ART. XIX.—*New locality of the Green Turquoise known as Chalchuite, and on the Identity of Turquoise with the Callais or Callaina of Pliny*; by WILLIAM P. BLAKE.

IN this Journal,* March, 1858, I directed attention to the occurrence in New Mexico of a green turquoise highly prized as a gem by the aborigines and known as "*Chal-che-we-te*." The completion of the railway along the valley of the Rio Grande has made the Cerillos Mountains, in which the gem occurs, much more accessible than it was, and the ancient mine has been re-opened and worked to some extent by Eastern capitalists, as made known by Professor Silliman.† The stone is in consequence more abundant than before, and at Wallace Station on the railway very good specimens can frequently be obtained of the Pueblo Indians.

I have recently visited another locality where chalchuite occurs and was mined by the ancients. This is in Cochise County, Arizona, about twenty miles from Tombstone, in an outlying ridge or spur of the Dragoon Mountains and not far from the stronghold of the Apache chief, Cochise, so long the terror of that region. This elevation is now known as the "Turquoise Mountain," and as there are several deposits of argentiferous ores near it, a mining district has been formed called the "Turquoise District."

At the turquoise locality there are two or more ancient excavations upon the south face of the mountain, and large piles of waste or debris thrown out are overgrown with century plants, yuccas and Cactaceæ. It has not been worked for a long time and probably never by the Apaches. The excavations are not as extensive as at Los Cerillos, and it is more difficult to find specimens of the mineral. It is evidently much less abundant than at the New Mexican locality. Enough of the gem was obtained, however, by searching in the waste heaps, to show that it is identical in its appearance with the New Mexican chalchuite. The rock is also similar and the chalchuite occurs in seams and veinlets rarely more than an eighth or a quarter of an inch in thickness.

The color is light apple-green and pea-green, precisely that of the New Mexican stone, as generally seen. There is in some fragments a faint shade of blue as at Los Cerillos, but the true normal color appears to be green rather than blue.

The specific gravity I find to be, of two different fragments, 2.710 and 2.828. The first was slightly porous and earthy and the second dense, hard and homogeneous. These results are

* The Chalchihuitl of the ancient Mexicans, this Journal, II, xxv, 227.

† Ibid., III, xxii, 67, July, 1881.

higher than I obtained with the specimens from the surface at the New Mexican locality, viz: 2.426 to 2.651. Two determinations recently made gave 2.500 as the specific gravity of two partly cut stones from the old Cerillos locality.

This stone is peculiarly interesting archæologically. I have shown, in my former paper, that it was in general use and high esteem among the Aztecs and Moctezumas, before the advent of the Spaniards, and that the Pueblos and Navajoes still value it highly. It is evident that the stone was known to all the leading tribes inhabiting the plateau region of Mexico, including the northern portion now known as Arizona and New Mexico. Of this there is much confirmatory evidence, obtained since my first communication. The reopening of the old mine revealed many implements of the stone age, and showed workings of much greater extent than even the enormous surface excavations indicated. The early explorers and historians of New Spain chronicle the fact that the inhabitants of Cibola had an abundance of turquoises. We also know that the chalchuite was worked with considerable skill by ancient lapidaries. A few years ago a remarkable specimen of neatly executed mosaic work in chalchuite was dug up from the ruins near Casa Grande on the Gila. A mask from Mexico preserved in the British Museum appears to be overlaid with small tablets of the same green gem. The stone thus appears to have been used for incrusting and overlaying very much as it was in ancient Persia. Its opacity, hardness and the tabular form in which it is obtained, fit it peculiarly for this use. The descriptions by Pliny of the *Callais* or *Callaina* (*Καλλαινός λίθος*) apply well to a stone like the chalchuite. According to C. W. King* in his admirable work on gems, *callaina* probably was the original reading in the chapter of Pliny treating of callais, and is a name derived from a peculiar green dye, the *callaicum*. Pliny describes the color of the callais or callaina as pale yellow, mixed with green, and again that the best have the color of the emerald. . . "No gem is more improved by setting in gold, and gold itself is better set off by no gem. The better kind lose their color by wetting with oil, grease or wine, but the inferior retain it more permanently." But Mr. King while noting the fact that the callais of Pliny is now universally understood by modern mineralogists to have represented our turquoise, thinks that the identification is not borne out by the description which Pliny gives. It seems to him to indicate a *transparent* rather than an opaque stone, an inferior peridot, perhaps. Pliny's statement that the stone is found of remarkable size, but full of holes and dross (*fistulosa*), is considered as repugnant to the idea of an opaque solid body like the modern turquoise.

