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LAMONT GEOLOGICAL OBSERVATORY
PALISADES, NEW YORK

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MICROPALEONTOLOGICAL AND SPECTROCHEMICAL ANALYSES OF TOP SAMPLES OF SEDIMENT CORES

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May 1955

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LAMONT GEOLOGICAL OBSERVATORY
(COLUMBIA UNIVERSITY)
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MICROPALEONTOLOGICAL AND SPECTROCHEMICAL ANALYSES OF TOP SAMPLES OF SEDIMENT CORES

[redacted]

by

David B. Ericson and Goesta Wollin

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2. Micropaleontological Analyses

General Statement

The results from micropaleontological analyses of the top samples of cores from S[redacted] P[redacted] 8, 9, 10 and 11 and R[redacted] 9 and 10 are presented in this chapter. Under the subheading Position and Depths of Cores and Descriptions of Top Samples are also included some samples from [redacted] S[redacted] P[redacted] 11 and 12 and R[redacted] 11 and 12 which have not yet been micropaleontologically analyzed. These samples, however, have been spectrochemically analyzed and the data given are referred to in the chapter which presents the results of the spectrochemical analyses.

For the description of the samples the term clay is not used because it is considered to have definite mineralogical implication. Instead the term lutite has been applied to indicate all particles smaller than the silt fraction, whether consisting of clay minerals, calcite or any other minerals. The term ooze denotes a fine sediment which consists mainly of the shells and debris of pelagic organisms. Silt indicates a deposite with particle sizes between 0.0625 and 0.004 mm in diameter.

All the samples were taken from piston cores.

For the micropaleontological analyses about 8gm samples were taken. The samples were dried, weighed, and washed on a 74 micron sieve. The fractions retained on the sieve were dried, weighed, and the percentage of material coarser than 74 microns were calculated. In the description of the samples some of the results of this kind of size fraction analysis are presented. The coarse fraction sediment samples obtained as described were examined for foraminifera and other organic remains. An estimate of the relative abundance of mineral particles to organic remains was made as well as a rough description of the mineral species present.

Positions and Depths of Cores and Descriptions of Top Samples

Core No.	Position	Depth
(67) SP8-3	30°24.7' 30°46.8'W	4445m

~~Light tan calcareous lutite.~~

(77) SP8-6	35°21.5'N, 07°41.5'W	1345m

~~Dark tan lutite.~~

(82) SP8-7	37°56'N, 11°09.9E	395m

Light tan lutite with calcareous debris and glauconite.

(86) SP8-9	35°23.8'N, 22°38.4E	3620m

Dark greenish-brown lutite with pteropod fragments.

(124) SP8-11	41°24.8'N, 10°37.7E	1115m

~~Tan lutite with pteropod fragments.~~

(61) SP8-13	32°44'N, 46°48.5W	4480m

Dark-tan lutite with some trace of quartz sand.

130 SP9-2	58°19'N, 32°57'W	1830m

Dark tan globigerina ooze with abundant alkalic shards and some vesicular dark glass.(About 2% quartz sand in washed sample).

(140) SP9-3	53°52.5'N, 21°06'W	2745m

Light tan calcareous lutite with some alkalic shards.

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Core No.	Position	Depth
(147) SP9-4	50°02.2'N, 14°46'W	4205m

Gray lutite with some alkalic shards. Size fraction of sample: 3% >74microns. (About 10% quartz sand in washed sample).

(127) SP10-1	51°23'N, 38°04'W	3695m

Tan foraminiferal lutite with some alkalic shards. Size fraction of sample: 20% >74 microns. (About 20% poorly sorted quartz sand in washed sample).

(158) SP10-2	56°-09.4'N, 09°20.1W	1555m

Greenish-gray, sandy lutite with abundant mica. Size fraction of sample: 8% > 74 microns. (About 85% well sorted quartz sand in washed sample).

(263) SP10-5	63°28.5'N, 00°04'W	2010m

Brown lutite with alkalic shards. Size fraction of sample:3% >74 microns. (About 95% quartz sand in washed sample.)

