that represented by the basal cleavage surface. But since there is a noticeable tendency for the veins to run parallel to this basal plane it may perhaps be reasonably conjectured that the break was occasioned by such a vein.

No petrographic analysis has yet been made and such an analysis will be very difficult by reason of the degree to which oxidation has advanced.

The meteorite shall be known as Cotesfield, the location of which is Lat. 41°, 20′ N.; Long. 98°, 40′ W. The largest mass is in the collection of the Colorado Museum of Natural History.

A TEPHROITE CRYSTAL FROM FRANKLIN FURNACE, NEW JERSEY

WALDEMAR T. SCHALLER, *Washington, D. C.*

An excellent clear pink tephroite crystal, several millimeters long, on typical material from this locality, was measured at the request of the late Col. Washington A. Roebling. The crystal was very brilliant and showed seventeen forms, of which four are new.

The forms noted, with their measured and calculated angles, are shown in the table below. The four faces of the unit pyramid gave excellent reflections and as the crystal was readily adjusted accurately in polar position, the axial ratio was calculated from these measurements, which were:

	°	′		°	′
ϕ	65	13	ρ	54	34
	65	13		54	32
	65	16		54	30
	65	11		54	34

The average values for the axial ratio, calculated from these angles, gives:

$$a=0.4616 \qquad c=0.5885 \qquad p_0=1.2748$$

The measurements of the other forms, which gave fairly good reflections, gave values very close to those derived from the measurements of the unit pyramid, as can be seen by comparing the measured and calculated angles. The axial ratio obtained is in close agreement with previously determined values, which are here given:

	a	c
Sjögren	0.4600	0.5939
Flink	0.4621	0.5914
Gordon	0.4606	0.5899
Schaller	0.4616	0.5885

References: Sjögren: *G. För. Förh.*, vol. **6**, p. 539, 1883.
Flink: *Ak. H. Stockh.*, Bihang, vol. **13** (2), No. 7, p. 64, 1888.
Gordon: *Proc. Acad. Nat. Sci.*, Philadelphia, vol. **74**, p. 107, 1922. Corrections given in *Amer. Mineralogist*, vol. **8**, pp. 33–34, 1923.

FORMS AND ANGLES ON TEPHROITE CRYSTAL, FRANKLIN FURNACE, N. J.

$a=0.4616$ $c=0.5885$ $p_0=1.2748$

Form	Measured				Calculated			
	ϕ		ρ		ϕ		ρ	
	°	′	°	′	°	′	°	′
a(100)	90	01	90	00	90	00	90	00
b(010)	0	02	90	00	0	00	90	00
c(001)	—	—	0	01	—	—	0	00
m(110)	65	13	90	00	65	13	90	00
s(120)	47	18	90	00	47	17	90	00
r(130)	35	51	90	00	35	50	90	00
*i(023)	0	00	21	35	0	00	21	25
h(011)	0	00	30	32	0	00	30	29
k(021)	0	00	50	14	0	00	49	39
d(101)	90	01	53	15	90	00	51	53
*v(102)	90	01	34	36	90	00	32	31
e(111)	65	13	54	33	65	13	54	33
*g(212)	78	41	52	10	77	00	52	37
q(122)	47	22	40	53	47	17	40	57
f(121)	47	44	60	40	47	17	60	03
l(131)	35	51	65	15	35	50	65	21
*w(133)	35	53	36	07	35	50	35	59

The new brachydome *i*(023) is present as medium size faces (meas. $\rho=21° 43', 21° 27'$).

The new macrodome *v*(102) occurs as medium size triangular faces, dull as if etched, giving no reflections. The position was determined by its maximum brightness.

The new pyramid *g*(212) was observed once as a line face, between *d*(101) and *e*(111).

The new pyramid *w*(133) was observed four times as line faces giving poor reflections, between *h*(011) and *e*(111). The measurements are:

	°	′		°	′
φ	35	44	ρ	35	44
	35	44		36	17
	35	58		36	20
	36	04		36	06

The basal pinacoid *c*(001) was noted by Flink as a large face occurring on several crystals. On the crystal here described, it forms a medium sized rectangular face giving a good reflection.

