

# Basics of Understanding, Maps of Bisbee's Underground Mine Workings

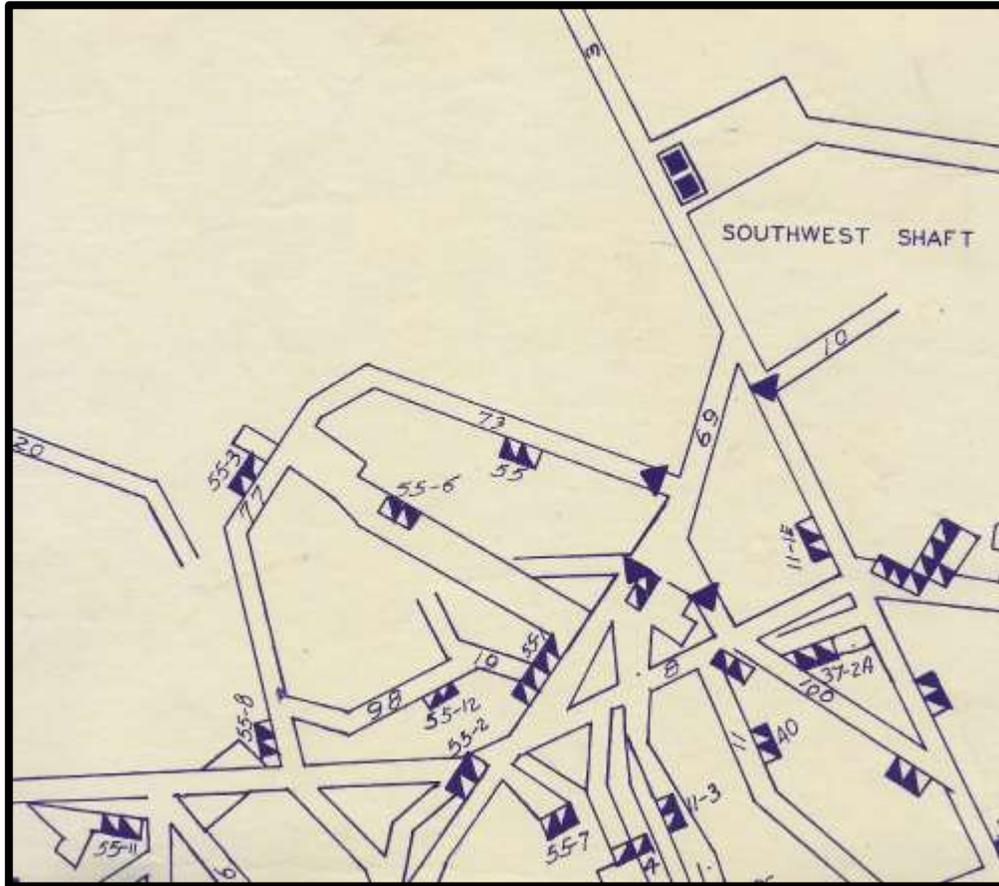


Today, mine maps are often seen as a curiosity and are treated with mild interest. Although, some are truly works of art with hand colored details and drawn carefully on vellum, most are utilitarian and printed on high acid paper. These maps deteriorate quickly and are often not saved as the usefulness of the information on them seems limited. Yet, these documents can provide useful information even when the areas are completely inaccessible or mined out, such as the deeply flooded levels of the Campbell or the upper levels of the Holbrook mine. The engineers in Bisbee, produced maps generally on one of three scales 1"=50 ft. 1"=200 ft. or 1"=500'. During the 1970's-1980's, mine maps were used by mineral collectors to determine how to access long abandoned sections of the mines in an attempt to recover specimens.



An example of a section of a 1"=200' scale map of the 700 level Shattuck Mine (reduced in size for this application)





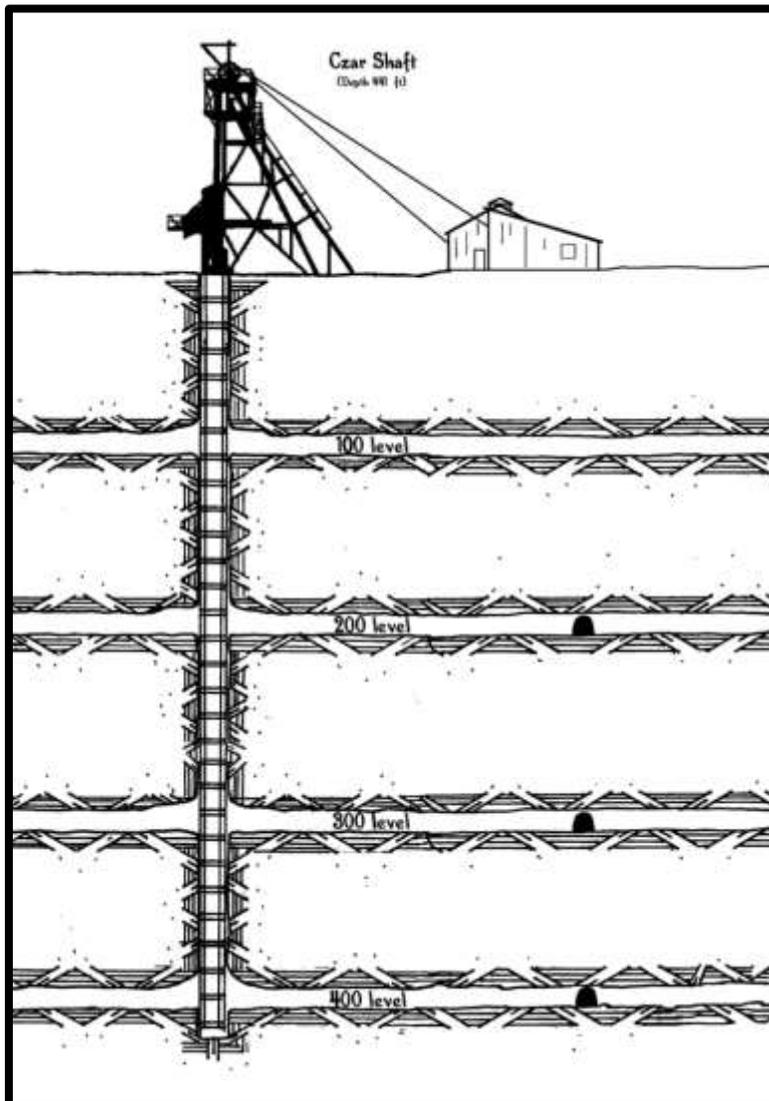
Part of a 1"=50' scale map of the 3<sup>rd</sup> level Southwest mine  
(at full scale)

With over a massive 2,200 miles of underground workings, the mines at Bisbee rank among the world's largest. These passageways were carefully surveyed and mapped, usually weekly. The workings of the larger mines are centered on deep vertical shafts with levels branch out, every 100 vertical feet. Levels are comparable to floors in a building. These levels provided access to the ore mining areas. The space between levels is divided into floors every 7.5 ft. A map was created for every floor section mined or even prospected by diamond drill holes showing location and geology including metal content if mineralized.





Left; Czar Shaft c-1963



Left; Diagram showing the levels of the Czar Mine



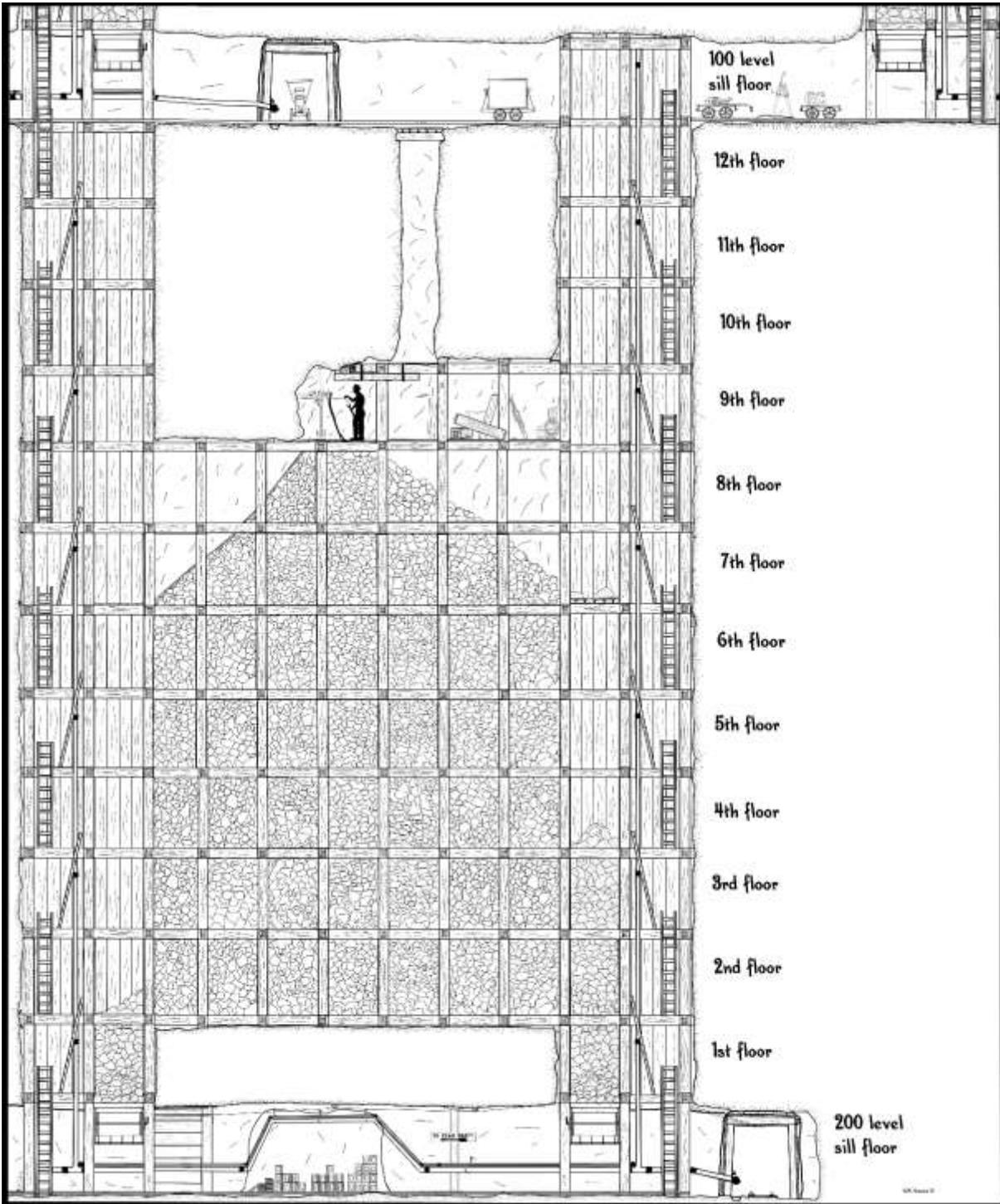
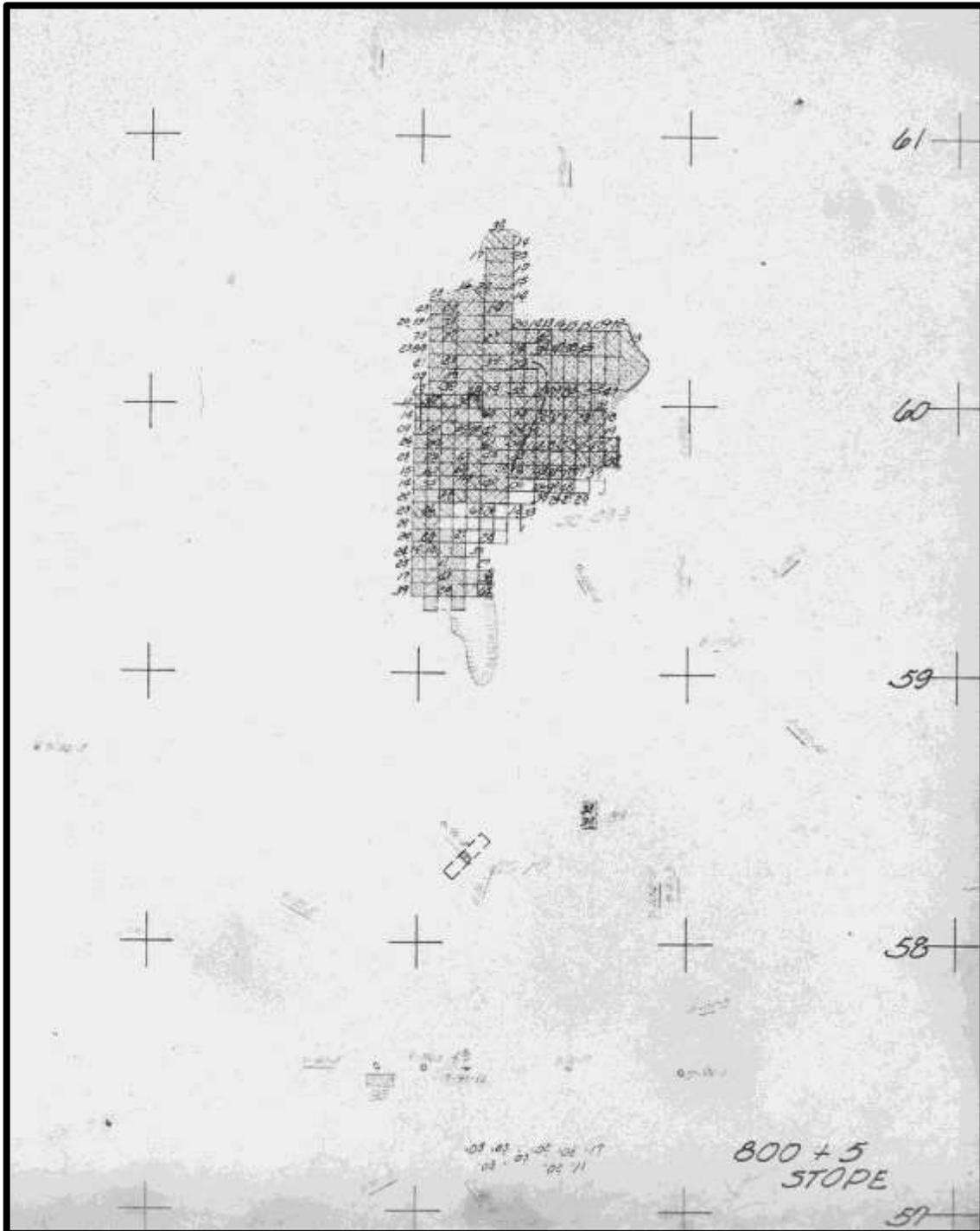


Diagram showing the floors between levels for an area where the levels are 100 feet apart. Sill level is 10 feet high, while the other floors are 8 ½ feet high.



