoms. Silt content appears to increase towards the bottom. Mottlings of lighter colored lutite in the lower 2/ 3 of the layer appear to have a higher content of the lutite

fraction than the surrounding matrix and much smaller amounts of manganese specks. The calcareous content amounts to less than 20% and most of the material probably has a siliceous base. Bottom contact gradational.

730-735 cm.- Grayish black (N2) manganiferous lutite, with light yellowish orange and dark yellowish brown (10 YR 6/2). Manganese occurs as micronodules surrounding lutites of the two colors mentioned above. This layer is extremely friable and no structures are observable. The lutite fraction amounts to about 70% and the silt to about 30%. Bottom contact moderately sharp and marked by a color change; the lithologic change appears gradational.

735-788 cm.- Moderate reddish brown (10 R 4/6) lutite becoming darker towards the bottom. At 757-760 cm. a layer (?) of grayish orange (10 YR 7/4) lutite. Disseminated throughout layer are smaller nodules of lutite of same color. From 735-745 cm. micronodules of manganese scattered. This manganese becomes more disseminated in the rest of the core, but may be responsible for the darker coloring toward the bottom of the core.

From 765 to 775 cm. a light gray (N7) to very light gray (N8) layer (?) cuts diagonally (45°) across the core. It has the feel and appearance of diatomaceous material. As the entire layer (735-788 cm.) is extremely friable, many of the structures cannot be seen. The lutite fraction amounts to about 70% and the silt fraction about 30%. Calcareous material is less than 10%. Near the bottom (about 780 cm.) are lutite nodules in the matrix forming what some would call a lutite breccia. Bottom contact moderately sharp and marked by a color change.

788-907 cm.- A dark reddish brown (10 R 3/4) lutite breccia with mottlings of moderate reddish brown (10 R 4/6) lutite. From 850-858 cm. grayish brown (5 YR 3/2) lutite layer with abundant disseminated manganese specks. Evidence for burrowing is most noticeable in the upper 5 cm. of the layer. Abundant nodules and micronodules of lutite of various colors scattered throughout the matrix, some (below 850 cm.) showing micronodules within the larger nodules. An especially large medium gray (N5) nodule at 808 cm. Nodule swarms occur between 820 cm. and 840 cm. Nodules are commonly dark yellowish orange (10 YR 6/6) and average less than 1 cm. in diameter. Lutite fraction is about 80% and the silt fraction about 30%. The calcareous content is less than 10%.

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The final 10 cm. grade into a grayish brown (5 YR 3/2) lutite with darker manganiferous nodules having a diameter of less than 1 cm. disseminated throughout. The lower contact is sharp with flow-in layer beneath. The provenance of the above described layer is an open question.

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Megascopic Description of a Split Core

Latitude:	17°17.5'S	Longitude	80°32' W
Corr. depth:	4643 M	P.D.R. depth:	2472 fms.
Date taken:	26 December 1958	Date opened:	26 March 1963
Described by:	L. Burckle	Flow-in:	500 cm
Core length:	1166 cm.		

General:- Predominantly moderate yellowish brown (10 YR 5/4) lutite. Much of the core was dried out and had to be opened with a saw. As a result, there may be pseudo-laminations on the cut face due to the blade of the saw.

0-7 cm.- A dark yellowish brown (10 YR 4/2) lutite. As the layer is very friable, it is difficult to see any burrowing or other structures, but burrowers appears to have been active in the upper 2 cms. Minute disseminations of white ash throughout the layer as well as minute disseminations of manganese micronodules. Diatoms but no forams although they may well be present. About 25% of the layer is calcareous. The lutite fraction predominates with 85-90% and the silt fraction 10-15%. The bottom contact is gradational and marked by a slight color change. It is generally more friable than the layer below.

7-175 cm.- Predominantly dark yellowish orange (10 YR 6/6) lutite with mottlings of slightly lighter material throughout. From 20-30 cm. dark yellowish brown (10 YR 4/2) lutite. Minute disseminations of manganese throughout. Thin manganese-like laminae were probably caused by the saw and can be scraped off easily with a knife. Burrowing is evident below 40 cm. but not readily apparent above it. Minute disseminations of white ash occur throughout. Lutite fraction (85-90%) predominates. Silt fraction amounts to about 10-15%. Radiolarians in small numbers but they, and diatoms, may exist beyond the competence of the microscope. No forams. Calcareous content is practically nil. Small reaction with hydrochloric acid was observed around 150 cm. but this is hardly considered significant. The layer was dried out and partially indurated upon being opened; hence much of it had to be sawed and bears the pseudo-laminae from the saw blade. The bottom contact is gradational and marked by a color change.

175-530 cm.- Predominantly dark yellowish brown (10 YR 4/2) lutite with varying amounts of silt and with minor disseminations of manganese and local pockets of manganese enrichment. These pockets occur at 208 cm., 220 cm., 256-260 cm., 451 cm., and 455 cm. Because of the homogeneity of this layer burrowing evidence is not readily apparent but is subtly suggested. In places there appears to be some displacement of manganese micronodules that may be caused by burrowing. No other structures are apparent. Lutite

(80-90%) fraction predominates. Silt fraction ranges from 10 to 20% and increases toward the bottom. Minor amounts of white ash occur as small pockets which become greatly disseminated, and reduced in number, toward the bottom. Calcareous content is practically nil except for a zone between 400 and 510 cm. where the carbonate content is about 25%. Although no forams were observed it is likely that this carbonate had a biogenic base. Diatoms and radiolarians appear to increase in numbers toward the bottom, but even there do not make up an appreciable portion of the sample. The bottom contact is very gradational and is marked by an increase in the friability of the layer below.

530-840 cm.- Dark yellowish brown (10 YR 4/2) lutite with varying amounts of silt. As in the 175-530 cm. layer there are minor disseminations of manganese and local pockets of manganese rich lutite. There is some rust stain around the periphery of the core due to the paper. Homogeneity of the color of the layer gives very little visible evidence for burrowing. Lutite fraction (80-90%) predominates. The silt fraction ranges from 10-20% and decreases toward the bottom. Minor disseminations of white ash. Calcareous content is practically nil but there is a calcareous rock zone from 590 cm. to 620 cm. Although no forams were observed this calcareous material is probably biogenic in origin. A few diatom and radiolarians were observed; more probably exist beyond the competence of the microscope. Bottom contact is gradational and is marked by a color change.

840-920 cm.- Pale yellowish brown (10 YR 6/2) to dark yellowish brown (10 YR 4/7) lutite with varying amounts of silt. Burrowing evidence exists in the upper 20 cm. From 860-890 cm. the layer is so friable that such structures are not readily visible. From 890-920 cm. there is also evidence for burrowing. Very minute amounts of manganese are disseminated throughout. Between 845-890 cm. is an appreciable increase in the ash (white) content which gives a very gritty feel to the lutite. Elsewhere the ash is widely disseminated. Lutite fraction is from 60% in the 840-890 cm. zone to 90% elsewhere. In the 850-890 cm. zone the ash amounts to about 40%. Elsewhere the silt fraction amounts to about 10-20% of the layer. Lutite fraction increases toward the bottom. Bottom contact is gradational with the layer below.

920-980 cm.- Dark yellowish brown (10 YR 4/2) lutite becoming moderate yellowish brown (10 YR 5/4) toward the bottom. No burrowing evident. Minor disseminations of manganese throughout with manganese rich lutite appearing below 950 cm. White ash disseminated throughout but more concentrated in the upper 10 cm. where it is 20% of the

material. Lutite fraction (80-90%) predominates; silt fraction 10-20%. Lutite content increases toward the bottom. Calcareous content is nil. No organic material observed. Bottom contact is moderately sharp and marked by a color change.

980-996 cm.- Pale yellowish brown lutite. The layer is very friable and burrow markings are not readily visible. However, there is some suggestion that they are present. Manganese micronodules disseminated throughout as is white ash. Lutite fraction is from 75-90% and silt fraction from 10-25%. Calcareous content is less than 10% and appears to increase toward the bottom. Bottom contact is moderately sharp and is marked by a color change.

996-1010 cm.- Dark yellowish brown (10 YR 4/2) manganese rich lutite. Burrowing evident. Minor disseminations of white ash. Lutite fraction is about 90% and silt fraction to about 10%. No organic material observed. Calcareous content is 20% near the top becoming almost negligible toward the bottom. Bottom contact is moderately sharp.

1010-1020 cm.- Pale yellowish brown (10 YR 6/2) ash rich lutite. Burrowing exists but is not readily apparent. In the lower 5 cm., layer becomes manganese rich with the ash occurring in what appears to be burrowed bore holes. Lutite (60-80%) predominates; the silt fraction (20-40%). Calcareous content is nil. Bottom contact gradational.

1020-1166 cm.- Similar in composition to 530-840 cm. layer except the bottom 16 cm. is well marked by burrowers. There is no calcareous rich zone as in 530-840 cm.; calcareous content of the layer is practically nil.

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V 15-48

Megascopic Description of a Split Core

Latitude:	23°04'S	Longitude:	75°09'W
Corr. depth:	4423 M	P.D.R. depth:	2342 fm.
Date taken:	28 December 1958	Date opened:	1 January 1963
Date described:	2 January 1963	Date photographed:	3 January 1963
Described by:	R. Hekinian	Flow-in:	0
Core length:	890 cm.		

0-61 cm. Lutite, dark brownish-tan, soft, siliceous, with less than 3% carbonate. No foraminifera, but some diatom frustules occur. Ashy materials composed of micaceous flakes and manganese micronodules occur throughout. Large burrows (1-2 cm. in diameter) are present. throughout.

