TURQUOISE AT BISBEE, ARIZONA

PRE-STRIPPING FOR THE LAVENDER PIT – 1951 AND BACKFILLING OF THE SACRAMENTO PIT

Looking east with the quaternary sediments on the Glance (center) and Naco Limestone (right) – 1953

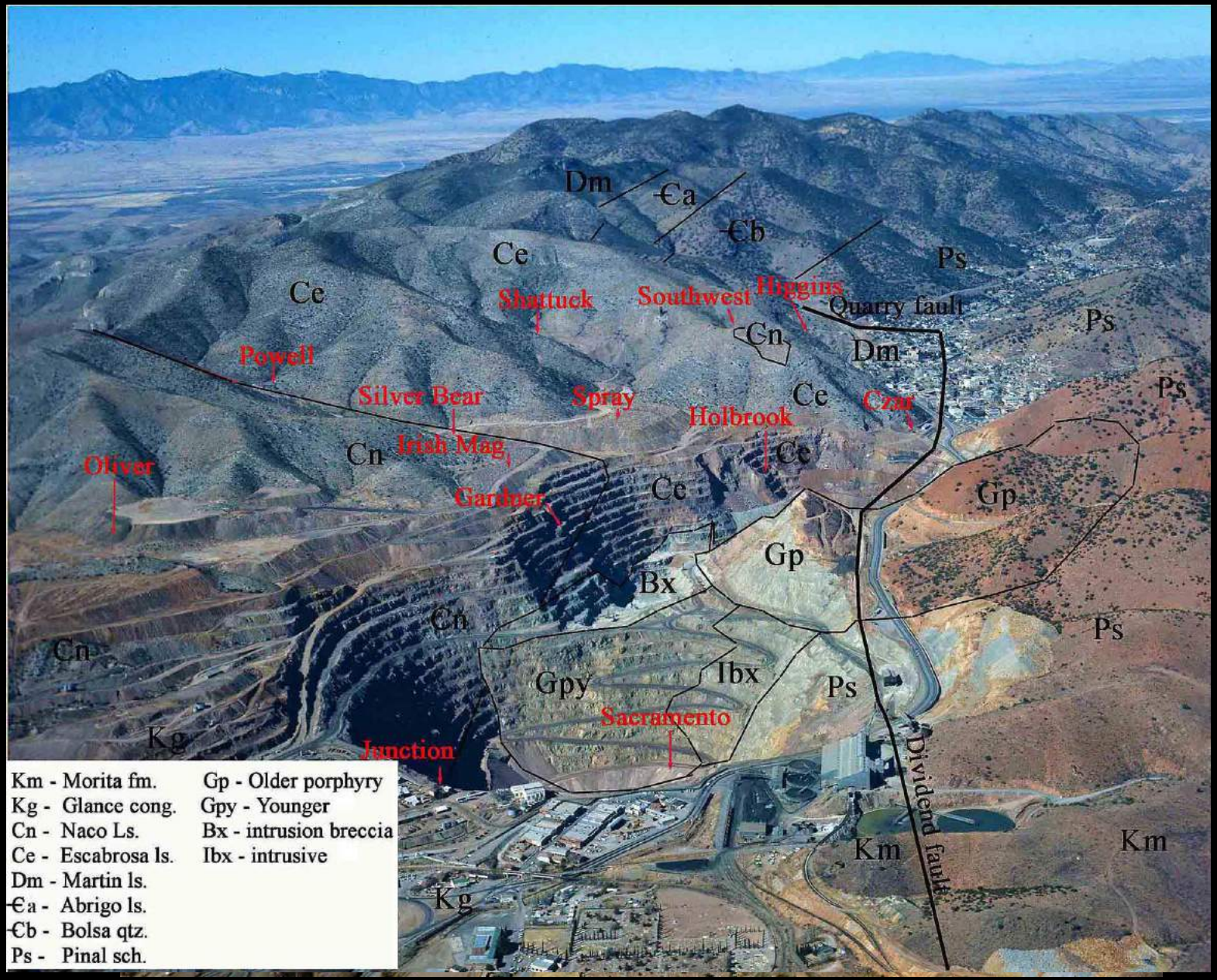
Looking southeast with the quaternary sediments on the Glance (left) -1967 ; note the collapsing Glance

The first turquoise found at Bisbee was between 1952-1953 with the stripping for the development of the Lavender pit mine. once the quaternary sediments were removed, exposing the post-mineral Glance conglomerate along the east wall of the pit. Minor amounts were noted in the deeply weathered glance as a pale blue, often powdery material.

As the pit was deepened, the quality of the material improved markedly with little to no weathering effects. However, the Glance was a weak, unstable unit. With depth, the benches soon began to collapse, forcing a flattening of the pit slope and in one area, material was dumped over the failing Glance to bring it to the angle of repose ± 35%.

