

## Odyssey to the Celestial Mountains

### A sobering look at exploring for gems

Article by Bart Curren, Columbia Gem House Inc.

It is easy for most of us to become jaded to the idea of gems being something rare. One only needs to attend the Tucson show in February to see literally millions of carats on display. We tend to lose touch with what actually goes into discovering and mining colored gemstones. To the public at large, the mention of prospecting and mining for gems usually inspires images of wealth and adventure. In fact, the vast majority of gemstone occurrences are random, hard to define and difficult to mine at a profit.



Tashmarine® mine camp (bottom right center)

When Columbia Gem House Inc. first introduced Tashmarine®, we were all very optimistic about reports from the mine that the resource was prolific and we would have a strong supply of Tashmarine for several years. The reality proved to be much more sobering.



43.94 carat Tashmarine®. Photo: Bart Curren

### A brief history

Most gemstone occurrences are initially discovered by accident and often by those knowing little to nothing about gemstones. The initial strike of Tashmarine diopside in 2001 was discovered in the Tien Shan Mountains in Western China while mining for mica, a mineral with many industrial applications. While mining the mica deposit, the miners stumbled upon a pocket that yielded about 50 kilograms of large gem quality diopside crystals, later to be named as Tashmarine® by Eric Braunwart, President and CEO of Columbia Gem House Inc. Knowing nothing about gem mining, the miners assumed that these pockets would be a common occurrence and they would be able to produce 50 kilograms per month with little effort. They were wrong. Pockets of gem quality material proved to be rare. From the start, mine production was sporadic at best. Size and quantity soon decreased to nearly nothing and eventually, mining was discontinued. In 2007, Eric Braunwart made the

decision to send professional mining geologist Dean Misantoni to the Tashmarine mining site in order to determine if the resources warranted investing more time and capital into mining. I accompanied Dean as a representative of Columbia Gem House to assist him and document the expedition.

### The Journey

Our four-day journey to reach the Tashmarine mining site began from Portland, Oregon to Beijing, China, and then by air to Urumqi in the Xinjiang Uyghur Autonomous Region of Western China, where we caught our first glimpse of the spectacular Tien Shan mountain range. From Urumqi, it was a two-hour flight west to Aksu, China where we met our miner and guide, Mr. Wong. The flight path from Urumqi to Aksu was directly over the Eastern end of the Tien Shan range. Tien Shan translates appropriately to “Celestial Mountains”. The origin of the name was obvious, especially from the air.

We left Aksu in an old beat-up Toyota Land Cruiser around 4:00 AM. After driving for a couple hours in pitch black night, the first light of dawn began to reveal the narrow strips of farmland reclaimed from the barren desert of the Tarim Basin. After three to four hours of driving on mixed pavement and gravel roads, we reached the mouth of the canyon leading into the Tien Shan range.



Clearing a path. Photo: Bart Curren

What started as a crude road quickly turned into no more than wheel tracks. Annual floods rearrange the boulders so the path changes continually. Many times we were forced to stop, evaluate the depth of the river, move boulders or find a new path altogether. In the end, the 15 mile journey up the river valley took over 6 hours of neck wrenching, head banging off-road driving to reach the mining camp. We quickly lost count of the number of times we had to forge the river. A count of full river crossings on the way out would reveal that we had forged the river a total of 61 times in one direction on the way to the mine. Once in camp, the intimidating beauty of the steep terrain of the Tien Shan Mountains began to sink in.

### **Uyghur of the Tien Shan**

The local Uyghur population is a hardy people well accustomed to harsh conditions of the Tien Shan region. Those who venture into the Tien Shan are mostly simple shepherds with herds of goats and sheep, with the occasional camel. Horses and donkeys seem to be the most common mode of long range transport. The typical living shelters for the shepherds range from simple lean-tos made from tree branches and logs to small huts made from mud and river rocks with logs, brush and mud used for the roof. Many are partially dug into the ground. One of the more sophisticated stone structures we saw sported a real glass window and had 12 volt power delivered from an automobile alternator run by a water wheel.

### **Exploration**

In this part of the Tien Shan Range, sedimentary limestone, sandstone and shale has been metamorphosed from the intensive pressures of mountain building. In the area where the Tashmarine was found, the sedimentary rocks contain zones of mineralization created by sedimentary rocks coming in contact with magma deep underground.

The first day of our exploration began after a night of broken sleep in mud dugout huts we shared with the local population of field mice scampering over the red, white and blue striped tarp used as a ceiling barrier. We began the first day of exploration with a complete tour of the mine site. First was a short grueling hike from camp, 1,000 feet up steep slopes to the tunnels where the first few pockets of Tashmarine were found. Diopside was everywhere, occurring in massive seams containing crude, opaque, fist sized crystals occurring with large crystals of mica mixed with crystals of sodalite, and what appeared to be small crystals of blue green apatite. Excitement of new discoveries began to help mask the burning pain in my feet and leg muscles from too many years without fieldwork. The awesome beauty of the Tien Shan Mountains draws the eye to its massive vistas. But one quickly realizes that if they want to survive on the sides of these mountains, they must constantly watch each and every footfall. There's little to no vegetation, or anything else to stop one from rolling down the mountain if they slip, and this is not the place to break bones. We continued with a 5-hour hike navigating the steep terrain around the entire mountain looking over the many prospect holes dug by Mr. Wong. We ended the day with excitement and optimism. Our physical exhaustion made it much easier to ignore the mice. After the first day of touring the mine site and all the adjacent workings, it was time to strike out on our own to survey and map the geology of the local area.