Concentration of manganese due to burrowing action occurs at the top. Two large nodules of manganese (3-4 cm. in diameter) are present at 15 cm. and at 25 cm. Bottom contact is not well defined; but due to a slight change of color and marked by an abundance of burrows.

61-280 cm. Lutite, light brownish-tan, soft, becoming firmer with depth. Burrow mottling present. The burrows vary in size from 2 mm. to 3 cm. in diameter and contain halos of lighter lutite. (Half of this layer shows a slightly darker color change, probably the result of disturbance during coring.)

15% micronodules of manganese are mixed with the sediment as well as small stains and specks of manganese. Approximately 5% micaceous flakes occur throughout. Light green, soft lutite lamina mixed with approximately 2% volcanic materials occurs at 208 cm. Bottom contact due to change of texture of sediment, which becomes less compact and more fragmented.

280-477 cm. Lutite, dark brown, fragmented, siliceous, slightly burrow mottled. Lighter lutite in outside zone may be due to slumping. At 450-460 cm. the sediment becomes darker due to concentration of manganese. Thin layer of lighter lutite containing slight amount of volcanic materials occurs at bottom of layer. Gradational bottom contact.

477-690 cm. Lutite, light brownish-tan, firm, siliceous. Less burrow mottled than overlying layer. Lighter lutite occurs along periphery (slumping ?). Thin laminae of lighter and darker lutite occurs from 550 to 559 cm. and from 650 to 670 cm. Few large stains of manganese occur from 610 to 690 cm. Bottom contact is due to change of color and marked by abundance of burrows.

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V 15-48 (cont'd)

690-890 cm. Lutite, reddish-brown, siliceous, softer than above lutite. Manganese staining throughout. Few burrows occur at the top. Lighter lutite in outside zone due to slumping. One thin disturbed lamina of dark lutite mixed with about 10-15% manganese occurs at the top.

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V 15-50

Megascopic Description of a Split Core

Latitude:	27°35'S	Longitude:	71°51'W
Corr. depth:	5618 M	P.D.R. depth:	2990 fm.
Date taken:	30 December 1958	Date opened:	29 April 1963
Described by:	L. Burckle	Date photographed:	30 April 1963
Corellength:	57 cm.	Flow-in:	0

0-20 cm. Lutite, medium dark brown, silty, with some medium brown bandings which may be caused by burrowers. Suggestion of some burrowing below 5 cm. Finely disseminated manganese occurs throughout, is less concentrated on the lighter zones. Filament of manganese at about 9 cm.. Elsewhere throughout are small visible specks of manganese.

From 3 to 4 cm., a filament of medium to coarse sand extends to about the middle of the layer. Sand layer is generally medium brown to black, due to the presence of ferromagnesium minerals. Few grains of magnetite occur. Angular to subangular quartz present; few grains have inclusions and some are frosted. Some foraminifera occur, largely in a fragmental state. Quartz grains are about 40%; the ferromagnesium minerals, about 30%; calcareous remains about 20%; and mica and other minerals about 10%.

Lutite fraction amounts to about 45%; the silt fraction about 40% and sand fraction about 15%. Carbonate fraction ranges from about 10% at the top to almost nil at the bottom. Sharp bottom contact is marked by a lithic and color change.

20-41 cm. Lutaceous silt, light to medium brown. Some burrowing evident; burrow tracks have a light brown color. Manganese is a very minor disseminate but increases slightly toward bottom. Some suggestion of alternating light and dark color laminations occur below 30 cm. Some foraminifera on the top, generally rare. Most of the layer composed of spicular volcanic particles which tend to become smaller toward the bottom and more intimately intermixed with the lutite. Volcanic ash is generally white to light brown in color.

Lutite amounts to about 40% and volcanic ash about 60%. Carbonate content about 50% on top, but practically nil elsewhere. Carbonate increases slightly at the bottom where there is some intermixing with the underlying layer. Moderately sharp bottom contact is marked by color and lithic change.

V 15-50 (cont'd)

41-57 cm. Lutite, silty, medium dark brown, similar to 0-20 cm. layer. Generally, the coarse sediments (silt and fine sand) tend to increase toward the bottom.

Note: Part 1B of 41-57 cm. layer appears to have been contaminated in traying.

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Megascopic Description of a Split Core

Latitude:	41°32' S	Longitude:	72°54.42' W
Corr. depth:	318 M	P.D.R. depth:	173 fm.
Date taken:	21 Jan 1959	Date opened:	26 March 1962
Described by:	D. Bauchelle		
Core length:	1155 cm	Flow-in:	None

General Description: Clive green lutite containing some fine sand material and cut at irregular intervals by fine to coarse grained usually graded terrigeneous, dark grey sand layers which vary from <2 mm tc> 63 cm thick. Burrowing is common. Forams are rare. Only one pelecypod shell fragment has been found (at 1075 cm). The lutite seems to be constant (almost) throughout the core and is differentiated only by the sand layers. Several little manganese nodules (1 - 5 mm) occur at two different levels, 315 cm and 330 cm. These seem to be the only nodules in the core but suggest that some of the brownish coloration elsewhere may be caused by finely divided manganese. The core will be treated as one layer of olive green lutite cut by many graded sand beds. The sand is approximately 40% angular - sub angular quartz sand, 45 % grey or black rock and mineral grains and 15% red, yellow, and green grains. Some mica.

0 -1155 cm Olive green lutite with fine shadings of browns and greys. Burrow mottling is common though not always easily visible. The differentiated zones are noted below:

0 -158 cm Generally featureless olive green lutite containing some burrow marking. A thin sharp layer of grey sand cuts the lutite at 28 cm and periodic concentrations occur in vague layers in the overlying 2 -3 cm. Another sharper layer occurs at 136 cm. Bottom contact very sharp by texture.

158 - 163 cm Sand layer composed of at least two units. The lower layer (1.5 cm) shows pulse-like deposition of sandy material and possibly has some grading. The upper unit (3.5 cm) is essentially non-graded though some horizontalitycan be observed. The interesting and unusual feature is the sharpness of the upper contact at 158 cm. The sand changes abruptly to a slightly sandy lutite which grades to a lutite by 152 cm.

Megascopic Description of a Split Core continued

The sand changes abruptly to a slightly sandy lutite which grades to a lutite by 152 cm.

178 - 182 cm Another grey sand deposit. Graded.

294 - 297 cm Several interbedded and mixed sand and silt layers.

305 - 308 cm Distorted layer; now a lens along side of core.

~331 - 352 cm
~363 - 370 cm Major, fine-to-coarse sand, graded deposits.
~382 - 393 cm

~400 - 401 cm
~404 - 406 cm Small, mixed (burrowed) fine sand-silt layers.
~408 - 410 cm

~418 - 428 cm Major graded, fine-coarse sand deposit.

501 - 502 cm
546 - 550 cm (Graded)
562 - 563 cm Minor layers; some coarse, some fine
573 - 594 cm
608 - 609 cm These two are disturbed and intermixed with the lutite.
616 - 618 cm

~ 628 - 697 cm Largest sand layer in core. Composed like the others of grey sand. Appears to be two graded deposits with no separation between. Contact of lower fine and upper coarse sand is badly disturbed and intermixed between 652 and 658 cm.

730 - 735 cm Intermixed sandy lutite.

752 - 757 cm Medium grained sand. Grey.

843 - 844 cm
850 - 857 cm Non-homogeneous sand lutite mixture
~888 - 889 cm
915 - 920 cm Finer, light brown-grey sand

The lutite below 920 cm is siltier than above and seems to be a little greyer than the usual olive-green.

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Megascopic Description of a Split Core

Latitude:	53°29.2'S	Longitude:	70°36.6'W
Corr. depth:	406 M	P.D.R. depth:	222 fms.
Date taken:	6 Feb. 1959	Date opened:	28 Feb. 1961
Described by:	T.Willis	Flow-in:	370 cm.
Core length:	866 cm.		

0-149 cm.- Grey/green silty lutite with occasional areas which show a slighter greener tint, a "greasy" appearance and have a slightly lower silt fraction. These areas which occur at 0-25, 45-52, 60-70, 82-88, 94-98 and 106-145 cm. give evidence of extensive burrowing. However, the material is so nearly homogeneous that only in and near the tinted areas can it be positively discerned. Very faint, minute streaks of hydrotroilite occur through the layer. Flecks of white decomposed calcareous material occur in the 53-55 cm. zone. A well preserved worm tube is present at 42 cm.. The lower contact of the layer is somewhat blurred by burrows and by the impact of the corer. Fine white ash from layer below is present in the burrows in the 142-148 cm. zone.

149-152 cm.- White, burrow mottled fine ash which appears to become coarser and darker with depth. Indistinct laminations occur in the darker ash which contains about 10% dark vitreous mineral grains. A 15 mm. pocket of finer ash occurs below the coarser material and probably marks a large burrow. This pocket has been reburrowed with lutite. With the exception of this pocket the lower contact is sharp and horizontal.

152-230 cm.- Grey green silty lutite similar to the tinted "greasy" material in the 0-148 cm. layer. Zones of slightly increased silt similar to the matrix layer in the 0-148 cm. layer occur at 165-168 and 204-210 cm.. These zones as in the previous layer are poorly defined and arbitrary. Burrow mottling is indistinctly evident except in the upper 5 cm. of the layer where irregular small burrows filled with fine white ash occur as well as two large burrows filled with the coarse material at 154 and 156 cm.. Minute streaks of hydrotroilite are present. Lower contact somewhat disturbed.