Turquoise from the Lavender Pit was found **ONLY** in the Glance Conglomerate on the east wall of the pit.

General geology, looking west



The Cretaceous age Glance conglomerate was derived from all of the surrounding rock units under extreme weathering conditions. Cobbles exceeding a meter is size are common and transport distances of more than 5 km are indicated by the presence of sulfides and pieces of the Sacramento Stock Complex. In pre-Cretaceous times, a deep canyon had been incised into the Paleozoic limestones east of the stock and was filled by the Glance to a depth exceeding 200 meters.

The Lavender Pit Mine in 1974, looking south. The general outline of the deep pre-Cretaceous canyon is in red. The crumbling, unstable Glance Conglomerate can be seen within the outline.

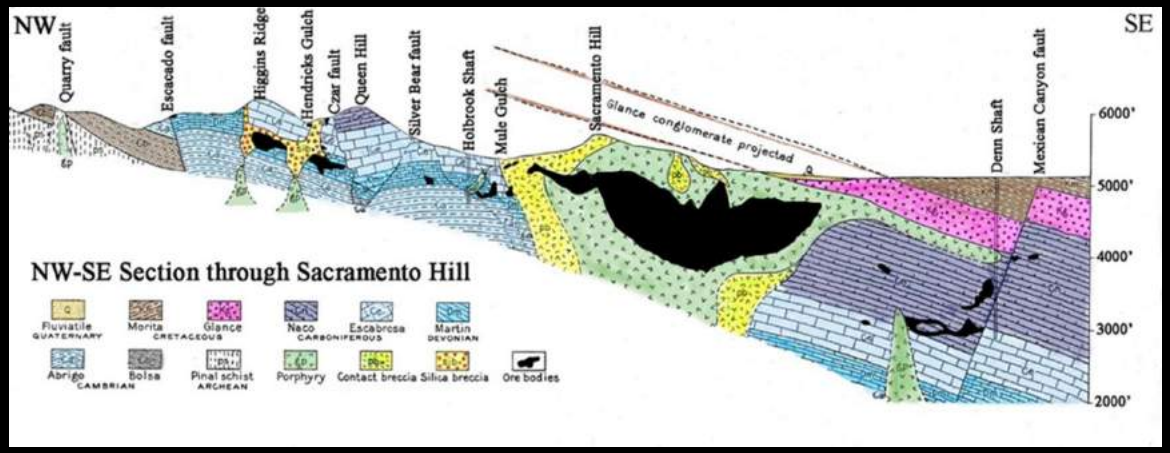
The Lavender Pit is the deeper part of the excavation, while the older Sacramento Pit occupies the center and the Holbrook Extension is in the foreground.

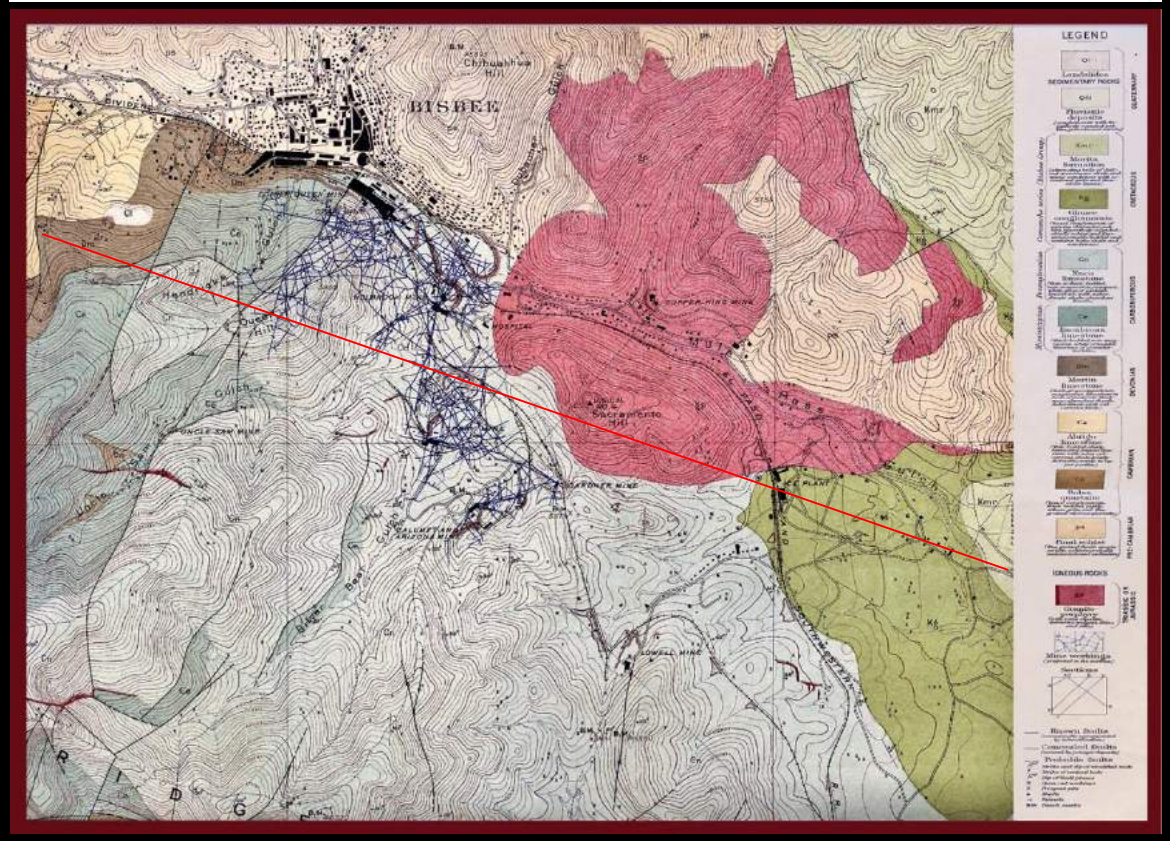
The barren core of the porphyry complex, which formed one wall of the Sacramento Pit, is evident at the narrow part.

