11. SITE 94

The Shipboard Scientific Party[1]

SITE DATA

Occupied: March 22-26, 1970.

Position: 24°31.64'N.
88°28.16'W.

Water Depth: 1793 meters.

Total Depth: 660 meters.

Holes Drilled: One.

Cores Taken: Forty.

BACKGROUND AND OBJECTIVES

A brief description of the Yucatan shelf has been presented by Logan et al. (1969) and is as follows:

"The Yucatan shelf is the submerged part of a low limestone plateau which also includes the Peninsula de Yucatan. The plateau slopes gently from south to north and is bounded on the west, north, and east by precipitous continental slopes which plunge from the submerged plateau margin to the abyssal depths of the Gulf of Mexico and the Caribbean Sea. The plateau margin normally is at depths of 550-900 ft, but in places it is shallower; minimum depths of 240 ft are recorded on the western margin, southwest of the Triangulos reefs. Much of the northern part of the plateau has been the site of limestone deposition dating from Tertiary time. During the late Quaternary, sedimentary conditions on the Yucatan shelf have been broadly analogous to those of the Tertiary and early Pleistocene, i.e., carbonate sediments have been deposited on the older limestone in much of the 22,000-sq mi shelf area. The hinterland adjacent to the shelf is a region of karst topography devoid of surface drainage systems; thus, river-borne detrital materials are not found in the sediments on the northern shelf."

The origin of the Campeche escarpment has been attributed to several causes. Some suggest that the scarp represents a fault scarp; other suggest that its origin is a function of upbuilding and outbuilding likened, in some cases, to that of delta building. Still others suggest that the scarp represents the detrital accumulation seaward of a barrier or reef complex.

There is no direct evidence to support the theory that the scarp is the result of faulting. The idea that a major barrier reef separates the evaporite-carbonates of both the Florida and Yucatan banks from the Gulf of Mexico has long been held by many petroleum geologists operating in the gulf.

No direct evidence for such a reef complex bordering the edge of the Yucatan shelf was found until very recently. Bryant et al. (1969) reported the recovery of early Albian shallow-water algal and pelletal limestone along the eastern edge of the Yucatan Shelf at a depth of approximately 1500 fathoms. This led them to suggest that a Lower Cretaceous reef trend bordered the east, north, and west portions of the scarp. The extension of the Lower Cretaceous reef trend to the western sectors of the bank was inferred from arcer profiles.

Ewing and Ewing (1966) were the first to infer that a drowned barrier reef underlies the edge of the escarpment. Their evidence was also taken from seismic reflection profiles. Uchupi and Emery (1968) also suggested the existence of such a barrier. Although Bryant et al. (1969) found direct evidence for the existence of Albian age shallow-water limestone on the Campeche Scarp, the exact depth of the barrier was unknown, but seismic profiles of the eastern bank indicated that the barrier was located at a depth of about 1300 meters.

Site 86 was drilled on the Campeche Scarp face on a small bench at a depth of about 1600 meters. This hole indicated a complete Tertiary section, although no core sample was actually recovered in the Miocene. It also indicated that there was a rich radiolarian fauna in the Eocene associated with calcareous fossils. The ranges of the radiolarian fossils in the Eocene were not yet well established, so it was felt this offered a great opportunity.

The location of Site 94 was chosen about 150 miles northeast of Site 86, along a profiler tract of *R.D. Conrad*, where a section similar to Site 86 seemed to occur. It was thought that this hole would provide an opportunity to extend the section obtained at Site 86 along the whole northwest scarp face, to establish the range of radiolarians in the Eocene, and to obtain more information about the Cretaceous section.

Forty cores were attempted at Site 94 where the *Glomar Challenger* cored on March 22-26 in a shallow-water depth of 1793 meters. The maximum depth penetrated below the sea floor was 660 meters. The entire section is composed of biogenic sediments with foram nanno ooze and foram nanno chalk being the major contributors to the column. A coring summary is given in Table 1.

NATURE OF SEDIMENTS

General Description

Site 94, situated on the continental slope of the Yucatan platform, is characterized by pelagic sediments through the entire Cenozoic section, which unconformably overlies Cretaceous shallow-water carbonates. The pelagic sediments range from foraminiferal, nannofossil ooze to chalk, and foraminiferal-radiolarian, nannofossil

[1] J. Lamar Worzel, Marine Biomedical Institute, University of Texas, Galveston; William Bryant, Texas A&M University (co-chief scientists); Arthur O. Beall, Jr., Continental Oil Company (lead sedimentologist); Kendell Dickinson, Unites States Geological Survey; Robert Laury, Southern Methodist University; Lee Anderson Smith, ESSO production Research (lead paleontologist); Blake McNeely, Shell Oil Company; Helen P. Foreman, Oberlin College; Roy Capo, Lamont-Doherty Geological Observatory.

TABLE 1
Core Inventory – Site 94

Core	No. Sections	Date	Time	Cored[a] Interval (m)	Cored (m)	Recovered (m)	Subbottom Penetration (m) Top	Bottom	Lithology	Age
1	2	3/22	2200	1793-1795	2.0	2.0	0	2.0	Foram nanno ooze	Late Pleistocene
2	6	3/23	0000	1845-1854	9.0	9.0	52.0	61.0	Foram nanno ooze	Late Pliocene
3	6	3/23	0130	1893-1902	9.0	8.5	100.0	109.0	Foram nanno ooze	Middle Pliocene
4	6	3/23	0305	1922-1931	9.0	9.2	129.0	138.0	Foram nanno ooze	Early Pliocene
5	6	3/23	0450	1961-1970	9.0	9.2	168.0	177.0	Foram nanno ooze	Early Pliocene
6	6	3/23	0705	2000-2009	9.0	9.2	207.0	216.0	Foram nanno ooze	Early Pliocene
7	5	3/23	0915	2035-2044	9.0	6.3	242.0	251.0	Foram nanno ooze	Late Miocene
8	5	3/23	1045	2044-2050.7	6.7	6.4	251.0	257.7	Foram nanno ooze	Late Miocene
9	6	3/23	1230	2085-2094	9.0	9.0	292.0	301.0	Foram nanno ooze	Early Miocene
10	3	3/23	1500	2124-2129	5.0	4.0	331.0	336.0	Foram nanno ooze	Late Oligocene
11	6	3/23	1645	2156-2162	6.0	8.0	363.0	369.0	Foram nanno ooze	Early Oligocene
12	6	3/23	1800	2162-2171	9.0	5.6	369.0	378.0	Foram nanno ooze	Early Oligocene
13	3	3/23	1930	2171-2180	9.0	3.0	378.0	387.0	Foram nanno ooze	Early Oligocene
14	4	3/23	2215	2200-2205	5.0	5.0	407.0	412.0	Foram nanno chalk	Late Eocene
15	4	3/23	2330	2205-2211	6.0	6.0	412.0	418.0	Foram nanno chalk	Late Eocene
16	3	3/24	0050	2211-2217	6.0	4.5	418.0	424.0	Foram nanno chalk	Middle to Late Eocene
17	5	3/24	0225	2217-2226	9.0	7.0	424.0	433.0	Foram nanno chalk	Middle Eocene
18	4	3/24	0430	2226-2235	9.0	6.2	433.0	442.0	Foram nanno chalk	Middle Eocene
19	5	3/24	0635	2235-2244	9.0	6.5	442.0	451.0	Foram nanno chalk	Middle Eocene
20	3	3/24	0745	2244-2253	9.0	5.2	451.0	460.0	Foram nanno chalk	Middle Eocene
21	2	3/24	0900	2253-2262	9.0	2.0	460.0	469.0	Foram nanno chalk	Middle Eocene
22	4	3/24	1030	2262-2271	9.0	5.7	469.0	478.0	Foram nanno chalk	Middle Eocene
23	2	3/24	1230	2271-2280	9.0	2.2	478.0	487.0	Foram nanno chalk	Middle Eocene
24	4	3/24	1345	2280-2298	9.0	5.0	487.0	496.0	Foram nanno chalk	Middle Eocene
25	3	3/24	1515	2289-2293	4.0	4.3	496.0	500.0	Foram nanno chalk	Middle Eocene
26	4	3/24	1615	2293-2300	7.0	6.5	500.0	507.0	Foram nanno chalk	Middle Eocene

TABLE 1 – *Continued*

Core	No. Sections	Date	Time	Cored[a] Interval (m)	Cored (m)	Recovered (m)	Subbottom Penetration (m) Top	Subbottom Penetration (m) Bottom	Lithology	Age
27	1	3/24	1800	2300-2309	9.0	0.9	507.0	516.0	–	Middle Eocene
28	5	3/24	2000	2325-2333	8.0	7.0	532.0	540.0	Foram nanno chalk	Middle Eocene
29	1	3/24	2130	2344-2353	9.0	0.3	551.0	560.0	–	Middle Eocene
30	2	3/24	2330	2364-2373	9.0	2.5	571.0	580.0	Foram nanno chalk	Early Eocene
31	1	3/25	0130	2382-2391	9.0	0.1	589.0	598.0	Foram nanno chalk	Early Eocene
32	–	3/25	0420	2402-2405	3.0	0.1	609.0	612.0	Foram nanno chalk	Early Eocene to Late Paleocene
33	2	3/25	0900	2405-2409	4.0	2.0	612.0	616.0	Foram nanno chalk	Early Eocene to Late Paleocene
34	3	3/25	1100	2409-2418	9.0	4.2	616.0	625.0	Foram nanno chalk	Late Paleocene
35	1	3/25	1300	2418-2420	2.0	0.4	625.0	627.0	Nanno chalk	Late Paleocene
36	1	3/25	1530	2420-2427	7.0	0.4	627.0	634.0	Nanno chalk	Early Paleocene
37	–	3/25	1645	2427-2428	1.0	0.0	634.0	635.0	–	–
38	1	3/25	1930	2428-2436	8.0	1.0	635.0	643.0	Lime mud	Early Cretaceous
39	1	3/25	2300	2436-2445	9.0	1.2	643.0	652.0	Limestone	Early Cretaceous
40	–	3/26	0845	2445-2453	8.0	0.0[b]	652.0	660.0	Limestone	Early Cretaceous
Total	132				313.7	175.6		660.0		
% Cored					47.5%					
% Recovered						56.0%				

[a]Drill pipe measurement from derrick floor.
[b]Recovery in core catcher only.

chalk with subsidiary foraminiferal nannofossil-bearing, radiolarian chert. Volcanic ash is a minor component throughout the section, being generally more common in the Oligocene and Eocene intervals. Chert is common in the Lower Eocene, consisting of concretionary bands and beds up to 11 cm thick.

Cretaceous sediments consist of odorous, finely laminated lime mud with displaced lime/dolomite rock fragments overlying a highly leached section of very pale orange dolomitic calcarenite and calcilutite. The presence of dolomitized, microlaminated, stromatolite lime mud, interpreted as supratidal mud flat in origin, and the leached character of the sediment suggests subaerial exposure of very shallow-water carbonate bank (shallow shelf to supratidal) sediments. Carbonate grains are characteristically miliolids, orbitolinid forams, pelecypods, gastropods, ostracods, and pellets/lithoclasts. Varying degrees of lithification of the carbonate oozes and chalks appear to correlate reasonably well with reflecting horizons as determined from the reflection profiler. Most notable of these include a reflector at approximately 250 meters, which corresponds, within limits, to the first appearance of transitional-carbonate ooze to soft chalk. The first occurrence of "hard" white chalk, at about 440 meters, appears to correspond with a good reflector at approximately the same depth. The base of the Tertiary chalk section appears to occur too deep with respect to the reflection profile, suggesting that a slightly higher velocity function is required for that part of the section. The occurrence of a thick "hard" section of chert-bearing chalk would support interpolation of a high velocity.

Natural gamma determination on the sediment cores shows the upper Tertiary section to be characterized by slightly higher values as compared to the lower Tertiary section (approximately Oligocene level and below). The level of gamma change is comparable to that determined at Site 86, i.e., Oligocene. Just below the Eocene-Paleocene boundary (approximately P-4), gamma determinations are again higher (above 2000 counts). Site 86 also shows this relationship, suggesting that the somewhat more argillaceous character of the Paleocene chalks is reflected by higher natural gamma readings. No physical measurements were obtained on the Cretaceous sediments.

Stratigraphically, Cores 1 through 10 consist of light greenish gray to very light greenish gray, strongly burrowed, rarely vaguely laminated foraminiferal, nannofossil ooze/transitional ooze to chalk. The top of Core 1 is an exception to this, consisting of tan to light brownish gray, foraminiferal nannofossil ooze of Holocene age. Proceeding down hole, the presence of very soft chalk is first detected in Core 7. Strong mechanical disturbances of these cores apparently destroy most of the original fabric of such soft chalks, thus making the first appearance of "chalk" highly interpretive. Penetrometer measurements on isolated pieces of such sediments are on the order of 8 or lower. This sequence is characterized by the higher gamma readings previously mentioned, suggesting a slightly higher clay content.

Core 11 marks the upper limit of a slight color change to a more greenish white chalk, which continues with slight variations through Core 34. These sediments are more carbonate-rich, commonly 100 per cent calcite, occasionally containing ash beds/burrowed zones. Cores 30 to 34 are notable for the presence of abundant Radiolaria as well as the presence of impure radiolarian cherts. These sediments are described as "hard" chalks, with zero penetration and very low gamma readings.

Cores 35 and 36 are darker colored, olive gray to brownish gray, slightly more argillaceous, soft carbonate chalks (as reflected by natural gamma data). Core 35, although very short, apparently encompasses a stratigraphic break between Early and Late Paleocene as determined paleontologically. Lithologically, the core also reflects a discontinuity with olive gray, foraminiferal-radiolarian, nannofossil (hard) chalk sharply overlying brownish gray, somewhat foraminiferal, slightly clayey, nannofossil (soft) chalk. Remaining cores were previously discussed in the introduction and will be covered further in the "Discussion and Interpretation" section.

Sedimentological Interpretation

As previously discussed, the entire Cenozoic section represented at Site 94 is pelagic in origin. Carbonate marine microorganisms represent dominant constituents throughout. Variation in the amount of pelagically deposited terrigenous clay, presumably from the north and west, is reflected by natural gamma measurements. The higher argillaceous content of the post-Oligocene section, although quantitatively low, may be indicative of the more clastic nature of the north and western gulf Tertiary section in general; that is, these pelagic sediments, far removed from sources of terrigenous clastics, may reflect major basin-wide variations in introduction of clastic sediments.

Pelagic sediments are dominant in the lower Tertiary also, with the addition of siliceous organisms such as Radiolaria and the lack of terrigenous clay. The presence of chert in Lower Eocene strata is especially interesting, inasmuch as this quite possibly marks the first occurrence of these sediment types in the deep-water Gulf in Eocene beds. No cherts were recovered at Site 86, although the Eocene was poorly sampled, and drilling did not suggest presence of chert. The obvious interpretation is that chert increases to the east within Eocene strata. Site 95 provides at least partial substantiation of such a chert gradient.

The slightly higher argillaceous content of Paleocene strata at Site 94 suggests that the Cretaceous-Tertiary boundary is a lithological substantiation of a major stratigraphic change. The presence of Cretaceous shallow-water carbonates immediately beneath the pelagic oozes of the Paleocene certainly substantiates such a statement.

In comparing stratigraphic thicknesses of Sites 94 and 86, it is apparent that sediment thicknesses are quite variable within any one particular stratigraphic horizon. In conjunction with a cursory inspection of profiler records, it would appear that these variations in sediment thickness, in such a pelagic sequence, are indicative of either nondeposition or subsequent sediment removal through erosion or gravity slumping down the continental slope. The presence of ooze clasts at the base of the scarp (Site 93) and in sediments on the abyssal plain (Site 85) suggests that slumping is the primary cause of sediment removal. This problem deserves further study, possibly by detailed reflection profiling on the slope, before a definitive answer can be given.

The Cretaceous carbonate sediments recovered at Site 94 are selectively leached with moldic porosity vugs lined with spar infill and dolomite. The presence of dolomitized, algal mat-type stromatolites with desiccation cracks along with paleontologically determined shallow-water miliolids within the carbonate sand interval suggests a shallow marine to supratidal environment of deposition. A very shallow marine environment is suggested by the micrite-rimmed skeletal grains which are probably evidence of algal fungal boring. Miliolid-rich lutites and arenites are characteristic of restricted shallow shelf deposits in the Lower Cretaceous (Edwards and Glen Rose) of Texas and northern Mexico.

Following deposition of the aforementioned Cretaceous shallow-water carbonates, a period of nondeposition or erosion followed. Although the extent of the unconformity is unknown, the first sediment type observable above the unconformity is definitely a comparatively deep-water pelagic ooze. There is no strong evidence of significant changes in water depth *above* that level through to the Recent. These relationships will be discussed further for Site 95.

Physical Measurements

Natural gamma readings have been discussed earlier in the text. Penetrometer readings have also been discussed in part with respect to characterization of chalk. The sediments down through approximately Core 10 or lower are so mechanically disturbed that measurements are seriously affected. The uppermost cores do appear to reflect the general trend of consolidation. GRAPE measurements are also strongly affected and are only included here for completeness. GRAPE data reflects an overall increase of consolidation with depth. The deeper cores are undercut; thus values are low by a factor of several tenths of a gm/cc.

BIOSTRATIGRAPHY

As interpreted from fossil plankton (foraminifera and calcareous nannofossils), the biostratigraphy of Site 94 is shown in Figure 1. The species lists are not complete, since only stratigraphically or environmentally significant forms are noted. With the exceptions of Middle Paleocene and late Middle Eocene, most of the Cenozoic is represented by pelagic sediments at this site.

Sample (10-94-1, CC):
Globigerina inflata (abundant), *Globigerinoides ruber* (pink), *Globorotalia tumida* (rare), *G. truncatulinoides* (very abundant), *G. menardii* (sinistral, frequent to common), *Gephyrocapsa oceanica, G. kamptneri, Pseudoemiliania* sp., and cf. *Emiliania huxleyi.*
Age: Latest Pleistocene, (late Wisconsinan): *Globorotalia truncatulinoides* Zone; *Pulleniatina finalis* Subzone.
Environment: Bathyal.

Sample 2 (10-94-2, CC):
Globoquadrina altispira, G. venezuelana, Globorotalia multicamerata, G. miocenica, G. praehirsuta, Globigerinoides obliquus, Discoaster brouweri, D. pentaradiatus, D. surculus, and *D. asymmetricus.*
Age: Late Pliocene: *Pulleniatina obliquiloculata* Zone.
Environment: Bathyal.

Sample 3 (10-94-3, CC):
Globorotalia margaritae, G. multicamerata, G. miocenica, Globoquadrina altispira, G. venezuelana, Discoaster brouweri, D. pentaradiatus, D. surculus, D. asymmetricus, Ceratolithus rugosus, and *Scyphosphaera intermedia.*
Age: Middle Pliocene: *Globorotalia margaritae* Zone; *Pulleniatina primalis* Subzone.
Environment: Bathyal.

Sample 4 (10-94-4, CC):
Globigerina nepenthes, Globorotalia acostaensis, G. miocenica, G. pseudomiocenica, G. margaritae, Discoaster brouweri, D. pentaradiatus, D. surculus, D. sp. cf. *D. quinqueramus, Ceratolithus rugosus,* and *C. tricornulatus.*
Age: Early Pliocene: *Globorotalia margaritae* Zone; ? *Globorotalia multicamerata* Subzone.
Environment: Bathyal.

Sample 5 (10-94-5, CC):
Globorotalia margaritae, G. acostaensis, Globoquadrina altispira, G. venezuelana, Discoaster brouweri, D. pentaradiatus, D. surculus, D. exilis, and *D. quinqueramus.*
Age: Early Pliocene: *Globorotalia margaritae* Zone; *Globorotalia multicamerata* Subzone.
Environment: Bathyal.

Sample 6 (10-94-6, CC):
Sphaeroidinellopsis sphaeroides, Globigerina nepenthes, Globorotalia acostaensis, G. menardii s.1. (sinistral), *Globoquadrina altispira, Discoaster quinqueramus, D. exilis, D. brouweri, D. surculus, D. subsurculus, D.* aff. *D. bollii,* and *Ceratolithus tricorniculatus.*
Age: Early Pliocene: *Globorotalia margaritae* Zone; *Globorotalia multicamerata* Subzone.
Environment: Bathyal.

Sample 7 (10-94-7, CC):
Globorotalia acostaensis, G. miocenica, Globigerina nepenthes, Globoquadrina altispira, G. venezuelana, Sphaeroidinellopsis sphaeroides, S. seminulina, Discoaster quinqueramus, D. exilis, D. brouweri, D. surculus, D. sp. cf. *D. bollii,* and *D.* sp. cf. *D. neohamatus.*
Age: Late Miocene: *Globorotalia acostaensis* Zone; *Sphaeroidinellopsis sphaeroides* Subzone.
Environment: Bathyal.

Sample 8 (10-94-8, core catcher):
Globorotalia acostaensis, G. miocenica, G. sp. cf. *G. mayeri, Globigerina nepenthes, Globoquadrina altispira, G. venezuelana, Sphaeroidinellopsis seminulina, S. sphaeroides, Discoaster quinqueramus, D. exilis, D. brouweri, D. surculus, D.* sp. cf. *D. bollii,* and *D.* sp. cf. *D. challengeri.*
Age: Late Miocene: *Globorotalia acostaensis* Zone; ?*Sphaeroidinellopsis sphaeroides* Subzone.
Environment: Bathyal.

Sample 9 (10-94-9, CC):
Globorotalia fohsi barisanensis, Globoquadrina dehiscens, G. altispira, G. venezuelana, Globigerinoides triloba, Discoaster challengeri, D. deflandrei, D. sp. cf. *D. saundersi, Cyclococcolithus neogammation,* and radiolarians of the *Calocycletta costata* Zone.
Age: Late Early Miocene (probable N. 8).
Environment: Bathyal.

Sample 10 (10-94-10, CC):
Globorotalia kugleri, G. mayeri, G. nana, Globoquadrina venezuelana, Cassigerinella chipolensis, Globigerina sp. cf. *G. binaiensis, Discoaster saundersi, D. deflandrei, D.* sp. cf. *D. extensus, Cyclococcolithus neogammation, Reticulofenestra scissura, Helicopontosphaera obliqua, H. parallela, H. truncata,* and radiolarians of the *Calocycletta virginis* Zone.
Age: Late Oligocene (P. 22/N. 4), probable *Globorotalia kugleri* Zone.
Environment: Bathyal.

Sample 11 (10-94-11, CC):
Globorotalia opima opima, G. nana, Globigerina ciperoensis, Globoquadrina venezuelana, Cassigerinella chipolensis, Reticulofenestra scissura, R. umbilica, Helicopontosphaera seminulum ssp., *H. parallela, H. compacta, H. truncata, Cyclococcolithus neogammation, C. reticulatus,* and radiolarians of the *Theocyrtis tuberosa* Zone.
Age: Early Oligocene (probable P. 21).
Environment: Bathyal.
Remarks: Reworked Eocene Radiolaria and calcareous nannofossils also were noted from this sample.

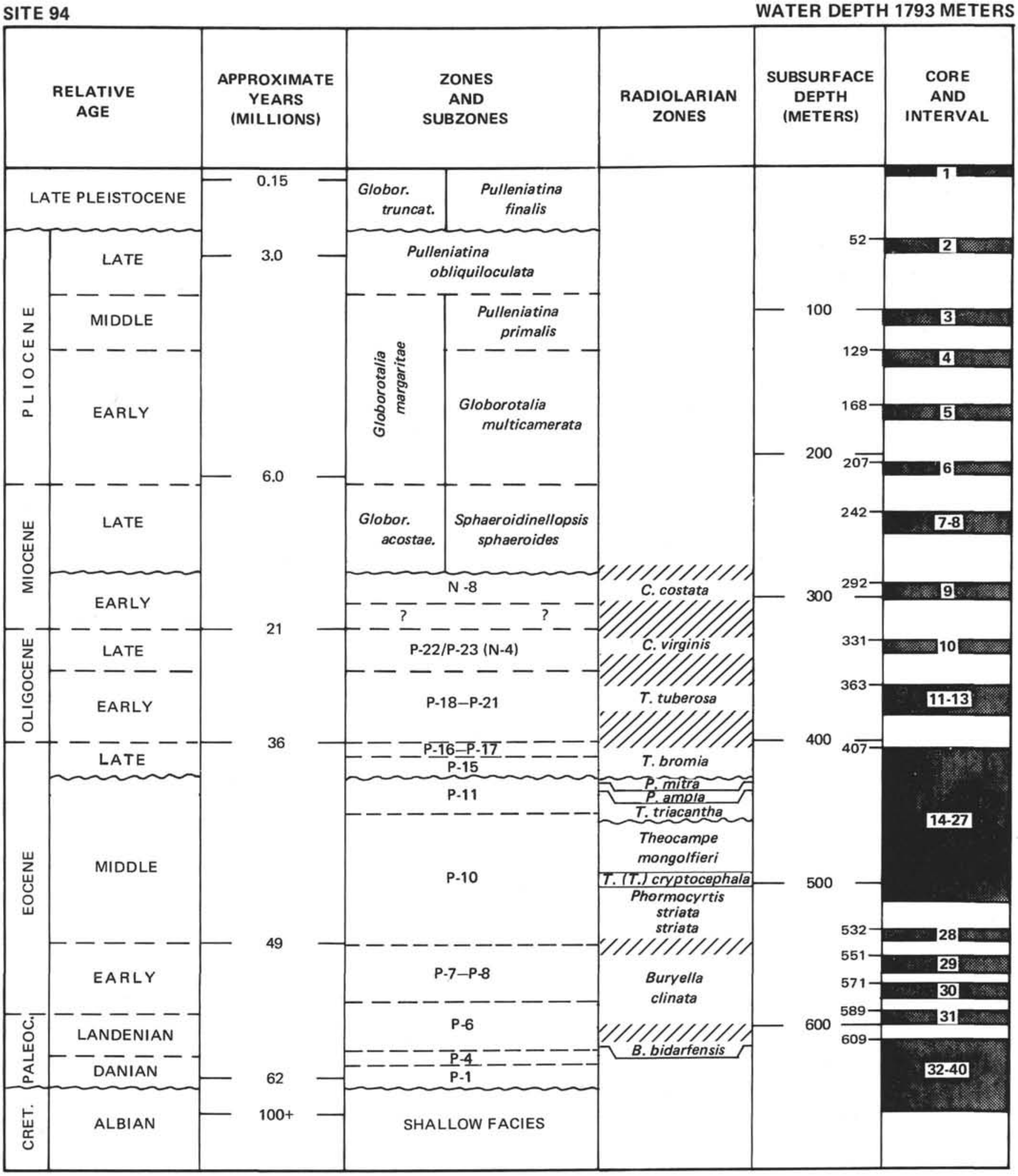


Figure 1. *Biostratigraphic summary of Site 94.*

Sample 12 (10-94-12, CC):
Globorotalia opima opima, G. nana, G. mayeri (very small), *Globigerina ciperoensis, Globoquadrina venezuelana, Cassigerinella chipolensis, Discoaster adamanteus, D.* sp. cf. *D. trinidadensis, Reticulofenestra umbilica, R. scissura, Sphenolithus predistentus, Leptodiscus larvalis, Helicopontosphaera compacta,* and radiolarians of the *Theocyrtis tuberosa* Zone.
Age: Early Oligocene (P. 18-P.20).
Environment: Bathyal.

Sample 13 (10-94-13, CC):
Globorotalia nana, G. sp. cf. *G. ciperoensis, Globoquadrina venezuelana, Globigerina rohri, Cassigerinella chipolensis, Discoaster adamanteus, Sphenolithus predistentus, S. pseudoradians, Reticulofenestra umbilica, R. scissura, Helicopontosphaera parallela, H. compacta, H. seminulum* ssp., and radiolarians of the *Theocyrtis tuberosa* Zone.
Age: Early Oligocene (P. 18-P. 20):
Environment: Bathyal.
Remarks: The sample also contains volcanic glass shards.

Sample 14 (10-94-14, CC):
Globorotalia centralis, G. cerroazulensis, G. nana, Hantkenina alabamensis, Hastigerina micra, Globoquadrina venezuelana, Globigerina yeguaensis, Catapsydrax dissimilis, Discoaster barbadiensis, D. saipanensis, D. tani tani, Pemma papillatum, Bramletteius serraculoides, Cyclococcolithus orbis, C. reticulatus, Blackites spinosus, Reticulofenestra umbilica, R. scissura, and radiolarians of the *Thyrosocyrtis bromia* Zone.
Age: Late Eocene (P. 16/P. 17)
Environment: Bathyal.
Remarks: The faunal and floral assemblages recovered from this sample are extremely similar to those recovered from Sample 10-86-6(CC).

Sample 15 (10-94-15, CC):
Globigerapsis semiinvoluta, Globorotalia cerroazulensis, G. centralis, Hantkenina alabamensis, Hastigerina micra, Catapsydrax dissimilis, Cyclococcolithus proannulus, C. orbis, C. reticulatus, Helicopontosphaera reticulata, H. seminulum ssp., *H. compacta, Discoaster barbadiensis, D. saipanensis, Bramletteius serraculoides, Blackites spinosus,* and radiolarians of the *Thyrsocyrtis bromia* Zone.
Age: Late Eocene (P. 15).
Environment: Bathyal.

Sample 16 (10-94-16, CC):
Globorotalia centralis, Globigerapsis semiinvoluta (rare), *G. index, Catapsydrax* sp. cf. *C. dissimilis, Hastigerina micra, Globoquadrina venezuelana, Chiasmolithus grandis, C. oamaruensis, Reticulofenestra mohleri, Micrantholithus* sp. cf. *M. proceras,* and radiolarians of the *Thyrsocyrtis bromia* Zone.
Age: Late Middle to early Late Eocene (P. 15), probable early *Globigerapsis semiinvoluta* Zone.
Environment: Bathyal.

Sample 17 (10-94-17, CC):
Globigerapsis kugleri, G. index, Globorotalia lehneri, G. spinuloinflata, G. spinulosa, G. bullbrooki, G. renzi, G. broedermanni, Truncorotaloides topilensis, T. rohri, Hantkenina mexicana, H. dumblei, H. sp. cf. *H. aragonensis, Micrantholithus proceras, Discoaster hilli, Chiasmolithus solitus, C. titus, Lophodolithus* sp., *Sphenolithus furcatolithoides, Bramletteius serraculoides,* and radiolarians of the *Podocyrtis mitra* Zone.
Age: Early Middle Eocene (P. 11).
Environment: Bathyal.
Remarks: The sample also contains volcanic glass shards.

Sample 18 (10-94-18, CC):
Globigerapsis kugleri, G. index, Globorotalia aragonensis, G. centralis, G. spinulosa, G. renzi, G. spinuloinflata, G. broedermanni, Truncorotaloides sp. cf. *T. rohri, Globigerina boweri, Hantkenina mexicana, Chiasmolithus grandis, Discoaster hilli, Sphenolithus* sp. cf. *S. furcatolithoides,* and radiolarians of the *Podocyrtis ampla* Zone.
Age: Early Middle Eocene (P. 11).
Environment: Bathyal.
Remarks: The sample contains volcanic glass shards.

Sample 19 (10-94-19, CC):
Globigerapsis kugleri, Globorotalia aragonensis, G. renzi, Globigerina boweri, Hastigerina micra, Cyclococcolithus gammation, Discoaster hilli, D. mirus, D. tani nodifer, and radiolarians of the *Thyrsocyrtis triacantha* Zone.
Age: Early Middle Eocene (P. 11).
Environment: Bathyal.

