ites, this tetragonal mullite-like phase falls within the range of the 'iron free synthetic mullite' designated by Agrell and Smith[4]. When plotted in the diagram a/b versus c/b, this phase falls on the linear extrapolation of the line representing the 'iron free synthetic mullite'. There is no indication that this phase has any similar evidence to sillimanite.

All the evidence appears to indicate that this new phase has a very close similarity to mullite in crystal structure.

This communication reports work from Morimoto's Laboratory of this Institute. A detailed account is now in preparation.

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[1] Ossaka, J., *Advances in Clay Science*, Proc. Second Ann. Meeting on Clay and Clay Minerals, 337 (1960).
[2] Demeduk T., and Cole, W. F., *Nature*, **181**, 1400 (1958).
[3] Scholze, H., *Ber. D.K.G.*, **32**, 381 (1955).
[4] Agrell, S. O., and Smith, J. V., *J. Amer. Ceramic Soc.*, **43**, 69 (1960).

GEOLOGY

Two Unexplored Records of Quaternary History

During the last glaciation, world sea-level is generally thought to have been about 330 ft. (100 m.) below that of to-day. The rate of recovery for the last 200 ft. has been obtained from the (radiocarbon) age of peat beds and beach deposits which were covered successively by the rising sea[1]. Search for material to date the preceding 130 ft. could be made, quite reasonably, in a region of tectonic stability such as south-west England. The existing estuaries are too shallow to carry suitable material, but there are good prospects in the ground between the south coast of Ireland and the north coast of Cornwall. Here there is a hollow, the floor of which is 420 ft. below present sea-level, cut off from water of comparable depth, some 20 miles distant, by a sill the greatest depth of which is 330 ft. below present sea-level. Mitchell[2] considers that this sill and two others at a higher level in the Irish Sea are moraines, and this is supported by what is known of the composition of the sea-floor. Material from mud to stones is common. Pleistocene erratics certainly occur on the floor of the Irish Sea[3,4], and the height of the middle sill is far less than the thickness of the uncompacted materials, revealed by a seismic refraction station nearby[5].

If the southernmost sill is of Gipping age as Mitchell suggests, then it is likely that the hollow behind it was a freshwater lake during the last glaciation, during which the ice did not reach farther south than the two presumed moraines in the Irish Sea. The deepest sill was certainly land at some time for its surface is cut by two channels.

The proving of lake deposits could show that the sea had dropped below the level of the sill during the Pleistocene. The finding of a sequence of lake deposits or of peat should reveal when the sea-level rose to -330 ft. Similar deposits in the Irish Sea could reveal when the sea-level rose to -270 ft.

The two hollows are the sites of contemporary deposition of mud and sand, by the tidal currents, so that older materials will have been protected from erosion, at least locally, since they were covered by the sea. Search for the older materials will give a chance to assess the amount of recent deposition and therefore the importance of the supply paths that have been proposed[6].

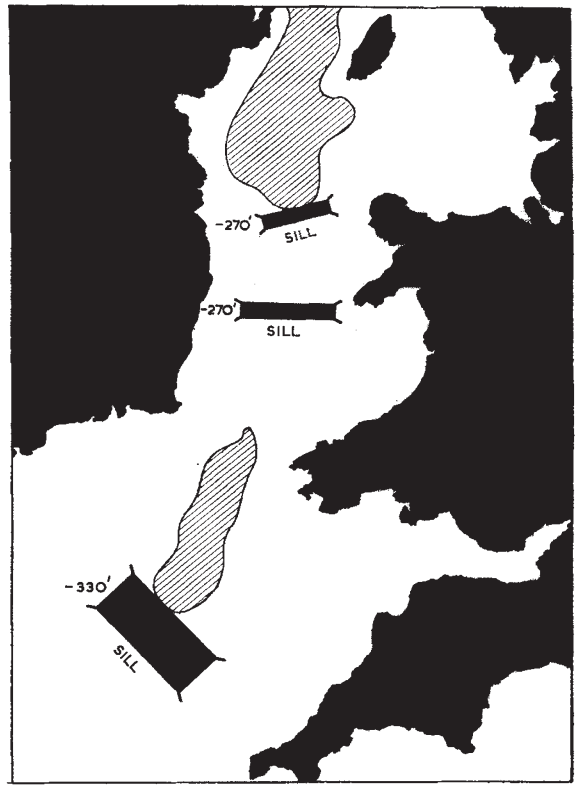

Fig. 1. The sills (? moraines) behind which freshwater lakes (diagonal shading) were probably in existence during the late Pleistocene

Examination of the northern hollow by means of the echo-sounder on R.R.S. *Discovery II* showed that there is up to 90 ft., of what experience shows can be interpreted as uncompacted material, lying partly on a rock floor. Sixty feet was proved by the same equipment in the southern hollow while a high-power, low-frequency echo-sounder, the 'Thumper', showed that the layer was underlain by other materials with a total thickness of 360 ft. (uncorrected for the velocity of sound in the material).

Further exploration is planned for the coming year, but it is anticipated that effective sampling of such sequences of deposits calls for ship-borne rotary drilling equipment of the type already used so successfully in deep water. Although such a technique is beyond the financial resources of the National Institute of Oceanography, it is hoped that the potential value of this suggested line of research will find wider support elsewhere.

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[1] Godwin, H., *Proc. Roy. Soc.*, B, **153**, 287 (1961).
[2] Mitchell, G. F., *Adv. Sci.*, **17**, 68, 313 (1960).
[3] Herdman, W. A., and Lomas, J., *Proc. Liverpool Geol. Soc.*, **8**, 205 (1898).
[4] Berthois, L., *Rev. Trav. Inst. Pêches marit.*, **21**, 488 (1957).
[5] Hill, M. N., *Quart. J. Geol. Soc., Lond.*, **111**, 393 (1956); and personal communication.
[6] Stride, A. H., *Dock and Harb. Author.*, **40**, 145 (1959).