Information supplied by the manufacturers of dimethyl sulfoxide states that toxicity does not seem to be a problem. Toxicological evaluation of preliminary animal studies reveals no sensitivity reactions or harmful effects on lung tissue. However, as these studies are continuing and the final word on this is yet to come, the manufacturer suggests that due care should be exercised in its handling and application.

References

GREGORY, R. A., AND STYLE, D. W. G., 1936, The photo-oxidation of methylene iodide: *Faraday Soc. Trans.*, **32,** 730.

HODGMAN, C. D., 1957, Handbook of chemistry and physics, 39th ed.: Cleveland, Chemical Rubber Publishing Co.

MEYROWITZ, R., CUTTITTA, F., AND HICKLING, N., 1959, A new diluent for bromoform in heavy liquid separation of minerals: *Am. Mineral.*, **44,** 884–885.

National Research Council, 1928, International critical tables of numerical data, physics, chemistry and technology, 1st ed., v. 3: New York, McGraw-Hill Book Co., Inc.

TIMMERMANS, M. J., AND HENNAUT-ROLAND, MME., 1932, Travaux du bureau international d'étalons physico-chimiques. V. Étude des constantes physiques de vingt composés organiques: *Jour. Chimie Physique,* **29,** 536.

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STIBIOTANTALITE FROM THE BROWN DERBY No. 1 PEGMATITE, COLORADO*

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The Brown Derby group of pegmatites and especially the Brown Derby No. 1 pegmatite on the east side of Quartz Creek Valley in Gunnison County, Colorado, are famous for the exceptional development of the variety of pegmatitic minerals that they contain, ever since the discovery in them of lepidolite (Eckel, 1933). Minerals from this dike and its parent granite also have been used extensively for age determinations (e.g., Aldrich *et al.*, 1956). The geology of the dikes and of the district has been thoroughly investigated (Hanley *et al.*, 1950; Staatz and Trites, 1955), and many of the minerals have been studied in detail: microlite (Eckel and Lovering, 1935); tourmalines (Staatz *et al.*, 1955); columbite (Heinrich and Giardini, 1957); garnet (Jaffe, 1951), the micas, especially the lepidolites (Heinrich *et al.*, 1960B); and monazite (Heinrich *et al.*, 1960A). A list of the minerals identified with certainty from the Brown Derby group is given in Table 1.

Stibiotantalite was found by the writer in 1953 in pegmatite blocks on

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TABLE 1. MINERALS FROM THE BROWN DERBY GROUP OF PEGMATITES, QUARTZ CREEK, GUNNISON COUNTY, COLORADO

Magnetite	Quartz
Gahnite	Microcline-perthite
Hematite	Oligoclase
Columbite	Albite (incl. cleavelandite)
Microlite	Beryl (greenish-blue and rose)
Euxenite	Topaz
Stibiotantalite	Garnet (yttrian spessartite)
	Tourmalines (pink, red, watermelon,
Fluorite	green, blue, purple, yellow, black)
	Muscovite
Apatite	Rose muscovite
Monazite	Sericite (incl. phengite)
	Lepidolites (1M, 6M)
	Zinnwaldite
	Biotite
	Chlorite

the dumps from the main inclined workings in the Brown Derby No. 1 dike. The mineral, which is very rare, appears in relatively pure crystal fragments as large as $5 \times 3\frac{1}{2} \times 2\frac{1}{2}$ cm. It is very likely that all of the pieces obtained came from a single cluster of crystals that was broken during mining. Occurring with the tantalum mineral are crystals of pink tourmaline as much as 1 cm. across.

The stibiotantalite fragments are cut by thin veinlets of quartz and a colorless muscovite with $2V = 0°$, probably a phengite. The tantalum mineral and its associates were formed within albite-quartz-lepidolite rock of the lepidolite-quartz-cleavelandite unit of Hanley *et al.* (1950).

Hamilton (1957), who also reports stibiotantalite from the Brown Derby, likewise notes pink tourmaline, quartz and lepidolite as the associates. The identity of his material was verified by Professor C. S. Hurlbut of Harvard University.

The optical and physical properties of the stibiotantalite are presented in Table 2, and *x*-ray powder data are listed in Table 3. The chemical composition of the mineral is as follows (semi-quantitative by *x*-ray fluorescence):

Ta_2O_5	48.8%
Nb_2O_5	8.6
Sb_2O_3	42.6
Bi_2O_3	nil
PbO	0.06
RE	nil

The figure for Sb_2O_3 is by difference; the analysis showed Sb to be the

TABLE 2. OPTICAL AND PHYSICAL PROPERTIES OF THE BROWN DERBY STIBIOTANTALITE

Megascopic:

Yellowish steel gray with a brilliant light yellowish resinous luster on fresh surfaces. H=5.0; G=7.3. Cleavages: {010} good; {100} fair.