Sample 20 (10-94-20, CC):
Globorotalia aragonensis, G. bulbrooki, G. renzi, G. spinuloinflata, Globigerinoides higginsi, Globigerapsis kugleri, Hastigerina micra, Truncorotaloides rohri, Globigerina boweri, Chiasmolithus gigas, C. grandis, Triquetrorhabdulus inversus, Sphenolithus radians, and radiolarians of the *Thyrsocyrtis triacantha* Zone.
Age: Early Middle Eocene (P. 10).
Environment: Bathyal.

Sample 21 (10-94-21, CC):
Sample 22 (10-94-11, CC):
Sample 23 (10-94-23, CC):
Sample 24 (10-94-24, CC):
Sample 25 (10-94-25, CC):
Include radiolarians of the *Theocampe mongolfieri* Zone.
Include radiolarians of the *Theocotyle (Theocotyle) crytocephala cryptocephala(?)* Zone.
Ages: Early Middle Eocene (P. 10).
Environments: Bathyal.
Remarks: The fauna and flora generally common in the above listed samples include: *Globorotalia aragonensis, G. renzi, G. broedermanni, Globigerapsis* sp. cf. *G. kugleri, G. spinuloinflata, G. bullbrooki, Globigerina boweri, Hastigerina micra, Chiasmolithus grandis, Triquetrorhabdulus inversus, Micrantholithus proceras.*

Sample 26 (10-94-26, CC):
Globorotalia aragonensis, G. renzi, G. aspensis, G. bulbrooki, G. broedermanni, Truncorotaloides rohri, Globigerina boweri, Hastigerina micra, Chiasmolithus grandis, C. sp. cf. *californicus, Cruciplacolithus staurion, Lophodolithus nascens, Discoaster lodoensis, Sphenolithus anarrhopus, Rhabdosphaera inflata, R.* sp. cf. *R. perlonga,* and radiolarians of the *Phormocyrtis striata striata* Zone.
Age: Early Middle Eocene (P. 10).
Environment: Bathyal.

Sample 27 (10-94-27, CC):
Globorotalia aragonensis, G. renzi, G. broedermanni, G. sp. cf. *G. bulbrooki, Hastigerina micra, Globigerina*

boweri, G. linaperta, Ellipsolithus sp. cf. *E. distichus, Chiasmolithus grandis, C. solitus, Triquetrorhabdulus inversus, Sphenolithus anarrhopus, S. radians, Coccolithus* ? sp. cf. *C. dupouyi, Cruciplacolithus* sp. cf. *C. tenuis,* and radiolarians of the *Phormocyrtis striata striata* Zone.
Age: Early Middle Eocene (P. 10).
Environment: Bathyal.

Sample 28 (10-94-28, CC):
Globorotalia aragonensis, Hastigerina micra, G. renzi, G. broedermanni, G. bulbrooki, Globigerapsis sp. cf. *G. kugleri, Discoaster lodoensis, Triquetrorhabdulus inversus, Ellipsolithus* sp. cf. *E. distichus, Cruciplacolithus* sp. cf. *C. tenuis, C. delus, Rhabdosphaera* sp. cf. *R. perlonga,* and radiolarians of the *Phormocyrtis striata striata* Zone.
Age: Early Middle Eocene. (P. 10).
Environment: Bathyal.
Remarks: The Sample contains also volcanic glass shards.

Sample 29 (10-94-29, CC):
Globorotalia formosa formosa, G. aragonensis, G. broedermanni, Globigerina soldadoensis, Hastigerina micra, Cruciplacolithus delus, Discoaster lodoensis, Lophodolithus reniformis, Heliorthus robustus, Sphenolithus anarrhopus, Ellipsolithus sp. cf. *E. distichus,* and radiolarians of the *Buryella clinata* Zone.
Age: Middle Early Eocene (P. 7/8).
Environment: Bathyal.

Sample 30 (10-94-30, CC):
Globorotalia formosa formosa, G. rex, G. broedermanni, G. aragonensis, Globigerina soldadoensis, G. primitiva, Discoaster lodoensis, Lophodolithus nascens, Chiasmolithus consuetus, Ellipsolithus sp. cf. *E. distichus,* Cf. *Fasciculithus involutus,* and radiolarians of the *Buryella clinata* Zone.
Age: Middle Early Eocene (P. 7/8).
Environment: Bathyal.

Sample 31 (10-94-31, CC):
Globorotalia rex, G. aequa, G. gracilis, G. sp. cf. *G. broedermanni, Chilogumbelina wilcoxensis, Discoaster multiradiatus, D. lenticularis, Ellipsolithus* sp. cf. *E. distichus, E.* sp. cf. *E. macellus, Fasciculithus involutus, Zygodiscus adamas, Heliorthus robustus, H. distentus, Cruciplacolithus tenuis, Chiasmolithus consuetus,* and radiolarians of the *Buryella clinata* Zone.
Age: Late Paleocene to early Early Eocene (Late P. 6).
Environment: Bathyal.

Sample 32 (10-94-32, CC):
Globorotalia rex, G. aequa, G. gracilis, G. wilcoxensis, G. marginodentata, Globigerina soldadoensis, G. linaperta, Chilogumbelina spp., *Fasciculithus involutus, Heliorthus distentus,* and radiolarians of the *Bekoma bidarfensis* Zone.
Age: Late Paleocene to early Early Eocene (Late P. 6).
Environment: Bathyal.

Sample 33 (10-94-33, CC):
Globorotalia rex, G. aequa, G. gracilis, G. sp. cf. *G. quetra, G.* sp. cf. *G. broedermanni, Globigerina linaperta, G.* sp. cf. *soldadoensis, Chilogumbelina* sp., *Fasciculithus involutus, Discoaster lenticularis, Chiasmolithus* sp. cf. *californicus, Heliorthus distentus,* and *Toweius* sp.
Age: Late Paleocene to early Early Eocene (Late P. 6).
Environment: Bathyal.

Sample 34 (10-94-34, CC):
Globorotalia velascoensis, G. rex, G. wilcoxensis, G. aequa, G. marginodentata, G. sp. cf. *G. acuta, Ellipsolithus distichus, Discoaster lenticularis, Chiasmolithus consuetus, Cruciplacolithus tenuis, Heliorthus concinnus,* and *Zygodiscus sigmoides.*
Age: Late Paleocene (P. 5).
Environment: Bathyal.

Sample 35 (10-94-35-1, 110-112 cm, above contact of gray and pinkish clays):
Globorotalia velascoensis, G. aequa, and *G. pseudomenardii, G. convexa, G.* sp. cf. *G. mckannai, G. occusa, Globigerina triloculinoides,* and *G.* sp. cf. *G. soldadoensis.*
Age: Late Paleocene (P. 4), (Landtenian).
Environment: Bathyal.

Sample 36 (10-94-35, CC):
Globorotalia trinidadensis, G. pseudobulloides, G. compressa, Globigerina triloculinoides, Chilogumbelina morsei, Cruciplacolithus tenuis, Chiasmolithus danicus, C. consuetus, Heliorthus concinnus, and *Zygodiscus sigmoides.*
Age: Early Paleocene (P. 1), (Danian)
Environment: Bathyal.

Sample 37 (10-94-36, CC):
Globorotalia trinidadensis, G. pseudobulloides, Globigerina triloculinoides, Chilogumbelina morsei, Marssonella sp. cf. *M. oxycona, Chiasmolithus danicus, Cruciplacolithus tenuis, Zygodiscus sigmoides, Heliorthus concinnus,* and Cf. *Vekshinella ara.*
Age: Earliest Paleocene (P. 1), (Danian).
Environment: Bathyal.

Sample 38 (10-94-37, CC):
Sample 39 (10-94-38, CC):
Sample 40 (10-94-39, CC):
Sample 41 (10-94-40, CC):
Age: Cretaceous (probable Late Albian).
Environment: Very shallow-water carbonate platform.
Remarks: The samples are of a mixture of carbonate lithologies containing abundant miliolids dominated by *Nummoloculina heimi.*

DISCUSSION AND INTERPRETATION

At Site 94, situated on the continental slope of the Yucatan platform, 180 miles northeast of Site 86, forty cores were obtained. The maximum depth penetrated was

660 meters. The Late and Middle Eocene sections were continuously cored, as were the Paleocene and Cretaceous sections. There were 175.6 meters of cored material obtained at the site.

Site 94 (Figure 2) is characterized by pelagic sediments through the entire Cenozoic section, bottoming in Cretaceous shallow-water carbonates. The pelagic sediments range from foraminiferal, nannofossil ooze to chalk, and foraminiferal-radiolarian, nannofossil chalk with subsidiary foraminiferal-nannofossil-bearing, radiolarian chert. Volcanic ash is a minor component throughout the section, being generally more prevalent in the Oligocene and Eocene intervals. Chert is common in the Lower Eocene, consisting of concretionary bands and beds up to 11-cm thick.

Cretaceous sediments consist of odorous, finely laminated lime mud with displaced lime/dolomite rock fragments overlying a highly leached and pisolitic section of very pale orange dolomitic calcarenite, calcilutite, and calcirudite. The presence of microlaminated stromatolitic lime mud, interpreted as algal mat in origin, and the highly leached character of the sediment suggests subaerial exposure of very shallow-water carbonate bank (intertidal to supratidal) sediments.

Varying degrees of lithification of the carbonate oozes and chalks appear to correlate reasonably well with reflection horizons as determined from the reflection profiler. Most notable of these include a reflector at approximately 250 meters (Late Miocene), which corresponds, within limits, to the first appearance of transitional-carbonate ooze to chalk. The first occurence of "hard" white chalk at about 440 meters (Middle-Late Eocene) probably corresponds with a good reflector at approximately the same depth. The base of the Tertiary chalk section appears to occur too deep with respect to the reflection profile, suggesting that a slightly higher velocity function may be required for that part of the section. A higher velocity would be consistent with a thick "hard" section of chert-bearing chalk.

Compositionally, the most striking difference between Sites 86 and 94 is in the abundance of siliceous organisms or skeletal material—sponge spicules, radiolarians, and diatoms, in order of decreasing abundance. Despite the increase in siliceous fossils at Site 94 relative to Site 86, calcareous nannofossils are abundant to dominant in the Cenozoic sections.

Pelagic foraminifera, although less abundant than nannofossils, are ubiquitous and supply significant amounts of

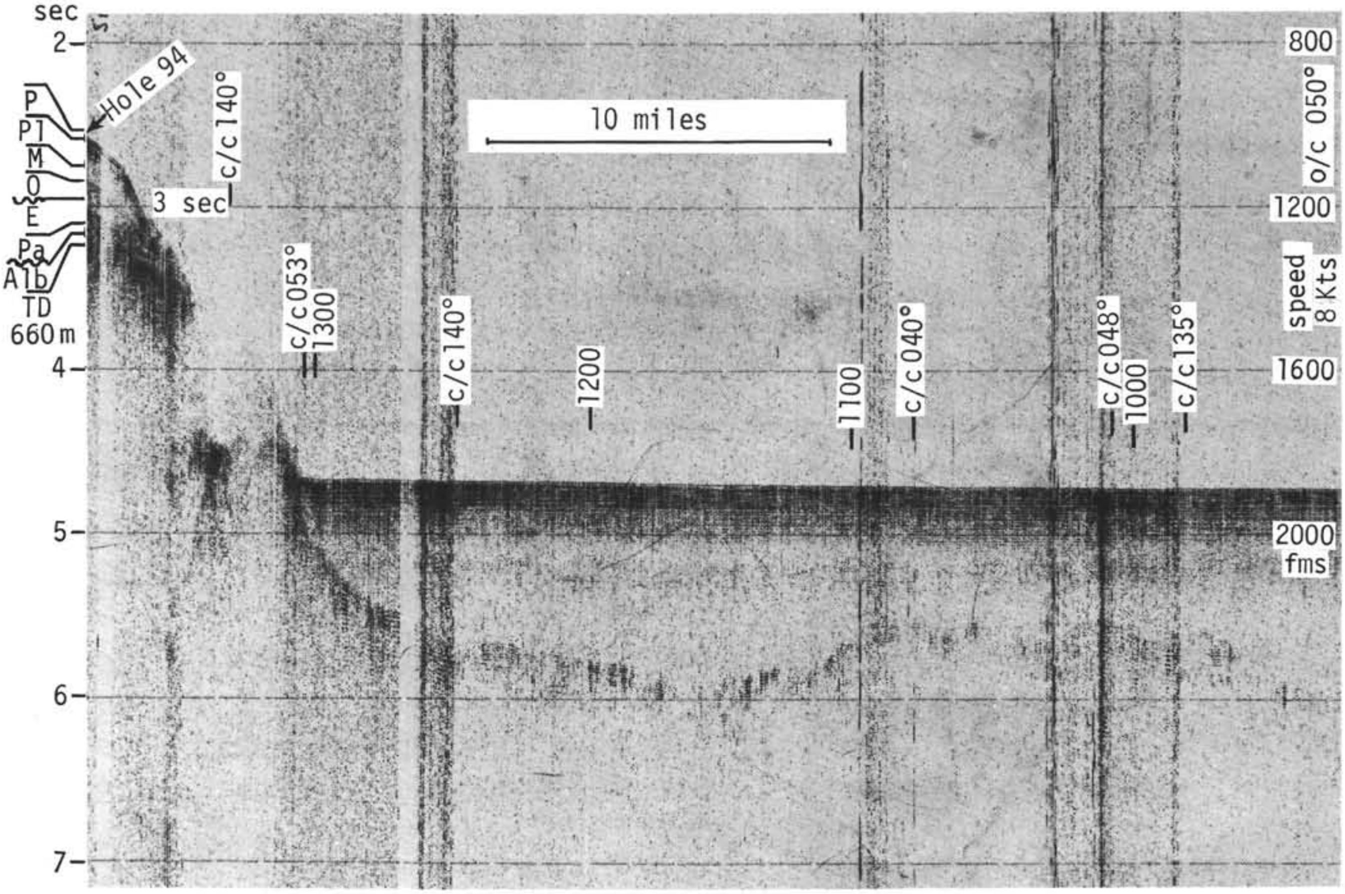


Figure 2. *Profile record, Site 94.*

silt-and finer sand-size calcium carbonate skeletal debris to the sediment.

In general, an analysis of Site 94 material shows:

1) Upper Pleistocene sediments are foraminiferal-nannofossil oozes.

2) Pliocene sediments are nannofossil oozes with sponge spicules common and volcanic glass rare.

3) Lower Pliocene sediments contained dolomite rhombs as did the Miocene and Paleocene sections.

4) Miocene sediments are organic oozes, Nannofossil, siliceous sponge spicules, pelagic foraminifers and radiolaria, in order of decreasing abundance, made up the bulk of the Miocene sediments.

5) Oligocene sediments are nannofossil-rich organic oozes.

6) Eocene sediments constitute a thick sequence of silica-rich organic oozes. Detrital carbonate is abundant in certain sequences of Eocene sediments. Chert was recovered for the first time.

7) Sections from the Early Eocene through the Early Paleocene contain foraminiferal-nannofossil oozes, slight shows of volcanic glass, and small amounts of euhedral dolomite rhombs.

8) Cretaceous sediments recovered and analyzed are carbonates containing stromatolites, ostracods, and fecal pellets.

The most obvious difference in sediments from Sites 86 and 94 is an increase in siliceous material at Site 94, otherwise the sediments are quite similar for similar time horizons.

The average rates of deposition at Site 94 were determined to be the following:

Pleistocene	1.8 $cm/10^3y$
Pliocene	4.5 $cm/10^3y$
Miocene	0.7 $cm/10^3y$
Oligocene	0.5 $cm/10^3y$
Late and Middle Eocene	1.1 $cm/10^3y$
Early Eocene	0.8 $cm/10^3y$
Paleocene	0.04 $cm/10^3y$

The average rate of deposition for the complete section from Paleocene to Present is 0.9 $cm/10^3y$.

The rates of deposition as presented above are to be considered rates of accumulation. It is known from the biostratigraphy of the section that there is a disconformity between the Late and Early Eocene and between the Early and Late Paleocene, as well as between the Cretaceous and Paleocene. These disconformities would explain the apparent extremely low rates of depositions during these periods.

Deposition rates of Site 94 compared to those of Site 86, show that during Late Pleistocene and Pliocene times the rates at Site 86 were higher by a factor of 3 for the Pleistocene and a factor of 1.5 for the Pliocene. Rates of deposition were similar for the Tertiary sediment at both sites, and the average rate of deposition for the entire span of time represented in both holes was almost the same (0.9 $cm/10^3y$). There are large variations in thickness between similar time sections in Sites 86 and 94. The Oligocene has a thicker section in Site 86, while the Eocene of Site 94 is almost 4 times thicker than that in Site 86. The Paleocene of Site 86 is 3 times thicker than the Paleocene of Site 94.

Environments of deposition at Site 94 were similar for similar time horizons at Site 86. The area at Site 94 represents a pelagic buildup of carbonate sediments in a deep water environment since the Early Cretaceous. In the Early Cretaceous, the area was of a shallow water nature. The finding of Lower Cretaceous shallow water limestone at Sites 94 and 86 suggests that the Campeche Bank has undergone relative subsidence on the order of 8000 feet since the Early Cretaceous. A fairly rapid rate of subsidence is indicated by the appearance of deep-water fauna during the early Late Cretaceous of Site 86.

Obtaining an almost complete Eocene section at Site 94 will afford the paleontologists an opportunity to cross correlate Eocene radiolaria with nannofossils and foraminifera.

In general, Sites 86 and 94 represent almost identical settings, suggesting that the Campeche Bank grew as a massive block since Middle Cretaceous times. This indicates that the upper part of the Scarp is caused, not by faulting, but by the upbuilding of carbonate sediments.

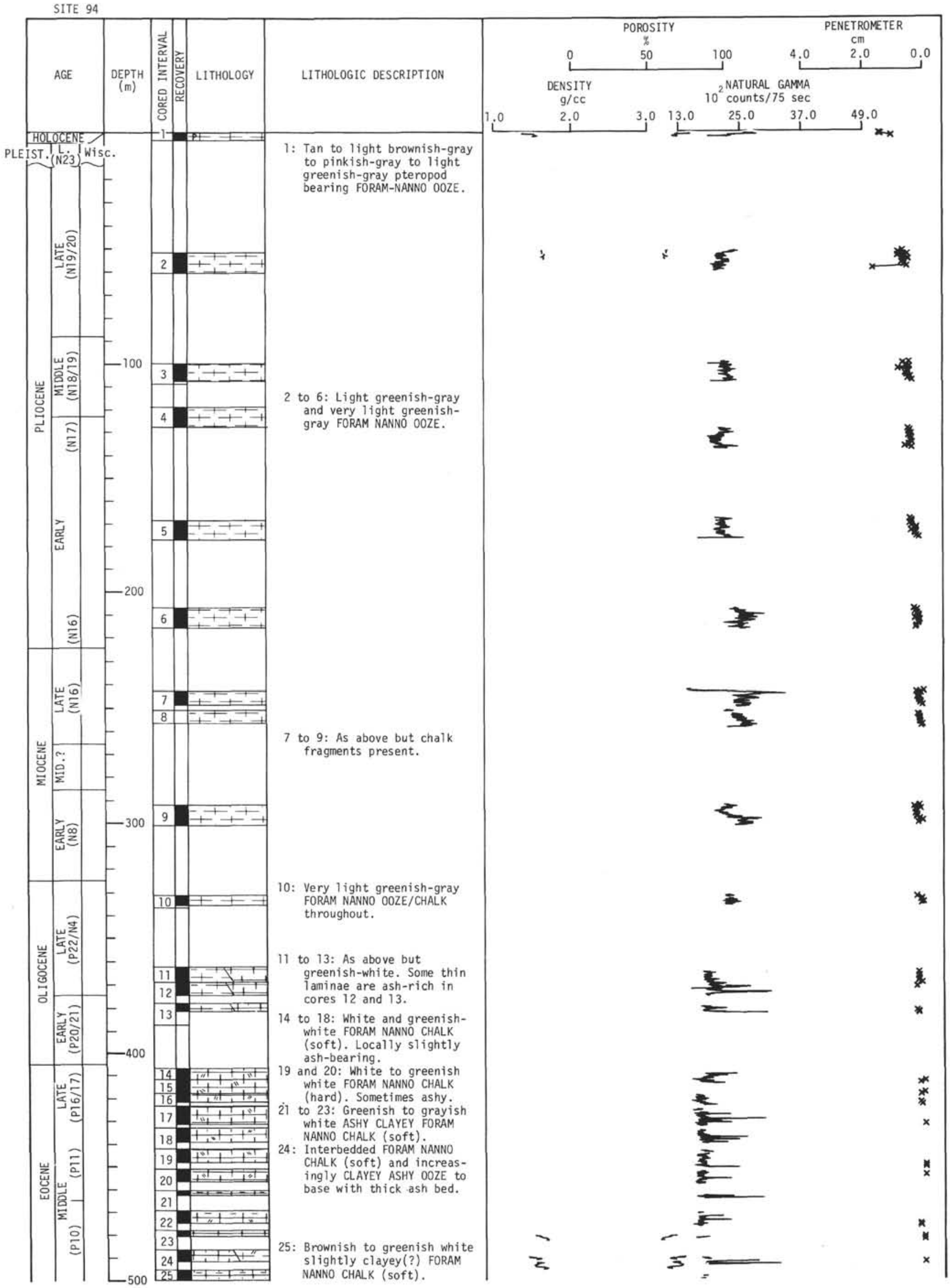
REFERENCES

Bryant, W.R., Meyerhoff, A.A., Brown, N.K., Furrer, M., Pyle, T. and Antoine, J.W., 1969. Escarpments, reef trends, and diapiric structures, eastern Gulf of Mexico. Bull. Am. Assoc. Petrol. Geologists. 53 (12), 2506.

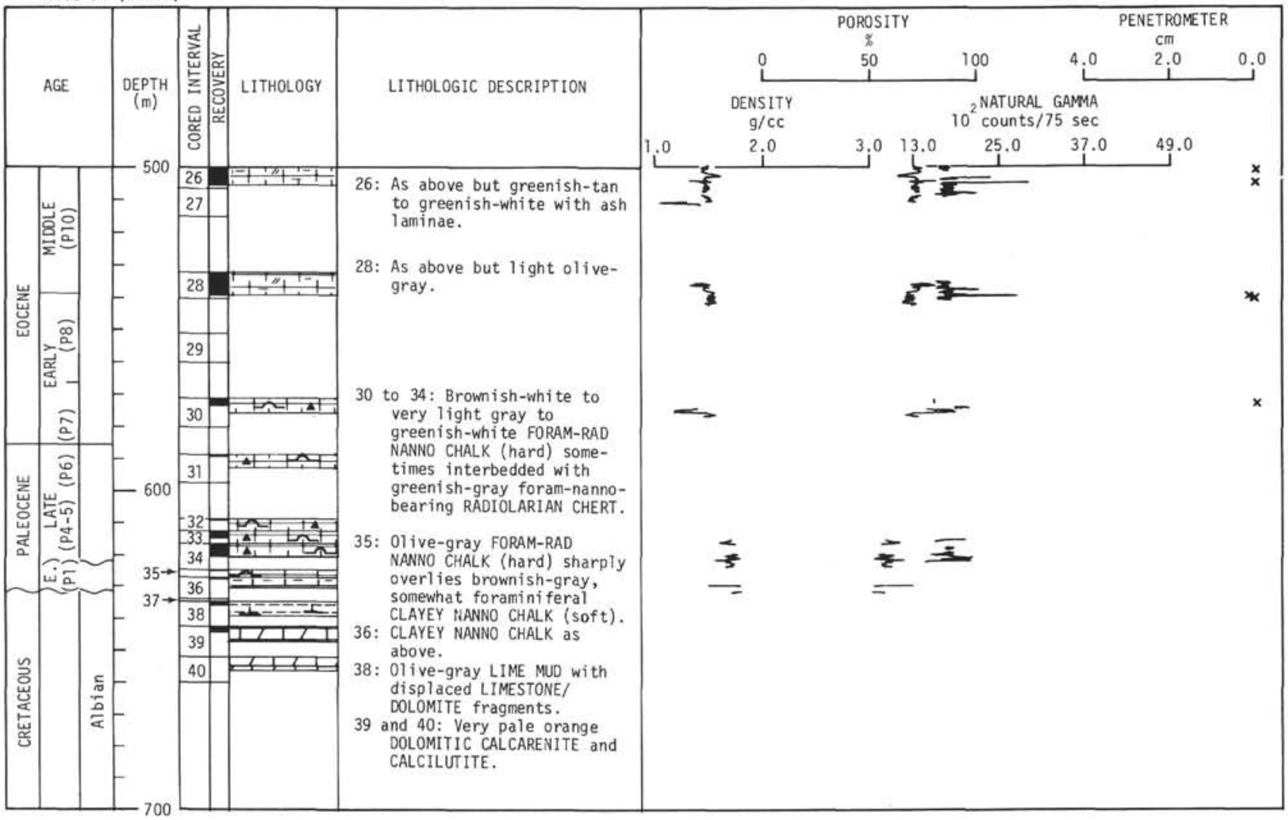
Ewing, M., and Ewing, J., 1966. Geology of the Gulf of Mexico. *In* Exploiting the Oceans. Marine Tech. Soc., 2nd Ann. Conf. and Exhibit Trans. Suppl. Washington, D.C. 145.

Logan, B.W., Harding, J.L., Ahr, W.M., Williams, J.D. and Snead, R.G., 1969. Introduction. *In* Carbonate Sediments and Reefs, Yucatan Shelf, Mexico, Part 1. Late Quaternary Carbonate Sediments of Yucatan Shelf, Mexico. Am. Assoc. Petrol. Geologists, Mem. 11. Ch. 1, 7.

Uchupi, E. and Emery, K.O., 1968. Structure of continental margins off Gulf Coast of United States. Bull. Am. Assoc. Petrol. Geologists. 52 (7), 1162.


SITE 94
AGE
DEPTH (m)
CORED INTERVAL
RECOVERY
LITHOLOGY
LITHOLOGIC DESCRIPTION
POROSITY %
0 50 100
PENETROMETER cm
4.0 2.0 0.0
DENSITY g/cc
1.0 2.0 3.0
NATURAL GAMMA 10^2 counts/75 sec
13.0 25.0 37.0 49.0
HOLOCENE
PLEIST.
L. (N23)
Wisc.
PLIOCENE
LATE (N19/20)
MIDDLE (N18/19)
(N17)
EARLY
(N16)
MIOCENE
LATE (N16)
MID.?
EARLY (N8)
OLIGOCENE
LATE (P22/N4)
EARLY (P20/21)
EOCENE
LATE (P16/17)
MIDDLE (P11)
(P10)
100
200
300
400
500
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Pt
1: Tan to light brownish-gray to pinkish-gray to light greenish-gray pteropod bearing FORAM-NANNO OOZE.
2 to 6: Light greenish-gray and very light greenish-gray FORAM NANNO OOZE.
7 to 9: As above but chalk fragments present.
10: Very light greenish-gray FORAM NANNO OOZE/CHALK throughout.
11 to 13: As above but greenish-white. Some thin laminae are ash-rich in cores 12 and 13.
14 to 18: White and greenish-white FORAM NANNO CHALK (soft). Locally slightly ash-bearing.
19 and 20: White to greenish white FORAM NANNO CHALK (hard). Sometimes ashy.
21 to 23: Greenish to grayish white ASHY CLAYEY FORAM NANNO CHALK (soft).
24: Interbedded FORAM NANNO CHALK (soft) and increasingly CLAYEY ASHY OOZE to base with thick ash bed.
25: Brownish to greenish white slightly clayey(?) FORAM NANNO CHALK (soft).

SITE 94 (cont.)


AGE
DEPTH (m)
CORED INTERVAL
RECOVERY
LITHOLOGY
LITHOLOGIC DESCRIPTION
POROSITY %
0 50 100
PENETROMETER cm
4.0 2.0 0.0
DENSITY g/cc
1.0 2.0 3.0
NATURAL GAMMA 10^2 counts/75 sec
13.0 25.0 37.0 49.0
EOCENE
MIDDLE (P10)
EARLY (P8)
(P7)
PALEOCENE
LATE (P6)
(P4-5)
E. (P1)
CRETACEOUS
Albian
500
600
700
35→
37→
26
27
28
29
30
31
32
33
34
36
38
39
40
26: As above but greenish-tan to greenish-white with ash laminae.
28: As above but light olive-gray.
30 to 34: Brownish-white to very light gray to greenish-white FORAM-RAD NANNO CHALK (hard) sometimes interbedded with greenish-gray foram-nanno-bearing RADIOLARIAN CHERT.
35: Olive-gray FORAM-RAD NANNO CHALK (hard) sharply overlies brownish-gray, somewhat foraminiferal CLAYEY NANNO CHALK (soft).
36: CLAYEY NANNO CHALK as above.
38: Olive-gray LIME MUD with displaced LIMESTONE/DOLOMITE fragments.
39 and 40: Very pale orange DOLOMITIC CALCARENITE and CALCILUTITE.

Site 94 Hole Core 1 Cored Interval: 0-2 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
HOLOCENE	*Globorotalia truncatulinoides* (*Pulleniatina finalis* Subzone)	1	0.5, 1.0	VOID						
LATE PLEISTOCENE (Wis.)		2		P		—	FORAM NANNO OOZE Tan to light brownish-gray to pinkish-gray to light greenish-gray; slightly clayey; moderately to strongly burrowed; seldom vaguely laminated; Pteropod-bearing. Speckled with N5 (fecal) throughout.	4.6	29.4	66.0
		Core Catcher								

Site 94 Hole Core 2 Cored Interval: 52-61 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE PLIOCENE	*Pulleniatina obliquiloculata*	1	0.5, 1.0				Slight H_2S odor throughout.			
		2				—	FORAM NANNO OOZE Very light greenish-gray (5G9/1); highly mottled (5GY7/1,N5-7) and burrowed. Speckled with N5-7 fecal/FeS stain and microburrow-fill.	13.1	29.1	57.2
		3				—		9.3	36.1	54.6
		4				—	Approximate level of transitional color change with a slight increase in percentage of 5G8/1.	12.4	28.0	59.7
		5				—	5G8/1 dominant with subsidiary N5-N7,5G9/1 and 5GY7/1 mottles.	9.2	21.7	69.0
		6				—		7.8	22.3	69.9
		Core Catcher								

Site 94 Hole Core 3 Cored Interval: 100-109 m

AGE: MIDDLE PLIOCENE

ZONE: *Globorotalia margaritae (Pulleniatina primalis* Subzone)

Sections: 1, 2, 3, 4, 5, 6, Core Catcher

LITHOLOGY: VOID (top of Section 1)

LITHOLOGIC DESCRIPTION

VOID

FORAM NANNO OOZE
5G8/1 dominant with subsidiary mottles of 5G9/1 and 5GY7/1; strongly to moderately (?) burrowed; rarely vaguely laminated. Minor fecal (N5) speckles.

Sample	SAND	SILT	CLAY
Section 2	10.0	29.4	60.6
Section 3	8.4	30.9	60.7
Section 4	9.9	28.2	61.9
Section 5	6.8	32.5	60.7
Section 6	9.9	31.9	58.2

Site 94 Hole Core 4 Cored Interval: 129-138 m

AGE: EARLY PLIOCENE

ZONE: *Globorotalia margaritae (?Globorotalia multicamerata* Subzone)

Sections: 1, 2, 3, 4, 5, 6, Core Catcher

LITHOLOGIC DESCRIPTION

Note: Massive zones apparently represent disturbed/homogenized sediment-not shown here.