230-300 cm.- Grey green sitly lutite matrix with tinted "greasy" areas at 252-258 and 280-284 cm.. A small irregular burrow filled with white ash occurs at 231 cm.. Hydrotroilite present as minute streaks in the 230-260 cm. zone, increasing sharply in the 26—300 cm. zone.

300-398 cm.- Grey green "greasy" silty lutite similar to that in 152-230 cm.. Darker lamina of increased silt occur in the 318-320 and 326-329 cm. zones. Minute white flecks of calcareous material are present at 341, 363, 378 and 389 cm.. Indistinct burrow mottling is present.

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300-398 cm.- (cont.) Streaks of hydrotroilite occur increasing in frequency with depth; Lower contact arbitrary.

398-480 cm.- Grey green silty lutite irregularly mottled with the "greasy" material. Hydrotroilite streaks heavier and more frequent than in the previous layers. Indistictly burrow mottled. A white fleck of calcareous material occurs at 484 cm.. Lower contact gradational.

480-500 cm.- Grey green silty lutite as above. Very little hydrotroilite. Indistinct burrow mottling. Lower contact gradational.

500-866 cm- Grey, less silty lutite becoming darker with depth. When first opened, the layer was nearly black with regular frequent bands of hydrotroilite which largely disappears within hours, leaving faint lamina of concentrated hydrotroilite. Bands of slightly increased silt are usually, but not always, associated with the hydrotroilite. Flecks of white decomposed calcareous material occur at 760 and 846 cm.. Partially decomposed fragments of a complete pelecypod shell occur at 854 cm.. The 795-830 cm. zone shows a light streaks of light calcareous material. This zone also shows brown oxidation stains around what appear to be small (less than 1 mm.) particles of hydrotroilite. There is no obvious burrowing in this layer.

Observation: The apparent grading in the ash layer may a) be the result of an actual turbidity deposit, b) be the result of the different settling velocities of various sizes of aeolian material or c) be two or more separate layers.

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Megascopic Description of a Split Core

Latitude:	53°08.5'S	Longitude:	70°47'W
Corr. depth:	141 M	P.D.R. depth:	77 fms.
Date taken:	3 Feb. 1959	Date opened:	4 Mar. 1961
Described by:	T.Willis	Flow-in:	274 cm.
Core length:	964 cm.		

0-396 cm.- Greenish-grey silty lutite irregularly flecked with minute dark streaks of hydrotroilite, which becomes larger and more frequent with depth. Indistinctly burrow mottled with lighter siltier material. Lighter areas of increased silt fraction occur at 0-12 , 75-120, 131-158, 164-170, and 342-396 cm.. Lower contact sharp.

396-626 cm.- Slightly darker greenish grey silty lutite becoming somewhat lighter and siltier with depth. Large, frequent streaks of hydrotroilite occur. Lighter areas of increased silt are present at 499-506, 528-539, 559-568, 590-597, 604-609, and 615-624 cm.. Burrow mottling noted in lighter areas.

626-964 cm.- Dark greenish grey slightly less silty lutite with lighter areas of increased silt at 638-644 and 649-653 cm.. Hydrotroilite as in previous layer. Burrows smaller and less distinct but similar to those in the previous area.

Observation: The lighter siltier areas of the core may be the result of increased burrow activity, the silt concentrations produced giving an appearance of overall increase.

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Megascopic Description of a Split Core

Latitude:	52°50'S	Longitude:	70°30.5'W
Corr. depth:	99 M.	P.D.R. depth:	54 fms.
Date taken:	9 Feb. 1959	Date opened:	5 Mar. 1961
Described by:	R.Grinnell	Flow-in:	0
Core length:	24 cm.		

General: A medium grained shelly sand containing pebbles of various sizes and one cobble (over 64 mm.).

0-24 cm.- Medium grained, angular to subrounded fossiliferous poorly sorted, greyish green sand. The sand grains are made up of quartz, hornblende, magnetite, rock fragments and shell fragments. The sand is loosely consolidated and no bedding of any kind is visible. Shell fragments larger than sand size are numerous. They comprise roughly 14% of the total sediment. They include pieces of pelecypod and gastropod shells as well as many bryozoan fragments. The bryozan genus Edmonea is one that can be identified in the layer. The chitinous hard parts of the genus Bugula are also present. Bryozoan colonies have coated parts of several of the pebble surfaces and on one pebble a cerriped is also found. The pebbles are of various sizes and generally show a high degree of roundness. Basalt seems to be the common rock type, though granite pebbles are also found. A few of the larger pebbles show fresh broken surfaces. One large subrounded granite cobble is present in the layer. Size, composition: 18% pebbles and cobbles, 14% shell fragments larger than sand size, 65% sand, 3% silt size and smaller.

Coservation: The core was taken in a neritic environment where benthic fauna flourished. The numerous shell fragments and some of the small pebbles were probably deposited by swift-moving currents. Most of the large pebbles and the cobble represent ice-rafted sediment, however.

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Megascopic Description of a Split Core

Latitude:	53°10.75'S	Longitude:	70°38.75'W
Corr. depth:	135 M	P.D.R. depth:	74 fms.
Date taken:	10 Feb. 1959	Date opened:	4 Mar. 1961
Described by:	T.Willis	Flow-in:	
Core length:	609 cm.		

0-609 cm.- Grey green silty lutite becoming greyer with depth. Core thoroughly burrow mottled with the lighter, slightly siltier material. Hydrotroilite occurs in minute streaks, increasing slightly in size and frequency with depth. A well preserved venus type pelecypod valve occurs at 249 cm. and a large well preserved fragments of the same type shell at 281 cm.. Flecks of decomposed white calcareous material are present at 6, 49, 223, 246, 328, 346, 419, 433, 476, 521, 524 and 596 cms..

Observation: No obvious ash layer or ashy zone was noted.

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Megascopic Description of a Split Core

Latitude:	52°38.2'S	Longitude:	69°10.5'W
Corr. depth:	54.9 M	P.D.P. depth:	30 fms.
Date taken:	12 Feb. 1959	Date opened:	6 Mar. 1961
Described by:	T.Willis	Flow-in:	0
Core length:	106 cm.		

0-4 cm.- A shelly "hash" of 85% calcareous material and 15% grey sandy lutite. The organic material consists of cerripeds and cerriped fragments. Three nearly complete cerripeds occur at 3 cm.. Lower contact sharp and somewhat irregular.

4-66 cm.- A zone of alternating layers of dark greenish grey silt-free lutite and silt. The lutite layers generally average about 7 mm. in thickness and the silt 10 mm., The silt layers, which have an extreme thickness range of 1 mm. to 30 mm., are composed of alternating varves of darker and lighter material. These fine varves occur with a frequency of about 8 laminae to the mm. although several approach 1 mm. in thickness. A cross-bedded (slumped?) series of varves are present at 13.5-14 cm.. The 40-45 cm. zone is disturbed, probably by slumping and the varves are folded and distorted although still preserving their individual identity. The varves in the 53-60 cm. zone are also somewhat disturbed and fragmented with several small intrusive lenses of silt in the lutite layer. Two of the silt layers, at 13 and 60 cm. contained traces of hydrotroilite which quickly disappeared. The hydrotroilite appeared to be confined to one or two of the varves. The upper 2 cm. of the layer has been slightly disturbed, probably by corer impact. Lower contact sharp.

66-106 cm.- A shelly "hash" similar to 0-4 cm. layer but with a slightly decreased fraction of calcareous material to 75% of the total and a slight coarsening of the non-organic material. The calcareous material consists mainly of cerripeds, many well preserved, several pecten-type pelecypod shells and a large gastropod. Bryozoans occur partially covering a large clump of cerripeds and the gastropod. Worm tubes are also present irregularly. A large (6 cm.) pebble occurs at 80 cm. with a well preserved cerriped attached.

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Megascopic Description of a Split Core

Latitude:	56°13'S	Longitude:	63°53.2'W
Corr. depth:	4154 M	P.D.R. depth:	2228 fms.
Date taken:	2 Mar. 1959	Date opened:	14 Apr. 1960
Described by:	C.Fray	Flow-in:	approx. 348 cm.
Core length:	525cm.		

Note: Smear outside upper part of core sandy and contains forams. Several meters of core below 525 cm. badly disturbed and may be flow-in. This material not saved. The MnOx layers may represent periods of slow deposition which correspond to periods of glaciation. Intervening layers may correspond to interglacial periods of much faster sedimentation.

0-8cm.- Almost entirely MnOx nodules up to 3cm. in diameter.

8-39cm.- Light greenish-brown silty fine sand containing numerous flecks of glassy substance(volcanic ash?) scattered throughout. MnOx nodule at 28cm. appears to have been dragged down from 0-8cm. layer. No apparent burrowing.

39-50cm.- Three MnOx nodules embedded in silty fine sand (same as layer above) largest nodule 5cm. in diameter.

50-126cm.- Light greenish-brown silty fine sand(same as 8-39cm.) containing numerous flecks of MnOx. A few scattered burrows. Bottom contact is horizontal and sharply defined.

126-145cm.- Light brown clayey silt. Top of section distinct layer MnOx, 1-2cm. thick. MnOx nodule 2cm. maximum diameter at 131cm.. Below this scattered particles MnOx.

145-184cm.- Greenish-brown clayey silt. MnOx content much less than sections above. A few possible burrows. Bottom contact horizontal and well defined.

184-228cm.- Light brown silt containing numerous MnOx nodules. Nodules up to 2cm. in diameter (similar to section126-145cm.).