(265) SP10-6	62°42N, 01°15'E	1005m

Brownish-gray lutite. Size fraction of sample: 12% >74 microns. (About 75% quartz sand and about 20% alkalic shards in washed sample.)

(159) SP10-7	58°58.2'N, 08°44.8'W	1555m

Gray, silty lutite with alkalic shards. Size fraction of sample: 20% >74 microns. (About 30% sand in washed sample.)

(247) SP11-1	60°02'N, 34°12'W	2470m

Brown lutite with sponge spicules. (About 5% quartz sand in washed sample.

Core No.	Position	Depth
(251) SP11-2	62°17'N, 15°30'W	2195m

Gray volcanic ash with sponge spicules. (About 60% brown and colorless volcanic glass in washed sample.)

(258) SP11-3	60°20.5'N, 05°40'W	860m

Light-brown, sandy lutite.

(281) SP11-5	73°22'N, 17°15'E	470m

Dark gray, sandy lutite.

278 SP11-6	70°29'N, 07°57'E	2925m

Red lutite.

(273) SP11-7	74°35.3'N, 01°20'W	3750m

Dark brown lutite.

(277) SP11-8	76°31.3'N, 03°34'E	2560m

Gray-brown, silty lutite.

(271) SP11-10	73°53'N, 10°26'W	3110m

Gray-brown, silty lutite.

(270) SP11-11	70°33'N, 11°14'W	715m

Light-brown, sandy lutite.

(269) SP11-12	70°48.5'N, 19°45'W	1115m

Gray-brown, snady lutite.

Core No.	Position	Depth
(138) SP11-13	54°49.8'N, 22°34.3'W	3255m

Light tan, foraminiferal lutite.

(132) SP11-14	52°51.2'N, 32°37.1'W	3000m

Gray-brown, foraminiferal lutite.

(91) SP12-1	43°22.5'N, 59°52.5'W	1280m

Light-gray, sandy lutite.

(12) SP12-10	18°49'N, 66°29'W	1830m

Yellowish-gray, calcareous , sandy lutite.

(15) PS12-11	18°37.6'N, 65°42.5'W	1050m

Gray, calcareous, sandy lutite.

(14) SP12-12	18°47.7'N, 65°57.8'W	2195m

Tan, calcareous lutite.

(248) R9-6	62°21'N, 27°37'W	1300m

Chalky, nearly white, calcareous lutite with some alkalic glass. Size fraction of sample: 9% >74 microns.(About 20%fine,well sorted quartz sand in washed sample.)

(72) R9-8	38°34'N, 16°27'W	5355m

Tan lutite. (About 30% fine quartz sand in washed sample.)

	Position	Depth
(133) R10-1	56°47'N, 31°00'W	2375m

Dark-tan, foraminiferal lutite with dark voloanic glass. Size fraction of sample: 26% >74 microns. (About 15% quartz sand in washed sample.)

(254) R10-3	63°55'N, 09°53'W	660m

Gray, muddy sand with glauconite, sponge spicules and alkalic shards. Size fraction of sample:46% >74 microns. (About 95% poorly sorted quartz sand in washed sample.)

(261) R10-4	64°18.2'N, 01°20.8'W	2690m

Dark-gray, sandy lutite with several Upper Cretaceous chalk particles. The sample contains some Inoceramus prisms. Size fraction of sample: 21% >74 microns. (99% fairly well sorted quartz sand in washed sample.)

(262) R10-5	63°47'N, 00°25'W	2375m

Dark-gray, very sandy lutite with a few particles of Upper Cretaceous chalk and some glauconite. The Upper Cretaceous species, which are considered to be reworked, found in the sample are Inoceramus prisms and Globotruncana. Size fraction of sample: 27% >74microns. (Almost 100% poorly sorted quartz soand in washed sample.)

(264) R10-6	63°06.8'N, 00°50'E	1255m

Gray lutite with some alkalic shards and glauconite. Size fraction of sample: 3% >74 microns. (About 90% poorly sorted quartz sand in washed sample.)

266 R10-7	62°32.8'N, 01°48.8'E	640m

Gray, very sandy lutite with glauconite, pyrite, particles of Upper Cretaceous chalk, and a particle of carbonized vegetable debris. The Upper Cretaceous species, which are considered to be reworked, found in the sample are Gumbelina, Bolivinoides, Stensiöina, and Bryozoa. Size fraction of sample: 20% >74 microns. (99% quartz sand in washed sample.)