FORAM NANNO OOZE
Very light greenish-gray (5G8/1 to 9/1); strongly burrowed; rare to occasional vague laminae.

5G9/1 dominant with subsidiary 5GY7/1, 5G8/1. Minor N5 speckles throughout.

H_2S odor throughout.

Transition between 5G9/1 and 8/1.

As above. Vaguely laminated throughout. Suggests upper sections may be more disturbed than is apparent - although still not severely. Color variation alternating between 5G8/1 dominant and 5G9/1 dominant.

Sample	SAND	SILT	CLAY
Section 2	6.6	23.0	70.4
Section 3	4.8	20.4	74.8
Section 4	5.5	22.5	72.0
Section 5	4.9	22.4	72.6
Section 6	5.9	26.6	67.5

Site 94 Hole Core 5 Cored Interval: 168-177 m

AGE: EARLY PLIOCENE

ZONE: *Globorotalia margaritae* (*Globorotalia multicamerata* Subzone)

LITHOLOGY: FORAM NANNO OOZE

SECTION	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1	Disturbed as in core 4. Slight H_2S odor. FORAM NANNO OOZE 5G9/1 dominant with subsidiary 5G8/1 and 5GY7/1; strongly (?) burrowed; minor fecal (N5) speckles throughout.			
2		5.4	24.3	70.4
3	5G8/1 to 9/1	8.3	26.2	65.5
4	5G8/1 dominant → transition → 5G9/1 dominant	4.8	22.7	72.4
5	transition to 5G8/1	6.1	27.2	66.8
6	9/1 dominant; 9/1 dominant; 9/1 dominant. As above. Rare, vague laminae. Color variation as shown.	6.2	26.9	66.9
Core Catcher				

Site 94 Hole Core 6 Cored Interval: 207-216 m

AGE: EARLY PLIOCENE

ZONE: *Globorotalia margaritae* (*Globorotalia multicamerata* Subzone)

LITHOLOGY: FORAM NANNO OOZE

SECTION	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1	Disturbed as in cores 4 and 5. Slight H_2S odor. FORAM NANNO OOZE 5G8/1 dominant with subsidiary 5G9/1 and minor 5GY7/1; strongly to moderately burrowed. Fecal speckles (N5) throughout.			
2		6.5	31.0	62.6
3	As above. Zone with darker green burrow-fill (5GY5/1 with subsidiary 6/1). Zone of darker burrow-fill as above.			
4	Occasional rare burrow-fill of 5GY5/1-6/1.	1.5	37.4	61.1
4		4.6	27.1	68.2
5		3.9	30.6	65.5
6		5.7	27.4	66.9
Core Catcher				

Site 94 Hole Core 7 Cored Interval: 242-251 m

AGE: LATE MIOCENE

ZONE: *Globorotalia acostaensis* (*Sphaeroidinellopsis sphaeroides* Subzone)

SECTION	METERS	LITHOLOGY	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1	0.5, 1.0	VOID	Disturbed moderately to strongly throughout-homogenized bands not depicted.			
2			FORAM NANNO OOZE Light greenish-gray (5G8/1 with minor 5GY7/1 and N6); burrow(?) mottled; ash-bearing locally. Note chalk fragment at top, suggesting initial stage of consolidation to chalk. (Mechanical disturbance largely destroys such a fabric).			
3				2.4	32.3	65.3
4				3.7	29.1	67.2
5				3.9	35.3	60.8
5			As above. Less disturbed and very vaguely laminated.			
Core Catcher						

Site 94 Hole Core 8 Cored Interval: 251-257.7 m

AGE: LATE MIOCENE

ZONE: *Globorotalia acostaensis* (?*Sphaeroidinellopsis sphaeroides* Subzone)

SECTION	METERS	LITHOLOGY	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1	0.5, 1.0	VOID	Moderate to strongly disturbed as in upper cores.			
1			FORAM NANNO OOZE 5G8/1-9/1 with subsidiary 5GY7/1 mottles; strongly burrowed; rarely vaguely laminated. Fecal (N5-6) speckles throughout.			
3				7.5	34.0	58.5
3				2.5	34.2	63.3
4			As above with a few vague laminae.			
4				9.8	44.2	46.0
5						
Core Catcher						

Site 94 Hole Core 9 Cored Interval: 292-301 m

AGE: EARLY MIOCENE
ZONE: N8

SECTION	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1				
2	FORAM NANNO OOZE 5G8/1-9/1 with minor mottles of 5GY7/1; strongly burrowed. Speckles of N5 throughout.	13.3	41.0	45.6
2	As above with a few scattered zones of disturbed soft chalk.			
3		11.9	43.0	45.0
3	As above. Presence of chalk fragments again suggests an early stage of consolidation to chalk.			
4		12.3	40.7	47.0
5		22.9	42.0	35.1
6		12.4	39.9	47.7
6	As above. More severely disturbed.			
Core Catcher				

Site 94 Hole Core 10 Cored Interval: 331-336 m

AGE: LATE OLIGOCENE
ZONE: P22/N4

SECTION	LITHOLOGY	LITHOLOGIC DESCRIPTION	SAND	SILT	CLAY
1	VOID	Disturbed as in upper cores.			
1		FORAM NANNO OOZE 5G9/1 dominant with 5G8/1 and minor mottles of 5GY7/1 and 8/1; minor N5 speckles; strongly (?) burrowed. Local chalk zones.			
2			2.5	41.6	55.9
3			3.2	45.0	51.8
3		As above 5G8/1 dominant.			
3		Transition to 5G9/1 dominance.			
3		As above. Occasionally vaguely laminated. Intermediate ooze to soft chalk throughout.			
Core Catcher					

Site 94 Hole Core 11 Cored Interval: 363-369 m

AGE: EARLY OLIGOCENE

ZONE: P21

Section 1 (0.5, 1.0 m): VOID

Deformed/disturbed as in upper cores. Note color change and more abundant evidence of soft chalk as of this core.

FORAM NANNO OOZE
White (5B9/1 to 5G9/1 with 5G9/1 mottles); local soft chalk; occasional to rare vague laminae; strongly burrowed. Scattered N7 stain and microburrow-fill.

As above. Additional burrow-fill of 5GY8/1.

As above. Scattered disturbance areas of soft chalk.

As above. Transition in dominant color to 5GY8/1 with burrow-fill of 5YR5/1. Considerable fragments of chalk.

As above with vague color variations as shown. Random soft chalk areas.

5B9/1-5G9/1 dominant.

Slightly darker (8/1).

5B9/1-5G9/1 dominant.

Core Catcher

Section	Sand	Silt	Clay
2	4.3	49.3	46.4
3	3.8	47.6	48.6
4	4.2	48.5	47.3
5	4.0	47.6	48.3
6	4.0	48.2	47.8

Site 94 Hole Core 12 Cored Interval: 369-378 m

AGE: EARLY OLIGOCENE

ZONE: P18-P20

Note: Upper 5 sections not described in detail. Lithology is basically as below.

Section 2 contains burrowed ashy zone.

Section 3 contains ash-rich vague laminae and burrowed zones (tending toward N7).

FORAM NANNO OOZE
5B9/1 and 5G9/1 with subsidiary N5-N7 mottles and specks. 5Y8/1, 5GY7/1 burrow-fill; strongly burrowed; occasional vague laminae some ash rich.

5B9/1-5G9/1 transitional.

Mottles of 5YR7/1.

Core Catcher

Section	Sand	Silt	Clay
6	10.4	50.2	39.2

Site 94 Hole Core 13 Cored Interval: 378-387 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY OLIGOCENE	P18-P20	1	0.5 1.0				Disturbed throughout - probably chalk. Note: Upper 2 sections not described in detail. Lithology is basically as below.			
		2					As below. White (5G9/1-5B5/) with N7 as vague bands. Slightly ashy.			
		3				—	FORAM NANNO OOZE/CHALK Greenish-white (5G9/1,5B9/1 with vague laminae of 5G9/1, 5Y8/1 and N7. Burrow mottles of same. Strongly burrowed; occasional vague laminae.	1.8	54.2	44.0
		Core Catcher								

Site 94 Hole Core 14 Cored Interval: 407-412 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE EOCENE	P16/P17	1	0.5 1.0				Disturbed with a higher % of chalk than above. Sections 1-3 not described in detail. Lithology as below.			
		2								
		3								
		4				—	FORAM NANNO CHALK/OOZE Greenish-white (5B9/1 dominant with subsidiary 5B9/1,N6-7); strongly burrowed; few vague laminae.	1.8	54.2	44.0
		Core Catcher								

Site 94 Hole Core 15 Cored Interval: 412-418 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE EOCENE	P15	1	0.5, 1.0	UNOPENED			Note: Sections 1-3 not opened. Taken without a liner and oversized. Lithology as below.			
		2								
		3								
		4		VOID			FORAM NANNO CHALK (soft) Greenish-white (5G9/1); ashy; strongly burrowed; rarely very vaguely laminated. Band of burrowed ash. 5G9/1 mottled with slight N7-8, occasionally to rarely 5YR7/1.	6.8	61.8	31.4
		Core Catcher								

Site 94 Hole Core 16 Cored Interval: 418-424 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE to LATE EOCENE	P15	1	0.5, 1.0				Note: Sections 1 and 2 not described. Lithology as below.			
		2					FORAM NANNO CHALK (soft) White; strongly burrowed; very rarely vaguely laminated. Possibly locally slightly ash bearing.			
		3					N9 (and 5G9/1) dominant. 5G9/1 dominant. Mottled with a trace of 5G6/1. N8 dominant. N9 dominant. 5G9/1 dominant.	8.9	57.2	33.9
		Core Catcher								

Site 94 Hole Core 17 Cored Interval: 424-433 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P11	1	0.5, 1.0				Note: Sections 1-4 not described. Lithology as below.			
							Section 1: N9 intermediate chalk.			
		2					Section 2: Mottles of 5G5/1 115-135 cm.			
		3					Sections 3 and 4: N9-5G9/1 transition with scattered mottles of 5G5/1.			
		4								
		5				—	FORAM NANNO CHALK (soft to intermediate) White to greenish-white (N9 mottled with 5G9/1 to 5G9/1-N9 transitional); strongly (?) burrowed. Disturbed with abundant chalk clasts.	8.6	55.4	35.9
		Core Catcher								

Site 94 Hole Core 18 Cored Interval: 433-442 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P11	1	0.5, 1.0				Note: Sections 1-3 not decribed. Lithology as below.			
							Section 1: N9-5G9/1 transition. Ash at 127-128 cm.			
		2					Section 2: 5G9/1 (dominant) and N9.			
		3					Section 3: N8 - 0 to 110 cm, N9 - 5G9/1 below.			
							N1-N4 ash and fecal fill.			
		4				—	FORAM NANNO CHALK White, slightly greenish (N9 - 5G9/1 transitional); strongly burrowed. Locally ash-bearing as in upper sections. Strongly disturbed-brecciated.	5.3	57.3	37.4
							N6 ash (?) fecal (?)			
		Core Catcher								

Site 94 Hole Core 19 Cored Interval: 442-451 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P11	1	0.5, 1.0				Note: Sections 1-4 not described. Lithology as below.			
		2								
		3					FORAM NANNO CHALK (hard) White to greenish-white; ashy; strongly burrowed; very rarely vaguely laminated.			
		4					5G9/1 (dominant) and N9.			
		5					Ashy (N7). 5G9/1-N9 transition with distinctive branching burrows. Concave upwards burrow-fill. N8 burrowed ash zone.			
		Core Catcher					5G9/1 (dominant) and N9.			

Site 94 Hole Core 20 Cored Interval: 451-460 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0				Note: Sections 1 and 3 not described. Lithology as in Section 2. FORAM NANNO CHALK (hard) Greenish-olive white (N9-5Y9/1-5G9/1); strongly burrowed; occasionally laminated.			
		2					Well laminated with N6 and 5G9/1. Mottled and speckled with N6. Vaguely to sharply laminated with 5G8/1 at base. FeS/FeS_2 nodule (N2).			
		3					As above.			
		Core Catcher								

Site 94 Hole Core 21 Cored Interval: 460-469 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0				Note: Section 1 not described. As below. Well laminated from 110-130 cm. Contorted at top - probably slump with horizontal fold axes and shear planes.			
		2					FORAM NANNO CHALK (soft?) Greenish white to white (N9-5G9/1 transitional mottled with N7); ash bearing; strongly burrowed.	3.2	55.9	40.9
							Disturbed.			
		Core Catcher								

Site 94 Hole Core 22 Cored Interval: 469-478 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0	A			Note: Sections 1-3 not described. Lithology is approximately the same as below but slightly more massive.			
		2								
		3		A						
		4		A, A			FORAM NANNO CHALK Grayish-white (N8 laminated with 5G7/1, 5YR7/1, 5Y7/1, 5G8/1 and N7); very slightly ashy/clayey; moderately (?) burrowed (rare burrow fill of 5YR6/1); irregularly to vaguely laminated throughout.			
		Core Catcher								

Site 94 Hole Core 23 Cored Interval: 478-487 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0	A, A			Note: Section 1 not described. Lithology as below.			
		2		A			FORAM NANNO CHALK (soft) Grayish-white (N8 laminated with 5G7/1, 5Y7/1, 5YR7/1, 5G8/1 and N7); very slightly ashy/clayey; moderately to strongly burrowed (rare burrow-fill of 5YR6/1). Irregularly to vaguely laminated.			
		Core Catcher		A						

Site 94 Hole Core 24 Cored Interval: 487-496 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0				Note: Sections 1,2 and 4 not described. As Section 3 with thinner ash zones.			
		2					Interbedded FORAM NANNO CHALK (soft) and FORAM NANNO OOZE Former is strongly burrowed; occasionally vaguely laminated. Latter is increasingly ashy and clayey to base. Note thick ash bed.			
		3					5Y9/1 N5-7 N9-5G9/1 5G8/1 5GY9/1 5G8/1 ↓ 5GY7/1			
		4								
		Core Catcher								

Site 94 Hole Core 25 Cored Interval: 496-500 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
MIDDLE EOCENE	P10	1	0.5, 1.0				Note: Sections 1 and 2 not described. As below.			
		2					FORAM NANNO CHALK (soft) Brownish to greenish-white; slightly clayey (?); strongly burrowed; rarely vaguely laminated.			
		3					5Y9/1 with mottles of 5G9/1, 5G8/1-9/1. 5GY8/1 with mottles of 5Y5/1, 5Y8/1. VOID			
		Core Catcher								

Site 94 Hole Core 26 Cored Interval: 500-507 m

AGE | ZONE | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO. SAMPLE | LITHOLOGIC DESCRIPTION | GRAIN SIZE WEIGHT % (SAND, SILT, CLAY)

AGE: MIDDLE EOCENE

ZONE: P10

Sections: 1 (0.5, 1.0), 2, 3, 4, Core Catcher

Note: Sections 1,2 and 4 not described. Lithology as in Section 3.

FORAM NANNO CHALK (soft)
Greenish tan to greenish white; slightly clayey (?)/ashy. Strongly burrowed; rarely vaguely laminated.

5GY9/1 with 5G7/1 vague laminae.

5YR6/1 laminae.

5G9/1 to 5GY8/1.

N6

N5

5G9/1 with mottles and vague laminae of 5Y8/1, 5GY8/1, 5G8/1 and N6.

Site 94 Hole Core 27 Cored Interval: 507-516 m

AGE | ZONE | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO. SAMPLE | LITHOLOGIC DESCRIPTION | GRAIN SIZE WEIGHT % (SAND, SILT, CLAY)

AGE: EARLY EOCENE

ZONE: P9

Sections: 1 (0.5, 1.0), Core Catcher

LITHOLOGY: VOID; UNOPENED

Core disturbed and unopened. Foram nanno chalk in core catcher.

Site 94 Hole Core 28 Cored Interval: 532-540 m

AGE | ZONE | SECTION | METERS | LITHOLOGY | DEFORMATION | LITHO. SAMPLE | LITHOLOGIC DESCRIPTION | GRAIN SIZE WEIGHT % (SAND, SILT, CLAY)

AGE: MIDDLE EOCENE

ZONE: P10

Sections: 1 (0.5, 1.0), 2, 3, 4, 5, Core Catcher

Note: Sections 1-4 not described. Lithology as below.

FORAM NANNO CHALK (soft)
Light olive-gray; very slightly clayey (?); strongly mottled (burrowed); occasionally vaguely laminated.

5Y8/1 dominant.

N6-5Y8/1 transitional.

5Y8/1 dominant with subsidiary laminae and mottles of 5Y7/1, 5G8/1, 5G6/1, N5-6.

VOID

Site 94 Hole Core 29 Cored Interval: 551-560 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY EOCENE	P9	1	0.5, 1.0	VOID						
				UNOPENED			Core disturbed and unopened.			
		Core Catcher					Foram nanno chalk in core catcher.			

Site 94 Hole Core 30 Cored Interval: 571-580 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY EOCENE	P7/P8	1	0.5, 1.0	VOID			Top of hard chalk. Some vertical fractures noted - incipient?			
							FORAM NANNO CHALK (hard) Brownish-white (5Y9/1-5B9/1 mottled with 5Y5/1, 5Y7/1, N6/7); strongly burrowed.			
		2					As above. More disturbed.			
		Core Catcher								

Site 94 Hole Core 31 Cored Interval: 589-598 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY EOCENE	P9	Core Catcher					Foram nanno chalk			

Site 94 Hole Core 32 Cored Interval: 609-612 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY EOCENE(?)		Core Catcher					FORAM NANNO CHALK			

Site 94 Hole Core 33 Cored Interval: 612-616 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE PALEOCENE	P6	1	0.5, 1.0	VOID			Interbedded FORAM-RAD NANNO CHALK (hard) and RADIOLARIAN CHERT Former is very light gray (N8 with N6-7 laminae); moderately to strongly burrowed; commonly to rarely finely laminated. Latter is greenish-gray (5GY7/1-5G5/1); massive to mottled.			
		2								
		Core Catcher								

Site 94 Hole Core 34 Cored Interval: 616-625 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE PALEOCENE	P5	1	0.5, 1.0	VOID						
		2					FORAM-RAD NANNO CHALK (hard) Greenish-white (5GY9/1-N9 transitional); rarely vaguely laminated; strongly burrowed. Occasional bed/concretion of foram-nanno-rich radiolarian chert.			
		3					— VOID			
		Core Catcher								

Site 94 Hole Core 35 Cored Interval: 625-627 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
LATE PALEOCENE	P4	1	0.5, 1.0	VOID			110-125 cm: 5Y8/1-5GY8/1 transitional olive-gray foram-rad nanno chalk (hard).			
		Core Catcher					CLAYEY NANNO CHALK (soft) Brownish gray (5YR7/1 mottled with 5G6/1 and 8/1); somewhat foraminiferal 5G5/1 clay.			

Site 94 Hole Core 36 Cored Interval: 627-634 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY PALEOCENE	P1	1	0.5, 1.0	VOID			CLAYEY NANNO CHALK (soft) Brownish-gray; somewhat foraminiferal; strongly burrowed 110-123 cm - 5YR6/1 mottled with 5Y6/1 and slight 5Y5/1. Rest is 5YR7/1 with slight mottles of 5Y5/1.			
		Core Catcher								

Site 94 Hole Core 38 Cored Interval: 635-643 m

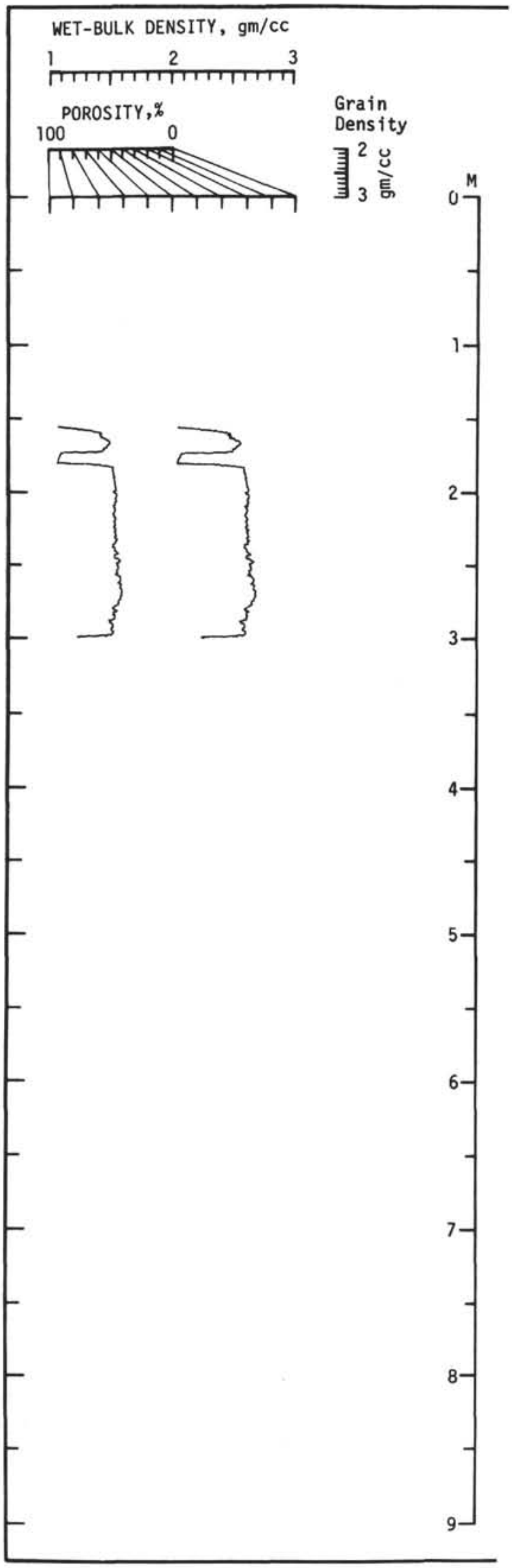
AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY CRETACEOUS (Late Albian?)		Core Catcher					Sample from core catcher - highly disturbed.			
							H_2S-CH_3-? gas odor. Strange pungent carbide-like aroma.			
							LIME MUD 5Y8/1-9/1 and 5Y5/1; finely laminated; rare skeletal fragments; organic-bearing. May contain some inert solid hydrocarbon residue. Occasionally irregular to distorted around limestone rock fragments.			
							LIMESTONE/DOLOMITE rock fragments Pale-brown (10YR7/2); basically skeletal (Milliolid) pelletal lime mud with leached porosity.			

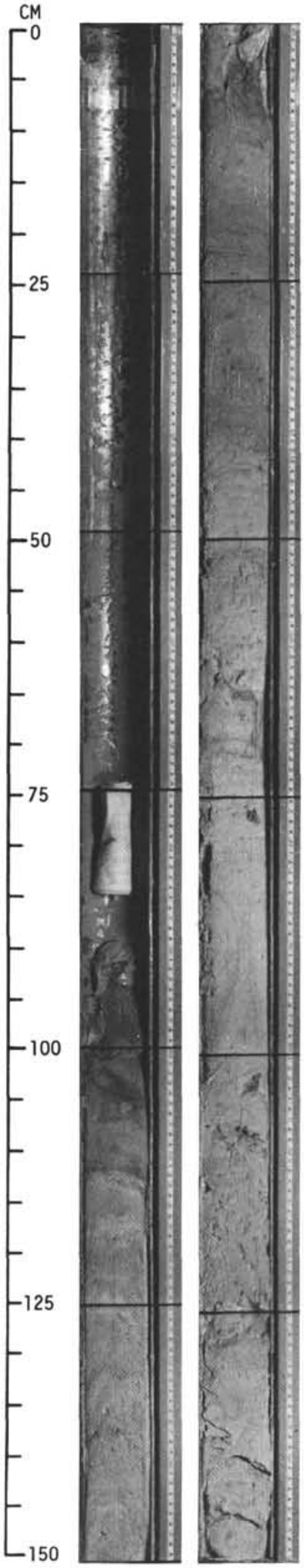
Site 94 Hole Core 39 Cored Interval: 643-652 m

AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY CRETACEOUS (Late Albian?)		1	0.5 1.0				Thin sections required for final description. Calcarenite, skeletal, pisolitic, horizontally laminated to massive at top. Dolomitic. Leached porosity 10YR8/2-7/2. Calcilutite, leached molluscan mold, N9. Molluscan debris - rudite. Pisolithite, heavily leached porosity, Vuggy, spar-lined, dolomitic N9-5Y9/1. Calcarenite, leached porosity, dolomitic 10YR 8/2. Stromatolite, dololutite (algal-mat), 10YR8/2,7/2,6/2,5/2. Calcarenite, as above. Organic clayey calcilutite 10YR3/2, dark yellow-brown. Leached top - pisolite - caliche. Calcarenite, leached porosity, skeletal molds with sparse infill, dolomitic, 10YR8/2 (very pale orange).			
		Core Catcher								

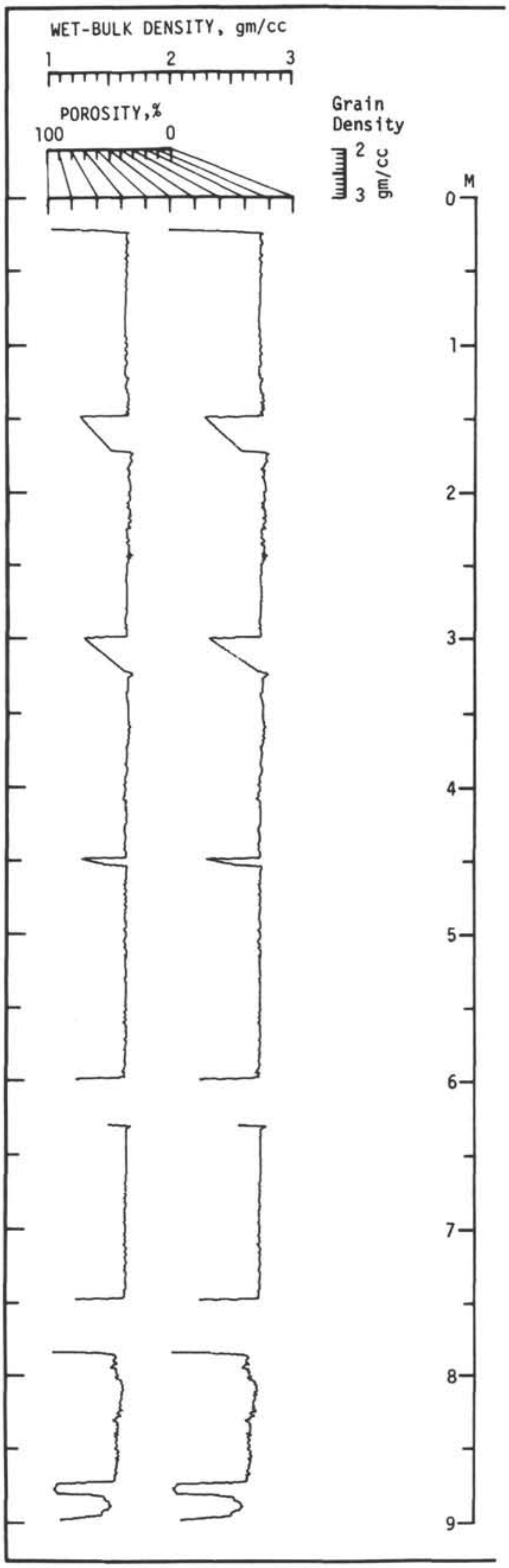
Site 94 Hole 40 Core Cored Interval: 652-660 m

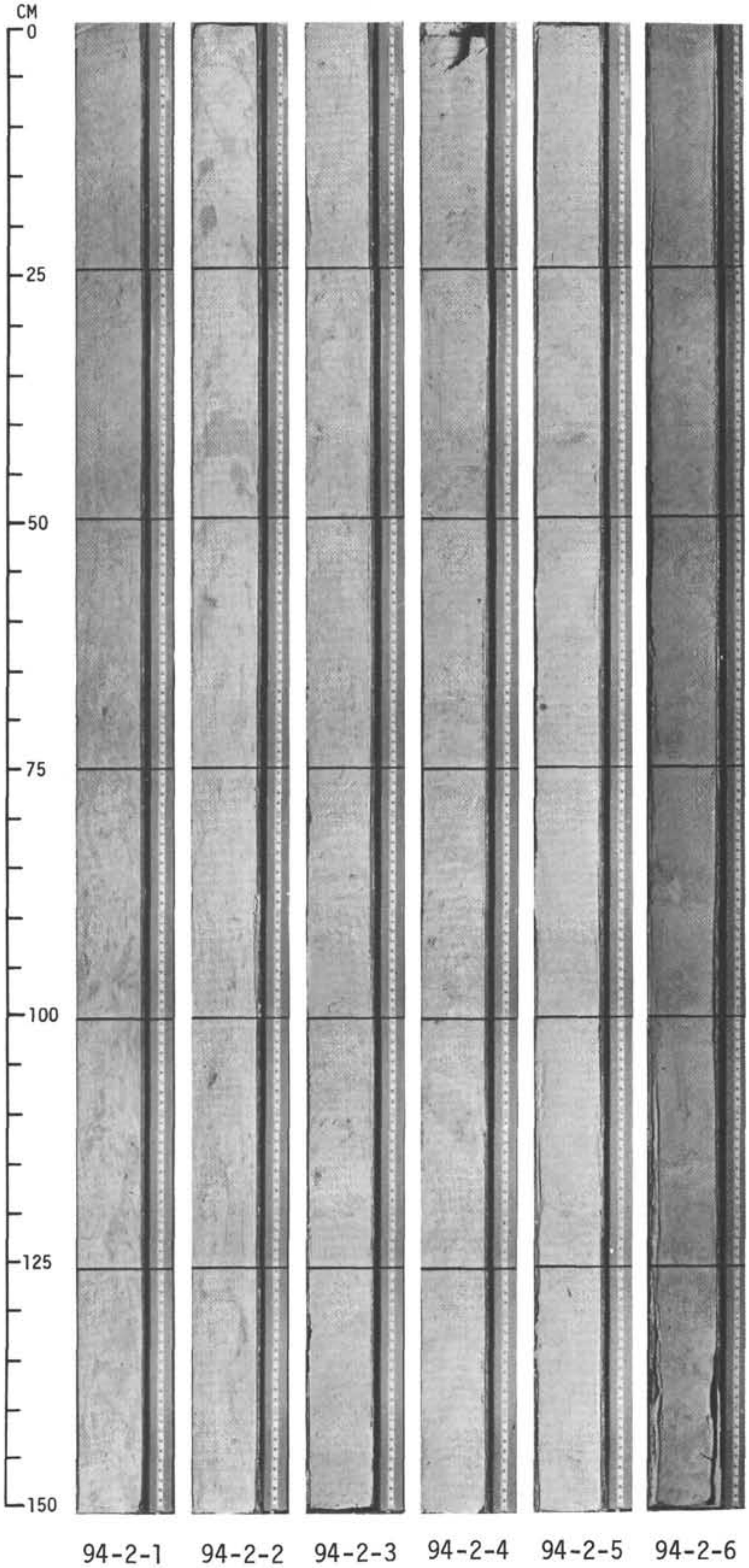
AGE	ZONE	SECTION	METERS	LITHOLOGY	DEFORMATION	LITHO. SAMPLE	LITHOLOGIC DESCRIPTION	GRAIN SIZE WEIGHT % SAND	SILT	CLAY
EARLY CRETAC. (Late Albian?)		Core Catcher					Core catcher only. CALCARENITE Pale orange (10YR8/4); slightly foraminiferal; porous; pisolitic; dolomitic. Very similar to core 39 calcarenites. Paleo. reports same faunal elements.			

