MEETING OF DECEMBER 7th, 1885.

ON ALLANITE AND GADOLINITE.

BY L. G. EAKINS.

The three minerals about to be described, were analyzed during the spring of 1885, and are part of a number collected by Mr. W. B. Smith, of the U. S. Geological Survey, and turned over by him to the laboratory of the survey for investigation; the remaining ones now being in the hands of Mr. W. F. Hillebrand. They are all from the same locality, namely: "Devil's Head" mountain, Douglas County, Col., the region being already described by Mr. Smith, in Bulletin No. 20, of the U. S. Geological Survey..

For the microscopical notes in connection with the following descriptions, I am indebted to Mr. Whitman Cross.

ALLANITE.

Allanite occurs scattered throughout a more or less decomposed granite, from which it was separated for analysis by the Thoulet solution.

Color:—Pitch-black.
Luster:—Brilliant, glossy.
Fracture:—Sub-conchoidal.

Microscopical:—Interior, pale greenish-yellow, with irregular fissures. Isotropic, often there is a zone about the kernel, which is chestnut to strong yellowish-brown, pleochroic and strongly doubly refractive.

This outer zone is identical in behavior with the allanite of eruptive rocks. From the presence of apparent rude prismatic forms one would infer that the amorphous state is in this case a secondary one.

Heated before the blowpipe a fragment swells to several times its original size. It is readily decomposed by acids.

S. G. 3.52 at 29°C.
H. about 6.

The analysis is as follows:

SiO_2	31.13
AlO_2O_3	11.44
Fe_2O_3	6.24
Ce_2O_3	12.50
$(La\ Di)_2O_3$	10.98
FeO	13.59
BeO	0.27
MnO	0.61
CaO	9.44
MgO	0.16
K_2O	tr
Na_2O	0.56
H_2O	2.78
CO_2	0.21
P_2O_5	tr
	99.91

GADOLINITE.

Of this mineral there were two specimens, of which separate analyses were made; they are figured in the table below as I and II.

The description of the material which furnished analysis I, is as follows:

The specimen resembled, externally, a stone worn and rounded by the action of water; when broken, a black, slightly lustrous surface was exposed.

Fracture:—Smooth.

Cleavage:—Apparently none.

Microscopical:—Dark-green. Isotropic.

The section was fissured, with films and flakes of dark, reddish-brown oxides in them.

Before the blowpipe it glows brilliantly.

S. G. 4.56 at 17°C.

H. 6.—6.5

The material which furnished analysis II differs very much in appearance from the one just described.

It also was in fragments, but none of them displayed the worn, rounded appearance of the other.

In color it was less dark, approaching at places to a dull green.

S. G. 4.59 at 25.°5C.

H. about 6.

As these two analyses are the first of material from this country, it has been considered advisable to add the analyses of gadolinite from two of the noted European localities. They are given in the table below, as III and IV. III being from Ytterby, and IV from Hitteroe. They are taken from an article by Humpidge and Burney, in the *Zeitschrift fur Krystallographie* VI. P 94.

	EAKINS.		HUMPIDGE AND BURNEY.	
	I	II	III	IV
SiO_2	22.13[x2]	21.86	25 16	24.24
Al_2O_3 . . .	2.34	0.54	. . . . .	. . . . .
Fe_2O_3 . . .	1.13	3.59	2.15	. . . . .
ThO_2 . . .	0.89[x3]	0.81	. . . . .	. . . . .
Ce_2O_3 . . .	11.10[x3]	6 87	Ce La Di $_2O_3$ 6.52	9.93
(La Di) $_2O_3$	21.23	19.10[x5]	4.11	10.91
Er_2O_3 . . .	12.74[x4]	15.80[x6]	35.16	30.59
Y_2O_3 . . .	9.50[x4]	12.63[x6]	12 40	16.04
FeO	10 43	11.36	9 39	6.56
BeO[x1] . . .	7.19	5.46	. . . . .	. . . . .
MnO	. . . . .	0 11	1.11	0.79
CaO	0.34	0.47	tr.	0.24
MgO	0.14	0.16	. . . . .	tr.
K_2O . . .	0.18	0.20	. . . . .	. . . . .
Na_2O . . .	0.28	0.32	2.32	0.62
H_2O	0 86	0.74	1.28	. . . . .
P_2O_5 . . .	. . . . .	. . . . .		
Total,	100.48	100 02	99.60	99 92

X[1] Humpidge and Burney use Be_2O_3 instead of BeO.

X[2] Mean of 22.10 and 22.15.

X[3] A second determination gave for $ThO_2 + Ce_2O_3 = 11.82$.

X[4] The molecular weight of the mixed oxides Er_2O_3 and $Y_2O_3 = 296$.

X[5] Didymium absorption line very strong.

X[6] The molecular weight of the mixed oxides Er_2O_3 and $Y_2O_3 = 294$.

In analysis I and II the Er_2O_3 and Y_2O_3 were calculated by

the formula of Bahr and Bunsen, after the conversion of the oxides into sulphates:

Er_2O_3 = 4.79 wt. oxides — 2.33 wt. sulphates.

The absorption spectrum of erbium from one gram of the mineral in a solution 2 c. m. thick and 1 c. m. deep was so weak that only the band in the green was visible, being but little darker than the two dark Fraunhoefer lines on each side.

In the notes in connection with the analyses given here as III and IV, Humpidge and Burney make the following remarks:

"The P_2O_5 (for the first time discovered in gadolinite,) is combined with cerium metals, for it remains undissolved on treatment with aqua regia. Xenotime could not be detected in thin sections, the whole appearing as a homogeneous, isotropic, green mass. The above analyses contradict the statement of Descloiseaux that the amorphous gadolinites are free from Be_2O_3."

It will be noticed in regard to this last statement, that my analyses lead to the same conclusion.

Dr. M. W. Iles gave an informal description of some recent inventions connected with lead smelting, illustrating the same by black-board sketches.

MISCELLANEOUS NOTES AND REMARKS.

Mr. Whitman Cross called attention to an article in the American Journal of Science, for September, 1885, by G. F. Kunz, describing some large pieces of meteoric iron from Glorieta Mountain, Santa Fe Co., New Mexico, and further stated that personal correspondence with Mr. Kunz had brought out the probable identity of the meteoric iron presented to the Society by Mr. Pearce and analyzed by Mr. Eakins, with this