Core No.	Position	Depth
(257) R10-8	60°07.6'N, 05°56.8'W	1105m

Gray, very sandy lutite with a pebble, 1cm in diameter, of sandstone, some glauconite, and trace of dark vesicular glass. Size fraction of sample: 58% >74 microns (About 95% unsorted quartz sand in washed sample).

(104) R10-9	40°37'N, 23°06'W	4150m

Light-gray, calcareous foraminiferal lutite, Size fraction of sample: 14% >74 microns. (1% quartz sand in washed sample.)

(100) R10-10	41°24'N, 40°06'W	4755m

Gray-brown lutite with MnOx pellets.

(253) R11-1	61°17'N, 10°39'W	1155m

Light-gray lutite.

(271) R11-2	73°39'N, 08°55'E	2105m

Light-gray lutite.

(280) R11-3	71°53'N, 11°40'E	2160m

Gray, silty lutite. Size fraction of sample: 6% >74 microns.

(276) R11-4	75°30.6'N, 00° 46.5'E	1755m

Brownish-gray, sandy lutite. Size fraction of sample: 17% >74 microns.

Core No.	Position	Depth
(275) R11-7	70°28'N, 00°28'E	3035m

Light-brown, sandy lutite. Size fraction of sample: 17% > 74 microns.

(47) R12-1	20°49'N, 69°25.5'W	3660m

Light-tan, calcareous lutite. Size fraction of sample: 11% > 74 microns.

(49) R12-2	20°19.9'N, 68°40'W	2800m

Gray, calcareous lutite. Size fraction of sample 19% > 74 microns.

Distribution of Foraminifera in Top Samples of Cores

The following 3 tables show the distribution of planktonic foraminifera in the top samples of the cores. The symbols indicate as follows:

R= Rare= 1-5 specimens in sample

F= Frequent= 6-10 specimens in sample

C= Common= 11-25 specimens in sample

A= Abundant = 26-100 specimens in sample

VA= Very Abundant= More than 100 specimens in sample

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Distribution of Foraminifera in Top Samples of Cores

	SP8-3	SP-8-6	SP8-7	SP8-9	SP8-11	SP8-13	SP9-2	SP9-3	SP9-4	[illegible]-1
Globorotalia menardii menardii	R									
Globorotalia menardii tumida										
Globorotalia menardii flexuosa										
Globorotalia hirsuta hirsuta	A	A				R		A	A	VA
Globorotalia hirsuta puncticulata	F	F							R	
Globorotalia truncatuinoides	A	A	A	A	A	R	R	A	C	F
Globorotalia scitula		F					A	A	A	
Globigerina inflata	A	VA	A	A	A	VA	A	VA	VA	VA
Globigerina bulloides			A		A		A	VA	VA	VA
Globigerina pachyderma					A		VA	VA	A	VA
Globigerina eggeri							R			
Globigerina dutertrei									A	C
Globigerinoides ruber	A	VA	A	A	A	F				
Globigerinoides sacculifer	A	A	R	A	A	R				
Globigerinoides conglobatus	A	F				R				
Globigerinella aequilateralis										
Orbulina universa	R	C	C	F	C	R	R	A	C	F
Pulleniatina obliquiloculata	F									
Sphaeroidinella dehiscens										

Distribution of Foraminifera in Top Samples of Cores

	SP10-2	SP10-5	SP10-6	SP10-7	SP11-1	SP11-2	SP11-13	Sol1-14	R9-6	R9-8
Globorotalia menardii menardii										
Globorotalia menardii tumida										
Globorotalia menardii flexuosa										
Globorotalia hirsuta hirsuta	R			F		F	VA	VA	R	R
Globorotalia hirsuta puncticulata										C
Globorotalia truncatulinoides	R			R		R	A			C
Globorotalia scitula	R			C		A	VA		A	
Globigerina inflata	A			F		VA	VA	VA	F	C
Globigerina bulloides		R	R	VA	A	VA	VA	VA	VA	
Globigerina pachyderma	A	A	A	VA	VA	VA	VA	VA	VA	R
Globigerina eggeri							A			
Globigerina dutertrei	A			A						
Globigerinoides ruber										R
Globigerinoides sacculifer										
Globigerinoides conglobatus										R
Globigerinella aequilateralis										
Orbulina universa				F		R	VA		R	R
Pulleniatina obliquiloculata										
Sphaeroidinella dehiscens										

