of the tube as well as mixing of the sample and flux in the bulb during ignition.

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A DIAMOND DRILL FOR CORING MINERAL SAMPLES IN THE LABORATORY

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During a current study of apatite mineralogy a large crystal was grid sampled on a basal section. Small core samples were obtained at over 100 points on a surface 11 × 14 cms. with a small coring diamond drill bit, made to specifications by J. K. Smit and Sons, 81 Tycos Drive, Toronto. The ease with which core sections were made suggests the technique will be of general value in cases where a small quantity of a rock or mineral is required for mineralogical examination or chemical analysis.

The drill bit used was 5.2 mm. in outside diameter and 3.4 mm. inside diameter, and will give a core length of approximately 1.5 cms. in one operation. Core lengths used in the present study were generally less than this, being of the order of 0.5 to 1.0 cm. (Fig. 1). The diamonds are set in a tungsten alloy matrix, and bit wear is negligible with a relatively soft mineral such as apatite.

Initially the drill bit was set in the chuck of a drill press, and water was poured over the bit to act as a coolant and wash away cuttings. This was found to be unsatisfactory since the cuttings block the inside of the bit. J. K. Smit and Sons then supplied a water swivel which fits between the

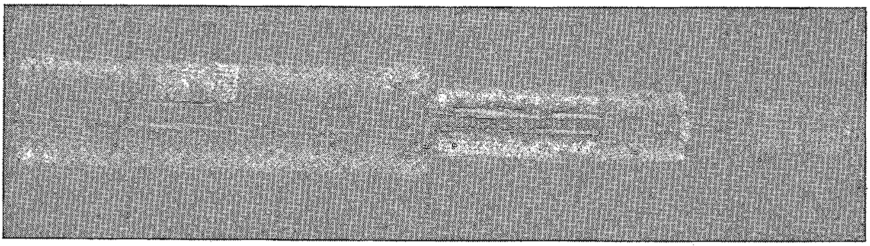

FIG. 1. Drill-bit with a piece of apatite core about 8 mm long.

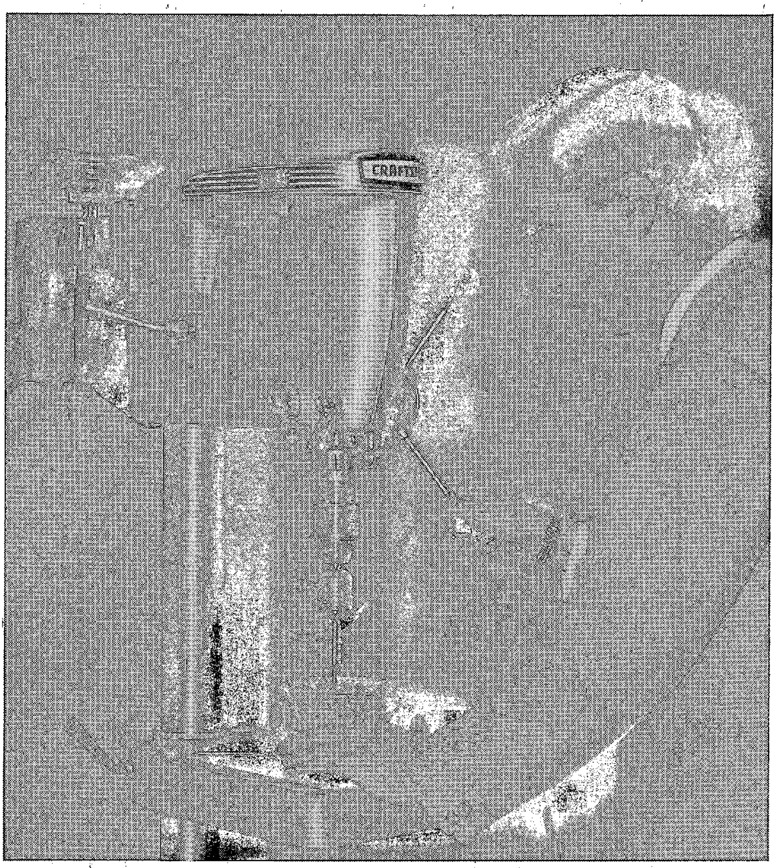

FIG. 2. The drill-bit assembled for operation. The crystal to be drilled is mounted in plastic.

drill press chuck and the bit, and enables water to flow down through the inside of the bit and wash out the cuttings (Fig. 2). The operation is similar to that used in a large diamond drill, of the type used for evaluating ore deposits. Excellent core sections can be obtained using the water swivel. Experience shows the water flow should be gentle, and can be supplied from a gravity-feed bottle or from a water main with the tap barely open.

Care must be taken to ensure that the bit and swivel are accurately centred in the axis of rotation of the chuck, and the sample must be clamped securely to minimize vibration. Mounting the rock or mineral in polylite cold plastic is recommended if a large number of cores are required from one specimen. Pressure should be gentle during drilling and with a little experience the "feel" of the cutting edge can be used to adjust the downward pressure for a high core recovery. The core may be left in the hole and taken out with tweezers, but it is probably easier to "dry-block," by cutting off the water supply momentarily. A pad of cuttings then forms at the base of the bit and the core can be lifted out.

Advantages of this technique over the dentist's or non-coring drill often used in geological laboratories are: (*i*) speed of operation; (*ii*) contamination is reduced to a minimum as the cuttings and bit particles are rapidly washed away; (*iii*) the sample obtained is in a form more suitable for microscopic examination prior to *x*-ray or chemical analysis; (*iv*) closer control of the sampling is maintained, and a larger volume of sample is obtained.

The results suggest a smaller diameter bit could be used if necessary. The technique was also tried on samples of feldspar, quartz, and beryl with good results. The cost of the apparatus, excluding the drill press, was less than $100.

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CUPROSKLODOWSKITE, KASOLITE AND SCHOEPITE FROM GREAT BEAR LAKE, NORTHWEST TERRITORIES, CANADA

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Cuprosklodowskite, kasolite, and schoepite are identified on pitchblende from Great Bear Lake, Northwest Territories, Canada, by *x*-ray diffraction powder patterns. All of the specimens studied were collected during the first few years after the original discovery.