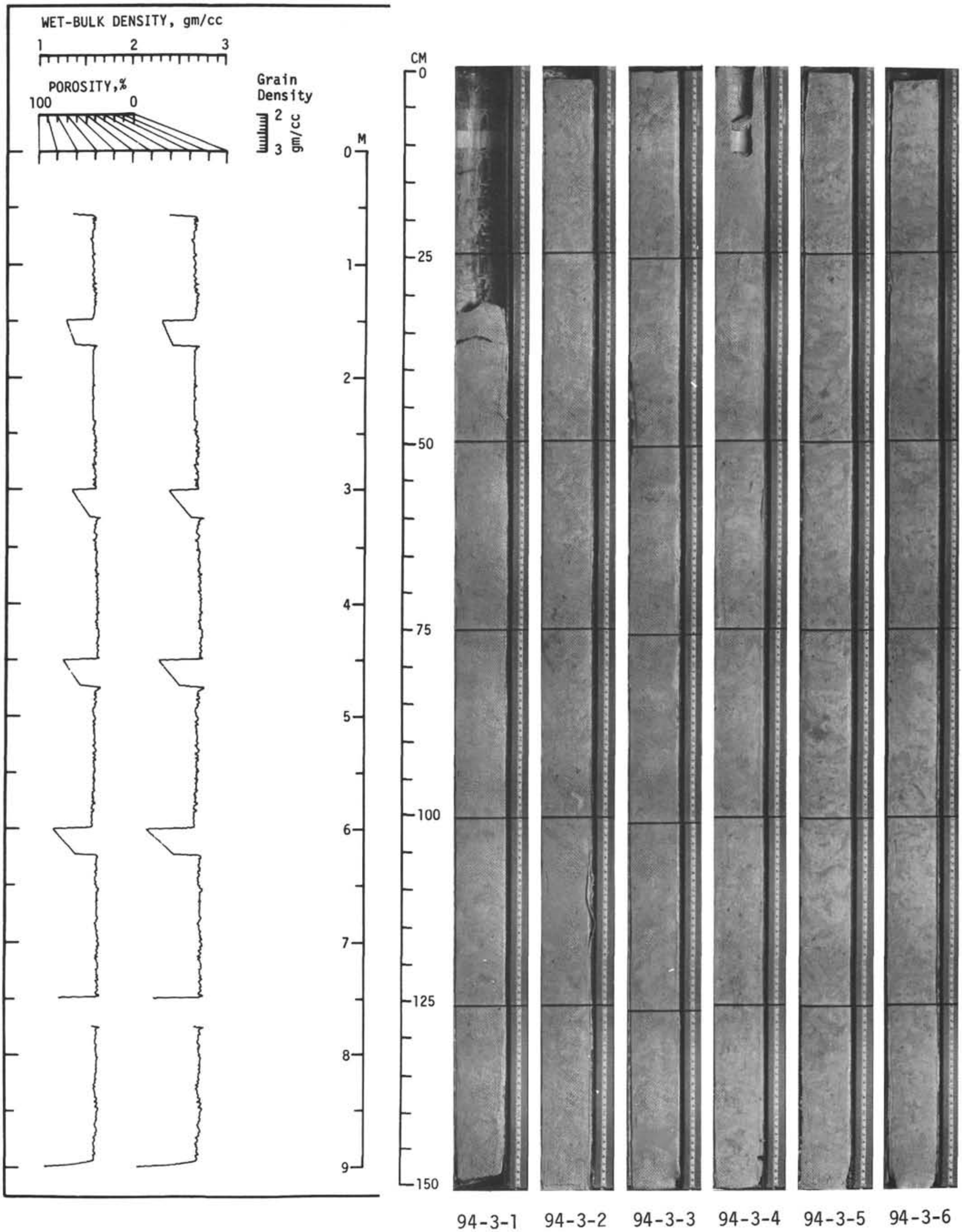

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

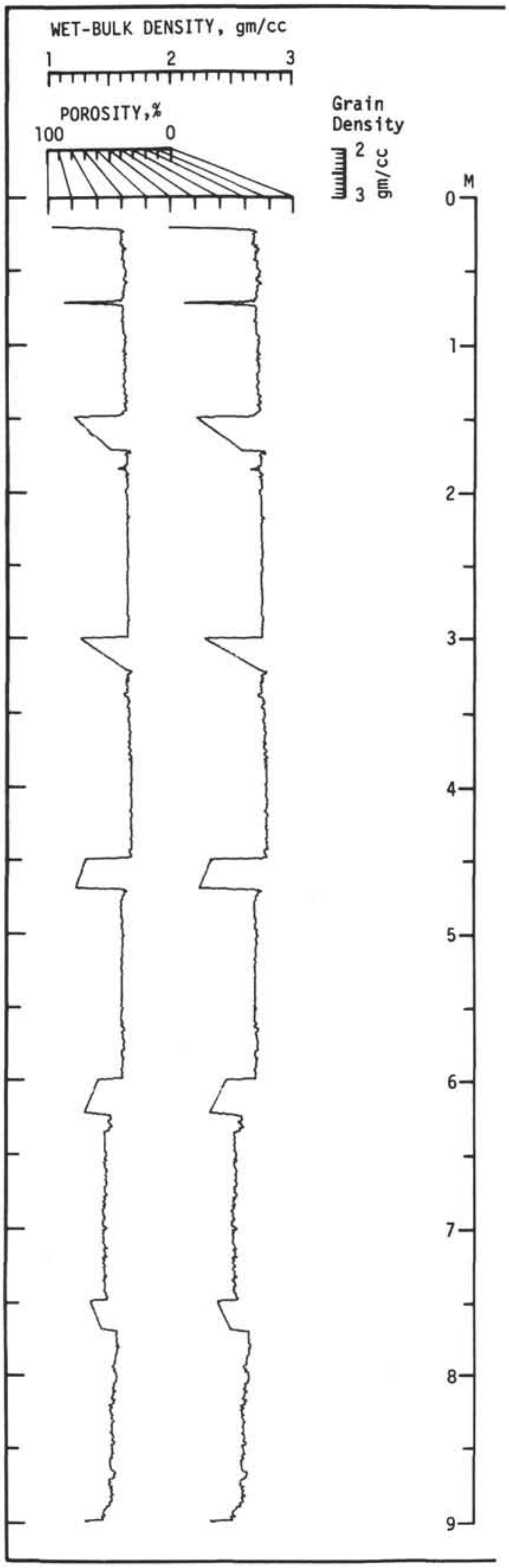

CM
0
25
50
75
100
125
150

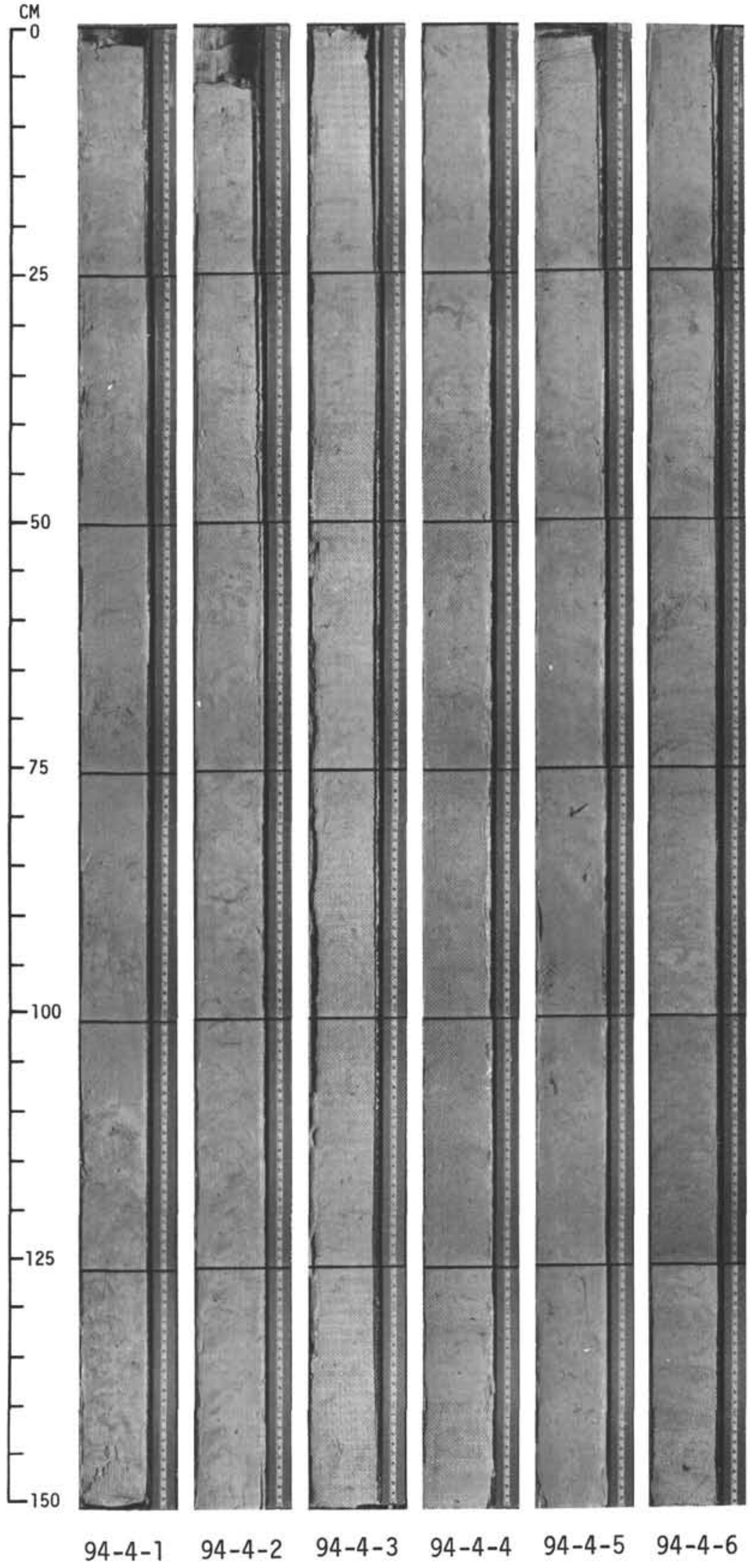
94-1-1 94-1-2

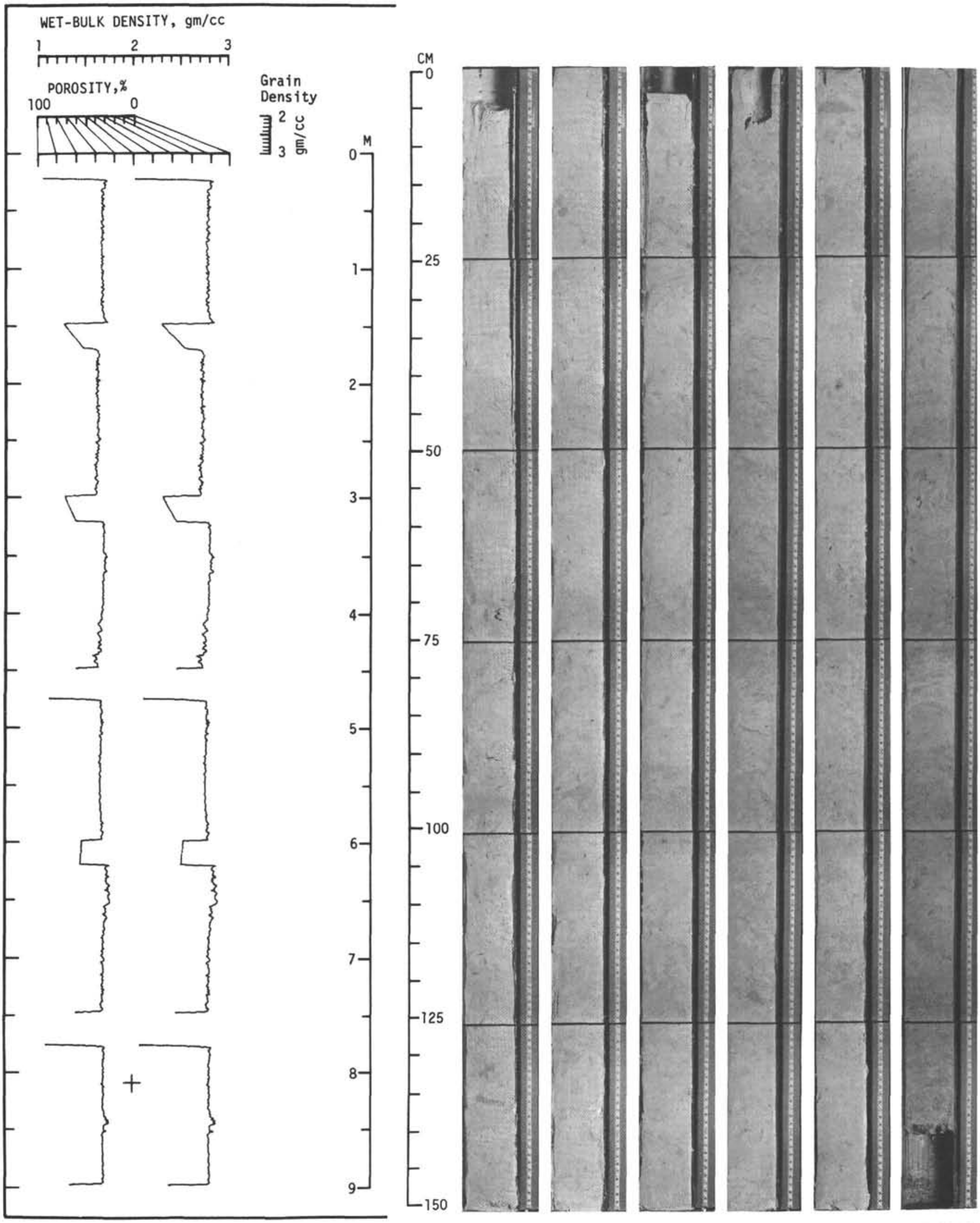

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9


CM
0
25
50
75
100
125
150
94-2-1
94-2-2
94-2-3
94-2-4
94-2-5
94-2-6

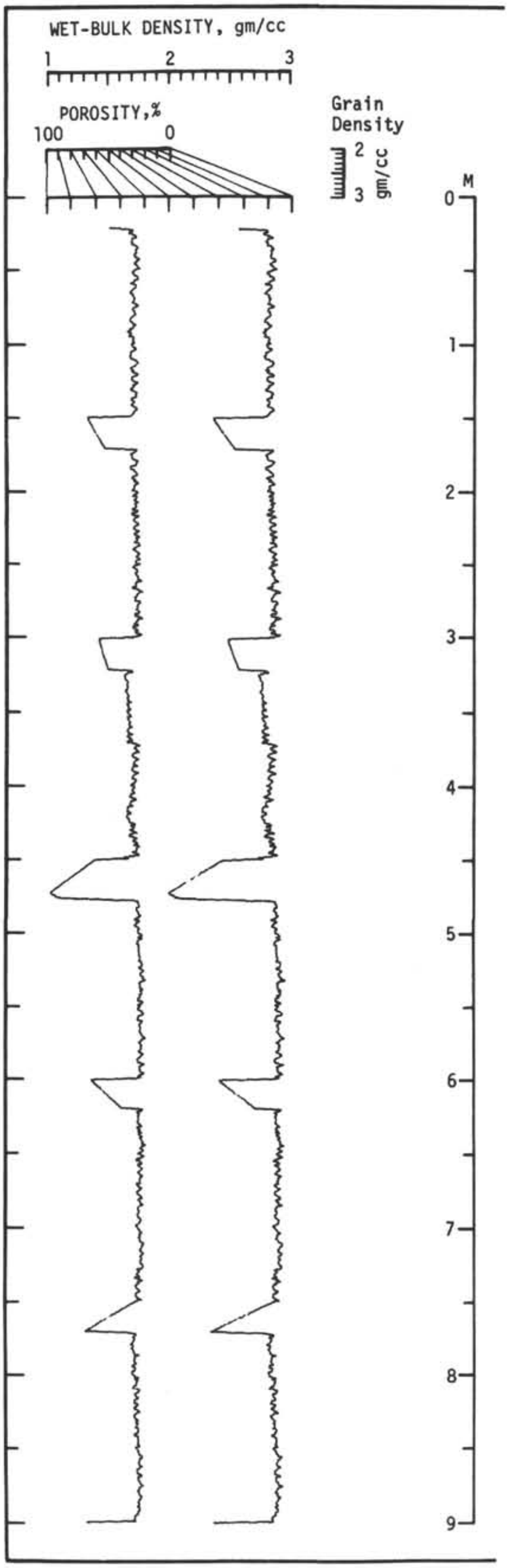

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150
94-3-1
94-3-2
94-3-3
94-3-4
94-3-5
94-3-6

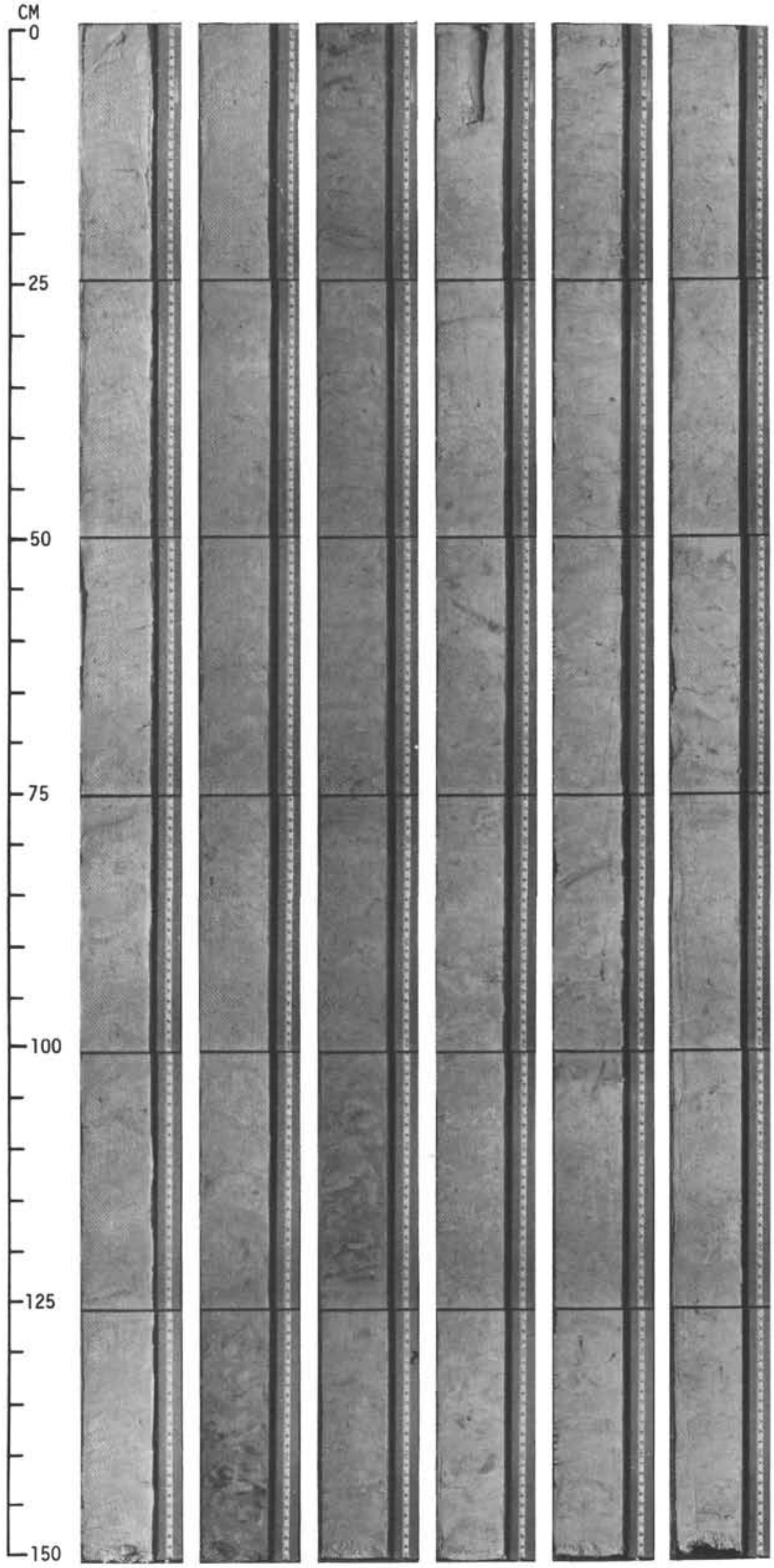

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9


CM
0
25
50
75
100
125
150
94-4-1
94-4-2
94-4-3
94-4-4
94-4-5
94-4-6

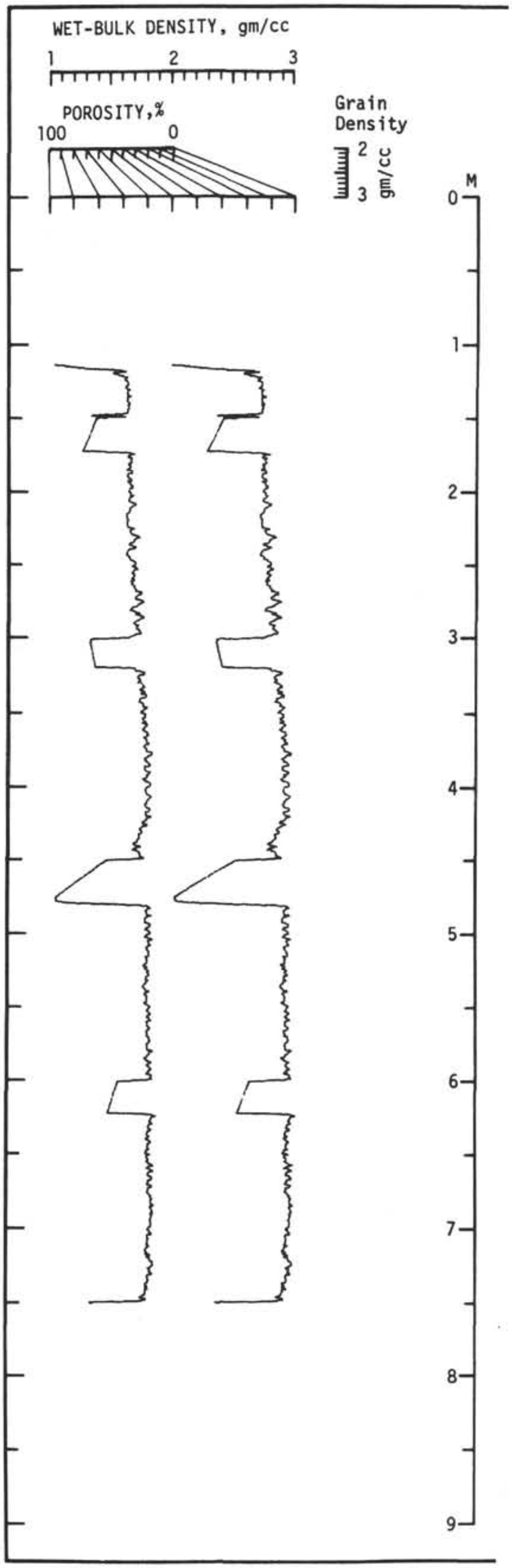


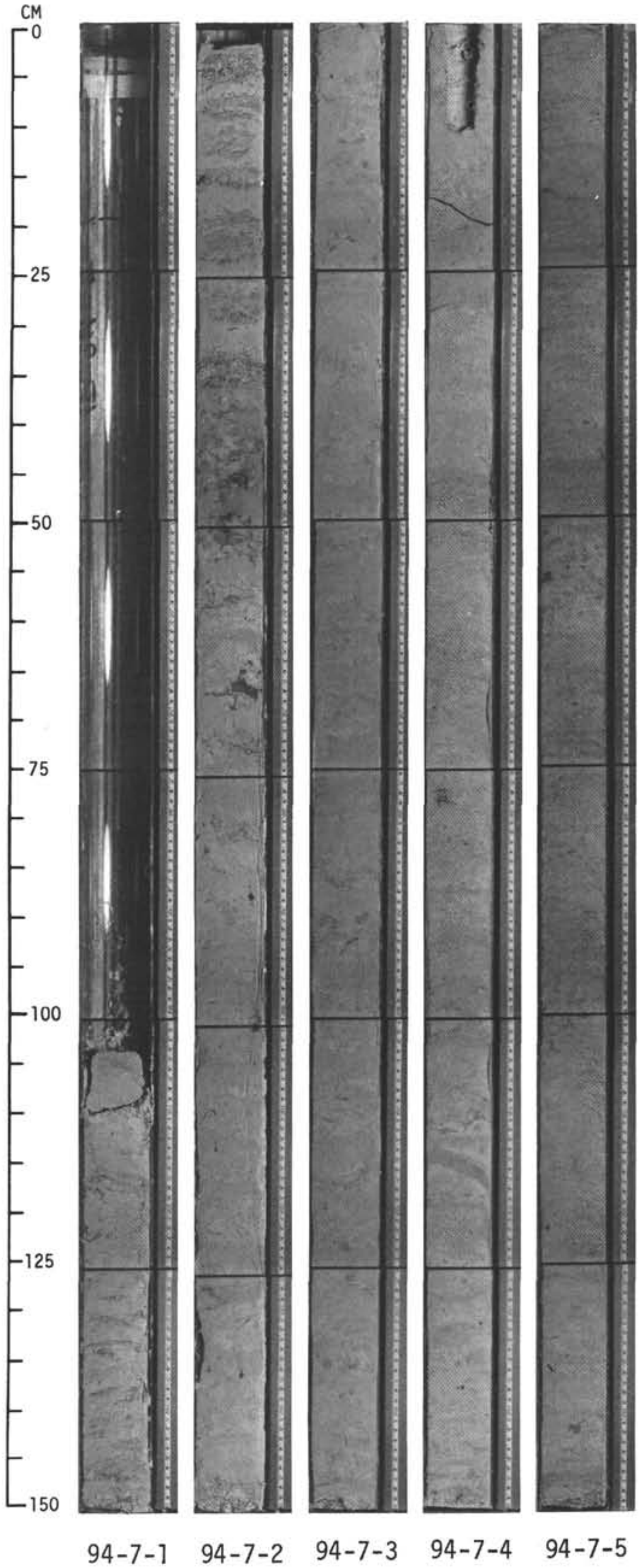
94-5-1 94-5-2 94-5-3 94-5-4 94-5-5 94-5-6

