

The Daniels Mine Surveyor

History indicates that surveying likely began in ancient Egyptian to determine taxes on landowners. Methods used by the Egyptians influenced early Grecian surveyors, who were referred to as “rope stretchers,” because they used knotted ropes to take measurements.

Many of our early American pioneers were surveyors: Presidents George Washington and Abraham Lincoln and pioneer Daniel Boone. These early surveyors would survey western uncivilized territory ahead of the general population to ready land for pioneers to purchase.

Irregular shaped states were adequate in the original 13 colonies, such as Kentucky, Tennessee, and parts of other eastern states. After the Louisiana Purchase in 1803, Congress approved the subdivision of public lands based on longitude or latitude from an office in Washington DC, and parcels could be designated without reference to any condition of the land itself.

The discovery of gold in 1848 at Sutter’s Fort in California spurred a rapid westward movement into unsurveyed land to collect potential fortune. Prospectors needed a way to stake their claim and prevent “claim jumping” on unsurveyed land. The law allowed that the first person to put public land to use was granted the claim.

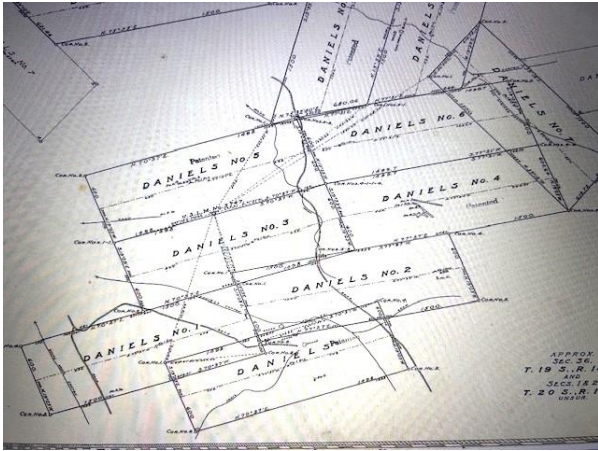
Two types of claims a prospector used were **placer** claims and **lode** claims. **Placer** mining is used when superficial deposits are washed out of a vein or lode. **Lode** mining is when veins of quartz or other rock bearing gold, silver, copper, lead, etc., are still imbedded in rock. Federal statute limits a lode to be no larger than 1500 feet in length and 600 feet in width (300 feet on either side of the vein). Lode mining was the method used by Daniels.

To claim mining rights on unsurveyed land, a monument stone was used sometimes to reference a point for the location of mining claims. Preferably, “Location Monuments” or “Mineral Monuments” (designated USLM or USMM) were used and generally located upon a visible, prominent point near the claim.

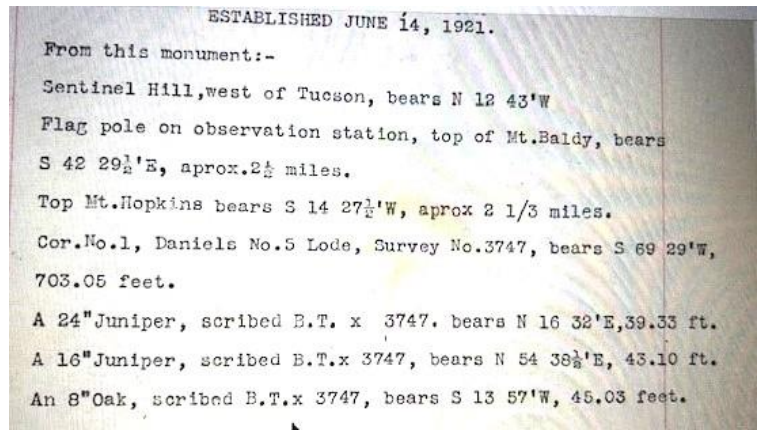
In Arizona, Ben Daniels mined in various areas of Madera Canyon. As long as he worked the public lands and showed improvements annually, no one could “jump” the claim. The public land was still not owned by Ben, but he held the mineral rights. By patenting his mining parcels, the land and the mineral rights belonged to him and to his descendants.