* C. W. King. The Natural History, Ancient and Modern, of Precious Stones and Gems. p. 136.

Such objections vanish before the specimens of chalchuite as they come from the mine. Large masses do not occur without earthy impregnations and mixtures of a yellow color. The mode of origin and the accretion of more or less rounded semi-globular crusts in the cracks of the rock often leave spaces in a fistulous form, and these are generally filled by earthy deposits, colored by iron oxide. In the selection of masses for jewels such imperfections are cut away and of course do not appear in the turquois of commerce.

That the stone of which Pliny treats is not a transparent gem seems to be clearly shown by the statement of the effect of oil or grease upon it. He evidently is describing an absorbent stone, a porous and consequently opaque mass. It is an interesting fact that the Pueblo Indians at this day resort to the expedient of soaking the chalchuite in tallow or grease to heighten the color and to make the tint of the larger specimens more uniform. The grease is taken up by the more porous and softer parts of the stone, while the harder portions of a deeper tint do not absorb it. Ben Mansur, in describing the turquois, also refers to the improvement of the color of some sorts of the stone by steeping in oil. Damour* refers the green-colored hydrous phosphate of alumina ornaments, found in a Celtic grave, to the callais of Pliny, especially in view of the green color. The mineral is evidently a somewhat altered green turquois and is not specifically different, but is well entitled to the name callainite, the modified form of Pliny's name proposed by Professor Dana.† The name turquois is certainly unsatisfactory for the species. Callais or callaina and also *chalchuite*, not only have precedence in time, but are distinctive and better in form, and with the modification noted are in accord with the terminology of the nomenclature of the science. Moreover they are not misleading as turquois (Turkish stone) is in regard to the source of the gem. Although some of the mineral may have been found in Turkey, Persia has been the chief locality. This is fully recognized by Buffon,‡ and he cites from various authorities particulars regarding the localities in Persia, at Nichabour and at Firusku in the province of Irak. One of these authors§ says that the turquoises were there called "*firuses*," and King mentions *Firuzegi* as the name of Persian turquois. Brongniart, ii, 225, quoting from Chardin, says the turquois is found in a mountain named "*Phirous*," between Hircania and Parthide. Again the name turquois is applied to the blue fossil bone or ivory, called also the Occidental turquois and odontolite, of which large quantities were formerly, and are still, used in jewelry.

* Compt. Rendus, lix, 936.

† Dana's Mineralogy, 5 edit., p. 572.

‡ Buffon, Histoire naturelle des Mineraux, 1790, viii, 51.

§ Adam Olearius; Voyage, &c., Paris, 1656, p. i, 461.

The fact that the beautiful green of chalchuite is the normal color of the gem, and that among the ancients, and even so recently as the last century, the stones of a green tint were the most prized, should lead to a higher appreciation of this gem and to its more extended use in jewelry and choice mosaics. Mr. C. W. King, in the work already cited, says that the very rare antique works in turquois are in the green kind, notably the head of Tiberius at Florence in a stone as large as a walnut, and other half relief works in green turquois in the Marlborough collection. The chalchuite is well adapted to cameo or intaglio work, and the color is finer by candle light than by sun light and the blue tint is deeper.

In using the name *chalchuite* instead of the longer form "*chalchihuitl*," as in my former paper, I now follow Bernal Diaz, the historian of the conquest of Mexico, rather than Lockhart, the translator, for brevity and the accordance of chalchuite with the now generally accepted terminology of the names of mineral species. This name in all probability is older than Pliny's, and if not given the precedence of callainite, should at least have the second place in the synonymy of the species.

Mill Rock, New Haven, Conn., Jan. 6, 1883.