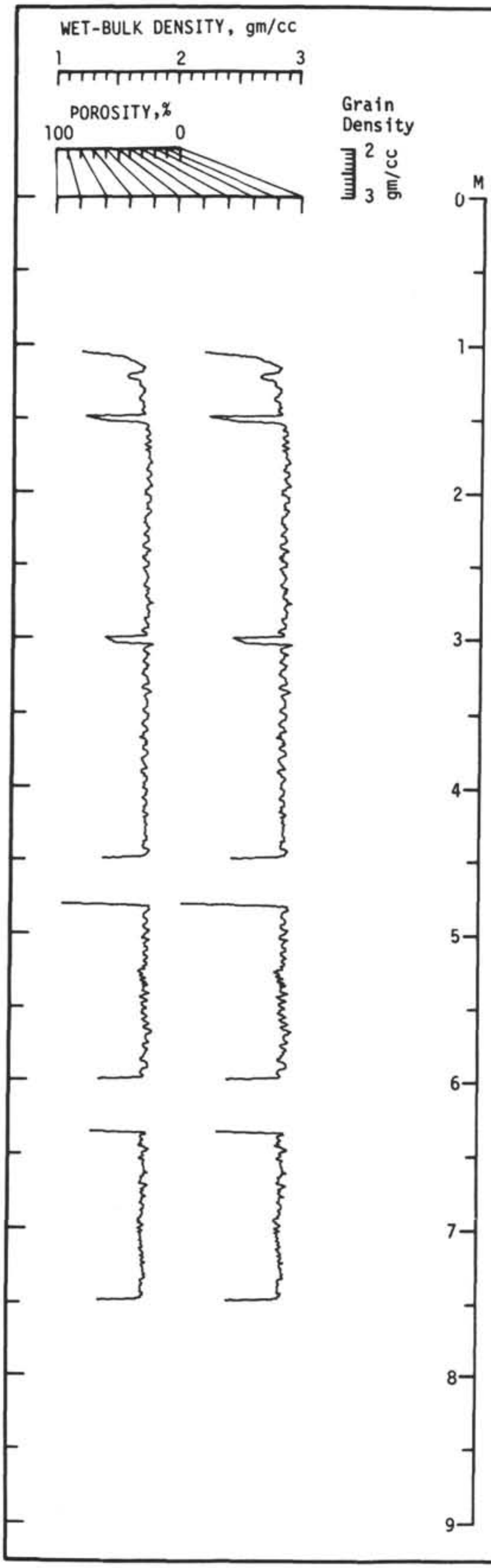


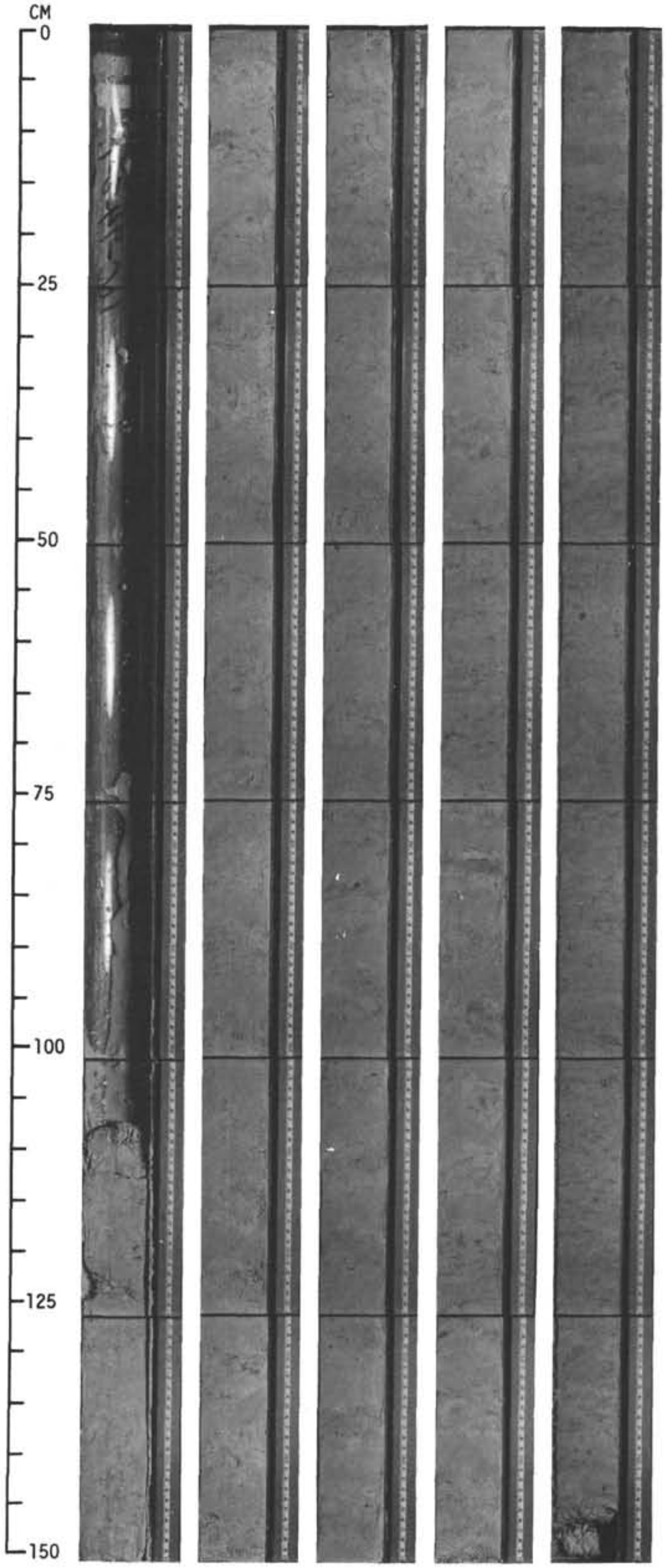


94-6-1 94-6-2 94-6-3 94-6-4 94-6-5 94-6-6

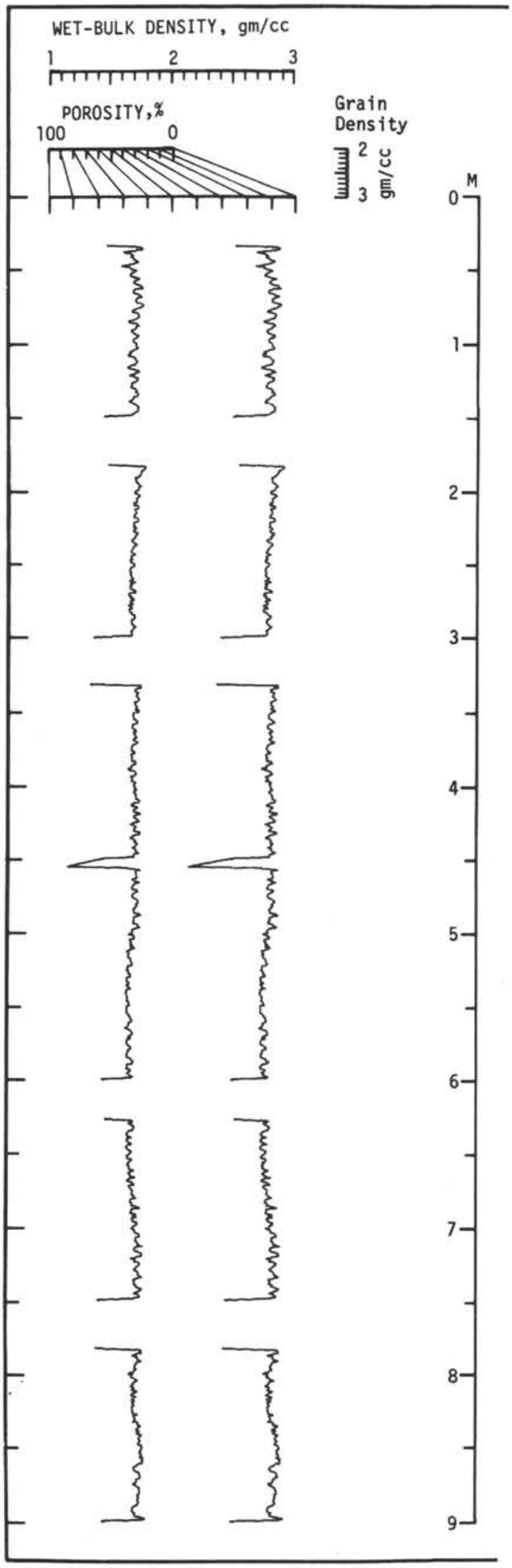

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

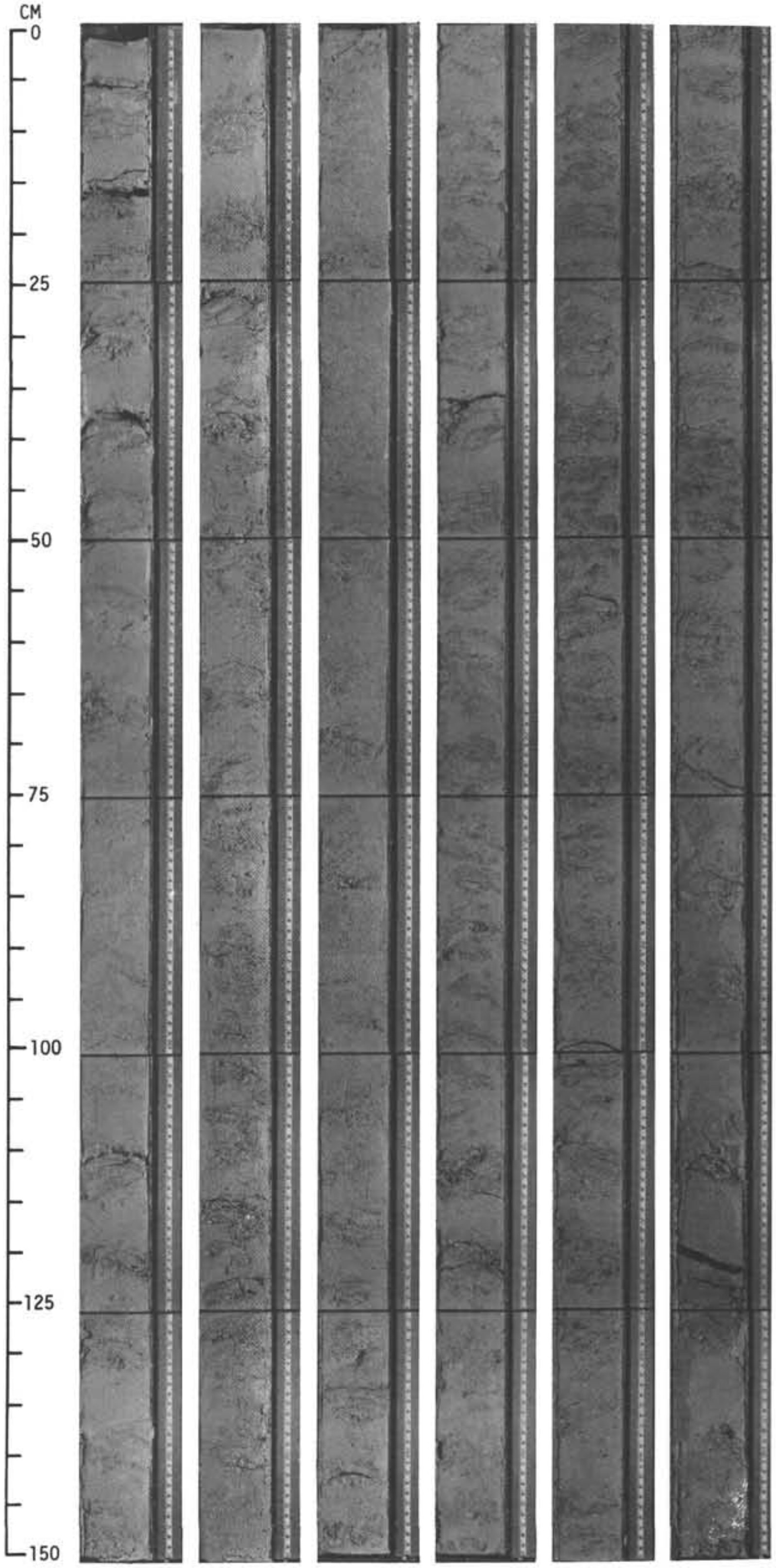

CM
0
25
50
75
100
125
150
94-7-1
94-7-2
94-7-3
94-7-4
94-7-5



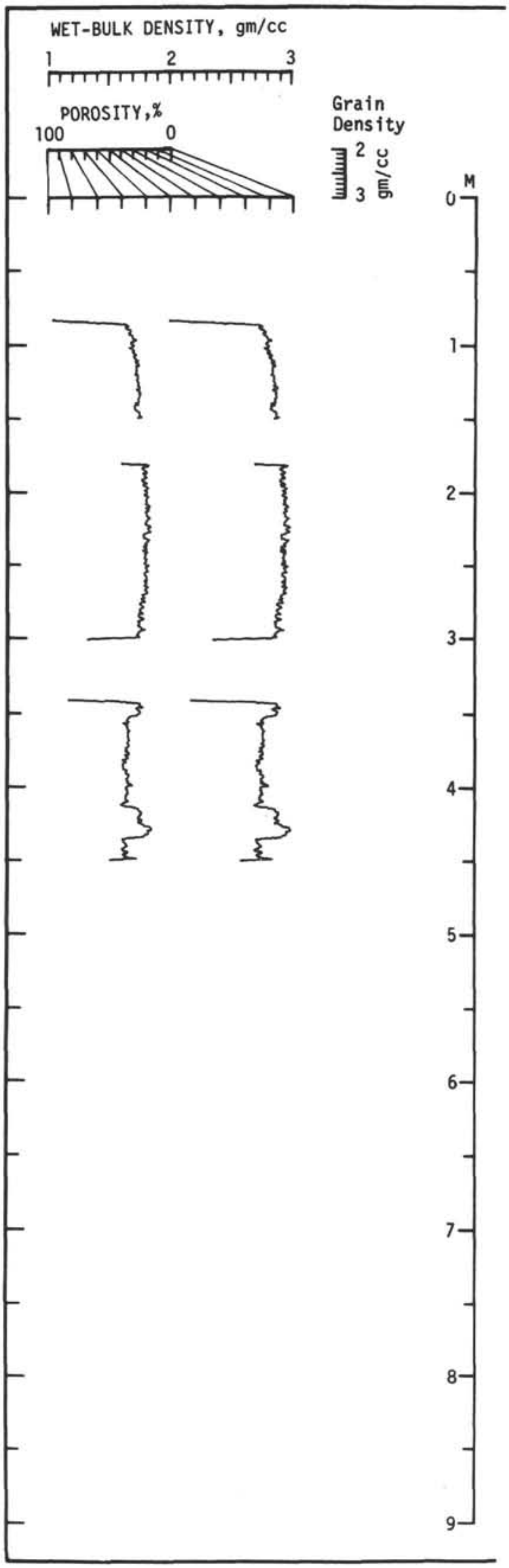


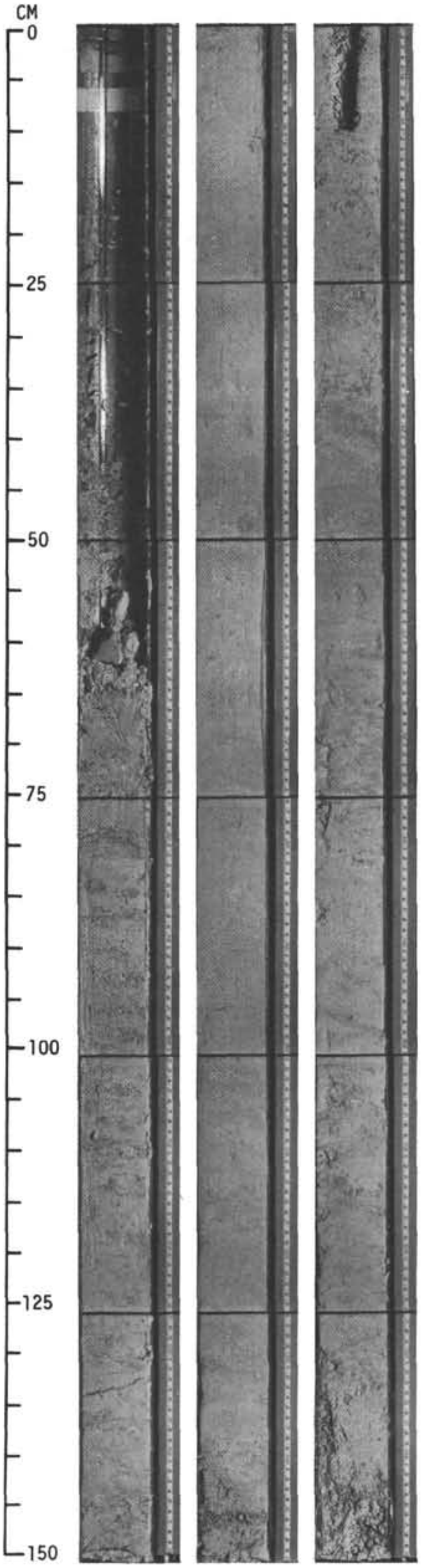
94-8-1 94-8-2 94-8-3 94-8-4 94-8-5

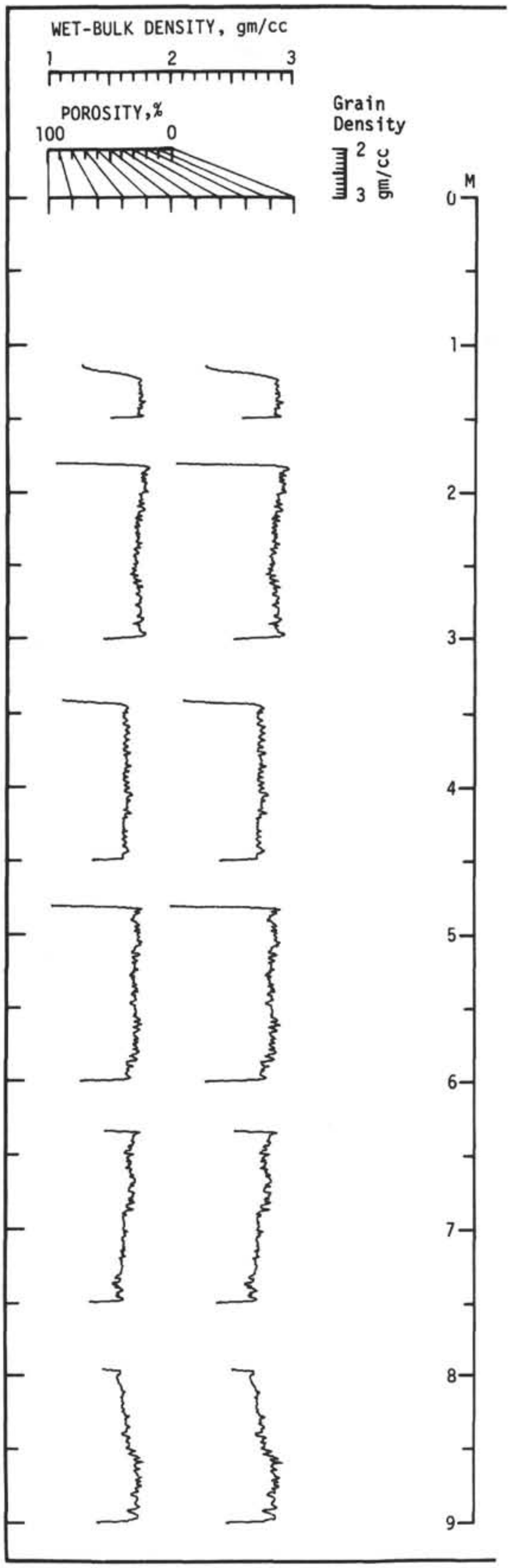


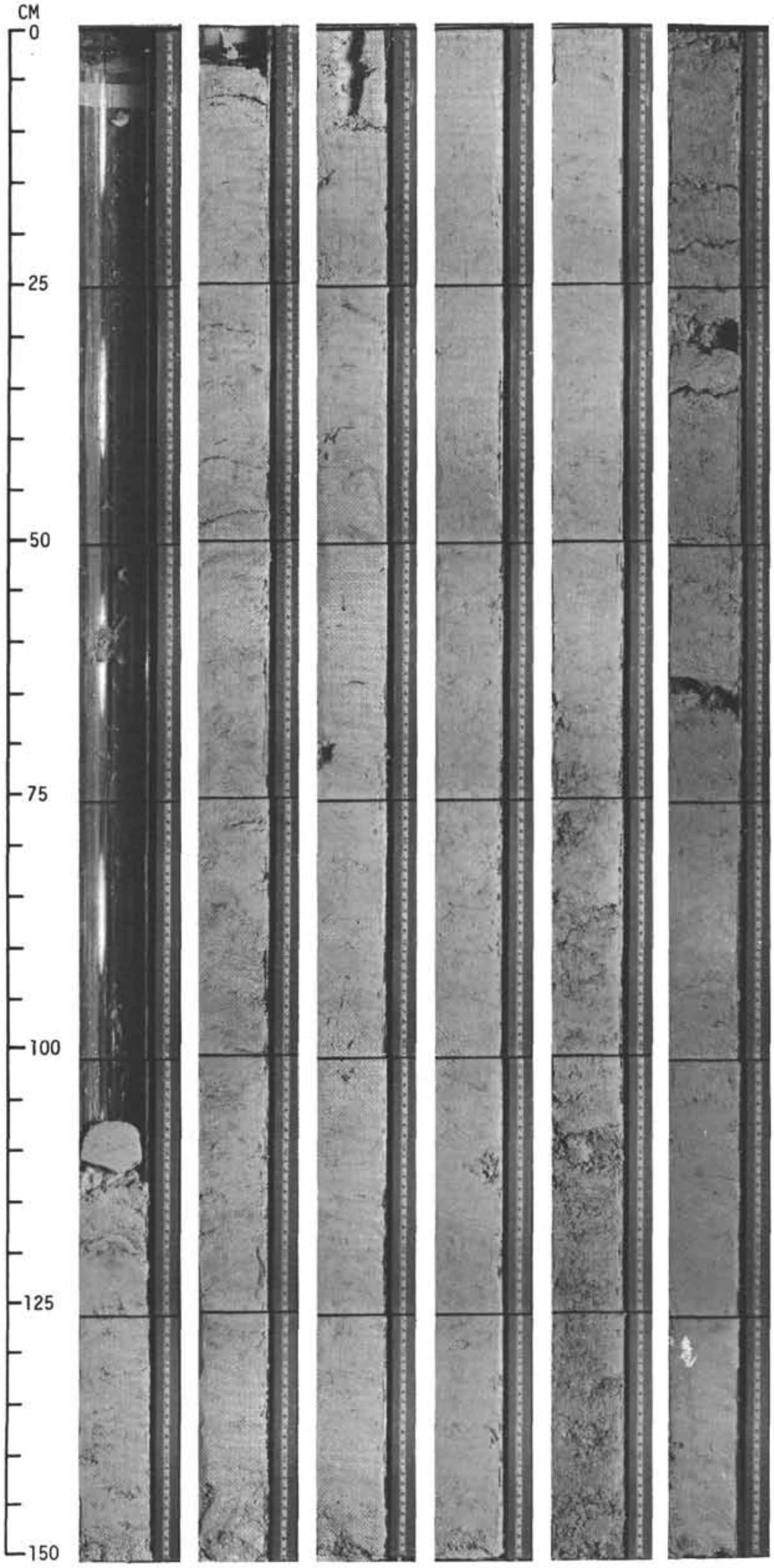


94-9-1 94-9-2 94-9-3 94-9-4 94-9-5 94-9-6

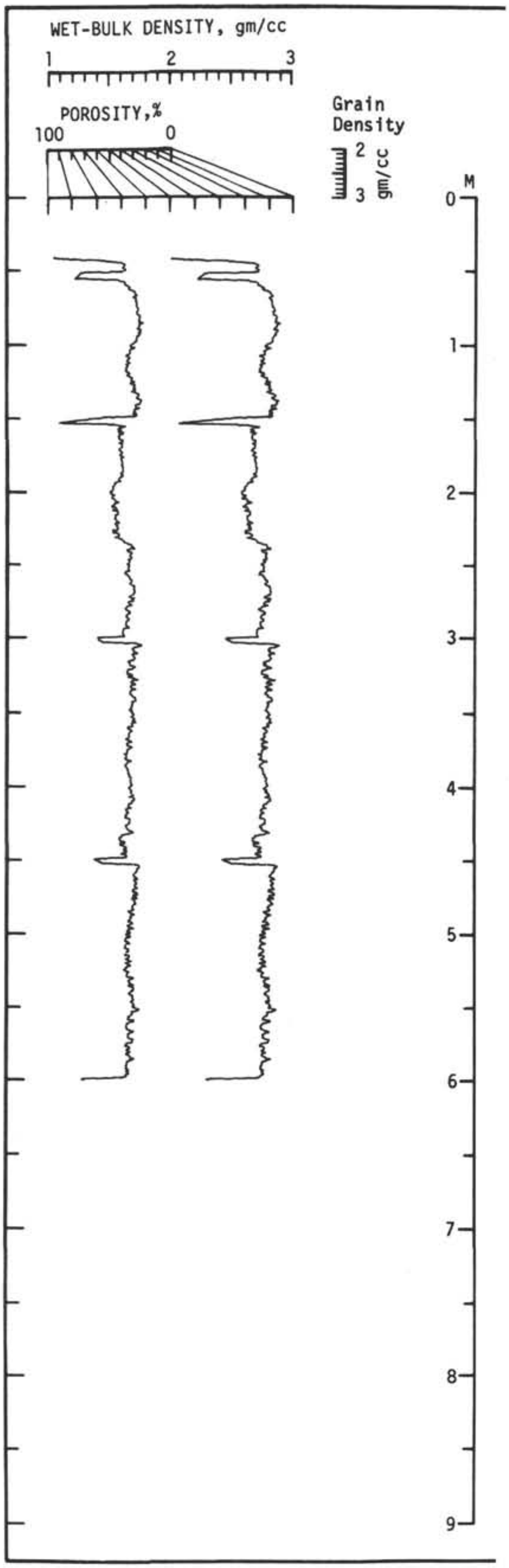

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

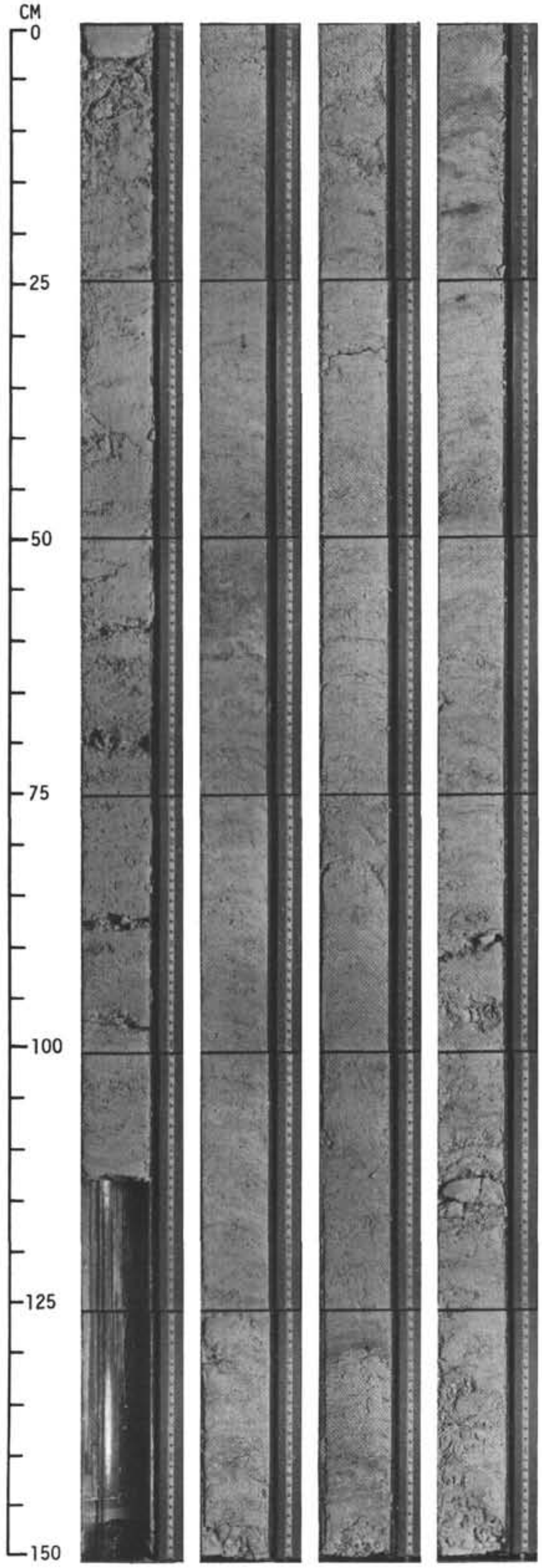

CM
0
25
50
75
100
125
150
94-10-1
94-10-2
94-10-3



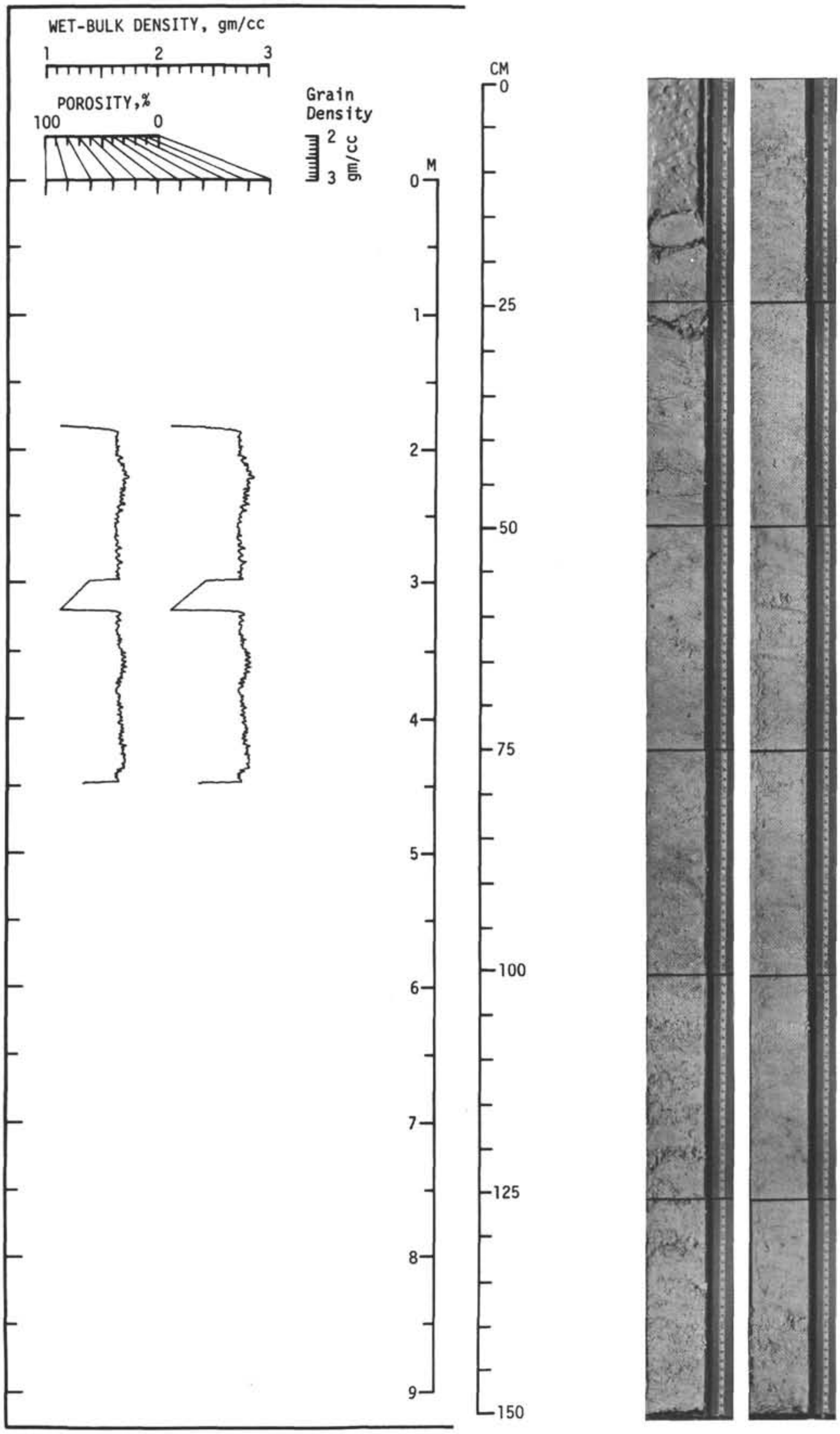


94-11-1 94-11-2 94-11-3 94-11-4 94-11-5 94-11-6

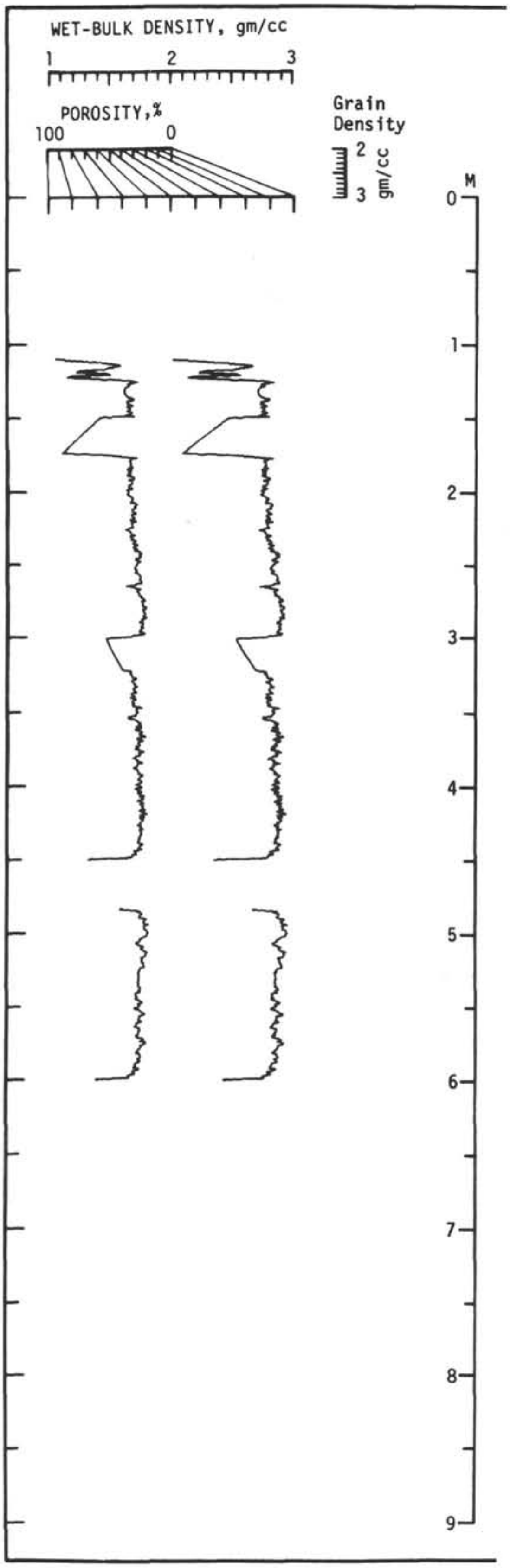


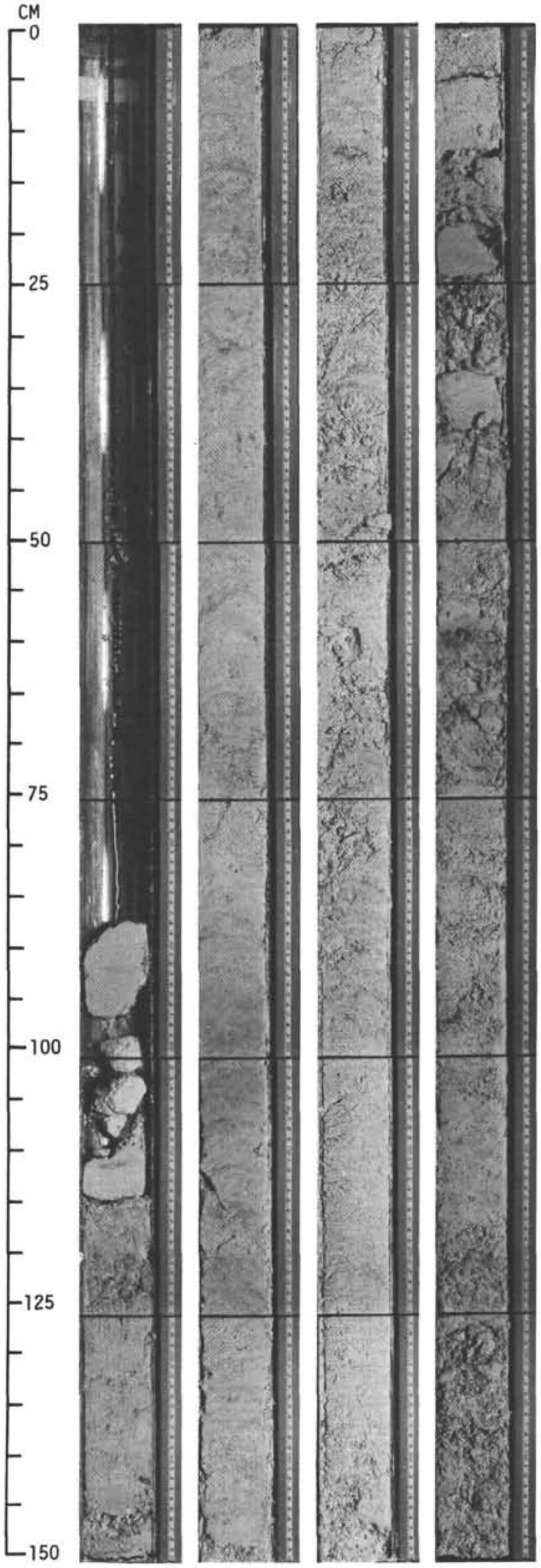


94-12-1 94-12-2 94-12-3 94-12-4

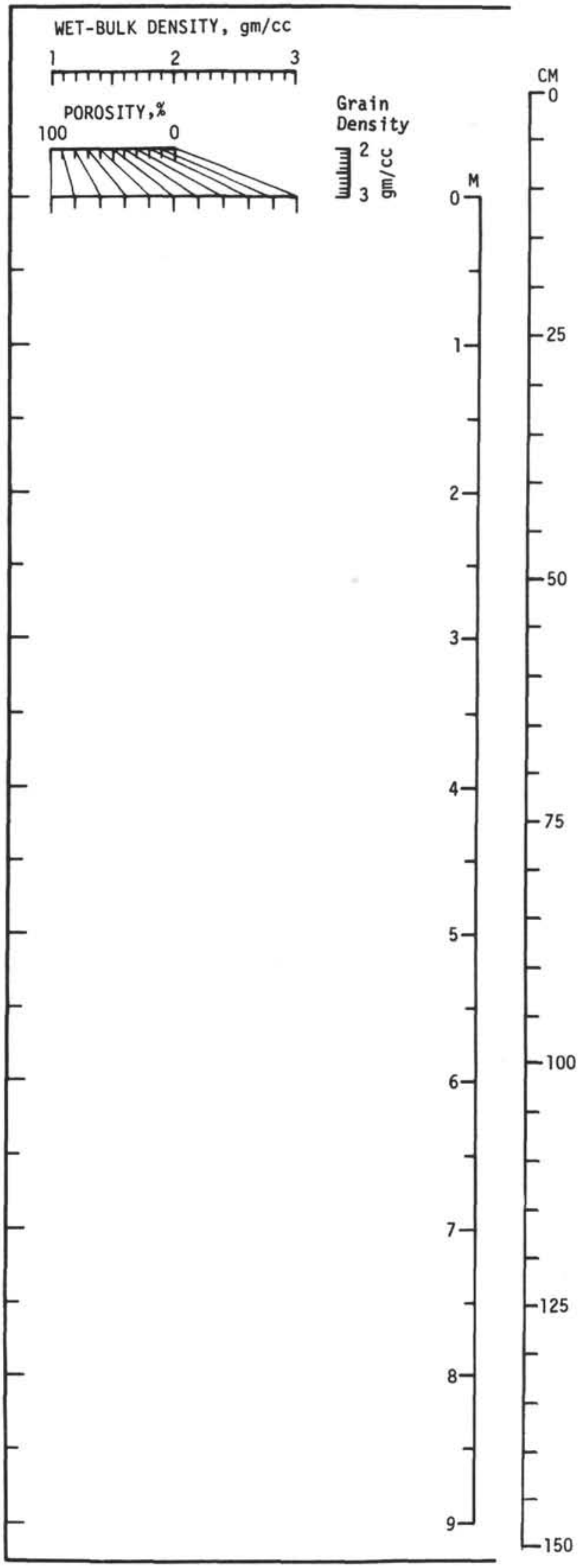