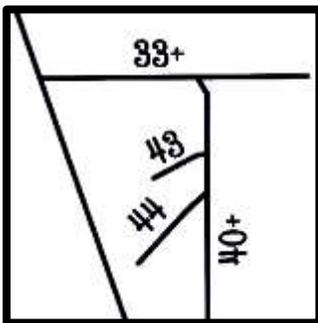


A map of the 5<sup>th</sup> floor of a stope on the 800 level, Cole Mine. Other mine workings, including numerous diamond drill holes, both mineralized with assay data and non-mineralized with only the hole number and two raises (93 & 89)

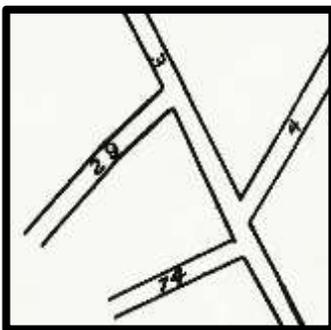


## The symbols

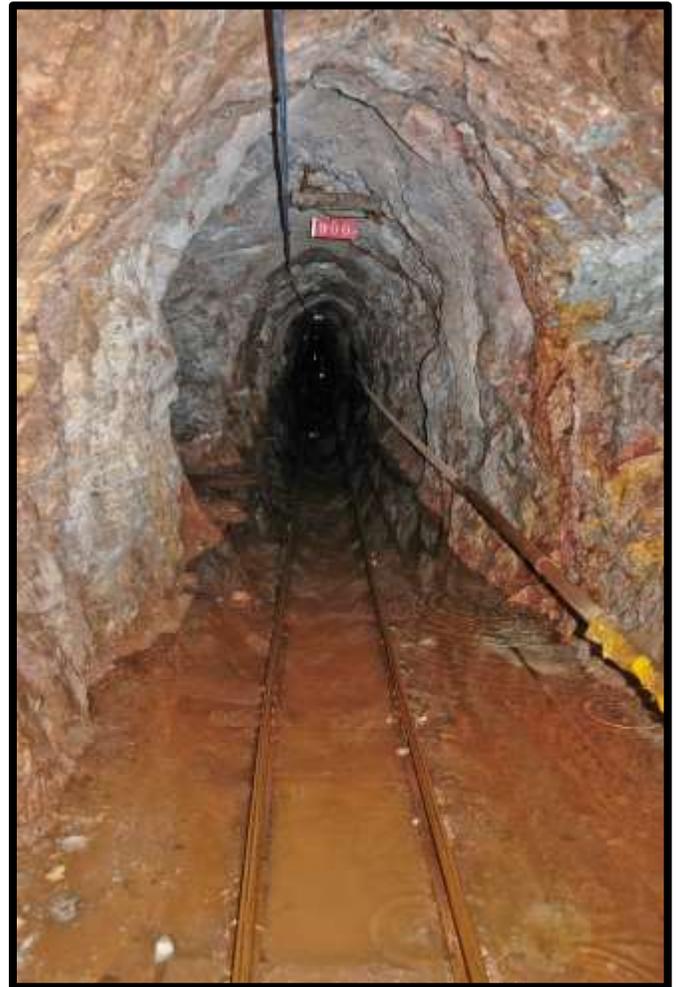
**Cross cuts and drifts,**  
Drawn either as a single line  
or two parallel lines. These  
are the “tunnels” or passageways.



View, 1"=200' scale map



View of 1" =50' scale map



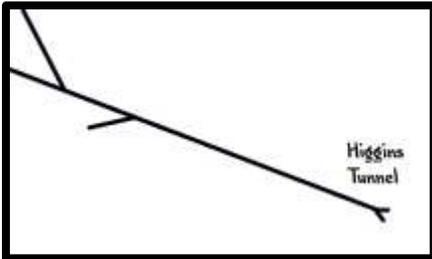
# 30 drift, 3rd level Southwest mine



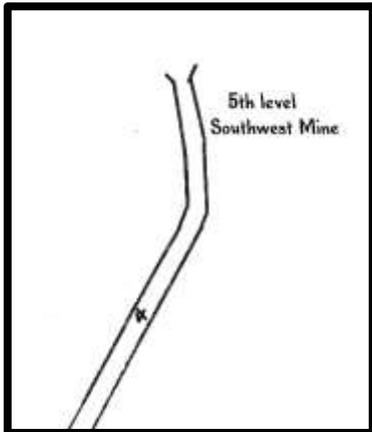
**Adit or Tunnel portal**

A single or double line that is drawn flared by two short lines.

These are horizontal entrances to the mine workings.



Higgins mine portal on 1"=200' scale map.



5<sup>th</sup> level Southwest Mine portal on 1" = 50' scale map



5<sup>th</sup> level portal Southwest mine

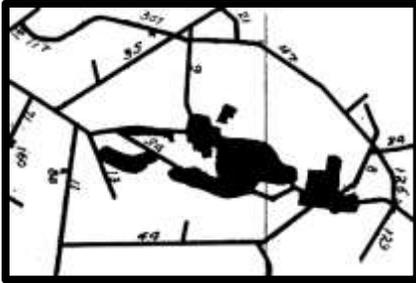


## Stopes

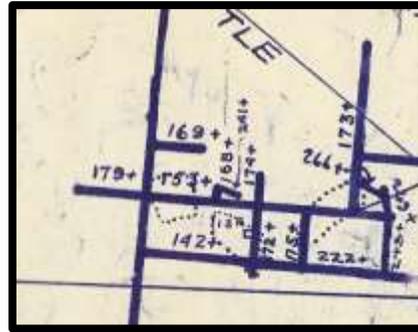
Stopes are the areas ore is mined. They are typically irregularly shaped.

On 1" = 200' and 1" = 500' scale maps stopes are shown as dotted lines or are blacked out.

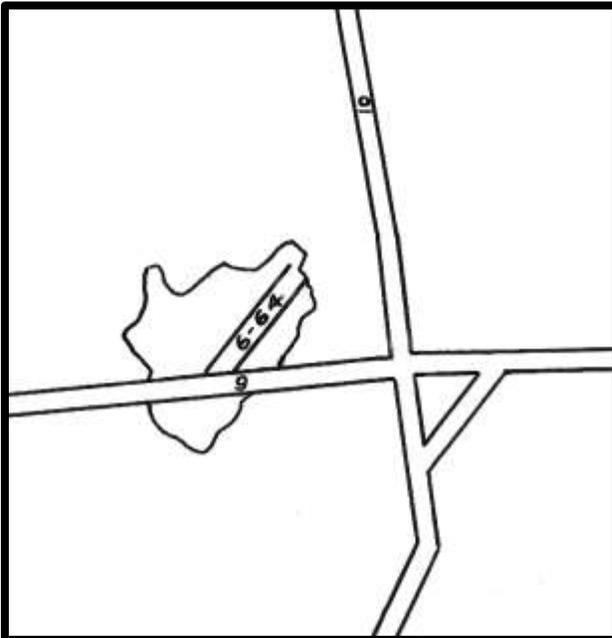
On 1" = 50' scale maps the stopes are outlined as a single solid line. Note, that the maps normally show the stope dimensions on the sill floor/level. The stopes are much larger, but this information is shown on the individual floor maps.



1" = 200' scale map with stopes blacked out.



1" = 500' scale map with stope outlines as dotted lines



1" = 50' scale map with the stope drawn as a solid line, Note that 6-64 and part of 9 crosscuts have been mined out





Stope in the Higgins Mine Tunnel Level

**Raises:** Vertical openings driven from the bottom upwards and were used to provide ventilation, access to an area or a chute to transfer broken rock. They are typically divided into compartments single compartment raise are 5'3" X 5'3" a double compartment raise is 6' X 11' and is divided into two 5'6" X 6' compartments. Raises of more than 4 compartments are not common, but one raise to 11 stope on the 3<sup>rd</sup> level of the Southwest mine had seven compartments They are drawn as black rectangles on 1"=200' and 1"= 500' scale maps. On 1" =50' they are drawn with each compartment as a square that is half filled leaving one half as a white triangle.

- symbol for raise on 1"=200' and 1"= 500' scale maps

**Symbols for 1" = 50' scale maps**



single compartment



double compartment





triple compartment



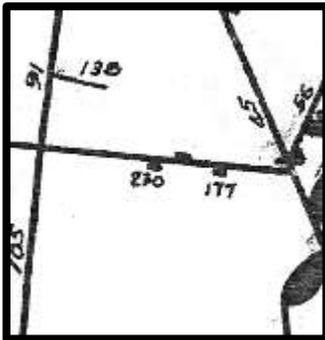
four compartment raise



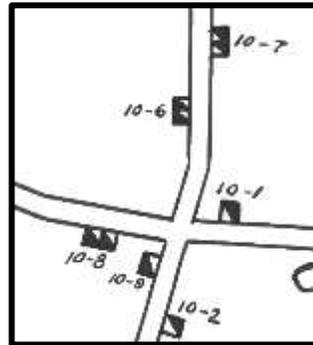
double compartment with manway and chute compartments indicated



Double compartment raise left empty. This was done either by carelessness or when the map was considered unimportant or useful for a short period of time. This is problematic, because this symbol is used intentionally sometimes to indicate a raise from the level below that is open on the level.



Three raises on a 200' scale map, 230, 177 and one unnumbered.



Six raises for # 10 stope 5<sup>th</sup> level Southwest mine.





Double compartment raise, one chute compartment and one manway. 6<sup>th</sup> level Southwest mine.



**Winzes:** vertical or inclined openings that are sunk or driven from the top downward. They are more expensive to develop compared to raises and are uncommon. Winzes are normally used for exploration and prospecting deeper or isolated areas. These workings are difficult to tell from open raises, unless timber or remnants of drill holes are remaining. An examination of drill holes can tell which direction the opening was mined. The difference between winzes and open raise from below is normally only technical and makes a small difference to someone exploring the mine workings.



winze



“Thursby” incline a double compartment winze on the tunnel level of the Higgins mine. The left compartment was a manway and pipe. A hoisting compartment was on the right.



**Open raise from below:** Raises were regularly developed from one level to the next level. This was to allow for ventilation, travel of men and to drop waste rock into stopes for backfilling. Not uncommonly they encompass the entire drift and are a 100 ft. deep. After they were abandoned these raises often created an impassable barrier to travel.



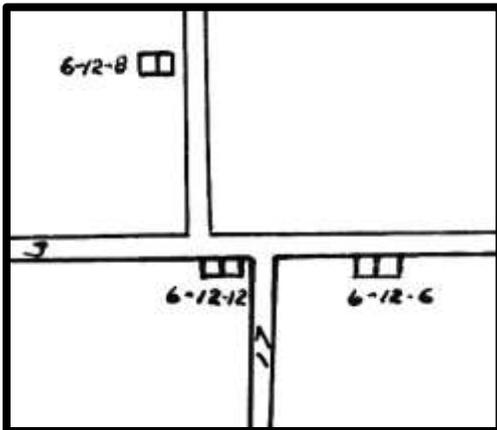
indicates an impassable open hole, often formed by raises or stopes.



Open hole Indicates a raise open from the level below



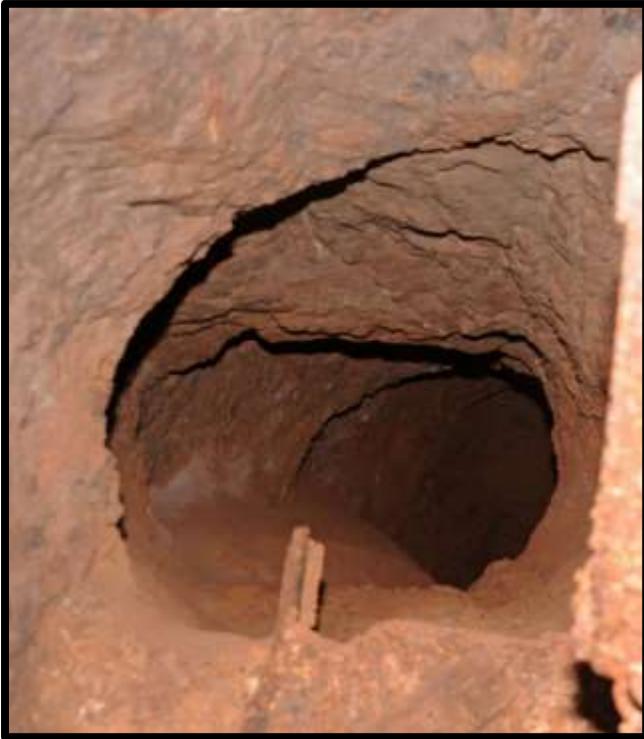
A significantly less commonly used symbol for a raise open from the level below





#25 crosscut 5th level Southwest mine with an open raise from stope below





Two views, of an open single compartment gob raise from a 4<sup>th</sup> level stope.  
# 17 crosscut 5<sup>th</sup> level Southwest mine



**Shaft:** The normally a shaft symbols occurs with the shaft name. The most commonly drawn is an open rectangle surrounded by a circle or the symbol for a winze.

