

ART. XLVI.—*Contributions to Mineralogy, No. 51*; by
F. A. GENTH.1. *Aguilarite*, a new species.

A PRECIOUS lot of about half a dozen specimens, secured by Mr. William Niven of Geo. L. English & Co., from Señor Aguilar, the superintendent of the San Carlos Mine at Guana-juato, Mexico, as Naumannite, were placed in my hands for identification. They all proved to be a new species which has been named *Aguilarite*, in acknowledgment to the discoverer of this interesting mineral. I am indebted to Messrs. Geo. L. English & Co. for allowing me to break off a sufficient quantity of this valuable material for investigation.

There was only *one piece* in the lot which gave aguilarite in a state of perfect purity. It is, associated with little quartz, imbedded in colorless calcite which was readily removed by dilute acetic acid. The pure crystals, thus obtained, were placed in the hands of Prof. S. L. Penfield, who very kindly determined the crystallization, of which he gives the following description:

“It is isometric; the crystals are skeleton dodecahedrons with only the edges well developed. Many are lengthened out in the direction of one of the crystallographic axes, looking then like a tetragonal prism, terminated by a pyramid of the opposite order; others are elongated in the direction of an octahedral axis and these resemble hexagonal prisms, terminated by a rhombohedron. I detached one crystal for measurement; it gave only approximate reflections; eight dodecahedral angles, in three different zones, gave angles which varied between $60^{\circ} 33'$ and $59^{\circ} 35'$, the average being $60^{\circ} 5'$, calculated $60^{\circ} 0'$. I also measured two angles over the top of the dodecahedron $89^{\circ} 59'$ and $90^{\circ} 11'$, calculated $90^{\circ} 0'$. The crystals are attached and grouped together, so that distinct, fully developed dodecahedrons do not seem to occur.”

The largest crystals were not over $10^{\text{mm}} \times 6^{\text{mm}}$ in size, groups of crystals up to 15^{mm} . No cleavage observed; fracture hackly; sectile; malleable; H. = 2.5; sp. gr. = 7.586; color iron black; luster very brilliant. In an open tube at low heat, gradually increased to red heat, it yields metallic silver, a slight sublimate of selenium, slender silky needles of selenous oxide and sulphuric oxide, which latter, attacking silver, forms a small quantity of Ag_2SO_4 ; no SeO_3 could be observed. The analyses gave:

	1.	2.	Ratio.		Calculated.
Ag	79.13	79.07	.732	4	79.50
S	----	5.86	.183	1	5.89
Se	----	14.82	.188	1	14.61
		99.75			100.00

Represented by the formula : $\text{Ag}_2\text{S} + \text{Ag}_2\text{Se}$.

All the other specimens were more or less altered; the aguilrite crystals had become rounded, and in the proportion to the extent of the alteration, their crystalline form was more or less obliterated. They often were penetrated by round holes, showed the presence of metallic silver and were coated with microscopic iron-black crystals, sometimes in, apparently, hexagonal scales. Although this coating was quite brittle, I did not succeed in obtaining the unaltered nucleus of aguilrite in a state of purity, as has been proved by the following analyses :

	1.	2.	3.
Ag	78.09	77.85	75.75
S	not det.	7.55	8.32
Se	12.39	12.22	not det.

Sb, As, Cu, etc., not determined.

I was able to separate, in a state of approximate purity, a little over half a grain of the scaly brittle iron-black product of alteration, which gave :

		Ratio.		
Ag	67.08	.621	5.84	11.6
Cu	6.44	.101	0.94	2
Fe	0.82			
Sb	10.82	.090	} .107	1.00
As	1.29	.017		
S	13.62	.426	3.98	8
	100.07			

Giving the molecular ratio of a cupriferous stephanite $5(\text{Ag}, \text{Cu})_2\text{S} + (\text{Sb}, \text{As})_2\text{S}_3$ with an admixture of metallic silver.

2. Seleniferous Bismuthinite and Guanajuatite.

A. *Seleniferous Bismuthinite*.—As crystallized Guanajuatite, Messrs. Geo. L. English & Co. sent me for identification a small specimen, consisting of slender, striated crystals, about 5^{mm} in length and 0.5 to 1^{mm} in thickness with distinct brachy-diagonal cleavage, imbedded in indurated clay. Color light gray, some crystals showing a yellowish tarnish. Sp. gr. = 6.306. The analysis gave :

	1.	2.	Mean.	Ratio.		Calculated.
Bi...	76.94	78.14	77.54	.371	10	77.08
S....	14.15	13.96	14.06	.440	12	14.18
Se...	8.80	not det.	8.80	.111	3	8.74
	99.89		100.40			100.00

This would prove the mineral to be a seleniferous bismuthinite of the composition $4\text{Bi}_2\text{S}_3 + \text{Bi}_2\text{Se}_3$. A piece which I received about four years ago from Prof. Carlos F. de Landero of Guadalajara, Mex., more compact, but with slender crystals, imbedded in indurated clay, looks as if it had come from the same mass which furnished Messrs. Geo. L. English & Co.'s specimen.

B. *Guanajuatite or Frenzelite*.—The results under "A" suggested repeating the analysis of Guanajuatite with a specimen which came from an old German collection, purchased about ten years ago. It is compact, granular, indistinctly fibrous and of a light gray color. Spec. grav. = 6.977. The results of the analysis are as follows:

		Ratio.		Calculated.		Frenzel found.
Bi....	68.86	.330	6	68.74	Bi ...	67.38
S.....	4.68	.146	3	5.27	S.....	6.60
S	25.50	.320	6	25.99	Se....	24.13
	99.04			100.00		

Corresponding to: $\text{Bi}_2\text{S}_3 + 2\text{Bi}_2\text{Se}_3$, analogous to the usual variety of tetradymite. The percentage of sulphur, in Frenzel's analysis, seems to be too high; as it is, the analysis would not lead to a rational formula, but the results are close enough to admit of a comparison with mine and suggest that the same mineral has been analyzed by both of us, and that the existence of the species cannot be questioned.

Chemical Laboratory, No. 111 S. 10th St., Philadelphia, March 23d, 1891.