The mechanical calculation obviously depends upon the use of the similar triangles CAE and CBD, as shown in Fig. 5, where CA is proportional to the weight of the specimen in air (W) and CB to the loss of weight of the specimen in water (L). The unit used in the horizontal graduated scale is BD, the horizontal distance between the center of the pivot O and the knife-edge K. The following relationships between these sides of the two triangles now becomes obvious.

$$\frac{\text{W(weight in air)}}{\text{L(loss in water)}} = \frac{\text{AE}}{\text{BD}} = Sp.\,Gr.$$

$$\text{BD} = 1$$

$$\text{Therefore } Sp.\,Gr. = \text{AE}$$

The graduated scale used with the balance, as shown in the figures, permits of the determination of solids with specific gravities up to 12. For heavier substances the pointer P may be moved to the right so that the distance petween the pivoting point O and the knife-edge K (BD in Fig. 5) is reduced one-half. A properly placed hole is provided for this purpose. When O is in this half-way position the readings on the graduate scale must obviously be doubled, and it now becomes possible to determine values up to 24.

Where rapid determinations of the specific gravity of solids is a matter of routine, or where the time element is of great importance, this new instrument has many advantages over the older forms of jolly balances.

The attachments described in this paper were made by Mr. Ralph Miller of the Eberbach and Son Company of Ann Arbor, Michigan, to whom I wish to express my appreciation for his very expert assistance.

HYALOPHANE FROM FRANKLIN FURNACE, NEW JERSEY

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This barium feldspar was discovered at Franklin Furnace by the chemists of the New Jersey Zinc Company. A mass of coarse granular feldspar, dark red in color, was found in the old dump of the Parker Shaft and upon analysis showed the presence of more than 10 per cent of barium oxide. It is associated with the black manganese biotite and yellow garnet so common in that locality. In thin section the feldspar was found to be monoclinic with small extinction angle, negative, 2V large, and a refractive index β about 1.54. Specific gravity 2.90. Hardness 6. It is very impure, the dark color being due to the presence of grains of hancockite and to a network of microscopic veinlets of what was apparently bementite, evidently an alteration product. The analysis, made by Jenkins & Bauer, follows:

SiO_2	45.40	FeO	1.54
Al_2O_3	20.82	MnO	2.67
K_2O	7.54	ZnO	1.36
Na_2O	2.69	PbO	1.15
BaO	10.58	SO_3	0.99
CaO	2.70	H_2O	2.35
MgO	0.76	Total	100.55

This analysis was discussed on the basis of the observed impurities in the following manner. The SO_3 was regarded as contained in barite. The PbO was assigned to hancockite and the remainder of the bivalent oxides, except BaO, was assigned to bementite. It is evident that such a calculation must be very approximate since neither hancockite nor bementite has a constant composition. The result of the calculation was as follows:

Barite	2.89 Per cent
Hancockite	5.48
Bementite	15.71
Excess H_2O	1.00
	25.08

Recalculating the remainder of the analysis to 100% the following figures were obtained:

	Per cent	Molecular ratios	
SiO_2	49.51	.821	$.821 = 4 \times .205$
Al_2O_3	25.48	.249	$.249 = 1 \times .249$
K_2O	9.98	.106	
Na_2O	3.56	.057	$.238 = 1 \times .238$
BaO	11.47	.075	
	100.00		

This result approximates the composition of a soda-bearing hyalophane but is slightly deficient in silica. The optical characters are thus supported by the analysis. An attempt was made to purify some of the finely ground feldspar in heavy solution but it proved to be impossible, the finest particles of powder still showing a network of the alteration products. The calculated amount of the impurity, 25%, did not seem unduly large in view of the abundance of the secondary bementite.

It is interesting to note that this occurrence adds one more mineral to the list of those common to Franklin Furnace and the manganese mines of Långban and Jakobsberg, Sweden. The hyalophane of the latter place is also a granular red feldspar associated with manganese epidote.

MARCASITE INCLUSIONS IN FLUORITE FROM THE CENTRAL KENTUCKY BARITE-FLUORITE-CALCITE VEINS

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Introduction

The occurrence of marcasite as inclusions in fluorite from the barite-fluorite-calcite veins of Central Kentucky is of genetic significance. These veins have been described by Miller[1], Fohs[2], and recently by Currier.[3] In the main, the veins have a north-south trend paralleling the axis of the Cincinnati anticline, altho departure from this general strike is not uncommon. The country rock is Ordovician limestone from the Camp Nelson formation, exposed on the crest of the Cincinnati anticline, to the top of the Trenton. There are several conspicuous fault zones in the central Kentucky region, and vein material is associated with all of them, usually however, occurring in tension fissures without vertical displacement as vein filling from a few inches to seven feet in width. Barite, fluorite, and calcite are the principal vein minerals, with minor amounts of galena and sphalerite, and oc-

[1]Miller, A. M.; The Lead and Zinc Bearing Rocks of Central Kentucky, *Ky. Geol. Survey, Bull.* **2**, (1905). Geology of Kentucky. *Ky. Geol. Survey, Series V, Bull.* **2**, (1919).

[2]Fohs, F. Julius; Fluorspar Deposits of Kentucky, *Ky. Geol. Surv., Bull.* 9, (1907); Barytes Deposits of Kentucky, *Ky. Geol. Surv., Series IV, Vol.* **1**, Part I, (1913).

[3]Currier, Louis Wade; Fluorspar Deposits of Kentucky, *Ky. Geol. Survey, Series* VI. *Vol.* **13**, (1923).