

XIII. ROCKS FROM GUYOTS OF THE CHRISTMAS RIDGE

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Some rock samples dredged from three stations on unnamed guyots of the Christmas Ridge were examined under the microscope, and the results are shown in Table XIII-1.

Collected samples were cut in the laboratory by diamond cutter and some of the chips were used for the preparation of thin sections. To make slices, the ordinary method was used for fresh samples, and altered or loose samples were solidified by using cyano or lakeside cement before grinding.

Results

The *olivine basalts* at Sts. 112 and 113 are coated with a thin film of manganese oxides and are black-brown to black-gray in color. Under the microscope, olivine, plagioclase and augite occur as phenocrysts. Olivine occurs as euhedral crystals up to 0.5–1 mm in diameter and is yellow to reddish-brown in colour. Cleavages are imperfectly developed and partial alteration to chlorite along the cleavage or fracture planes (Fig. XIII-1). Plagioclase is lath-shaped (up to 2.6 mm in length), showing albite, Carlsbad and minor pericline twinning. Clinopyroxene is euhedral to subhedral in habit, and not as abundant as olivine.

The ground-mass consists of lath-shaped plagioclase, clinopyroxene, olivine, magnetite and chlorite. Plagioclase and mafic minerals are partially altered to chlorite.

According to the results of DSDP Leg 17 (Site 165), the basaltic flows are buried and interbedded with volcanic turbidite lying on basaltic basement, in deeper zone beneath the ocean bottom in the western adjacent area to the guyots chain from which the samples studied were obtained. The age of the oldest sediments between the basalt flows is in the range of about 75–84m.y. (The Shipboard Scientific Party, 1973). The present basalt samples may represent those of basement, and so their age is expected to be older than that mentioned above. The detailed results of age determination on the basalts dredged will be reported elsewhere in near future by K. Saito.

The *phosphorite* at St. 111 is pale yellowish brown in colour. Thin section study indicates that the marine phosphorite consists of collophane with detritus of plagioclase and negligible amounts of calcite. Basalt fragments are included and are more altered than

Table XIII-1 Rocks dredged from the guyots of the Christmas Ridge.

St. no.	Situation	Results
St. 111	Upper slope of guyot unnamed	Rock fragments of phosphorite coated with manganese oxide, 5 cm in thickness.
St. 112	Upper slope of guyot unnamed	Oceanic basalts. Fragments of chert. Tuffaceous mudstone; pale yellow gray, platy with burrow. Pumice.
St. 113	Upper slope of guyot unnamed	Rounded fragments of oceanic basalt. Foraminiferal sandstone. Pumice.



Fig. XIII-1 Olivine basalt under microscope.

the host rocks. Although foraminifera and organic debris are recognizable in the phosphorite, they are rarely preserved in their original form.

Fragments of light green, dull-lustered *chert* were dredged from St. 112. Under the microscope, the matrix of the chert appears essentially isotropic and may be largely composed of opaline silica or cristobalite. Well-preserved planktonic foraminifera are numerous found in the rock, generally partly or wholly pseudomorphed by chalcedonic quartz.

In referring the DSDP results, the above-cited chert and the burrowed tuffaceous mudstone from St. 112 may represent the eastern prolongation of early Eocene chert and Cretaceous rock, respectively, recognized at DSDP St. 165 on the eastern extremity of the oceanic basin of the surveyed area.

Reference

The Shipboard Scientific Party (1973): Site 165. p. 47-102, *In* Winterer, E. L., Ewing, J. I., et al., *Initial Reports of the Deep Sea Drilling Project*, vol. 17. Washington (U.S. Government Printing Office), xx+930p.