ber of simple laboratory experiments. Samples of a bright red clay, a fine green glauconitic sand and a buff-colored clay were slaked down and layered in a glass-sided aquarium tank, two and one half, by three, by two feet in dimension. The buff clay was placed on the bottom, the green sand over that, and the red clay as the surface material. Mechanical analyses were made of the fine green sand and the buff clay, which gave median diameters of .129 mm for the sand and .062 mm for the clay. The red clay presented a problem in obtaining deflocculation of the finer particles; and as time was short, the median diameter was not determined. However, the texture appeared to approximate that of the buff clay. Cores were then taken in these layered sediments by plunging the instruments in by hand. The two types of instruments which are most commonly used were tested, a brass tube, one and one half inch in diameter, and a three quarter inch glass tube which is inserted in a metal pipe when in actual use. In every case observed the soft red clay surface material was found to have smeared the entire length of the outer surface of the core, which left only a part of this material in its original position at the upper surface of the core. The base of the green glauconite layer showed a sharp, clean-cut contact, while the top of this green glauconite layer presented a zone of contamination from one half to one inch wide in which the red clay was mixed with green glauconite grains.

The second phase of the problem, the compaction which results from the instrument plunging into the sediments, was studied by actually obtaining core samples of the numerous types of bottom materials present in the vicinity of Woods Hole and Massachusetts Bay. The outer surface of the coring instrument was carefully cleaned and coated with shellac before each core was taken. In that manner the exact depth of penetration of the instrument could be determined as particles of the sediment clung fast to the sticky shellac. The length of the core was determined before removing it from the instrument, and the amount of compaction could then be calculated. The figures given below in Table I are averages of not

TABLE I

ILLUSTRATING THE COMPACTION TAKING PLACE DURING CORE SAMPLING. PENETRATION WAS DETERMINED BY SHELLACKING OUTER SURFACE OF CORING INSTRUMENT

Character of bottom	Penetration	Length of core	Compaction
Soft mud over sand	5′ 11.25″	3′ 2.85″	2′ 8.4″
Soft mud	6′ 8.6″	3′ 2.4″	3′ 6.2″
Soft mud (Lowering tube slowly)	4′ 1.3″	1′ 10.6″	2′ 2.7″
Sand bottom	1′ 8.1″	1′ 1.6″	6.5″
Sandy silt	2′ 9″	1′ 5″	1′ 4″

less than six cores taken in each type of material. The fact that the relative depth of penetration and the length of core remained constant in a particular type of sediment indicated that a true picture of the compaction taking place was obtained.

CONCLUSIONS

The results obtained from the experiments on contamination suggest three points which should be observed when taking samples from a core.

(1) The outer surface of the core should be eliminated from the sample. This may be done by simply drying the core and scraping off the outer surface or slicing the core lengthwise and removing the sample from the center.

(2) The presence of the zone of contamination between the layers of fine sand and the red clay indicated the possibility of contamination at the contact of two sediments of varying texture. Taking samples close to such a contact should be avoided.

(3) If the surface material is of fine texture any analyses such as a mechanical analysis of the material being deposited under present-day conditions or the determination of the food value for sea life in the material at the bottom of the sea could not be done accurately by analyzing the material at the top of such a core sample. The surface material would be smeared down the length of the core and compacted.

From the figures given above it is clear that the vertical extent of material being dealt with in a core is much greater than the apparent extent shown by the length of the core itself. The exact extent, however, can not yet be shown; as it seems reasonable to believe that the material say two feet below the surface will compact less than the material at the surface as the instrument penetrates it. Thus, the true vertical extent of the material dealt with could be determined only after a curve showing the decrease of compaction taking place in a coring tube with depth has been established.

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