

A NEW OCCURRENCE OF LANSFORDITE FROM ATLIN, B. C.^a

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In 1915 Dr. G. A. Young of the Canadian Geological Survey, while making an examination of the hydromagnesite of Atlin,¹ collected some peculiar specimens of that mineral from a deposit located east of Atlin, figure 1. This deposit of hydromagnesite, which is the most southerly one, lies in a valley and has approximately one acre in area and from one to three feet in depth. According to Dr. Young the beds of that deposit are remarkably uniform in structure and composed of a fine powdery white hydromagnesite. The specimens of interest referred to above were

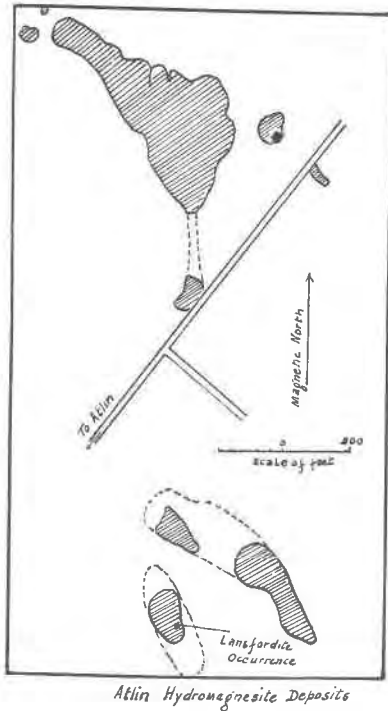


Fig. 1.

(a) Published by permission of the Director, Geological Survey, Canada.

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¹ Summary report of the Geological Survey, Department of Mines, pp. 50-61, 1915.

obtained towards the bottom of the beds where, in places, the hydromagnesite forms a porous rock traversed by irregular vein-like films of a glassy, crystalline substance which also occurs lining cavities. This crystalline mineral was examined by R. A. Johnston who suggested that it was a basic hydrous magnesium carbonate.

Recently at the suggestion of Dr. Young the writer undertook the examination of a few specimens which had been collected and carefully placed in proper containers by the late Dr. D. D. Cairnes, to prevent any possible alteration. These specimens consist of a porous, semi-indurated white powdery hydromagnesite, the cavities of which are lined with thin films of translucent lansfordite. These films of lansfordite do not exceed one millimeter in thickness and, as a rule, are thinner. Enough partial crystals were gathered for a chemical qualitative examination and for crystallographic work but it has been impossible to find sufficient unaltered lansfordite for a complete chemical study.

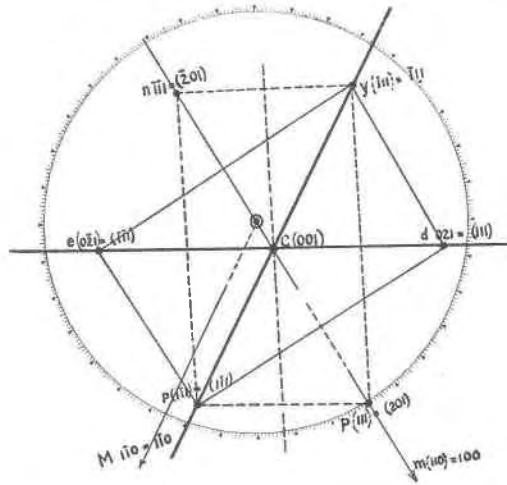


FIG. 2. GNOMONIC PROJECTION: *Dotted lines* showing lansfordite as a triclinic mineral (Penfield); *Heavy lines* showing lansfordite as a monoclinic mineral (Césaro and Poitevin).

CRYSTALLOGRAPHY OF LANSFORDITE. Measured on the two circle goniometer these very minute crystals were found to belong to the monoclinic system and at first were thought to be a new mineral. After a careful search of the literature dealing with basic

hydrous magnesium carbonates and upon studying the figures given for lansfordite in Goldschmidt's Winkeltabellen, I found that the polar distance given for the base of lansfordite was exactly the same as that obtained for the Atlin crystals. The principal forms of lansfordite as given by Goldschmidt were then plotted, and as seen from the accompanying gnomonic projection, Penfield's triclinic lansfordite can be assigned to the monoclinic symmetry by simply making his unit prism m (110) become a (100). The lansfordite crystals from Atlin are simple in habit and resemble the one figured in Dana's textbook with the possible exception that they are stouter, owing to a smaller development of the prism zone. Using the orientation suggested above, goniometer measurements of the Atlin crystals yielded the following forms (100); (010); (120); (111); (101); (102); (302); (011); (321); (323); and (001).