1" = 200' and 1" = 500' symbols



Most common symbol for a shaft



Used on the Shattuck & Arizona maps to indicate a shaft



Rarely, used to indicate shafts



Rarely, used to indicate shafts

1" = 50' symbols



most commonly used symbol, same symbol as a winze



rarely, used symbol

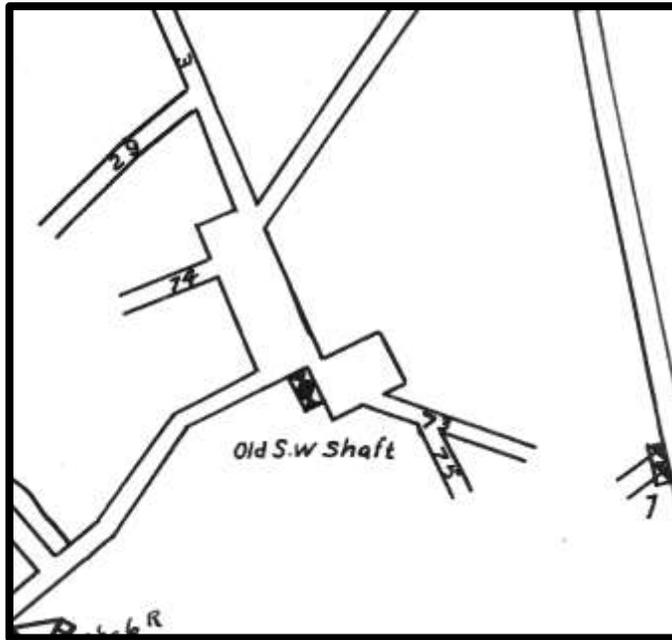




2966 level Campbell interior shaft

**Shaft stations:** large rectangular chambers are cut where the levels intercept the main hoisting shafts. These chambers are used for temporary storage of mine cars and supplies being lowered or raised on the cages. On 1" = 50' scale maps they are drawn as enlarged rectangular areas. Normally, they are not indicated on 1" = 200' and 1" = 500' scale maps





Southwest Shaft# 3, 5<sup>th</sup> level Station

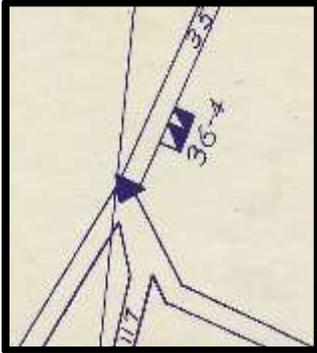


2966 level Campbell (main) Shaft station



**Cave in tight:** completely, seals the tunnel and creates an impassable barrier. These are represented by a solid or filled triangle. The symbols may be crudely drawn as they were added by an engineer or a boss while underground. This symbol is used on all different scale maps.

 = caved tight



Left; 1' = 50' scale map showing a cave-in marked



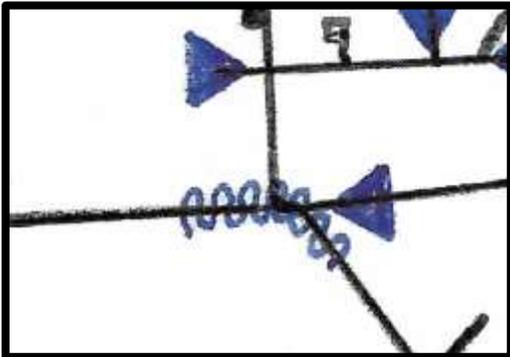
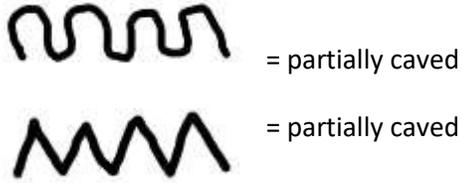
Above: Intersection of 24 and 19 crosscuts.  
Number 24 xc is caved tight. 5th level Southwest Mine



Right: Tight cave-in, #10 xc 6<sup>th</sup> level Southwest Mine



**Partially caved:** represented by squiggly or zig zag lines on all scales of maps. This indicates that the area is caving, but the drift is still passable. Note, that even if a crawl space is only open it will be marked as passable.

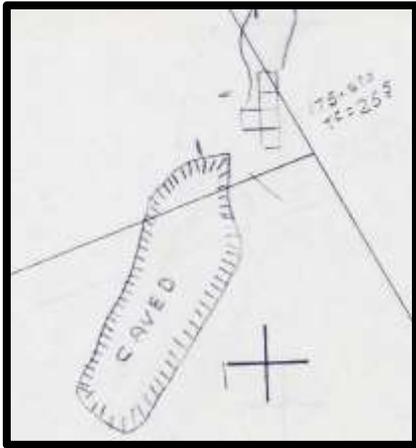


A partially caved intersection on the 6<sup>th</sup> level Southwest Mine



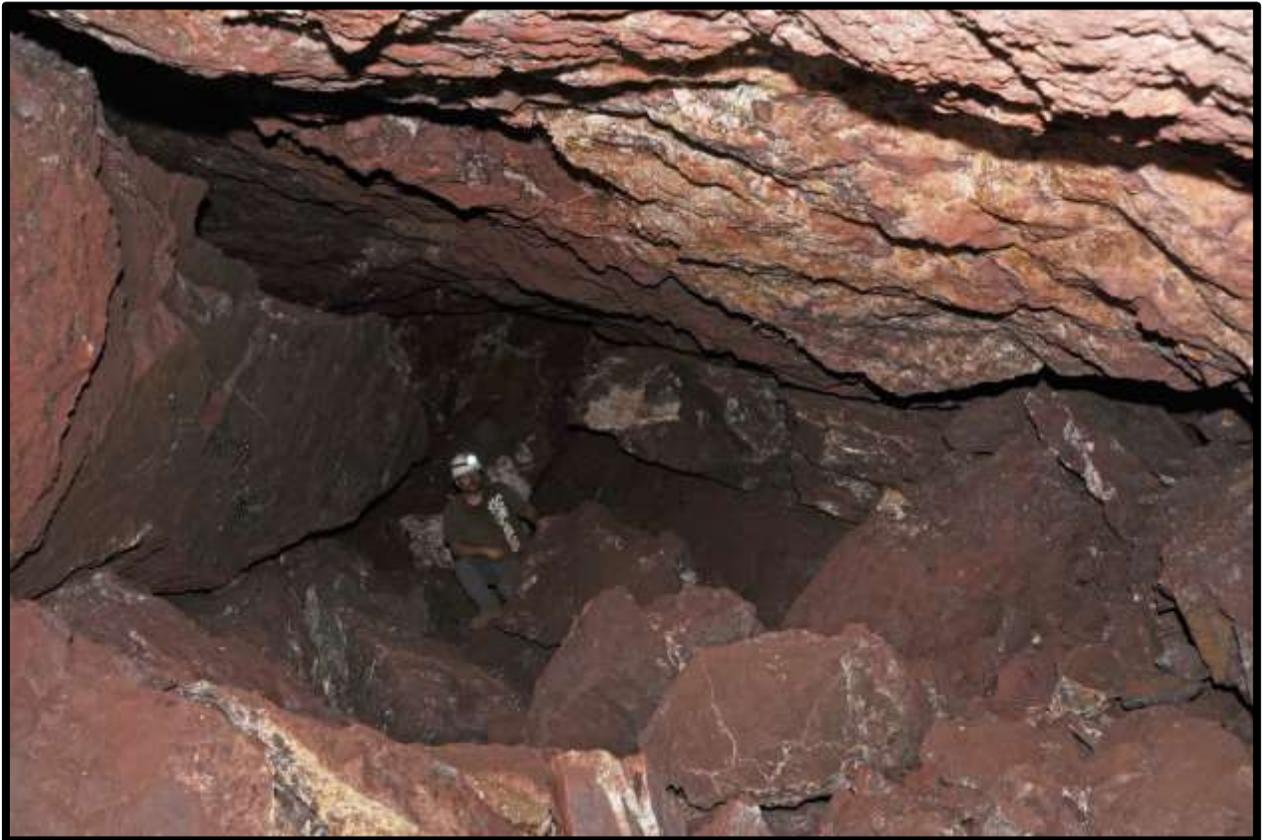
Partially caved 21xc 6<sup>th</sup> level  
Southwest Mine





= caved stope

A stope outline with short perpendicular lines indicates a caved stope. Normally they are marked caved, but sometimes they are simply marked "cave" and can be confused for natural caves. These stopes are often at least partially accessible.



A section of a caved stope 6<sup>th</sup> level Southwest Mine



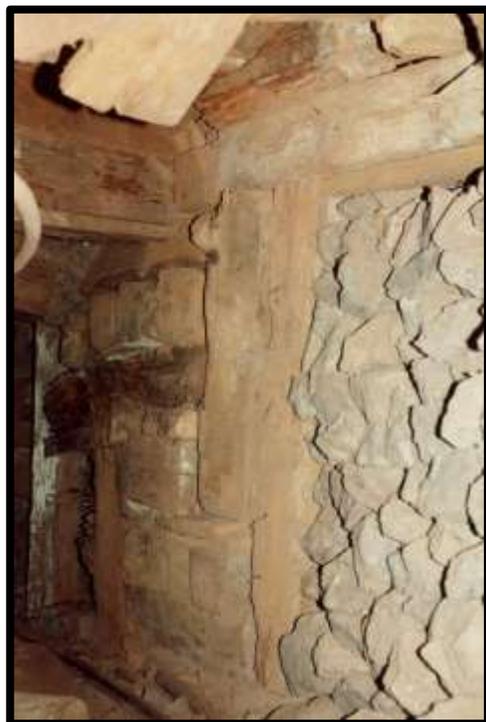
**Gobbed tight:** represented by three or four straight lines perpendicular to the mine working. These indicate the mine working has been completely backfilled and is impassable. This symbol is used on all scale maps.

 = gobbed



A drift gobbed at a chute, 6<sup>th</sup> level Southwest Mine

Gobbed drift along # 2 crosscut  
5<sup>th</sup> level Southwest mine, note the  
rock wall to the right, built to retain  
the gobb, while scrap timber was  
used at the left



**Diamond Drill Hole:** Diamond drills were used to explore unmined areas of ground. A diamond studded, hollow drill bit was used to drill through the rock. These holes were sometimes thousands of feet in length. A core of the rock was retrieved and was studied by geologist. These are represented by dashed lines showing only the section of the drill hole that drilled through the floor section. Vertical holes are indicated by an unfilled circle. Drill holes that agree horizontal with a level or a floor are drawn as a thin straight line. Sometimes, they are found radiating from a single point or a vertical drill hole. The holes are identified by a series of numbers for example 13-186-22. The first number indicates the level of origin, the 1300. A second number identifies the crosscut number that the hole was drilled from. In this case 186 crosscut and the final number indicates the number of the hole. Which is 22. It can be read 1300 level 186 crosscut #22 hole.



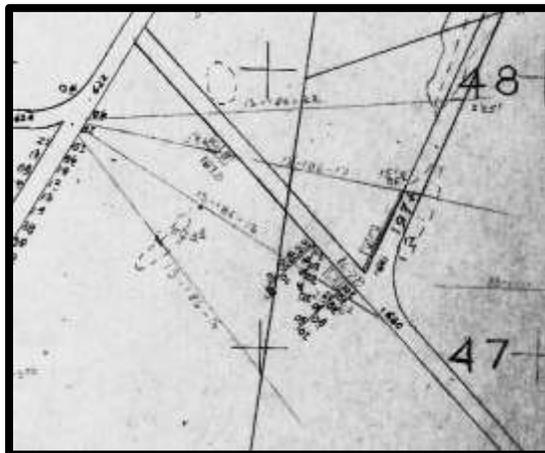
A line indicating a diamond drill hole. Sometimes they are numbered.



A circle indicating a vertical drill hole



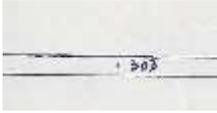
Diamond drill holes radiating from a vertical drill hole  
1300 level Cole Mine 3<sup>rd</sup> floor.



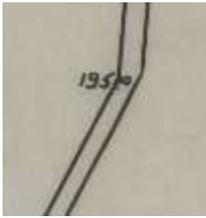
Horizontal diamond drill holes 1300 level Cole



**Survey points** represented by a dot or small circle followed with a number. These were the points used for surveying. Unlike, on the surface, these markers are found on the ceiling, instead of the on the ground. Typically, they are a copper or brass metal tag with the point's number attached to a wooden plug driven into a drill hole. A survey spad which looks like a flat nail with a hook is driven into the plug to hang a plumb bob. Survey points are normally, noted only on 1"= 50' scale maps.



