A stringer of massive maucherite ($Ni_{12-x}As_8$) with minor magnetite and millerite (NiS), about five feet long and two inches wide, lies in a similar position one mile to the northwest. Other sulphide stringers in the area contain pyrrhotite and chalcopyrite. Scattered grains of native copper are found in limestone pebbles in some of the creeks.

The locality at Miles Ridge is part of the nickel-bearing belt extending from the Yukon-Alaska boundary southeast through the White River pyrrhotite showing to the Hudson Bay nickel-copper property at Quill Creek, and possibly farther. The area is readily accessible from the Alaska Highway and may prove to be an interesting locality for nickel minerals.

The writer wishes to thank Dr. R. M. Thompson of the University of British Columbia for his advice and encouragement, and Mr. W. G. Smitheringale, who first noticed this mineral in polished section.

REFERENCES

PEACOCK, M. A. (1947): On Heazlewoodite and the Artificial Compound Ni_3S_2, *Univ. Toronto Studies, Geol. Series*, **51**, 59–68.

RAMDOHR, P. (1950): Ueber das Vorkommen von Heazlewoodit und . . . Shandit, *Sitz. Ber. Deutsch. Akad. Wiss.*, **6** Berlin, 1950.

——— (1950): Ueber Josephinit, Awaruit, Souesit, ihre Eigenschaften, Entstehung und Paragensis, *Min. Mag.*, **29**, 374–394.

NIGGLIITE, A MONOTELLURIDE OF PLATINUM?

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Niggliite, named by Scholtz (1936) after the late Professor Paul Niggli, was found in a concentrate which was obtained by panning large amounts of oxidized sulphide ore from Waterfall Gorge, Insizwa, South Africa. Microchemical tests showed the presence of tellurium and platinum and a chemical analysis, performed on a fraction of a milligram, yielded 34.8 per cent platinum. The formula $PtTe_3$ was assigned to the mineral.

The author is not aware of any AX_3 compounds of platinum and B-subgroup elements. $PtTe_2$, with a cadmium iodide structure, is the only platinum telluride which has been synthesised (Thomassen, 1929 and Groeneveld Meijer, 1955). Neither optical characteristics, nor interplanar spacings and intensities of diffraction lines on x-ray powder photographs of $PtTe_2$, check with the data given by Scholtz (1936) for niggliite. With the exception of seven weak and very weak lines, which

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according to Niggli (in Scholtz, 1936, p. 185) might be due to impurities, the author has been able to index the powder diagram from the original data. On this basis, the unit cell is hexagonal with $a_0 = 4.111$ Å, $c_0 = 5.446$ Å; $c = 1.325$ (Table 1).

It is of interest to note how closely the optical characteristics of niggliite check with those obtained on synthetic PdTe. Specifically the remarks of Scholtz (1936) on cleavage, colour in hand specimen and

TABLE 1. COMPARISON OF CALCULATED AND OBSERVED INTERPLANAR SPACINGS OF NIGGLIITE

	Scholtz (1936)		Calculated	
	θ (Cu)	d (meas)	d (calc)	*hk.l*
mw*	12° 33′	3.54	3.56	10.0
w	13 27	3.31	—	—
w	14 45	3.03	—	—
mw	15 05	2.96	2.98	10.1
mw	15 49	2.83	2.72	00.2?
w?	19 18	2.33	—	—
w?	19 48	2.27	—	—
st	20 59	2.15	2.16	10.2
st	22 03	2.05	2.06	11.0
mw	25 45	1.773	1.780	20.0
mw	27 12	1.685	1.692	20.1
w	28 03	1.638	1.641	11.2
w	28 36	1.609	1.583	10.3
st	31 14	1.486	1.490	20.2
w	32 39	1.438	—	—
w	33 03	1.412	—	—
mw	34 13	1.358	1.361	11.3, 00.4
mw	35 00	1.343	1.346	20.1
w	35 30	1.326	—	—
m	36 12	1.304	1.306	21.1
m	37 24	1.268	1.271	20.3, 10.4
st	39 45	1.205	1.206	21.2
m	40 30	1.186	1.187	30.0
mw	42 48	1.134	1.135	11.4
ww	45 00	1.089	1.088	30.2, 00.5
mw	45 27	1.081	1.081	21.3, 20.4
w	47 45	1.041	1.042	10.5
m	48 30	1.028	1.028	22.0

* m = medium, w = weak, st = strong.

d (meas): interplanar spacings as calculated from Scholtz' (1936) θ values ($CuK\alpha_1 = 1.5405$ Å).

d (calc): interplanar spacings as calculated from the determined lattice dimensions $a_0 = 4.111$ Å, $c_0 = 5.446$ Å; $c = 1.325$.

polished section, polish, hardness, reflectivity, and anisotropism of niggliite find their equal in PdTe. PdTe reacts strongly with HNO_3; niggliite, according to Scholtz (1936), behaves inertly toward all standard etch reagents. The etch reactions of PdTe and $PdTe_2$ are quite similar and distinct from those of niggliite and $PtTe_2$ which are likewise related to each other. We believe on this basis that niggliite is likely the monotelluride of platinum.