228-248cm.- Greenish brown clayey silt containing disseminated MnOx (similar to section 145-184cm.). Contact between this section and upper part of section below disturbed during coring operations.

248-283cm.- Light brown silt with disseminated MnOx (similar to 184-228cm.) but with much less MnOx. Possibly some burrow mottling.

283-320cm.- Greenish brown clayey silt (similar to145-184 cm.) containing disseminated MnOx. Disturbed at contact with section below. Some of material from section below dragged up to this section during coring.

320-334cm.- Light brown silt with a large MnOx nodule about 5cm. in diameter. Other MnOx nodules less than 1cm. in diameter. Contact with section below fairly well defined.

334-525cm.- Greenish-brown clayey silt containing disseminated MnOx. Possible sandy layer 1cm. thick at 344cm. (somewhat disturbed). Piston effect at core couple 398-432cm.. Amount of MnOx less than in section above. No burrow mottling evident.

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Megascopic Description of a Split Core

Latitude:	54°53.3' S	Longitude:	67°59' W
Corr. depth:	220 M	P.D.R. depth:	120 fms.
Date taken:	12 March 1959	Date opened:	6 April 1962
Described by:	D. Bauchelle		
Core length:	980 cm	Flow-in:	580 cm.

0-980 cm. Dull grey brown lutite. Sparkles on the surface indicate a certain amount of volcanic ash through most of the core. There is practically no lithic change. Silt and fine sand size mineral matter are probably less than 10 %. Shells of about 1 cm in size are scattered unevenly through the core. Only about 20 specimens are visible. These are all rather soft being cut easily by the knife. Most appear to be pelecypods but one might be a 2 cm gastropod. Forams are very rare, if present. Burrowing is very difficult to see but was undoubtedly abundant. Hydrotroilite could well have been present at one time.

V 15-125

Megascopic Description of a Split Core

Latitude:	55°18.2'S	Longitude:	64°08.6'W
Corr. depth:	3263 M	P.D.R depth:	1756 fm
Date taken:	14 March 1959	Date opened:	
Date described:	7 October 1965	Date photographed:	
Described by:	M. Morgenstein	Flow-in:	0
Core length:	714 cm.		

Note: Description of a dry core. No description in file.

0-5 cm.- Manganese layer, moderate brown (5Y3/4), dry and intact, containing microlaminations. Medium grained rounded quartz imbedded in the manganese. Bottom contact sharp.

5-500 cm.- Lutite, very light gray (N8), dry and intact, containing fine to medium grained sub-angular to angular quartz; manganese coated, medium grained well rounded quartz; muscovite; and less than 1% pyroxene, diatoms and sponge spicules.

The sand fraction comprises about 20% of the sediment. The finer fraction contains angular quartz, less than 1% quartz crystals, small sponge spicule fragments and few diatom fragments. The bottom contact is gradual.

500-714 cm.- Lutite, yellowish-gray (5Y8/1), dry and intact, composed of about 30% sand fraction which contains mostly sub-angular quartz, and less than 2% phlogopite, hypersthene (?), garnet, muscovite, and diatoms. About 4% sponge spicules occur. No manganese is present.

The finer fraction contains angular quartz, garnet, sponge spicule fragments and hypersthene(?).

Note: No carbonate is present in the core.

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Megascopic Description of Split Core

Latitude: 57°04'S
Longitude: 61°25'W
Corr. Depth: 3959 M
Date Taken: 17 March 1959
Date Opened: 14 June 1961
Described by: E.C. Dahlberg
Core Length: 551cm.
Flow-in: 300 cm.

0-50 cm. Greenish-tan foraminiferal, fine sandy, gritty silt. A concentration of fairly well-rounded pebbles varying in size from 4 mm. to 25 mm. appears within the top 10 cm. of the material (~2 dozen). These pebbles are well encrusted with MnOx, and consist of several lithologies, among these a probable rhyolite porphyry containing phenocrysts of quartz, orthoclase, acid plagioclase and epidote, in a crystalline glass ground mass. Several others are of a basaltic nature.

The silty matrix contains scattered fine foram tests, fine quartz grains, feldspar grains, mica flakes and fine glass-like particles. Brown mottling from 10-15 cm. from MnOx oxidation.

50-58 cm. Greenish-tan, gritty, fine sandy silt similar to overlying material, though chunkier. No forams. Underlying contact is quite sharp due primarily to textural change.

58-76 cm. Tan (beige) silt with dark brown mottling (MnOx) scattered through it. Small flakes of glass (ash?) also mixed throughout, though to a lesser degree than in the overlying material. Mottling increases as underlying contact is approached. Contact is gradational due to increase in fine clastic material.

76-110 cm. Greenish-tan, very fine quartzose sandy silt. Occasional fine-sized foram tests not as abundant as the 0-58 cm. layer. Underlying contact is a gradational one due to decrease in gritty, glass and quartz fractions.

110-140 cm. Brownish-tan silt. Slight brown mottling (MnOx) from 110 to 125 cm. Occasional scattered foram tests and glass particles. Underlying contact is quite sharp due to color change.

140-142 cm. Grayish-brown silt layer. No foram tests. Underlying contact is distinct due to color change.

142-144 cm. Brownish-tan silt similar to 110-140 cm. layer.

144-150 cm. Tan (beige) silt. Underlying contact is not extreme, but observable due to difference in both color and nature of the material above. and below the 150 cm. mark. A linear brown stain (horizontal) appears at the contact.

150-156 cm. Olive drab (yellowish) gritty silt layer, possibly bentonitic containing a sizeable fraction of fine glassy particles, more than in the overlying layers. Further study is required to verify the possibly volcanic origin of this material. The underlying contact is fairly well-defined due to color and textural change.

156-175 cm. Greenish-beige silt with very fine gritty (quartzose, glass) material mixed through it. This material is devoid of mottling and quite homogeneous. The underlying contact is sharp and well-defined due to a color and textural change and is also marked by a horizontal, thin, linear rust-colored stain which passes through the entire core.

175-190 cm. Grayish-tan homogeneous silt. Some dark mottling between 188 and 190 cm. Underlying contact is a gradational one as the material increases in coarseness to a very fine sandy silt between 190 and 195 cm.

190-223 cm. Greenish-tan, very fine to fine sandy silt.

At 198 cm. a green, sandy silt lens, outlined by brown rust stain appears. Directly overlying this lens the material shows a yellowish-brown hue. From 210 cm. to 223 cm., the material becomes increasingly siltier as the quartz sand fraction gradually decrases.

223-551 cm. Greenish-tan, very fine sandy, gritty silt similar to the 156 to 175 cm material. The sandy fraction (quartz grains, glass particles, mica, etc.) fluctuates through the material. Fine, scattered flakes of calcareous shell material as well as occasional dark mottled patches are also present.

The material from approximately 245 to 551 cm. shows vertical streaking and smearing typical of flow-in deformation. Small rounded black pebble at 338 cm. looks volcanic. Green and rusty patches are assumed due to contamination during storage. 300 cm. of flow-in were discarded.

Note: No reaction from the silty material when tested for $CaCO_3$ content with dilute HCl.

Megascopic Description of Split Core

Latitude: 57°51'S
Corr. Depth: 3477 M
Date Taken: 18 March 1961
Described by: E.C. Dahlberg
Core Length: 362 cm.

Longitude: 60°09.3'W
P.D.R. depth: 1875 fm.
Date Opened: 15 June 1961

Flow-in: 0

0-05 cm. Greenish tan fine foraminiferal silt with irregular pebbles (2 mm. to 12 mm. ±), angular to sub-rounded, MnOx encrusted) mixed through it. Lithologically, these pebbles consist of siltstone, greenish gray quartzite (w/pyrite and feldspar inclusions) and dark basics (possibly olivine basalt). Underlying contact is not clearcut although gradual color change does occur.

05-45 cm. Greenish tan, very fine sandy silt, slightly tanner in color and grittier than the overlying material. Irregular pebbles are scattered through the silty material. These are angular to sub-rounded, vary in size from >4 mm. to <30 mm. though are generally within the 5 to 15 mm. range. Many are encrusted with MnOx though not all.

A good number of subangular cobbles, well-encrusted with MnOx, up to 60 or 70 mm. are also present. The lithologies of the pebbles and cobbles are varied and include green crystalline quartzite, basalt, granite gneiss, and sedimentary siltstone. Occasional MnOx stains appear in the silty material.

Underlying contact is transitional due to gradual color change.

45-123 cm. Tannish beige, very fine sandy silt, slightly tanner than overlying layer. Occasional pebbles and chip fragments of MnOx are mixed through the silty material; average size ~2 to 8 mm. Larger MnOx encrusted pebbles appear at 45 cm. These are generally crystalline, possibly trachyte or rhyolite glass. Several sub-angular manganese nodules, approximately 15 mm. in diameter, are also present at this level. MnOx stains and patches appear between 50 and 60 cm. Sub-angular pebbles, also occur between the 70 and 80 cm. marks. A dark brown patch of powdery, unconsolidated material, probably MnOx, appears at 82 cm. Underlying contact is well-defined due to distinct textural change and appearance of foram tests.

123-138 cm. Tannish beige, silty, fine- to medium-sized foraminiferal sand. Sand fraction comprises 70% of the sediment (the rest being tan silt) and consists of sub-angular to rounded quartz grains (40%), medium- to large-sized MnOx grains (25%), lithic fragments and dark minerals(20%) and subordinate feldspar (orthoclase), epidote, tourmaline and foram tests.

Underlying contact is gradational due to decrease in sand (grit) content with increasing silt and MnOx granules.

