$\beta=1.470$. $2V$ measured 60°37′. The approximate birefringences are given as: $(\gamma-\alpha)=.051$; $(\gamma-\beta)=.038$; $(\beta-\alpha)=.013$.

Larsen[3] gives the following figures for lansfordite but does not mention where the specimens examined came from. $\alpha=1.46$; $\beta=1.47$; $\gamma=1.51$. $2V=61°$.

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_2O	51.77	2.876=5.05

Formula, $MgO.CO_2.5H_2O$

According to Césaro it seems that Genth and Penfield must have analyzed a lansfordite partially altered in order to obtain $4MgO$, $3CO_2$, $22H_2O$.

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,

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

[4] Césaro, loc. cit., p. 252.

consisting almost entirely of radiating fibers and plates of the micaceous mineral and quartz.[1] Along brecciated zones in the slates many of the fragments are covered by a thin velvety coating that is apparently this same dark green to olive green mineral.

The microscopic texture of many of the small veins indicates that much of the material in the veins was derived from fragments of the wall of the vein as the quartz crystallized. (See fig. 1). In others, however, the greenish-brown fibers that have crystallized in the fractures, are clearly precipitated from solution.

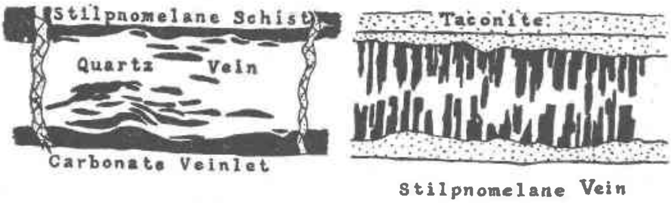

FIG. 1. Sketches showing the occurrence of stilpnomelane, (black) and quartz (white), in veins crossing stilpnomelane schist and taconite. Later carbonate veinlets cross the earlier vein. 2/3 Natural size.

The optical data resemble those for biotite; $2V$ very small, gamma $= 1.615 \pm 6$, alpha $= 1.546 \pm 4$. The indices, however, suggest a biotite with little iron, while the birefringence is that of a ferruginous biotite. A first analysis on carelessly separated material not only showed too much silica for biotite, but too little potash for a mixture of biotite and a little quartz; and the iron was too high for a biotite of the indices of refraction found. Carefully selected material was then crushed, and appeared under the microscope to be uniformly pure. The analysis, No. 2, is not that of a member of the biotite group. It resembles those of stilpnomelane, and chalcodite. Its higher potash and lower water are noteworthy, but the anlyses of stilpnomelane show so much variety that the identification is satisfactory. The specimens closely resemble museum specimens of stilpnomelane from Europe.

The occurrence of stilpnomelane elsewhere, (like that of the Minnesota mineral), is in veins in iron formations.[2] The development in wide-spreading slates in Minnesota, however, is somewhat

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[1] These green banded slates have no doubt been in some cases mistaken for green amphibole rocks. Harder, E. C., and Johnston, A. W., The geology of east central Minnesota: *Minn. Geol. Survey, Bull.* 15, 117 (1918).

[2] Shannon, E. V., *Proc. U. S. Nat'l. Museum*, **57**, 397, and **58**, 451, (1921).

different from the reported occurrence in altered diabase in eastern states. The green color is probably a sign of lack of much oxidation as suggested by Shannon. Its association in veins with apatite and specularite indicates that it forms at high temperatures and at considerable depth.

Analyses of Mineral from Veins on Mesabi Range

	1	1a	2	A	B	C	D
SiO_2	59.26	45.68	46.85	45.96	45.29	44.08	40.24
Al_2O_3	3.16	4.21	4.64	5.84	3.62	4.74	10.34
Fe_2O_3	8.99	11.99	11.60		20.47	5.27	24.57
FeO	14.65	19.53	20.00	35.60	16.47	23.31	5.21
MgO	4.66	6.21	5.75	1.78	4.56	8.36	6.78
CaO	1.42	1.89	0.94	.19	.28	Trace	.....
Na_2O	.06	.08	.27	.....	.....	Trace	2.20
K_2O	1.89	2.52	2.07	.75	Trace	Trace	
H_2O+	4.36	5.81	5.77	8.63	9.22	10.28	7.63
H_2O-	1.00	1.33	1.80			2.21	3.03
TiO_2	.15	.20	.15				
MnO	n.d.	n.d.	.33			.87	.....
Cr_2O_3	Trace	Trace					
	99.60	99.45	100.17	98.75	99.91	99.82	100.00
Sp. G.			2.882	2.77 to 2.96	2.75		