Platinum monotelluride could not be synthesized by Thomassen (1929). The compound $PtTe_2$ does not melt under the conditions of fusion and the failure to obtain PtTe is understandable. However, failure to obtain a compound by a certain procedure of synthesis does not preclude the possibility of its existence as a mineral.

The unit cell of niggliite compares favourably with that of PdTe and IrTe. Thomassen (1929) gives for PdTe: $a_0=4.127$ Å, $c_0=5.663$ Å; $c=1.372$ and the present author (1955) obtained for IrTe: $a_0=3.930$ Å, $c_0=5.386$ Å; $c=1.371$. As with all platinum and palladium compounds, the palladium homologue has the smaller unit cell volume.

On the basis of the above observations we are inclined to favour PtTe as the formula for niggliite. In short these are:

1) Presence of platinum and tellurium as indicated by the original microchemical and chemical work.

2) No AX_3 compounds of platinum and palladium have been found reported upon in the literature.

3) X-ray pattern, optical, and physical characteristics of niggliite are unlike those of $PtTe_2$.

4) Physical and optical properties of niggliite compare closely with those of PdTe; x-ray data indicate a similar unit cell with a smaller volume for that of the mineral.

5) Etch reactions on PdTe and $PdTe_2$ are similar; also those of niggliite and $PtTe_2$. Etch reactions on $PdTe_2$ and $PtTe_2$ are dissimilar; it is suggested, therefore, that niggliite is PtTe.

6) Indexing of the powder pattern of niggliite is possible on a unit cell of the niccolite type, similar to that of PdTe and IrTe, and of plausible dimensions.

A remark of Scholtz in Ramdohr (1950) to the effect that niggliite is the monostannide of platinum, cannot be commented upon without further chemical data on the original material. The unit cell of PtSn, as determined by Oftedal (1928), is of the niccolite type with $a_0=4.103$ Å, $c_0=5.428$ Å; $c=1.323$.[1]

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[1] *Editor's note.* Unpublished x-ray powder data by R. M. Thompson for synthetic PtSn, also compare closely with Scholtz data. This would be expected from the similarity of the lattice dimensions for PtSn and those derived here for niggliite, PtTe.

REFERENCES

GROENEVELD MEIJER, W. O. J. (1955): Synthesis, structures, and properties of platinum metal tellurides. *Am. Mineral.*, **40,** 646–657.

OFTEDAL, I. (1928): Röntgenographische Untersuchungen von Manganarsenid, Eisentellurid, Nickelstannid und Platinstannid. *Z. phys. Chem.*, **132,** 208–216.

RAMDOHR, P. (1950): *Die Erzmineralien und ihre Verwachsungen.* Berlin, Akademie Verlag.

SCHOLTZ, D. L. (1936): The magmatic nickeliferous ore deposits of East Griqualand and Pondoland. *Publ. Univ. Pretoria; Series II: Nat. Sc.* No. **1,** 81–210.

THOMASSEN, L. (1929): Über Kristallstrukturtypen einiger binärer Verbindugen der Platinmetalle. *Z. phys. Chem.*, **48,** 277–287.

LATTICE DIMENSIONS OF CADMIUM SULPHIDE

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There appears to be a discrepancy between the structure assigned to certain tetrahedral compounds and the measured lattice dimensions. In wurtzite-type structures, if the coordination is tetrahedral, the ratio $c/a=\sqrt{2/3}\times Z=0.81650\,Z$. However, in the case of hexagonal cadmium sulphide, the following lattice dimensions and ratios have been reported:

	c	a	Z	$c/a\,Z$
Ulrich and Zacharaisen (1925)[1]	6.724	4.142	2	0.8115
Schnaase (1933)[2]	6.691	4.131	2	0.8099

These values agree fairly well, but the mean ratio, 0.8107, is significantly smaller than the theoretical vaue, 0.8165.

Pure cadmium sulphide was precipitated, dried, mixed with about 10 per cent by weight of Na_2S_x in evacuated vycor tubes, and heated in a controlled furnace for several hours. The chilled crystalline products were ground, washed free from alkali, and mounted on glass plates with balsam. After curing, the specimens were ground flat. Analysis of several *x*-ray diffractions was carried out with a Norelco geiger counter diffractometer. Instrumental calibration for angle was by the direct comparison method using a Norelco silicon standard. Diffraction angles of $CuK\alpha_1$ radiation were converted to spacings using U. S. Bureau of Standards tables (1950). The a dimension (=tetrahedral edge) was obtained from twice the spacing of the 11.0 plane, and the c dimension (=tetrahedral height) was obtained from three times the spacing of the third order of the basal plane. From calibration and reproducibility tests, both values

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[1] *Zeit. Krist.* **62,** 260–270 (1925).

[2] *Zeit. phys. Chemie* **20**B, 89–117 (1933).