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Distribution of Foraminifera in Top Samples of Cores

	R10-1	R10-3	R10-4	R10-5	R10-6	R10-7	R10-8	R10-9	R10-10
Globorotalia menardii menardii									A
Globorotalia menardii tumida									R
Globorotalia menardii flexuosa									
Globorotalia hirsuta hirsuta	C							VA	C
Globorotalia hirsuta puncticulata								C	
Globorotalia truncatulinoides	R							VA	C
Globorotalia scitula	R							VA	
Globigerina inflata	VA						R	VA	A
Globigerina bulloides	VA							VA	R
Globigerina pachyderma	VA	A	C		VA	R	VA	R	A
Globigerina eggeri									
Globigerina dutertrei	R	C	R		C	R	C		
Globigerinoides ruber								A	
Globigerinoides sacculifer								A	R
Globigerinoides conglobatus								F	R
Globigerinella aequilateralis								C	
Orbulina universa	VR							A	
Pulleniatina obliquiloculata									
Sphaeroidinella dehiscens									

e. Spectrochemical Analyses

General Statement

The results from the spectrochemical analyses of the top samples of cores from S[redacted] 8, 9, 10, 11 and 12 and R[redacted], 9, 10, 11 and 12 are shown in the following six tables. Descriptions of the samples and the positions and the depth of the cores are given in the preceeding chapter. The samples were spectrochemically analyzed by California Research Corporation, La Habra, California.

For the spectrochemical analyses about 2 gm. samples were taken, The samples range in type from siliceous and highly argillaceous materials to nearly pure carbonates. Because of this wide range of sample type and becuase single analyses were made, the usual accuracy of $\pm$ 10% of the amount present may not have been attained for certain element ranges. In particular, reliability of the SiO_2 analyses decreases above about 40% concentration and values over fifty are reported simply as greater than fifty. Al_2O_3 above 15% and TiO_2 above 1.0% tend to be less reproducible, in the same manner as SiO_2, with accuracies more nearly in the range of $\pm$20% of the amount present.

In the tables + indicates greater than and - indicates less than.

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Spectrochemical Analyses of Top Samples of Cores

	SP8-3	SP8-6	SP8-7	SP8-9	SP8-11	SP8-13	SP9-2	SP9-3
SiO_2	6.	30.	31.	37.	25.	35.	25.	34.
Al_2O_3	2.0	14.	13.	15.	13.	15.	7.	12.
TiO_2	.06	.56	.50	.60	.46	.52	.62	.60
Fe_2O_3	1.4	5.2	4.0	6.6	3.8	4.6	4.2	4.6
MgO	2.2	3.8	3.8	5.4	5.4	3.4	3.4	4.0
CaO	+47.	31.	30.	29.	28.	23.	36.	30.
Na_2O	1.9	1.5	1.4	1.4	+4.0	1.7	2.3	2.6
K_2O	.8	2.6	1.8	2.2	3.1	3.1	1.6	2.9
SrO	+.18					.11	.087	
MnO	.098	.048	.16	+.18	.16	+.18	.12	.15
CuO	.003	-.003	-.003	.013	.008	.010	.004	.009
V_2O_5	.006	.020	.018	.020	.028	.016	.016	.022
BaO	.018	.032	.022	.024	.024	.076	.034	.074
Cr_2O_3	.012	.020	.020	.028	.024	.016	.014	.020
B_2O_3	.05	.07	.07	.07	.12	.07	.08	.08
PbO	-.005	.006	.008	.010	.018	.006	.008	.024

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Spectrochemical Analyses of Top Samples of Cores

