well emphasized in sulfur, as are certain quantitative relations, but the number of sulfur crystals reported is too small to make quantitative relations of much value.

MINERALOGY.—*Plancheite and shattuckite, copper silicates, are not the same mineral.* WALDEMAR T. SCHALLER, Geological Survey.

The name plancheite was given by Lacroix,[1] in 1908, to a blue copper silicate from the French Congo, Africa. About five years later a blue copper mineral from Bisbee, Arizona, sent to the U. S. Geological Survey for identification, by Philip D. Wilson, of Bisbee, was determined by qualitative tests as probably plancheite. Abundant material was available for various determinations and it was soon found that several discrepancies existed between the properties of the two minerals from Arizona and from Africa. Accordingly a detailed investigation of the Arizona material was undertaken and it was determined that the Arizona mineral was not plancheite and that an additional new copper mineral was intimately associated with and genetically derived from the more abundant blue mineral, which in a preliminary note[2] was named shattuckite, the other new copper mineral being called bisbeeite. So far as known to the writer, plancheite has not been found in Arizona. The essential properties of shattuckite and of bisbeeite were published in the Third Appendix to Dana's System of Mineralogy. The paper describing in detail the properties of these two new copper silicates has not yet been published.

Zambonini[3] has recently questioned the validity of shattuckite as a separate species and has urged its identity with plancheite. He gives a new analysis of plancheite which does not agree with

[1] LACROIX, A. *Sur une nouvelle èspece minéral, provenant du Congo français.* Compt. Rend. **146**: 722–725. 1908; *Les minéraux accompagnant la dioptase de Mindouli (Congo français): plancheite, nov. sp.* Soc. Franç. Minéral. Bull. **31**: 247–259. 1908.

[2] SCHALLER, W. T. *Four new minerals.* Journ. Wash. Acad. Sci. **5**: 7. 1915.

[3] ZAMBONINI, F. *Sur l'identité de la shattuckite et de la plancheite.* Compt. Rend. **166**: 495–497. 1918.

the original one, but which does agree with the analyses of shattuckite. Explanations of his results are suggested at the close of this paper.

The nonidentity of shattuckite with plancheite, notwithstanding their very close resemblance in properties and in chemical composition, was definitely determined before the name shattuckite was proposed. The direct comparison of the two minerals was readily made, as Prof. Lacroix had kindly presented to the writer in Paris in 1912 a typical specimen of plancheite. The available specimen could not yield a sample of plancheite of the requisite purity for chemical analysis. Plancheite is intimately mixed with other copper silicates, the most abundant of which in the single specimen examined, is what is ordinarily called chrysocolla. A set of three thin sections of parts of the plancheite specimen shows that probably several other copper silicates are also present, although the two named are predominant. The fibers and spherulites of plancheite are imbedded, in places, in the massive pale green chrysocolla and the other copper silicates. The thin sections also show that although small fairly pure masses of plancheite spherulites occur in the rock, these masses are bordered by a layer of some other copper mineral. Judging only from the single specimen, it would be most difficult, if not impossible, to prepare even a very small sample of nearly pure plancheite for chemical analysis.

Abundant shattuckite was available, from which samples were prepared that after careful selection contained only small amounts of included tenorite. The analyses of three different samples of shattuckite establish its formula as $2CuO.2SiO_2.H_2O$; whereas the formula of plancheite, as revised, is given as $6CuO.5SiO_2.2H_2O$ (the original formula proposed is $15CuO.12SiO_2.5H_2O$).

If the only quantitative basis for determining the question of the supposed identity of shattuckite with plancheite were the chemical analyses, then the two minerals would readily be considered as identical. But there is a simple and absolutely conclusive method by which the question as to the identity of the two minerals can be answered. This is by a comparison of their

optical constants, of which the refractive indices are the easiest determined. If the refractive indices show a distinct difference, then the minerals are not the same.

The refractive indices of both minerals were determined by the writer before any mention of shattuckite was published and it was found that the lowest refractive index (α) of shattuckite was considerably higher than the highest (γ) refractive index of plancheite. The actual determinations are shown in table 1; there are also given the independent determinations kindly made by E. S. Larsen, of the U. S. Geological Survey. Mr. Larsen's values are more accurate than those of the writer and should be taken as the correct values. The accurate determinations of the refractive indices of such finely fibrous minerals as those under discussion is an operation requiring very careful work and considerable experience.

As table 1 readily shows, there is sufficient difference in the optical constants of shattuckite and plancheite to preclude their being identical.

TABLE 1

REFRACTIVE INDICES OF PLANCHEITE AND SHATTUCKITE

Index	Plancheite				Shattuckite	
	Lacroix [a]	Larsen [b]		Schaller	Larsen	Schaller
α	n.d.	1.645	1.640	1.644	1.752	1.730
β	n.d.	1.660	n.d.	n.d.	1.782	n.d.
γ	1.70	1.715	1.697	1.702	1.815	1.796

[a] Stated to be near 1.70 (γ), LACROIX, A. Minéral. France 4: 758. 1910.
[b] Two sets of determinations, made at different times.

Zambonini's analysis of plancheite yields the same formula as has been derived for shattuckite and he naturally concludes that the two minerals are the same. Two suggestions are offered: (1) that, through inadvertence, the mineral furnished Zambonini (obtained from Lacroix in Paris) really was shattuckite and not plancheite. This suggestion could have been readily proved or disproved by a determination of the refractive indices of the

material analyzed; (2) the material analyzed (plancheite) contained enough impurities (copper silicates) to affect the composition of the sample so that the results obtained are comparable to the composition of shattuckite.

But whatever may be the exact chemical relations of these two minerals and whatever may be the formula of plancheite the difference in the refractive indices proves conclusively that they are not the same.

PALEONTOLOGY.—*Description of a supposed new fossil species of maize from Peru.* F. H. KNOWLTON, U. S. National Museum.

Some months ago the United States National Museum came into the possession of a very remarkable specimen of fossil corn from Peru. It was sent in as an ethnological specimen, having been secured from a dealer in curios in the city of Cuzco, Peru, by Dr. W. F. Parks, of St. Louis, Missouri. Dr. Walter Hough, of the Division of Ethnology in the National Museum, brought the specimen to me for identification. Although it is wonderfully well preserved, it is in many particulars so different from the ordinary types of corn with which I was familiar that its affinity was not recognized until this was pointed out by Mr. G. N. Collins, of the U. S. Department of Agriculture, who for many years has been making a special study of the origin, evolutionary history, and distribution of Indian corn (Zea).

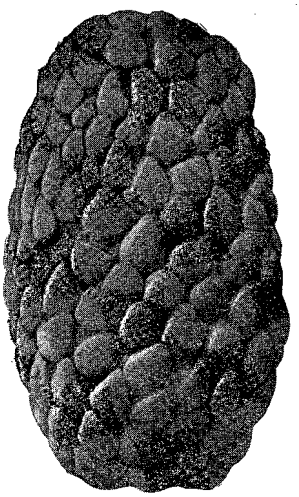

Fig. 1. Fossilized ear of corn.

The specimen has suffered practically no distortion during fossilization, though a portion of the apex has been broken off and lost. It is now a little more than 6 centimeters in length and was probably about 8 centimeters long when complete. The greatest diameter is nearly 4 centimeters. The point of attachment for the "ear" was very small, suggesting that it