= Survey point



= Survey point



Survey point with spad, 3<sup>rd</sup> level Southwest Mine

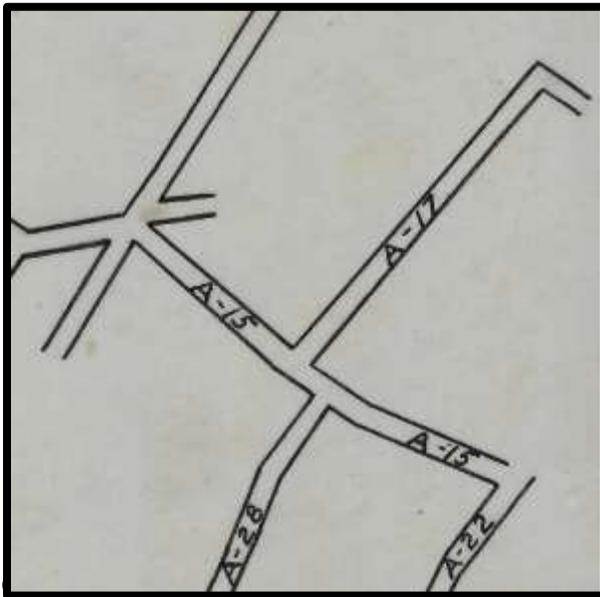


### Numbering mine workings:

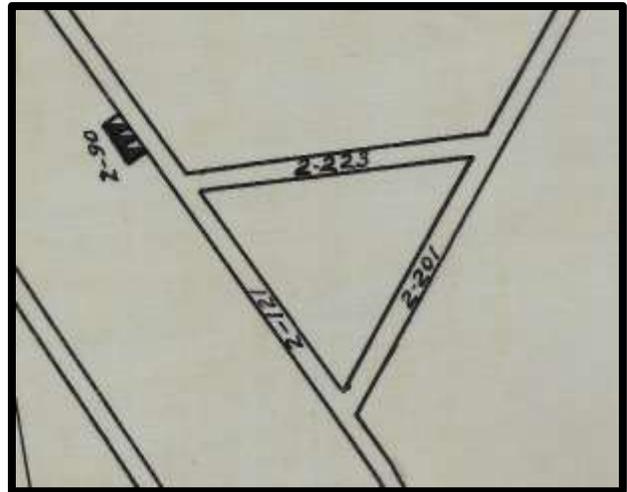
Some of the early mine workings were given names such as the Atlanta slice, Sullivan raise or Neptune stope. This allowed the miners to know what area that was being discussed. It was rapidly decided that a better method was needed. Numbers were chosen. The Copper Queen Consolidated Mining Company and the Calumet & Arizona Mining Company used slightly different systems. Understanding the numbers systems is not only important to read maps it also is used to understand written documents like notes from bosses, safety reports mineral localities and other primary source documents

### Copper Queen Number system of drifts and crosscuts:

When written in a complete format a crosscut or drift will be written in the following fashion, 7-146. The 7 represents the level which is the 700 level and the 146 is the 146<sup>th</sup> crosscut driven on that level of the mine. A few of the older levels were assigned letters instead of numbers. These levels are A, B, M, N, and are limited to the Southwestern part of the district. A crosscut named M-16, would be located on "M" Level and is the 16<sup>th</sup> crosscut driven in the mine on that level.



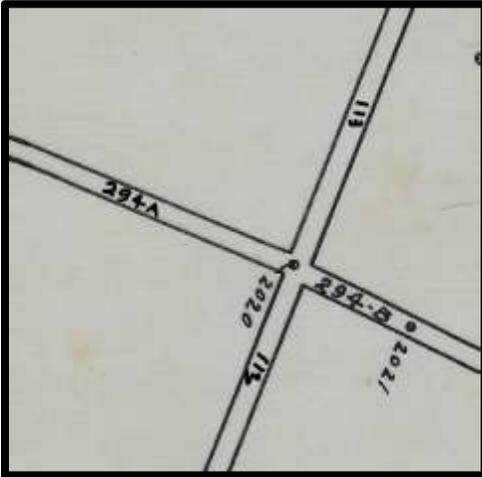
Section of "A" level with # 15, 17, 22 & 28 crosscuts



200 level map showing # 121, 201 & 223

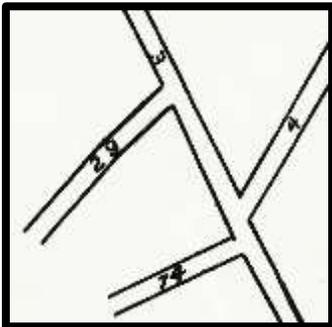


In some instances a crosscut was bisected by either a new crosscut intercepting an older crosscut before continuing further or a new crosscut would drive through an older crosscut. The parts of the crosscut would have same number with a letter A or B added. The best known drift is an important location of calcite specimens, 6-83-B crosscut and its other segment 6-83-A.



A 400 level Cuprite Mine map showing a bisected crosscut #294-A and 294-B.

Sometimes a quick notation on a map with clearly labeled with level information, the level number is dropped and only the crosscut number is used. Instead of 7-146 the crosscut would be label only as 146.



A map with # 3, 4, 29 & 74 crosscuts.

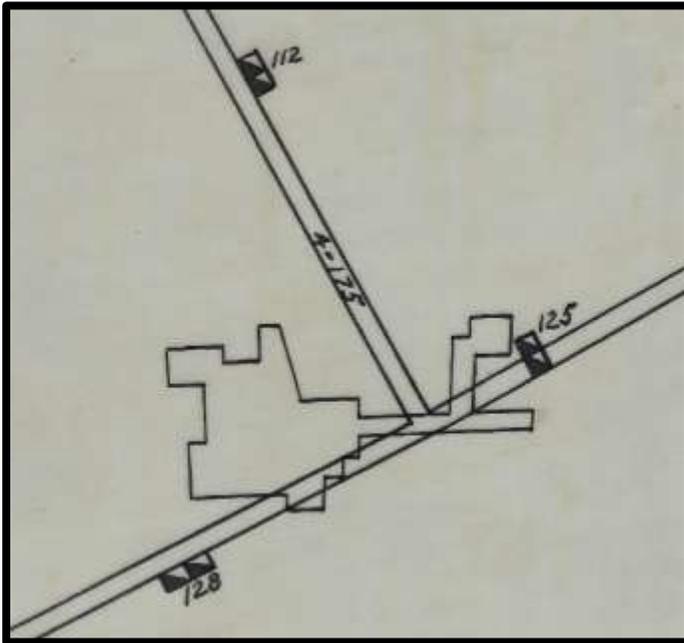
Calumet & Arizona Method. This simpler method was used by the C&A, but was adopted by Phelps Dodge after the merger between the companies. The crosscut is assigned as number followed by a plus sign.





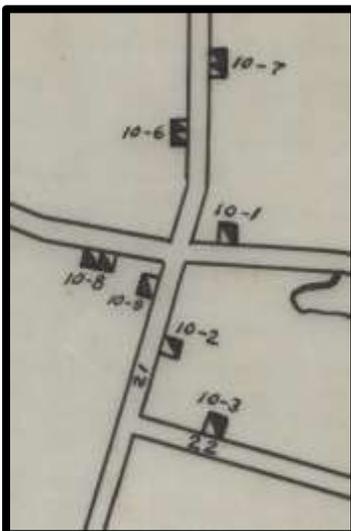
Raises were also numbered differently by the two major companies working at Bisbee

Copper Queen raise numbers: Slightly more complex than drifts and crosscuts, raises can be numbered in three different ways. The simplest was used for exploration and ventilation raises. They received a straight number such as # 14.



# 112, 125 & 128 raises

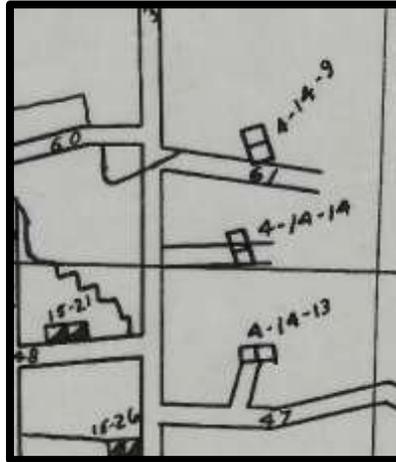
Raises that served as access to stopes, chutes or gobbing were given sets of numbers separated by dashes. Such as #14-4. The first number 14 is the stope number the second number tells that it is the fourth raise driven to serve #14 stope. Sometimes the first raise into a stope is given a single number such as in # 6 stope on the 4<sup>th</sup> level on the Southwest Mine. The first raise is simply numbered #6 and is a large four compartment raise. The numbering continues # 6, # 6-1, # 6-2, #6-3 until it reaches the final raise #6-26.



Seven of the raises that were part of #10 Stope on the 5<sup>th</sup> level of the Southwest Mine.

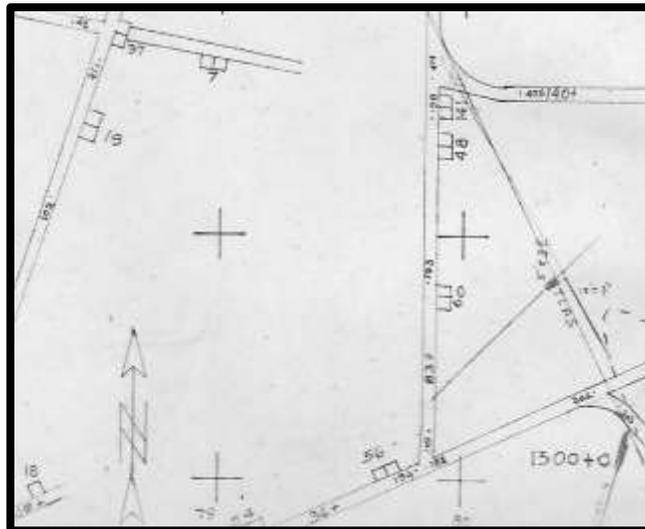


On floor maps and where raises intercepted a level a three numbered system is used. In the number, #2-11-2, the first number 2 indicates the level that the raise originated on. In this case the 200 level, followed by the stope number 11 and it is the second raise driven into 11 stope.



Series of raises with three number names. These raises were driven from the 4<sup>th</sup> level of the Southwest Mine and Intercepted 5<sup>th</sup> level workings (Note, in the Southwest Mine the 5<sup>th</sup> level is above the fourth level.

The Calumet & Arizona simply numbered the raises in the order they were driven on the level.



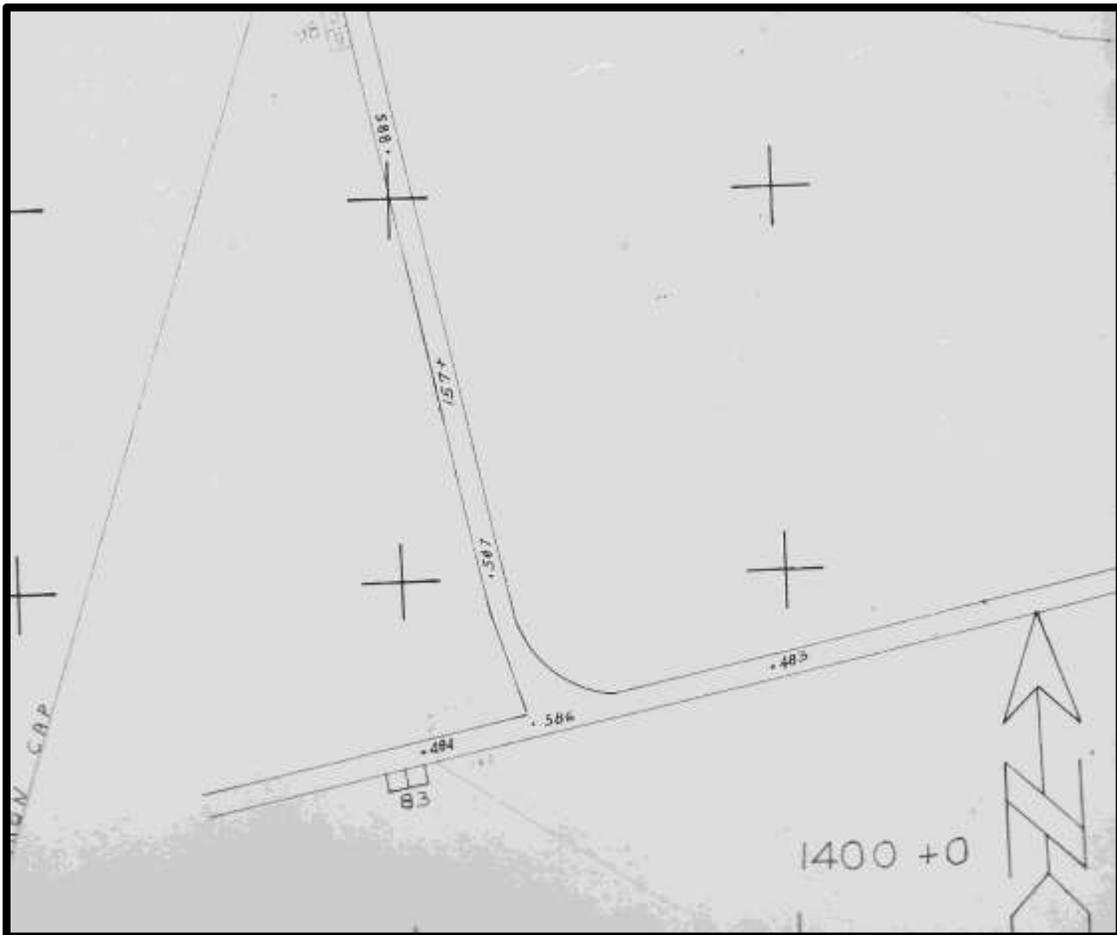
1300 level Cole Mine





## C&A Stope numbers

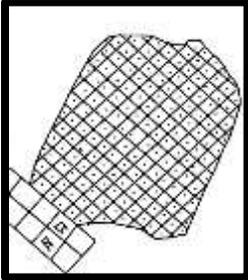
The stope was given the same number of the raise that discovered the orebody. If the orebody was large enough to require several stopes to mine. The stopes were given a letter following the number. The best example are the 26 stopes in the Cole mine. They are 26 stope, 26A stope, 26 B stope, 26C stope, 26D stope, 26 E stope, 26 F stope, 26G stope 26H stope, 26 I stope, 26 J stope, 26K stope and 26 L stope.