	SP9-4	SP10-1	SP10-2	SP10-5	SP10-6	SP10-7	SP11-1	SP12-2
SiO_2	26.	19.	37.	42.	50.	35.	41.	32.
Al_2O_3	9.	6.	6.	11.	12.	7.	13.	8.
TiO_2	.36	.28	.24	+1.3	.70	.32	.96	+1.3
Fe_2O_3	3.8	3.2	2.5	8.7	6.9	3.1	6.2	6.4
MgO	4.0	3.0	2.2	3.4	3.0	2.8	3.8	4.4
CaO	37.	41.	21.	23.	4.0	29.	19.	19.
Na_2O	2.7	1.9	.8	2.7	1.9	1.6	2.3	+4.0
K_2O	2.3	1.4	1.7	1.9	3.2	1.8	2.7	1.4
SrO	.12	.12	.034		-.005	.064		
MnO	.12	.13	.040	+.18	.058	.052	.17	.090
CuO	.015	-.003	+.003	.004	.004	-.003	.009	.006
V_2O_5	.018	.012	-.005	.032	.018	.008	.022	.038
BaO	.058	.038	.030	.06	.028	.040	.046	.026
Cr_2O_3	.018,	.014	.010	.014	.012	.012	.014	.020
B_2O_3	.08	.06	.05	.08	.09	.07	.08	.09
PbO	.008	.006	-.005	.006	.005	.006	.006	.006

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Spectrochemical Analyses of Top Samples of Cores

	SP11-3	SP11-5	SP11-6	SP11-7	SP11-8	SP11-10	SP11-11	SP11-12
SiO_2	41.	+50.	47.	+50.	36.	+50.	+50.	+50.
Al_2O_3	6.	13.	18.	13.	12.	18.	8.	13.
TiO_2	.56	.62	.94	.66	.52	.76	.40	.76
Fe_2O_3	4.7	5.6	7.4	5.6	5.3	7.7	3.3	6.9
MgO	2.2	1.6	3.6	2.6	3.0	2.6	2.0	2.4
CaO	8.8	2.6	14.	5.6	23.	7.8	7.6	1.6
Na_2O_3	1.1	1.1	2.4	1.4	1.8	1.7	1.4	1.9
K_2O	1.1	2.3	3.8	3.6	2.5	3.3	2.0	3.4
SrO	.016	-.005	.047	.009	.091	.021	.016	-.005
MnO	.088	.080	.11	.090	.14	.12	.058	.16
CuO	-.003	-.003	-.003	.004	-.003	-.003	-.003	-.003
V_2O_5	.010	.018	.026	.014	.024	.028	-.005	.020
BaO	.012	.026	.050	.038	.054	.044	.028	.042
Cr_2O_3	.012	.014	.018	.014	.016	.014	.012	.014
B_2O_3	.06	.06	.09	.07	.08	.09	.06	.08
PbO	-.005	-.005	.008	.008	.008	.006	-.005	.006

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Spectrochemical Analyses of Top Samples of Cores

	SP11-13	SP11-14	SP12-1	SP12-10	SP12-11	SP12-12	R9-6	R9-8
SiO_2	12.	9.0	+50.	11.	27.	26.	20.	45.
Al_2O_3	4.	3.	11.	3.0	16.	12.	4.	20.
TiO_2	.16	.26	.54	.12	.52	.42	.76	.70
Fe_2O_3	2.1	2.9	4.7	2.3	5.6	4.7	3.9	6.6
MgO	3.0	2.6	2.4	5.8	3.8	3.6	2.4	3.8
CaO	44.	44.	10.	40.	30.	30.	41.	17.
Na_2O_3	2.7	2.8	2.0	.7	1.3	1.3	2.2	2.0
K_2O	1.4	.9	3.3	.2	.6	.7	1.0	3.8
SrO	.16	.14	.034	+.18			.22	.071
MnO	+.18	.072	.046	.040	.10	.092	.11	+.18
CuO	.005	-.003	-.003	-.003	.005	.006	.004	.024
V_2O_5	.016	.014	.012	-.005	.020	.016	.018	.024
BaO	.076	.032	.054	.05	.024	.022	.068	.06
Cr_2O_3	.016	.016	.014	.014	.016	.018	.014	.018
B_2O_3	.07	.07	.07	.03	.04	.04	.06	.09
PbO	.010	.010	.006	.006	-.005	.005	.006	.010

