of stolzite do not reveal the substitution of Mo for W. As shown by chemical analyses the mineral collected at the Lost Gulch locality in Arizona probably is an example in which Mo takes the place of some of the W in the stolzite formula. The mineral is properly termed molybdenian stolzite because the ratio of W:Mo exceeds 1:1.

Insofar as the writers know, intermediate members of the wulfenite-stolzite series have been identified only from the above mentioned areas in Australia and Argentina. The scarcity of reported occurrences of intermediate members of this isostructural series is surprising inasmuch as neither wulfenite nor stolzite is very rare. The intermediate members of the series probably have been overlooked because of their similarity in appearance to wulfenite.

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REFERENCES

Ahlfeld, F., and Angelelli, V., Las Especes Minerales de la Republica Argentina, *Univ. Tucumen, Inst. Geol. Pub.* **458**, 204–205 (1948).

Palache, C., Berman, H., and Frondel, C., Dana's System of Mineralogy, Vol. II, 1081–1088 (1951).

Peterson, N. P., Copper Cities Copper deposit, Globe-Miami district, Arizona, *Econ. Geol.*, **49**, 362–377 (1954).

Ransome, F. L., Geology of the Globe copper district, Arizona, *U. S. Geol. Survey, Prof. Paper* **12**, 168 pp. (1903).

———, Description of the Globe Quadrangle, Arizona, *U. S. Geol. Survey*, Folio **111**, 17 pp. (1904).

———, The copper deposits of Ray and Miami, Arizona, *U. S. Geol. Survey*, Prof. Paper **115**, 192 pp. (1919).

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HUNTITE FROM TEA TREE GULLY, SOUTH AUSTRALIA

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Huntite, $Mg_3Ca(CO_3)_4$, occurs as a weathering product in the Proterozoic, Torrens Dolomite, near Tea Tree Gully, South Australia.

The Torrens Dolomite is fine-grained and compact, with minor interbedded shale and quartzite bands. Folding, minor faulting and jointing are present throughout the horizon. Around fold noses the shales and quartzites are often brecciated, though the dolomite itself is unbroken. Minor faults and a brecciated shale band are well-exposed to a depth of 50 feet in two small quarries in the Torrens Dolomite, 1 mile east of Tea Tree Gully.

Huntite occurs as sporadic nodules in the fault zones and in the brecciated shale. The distribution of the huntite strongly suggests a close relation to the present surface. In the fault zones huntite has not been observed more than 30 feet below the surface, and in the brecciated shale band, not more than 10 feet.

The present soil cover is 3 to 4 feet deep and appears to be derived by weathering of the underlying dolomite and shale beds. The predominant carbonate in the soil is calcite. Examination of surficial weathering products in the area shows that the compact dolomite breaks down to a fine powdery calcite. The calcite remains in the soil or, commonly, fills joints and cracks in the rock. The magnesium is apparently removed in solution, for magnesite is only found in isolated nodules at the base of the soil layer.

Faults and breccia zones localize deep weathering processes below the soil level and provide obvious channel-ways for descending surface waters. It is in these deep weathering zones that the huntite occurs. The huntite nodules are always found in the most porous zones, and generally in channel-ways that can be visually followed to the surface. The fault zones and breccias are filled with fragments of rock and huntite nodules up to 6 inches in diameter, set in a fine clay matrix. *X*-ray powder diffraction studies have shown the clay matrix to consist of kaolin, muscovite, quartz, chlorite, minor talc, goethite and magnesite.

In this deposit, huntite does not appear to form at depths greater than 30 feet below the surface. Suitable water channels persist below this depth, but the only carbonates present are dolomite and nodular magnesite.

No evidence has been found which suggests that huntite forms by interaction of dolomite and descending surface waters. Huntite has not been observed crusting either dolomite fragments or magnesite nodules. Since it is always nodular and is found in brecciated shales, the evidence

TABLE 1. ANALYSIS OF HUNTITE, TEA TREE GULLY, SOUTH AUSTRALIA

	(1)	(2)
MgO	34.4	33.2
CaO	16.0	15.6
CO_2	50.4	48.9
Cl_2	Tr.	N.D.
Insol.	Nil.	N.D.
Total	100.8	97.7

(1) Analysed in Geology Department, University of Adelaide.

(2) Analysed by J. T. Hutton, Soils Division, C.S.I.R.O.

strongly suggests that the huntite is formed by direct precipitation from descending surface waters. However, the possibility that huntite may form by interaction between descending surface water and previously formed magnesite nodules cannot be ignored.