138-165 cm. Tannish beige, pebbly silt with scattered fine-sized foram tests. Pebble fraction is made up of MnOx chunks and coated pebble inclusions ranging in size from <2 to <8 mm. and are poorly sorted size-wise.

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Underlying contact is gradational due to slow decrease in granule-pebble content.

165-355 cm. Tannish beige, silt to very fine sandy silt with scattered pebbles and foram tests mixed throughout. Material is similar to 45 to 123 cm. material in character. Larger pebbles, heavily encrusted with manganese dioxide appear at 190 cm., 210 to 220 cm., 258 cm. (a clay pebble ~25 mm. in length, encrusted with MnOx), 281 cm., 293 cm., and 305 cm.

Underlying contact is not well-defined though a change in texture due to increased pebble-granule concentration is noted.

355-363 cm. Greenish-tan, gritty silt with a concentration of MnOx granules and chunky texture. This may be the result of the core catcher and this material may in actuality be similar to the above.

No flow-in noted..

Notes: (1) Sediment shows no reaction to dilute HCl, therefore low $CaCO_3$ content is indicated.

(2) Great amount of manganese dioxide shows conditions of slow oxidation in an environment of slow deposition.

(3) Large pebbles of varying lithology, presumably the result of ice rafting.

(4) Forams present throughout the total length of the core though in flucuating concentrations.

(5) Material is roughly homogeneous with few sharp breaks.

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Megascopic Description of a Split Core

Latitude: 58°29' S
Corr. depth: 3823 M
Date taken: 18-19 Mar. 1959
Described by: C.Fray
Core length: 840cm.

Longitude: 59°03'W
P.D.R. depth: 2060 fms.
Date opened:
Flow-in:

Note: Pebbles represent ice-rafted material. Association of Mn with pebbles probably indicates period of very low rate of deposition of lutite. Question is: has the rate of deposition been very slow throughout time period represented by core or only for shorts intervals.

0-840cm.- Uniform tan, smooth lutite, fairly firm except near the top where it is soft. Burrow mottling evident throughout much of the core. A pebble 4cm. maximum diameter well rounded on one side and more angular on the other side occurs at 77cm.. Rounding of pebble due to ice movement rather than to stream or wave action. Another pebble 4.5cm. in diameter occurs at 92cm.. This pebble has thin coating of Mn and several other Mn nodules adhere to the pebble. These are less than 5mm. in diameter. Pebble similar to the other two occurs at 225cm.. Small dark colored angular pebble occurs at 778cm.. A small Mn nodule less than 5mm.also associated with this pebble. Mn nodules less than 5mm in size are scattered throughout the core; occur at particularly 69-98cm., 240,270, 306, 360, 442, 665 and 789cm.. Others probably occur which are not visible on the surface of split core.

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Megascopic Description of a Split Core

Latitude: 54°45.8'S
Corr. depth: 3952 M
Date taken: 22 Mar. 1959
Described by: C. Fray
Core length: 146cm.

Longitude: 52°02'W
P.D.R. depth: 2125 fms.
Date opened:
Flow-in:

General Description: A light brown sand composed of mineral grains, probably some foraminifera, and well rounded pebbles (less than 1cm. in diameter) coated with Mn observed as a smear all along the core (from ship-board description). Probably represents the present day surface sediments that was dragged down during the coring.

0-117cm.- Light greyish tan, smooth, soft lutite. No obvious burrowing. Lutite does contain some calcareous material and does contain diatoms. Particles of MnOx are less than 2cm. in diameter and are scattered throughout this section. These MnOx particles do not have a pebble at their center.

117-123cm.- Single large MnOx nodule with a pebble 2-3cm. in diameter comprising its nucleus. Coating of manganese is 2.5cm. thick at its maximum. Nodule completely fills core pipe.

123-143cm.- Tan soft foraminiferal lutite. No obvious burrowing. May have been some disturbance due to piston effect during coring.

143-146cm.- Half of a MnOx nodule that completely fills the core pipe. Thickness of MnOx coating at least 2cm.. Nucleus of nodule not contained in the core.

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Megascopic Description of a Split Core

Latitude:	52°10.8'S	Longitude:	49°04.9'W
Corr. depth:	2514 M	P.D.R. depth:	1364 fm.
Date taken:	24 Mar. 1959	Date opened:	16 June 1961
Described by:	E.Dahlberg	Flow-in:	
Core length:	735 cm.		

Note: Description of a dried core.

0-8cm.- "Salt and pepper", poorly sorted fine to coarse sand containing small (2-4 mm.) pebbles, composed of 30% fine sized foram tests, 50% generally subangular, fine to coarse glassy quartz grains and 20% dark mineral grains, lithic fragments, etc. Underlying contact is well defined due to color and lithologic change.

8-20 cm.- Light grey calci-lutaceous, pebbly sand. Clastic inclusions (quartz, lithic fragments) make up about 20% of the sediment. Pebbles are subangular to subrounded, greatly varied in size and make up about 20% of the sediment. Foraminiferal, calci-lutite matrix makes up 70%. Rest is poorly sorted fine to coarse quartzose sand. Underlying contact is gradational and poorly defined.

20-93 cm.- Greyish-tan, poorly sorted, silty, pebbly, fine to coarse, quartzose sand composed of brown silt, subangular to subrounded quartz grains and pebbles and grey lithic grains, fragments and rounded pebble inclusions mixed throughout the finer matrix. Foram tests (calcareous) are present though not abundant in this material as compared with that overlying. Several large (20-40 mm.), angular to subrounded rock pebbles occur at the 70 to 80 cm. level. Several lithologies are present - greenish-grey crystalline quartzite, basalt and possibly andesite or graywacke. Slickensiding and permineralization appears on one side of the larger angular pebbles. Underlying contact is poorly defined though a change is present due to increase in the lutaceous material with corresponding decrease in the silt content.

93-126 cm.- Greyish-tan, sandy, silt with rounded pebble inclusions. Lithology is same as overlying layer though silt fraction is considerably greater. Sandy material is quartzose, poorly sorted and ranges from fine to coarse size-wise. Underlying contact is clear cut due to color and textural change.

126-135 cm.- Yellowish-tan, chunky, pebbly and sandy silt. An interesting accumulation of very angular pebbles is seen at the 125-130 cm. level. These range in size from 10 to 40 mm. and a great variance in lithologies is observed. Several consist of black thin bedded shale with recrystalled quartz interbeds. Fine shale breccia appears within this quartz. Grey crystalline and possibly quartz diorite pebbles are also included. The yellow color which sets the layer apart from the overlying one is perhaps due to chemical action (oxidation) of iron constituents within the above rock bodies. This is only a speculative assumption, however. The possibility that this discoloration represents a zone of subaerial oxidation is a valid one. Underlying contact is a well defined one due to color and textural.

135-287 cm.- Light greyish-tan silt, quite homogeneous. Manganese and manganese nodules are occasionally scattered through the silt. Concentrations of these appear at 150 cm., one 35 mm. angular graywacke (or andesite) pebble at 240 cm.. Brown manganese staining from 283 to 287 cm..

287-375 cm.- Light greyish-tan homogeneous very fine quartzose sandy silt similar to material above and below but without the manganese inclusions.

375-395 cm.- Manganese and large 70 mm. manganese nodules (2).

395-677 cm.- Similar to material of 135-287 cm. layer although manganese concentrations are greater and more abundant. Extensive manganese at 405-415 cm., 470-485 cm., 645-675 cm.. (nodules and stain)

677-699 cm.- Beige, silty, very fine to fine quartzose sand with manganese bodies mixed through it. Manganese staining.

699-735 cm.- Similar to 395 to 677 cm. material. Manganese nodules concentrated between 699 and 710 cm. and at 720 cm.. Material in this layer appears to be disturbed.

Notes:

1- Pebbles of varying sizes, shapes and lithologies are abundant above the 130-135 cm. zone with little or none occuring below this.

2- Manganese and nodules, on the other hand, are abundant below this 135 cm. level with none occuring above this.

3- Possibly two different environments represented above and below this 135 cm. layer.

4- Forams abundant in upper 20 cm. of the material but peter off rapidly below this. None observed below 93 cm. level.

5- Manganese and nodules where observed are rich and highly concentrated.

6- Colors are faded and changed due to drying although the texture and lithology are assumed to be as original.

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Megascopic Description of Split Core

Latitude:	49°35' S	Longitude:	48°04.6' W
Corr. Depth:	2725 M	P.D.R. depth:	1474 fm.
Date Taken:	26 March 1959	Date Opened:	16 June 1961
Described by:	E.C. Dahlberg		
Core Length:	35 cm.	Flow-in:	0

0-08 cm. Large brown manganese nodule >80 mm. in diameter. Nucleus of this nodule is a 25 mm., subangular arenaceous (arkosic or graywacke) pebble. (Non-calcic cement and quartz grains).

Underlying contact (if there was one) has been destroyed by loss of natural moisture from this core during storage.

08-22 cm. Brownish-tan, poorly sorted, silty quartzose sand with intermixed foraminifera tests (20 to 30% of the sediment). Glassy quartz grains varying in size from fine to coarse, and subangular to subrounded in shape, comprise 50% dark minerals and lithic grains the rest. Scattered quartz pebbles (~2 to 3 mm. in diameter) are frosted (abraded) and occur mixed through the silty sand matrix. Subrounded to rounded gray rock pebbles (fine-grained basalt?) ~5 to 7 mm. in diameter also appear mixed through the material. Manganese staining and cementing in some patches.