Ben was 69 years old in 1921. His wife, Annie, was 17 years younger, and Ben wanted to provide for her in the likely case he died before her. Thus, he began the process of patenting his mining sites.

On May 1, 1921, surveyor Paul E. Fernald arrived at Ben Daniels Camp along with his chainman, Leo F. Hicks. The prominent point (USLM) Fernald chose to begin surveying was peak 5463. He began by mounting a flagpole atop the peak, the highest point in the claim area. The pole was triangulated by sighting in Sentinel Peak in Tucson, Mt. Baldy (Wrightson) and Mt. Hopkins. It was also triangulated by surveying three bearing trees (BT) at the peak close to the flagpole. If the pole was destroyed by some means, it could be replaced by using the bearing trees (BT’s) as reference points.



Plat map showing the 11 Daniel lodes



Field notes pointing out the location of the flagpole atop peak 5463

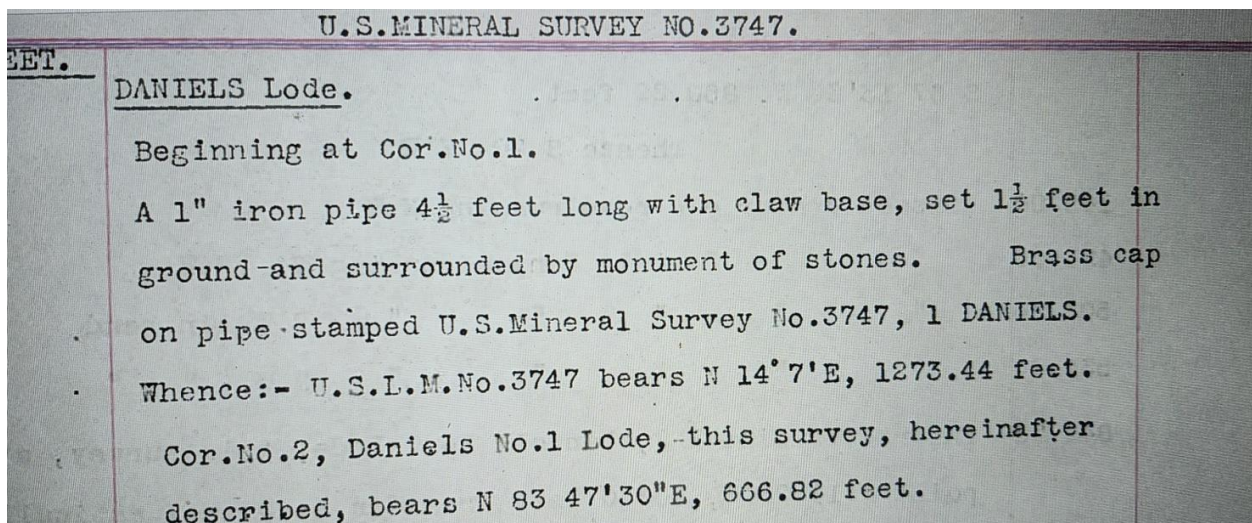
The juniper bearing trees are still present today, but the oak bearing tree no longer exists. The trees were blazed (3" x 6" cut off the bark always facing the pole). The etching in each blaze of the trees was "BT 3747", having long since disappeared.

The claim was designated US Mineral Survey No. 3747. The eleven lodes to be laid out were each 20 acres and 1500' by 600'.

The two men surveying the claim probably worked weekdays, camping overnight near Daniels Camp (today's Kent House) and returned to Tucson on the weekends. They returned with more supplies for the coming week to do the grueling work during the hottest part of the year. The survey began on May 1, 1921, and was finished eight weeks later on July 20, 1921.