Since completing the above work the writer came across an interesting paper by G. Césaro² entitled "Forme cristalline et composition du carbonate magnésique hydraté préparé par M. Moressée. Sa relation avec la lansfordite." This synthetic mineral is referred to by Césaro as the Moressée carbonate. Crystals of the Moressée carbonate were measured by Césaro on the goniometer and were assigned to the monoclinic system. Moreover their interfacial angles are exactly the same as those obtained by Penfield for lansfordite. Césaro also makes the suggestion that lansfordite is monoclinic and that Penfield's notation (110) should become (100); that (111) should be (201) and so on as suggested above.

OPTICAL PROPERTIES OF LANSFORDITE FROM ATLIN. The axial plane is parallel to the orthopinacoid (100). The basal cleavage shows in convergent light a beautiful biaxial figure. The acute bisectrix is positive with a moderate axial angle. The indices of refraction, carefully measured on fresh translucent crystals, were found to be: $\alpha = 1.456 \pm 0.001$; $\beta = 1.468 \pm 0.001$; $\gamma = 1.507 \pm 0.001$. Thus the birefringence is strong ($\gamma - \alpha$) = .051 while ($\gamma - \beta$) = .039 and ($\beta - \alpha$) = .012. The axial angle was measured in sodium light and found to be $2V = 59^\circ 30'$ while $2V$ calculated from the above indices = $59^\circ 20'$.

OPTICAL PROPERTIES OF THE MORESSÉE CARBONATE. Césaro gives the following data: Axial plane || to $h' = (100)$; optically +;

²Bulletin de la Classe des Sciences Acad. Roy. de Belg., 1910, No. 4, pages 234-265.

$\beta = 1.470$. $2V$ measured $60^{\circ}37'$. The approximate birefringences are given as: $(\gamma - \alpha) = .051$; $(\gamma - \beta) = .038$; $(\beta - \alpha) = .013$.

Larsen³ gives the following figures for lansfordite but does not mention where the specimens examined came from. $\alpha = 1.46$; $\beta = 1.47$; $\gamma = 1.51$. $2V = 61^{\circ}$.

From the above notes there can be no doubt but that the Moressée carbonate is synthetic lansfordite.

CHEMICAL COMPOSITION OF LANSFORDITE. The Moressée carbonate or synthetic lansfordite which was ideal material for chemical work has been found by Césaro to have the following composition and formula.⁴

	PERCENT	RATIOS
MgO	22.80	0.570 = 1.00
CO ₂	25.43	0.578 = 1.01
H ₂ O	51.77	2.876 = 5.05

Formula, $\text{MgO} \cdot \text{CO}_2 \cdot 5\text{H}_2\text{O}$

According to Césaro it seems that Genth and Penfield must have analyzed a lansfordite partially altered in order to obtain 4MgO , 3CO_2 , $22\text{H}_2\text{O}$.

NOTES ON STILPNOMELANE

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In connection with a study of the biotites of Minnesota, specimens of a dark brownish-green platy and bladed mineral were collected from the Animikian iron formations. There is a good exposure in veins in the Genoa pit on the Mesabi range. A similar mineral is found on the Cuyuna range in veins and throughout the gray-green carbonate slates; and elsewhere in the amphibole-magnetite slates.

In the veins the mineral forms plates and fibers with comb structures. (See fig. 1). In most of the veins it is associated with quartz and carbonate. Some of the larger veins, however, contain coarse euhedral apatite and a few grains of specular hematite.

In the slates the mineral occurs in the form of radiating or plumose groups and in the more schistose phases, the plates and fibers tend to follow the schistosity of the rock. Many of the magnetite slates are conspicuously banded with green bands,

³ The Microscopic determination of the Nonopaque Minerals, p. 206.

⁴ Césaro, loc. cit., p. 252.