any of the various reflecting arrangements. By placing the carbon paper below one sheet of paper and above the other a reversed pair can be made for viewing with a single mirror.

Sketches made by this simple procedure (Fig. 1) suffer all the deficiencies of orthographic projections compared to perspective drawings, but proved very helpful in checking discrepancies in the coordinate data for a model network structure of 1144 atoms. Data for perspective projections, calculated as described by Bond (1947), may be plotted equally well by this method. If the parallax adjustment is graduated in terms of the third coordinage with a special scale (which may be non-linear to give a geometrically perfect stereo pair) the points can be plotted almost as rapidly in the three-dimensional sketch as on an ordinary map.

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A NEW OCCURRENCE OF ANDORITE

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Andorite has been found in silver ores from the Taylor district near Ely, White Pine County, Nevada. The ores occur in brecciated limestones on either side of a fault zone and consist of sphalerite, galena, enargite, bournonite, tennantite, andorite and stibnite in varying proportions. Minor amounts of stephanite, miargyrite, and pyrostilpnite also occur. Gangue minerals are quartz, pyrite, fluorite and rare barite.

Andorite occurs as fine single crystals up to 6 mm in length in a vuggy silicified limestone. Most crystals are perched upon drusy quartz but some anhedra up to 12 mm across have been noted embedded in quartz. Measurement of several crystals on the two-circle goniometer revealed the following forms: b, {010}; u, {130}; k, {120}; l, {230}; m, {110}; o, {320}; W, {310}; X, {011}; γ {021}; y, {031}; r, {121}; and ϵ, {362}. The crystals are elongate on [001] and somewhat tabular on {100}. All {hkO} are present as striae with the exception of {230} and {120}. A typical crystal is illustrated in Fig. 1.

Stronger powder diffraction lines and estimated intensities (on a 1 to

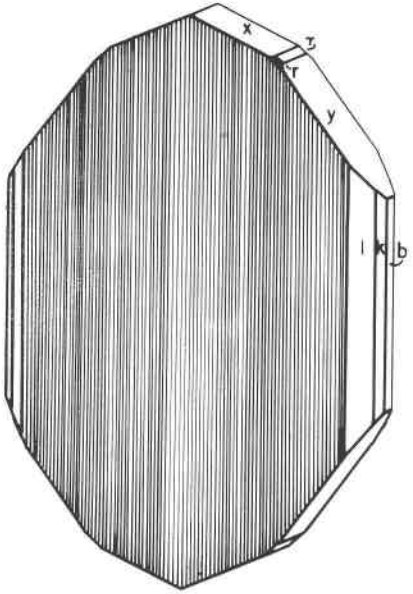

FIG. 1. Andorite crystal, Taylor district, Nevada.

10 scale) are listed here (for CuKα radiation): 3.30 (10), 2.89 (9), 2.74 (6), 3.71 (6), 3.42 (6), 1.787 (5), 6.13 (4), 5.05 (4), 2.272 (4).

Associated with the andorite are well crystallized enargite, bournonite, and tennantite. Enargite occurs as crystals either tabular on {001} or prismatic on [001]; {001} is generally etched and corroded. Forms found on the two-circle goniometer are c, {001}; a, {100}; l, {130}; n, {120}; m, {110}; and k, {101}. The axial ratio determined from three excellent crystals is $a:b:c = .8713:1:.8276$. A typical crystal is shown in Fig. 2. *X*-ray powder data agree very well with spacings for synthetic enargite.

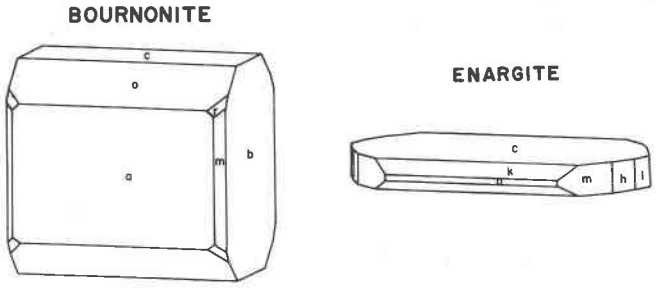

FIG. 2. Crystals of bournonite and enargite, Taylor district, Nevada.

