

of a brown color separating out which were found to consist of

Au 76.14
 Ag 1.49
 Cu 22.37 (dif)

Atomic ratio—

Au : Cu
 1.0 1.0

It will be seen from this experiment that nearly the whole of the Ag was replaced by Cu. Repeated experiments made with varying percentages of Cu demonstrated, however, that it was impossible to displace the whole of the Ag by Cu as the following analysis will show.

Au	66.085	65.11	71.084	67.95	69.90
Ag	1.883	2.04	3.075	2.29	2.14
Cu	32.032	32.85	25.840	29.70	27.96
	Au ₂ Cu ₃	Au ₃ Cu ₅	Au ₄ Cu ₅	Au ₅ Cu ₇	

The Au Cu crystals are much smaller than the Au Ag crystals but under the microscope they exhibit the same beautiful crystalline form, the regular octahedron without a trace of any modification.

MEETING OF NOVEMBER 2nd, 1885.

REMARKS ON THE OCCURRENCE OF COAL IN THE CARBONIFEROUS FORMATION AT ASPEN AND GLENWOOD SPRINGS, COLORADO.

BY R. C. HILLS.

A noticeable feature of the Carboniferous Formation of Colorado and of the Pacific States and Territories generally is the absence of coal seams which are mostly confined to the Dakota and Fox Hills groups of the Cretaceous and to the Lower Laramie of the Post Cretaceous or Lignitic. Two exceptional occurrences have, however, recently come under my observation.

One of these is a small seam of impure bituminous coal

exposed near the wagon road on the north side of Grand River, about one-half mile below Glenwood Spring.

The seam is sandwiched between hard calcareous rocks, and is very irregular in size, varying from two to ten inches in thickness. From the position of the including beds with reference to the Permian and Trias, and the presence of *Productus* at no great distance, they are very probably, as Hayden concludes, of Middle Carboniferous age, certainly not later.

The other occurrence which is thought worthy of mention is a small seam of anthracite, three and a half inches thick, discovered within a short distance of the ore-bodies on the Smugler and Johnson claims near Aspen.

The seam dips conformably with the formation at an angle of about 30° towards the northwest.

The enclosing rocks, consisting of limestone and black carbonaceous shale, underlie the purplish colored sandstones, regarded as Permian, usually present at the base of the Trias. and, therefore, can hardly belong to a period more recent than the Middle Carboniferous.

The coal has the color and luster of ordinary anthracite, but is, nevertheless, very impure, being seamed with numerous thin veins of calcite containing particles of pyrite. A proximate analysis in duplicate of clean bright particles apparently free from calcite and pyrites, and having a specific gravity of 1.8, gave as follows :

Hygroscopic water	5.5	5.3
Gas	4.0	4.2
Fixed carbon	64.8	64.5
Sulphur	1.1	1.1
Ash	24.6	24.9
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	100.0	100.0

One half the sulphur deducted from the ash, the other half from the gas. The ratio of fixed carbon to gas is as 94.18 to 5.82 in the first and as 93.88 to 6.12 in the second.