

MEETING OF JULY 6th, 1885.

NOTES ON SOME FURTHER INVESTIGATIONS ON THE FORMATION OF CRYSTALLINE ALLOYS.

BY RICHARD PEARCE.

At one of the meetings of the Society some months ago I drew attention to some discoveries in the artificial formation of certain crystalline alloys of gold and silver, and of gold and bismuth.* I subsequently read a paper on this subject at a meeting of the Institute of Mining Engineers† giving in detail the result of my experiments.

Within the last few days I have followed up some investigations in the same direction, the results of which I now lay before this Society.

In the preparation of crystals of an alloy of Au and Ag by adding Ag to a Bi Au alloy I found that in every experiment I made, that Ag was incapable of displacing the whole of the Bi, quite a large percentage of the Au remaining in the combination with Bi, which had to be separated by washing it out of the Au, Ag alloy. It occurred to me to try the effect of Cu on the Bi, Au alloy in place of Ag, and I was surprised to find that a crystalline compound of Au and Cu could be produced without a trace of the Bi, Au alloy. This result led me to the conclusion that Cu has a greater affinity for Au than Ag.

My next experiment was to try to what extent Ag might be replaced by Cu, 1 gramme of an alloy consisting of

Au	60.57
Ag	36.37
Cu	3.06

was melted with 0.2 gm. of Cu and 10 gm. of Bi and allowed to cool slowly. The alloy was broken and then treated with nitric acid (equal parts by volume of nitric acid and water), crystals

* This volume page 7.
† Trans. Am. I. of M. E. Feb. '85.

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