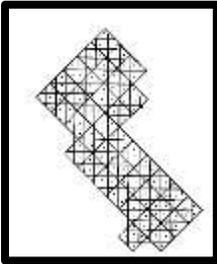
83 raise/83 stope, 1400 level Dallas Mine (note there was no stoping in this case on the level)



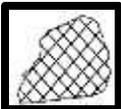
The general type of ore and ground conditions are noted by the pattern of fill used on 1"=50' maps.



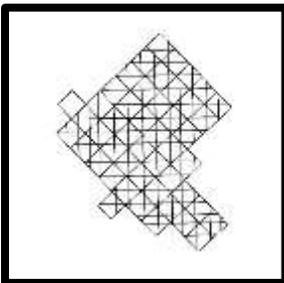
A stope outline filled with crudely drawn squares containing a dot indicates oxide ores like, malachite, cuprite and azurite were mined. The ground was solid enough to mine with limited or no timber



A stope outline filled with crudely drawn squares containing a dot overlain by larger squares indicates an oxide stope in heavy ground conditions that was mined by the square set method.



A stope outline filled with crude squares without a dot indicates sulfide ores such as, chalcopyrite, bornite and chalcocite were mined in these stopes. The ground condition was relatively strong and little or no timber was required for support.

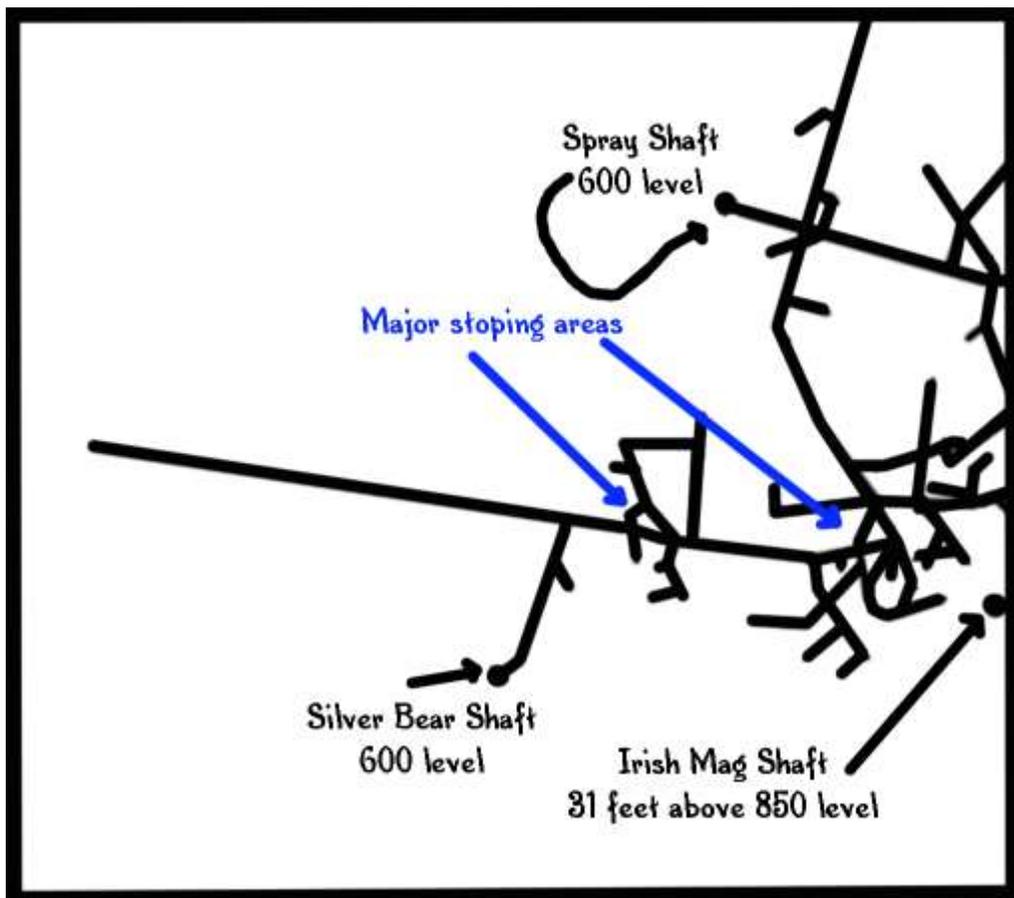


A stope outline filled with crude squares without a dot overlain by larger squares indicates a sulfide stope in heavy ground conditions that was mined by the square set method.



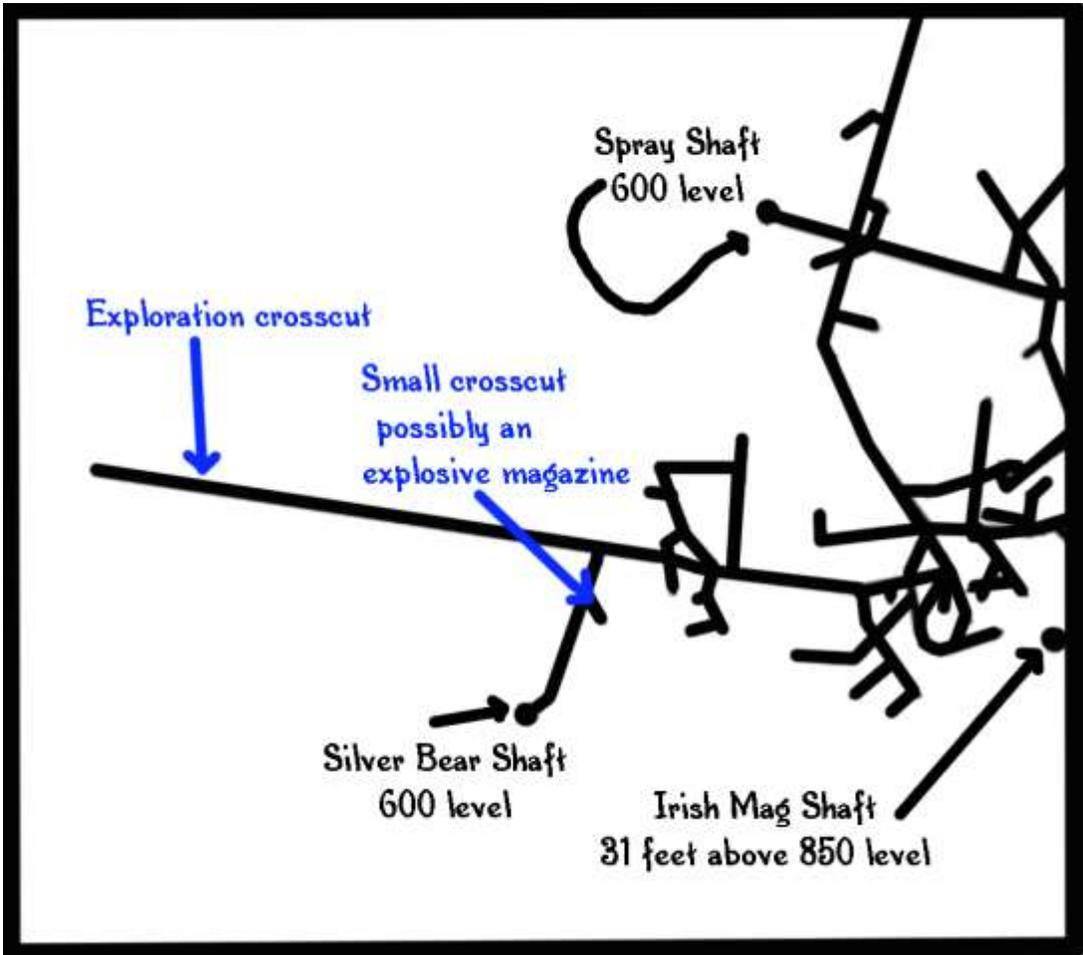
On mine maps a field mineral collector would be interested in those areas of dense areas of mine workings. These areas provide clues to where to search for minerals. This intense crosscutting and drifting indicates ore was being mined in this area and azurite, malachite, native copper and cuprite may be present. Although, these minerals would have been removed, if obvious during mining. Collapse of these areas can reveal previously unseen ore minerals and sometimes they remain in pillars.

Maps can also give general indications to the location a well labeled specimen may have been found. For example, if a specimen of native copper with cuprite on goethite is labeled as being found on the 600 level Silver Bear Mine. A quick examination of the Silver Bear Mine workings reveals that it was likely mined near the property line with the Calumet & Arizona's Irish Mag Mine. Although, a specimen of calcite would be problematic as this species occurs widely in and outside the ore zones and no more specific knowledge could be derived.



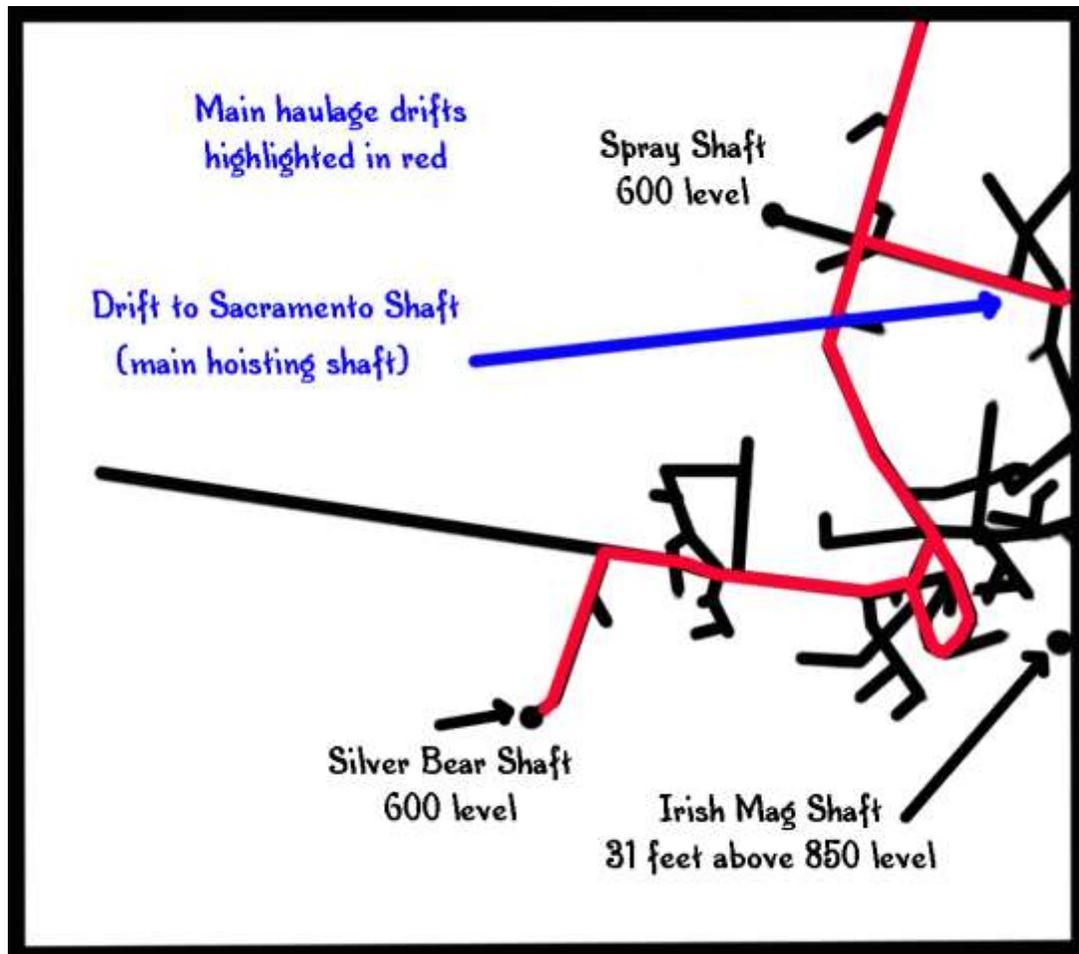
600 level with major stoping areas indicated