Probable origin and age of Bisbee turquoise

The Glance was a post-mineral unit of Cretaceous age , which once covered and was partially derived from the units of the Sacramento Stock Complex. All of the rock units were tilted about 30% to the east during the Basin and Range formation some ± 17 MYA, which is so evident in southeastern Arizona.

There can be little doubt that the elements necessary for the formation of the turquoise – Al, Cu, P was the mineralized oxidizing, Sacramento Complex. Further, given the area of occurrence of the turquoise , it is reasonable to suggest that it was deposited post-tilting and during the last stage of supergene alteration of the Complex. This would indicate an age of less than 17 mya. Indeed, it may even be younger, as much of the supergene activity appears to be quite recent - < 1mya.





The west end of the Lavender Pit, looking southwest in 1957. The high waste dumps in the center right are the backfilling of the Sacramento Pit. Some turquoise bearing material was used as backfill, giving the incorrect impression that turquois was found in this pit as well.

The forms and characteristics of Bisbee turquoise

Typical fine to medium grained Glance conglomerate, composed of oxidized porphyry, limestone and silicified limestone with very minor amounts of turquoise as a single 3 mm grain replacement of an unidentified rock and as a 1.2 cm, oxidized, pulverant mass.

The forms and characteristics of Bisbee turquoise

Turquoise as an apparent preferential replacement of altered volcanic fragments in an unusually angular facies of the Glance Conglomerate.

While the rock mass is largely siliceous replacements limestone, minor iron oxides are present as well.

Specimen – 9 cm.

The forms and characteristics of Bisbee turquoise

A 3.7 cm., nugget-like mass of turquoise with minor included quartz grains.

When found, these masses were invariably encased in powder-like turquoise or unidentified pale blue to white clay-like, material. These forms were not particularly common.

The forms and characteristics of Bisbee turquoise

In the specimen to the right, it has formed as a replacement of pebbles of an unknown lithology. Note the abundant quartz both as inclusions within and as a partial riming of the turquoise.

While the very best Bisbee turquoise is widely regarded as equal to the best from anywhere (Paul Desautels, personal communication. 1967), little to no investigating work has been undertaken to better understand the true mineralogy or the depositional controls. Bisbee's other, more spectacular copper minerals have always attracted far more attention.

Turquoise in Glance conglomerate Specimen - 11 cm. This is more typical of the material sought after by most.

Turquoise from the Cole mine

In 1957 and 1958 very modest amounts of turquoise were found while mining a sulfide orebody on the 1200 level of the Cole Mine. As so little was found, it is more of a mineralogical curiosity than a source of lapidary material or even specimens.

It occurred in a high sulfide material with silicified kaolinite.

Turquoise as a thin veinlet in a pyrite/chalcopyrite mix in silicified kaolinite, specimen 4.5 cm.

Summary

For Bisbee, the discovery of turquoise in 1952 – 1953 was something of a surprise, as it had never been recognized in the 70+ years of mining these spectacular orebodies. As continued mining would show, turquoise from the Lavender Pit was to be found only in the non-ore bearing, Glance Conglomerate on the east wall of the pit.

Over the next 20 years many thousands of pounds of turquoise of variable quality would be collected (most illicitly by the mine workers). Most of the recovered material went to feeding a growing demand in the lapidary market. Few specimens were saved because the lapidary value generally exceeded the price mineral collectors would pay for a non crystalized mineral.