Tashmarine mine site (above left center).  
Photo: Bart Curren



Tashmarine mining camp, Tien Shan Mountains, Xinjiang Uyghur Autonomous Region, China. Photo: Bart Curren

### **Day to Day**

Our host, Mr. Wong hired a local English teacher from Aksu as a translator who was fluent in both Mandarin and the local language, Uyghur. Our translator was quite excited at the opportunity to speak to speak English with Westerners for the first time. But having only her pumps and dress sandals, she was completely unprepared for the physical demands of hiking in steep mountain terrain. So while out of camp and in the field with the miner, communications was limited to finger pointing and hand gestures augmented with some vocal tones for emphasis. On our fourth day of prospecting, the miner led us 10 kilometers up a canyon to look at what we understood to be a new site where a local Sheppard found more green crystals. However, after hiking continuously for about 4 hours, without examining a single outcrop of rock, we turned around and headed back to camp mystified about what had just happened. Later, after returning to camp, our translator indicated that we were supposed to meet one of the local shepherds far up the canyon. Although we could hear domestic dogs barking above just before turning back, we never saw anyone.

We spent a total of five days prospecting the immediate area around the Tashmarine mining site. Much of my time was spent looking at the ground underneath my feet while concentrating one step after another to avoid rolling an ankle or falling down the mountain. The first two days were filled with optimism. The third day, the reality of prospecting began to sink in. The fourth day was nothing more than an endurance test. By the fifth day, the initial optimism of finding more Tashmarine was lost and we spent most of our time hiking the area to be thorough while hoping for a prospector's good fortune of stumbling over something that was overlooked before.



Author and miner at tunnel entrance of Tashmarine mine  
Photo: Dean Misantoni

## The Evidence

Little evidence remains from the initial strike of Tashmarine. If we understood the finger pointing and hand gestures correctly, the only remaining evidence of the original Tashmarine occurrence was some areas of pure white calcite around the outside edges of the pocket. During our survey, Dean determined that the most likely possibility for the formation of large gem quality crystals of Tashmarine was within highly mineralized metamorphic zones, in areas where shrinkage during the metamorphic process left open cavities where large, gem quality crystals of Tashmarine had enough room to grow. It is likely that these cavities would have later filled with calcite during the final stages of metamorphism. Unfortunately, these “pockets” of Tashmarine are rare and unpredictable. It is likely that more pockets are waiting to be uncovered. But the pockets are completely random. The metamorphism of the region is of such a massive scale that the actual physical contact zones are not obvious. So it seems impossible to predict where to find them. Even though the mineral diopside can be found all around the region, the odds of finding more pockets of gem quality Tashmarine seems more like the odds of winning the lottery. It is a possibility. But the odds are against it and cost of mining, even in China, is likely to be far higher than the value of any Tashmarine that could be recovered.

In addition to diopside, we saw evidence of amazonite-bearing pegmatite with rose quartz as well as mineralized marbles with sodalite (hackmanite) crystals. The sodalite we found was not gem quality. Some of the hackmanite crystals could possibly have specimen value. But the economics of mining them are questionable at best. We also found iolite locked in massive gneiss in the immediate area. But even though the iolite appears to have a few grains of gem quality material in them, the iolite occurs in small isolated pods locked in the center of huge boulders of gneiss, making it economically impossible to extract. The blue green apatite we saw was large enough to be seen, but too small to cut even 2mm gems.

## Exodus

After 5 days of prospecting, it was time to leave. Our food supply had run dry and we were nearly out of bottled water. We packed all our equipment into the Land Cruiser and started the long grueling trip back to Aksu. We soon discovered that on the way in, we broke the tail pipe from the exhaust manifold. So the entire trip back to Aksu, the cab of the vehicle was filled with diesel fumes. To add insult to injury, something was wrong with the fuel injection system and top speed on the open road was about 35 miles per hour. The trip back to Aksu took about 13 hours. I guess we should feel fortunate that the last lug nut did not fall off the wheel until after we had driven through the first small village so someone was able to bring us a jack. This because the jack supplied with the Land Cruiser was inoperable.

Dean and I did not fulfill our dreams of returning home with the next wave of Tashmarine production. But we did manage to complete our goal. The true nature of prospecting and mineral exploration is not just about new discoveries. It is about defining the nature and economic viability of the discoveries. Every once in awhile, a gem deposit proves to be consistent and reliable enough to support a continued mining operation. But most do not. The trip to the Tashmarine mine was intended to define the possible productivity and



Typical diopside crystal. Photo by Dean Misantoni



Iolite mass in Gneiss boulder. Photo by Bart Curren



Author Bart Curren at mine entrance  
Photo: Dean Misantoni

economics of the deposit. Even though we returned with empty pockets, we did establish that the Tashmarine mine, as currently defined, is not an economically viable mine site. The potential of the region is huge with great opportunities for new discoveries, possibly more Tashmarine, or maybe something altogether different. Eric Braunwart endeavors to find ways to support continued prospecting of this region in hopes of new discoveries. For myself, I feel very fortunate to return with the memories of prospecting in one of the most remote regions on earth. Our odyssey to the Tashmarine mine site and the Tien Shan Mountains was truly the trip of my lifetime. We should all be so lucky as to suffer so grand an adventure.



Breathing in the experience during a much needed rest. Photo: Bart Curren