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Spectrochemical Analyses of Top Samples of Cores

	R10-1	R10-3	R10-4	R10-5	R10-6	R10-7	R10-8	R10-9
SiO_2	49.	+50.	49.	+50	+50.	50.	+50.	6.0
Al_2O_3	16.	8.	10.	9.	16.	11.	7.	3.
TiO_2	+1.3	1.1	.44	.40	.94	.50	.24	.14
Fe_2O_3	7.6	6.4	3.9	4.0	6.9	4.3	3.0	1.3
MgO	4.2	2.0	2.0	1.0	4.0	2.2	1.0	2.8
CaO	11.	5.2	6.6	6.4	7.8	8.8	5.8	46.
Na_2O_3	3.1	1.0	1.1	.8	2.0	1.1	.9	1.1
K_2O	4.0	1.5	3.1	2.6	4.5	3.1	1.6	.9
SrO	.034	.007	.006	-.005	.014	.010	.010	.18
MnO	.17	.086	.054	.054	.088	.064	.060	.14
CuO	.010	.003	-.003	-.003	.006	-.003	-.003	.005
V_2O_5	.030	.018	.005	-.005	.026	.010	-.005	.008
BaO	.066	.018	.024	.024	.040	.028	.022	.036
Cr_2O_3	.018	.010	.012	.012	.018	.014	.010	.012
B_2O_3	.10	.05	.06	.04	.10	.07	.05	.04
PbO	.010	-.005	-.005	-.005	.010	.005	-.005	.005

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Spectrochemical Analyses of Top Samples of Cores

	R10-10	R11-1	R11-2	R11-3	R11-4	R11-7	R12-1	R12-2
SiO_2	38.	23.	47.	+50.	45.	+50.	4.	24.
Al_2O_3	12.	6.	13.	15.	11.	15.	2.	11.
TiO_2	.58	.48	.60	.74	.46	.64	.06	.38
Fe_2O_3	4.9	4.0	5.5	8.1	4.3	5.7	.8	4.4
MgO	4.0	3.4	2.2	4.0	3.4	2.4	3.4	3.4
CaO	15.	33.	4.2	2.4	7.8	3.8	+47.	34.
Na_2O_3	2.2	2.5	1.6	2.8	1.9	1.7	.9	1.6
K_2O	2.4	1.9	3.1	4.6	2.7	3.6	.4	2.0
SrO		.088	-.005	.009	.019	.005	+.18	.18
MnO	+.18	.068	+.18	+.18	.14	+.18	.056	+.18
CuO	.003	-.003	.004	.004	.003	.005	-.003	.008
V_2O_5	.012	.018	.020	.022	.010	.016	-.005	.018
BaO	.042	.044	.030	.038	.026	.028	.008	.040
Cr_2O_3	.012	.018	.014	.018	.012	.014	.012	.020
B_2O_3	.06	.08	.08	.12	.07	.08	.03	.07
PbO	-.005	.008	.006	.010	.006	.006	-.005	.008

Columbia University
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July 3, 1956

Mr. John Lyman
Division of Oceanography
U. S. Navy Hydrographic Office
Washington 25, D. C.

Code 5430-LBB/bbg
Serial 1074

Dear Mr. Lyman:

Your letter of June 8, 1956 has today been referred to us in the core laboratory. The cores listed in enclosure No. 2 we described together with other cores in two technical reports we sent to you April 29 and May 5, 1955. Here are two more of these reports. You don't need to make duplicates of them - just keep them.

Concerning the three "Ewing cores", Sp8-2, SP 9 -1, and SP 9 - 5, listed in enclosure No. 3, I would like to inform you again that there are no cores with these numbers because all the material we received was so disturbed that we could not use it. That means that all long cores (piston or "Ewing" cores) have been studied and described. The small gravity cores (Phleger and camera cores) and the bag samples (scoopfish and snapper) have not been described yet.

Sincerely yours,

Goesta Wollin

Goesta Wollin

Encls: 2 tech.rpts
GW/JA