Microscopic:

Light brownish gray, highly translucent. Indices >2.00. $\gamma-\alpha=0.08$, (+), 2V=75°, $r<v$ strong. Slight alteration to opaque red brown isotropic material. In reflected light: light gray, anisotropism moderate. Strong yellow internal reflection. Exceedingly minute specks of included galena (?) and pyrite (?). Minor alteration to medium gray material especially along fractures; alteration shows no internal reflection.

only other major metallic element present in addition to Ta and Nb. Both U and Th are absent; an autoradiograph of 30 days exposure showed no darkening.

The Brown Derby No. 1 pegmatite thus contains for Nb-Ta minerals: columbite, euxenite, microlite, and stibiotantalite. Material termed betafite by Hanley *et al.* (1950) has been identified as euxenite by the writer.

Other recorded United States occurrences of stibiotantalite are at Mesa Grande, San Diego County, California (Penfield and Ford, 1906), and at Topsham, Maine (Palache and Gonyer, 1940). In addition to the initial discovery at Greenbushes, Wodgina district, Western Australia Goyder, 1892), the mineral had also been found in the Varutrask, Sweden, pegmatite by Odman (1941). More recently magnificent crystals have been obtained from the Ribaue-Alto Ligonha pegmatite district, Portuguese East Africa (especially from the Muiane pegmatite), including one brilliantly faced crystal weighing over 10 lbs., now in the U. S. National Museum (Bandy, 1951). Sosedko (1958) also has identified stibiotantalite crystals in a pegmatite in the northern part of the Kola Peninsula.

REFERENCES

ALDRICH, L. T., G. L. DAVIS, G. R. TILTON, AND G. W. WETHERILL (1956). *Jour. Geophys. Res.*, **61**, 215–232.

BANDY, M. C. (1951). *Rocks and Minerals*, **26**, 512–521.

ECKEL, E. B. (1933). *Jour. Amer. Ceram. Soc.*, **16**, 239–245.

———, AND T. S. LOVERING (1935). Rpt. Comm. Meas. Geol. Time, Natl. Res. Council, Exhibit V.

GOYDER, G. A. (1892). *Proc. Chem. Soc. London*, **9**, 184.

HAMILTON, H. V. (1957). *Rocks and Minerals*, **257**, 126.

HANLEY, J. B., E. WM. HEINRICH, AND L. R. PAGE (1950). *U. S. Geol. Surv. Prof. Paper* **227**.

HEINRICH, E. WM., AND A. A. GIARDINI (1957). *Geol. Soc. Am. Bull.*, **68**, 1744.

TABLE 3. *X*-RAY POWDER DIFFRACTION DATA ON STIBIOTANTALITE
Cu RADIATION, Ni FILTER

A Stibiotantalite Mesa Grande, Calif.		*B* Stibiotantalite Brown Derby, Colo.	
d(Å)	I	d(Å)	I
4.55	w		
3.52	s	*3.5*	m
3.12	vs	*3.10*	s
2.95	s	*2.94*	ms
2.78	w		
2.70	m	2.68	mw
2.57	mw	2.45	w
2.05	vw		
1.99	vw	2.01	vw
1.96	vw		
1.90	m	1.88	m
1.83	mw	1.84	w
		1.81	mw
		1.80	vvw
1.74	s	*1.73*	ms
1.72	vw	1.708	w
1.667	w	1.662	mw
1.63	vw		
1.562	vvw	1.58	w
1.524	w	1.53	vvw
		1.52	w
1.50	vvw	1.49	vw
1.405	vvw		
1.357	w	1.348	w
1.275	vw	1.265	w
1.24	vw	1.23	vw
1.19	vw	1.183	w
1.14	w	1.133	w
1.13	w	1.125	mw
1.087	vvw	1.082	vvw

———, A. A. LEVINSON, AND R. A. BORUP (1960A). *Geochim. Cosmochim. Acta* (in press).
———, R. L. CRAIG, AND A. A. LEVINSON (1960B). Manuscript in preparation.
JAFFE, H. W. (1951). *Am. Mineral.*, **31,** 122–155.
ÖDMAN, O. H. (1941). *Geol. För. Förh.* **63,** 289–293.
PALACHE, C., AND F. GONYER (1940). *Am. Mineral.*, **25,** 411–417.
PENFIELD, S. L., AND W. E. FORD (1906). *Am. Jour. Sci.*, **22,** 61–77.
SOSEDKO, A. F. (1958). *C. R. Acad. Sci. U.R.S.S.*, **118,** 1025–1026.
STAATZ, M., AND A. F. TRITES (1955). *U. S. Geol. Surv. Prof. Paper* **265.**
———, K. N. MURATA, AND J. J. GLASS (1955). *Am. Mineral.*, **40,** 789–804.