plex titano-titantalo-columbate minerals is in the writer's opinion questionable. It seems probable that where the UO_3 was an original primary constituent of the mineral it should be considered as an acid, but that UO_3 resulting from autoxidation or normal oxidation of original UO_2 (which is a base) merely replaces the latter in the molecular network and should be calculated as a base. The difficulty is to distinguish the primary and secondary UO_3.

If it is agreed to consider the betafite is represented by analyses A & B and that C is ellsworthite, then the Haliburton mineral is probably more nearly related to ellsworthite with which it also agrees well in physical properties, mode of occurrence and origin.

The analyses of the original ellsworthite from Lot 18, Con. VII, Monteagle township, Hastings County, by E. W. Todd[5] are given for comparison.

	I (Lighter type)				II (Darker type)			
Nb_2O_3.....	34.22		.125		34.27	.125		
Ta_2O_5.....	4.32		.009		4.27	.009		
TiO_2.....	10.47		.131	.313	9.79	.122	.349	
SnO_2.....	0.10		.001		0.25	.002		
SiO_2.....	2.54		.042		2.68	.047		
F.....	0.22	($x\frac{1}{2}$)	.005		0.49 ($x\frac{1}{2}$)	.013		
UO_2.....	....				8.42	.031		
UO_3.....	18.50		.065		10.68	.037		
CaO.....	11.73		.209		13.62	.243		
MnO.....	0.43		.006		0.22	.003		
PbO.....	0.24		.001	.326	0.41	.002	.321	
Rare Earths	0.21		.001					
Fe_2O_3.....	4.10	($x\frac{3}{2}$)	.038		3.80 ($x\frac{3}{2}$)	.036		
Al_2O_3.....	0.42	($x\frac{3}{2}$)	.006					
H_2O.....	12.22		.677 ÷ 2 = .338		11.42	.634 ÷ 2 = .317		
	99.72				100.32			
Sp. Gr.....	3.608				3.758			

THE SERPENTINE LOCALITY OF MONTVILLE, NEW JERSEY

EARL V. SHANNON, *United States National Museum.*[1]

The name Montville, New Jersey, is familiar to all mineralogists and collectors throughout the world as the locality for the beautiful

[5] Walker & Parsons: Contributions to Canadian Mineralogy, 1923, p. 14.

[1] Published by permission of the Secretary of the Smithsonian Institution.

translucent oil-green serpentine which is to be found in most collections of consequence. Published descriptions of the place from which these specimens have come are very few indeed, almost the only one being Dr. George P. Merrill's[2] paper of many years ago. Although this paper gives an excellent description of the serpentine, its associations and probable origin, the article is now out of stock and not available to most persons who might be interested in visiting the locality.

Recently the writer spent about a month in Dover, N. J., in appraising and packing the Canfield collection of minerals. The opportunity of visiting a number of classic New Jersey mineral localities was thus offered and a Sunday was devoted to visiting the Montville locality in company with Geo. M. Hyland, Jr.

A description of the geography of the quarry is rather difficult. Montville is a small village on the Boonton branch of the Lackawanna Railroad about 2 miles northeast of Boonton. This is within the area of the Passaic quadrangle and the prospective visitor to the locality is strongly advised to provide himself in advance with a copy of the Passaic folio (folio 157, Geologic Atlas of the U. S., U. S. Geological Survey, Washington, D. C.). The quarry from which the specimens have come is indicated by the usual conventional sign in a small elongate area, designated in blue on the geologic map as Franklin limestone, about 3 miles NNE of Montville and on Turkey Mountain. If the folio is not available—it is out of stock at the Geological Survey—the folio should be consulted at a library, and the location of the quarry carefully copied on the Passaic topographic sheet which can be purchased.

The private road shown on the map as ascending the valley east of Turkey Mountain can be followed until it crosses the small tributary from the west which bisects the mountain. This valley, shown on the map as containing a small pond, has been dammed and is now occupied by an artificial lake of rare beauty about a mile long. After crossing the small stream mentioned, the writer simply ascended the nose of the ridge, disregarding a confusion of dim logging roads. The quarry was found precisely where indicated on the map but is badly overgrown and looks more like a natural ravine cutting into the ridge from the west than an artificial excavation. It probably has not been operated for thirty-five years. There seems to be no well marked road or path approaching

[2] George P. Merrill. On the serpentine of Montville, New Jersey. *Proc. U. S. National Museum*, Vol. 11, pp. 105–111 (1888).

it although there is a barely discernible and almost obliterated cart path up the ridge which probably furnished the outlet. The limestone was used for flux in iron furnaces or burned to quicklime. There are two ruined lime kilns alongside the road at the edge of the lake a mile below the quarry.

Once found, the quarry yielded specimens of the serpentine in abundance. It is not necessary to repeat here Dr. Merrill's descriptions which indicate that the serpentine occurs as investing crusts of various thicknesses surrounding nodular masses of granular grayish diopside. He suggests that the serpentine is due to an alteration of the diopside and that its prevailing slickensided and grooved surfaces are due to volume increases resulting from such an alteration. The present writer does not dissent from any of Dr. Merrill's conclusions and can add but little of scientific consequence to his observations. Dr. Merrill mentions a small dike of dense trap rock, less than a foot in width, in the quarry opening which apparently had no connection with the serpentinization. This was not seen by the present writer. There was noted, however, in a wall of the quarry and intrusive into the monotonous Pre-Cambrian Losee Gneiss which incloses the limestone, an irregular dike of pegmatite of not unusual composition which may have furnished the thermal solutions which effected the transformation of the pyroxene to serpentine. Dr. Merrill quotes analyses which show the Montville serpentine to have some 2 per cent more water than ordinary serpentine and thus it is comparable to the variety retinalite which has been interpreted as a mixture of serpentine and deweylite. The finely fibrous metacolloidal structure of this serpentine as seen under the microscope, its excess water content, the abundance of shrinkage cracks which develop upon drying and its fine-grained colloidal appearance suggest that it was probably deposited originally in the amorphous form of deweylite.

The serpentine specimens available in the quarry vary from translucent light yellow-green to dark blackish-green. The gray granular pyroxene, thin veins of chrysotile, slickenside coatings of splintery picrolite, and flakes of coppery phlogopite in serpentine, diopside, and granular dolomite, constitute the list of minerals found here by the writer.