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XXVIII.—*On Algodonite, a New Mineral containing Arsenic and Copper.*

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IN a paper published by Dr. Blyth in the "Quarterly Journal of the Chemical Society," vol. i. page 213, he gives a long account of the mineral Condurrite, originally found in the Condurron Mine, Cornwall, and first analysed by Mr. Faraday in the year 1827. This mineral consists of

Water	8·987
Arsenious acid . .	25·944
Copper	60·498
Sulphur	3·064
Arsenic	} 1·507
Iron	
	100·000

Faraday supposed that the substance was a mechanical mixture, and the examination of other specimens by Blyth, caused him to entertain the same opinion. The formula deduced by Kobell

from the analyses of Faraday is $6\text{CuO} \cdot \text{AsO}_3 + 4\text{H}_2\text{O}$, in which the copper and arsenic bear the following proportions per cent.

Copper	. . . .	70·11
Arsenic	. . . .	29·88

And from the analyses of nine samples by Blyth, he obtained as a mean,

Copper	. . . .	71·15
Arsenic	. . . .	28·84

which quantities correspond to an arsenide containing six equivalents of copper to one of arsenic.

Condurrite, then, appears to be an arsenite of copper, $6\text{CuO} \cdot \text{AsO}_3$, which has been derived from the oxidation or weathering, as it is termed, of the arsenide Cu_6As . M. Domeyko has analysed several specimens, both from the provinces of Copiapo and Coquimbo, in Chili, one of which gave:

Copper	. . . .	71·64
Arsenic	. . . .	28·36

and another:

Copper	. . . .	70·70
Arsenic	. . . .	23·29
Sulphur	. . . .	3·87
Iron	. . . .	0·52

A specimen of great brilliancy and purity obtained from the Cordilleras of Copiapo, afforded me:

Copper	. . . .	71·56
Arsenic	. . . .	28·44

and a second from Coquimbo, extracted from a mass weighing several pounds:

Copper	. . . .	71·48
Arsenic	. . . .	28·26

leaving no doubt that the formula is Cu_6As . There is, however, another compound of these two elements.

In a small vein in the silver mine of Algodones, Coquimbo, there have lately been extracted small lumps of a white metallic substance, supposed by the owners of the mine to be native silver, but which, on examination, proved to contain but little of that metal, and to consist essentially of copper and arsenic. The physical appearance, and much higher specific gravity (6.902), at once led me to infer that the composition was very different from that of the Domeykite Cu_6As , and an analysis was therefore commenced. The mineral was coated with red oxide of copper, Cu_2O , and the matrix consisted of carbonate of lime. On removing the foreign matters from the surface, which was accomplished with difficulty after much filing and scraping, the interior mass presented a brilliant silver-white aspect, with a strong granular fracture, also white, but quickly tarnishing on exposure to the air. The mineral was quite soluble in dilute nitric acid, and gave a precipitate of chloride of silver on the introduction of hydrochloric acid into the solution. After the separation of silver by this means, the following percentages of copper were obtained :

I.	II.	III.	IV.	V.	Mean.
83.24	83.12	83.40	83.36	83.41	83.30

The copper in each case was precipitated from its solution in weak nitric acid by sulphide of hydrogen, and separated from the sulphide of arsenic by sulphide of potassium. The following numbers show the percentage of arsenic :

I.	II.	III.	IV.	V.	Mean.
16.21	16.08	16.41	16.24	16.20	16.23.

In three estimations of silver, the following percentages were obtained :

I.	II.	III.	Mean.
0.32	0.30	0.31	0.31

We have, therefore, for the composition of this mineral :

Copper	83.30
Arsenic	16.23
Silver	0.31
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	99.84

Now Cu_{12}As (in which the copper is exactly double of that in the specimens formerly examined) contains

Copper	83.66
Arsenic	16.34

We may therefore conclude that the mineral under consideration is a compound of twelve atoms of copper to one of arsenic, containing besides a small quantity of silver. I have proposed the name *algodonite* for this mineral, from the mine Algodones from which it was first obtained, believing it to be new in mineralogical science. Specimens have been forwarded by me for the acceptance of the Museum of the Chemical Society, to the care of Dr. Hofmann.
