Introduction

Many of the nitrates show extensive polymorphism (BRIDGMAN, 1916) and two of these, KNO_3 and $NaNO_3$, are of special interest because of their structural similarities to the carbonates. It was the prime concern in this study to check the previous results of JAMIESON (1956) on KNO_3 IV and to establish the cell type and structure, if possible. This effort seems warranted by the recent discovery of a high-pressure pattern of calcite (phase III) in this laboratory.

JAMIESON (1956) has previously obtained high-pressure x-ray data on KNO_3 IV by use of a single-crystal diamond bomb designed by LAWSON and TANG (1950). Jamieson did not undertake to index his lines by any general technique, evidently because his accuracy did not warrant it, but rather he sought out likely comparisons and found a reasonable fit of his data to the $RbNO_3$-type structure (PAULING and SHERMAN, 1932). Our results have been obtained by way of a more general attack, making use of conventional indexing techniques.

Apparatus and procedure

A detailed description of the apparatus has been presented elsewhere (ADAMS and DAVIS, unpublished). Only a brief explanation and sketches are included here. Fig. 1*A* illustrates schematically a modified Bridgman anvil device, or "squeezer" (BRIDGMAN, 1935). Between upper and lower carboloy anvils is placed a beryllium pellet ranging from 1 to 4 mm in thickness (depending on the pressure to be applied and duration of the experiment). The sample, consisting of a thin pellet, or film, lies beneath the beryllium, the latter acting as the window as well as pressure medium. The field of the figure is but an enlarged part of the anvils which are supported in a six-inch press. The press is mounted on a spindle for insertion into a goniometer axis.

Figure 1*B* is a sketch of a simplified supported pressure vessel. In our most recent vessels the bottom is detachable to allow better sample removal. Slots through the steel supporting casing (see inset) allow the x-ray beam to pass through the beryllium cylinder and beryllium-powder pressure medium above the sample. The diffracted beam has a similar path to the scintillation counter. Several sizes of pistons and cylinder bores are currently in use in our most recent vessel; removable, steel-encased inserts are unscrewed from the main steel support and thus allow work with different sample sizes, pressure ranges, and piston types.

The entire pressure vessel stands less than two inches high and is about $1\frac{1}{2}$ inches in diameter. Like the "squeezer" apparatus it is mounted in a 6-inch press which fits into a goniometer.

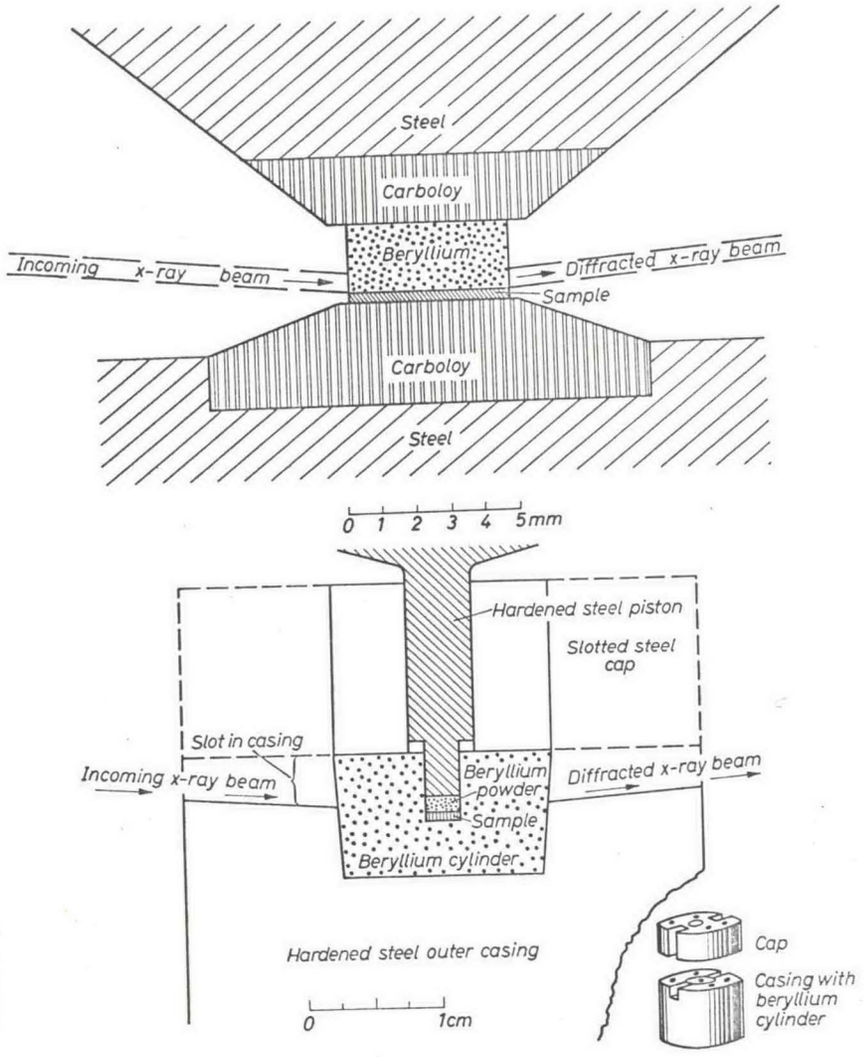

Fig. 1. *A*. Highly magnified sketch of modified Bridgman anvil device; *B*. Supported beryllium pressure vessel including cap and piston

Other essential equipment consists of a Philips x-ray diffraction unit, goniometer, counting panel and Brown recorder. The pressure is produced by a Blackhawk pump with a pressure hose leading to a