VII.—*On Youngite*

By J. B. Hannay, F.R.S.E., F.C.S.

IN No. V. of this Magazine (page 149) there appeared a paper on "Some new Minerals in the Collection of the Hunterian Museum, Glasgow," in which I gave a description and analysis of a new Sulphide of Lead, Manganese, Iron, and Zinc, to which I gave the name of "Youngite." In a note to his abstract of the above paper for the Journal of the Chemical Society of January, 1878, Dr. Burghardt, expressed an opinion that the "Youngite" was only a mixture of Galena, Blende, Alabandite (Mn S), and Iron Pyrites; and consequently had no claim to be called a new mineral. Although my analyses agreed closely, and coincided with such a probable formula that there was little reason to doubt their accuracy, I am glad to be able to place the matter beyond dispute.

Among some Australian minerals sent to me for examination by Mr. Paton, the Curator of the Kelvingrove Museum, was a very complex sulphide, which yielded on analysis the following results:—

Lead	26·02 per cent.
Zinc	35·42 "
Iron	9·16 "
Manganese	1·28 "
Antimony	0·25 "
Sulphur	27·43 "
Silica	·13 "
	99·69

This resembled the disputed "Youngite" so closely that several other confirmatory analyses were made, of which the following is the average:

Lead	25·73 per cent.
Zinc	36·62 "
Iron	8·73 "
Manganese	1·30 "
Sulphur	27·28 "
Silica	·10 "
	99.76

Sp. gr.=4·56.

Leaving out the small quantity of silica, all of which was granular and uncombined, and the traces of antimony and copper; on adding together the iron and manganese, we get numbers agreeing very closely with the formula—

$$2\ ZnS \left\{ \begin{matrix} \cdot 40\ Pb. \\ \cdot 60\ Fe\ Mn. \end{matrix} \right\} S.$$

or, multiplying the whole by 5 we get—

$$10\ ZnS.\quad 3\ Fe\ Mn\ S.\quad 2\ Pb\ S.$$

The "Youngite" examined before contained rather more zinc and less lead; the probable formula being—

$$12\ ZnS. \left\{ \begin{matrix} 3{\cdot}5\ Fe\ Mn. \\ 2{\cdot}5\ Pb. \end{matrix} \right\} S_6.$$

But the difference is very slight, and the ratio of the zinc to the sum of the other metals, and consequently their general formula being identical, they may be taken as one and the same mineral.

The Australian specimen was found at Ballarat, Victoria, 300 feet below the surface, but I have not been able to ascertain with what minerals it was associated. It is coarsely crystalline, and perfectly homogenous in structure; the only foreign matter visible with a strong lens being a yellow speck or two of iron pyrites. But that this does not enter into the composition of the mineral (as supposed by Mr. Burghardt) is shown by the sulphur agreeing almost exactly with the iron calculated to ferrous sulphide (Fe S.); whereas, if it existed as pyrites, the percentage of sulphur would be 4½ per cent. too low, and the total would be raised to above 104.

All these facts go to prove that "Youngite" is a perfectly definite mineral, with a composition remarkably constant, considering its complex character.

I have to thank two of my friends, Messrs. Stewart and Hood, for doing several very careful analyses of the above mineral for me.