

## LAMELLAR CALCITE

ALTHO the mineral calcite commonly occurs in rhombohedral crystals, it may also appear in thin-tabular or lamellar masses, to which the terms aphrite, argentine, paper spar, silvery chalk, slate spar, etc., have been applied by various authors. Crystal habit is in general controlled by external conditions, such as temperature, pressure, and in particular the presence of foreign substances in the solutions from which the crystals grow. What causes calcite to assume a lamellar habit is at present unknown, but observations as to the conditions under which this form of mineral occurs in nature should throw considerable light upon the question, and it has accordingly been decided to hold in these pages a sort of symposium upon this subject. This is here opened with a paper by Mr. Hawkins on certain of the occurrences in Rhode Island. In a future number of the magazine a Pennsylvania occurrence will be described by Mr. Gordon. Contributions on this subject are invited from our readers. If you have a specimen of lamellar calcite in your collection, tell us with what minerals it is associated, whether it appears to be a primary or a secondary mineral, or anything else that may throw any light on its origin.

THE EDITORS.

### THE OCCURRENCE OF LAMELLAR CALCITE IN RHODE ISLAND

ALFRED C. HAWKINS, *Brown University*

A careful survey of Rhode Island geology shows the presence of quartz veins in a wide variety of locations thruout the state, cutting practically all other rocks known to be exposed. Many of these veins carry some feldspar, or are closely associated with pegmatite dikes, showing that they were probably formed in connection with the intrusion of one or the other of the numerous granite masses of this region. Some carry hornblende, others epidote (where the veins cut thru basic rocks), still others galena, sphalerite, pyrite, pyrrhotite, chalcopyrite, and fluorite. But more common than any of these is calcite, occurring in quartz as an integral part of the vein, and often in large amount. Many of the largest quartz veins exposed, such as those near Woon-

socket and at Durfee Hill, Gloucester, carry several per cent of their volume of calcite. That the calcite existed originally in the vein in this form is not certain, but the introduction of calcium in connection with the introduction of the granite seems very probable, for calcium silicates, such as scapolite, and the phosphate, apatite, occur in pneumatolytic zones near granite in western Rhode Island. This scapolite at least is probably indicative of high temperature at the time of the formation of the veins.

Lamellar calcite has been found in at least two localities in Rhode Island. At Cumberland many specimens have been found, but their relations to the surroundings are not at present determinable. The calcite probably occurred along or near a contact of granite with the green schist. A second locality, however, is now accessible. At Hamilton, in a small outcrop along the trolley line, a narrow dike of granite cuts thru Carboniferous shales. On the border of the granite the writer has found tiny bright quartz crystals and rosettes of chlorite, embedded in a mass of pearly white plates of calcite.

This calcite may well have been deposited from material in solution in the liquids emanating from the cooling granite. The quartz, which preceded it in time of formation, is complicated in crystalline structure, showing a tendency to exhibit small faces of the forms *s* and *x*. Of two quartz crystals collected close together, one is right-handed in development, the other left-handed. Such complexity of development of quartz is typical of pneumatolytic veins. A vein in green schist, evidently connected with granite in the immediate vicinity, at Centerdale, near Providence, has been found to contain quartz crystals, all of which showed rare forms. One crystal has a profusion of faces, and is twinned, being both right and left-handed in development.

From these observations the writer would conclude that the lamellar calcite was probably formed by the action of hot waters emanating from a granite magma, and accordingly that it is a high temperature mineral.