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150

94-13-2 94-13-3

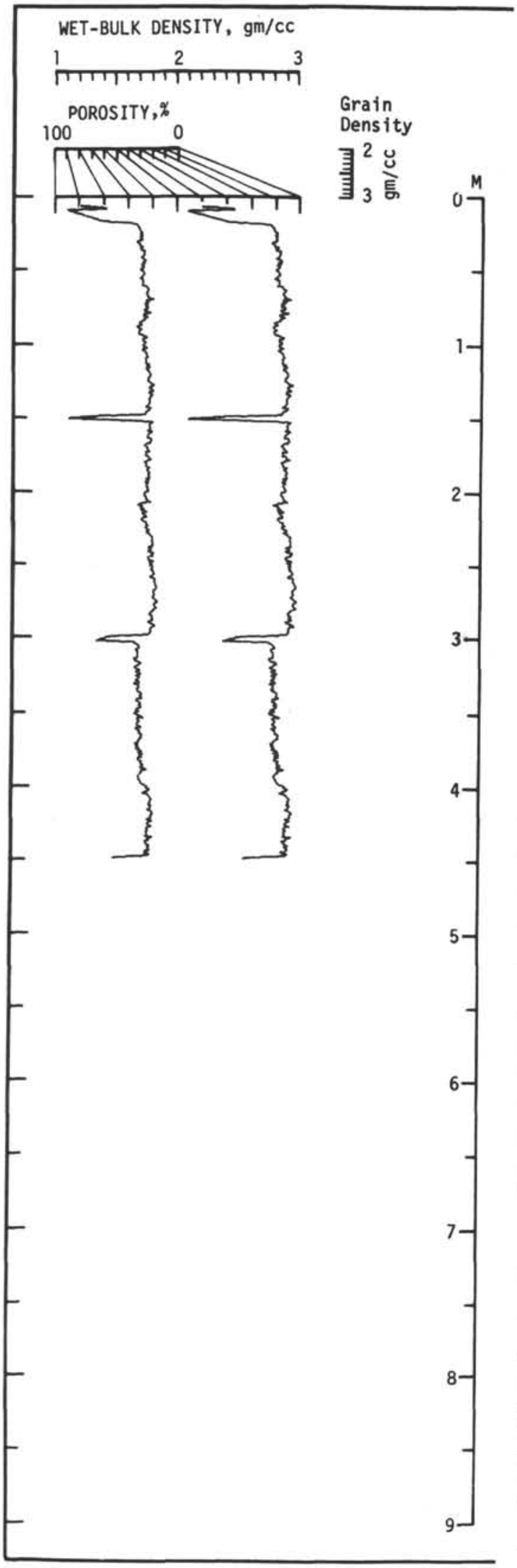


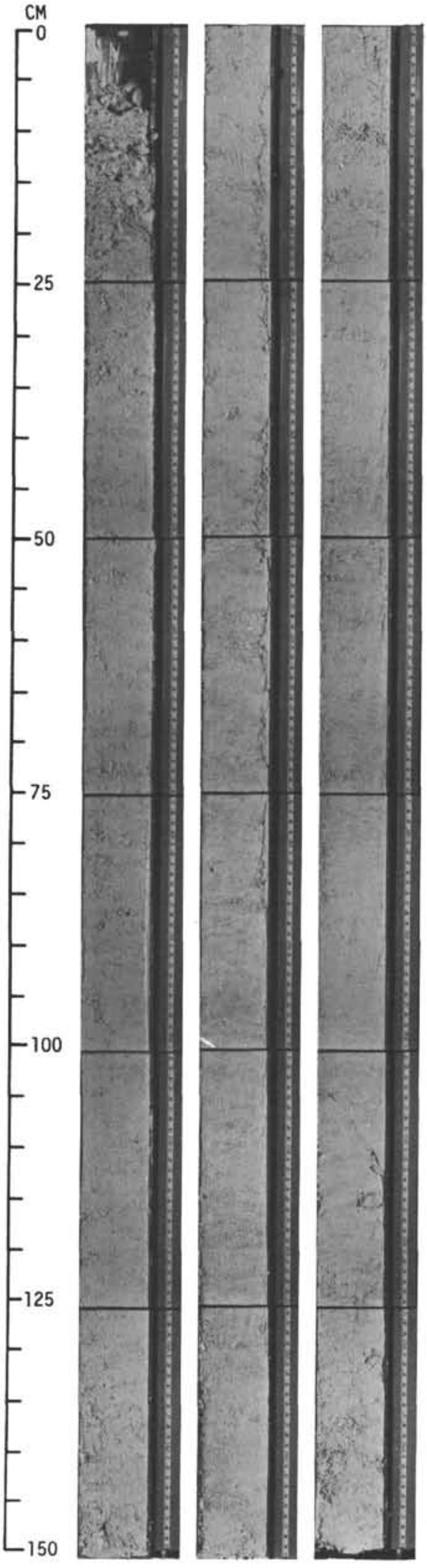


94-14-1 94-14-2 94-14-3 94-14-4

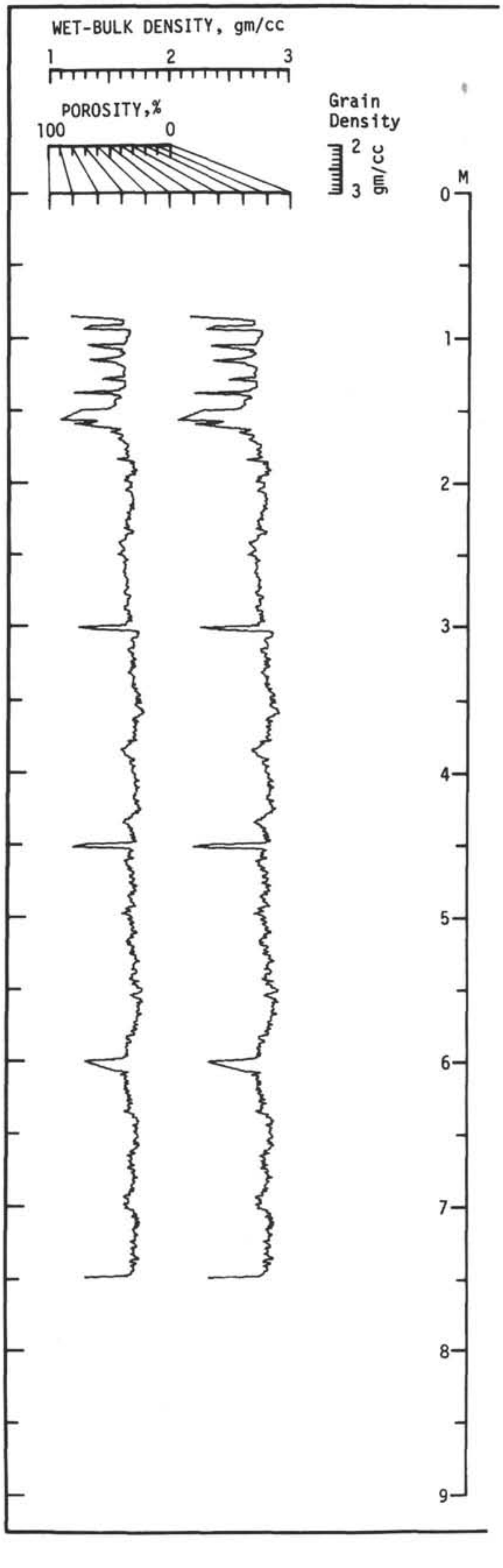

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150

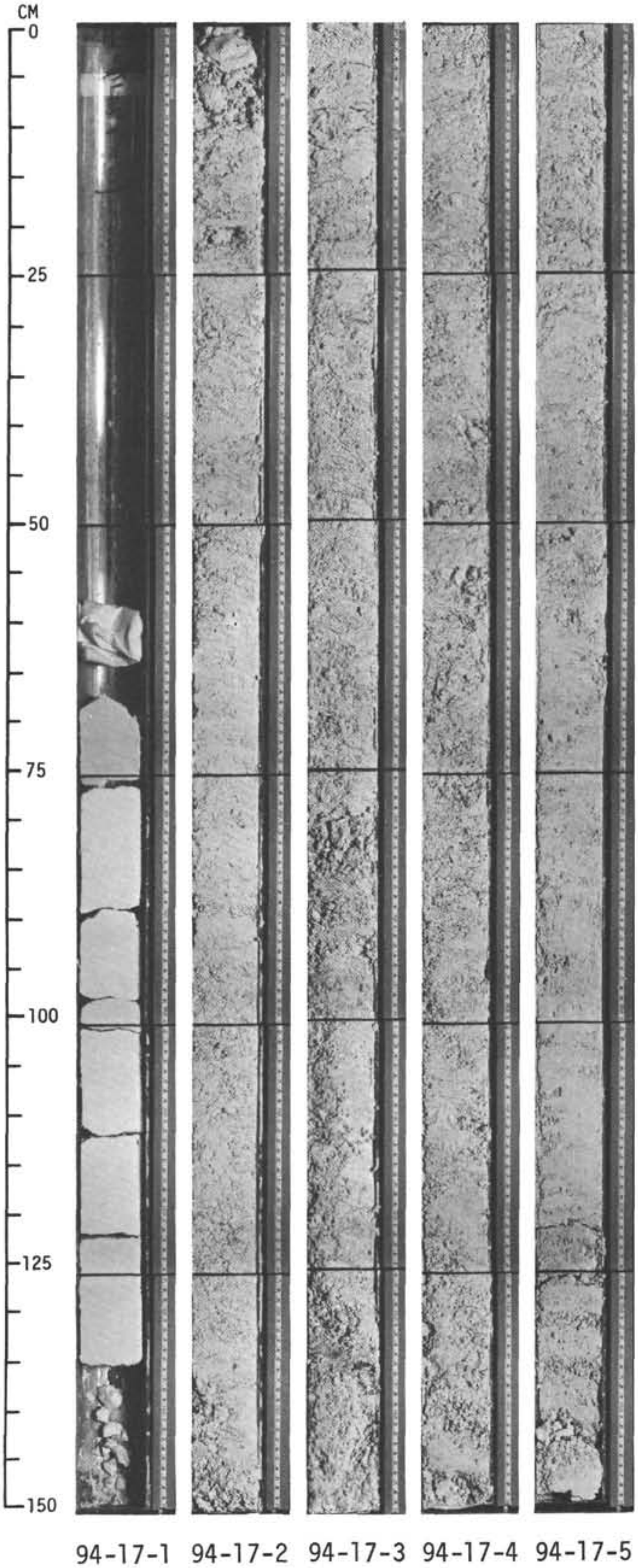
94-15-4



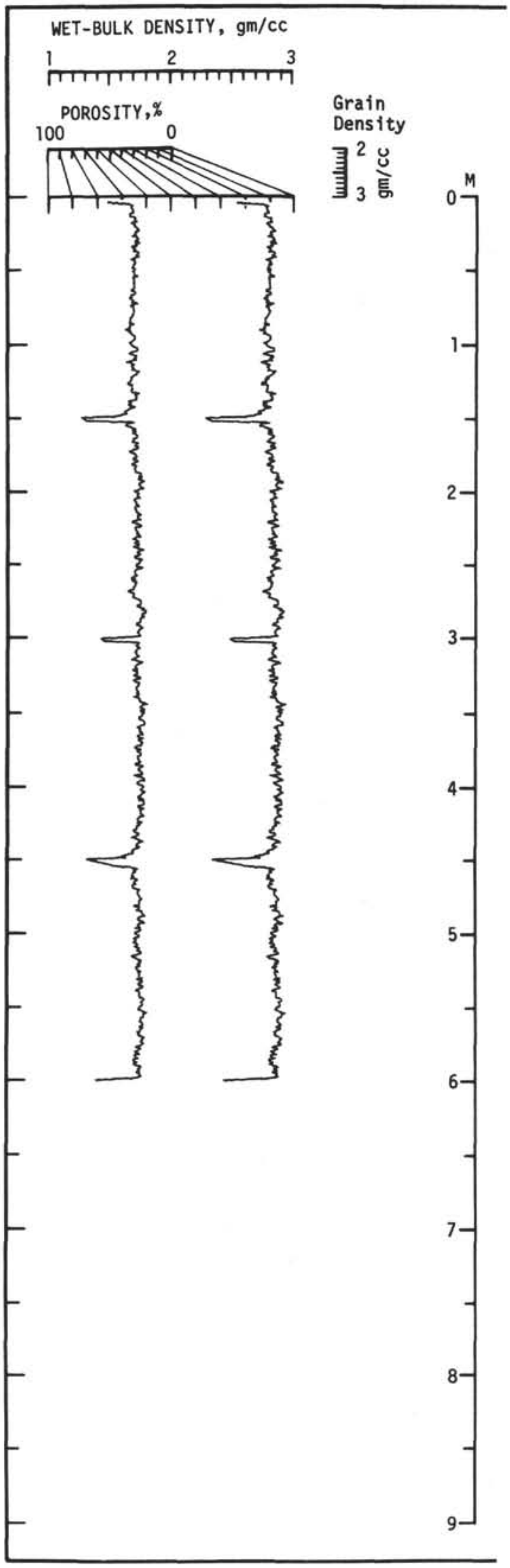


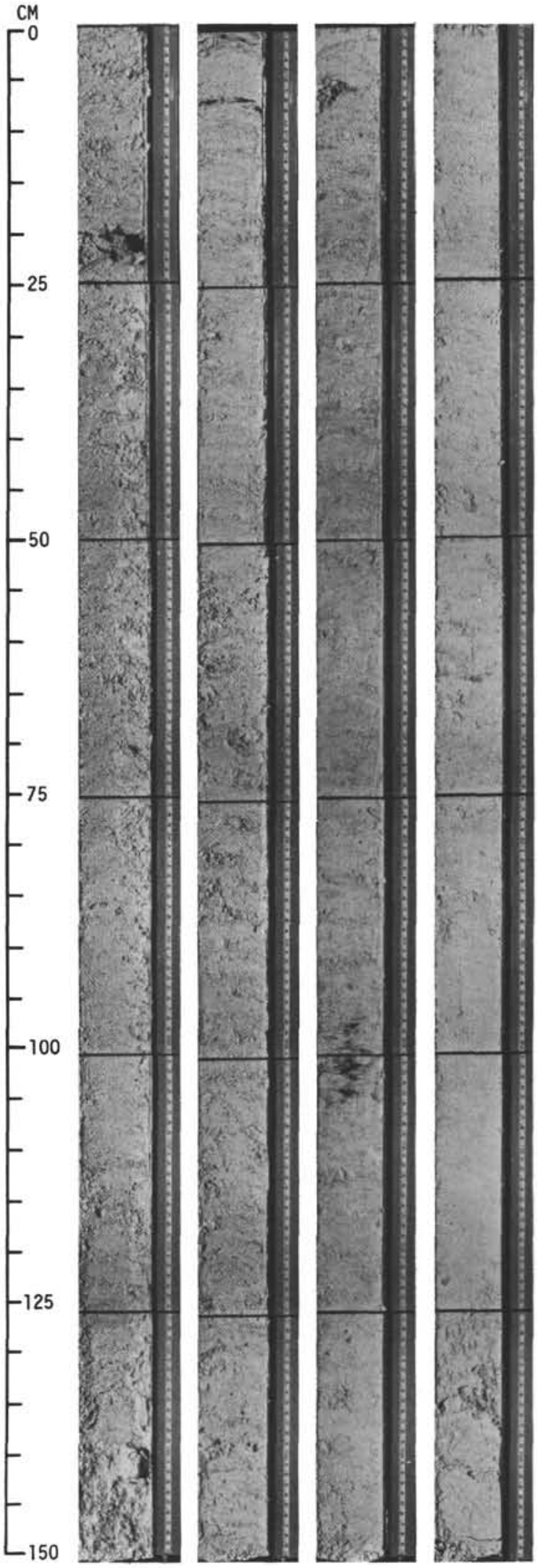
94-16-1 94-16-2 94-16-3



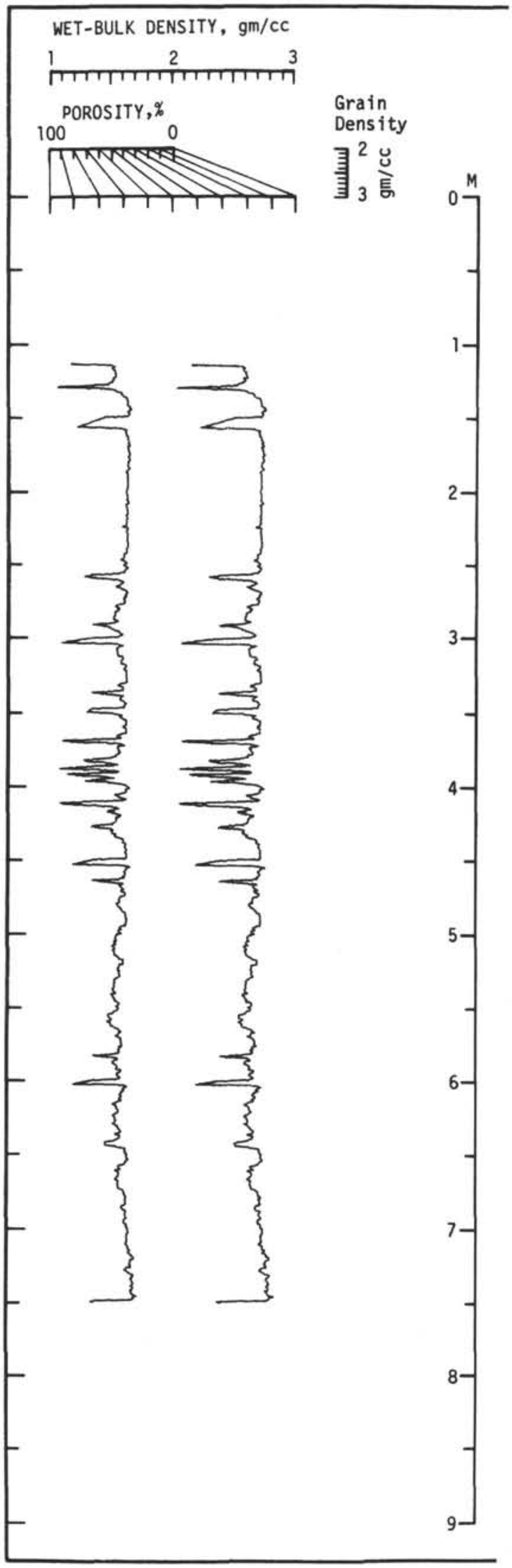


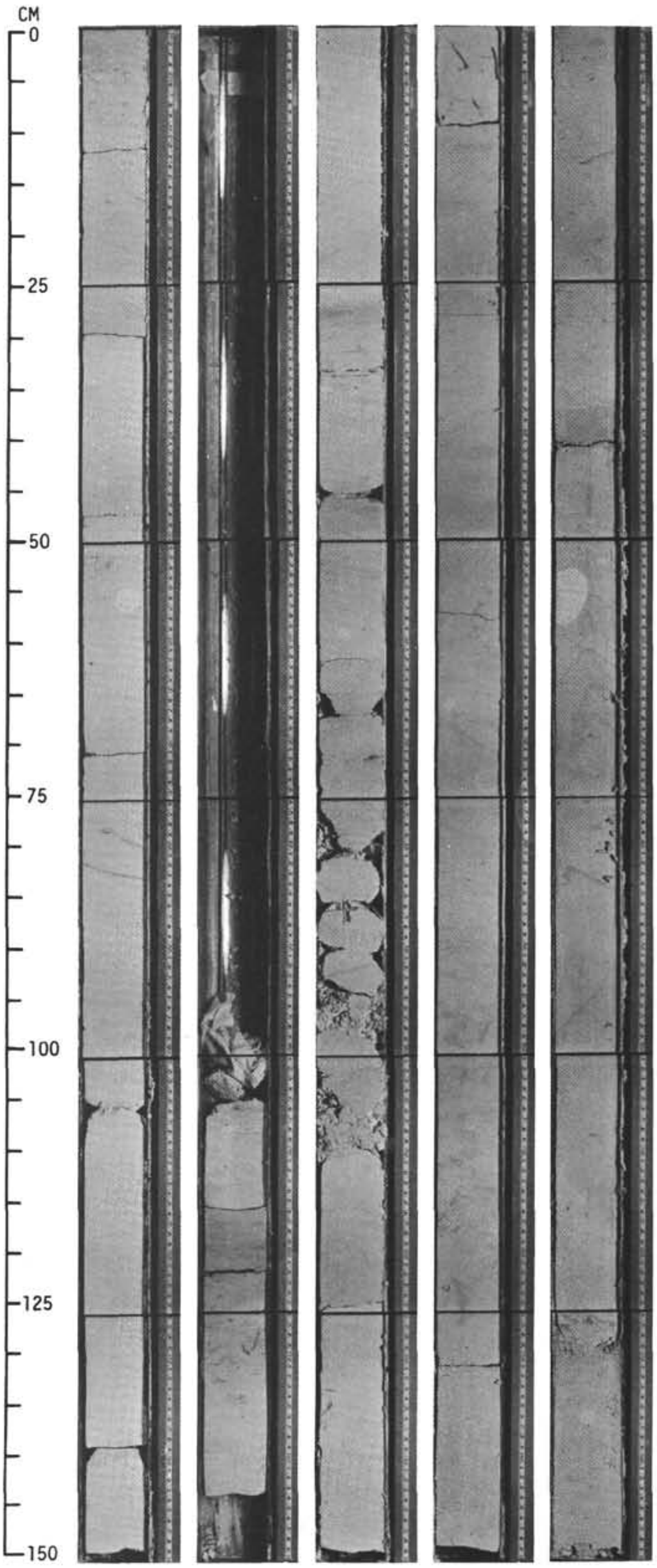
94-17-1 94-17-2 94-17-3 94-17-4 94-17-5

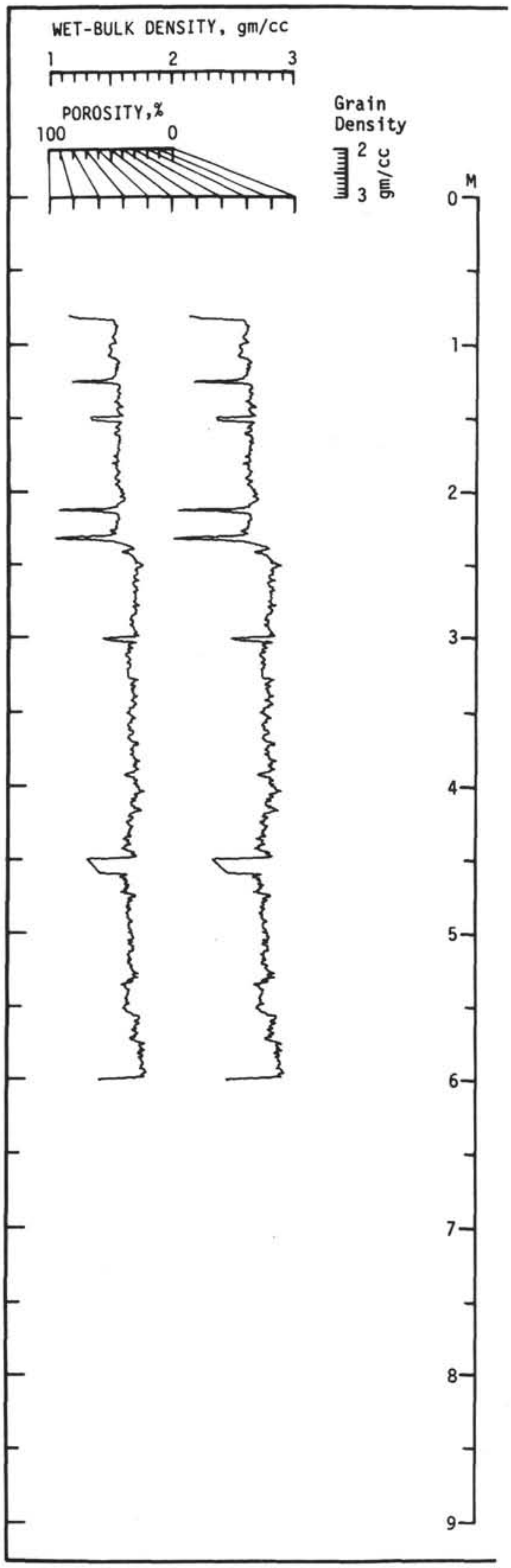


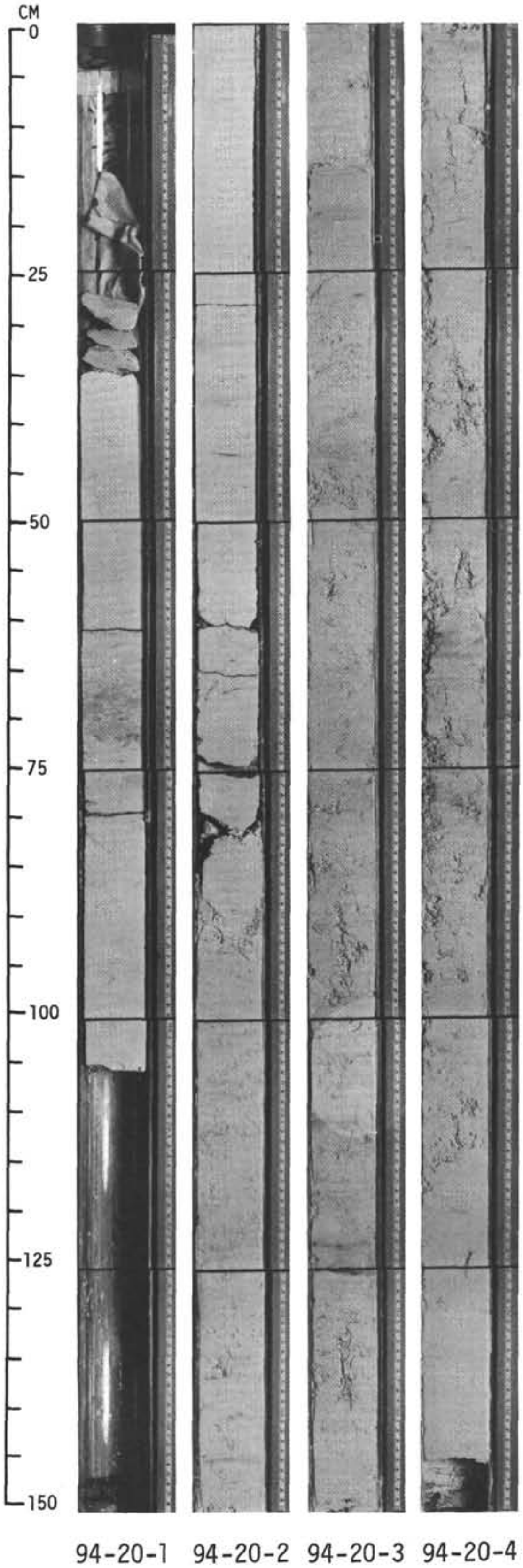


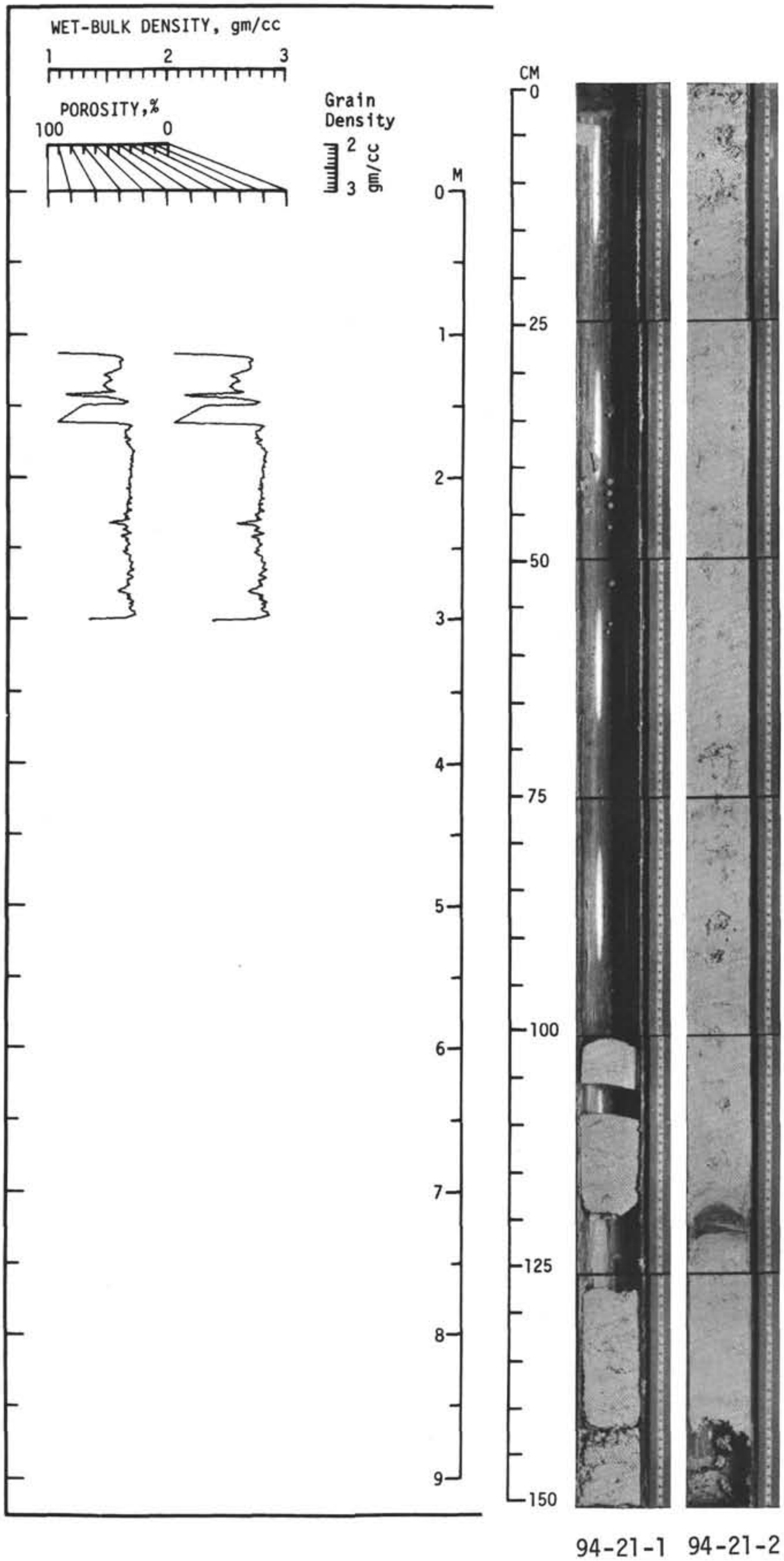
94-18-1 94-18-2 94-18-3 94-18-4

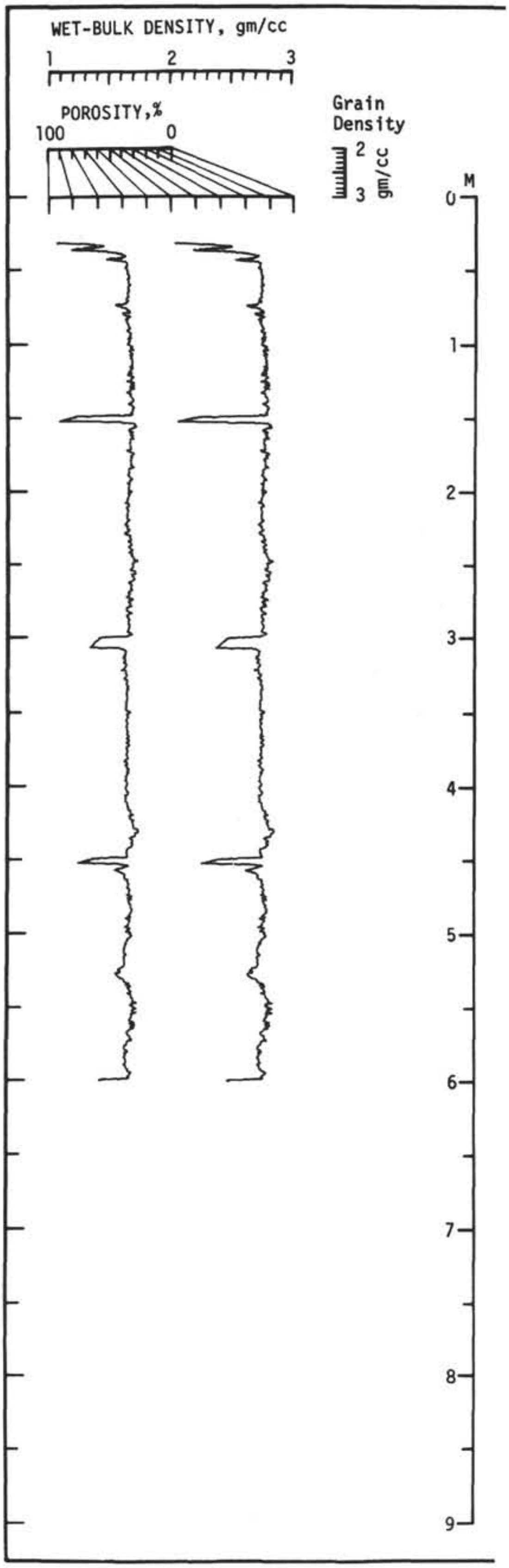

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

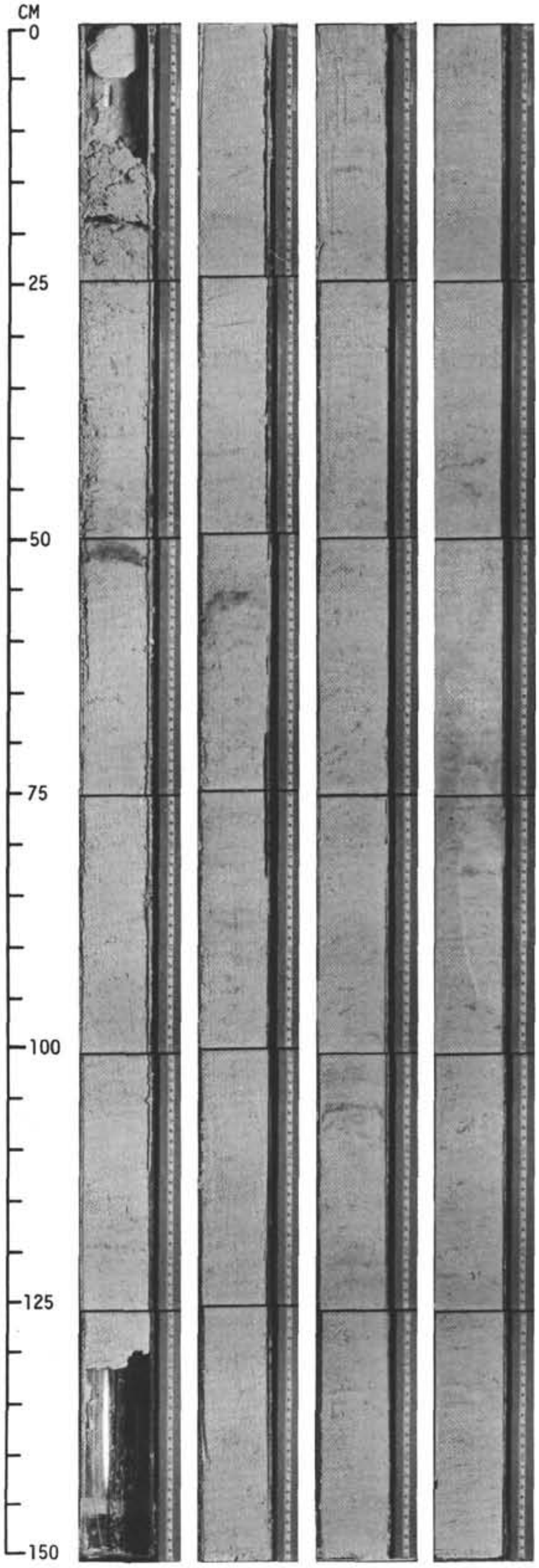

CM
0
25
50
75
100
125
150
94-19-1
94-19-2
94-19-3
94-19-4
94-19-5


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