In appearance and physical properties the huntite is identical with that reported from Currant Creek, Nevada, by Faust (1953). The grain size is less than two microns.

Two nodules have been analysed (see Table 1). One analysis was made in the Geology Department, University of Adelaide, the other by J. T. Hutton, Soils Division, C.S.I.R.O. The C.S.I.R.O. sample contained some insoluble clay material, which accounts for the numerical differences between the two analyses. The two analyses are in excellent agree-

TABLE 2. *X*-RAY POWDER DIFFRACTION DATA FOR HUNTITE*

d Å	I	*d* Å	I	*d* Å	I
5.64	W	1.515	VVW	1.111	VVVW
4.73	VW	1.479	M	1.102	VVW
3.63	W	1.462	VVW	1.095	VVW
3.12	VVW	1.450	VW	1.080	VVW
2.89	M	1.443	W	1.074	VVW
2.830	VVS	1.415	VW	1.055	VVW
2.74	VW	1.395	W	1.044	VW
2.598	M	1.382	VW	1.037	VVVW
2.443	M	1.370	W	1.006	M (Doublet)
2.372	M	1.354	W	0.9957	VVVW
2.279	W	1.333	VW	0.9865	VVVW
2.188	M	1.318	W	0.9785	VW
1.988	W	1.302	M	0.9735	W
1.966	VS	1.291	VVVW	0.9625	VVVW
1.895	VVW	1.277	VW	0.9554	VVVW
1.888	VW	1.259	VW	0.9508	W
1.832	W	1.244	VW	0.9444	VW
1.818	VW	1.239	W	0.9395	W
1.793	W	1.218	W	0.9322	VVVW
1.762	VS	1.205	VW	0.9264	W
1.752	VS	1.195	VVW	0.9199	VVW
1.696	M	1.178	W	0.9174	VVW
1.651	VW	1.161	W	0.9143	VW
1.608	VVW	1.142	W	0.9071	VVVVW
1.581	M	1.133	VVW	0.8983	VVW
1.523	VW	1.125	M		

* These data were obtained from 5 *x*-ray powder diffraction photographs taken with a Philips 114.83 mm. diameter camera, using cobalt radiation with an iron filter. The necessary corrections for film shrinkage were applied.

ment, and in both cases the formula is obviously $Mg_3Ca(CO_3)_4$.

X-ray powder diffraction data (Table 2) are in agreement with those of Faust (1953) and Koblencz and Nemecz (1953). More diffraction lines have been recorded than reported by the previous workers, and not all can be indexed on the unit cell proposed by Faust. A spacing of 2.74 Å, not previously reported, has been persistently recorded and does not vary in intensity from sample to sample which would be expected if it were due to an impurity. This diffraction line has now been recorded in Currant Creek, Nevada material (Personal communication, Dr. George T. Faust, Feb. 1957).

Attempts to refine the unit cell proposed by Faust, to fit the observed *x*-ray diffraction data, have been unsuccessful.

REFERENCES

Faust, G. T., (1953) "Huntite, $Mg_3Ca(CO_3)_4$, a new mineral." *Am. Mineral.* **38,** 4–24.

Koblencz, V., and Nemecz, E., (1953) "Huntite from the Dorog Mine, Dorog, Hungary." *Foldtani Közlöny* **83,** 391–395.

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CHROMIAN MUSCOVITE FROM BAKER MOUNTAIN, VIRGINIA

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Further research concerned with possible correlation between type and color of mica and intensity of color of associated kyanite, as previously outlined by the writer (Dietrich, 1956), has been postponed indefinitely because of a shift in research objectives. The following data derived from already completed studies of chromium-bearing muscovite ("fuchsite") from Baker Mountain, Prince Edward County, Virginia, are presented here because it is believed that possibly other workers may find them of value.

1. *X*-ray investigations: The mica is of the 2M type. As compared to "pure K-muscovite" this chromian muscovite has a slightly larger $c \sin \beta$ value (10.00 Å and 10.10 Å, respectively, for 002 reflection). Partial substitution of Cr^{+3} (radius .63 Å), Fe^{+3} (radius .64 Å), and perhaps Fe^{+2} (radius .74 Å) and $V^{+5,+4,+3}$ (radii .59 Å, .63 Å, and .74 Å, respectively) for Al^{+3} (radius .57) probably accounts for this.
2. Optical properties:

Pleochroism—slight in thick cleavage fragments
Indices of refraction—α—1.553 (calc.)
β—1.591
γ—1.596
Biaxial (−)
$2V = 37° \pm 3°$
Slight dispersion $r > v$.