After the flagpole was in place atop 5463, Fernald began to identify the 4 corners of each lode on the ground in reference to their direction and distance from 5463. Then the location of Corner #1 for each of the lodes was noted on the ground. Corner #2 for each claim was then referenced to its Corner #1 and so forth, until the outline of each lode had been defined.

The lode's Corner #1 was the most important of the 4 corners of each lode. Below is the beginning of the 22-page field survey report starting at Daniels Lode:



Fernald describes the corner #1 to be set and then used the word “whence” (or “then”). Next, he indicates the distance and direction from corner #1 to the USLM 3747, North East 14 degrees and 7 minutes for 1273.44 feet; then from corner #1 to the second corner, North East 83 degrees, 47 minutes and 30 seconds for a distance of 666.82 feet. The word “bears” can be interchanged to the word “is” and, therefore, indicates to go a certain distance and direction to the pole or corner.

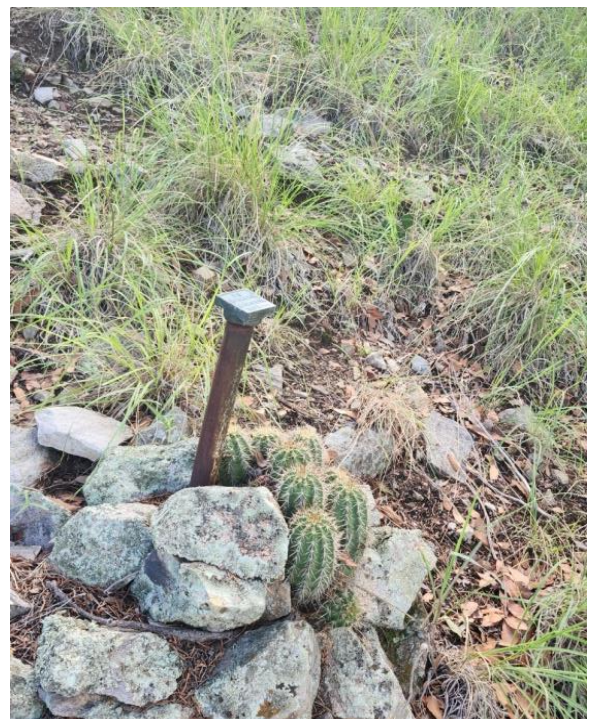
Fernald likely started surveying at the “Daniels Lode” which was the southernmost lode of the claim. The chain the men used was made of 100 iron or steel links and was 66 feet long. Eighty chains made up one mile. Ten square chains made one acre. Fernald would sight through his transit and direct Hicks where to go. Once Hicks was in line with the azimuth and to the end of the chain, he would mark that location, and Fernald would move to that point. This would continue until the distance had been reached. If roads, canyons, trails or intersecting line lodes were crossed during the process, the distances would be noted in the survey. If a tree blocked a line of sight, Fernald would sight to the trunk, measure the width to be added to the distance, walk around the tree, and then continue the line.

In addition to the lodes and measurements, a close inspection of the plat also shows Whitehouse, Daniels and Bog Springs Canyons, Daniels Mine, Daniels Camp with three houses in the area including the present day Kent House, Kent Road, White House Canyon Road, and the present day road to Kent House.

Below are samples of markers found in 2024.



1D10, first marker found



4 Daniels with mammillaria



4D6, the second marker found



3D1 marker with top missing

The claim has 49 markers: 44 are corner markers for the 11 lodes; 5 are intersect markers where the lodes overlap and where markers were placed. To date of the 49 total markers, 25 have been found; 12 were searched for but not yet found (some undoubtedly gone); and 12 have not yet been searched for.

It is hard to imagine the hard work done by Fernald and Hicks measuring in such rough and mountainous terrain. It is also amazing that so many of the markers, still in good shape, were hidden until now, 103 years later.

Summarized by T. Ferguson from material contained in U.S. Mineral Survey No. 3747, the Mining Act of 1872, the Bureau of Land Management website, Annie Daniels Claim by T. Johnson and Wikipedia. Photos by T. Ferguson.