No underlying contact due to drying.

22-35 cm. Dark brown manganese chunks, manganese coated pebbles (basaltic, fine-grained and glassy), manganese cemented silty sediment, and nodules. Occasional scattered foram tests. No flow-in.

Notes: 1. Core was described in a dry and desiccated condition and therefore color and texture may not be that of original "in situ" material.

2. Relative shortness of core assumed due to manganese nodules which may have resisted core pipe penetration.

3. Environment of slow deposition, under slowly oxidizing conditions with fairly mild current activity is indicated.

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Megascopic Description of a Split Core

Latitude:	44°53.7'S	Longitude:	51°32'W
Corr. depth:	5856 M	P.D.R. depth:	3114 fms.
Date taken:	31 Mar. 1959	Date opened:	20 Apr. 1960
Described by:	C.Fray	Flow-in:	
Core length:	1130cm.		

0-5cm.- Mottled brown foraminiferal lutite. Numerous burrows. Bottom contact sharp due to color change. Section slightly disturbed during coring and plane of contact with section below is not horizontal. Part of underlying section squeezed up into this section during coring.

5-28cm.- Greyish brown lutite, mottled with orange tan lutite. Sediment thoroughly reworked by bur rowing organisms. Bottom contact poorly defined.

28-33cm.- Tannish-grey lutite with dark brown spots. Latter probably represent concentration of dark silt fraction contained in lutite by burrowing organisms. Bottom contact horizontal and fairly well defined by color and textural changes.

33-37cm.- Yellow-greenish grey silty lutite. No burrows or other structure visible. Bottom contact horizontal and fairly well defined by color and textural changes. (Check for graded bedding as possible turbidity current deposit.)

37-40cm.- Grey lutite containing a coarse fraction. No burrowing apparent. Bottom contact sharply defined and horizontal.

40-42cm.- Greenish grey silty lutite. May represent altered ash. Bottom contact well defined by color and textural change.

42-44cm.- Dark grey lutite mottled with greyish green lutite carried up from underlying section by burrowing. Bottom contact irregular due to burrowing.

44-60cm.- Greyish green lutite with burrows of grey lutite carried down from overlying section. Dark grey fine sand or silt layer less than 0.5 cm. thick at 60cm. forms sharp contact with underlying layer.

60-632 cm.- Olive green lutite containing many dark grey horizontal layers of probably ash. Layers are mixture of ash and olive green lutite and outline of layers is generally diffuse. Layers

60-632cm.- (cont.) generally 1cm. or less in thickness. Number of burrows are filled with ash and may represent concentration from surrounding lutite by burrowing organisms. Much hydrotroilite scattered throughout the lutite. Burrowing organisms have been active throughout this section.

Core couple 505-510cm..

632cm.- 2mm. layer possible white ash at 625cm. pocket of ash on one side of the core (probably represents former layer disturbed by coring.)

632-1130cm.- Olive green to greyish green lutite containing very many thin (less than 1cm.) dark grey horizontal layers of probable ash. Burrow mottling throughout. Rounded crystalline rock(diorite?) 4cm. maximum diameter at 798cm.. Associated with rock is probable MnOx nodule 1cm. maximum diameter. Green layers that contain glassy materal and may represent altered ash are at 860-861, 954-956 and 1124-1130cm.. Much hydrotroilite scattered throughout the lutite.

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Megascopic Description of a Split Core

Latitude: 41°37'S
Corr. depth: 4797 M
Date taken: 2 Apr. 1959
Described by: D.Bauchelle
Core length: 1170cm.

Longitude: 54°24'W
P.D.R. depth: 2562 fms.
Date opened: 31 Jan. 1962
Flow-in: 0

General Description: Core oxidized along outside altering original color to a dull brown. The original material seems to have been a bluish grey lutite with zones tinged green by the alteration of volcanic glass. There are several zones of devitrified glass. Manganese specks are common. Burrowing is difficult to see except at color change areas but is probably abundant. There are several small layers of terrigeneous fine sand. Frequent grey spots and streaks are probably organic discoloration rather than manganiferous.

0-3cm.- Dull mustard brown lutite. Many tiny manganese specks. Burrowing abundant. Contact burrowed, generally flat.

3-17cm.- Dark beige lutite. Burrowed; some material from above. Non-homogeneously mixed manganese specks. Bottom contact faint. Very gradual and very burrowed.

17-~268cm.- Blue greenish lutite with usual very abundant tiny manganese specks and other larger organic streaks. Volcanic ash in very thin unclean layer occurs at 35cm. and pockets or disseminated zones of green, devitrified glass occur., at 55-57cm., 130cm., 162-162cm.,172-175cm. and 230-233cm.. Bottom contact is faint, sharp horizontal, burrowed and by color.

~268-~298cm.- Slightly lighter, greenish-brown lutite. Extensive burrowing. Abundant tiny manganese specks and larger streaks of grey probably organic. A lens of fine terrigeneous sand occurs along the side at 270-272cm. which may or may not in situ. Layer has some silt content. Sand is about 85% subangular/round quartz grains and 15% dark minerals. Bottom contact arbitrary, by color.

~298-330cm.- Usual dull greenish grey, manganese specked, burrowed silty lutite. Bottom contact sharp by color but very burrowed.

330-410cm.- Slightly lighter and greyer lutite than above layer. Contains abundant burrowing and dark streaks of grey which rather than being manganifereous are probably organic, especially in a layer at 361-363cm. and a lens at 596cm. There is no clearly visible bottom contact. The division is arbitrary upon a barely perceptible color change made difficult to see because the whole layer is transitional.

Note: Since this core is so uniform in overall character (being generally bluish or brownish green lutite, manganese speckled, burrowed and spotted with grey organic residue) from this point on only non-characteristc features will be described.

454-456cm.- Grey terrigeneous sand in diffuse, well burrowed layer. Composition: about 85% subround/angular quartz and about 15% dark grains.

490-560cm.- Includes approximately 20 volcanic glass(?) filled burrows.

655-661cm.- Zone distinguished by numerous small light burrows some filled with fine volcanic glass(?) and others with coarser terrogeneous sand. Bottom contact gradual.

178-185cm.- Scattered ash(?) filled burrows.

922-925cm.- Bluish green lens in yellowish olive lutite.

955-968cm.- Top contact marked by appearance of burrows filled with fine sand and forams. Burrows abundant to 961cm.. A black fine grained, sand-sized material in non-homogeneously mixed sandy lutite. Contact at 968cm. is curved but sharp by color and lithology.

968-992cm.- Dull brown olive lutite containing abundant manganese specks and forams. Burrowing abundant. Contact sharp and marked by cessation of manganese specks.

992-1028cm.- Bluish grey lutite discolored to yellowish olive. Top of zone is fairly clean lutite. This grades quickly to a lutite with grey quartz sand rich in forams and then back again to a fairly clean lutite with dark grey stains of organic material(?). Bottom contact arbitrarily on color line of oxidized lutite.

1070-end.- Usual bluish-olive green lutite with scattered burrows (up to 3mm.) containing terrogeneous sand.

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Megascopic Description of a Split Core

Latitude:	38°14'S	Longitude:	57°13.8'W
Corr. depth:	38.4 M	P.D.R. depth:	21 fms.
Date taken:	4 April 1959	Date opened:	
Described by:	C.Fray	Flow-in:	199 cm.
Core length:	230 cm.	Area:	Continental Shelf off Mar-del-Plata

Note: Description of core made several weeks after core had been opened.

0-33 cm.- Greyish brown sand composed of mineral grains and shell fragments. Yellow-brown color of iron oxide discolors surface of sediment. Grain size increases with depth and relative percentage of shell increases as does their size. Small rounded pebbles prominent below 25 cm.. Shells are fragmented and show evidence of solution. Bottom contact defined by sudden increase in shell size and apparent decrease in sand content.

33-57 cm.- Mixture of sand and shell. Percentage of sand appears less than section above and shell fragments are generally larger. Shell fragments up to 3 cm. in longest direction. No whole shells evident. Small rounded pebbles with a maximum diameter of 1 cm. contained in the sediment. No obvious grading. Bottom contact defined by abrupt decrease in shell content and size of shell fragments.

57-90 cm.- Brownish-grey mixture of sand and shell, but predominantly grey sand. In general, shell fragments are considerably less than 5 mm. in size. Locally there appears to be an increase in amount of shell fragments but such areas are not sharply defined. In places sand is marked by iron rust but this occurs only on outer portions of core and probably comes from core pipe. A large rounded light colored pebble occurs at 90 cm..

90-104 cm.- Shell fragments with subordinate amount of sand. Grey in color due to shell. In general shell is quite uniform in size. Bottom contact defined by sudden decrease in shell content and increase in sand content.

104-132 cm.- Greyish-brown sand containing a minor amount of sand size shell fragments.

132-140 cm.- Mixture of sand and shell fragments. Grey color due to shells. A few small rounded pebbles contained in sediment. Shell fragments less than 1 cm. in maximum diameter.

140-160 cm.- Mixture of sand and shell fragments. Yellow-brown of iron oxide discolors the normal color of mixture.

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140-160 cm.- (cont.) Iron oxide locally extends through the sediment and numerous lumps of sediment formed by grains cemented together by iron oxide. It is possible that iron oxide came from core pipe, but its localization in the core and its extensive penetration in the sediment, plus the numerous lumps formed by cementation suggests that the section may represent a weathered zone. Evidence is far from being conclusive. Bottom contact sharply defined by change in material.