The pyramid *q*(122), first recorded by Gordon, was noted twice as small faces, yielding fair reflections. The measurements are:

	°	′		°	′
φ	47	21	ρ	40	42
	47	22		41	03

Observance of Crystal Forms on Tephroite.

Form	Observer				
	Sjögren 1883	Flink 1887	Flink 1916	Gordon 1922	Schaller
a(100)	*a*	*a*	*a*	*a*	*a*
b(010)	—	*b*	*b*	*b*	*b*
c(001)	—	—	*c*	—	*c*
ψ(160)	—	*ψ*	*ψ*	—	—
y(150)	—	—	*y*	—	—
z(140)	—	—	*z*	—	—
j(270)	—	—	—	*j*	—
r(130)	—	*r*	*r*	*r*	*r*
s(120)	*s*	*s*	*s*	*s*	*s*
τ(580)	—	—	*τ*	—	—
m(110)	*m*	*m*	*m*	*m*	*m*
x(10.9.0)	*x*	—	—	—	—
σ(210)	—	*σ*	*σ*	—	—
ρ(310)	—	—	*ρ*	—	—
d(101)	—	—	*d*	*d*	*d*
v(102)	—	—	—	—	*v*
i(023)	—	—	—	—	*i*
h(011)	*h*	*h*	*h*	*h*	*h*
k(021)	—	—	*k*	*k*	*k*
u(031)	—	—	*u*	—	—
l(131)	*l*	*l*	*l*	*l*	*l*
f(121)	*f*	*f*	*f*	*f*	*f*
e(111)	*e*	*e*	*e*	*e*	*e*
w(133)	—	—	—	—	*w*
q(122)	—	—	—	*q*	*q*
g(212)	—	—	—	—	*g*
t(371)	—	*t*	—	—	—

The observance of the 26 forms (including the form *u*(031) noted by Flink without measurement) known for tephroite are given in the preceding tabulation.

The form (371) was given by Flink (1887) without letter. The letter *t* is here assigned to this form. These clear pink tephroite crystals represent very nearly the pure manganese silicate, as evidenced by the analysis given by Palache,[1] and the various properties determined on this material are the best available for tephroite.

[1] Palache, Charles, Mineralogical notes on Franklin and Sterling Hill, New Jersey: *Amer. Mineralogist*, vol. **13,** p. 325, 1928.

CHEMICAL COMPOSITION OF LEUCOXENE IN THE PERMIAN OF OKLAHOMA[1]

Fay Coil

The physical and optical properties of leucoxene, the most common alteration product of ilmenite, have been described but apparently no definite information regarding its chemical composition has been available. Most investigators agree that it is an alteration product of ilmenite, although its occurrence and character may vary somewhat in different formations.

Gümbel,[2] in 1874, was the first to describe the substance as he found it in diabase and named it leucoxene. However, he thought it was a primary constituent of the rock.

An analysis made by Cathrein,[3] in 1881, of aggregate material, apparently erroneously referred to as leucoxene, gave a composition of: SiO_2 33.26, TiO_2 41.12, and CaO 25.62. It seems that the material analyzed was essentially titanite. From this analysis, apparently, subsequent writers have thought that leucoxene is a variety of titanite.

Iddings[4] states that the substance has been considered by vari-

[1] Abstract of thesis presented for the M.S. degree in geology, University of Oklahoma, June, 1932.

[2] Die Paleolith Eruptivgesteine der Fichtelgebirges, 22, **1874.**

[3] *Zeit. Kryst.* **6,** 244, 1881. Quoted from Zirkel. F., Lehrbuch der Petrographie, vol. 1, p. 423.

[4] Iddings, J. P., Translation of Rosenbusch, Microscopic Physiography of the Rock Forming Minerals, pp., 167–168, **1893.**