However, *x*-ray fluorescence analysis indicates the presence of about 2% Sb by weight.

Bournonite twins up to 8 mm across occur with the enargite and andorite but untwinned crystals are rare. The habit of the crystals is simple, and only the following forms were found: c, {001}; b, {010}; a, {100}; m, {110}; o, {101}; and r, {211}. The same forms are found on twinned and untwinned crystals. A single crystal is depicted in Fig. 2.

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REVISED CHEMICAL ANALYSES OF TRASKITE, VERPLANCKITE AND MUIRITE FROM FRESNO COUNTY, CALIFORNIA

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The chemical analyses of traskite, verplanckite, and muirite (Alfors *et al.*, 1965, Table 2) are revised subsequent to the detection of substantial chlorine in traskite and minor fluorine in all three minerals. In addition, new data were obtained which resulted in a revision of the water content of traskite and muirite, and in a slight revision of the silica and alumina content of all three minerals. The resulting revisions have changed the cell contents of verplanckite and muirite slightly and the cell content of traskite markedly. The revised chemical analyses are given in Table 1 and the revised cell contents in Table 2.

The revised formula for traskite is $(Ba_{25.40},Ca_{1.17},Sr_{0.25},K_{0.08})_{26.90}(Fe_{4.45},Mn_{1.46},Mg_{0.57})_{6.48}Ti_{5.33}(Si_{35.17},Al_{0.49})_{35.66}O_{88.78}(OH_{43.09},Cl_{7.51},F_{1.60})_{52.20}$. This formula can be simplified to $Ba_9Fe_2Ti_2Si_{12}O_{30}(OH,Cl,F)_{18}$ or $Ba_9Fe_2Ti_2Si_{12}O_{36}(OH,Cl,F)_6\cdot 6H_2O$ in which Z is 3. The density calculated from the ideal formula $(Ba_{25.49},Ca_{1.18},Sr_{0.25},K_{0.08})_{27.00}(Fe_{4.12},Mn_{1.35},Mg_{0.53})_{6.00}Ti_{6.00}(Si_{35.51},Al_{0.49})_{36.00}O_{89.73}(OH_{44.58},Cl_{7.77},F_{1.65})_{54.00}$ is 3.75 gms/cc. The measured density is 3.71 ± 0.02 gms/cc.

The revised formula for verplanckite (analysis 2, Table 1) is $(Ba_{12.01},Ca_{0.12},K_{0.04})_{12.17}(Mn_{4.32},Fe_{0.93},Ti_{0.76},Mg_{0.14})_{6.15}(Si_{12.24},Al_{0.28})_{12.52}O_{37.16}(O_{1.52},OH_{5.90},Cl_{3.47},F_{1.11})_{12.00}\cdot 17.76H_2O$. This formula can be simplified to $Ba_2(Mn,Fe,Ti)Si_2O_6(O,OH,Cl,F)_2\cdot 3H_2O$ in which Z is 6. To maintain electrostatic balance it is suggested that for each Ti^{4+} ion replacing an Mn^{2+} ion, two 0^{2-} ions replace two $(OH)^{1-}$ ions. The density calculated from the ideal formula $(Ba_{11.84},Ca_{0.12},K_{0.04})_{12.00}(Mn_{4.21},Fe_{0.91},Ti_{0.74},Mg_{0.14})_{6.00}(Si_{11.73},Al_{0.27})_{12.00}O_{35.83}(O_{1.48},OH_{5.94},Cl_{3.47},F_{1.11})_{12.00}\cdot 18.00$ H_2O is 3.46 gms/cc. The measured density is 3.52 ± 0.02 gms/cc. The discrepancy between the measured and calculated densities may be