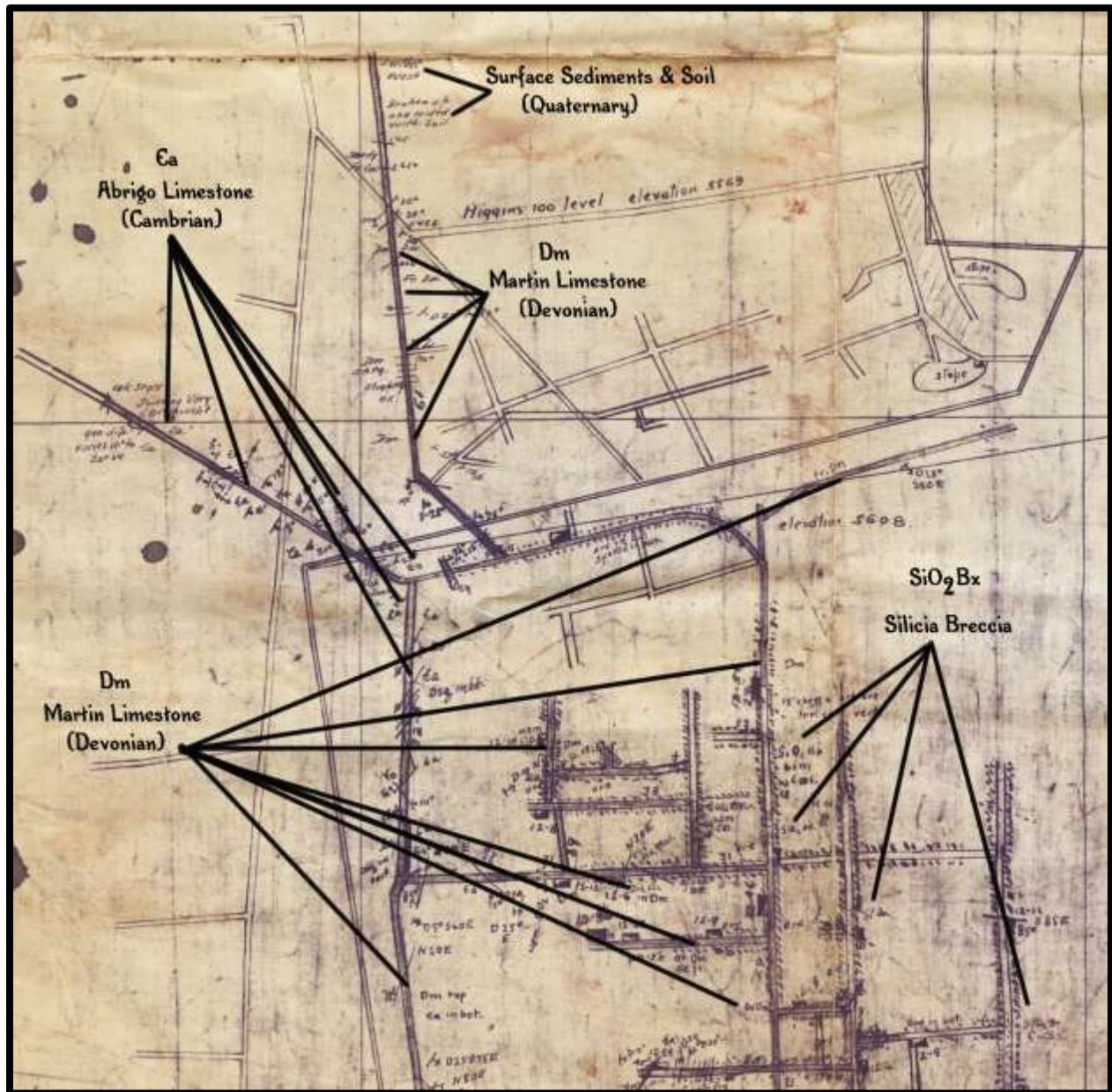
Long crosscuts driven were driven in exploration of ore. To a mineral collector these are of less interest since they normally were in waste rock and are less likely to contain interesting minerals. Short prospecting crosscuts are of more interest. These workings were often converted into tool rooms, explosive magazines and timber stations. As a result they may contain interesting mining relics.





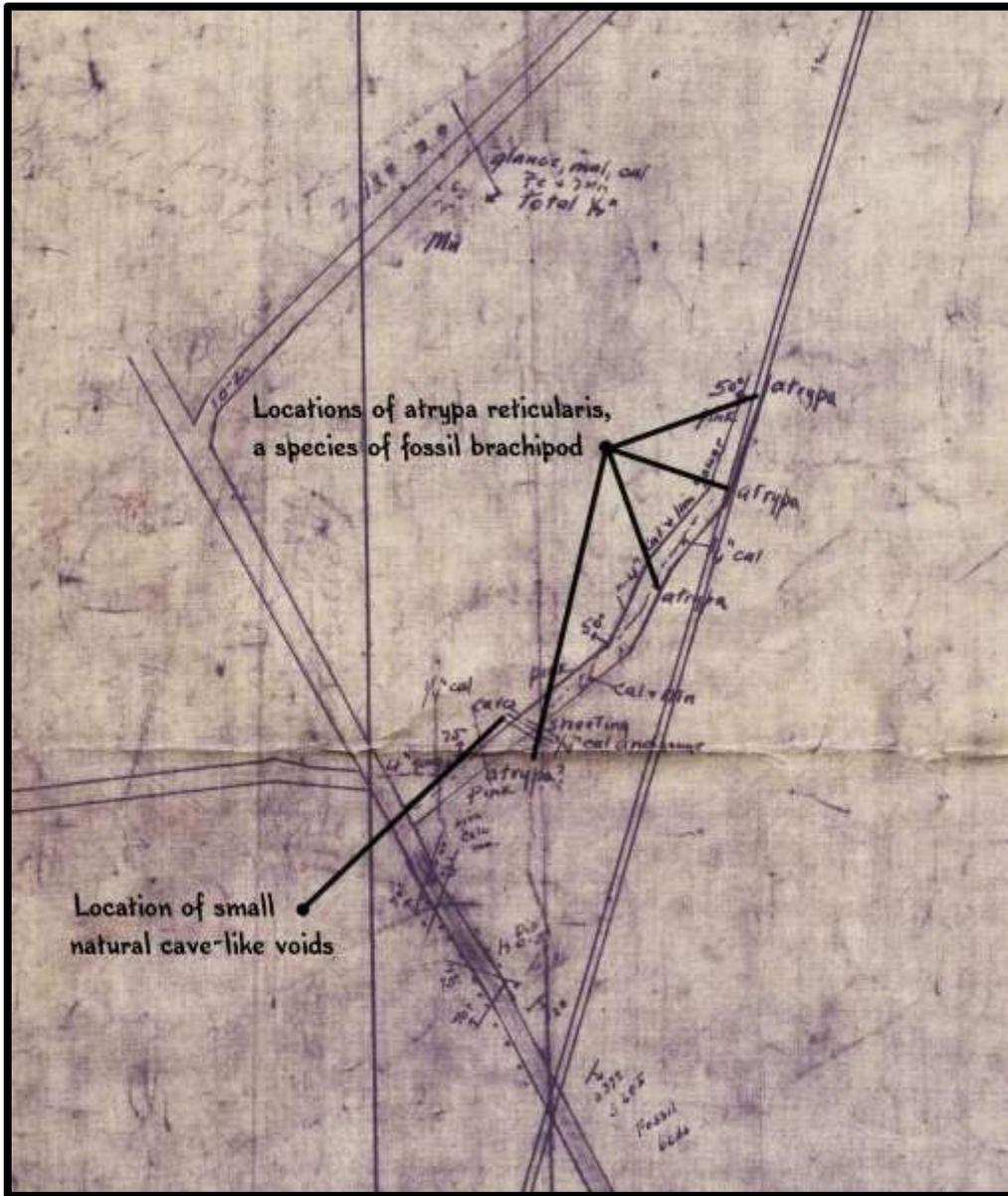
In the search for minerals to collect explorers had to deal with numerous cave-ins and impassable open holes. If a direct route to a stoping was unavailable, it was considered best to try to enter a main haulage drift. These were tunnels expected to be used for decades by the mining companies to haul trains of ore and were driven intentionally avoiding areas of heavy ground. They were also generally maintained to the end of the mines life. In the 1950's thru the 1970's, many were in better condition and could provide multiple openings to enter a mineral producing area. The problem was that in most areas, only even numbered levels such as the 200 level and 400 levels were provided with haulage drifts. There are exceptions part of the 3<sup>rd</sup> level of the Southwest Mine which is better known as the "Queen" Tunnel is a main haulage drift. It originally extended from the surface to two of the Southwest's shafts and continued to the Sunrise, Cuprite and Uncle Sam shafts before ending and connecting with 600 level of the Shattuck Mine.





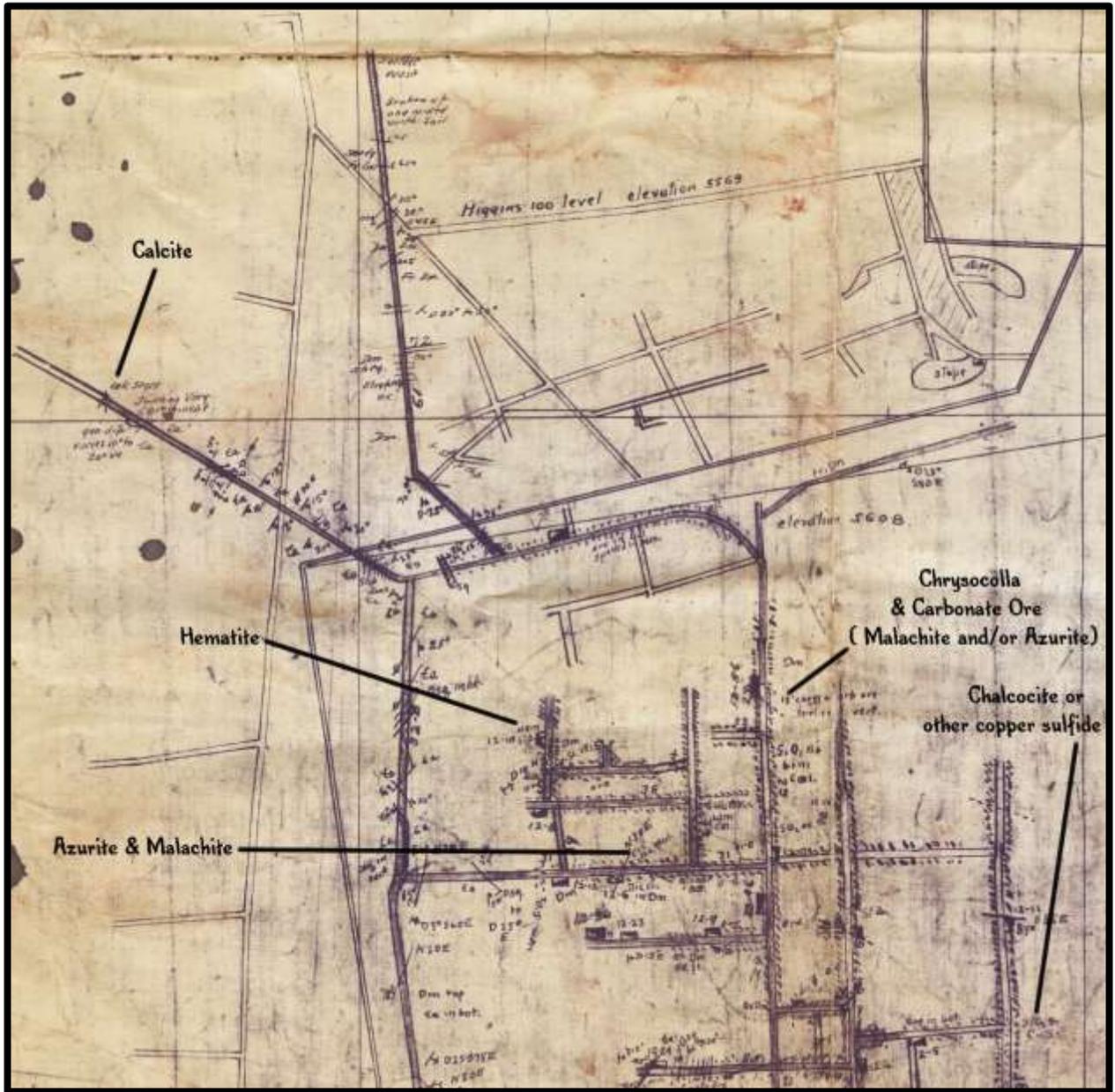
Maps also provide geologic information such as the location of faults and rock units. Less commonly they mention fossils, natural caves and locations of minerals





10<sup>th</sup> level of the Southwest Mine show the location of fossils and cave-like openings





6<sup>th</sup> level of the Southwest Mine with minerals locations noted.

In the early to mid 1910's M.N. Bateman and J. Murdoch completed an intensive study of the mineralogy and geology of Bisbee's oxide areas. Part of the study included the collecting of over 2,000 specimens. Each of these samples was studied and a 5"X6" card was completed with detailed information including the location that the specimens were collected. Many of the pieces are presently housed as part of the ore collection at Havard University and the cards were saved. The following images are of four of these documentation cards.



No. CQ 555

ORE

SPECIMEN

Loc. 4th. INT. #6 D. 53' from 3 D.

SOUTH-WEST.

Class. Malachite, Azurite, Chrysocolla, Tenorite etc.

Descrip. Banded specimen with black tenorite apparently the mineral that alters readily to the carbonates and silicates. There is a good deal of green stained clay that appears like chrysocolla, but also some of the straight silicate.

Specimen # 555, Azurite, Malachite, Chrysocolla and Tenorite (probably actually black Chrysocolla) Location should be interpreted as Southwest Mine, 4<sup>th</sup> level of interior shaft in #6 drift 53' from the intersection of # 3 drift.



883	ROCK	SPECIMEN	NO SLIDE.
4th Int. D. 4		30' S of Atlanta shaft.	SOUTH-WEST.
Finely crystalline limestone .Martin (Dev.)			
Finely crystalline with fine pieces of shells. Banded by limonite streaks of brown, that interrupt the gray of the normal rock.			

Specimen #883, Devonian Limestone, Location is Southwest Mine, 4<sup>th</sup> level of interior shaft, in #4 drift 30' feet from Southwest # 3 shaft ( "Atlanta" shaft, is actually the Southwest # 3 Shaft which was called the Atlanta for a few years. Note, this is a different shaft from the earlier Atlanta shaft made famous by Dr. James Douglas.)



No. CQ 2167	Rock Specimen
Loc. South West, 4 <sup>th</sup> 17 stope at 5 <sup>th</sup> level.	
Class. Specularite - Qtz.	
Field Obs At contact of silica breccia and Cc limestone associated with Pb-Ag ore - Massive specularite replaces beds of the ls.	
Descrip.	