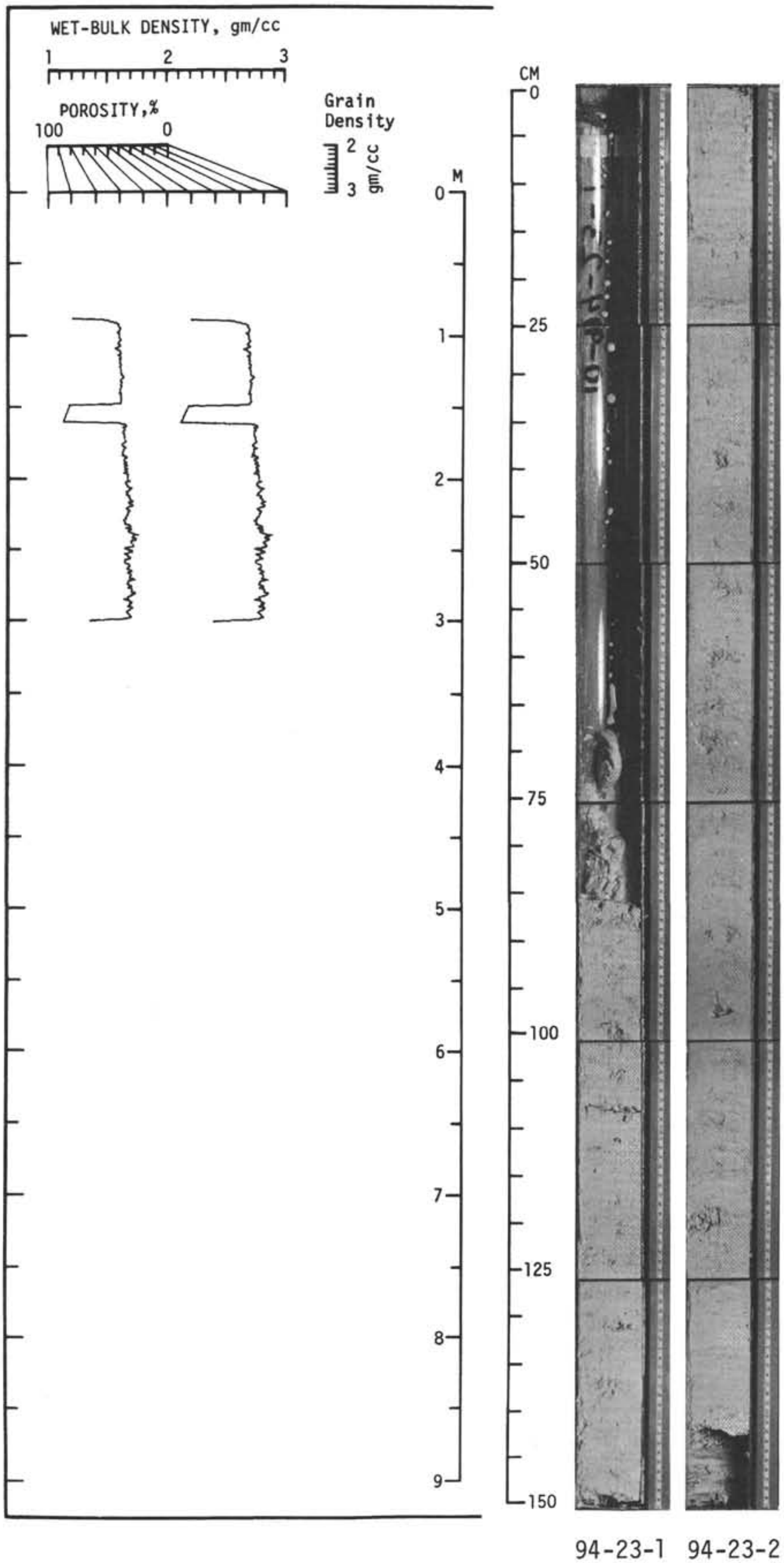

CM
0
25
50
75
100
125
150
94-20-1
94-20-2
94-20-3
94-20-4

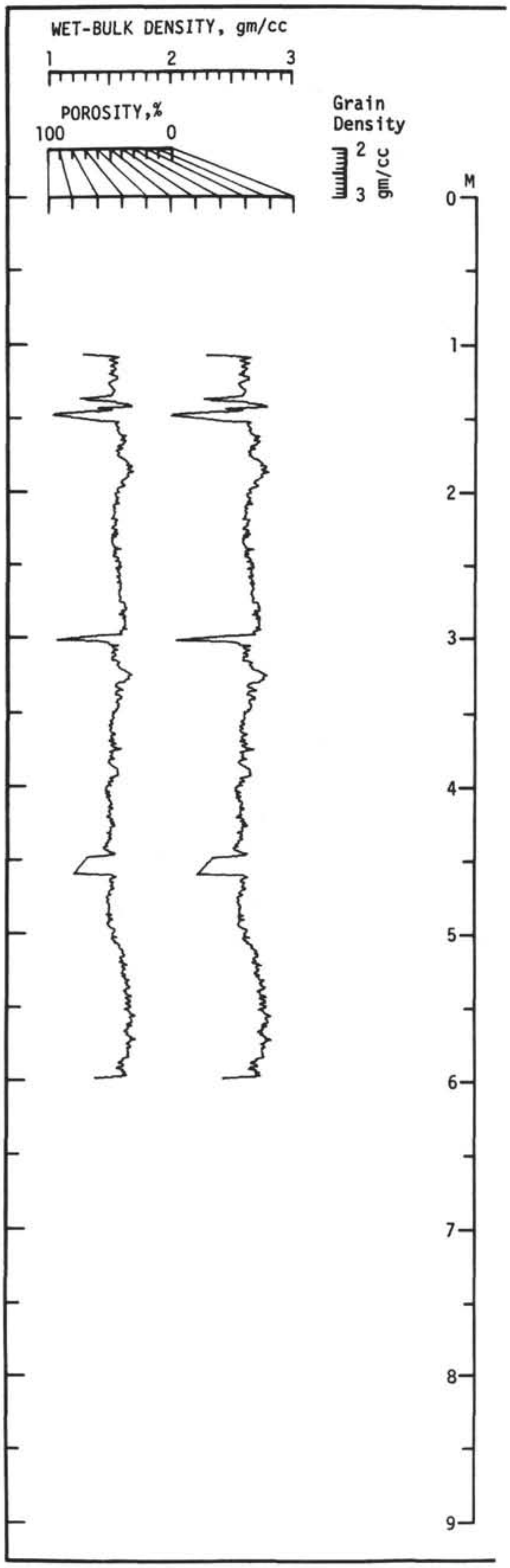

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150
94-21-1
94-21-2

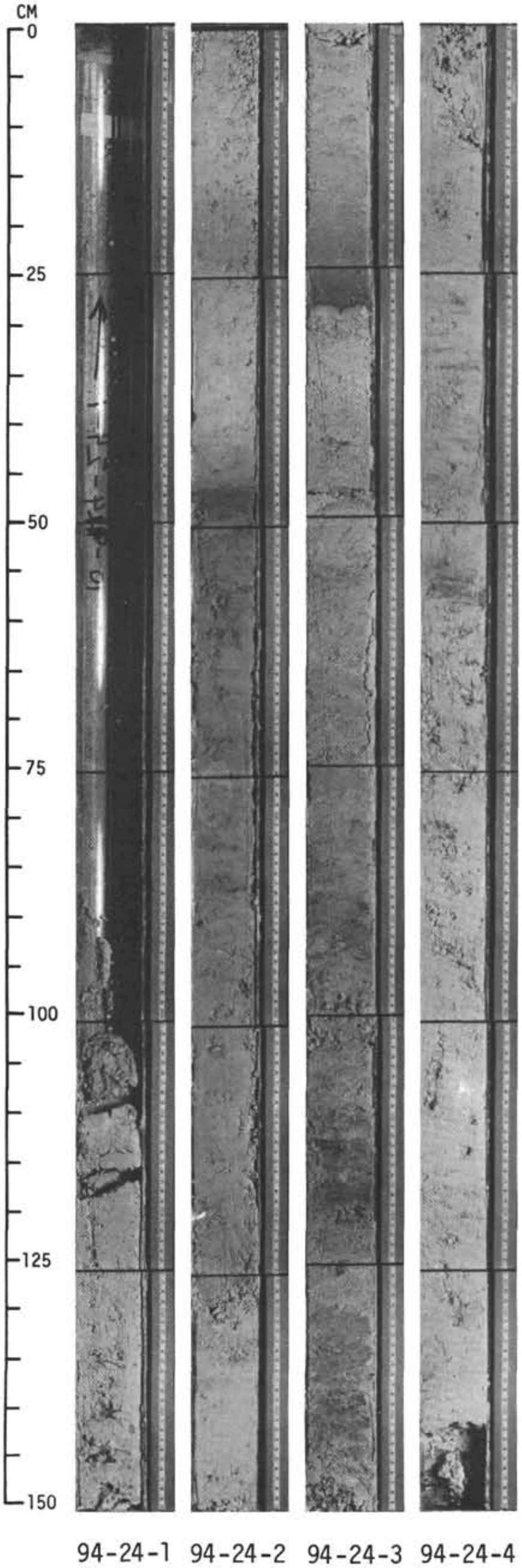


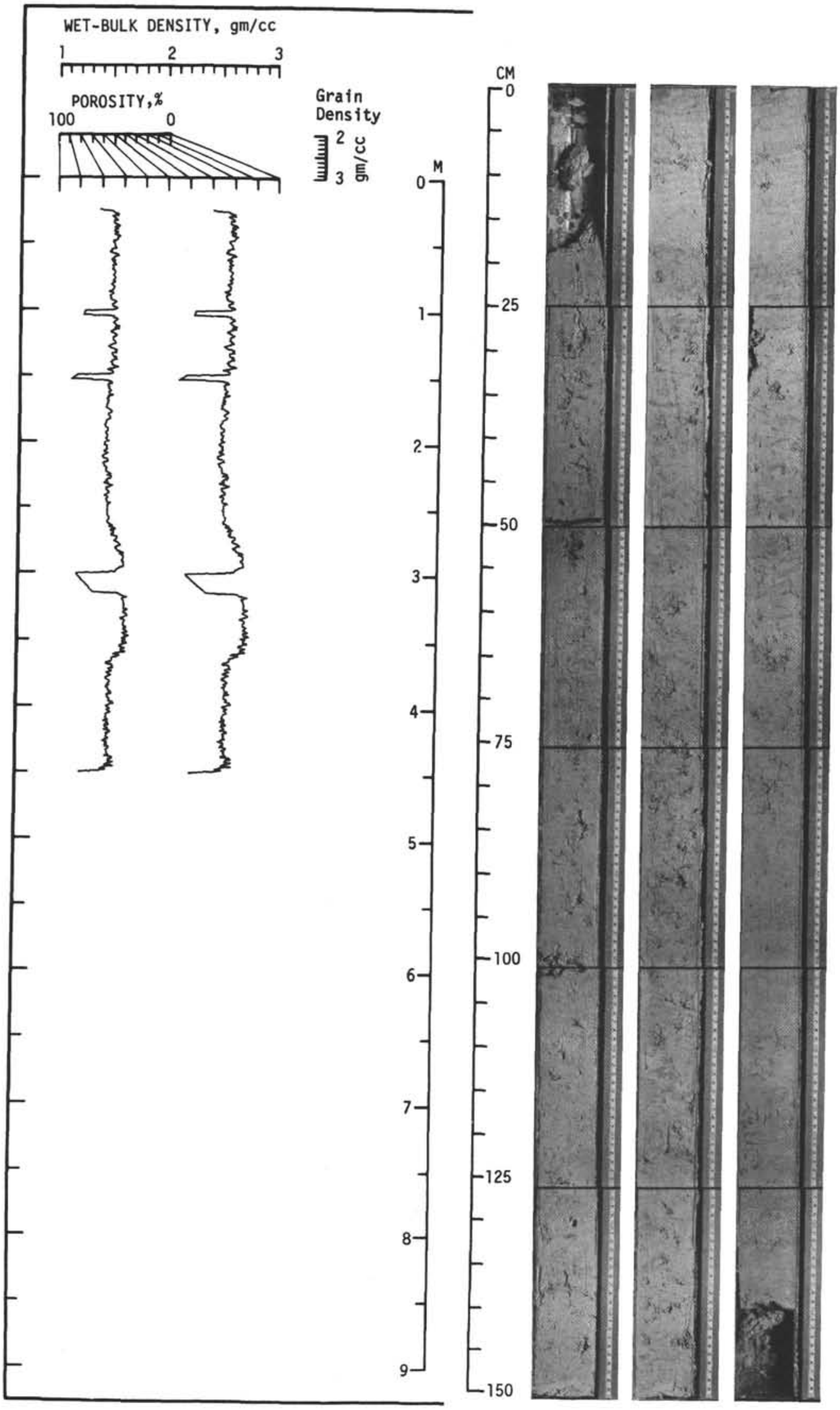


94-22-1 94-22-2 94-22-3 94-22-4

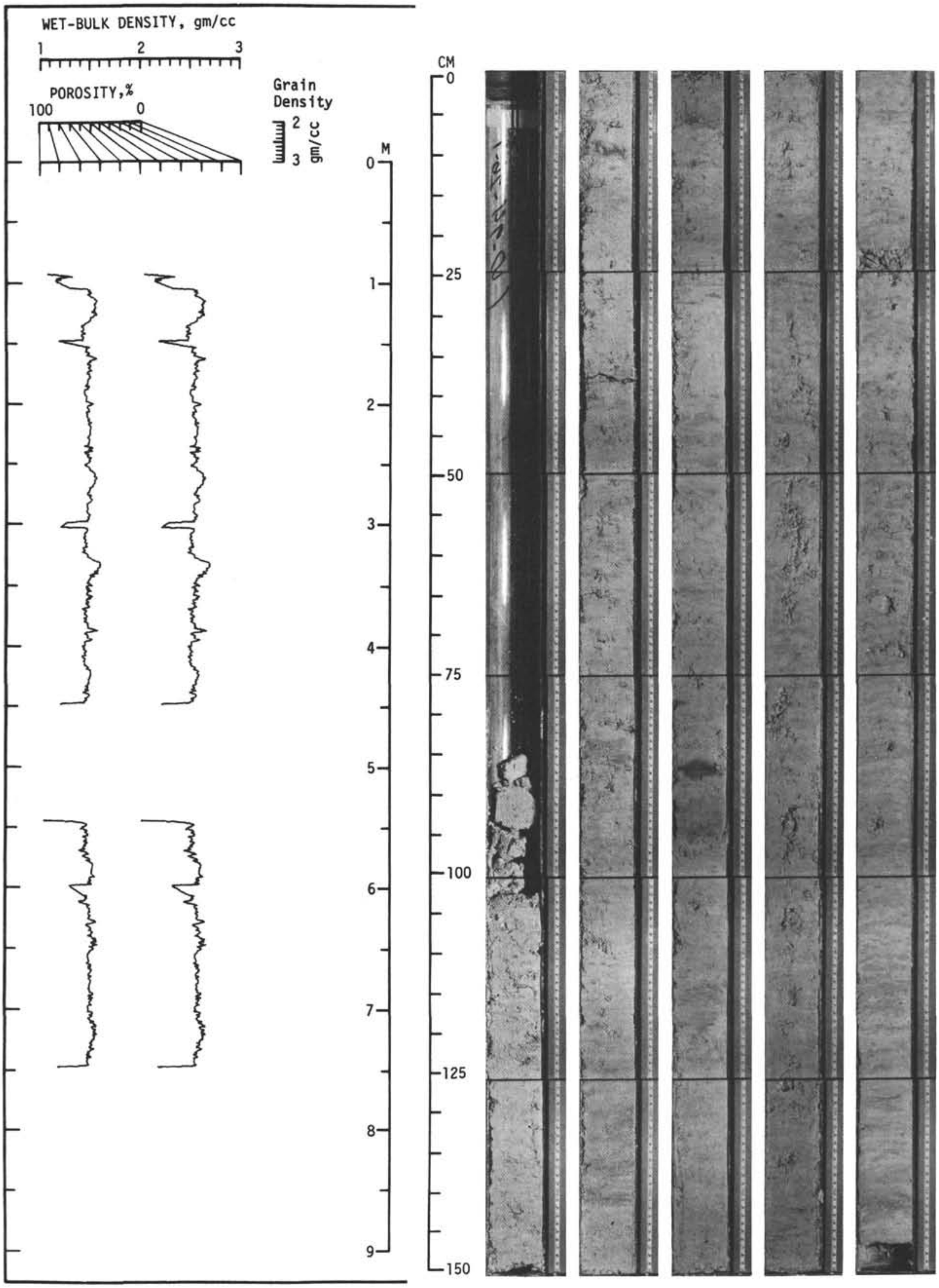

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150
94-23-1
94-23-2


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

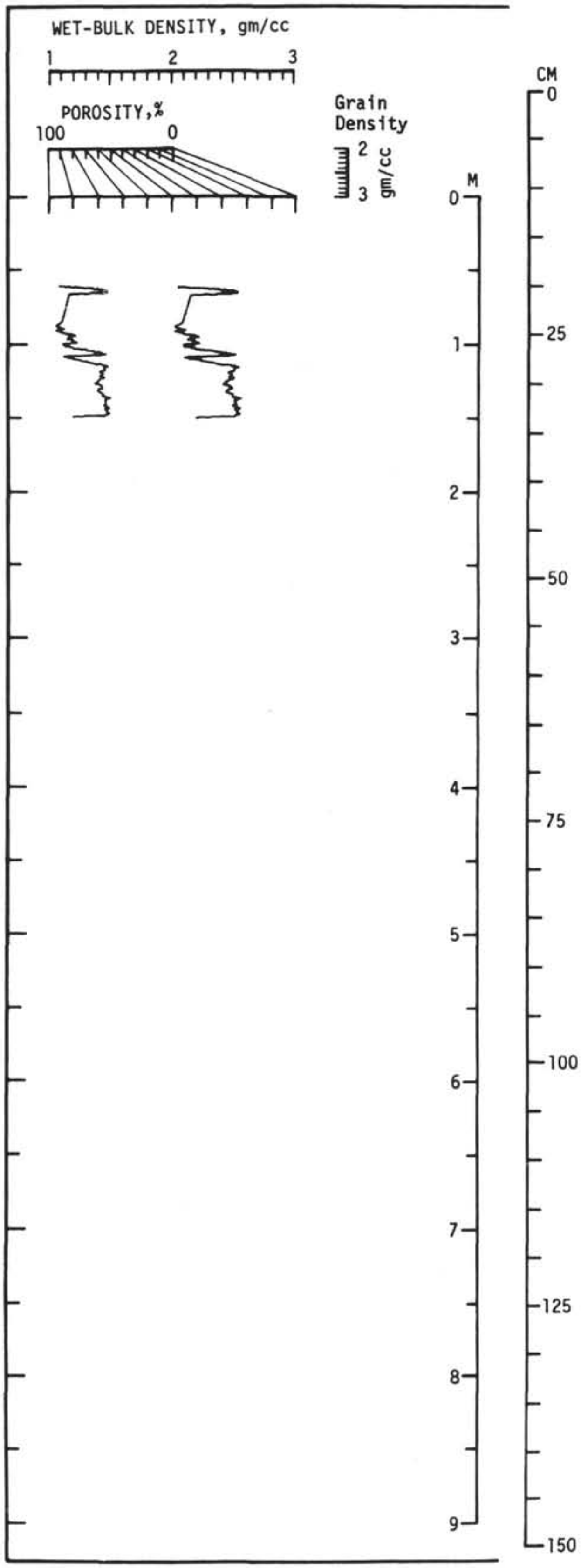

CM
0
25
50
75
100
125
150
94-24-1
94-24-2
94-24-3
94-24-4



94-25-1 94-25-2 94-25-3

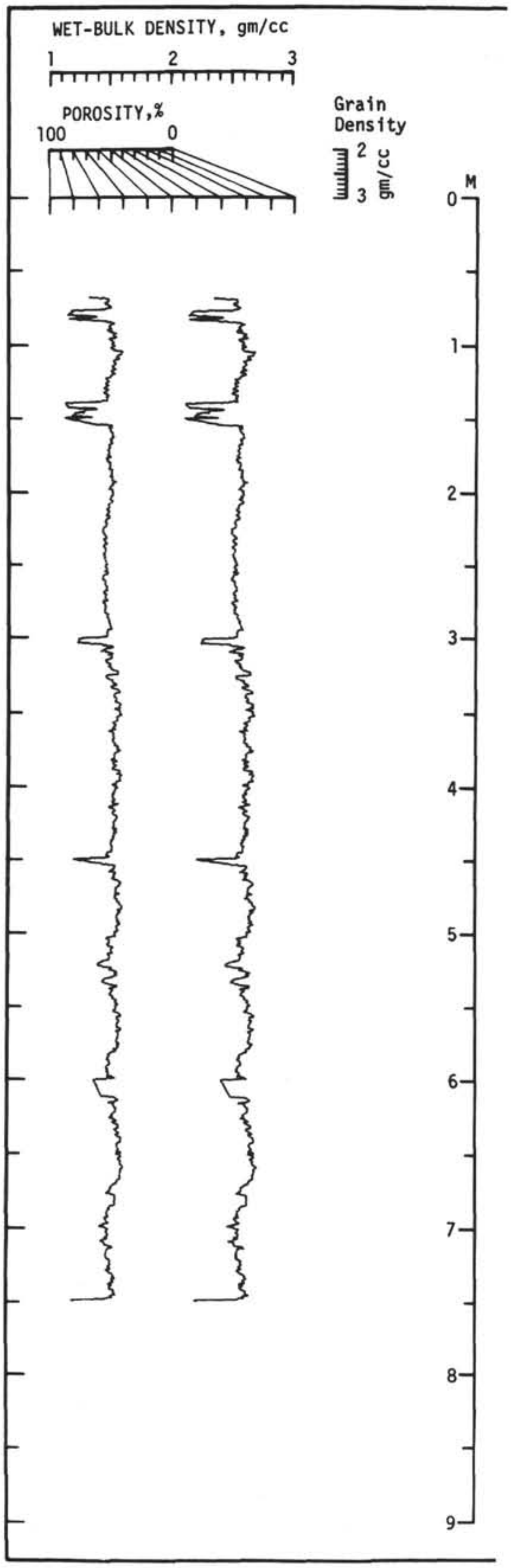


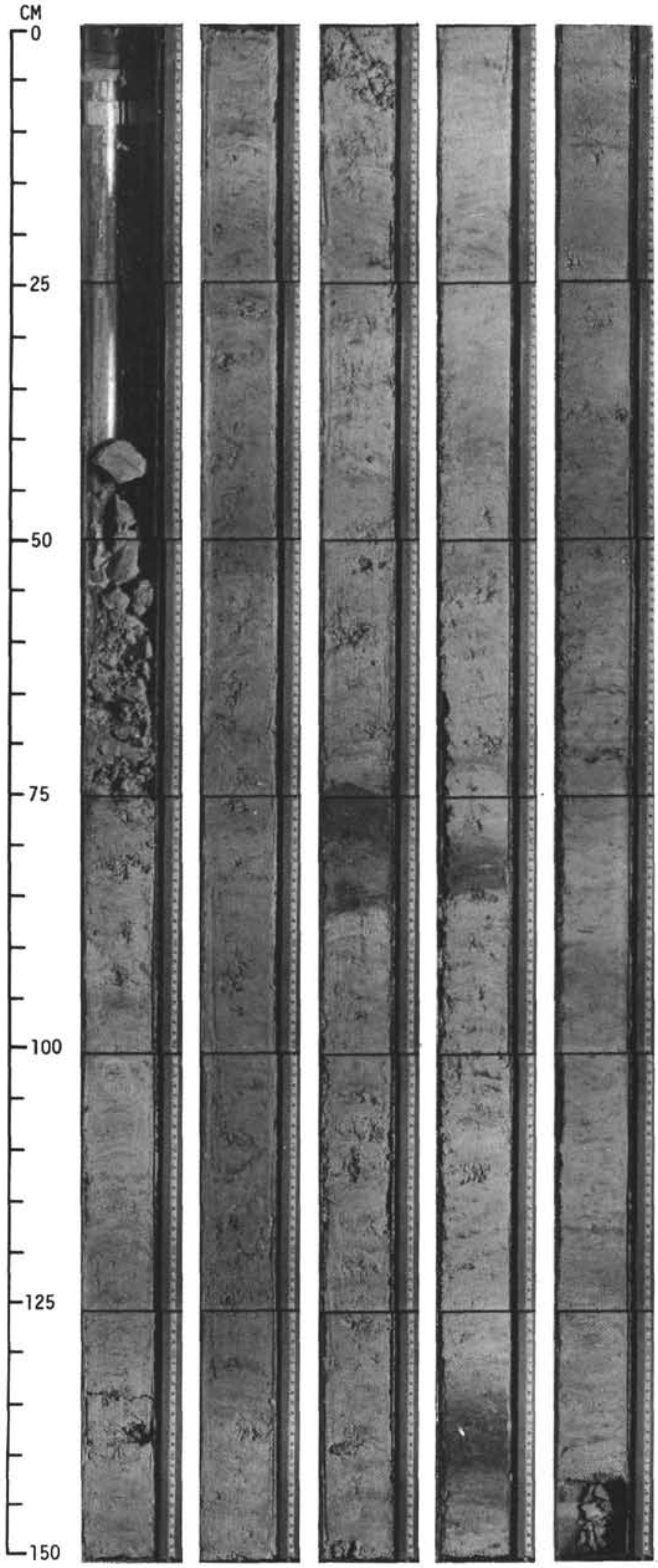
94-26-1 94-26-2 94-26-3 94-26-4 94-26-5



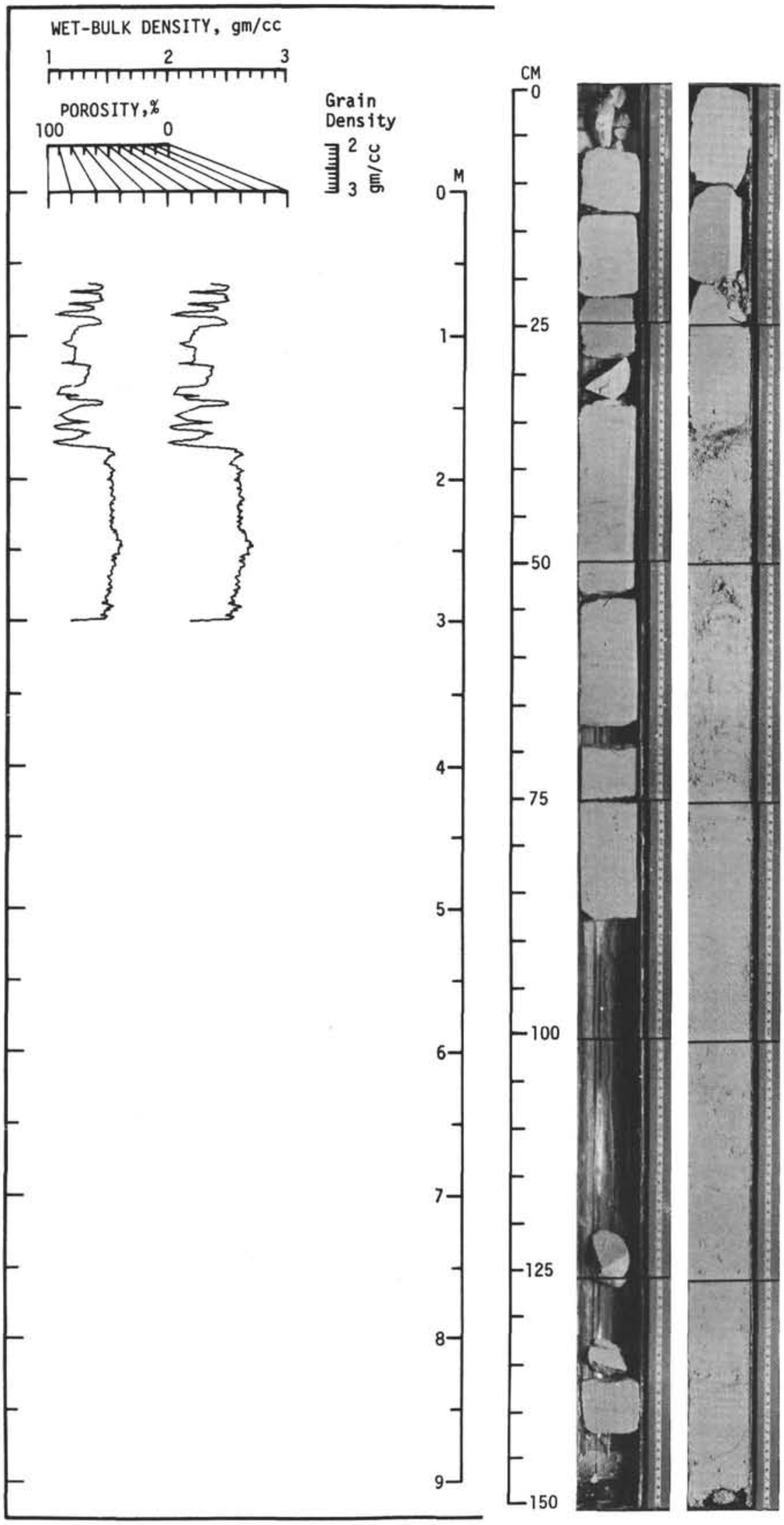
NO PHOTOGRAPH AVAILABLE

94-27

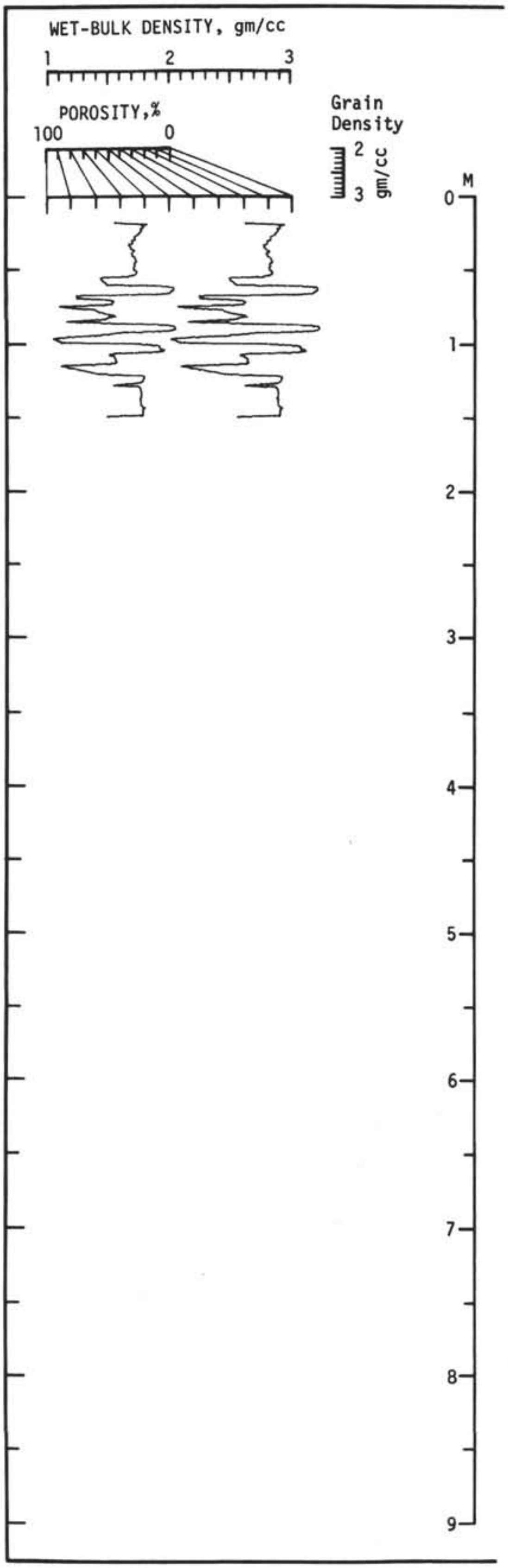


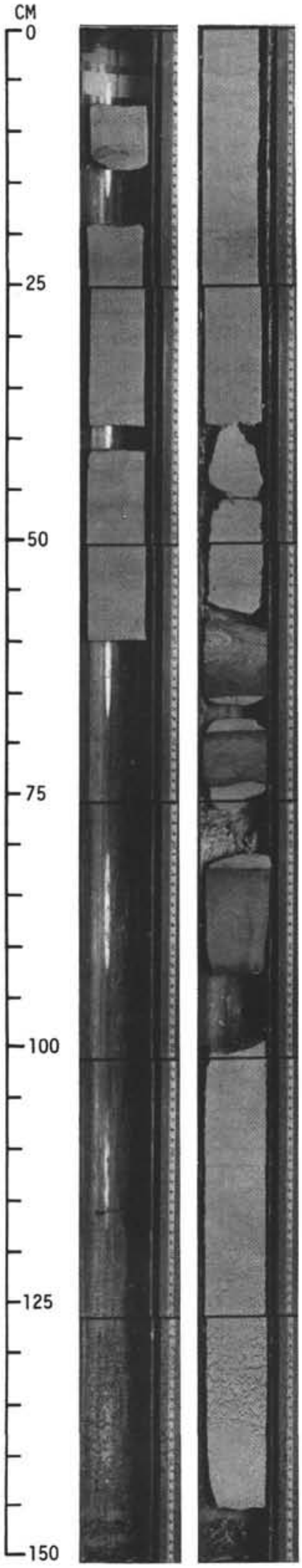


94-28-1 94-28-2 94-28-3 94-28-4 94-28-5

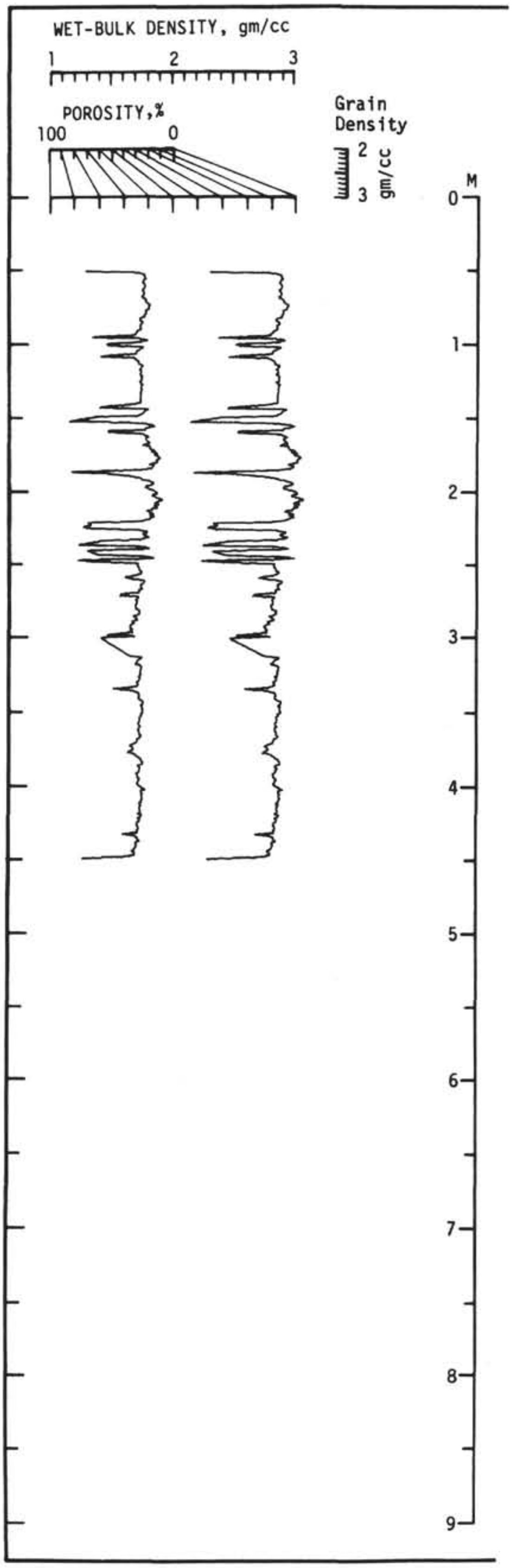