1. Impure quartzose stilpnomelane from Mesabi range, Minn. F. F. Grout, analyst.

1a. Analysis 1, recalculated, assuming about 25 per cent quartz impurity.

2. Pure micaceous stilpnomelane, Genoa pit, Mesabi range, Minn. F. F. Grout, analyst.

A. Stilpnomelane, Obergrund. Dana's System of Mineralogy, p. 658.

B. Chalcodite, Sterling, N. Y., Brush, G. J.: *Am. Jour. Sci.*, **25**, 198 (1858).

C. Stilpnomelane, Westfield, Mass., Shannon Earl V.: *Proc. Nat. Mus.*, **58**, 453.

D. Stilpnomelane, Rocky Hill, N. J., Steiger, George: *Proc. Nat. Mus.*, **58**, 453.

The new analyses raise a question as to the classification and relationships of stilpnomelane. Dana's System of Mineralogy and Doelter's Mineralchemie list it in the midst of some chloritic minerals; and it has the green color and micaceous structure of that group. The composition, however, does not seem to relate it logically to any portion of the connected chlorite series. The work here done was incidental to a study of biotite and leads us to call attention to the peculiar features of the new chemical data. The analyses here made (and checked by independent laboratories), show less water and more potash than older analyses. To check our work, tests were made on stilpnomelane from Baern, Bohemia, found in our museum collection. It contains 2.62 per cent potash, a trace of soda, and about 43 per cent silica; it has $2V$ very small, gamma $= 1.677 \pm 4$; alpha $= 1.58 \pm 1$.

In both potash and water, therefore, some stilpnomelane resembles biotite almost as closely as it does chlorite. The optical characters, especially the birefringence, make it very difficult to distinguish from biotite. In many respects, then, stilpnomelane seems to be intermediate between chlorites and biotites, but perhaps it should be considered independently of either group.

PROCEEDINGS OF SOCIETIES

PHILADELPHIA MINERALOGICAL SOCIETY

Academy of Natural Sciences, September 11, 1924

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the vice-president, Mr. Trudell, in the chair. Twenty-nine members and three visitors were present.

Reports of summer trips constituted the program of the evening. The following local trips were reported, specimens being exhibited: Mr. Biernbaum, Avondale, Delaware County; Mr. Hoadley, New England and Canadian localities; Mr. Oldach, Worrall's farm, Delaware County, and the French Creek mines; Mr. Clay, Stockton, N. J.; Mr. Frankenfield, Moore, Delaware County; Mr. Warford, Moore, N. J.; Mr. Boyle, Moore, N. J., and Henderson, Penna.; Mr. Knabe, Howellville; Mr. Millson, Sterling Hill, N. J. Mr. Gordon reported a visit to the Ecton and Perkiomen mines, with Dr. Wills; linarite and aurichalcite in minute amount were found at the former locality.

Mr. Blank presented an account of a trip over the Fourth of July, to Franklin, N. J., and Branchville, Conn., taken by Messrs. Frankenfield, Biernbaum, Gordon, and himself. Considerable lithiophilite, spodumene, beryl, albite, and cyrtolite were found at Branchville. Considerable hancockite was found on the dumps of the Parker shaft at Franklin.

Mr. Oldach reported an excursion to the French Creek mines over Labor day, taken by Messrs. Biernbaum, Frankenfield, Faust, McClure, and Oldach. A specimen of brilliant magnetite crystals measuring 20×9 cm., with individual crystals measuring 15 mm. was found by Mr. Biernbaum.

Mr. Biernbaum described in detail an expedition to Nova Scotia, participated in also by Messrs. Frankenfield and Broadbelt, from July 2 th to August 10th. On the way, stops were made at the fibrous quartz locality at Providence, R. I., and