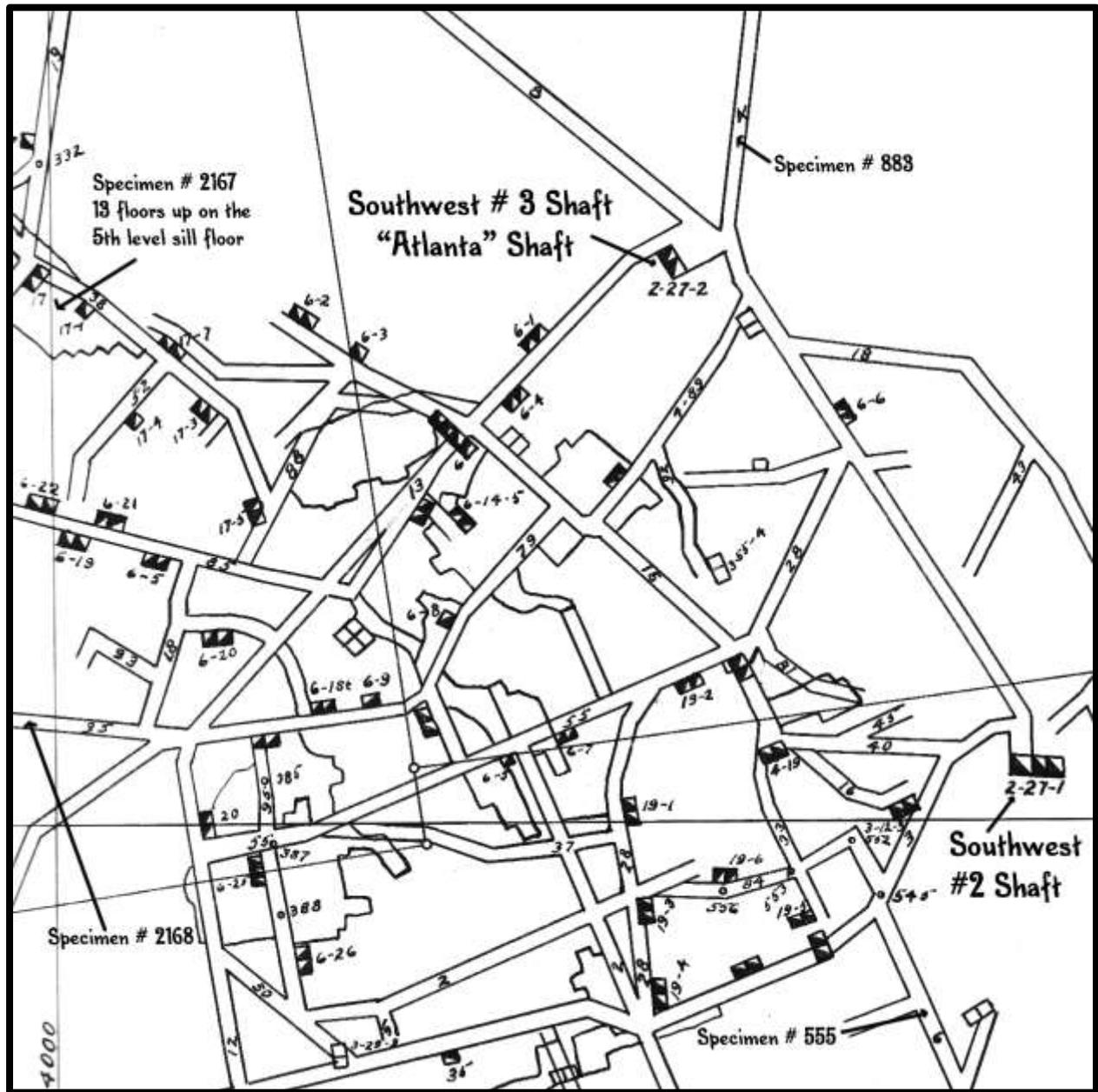
Specimen #2167, Specularite (Hematite) and Quartz. This location description is more complex. Southwest Mine in the 4<sup>th</sup> level, 17 stope, but 13 floors up to the equivalent elevation as the 5<sup>th</sup> level sill floor. This implies that access to the area was from the 4<sup>th</sup> level and there was no direct connection from the 5<sup>th</sup> level.



No. CQ 2168      Rock Specimen -  
Loc. South West, 4<sup>th</sup> - 35 d, 50' in  
Class. Chalcedonia (?) silica  
Field Obs From silica breccia - spaces filled mostly with  
powdery silica and a little  $CaCO_3$ .  
  
Descrip.

Specimen # 2168, Quartz Location is 4<sup>th</sup> level Southwest mine in # 35 drift 50 ft. feet from the mouth or six way intersect of # 35, # 87, # 12, #13, #79 and #20-B crosscut ( note #20-b crosscut number is off the edge of the image on the 4<sup>th</sup> level map)





4<sup>th</sup> level Southwest mine showing the location of the previous specimens



Although rarely as specific as the locations of mineral samples, other documents give locations. Accidents reports give general locations such as 10 crosscut. Meaning the accident occurred in somewhere in 10 crosscut. This crosscut can be hundreds of feet long, but a basic idea of the location can be determined. Foremans log books, engineers notes and shift boss document also tend to provide give general locations, but for those searching for mining relics, such as blasting cap tins this information is sufficient.

J. Rev.  
**PHelps DODGE CORPORATION—Copper Queen Branch**  
**ACCIDENT REPORT**

Answer All Questions Fully

Date 8-20 19 24  
Date of Accident 8-19- 19 24 Hours 6:30 0 M  
LOCATION—Department or Division District  
Mine Level 1400 Is this a lost-time injury? no  
Working Place 70XC Was blue card issued? yes  
Name of Injured Employee O.A. Sens Payroll 1769  
Residing at Bisbee Married Single   
Occupation Timbering Wage Rate H  
What was employee doing at time of accident? Making cave

Had he passed an examination on the procedure for this work? yes  
Was this his regular job? yes Was employee experienced? yes  
Was accident caused by violation of any rule or instruction? no  
What instructions were given employee by boss concerning work being done? Muck up rock spill in drift 70XC  
Injured employee's statement as to how accident occurred I had picked a boulder up to put in the car, a piece broke off and a sharp edge cut my hand between thumb & forefinger

Was injury caused by fellow employee? no If so, give name \_\_\_\_\_  
Names of eye-witnesses to accident C.C. Hendrich  
Nature of reported injury Cut between thumb & forefinger left hand  
Bosses statement regarding accident The boulders were blocking line stone

State fully how accident could have been prevented Close attention

Accident investigated by C. Jergens, E. Salmon, J. J. Juchick, J. J. Jansen  
John Jansen Shift Boss J. J. Jansen Foreman

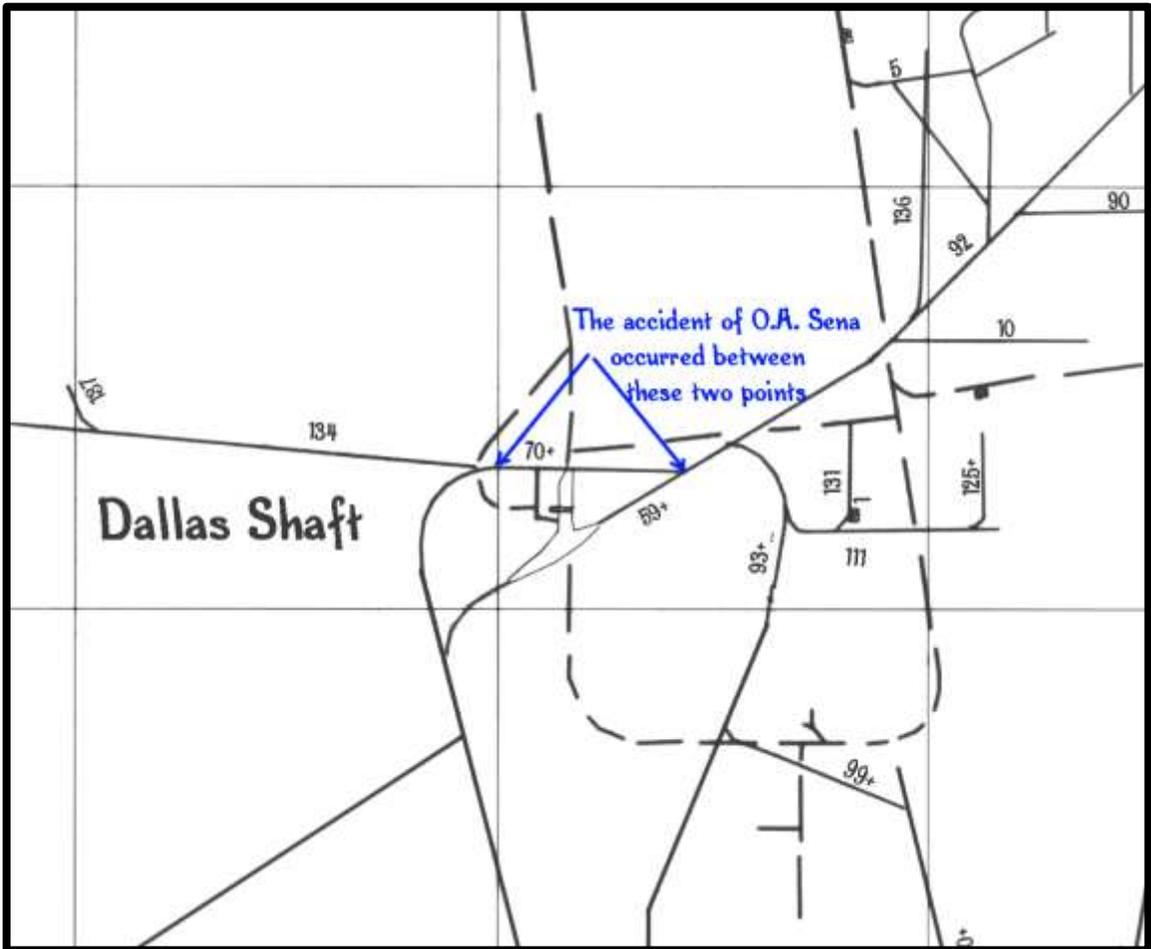
The Following Data is to be Furnished by the Safety Inspector

Exact nature and extent of injury LACERATION OF LEFT HAND  
Classification as to,  
Fault: — Injured Employee  Fellow Employee \_\_\_\_\_ Faulty Equipment \_\_\_\_\_ Direct Supervisor \_\_\_\_\_  
Cause: — I. HANDLING ROCK H. MISCELLANEOUS  
I. Agency B. MOVABLE OBJECTS II. Type 14 HANDLING ROCK  
III. Supervisory G, B IV. Physical NONE

Safety Inspector

(One Copy Each to: — Mine Superintendent, Safety Department, Foreman)





1400 Level Dallas, general location of O.A. Sena accident.



300 Gas

Powder magazine 3-293 drift  
 under 3-103 country  
 Timber <sup>stake</sup> string in old drifts  
 as close as possible  
 Men from faces get supplies here  
 Supplies brought from surface  
 by Berryhill.

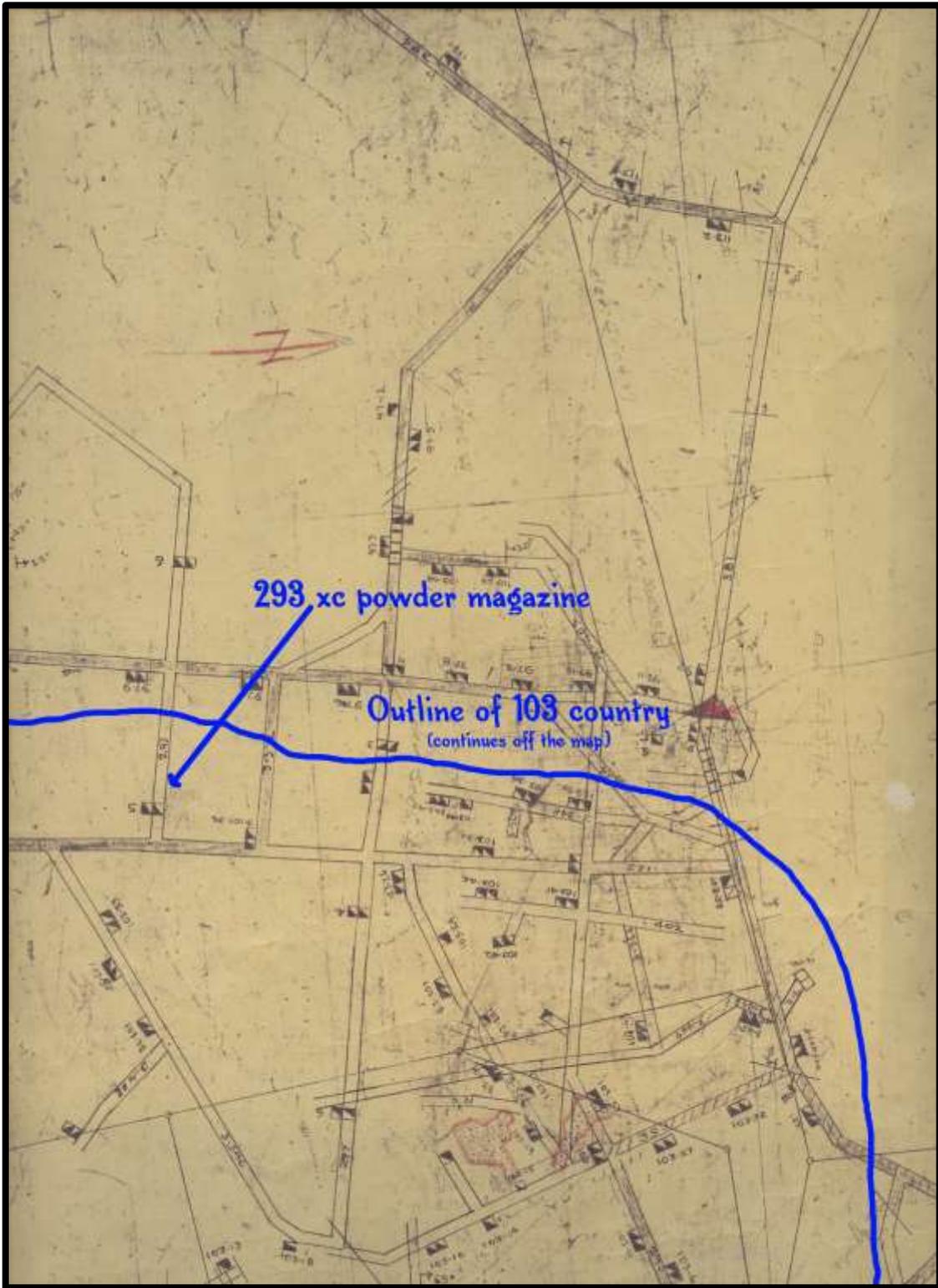
1 Supply man  
 1 T or nipper day shaft only  
 Powder from Road  
 5 trucks timber daily  
 2 Boxes Powder "  
 75 pieces steel "  
 100 fuses daily  
 Timber at 3-2-1  
 Also 3-472 D.