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150

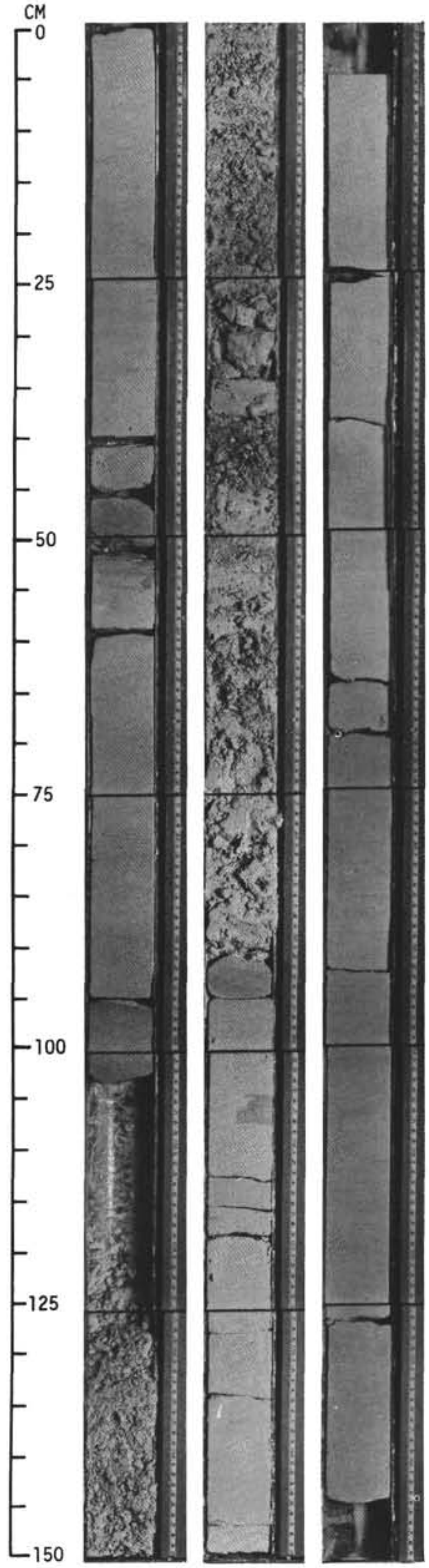
94-30-1 94-30-2


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain
Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

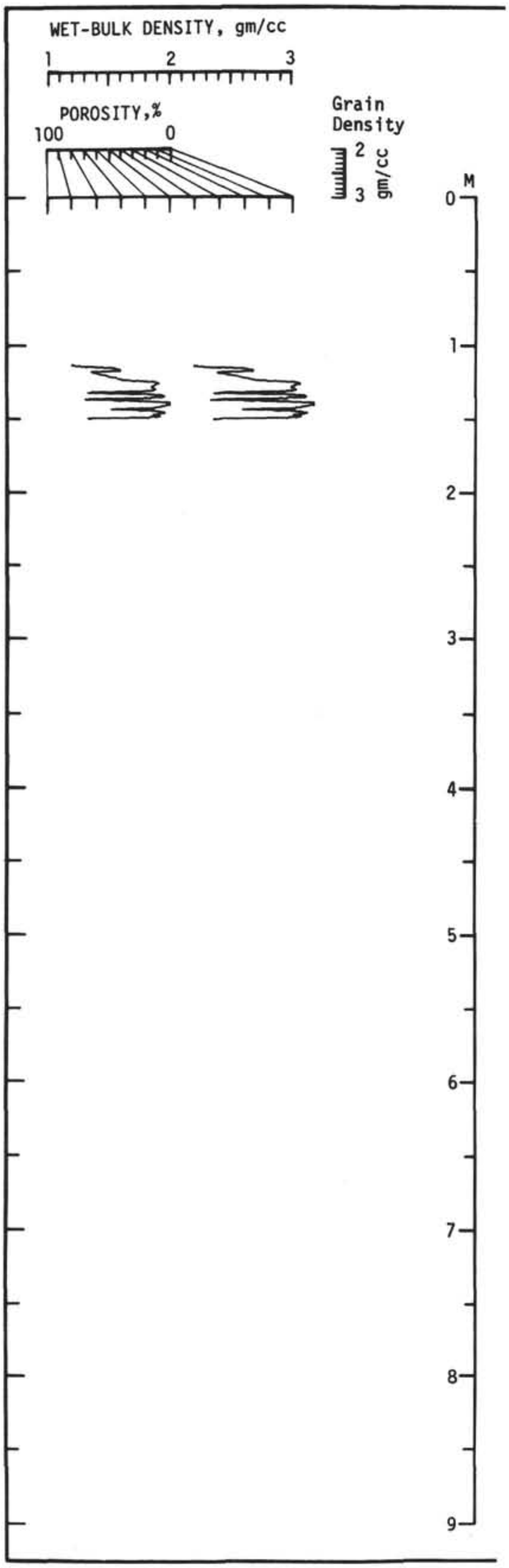

CM
0
25
50
75
100
125
150

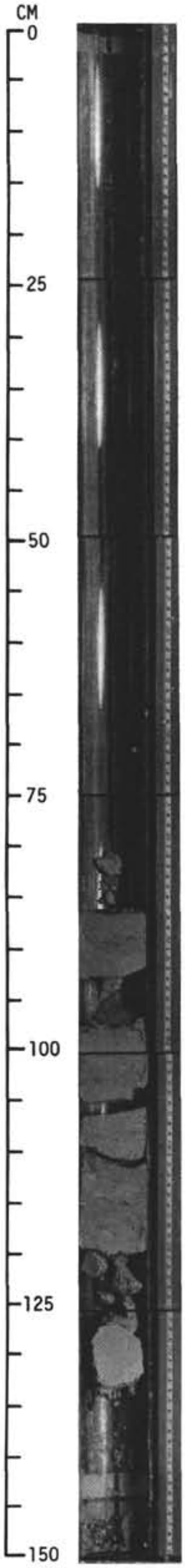
94-33-1 94-33-2



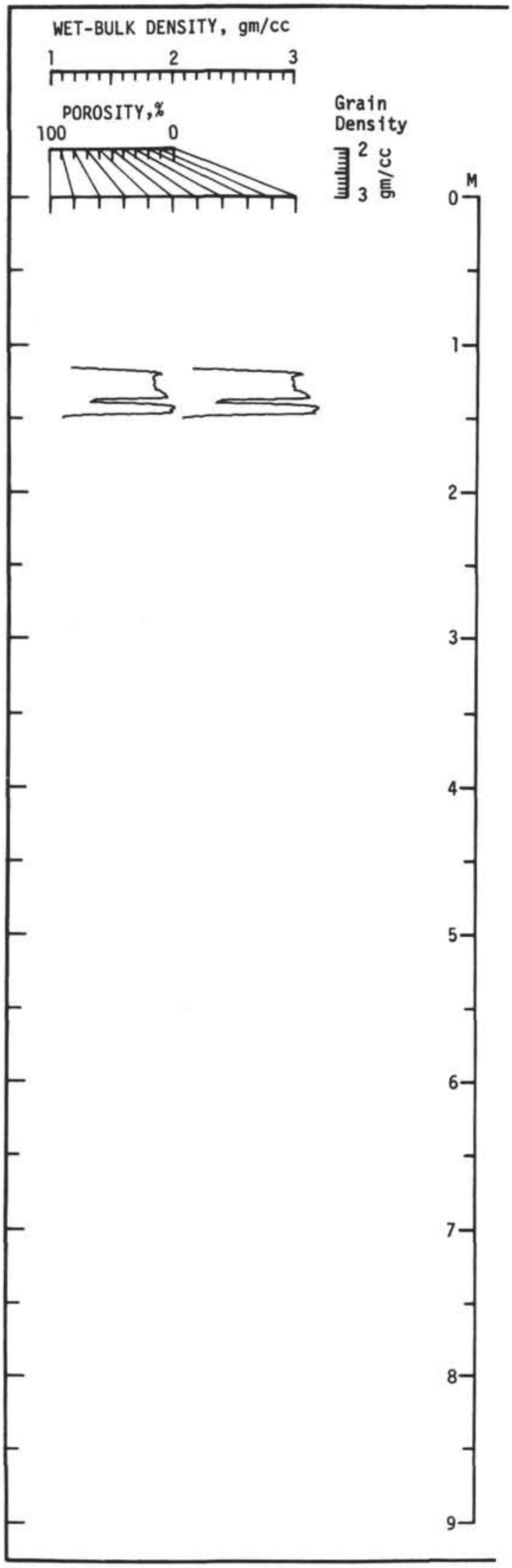


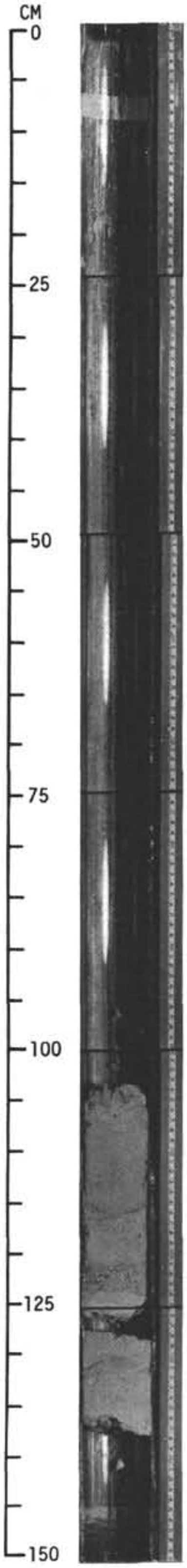
94-34-1 94-34-2 94-34-3


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

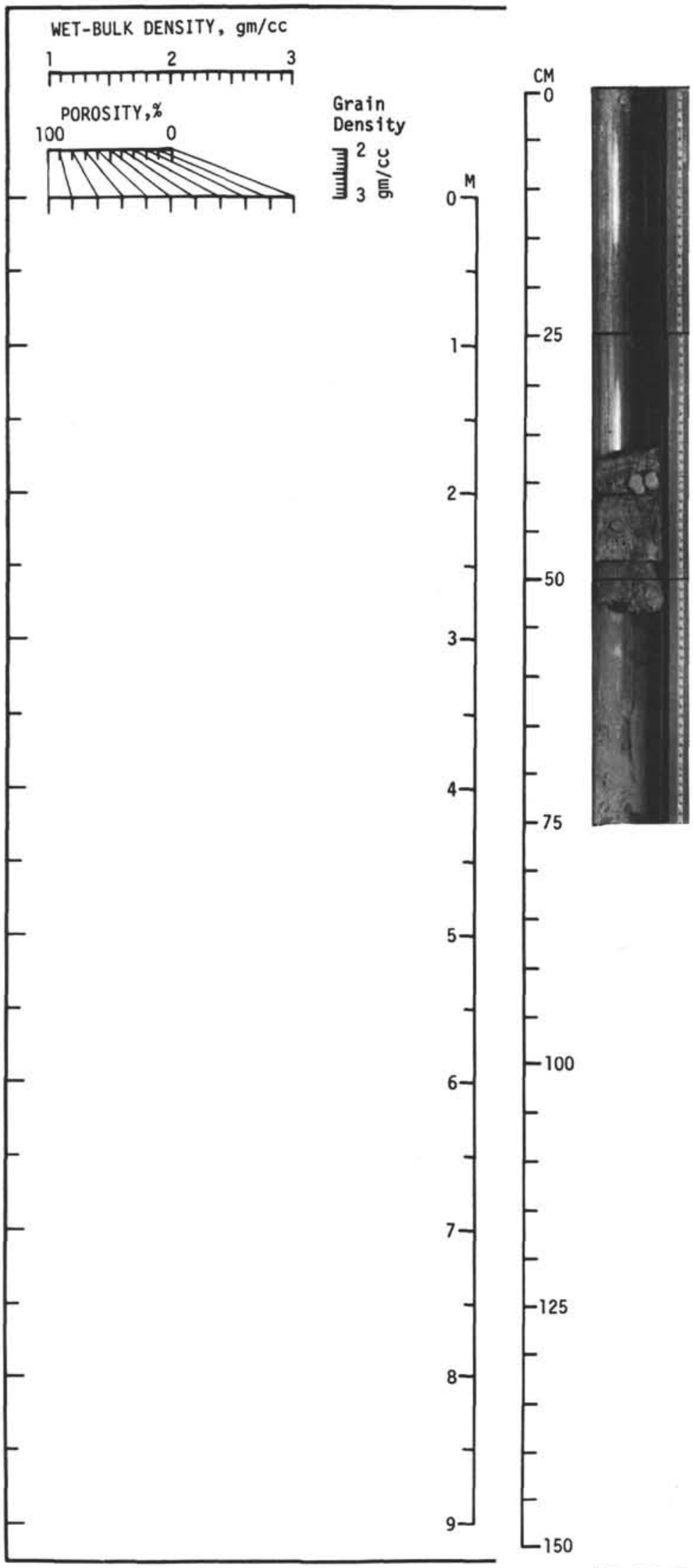

CM
0
25
50
75
100
125
150

94-35-1

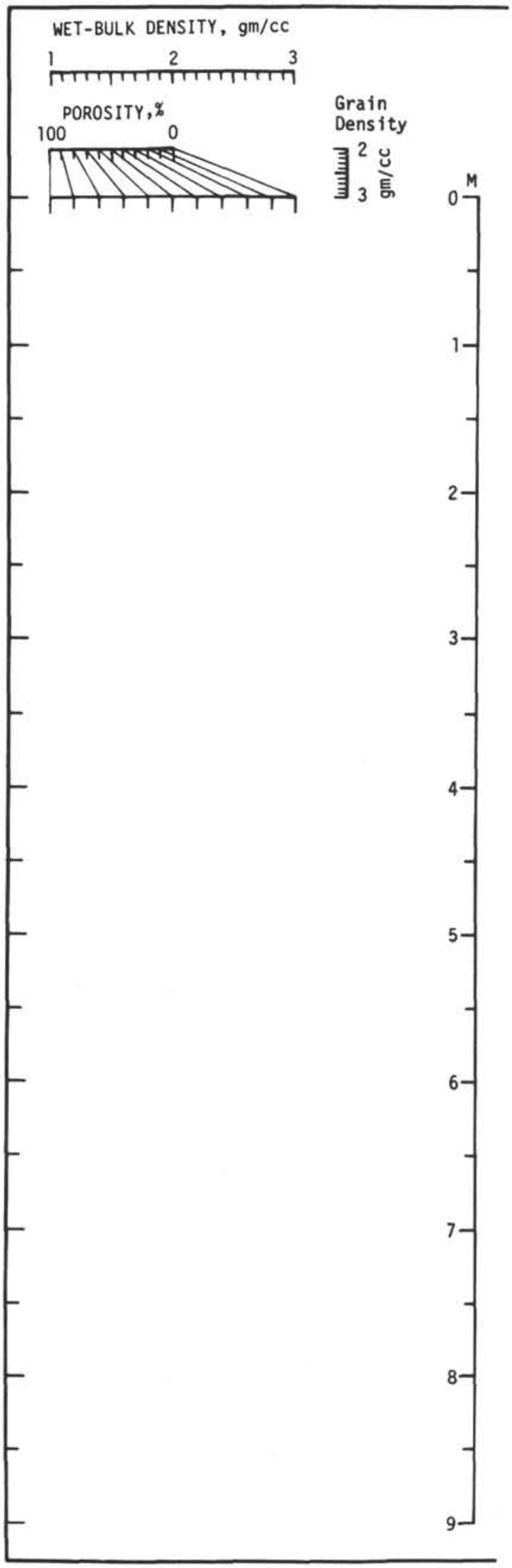

WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9

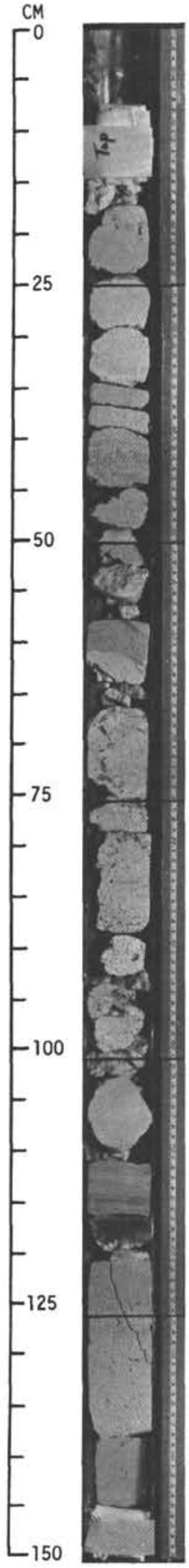

CM
0
25
50
75
100
125
150

94-36-1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9
CM
0
25
50
75
100
125
150

94-38-1


WET-BULK DENSITY, gm/cc
1
2
3
POROSITY,%
100
0
Grain Density
2
3
gm/cc
M
0
1
2
3
4
5
6
7
8
9


CM
0
25
50
75
100
125
150

94-39-1