160-230 cm.- Medium brownish sand containing a minor amount of shell fragments. A few scattered whole shells occur. A marked increase in shell fragments occurs from 220 cm. to the bottom of the core at 230 cm..

Notes from Dr. Horace Richards:

Shell material indicates shallow water fauna (suggests maximum depth to be about 10 fms).

Shells at 40-50 cm. and at 100 cm. suggest beach worn material (especially abrasion that probably is due to tumbling in the surf).

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Megascopic Description of a Split Core

Latitude:	38°29.4'S	Longitude:	56°41.8'W
Corr. depth:	67.7 M	P.D.R. depth:	37 fms.
Date taken:	5 Apr. 1959	Date opened:	
Described by:	C.Fray	Flow-in:	387 cm.
Core length:	95 cm.	Area:	Continental Shelf

General: Sand composed of mineral grains (much quartz), no pebbles evident, no conspicuous burrowing.

0-2.5 cm.- Greyish brown sand containing minor amounts of shell fragments. Bottom contact horizontal and well defined by increase in shell content.

2.5-4 cm.- Sand and shell. Shells 2-3 mm. in size; many are complete and show little abrasion. Bottom contact essentially horizontal and sharp; defined by change in material.

4 cm.- Dark brown, firm silt clay 2-3 mm. thick. Contacts above and below are sharp.

4-13.5 cm.- Brown medium grained sand containing much quartz. Contains very little shell. Bottom contact defined by change in material.

13.5-18 cm.- Mixture dark brown sand and shell fragments. Sand represents about 60-70% of material. Majority of shell appears to be broken as a result of abrasion.

18-21 cm.- Dominantly mollusc shells and some sand. Many shells are complete and show no conspicuous evidence of abrasion or solution. Shells have maximum diameter of 1-1.5 cm..

21-28 cm.- Mixture of fine sand and shell fragments. Shell fragments 2-3 mm. in size. Shell constitutes about 40% of total material. Bottom contact sharp and horizontal.

28-95 cm.- Essentially a brown medium grained sand composed of mineral grains and containing little shell. At 33.5-35 and 37-3[illegible] cm. are greyish brown layers containing considerable lutite as well as shell and sand. The upper layer extends into the overlying sand on one side of the core due to burrowing. Between 52 and 61 cm. sand contains scattered shell fragments 2-3 mm. in diameter. Subtle layering occurs in section due to slight changes in the grain size of the sand.

SAMPLES FOR DR. BOLTOVSKOY TAKEN AT:

2 cm.	61 cm.
11 cm.	71 cm.
21 cm.	81 cm.
31 cm.	91 cm.
41 cm.	99-100 cm.
51 cm.	

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Megascopic Description of a Split Core

Latitude:	26°21.4' S	Longitude:	34°36.5' W
Corr. depth:	4468 M	P.D.R. depth:	2378 fm.
Date taken:	27 April 59	Date open:	17 April 1962
Described by:	D. Bauchelle		
Core length:	919 cm	Flow-in:	344 cm

General Description: Burrow mottled, chocolate brown silty lutite which grades between ~435 - ~510 cm to a yellow-cream silty lutite. The brown lutite gains some of its color from finely disseminated manganese grains. There are extensive patches of lighter color in the brown lutite caused by oxidation while in the gutter pipe. Several manganese nodules are present in the upper layer.

Note: Dark oily contaminations occur at top and at 878 cm.

0 - ~435 cm Brownish silty lutite, burrowed abundantly, "salted" with manganese grains in varying amounts, mottled by patches of oxidized material, contains a few manganese nodules (several about 8 mm in size at 163 cm); two or three about 2 cm in size at 311 - 315 cm, (removed by Professor Keith from Penn State); one at 387 -389 cm and a mass of manganese rubble at 394 -399 cm, within which is a lighter material which might well be an altered ash layer). Apparently no forams. The 394 -399 cm layer also contains a one cm long, thinly manganese coated, sharks' tooth.

~ 435 - ~510 This is the transition zone; coloring changes from brown to yellow-cream; disseminated manganese grains become less frequent and die out finally by ~510 cm. Both contacts arbitrary though upper is selected by color and lower by presence of manganese grains.

~ 510 -919 cm Yellow-cream silty lutite. Manganese in this layer is not so coarse. It occurs as small, thin concentrations which are either horizontal layers or irregular patches (or lenses) which generally are somewhat linear and horizontal. Burrowing is abundant. There are some shell tests (very small) which have been sliced by the knife. At 554 -560 cm there are several manganese rich layers and some yellowish, colloidal, altered matter, possibly ash. Some rust staining occurs at 510 - 515 cm and 535 - 551 cm.

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V - 15 - 186

Megascopic Description of a Split Core

Latitude:	20°26.5'N	Longitude:	67°40'W
Corr. depth:	5159 M	P.D.R. depth:	2728 fms.
Date taken:	6 June 1959	Date opened:	25 April 1963
Described by:	R. R. Capo	Flow-in:	397 cm.
Core length:	765 cm.		

General:- Reddish-brown to reddish-tan calcareous lutite with foraminiferal lutite zones scattered throughout. Section of core from 220-584 cm. extremely dry.

0-32 cm.- Reddish-brown calcareous lutite with foram fragments of Globigerina and Globorotalia. Discoaster brouweri (only two!) observed under high power scope in smear taken from very top of core. Layer is well burrowed. Several prominent burrows of varying shapes in 10-20 cm. zone are lighter in color than the surrounding matrix. Manganese present. Calcareous lutite approximately 70%; forams 25% and manganese 5%. Bottom contact shows only slight gradation in color and no lithology change.

32-108 cm.- Reddish-brown to yellowish-brown (caused by oxidation?) calcareous lutite. Particles of manganese, quartz, and garnet in micro-sample. Globorotalia, Globigerina and many foram fragments. A decrease in burrowing as compared to the overlying layer. Two prominent oxidized zones at 75-90 cm. and 93-108 cm. Manganese. Calcareous lutite 70%; forams 25%; manganese 5%. Gradational bottom contact in color but similar in lithology.

108-220 cm.- Reddish brown to reddish-tan calcareous lutite. A marked increase in manganese content. Small elongated streaks throughout with one well-defined laminae of streaks at approximately 109 cm. Well burrowed. Globigerina, Globorotalia menardii (left coiling), and Globorotalia truncatulinoides. An increase in foram content compared with layer above. Manganese, quartz and garnet were observed in micro-sample. Lutite approximately 40%; forams 50%; manganese 10%. Bottom contact gradational in color but similar in lithology.

220-324 cm.- Yellowish-tan to brown calcareous lutite containing manganese, garnet, quartz, and white mica. Foram content decreasesin comparison to the overlying layer as does burrowing activity. This layer of the core is also much drier than the remainder. An increase in manganese streaks between 265-280 cm. Light tan to greenish-tan zone along edge of core between 265-290 cm. is highly calcareous. This structure may be caused by slumping. At approximately 290 cm. the layer grades into a light tan mottled structure which is less calcareous than overlying zone. Horizontal streaks lighter in color than the

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surrounding matrix between 300-306 cm. This burrowed zone grades into a tannish-brown to grayish-brown lutite toward the bottom. Calcareous lutite about 75%; forams 20%; manganese 5%. Color determines fairly sharp bottom contact.

324-390 cm.- Light tan to dark tan calcareous lutite. Burrows more prominent and numerous than above layer, especially at the top of the section. Manganese streaks very prominent between 330-356 cm. Several elongated manganese streaks occur at 385 cm. Foram content similar to above layer. Calcareous lutite 75%; forams 15%; manganese 10%. Bottom contact gradational in color. Lithology is about the same.

390-486 cm.- Grayish-tan to dark tan well burrowed calcareous lutite. Very dry and broken, therefore the continuity is fairly hard to distinguish. Globogerina. Forams, but appear to have increases in size though not in quantity. Several prominent burrows at approximately 420 cm. Zone between 435-490 cm. contains alternating concentrations of dark brown and light tan calcareous lutite -- an effect of burrowing. One outstanding lamina at bottom is about 2 cm. thick. Calcareous lutite 75%; forams 20%; manganese 5%. Bottom contact sharp in color, but lithology similar. Discoasters challengeri, D. brouweri and D. pentaradiatus under scope at 400 cm.

486-568 cm.- Light tan to grayish tan foraminiferal lutite. Badly fractured and broken due to drying out. Surface features hard to distinguish. Good burrows at top of layer and one V-shaped burrow (?) at 497-500 cm. Rest of layer too broken up for distinguishing features. Test for manganese inconclusive. Bottom contact shows gradational change in color. Foraminiferal lutite approximately 70%; calcareous lutite 30%.

568-765 cm.- Light tan-tannish brown-dark brown calcareous lutite with numerous manganese laminae and streaks dispersed between 625-693 cm. Top of layer appears to be less calcareous than that part between 590-648 cm. Slight textural change at approximately 650 cm. Zone above 650 cm. is of a coarser texture than zones below. Reaction to hydrocloric acid between 648-approximately 715 cm. is practically nil. An increase in foram content between 725-740 cm. and 760-765 cm. Burrows throughout but are especially prolific between 598-606 cm. and 740-749 cm. Burrow paths are much lighter in appearance than the surrounding matrix. Manganese particles quite numerous in micro-sample. Foram content less than in overlying layers. Calcareous lutite 10%; lutite 40%; forams 10%; manganese 10%.

NOTE:- Although discoasters were seen at (top of core), 230 cm. and 400 cm., none were observed in samples from 700 and 755 cm.

