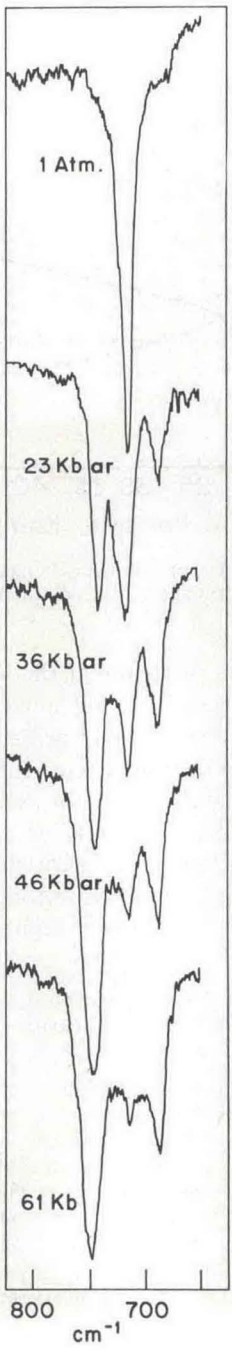

FIG. 1. High Pressure Changes of the ν_4 Fundamental in Calcite.

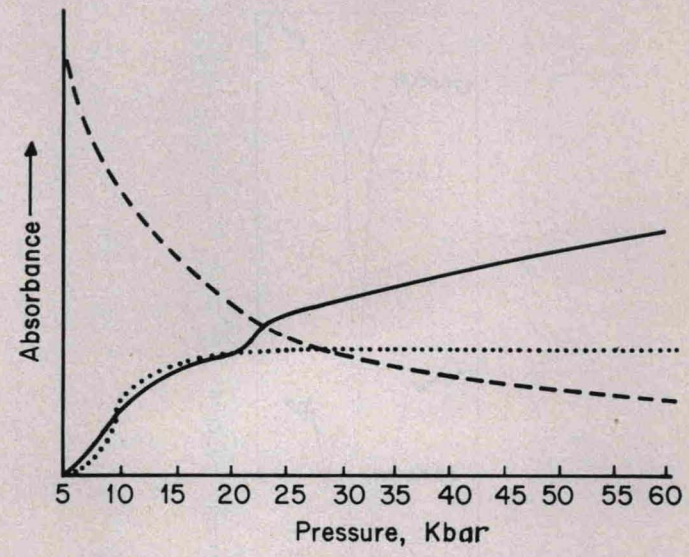

FIG. 2. Relative Intensity Changes in the v_4 Fundamental as a Function of Pressure [– – –, 715 cm^{-1}; . . . , 690 cm^{-1}; — 740 cm^{-1}.

repulsion of oxygen atoms in the plane of the ion resulting from both a decrease in the carbon-oxygen bond distance and intraionic bonding with calcium as a function of increasing pressure. The new polymorph exhibits infrared bands having frequencies similar to those of known "vaterite-type" polymorphs (Table 1); the X-ray powder pattern also confirms the existence of a "vaterite-type" structure (Table 2). The repulsive force explanation is consistent with Weir and Lippincott's interpretation of the calcium carbonate vaterite spectrum. The theory of intraionic bonding of oxygen and calcium supplies the mechanism neces-

TABLE 1. KNOWN VATERITES AS COMPARED TO THE HIGH PRESSURE (61 kbar) POLYMORPH

	Sterzel and Chorinsky (1968)	Weir and Lippincott (1961)	This work, synthetic	This work, calcite at 61 kbar
v_1	1089	1090	1089	1100
v_2	877	850–878	877	878
v_3	1450	1450	1450	N.A.
v_4	744	741–747	746 (715)	747 (715) (690)

Frequencies in parentheses are believed to be due to calcite and/or aragonite.
N.A. = not available.