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3B

Megascopic Description of a Split Core

Latitude:	21°34'N	Longitude:	67°05.5'W
Corr. depth:	5293 M	P.D.R depth:	2797 fm.
Date taken:	7 June 1959	Date opened:	11 Oct.1962
Date redescribed:	26 June 1964	Date photographed:	12 Oct.1962
Redescribed by:	R. Hekinian	Flow-in:	0
Core length:	1052 cm.		

Note: Core originally opened over 18 months ago. Description (if any) could not be found. Redescribed in dry condition.

0-125 cm.- Brown, poorly sorted lutite with about 25-30% fine-grained foraminifera. Small patches of manganese are scattered throughout. Lighter and darker small burrow mottlings occur. Percentage of foraminifera decrease with depth. Bottom contact due to the presence of laminations.

125-200 cm.- Brown, poorly sorted, laminated lutite. Laminae and microlaminae are composed of dark manganese lutite at 125 cm., 130-134 cm., 161 165 cm., and 191-199 cm. Carbonate content about 20-35%. Bottom contact due to absence of laminations.

200-336 cm.- Brown poorly sorted lutite mixed with 25-30% fine to medium-coarse foraminifera; test sizes increase with depth. Carbonate content about 35%. This layer is very similar to the 0-125 cm. zone. Gradational bottom contact due to beginning of laminations.

336-349 cm.- Brown, laminated lutite. Darker microlaminae of manganese lutite (very low carbonate content) are intercalated with lighter brown lutite containing moderate amounts of carbonate and foraminifera. Sharp bottom contact.

349-520 cm.- Brown, poorly sorted lutite with moderate amount of foraminifera similar to 0-125 cm. zone. Bottom contact shows increase of burrow mottlings. Piston effect at 440-450 cm.

520-555 cm.- Reddish-brown well burrowed lutite. Carbonate content about 25%. Occasional fine tests of foraminifera were observed. Burrows are filled with calcilutite. Gradational bottom contact.

555-654 cm.- Brown, poorly sorted lutite with moderate amount of foraminifera similar to 0-125 cm. layer. Gradational bottom contact due to presence of laminations.

654-660 cm.- Laminated, brown lutite similar to 336-349 cm. layer.

660-764 cm.- Brown, poorly sorted lutite very similar to 0-125 cm. layer. Contact due to burrow mottlings.

764-774 cm.- Tannish-brown, well burrowed lutite. Carbonate content around 35-40%. Micronodules of manganese were observed throughout. Gradational bottom contact.

774-849 cm.- Light brown, poorly sorted lutite mixed with 10-15% medium coarse foraminifera tests. No burrow mottlings. The amount of carbonate is around 20-25%.

849-864 cm.- Laminated, tannish-brown, burrowed lutite. Laminae and microlaminae are composed of manganese. Lighter burrow mottlings gradually increase with depth. Sharp, burrowed bottom contact.

864-881 cm.- Tannish-brown lutite. About 25-30% carbonate present. Occasional medium-coarse tests of foraminifera were seen. Gradational bottom contact.

881-889 cm.- Laminated, tannish-brown lutite. Darker laminae, rich in manganese, are spaced rhythmically apart. Small burrow mottlings occur throughout. This layer is apparently similar to 336-349 cm. layer. Gradational bottom contact due to increase of burrow mottlings.

889-911 cm.- Tannish-brown, burrowed lutite. Small amount of medium to coarse-grained foraminifera occur. Amount of carbonate is about 20-30%. Gradational contact due to decrease of burrow mottlings.

911-1032 cm.- Brown lutite with apparently total lack of foraminifera and very low carbonate content (about 2%). Micronodules of manganese scattered throughout. No burrow mottlings were observed.

1032-1046 cm.- Light-tan, abundantly burrowed lutite with carbonate content around 30-35%. Gradational bottom contact due to decrease of burrows.

1046-1052 cm.- Brown lutite with very low carbonate content (2%). Similar to 911-1032 cm. layer.

V 15-188

Megascopic Description of a Split Core

Latitude:	20°23'N	Longitude:	66°06'W
Corr. depth:	5786 M	P.D.R. depth:	3051 fm.
Date taken:	10 June 1959	Date opened:	30 April 1963
Described by:	R. R. Capo	Date photographed:	30 April 1963
Core length:	782 cm.	Flow-in:	0

0-141 cm. Lutite, moderate yellowish-brown (5YR4/4). Manganese laminae occur between 32-34 cm. Foraminifera content at top of layer practically nil. Quartz and manganese micronodules present. Between 40-90 cm. the laminae of manganese are very pronounced.

Yellowish-brown streak (lighter in color than surrounding matrix) extending vertically down core center from 40-120 cm. is probably due to disturbance during coring. It appears that the section of core from 0-141 cm. was all that the first core pipe contained. There could have been an omission of several screws from core coupling and the core washed out of pipe. Bottom contact gradational; appears to be sharp due to disturbance.

141-200 cm. Lutite, similar in appearance and lithology to the 40-80 cm. zone except for numerous manganese laminae and an increase in burrowing activity. Abundant burrows between 170-175 cm. No foraminifera observed.

200-470 cm. Lutite, grayish-tan. This section of the core appears to have been frozen during storage. Lutite is broken and crumbly. Indication of burrowing activity and manganese laminae present at 213 cm. and 225-230 cm. Layer seems to have coarser grained sediment probably due to the after-effects of freezing.

Between 273-470 cm. is a tannish to yellowish-brown lutite (5YR6/4), fairly compact (as compared to overlying zones). Prominent manganese laminae occur between 335-340 cm. and at 345 cm.

Considerable contamination by oxidation occurs between 375-440 cm. Bottom contact sharp because of secondary disturbance.

470-568 cm. Lutite, very similar to overlying zone. This section also seems to have been frozen during storage. Lutite is broken and lighter in color than overlying section. Bottom contact sharp due to contrast in core condition.

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Megascopic Description of a Split Core

Latitude:	20°23'N	Longitude:	66°06'W
Corr. depth:	5786 M	P.D.R. depth:	3051 fm.
Date taken:	10 June 1959	Date opened:	30 April 1963
Described by:	R. R. Capo	Date photographed:	30 April 1963
Core length:	782 cm.	Flow-in:	0

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Considerable contamination by oxidation occurs between 375-440 cm. Bottom contact sharp because of secondary disturbance.

470-568 cm. Lutite, very similar to overlying zone. This section also seems to have been frozen during storage. Lutite is broken and lighter in color than overlying section. Bottom contact sharp due to contrast in core condition.

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Megascopic Description of a Split Core

Latitude:	27°19'N	Longitude:	76°34'W
Corr. depth:	1748 M	P.D.R. depth:	930 fms.
Date taken:	3 July 1959	Date opened:	9 April 1963
Described by:	Roy R. Capo	Flow-in:	0
Core length:	56 cm.		

0-28 cm.- Light tan foraminiferal ooze poorly consolidated and highly calcareous. Forams (Orbulina, Globorotalia, Globigerina and Globigerinella) smaller in top 17 cm. of layer than in the bottom of layer. A few gastropods. Manganese disseminated throughout with a concentration at about 13 cm. and some nodules from 22-26 cm. About 90% ooze with maybe 3% lutite towards bottom and 7% manganese nodules. Bottom contact is not sharp; no great lithological change.

28-56 cm.- Calcareous foraminiferal ooze finer grained than top layer and mixed with some pebbles that effervesce with HCL and are probably limestone. Greater amount of manganese disseminated throughout this layer than the overlying one. Some calcareous lutite occurs as compact pebble-sized concentrations cemented with manganese. About 50% foraminiferal ooze, 30% lutite and 10% manganese nodules. Subrounded pebbles; one has indications of worm trails and some type of undetermined inclusion. Pebbles form roughly 10% of the layer.

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Megascopic Description of a Split Core

Latitude:	27°54'N	Longitude:	76°36'W
Corr. depth:	3199 M	P.D.R. depth:	1700 fms.
Date taken:	6 July 1959	Date opened:	15 March 1963
Described by:	R. Grinnell	Flow-in:	3 cm.
Core length:	57 cm.		

0-11 cm.- Yellowish-gray (5 Y 7/2), blocky foraminiferal lutite. Mixed with chalky, friable limestone fragments ranging up to 2 x 1 x 1 cm. in size and dark bluish-black manganese nodules ranging up to 3 x 2 x 1.5 cm. in size. Slightly stained by gutter pipe rust. Planktonic forams and pteropods form 30% and 15% of the layer, respectively. Common forams include Globigerina, Globorotalia, Orbulina, and Eponides. Lutite amounts to 35%, limestone pebbles, granules, and sand to 10%, and manganese to 10%. No burrowing seen. Lower contact marked by color change.

11-39 cm.- Pale yellowish-orange (1o YR 8/6), blocky foraminiferal lutite and numerous limestone fragments. The latter have an average diameter of one centimeter, are chalky white, and comprise 35% of the layer. Siliceous and calcareous hard parts of sponge spicules, forams, pteropods, and alcyonarian corals are present, forming 35% of the layer. Lutite amounts to 25% and particles of manganese, ranging from silt size up to small pebble size, to 5%. The section is contaminated by rust and has undergone considerable fragmentation due to dehydration and disintergration of the limestone fraction. No burrowing. Lower contact demarcates color change.

39-57 cm.- Yellowish-gray (5 Y 7/2), blocky foraminiferal lutite. Contains far fewer limestone fragments than the overlying layer. Similar in appearance and composition to the 0-11 cm. section. Pteropods and forams amount to 10% and 30%, manganese nodules and micronodules to 10%, limestone fragments to 5%, and lutite to 45%. No burrowing seen.