Gas yard

Supplies 300 Gas - 1st Gas  
 Drift 300 - 200 SW  
 Hatchers Road & full timber  
 take care of 3rd SW sta  
 and lower to BL 1st SW x 200  
 3rd SW shaft  
 B level - 1st SW - Top of Dec.  
 Hatchers on dayshaft  
 Uselets tool up to 400  
 2 Sup men 1st SW 1 D - 1 M.  
 200 SW station  
 200 SW Queen's level

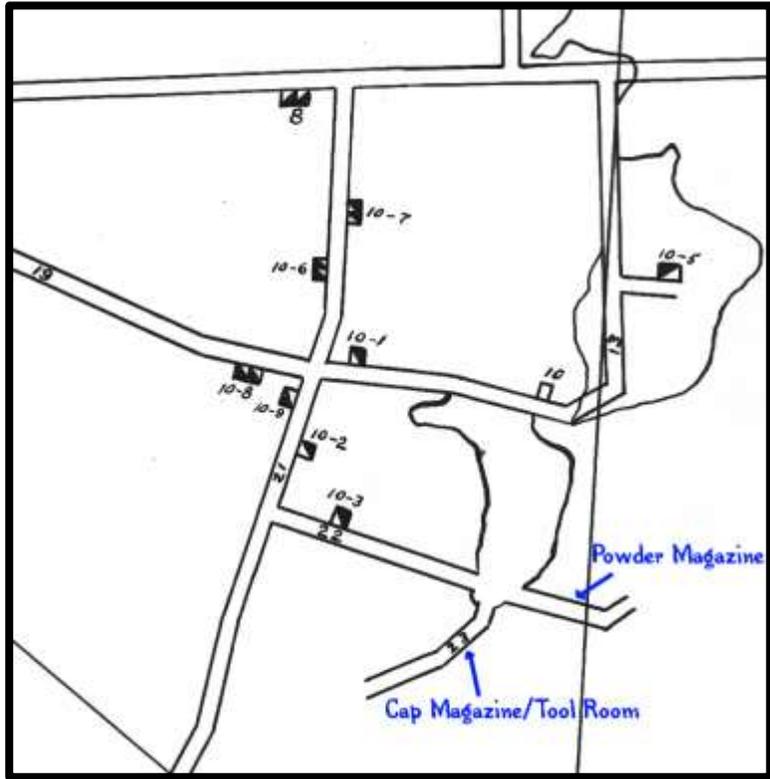
Page from a foreman's notebook c-1928 noting a powder magazine in 3-293  
 Drift under the 103 stoping area



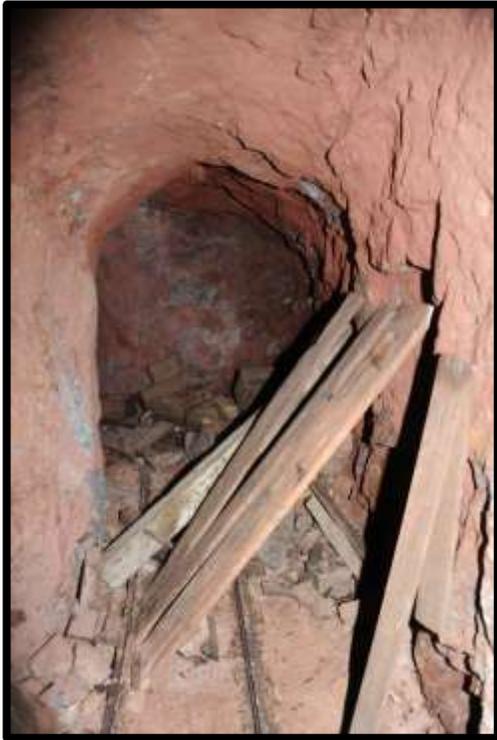


A 300 level Czar mine map showing the location of the powder magazine





5<sup>th</sup> level Southwest Mine



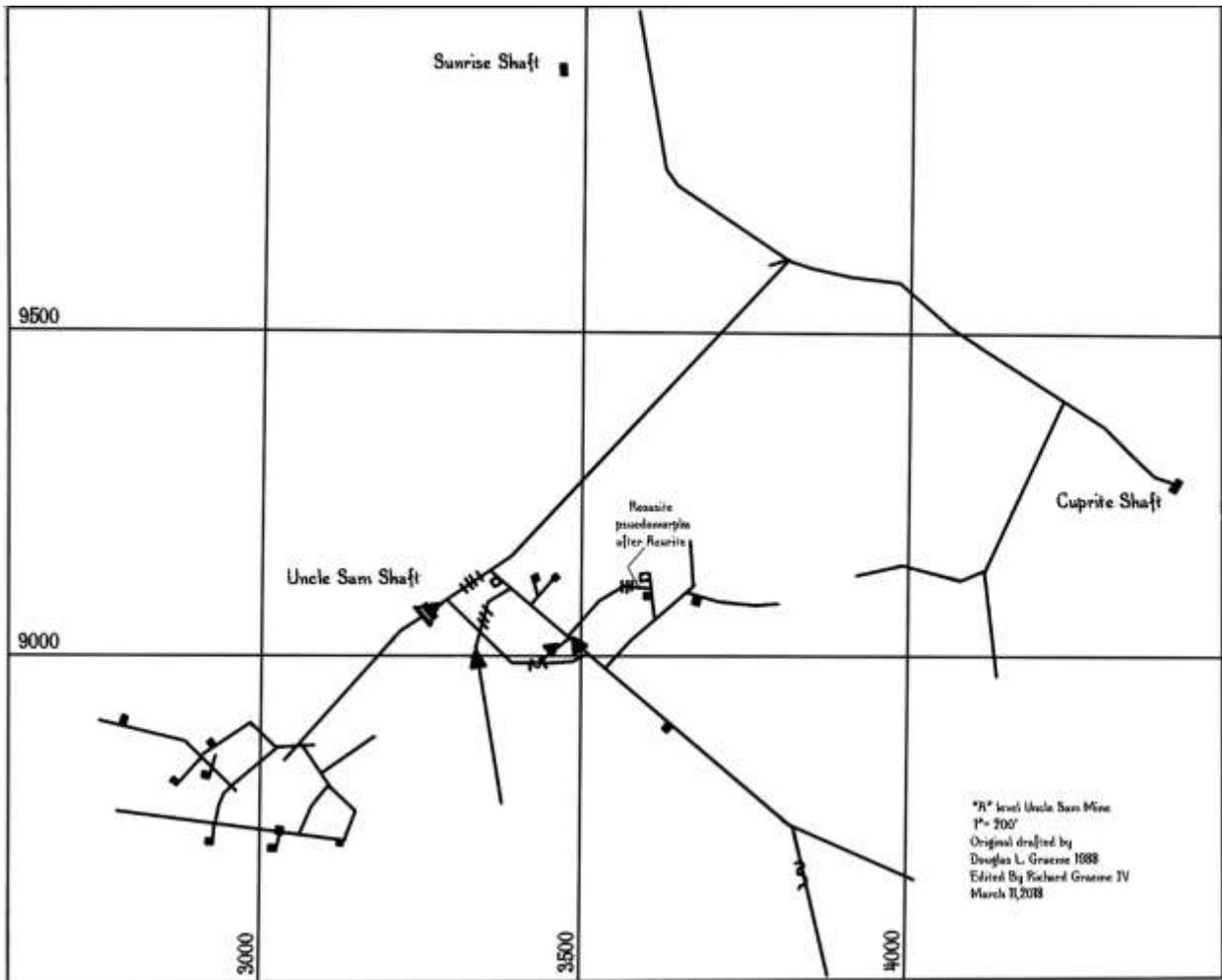
#22 drift powder magazine



# 23 crosscut cap magazine / toolroom



Arguably, the most important use of historical mine maps is the preservation of the location of mineral localities. The map below shows the location of a rosasite pseudomorphs after azurite pocket. .Access to this area was lost in 1988 when # 66 crosscut of the 3<sup>rd</sup> level of the Southwest mine caved in. The pocket was later to be determined to be the entrance to a small oxidation cave/ large pocket. The Cave is below “A” level and is thus considered part of the “B” level Uncle Sam Mine filled with aurichalcite and rosasite.. Although, it would be of questionable ethics to collect in the cave part of the area, # 16 could be developed with modern collecting techniques that were impractical in the 1980s.

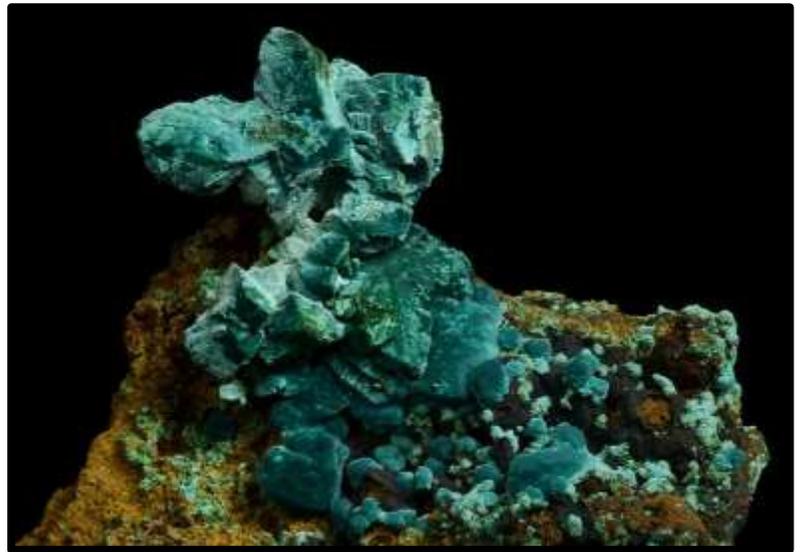
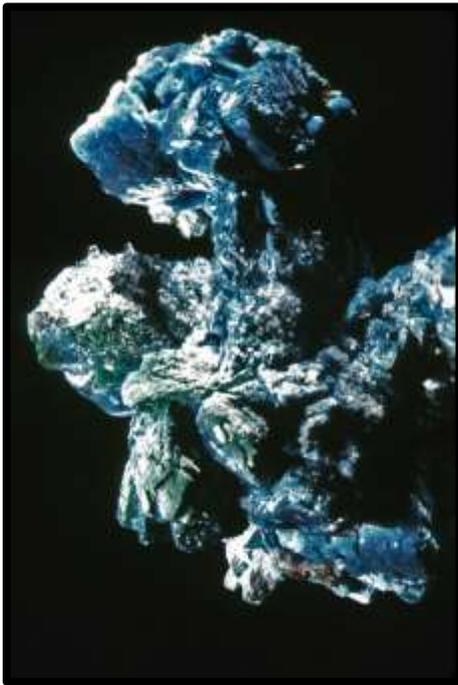


“A” level Uncle Sam Mine





Rosasite with aurichalcite "B" level Uncle Sam mine



Rosasite pseudomorphs after malachite pseudomorphs after azurite # 16 crosscut "A" level Uncle Sam Mine



Mineral producing areas in Bisbee are rarely depleted of specimens and by provided detailed information where each specimen was discovered will allow future generations of collectors benefited by advances in technology to bring wonderful minerals to light. Yet, in some areas providing this information is difficult determine. Many of the fine calcite localities on the 6<sup>th</sup> and 7<sup>th</sup> levels of the Southwest mine were found in parts of the mine that are caved beyond recognition. Orienting oneself on a mine map is impossible. In other areas the soft ground has collapsed disguising important landmarks, such as drift intersections. Surprisingly, a gobbed or caved crosscut can be extremely difficult to locate, particularly in soft ground. Other reasons that can result in a detailed location not being given is that the maps contain errors such as crosscut or raise numbers not being added. Less common, but still problematic is areas that either were never mapped or the maps of the areas are unavailable to collectors.

Abbreviations often determined by which engineer drew or worked on the map as a result they vary from map to map and in cases where another engineer made notation two versions of and abbreviation may occur on the same map, R and rse are often seen on the same map as an abbreviation for raise.

Ag = silver

Apx= Approximate\*\*\*\*\* 980

Au= gold

bk = back

Bot = bottom

btm = bottom

cave = caved or sometimes natural cave

C&A= Calumet & Arizona

Ce = cretaceous

C.Q = Copper Queen

Cu = Copper

D.D. Stn = diamond drill station

D.D. sta = diamond drill station

De = Devonian



Div = Dividend fault

Elev = Elevation

Fe = iron

Fl = floor

Hdg = heading

Inc =incline

KVA Sub = electrical substation

Ls = limestone

Pb = Lead

Sibx = Silica breccia

Sbr = subraise

SR = sub-raise

Sto = stope

Sub = sub-level

Sulp = Sulphide

R = raise

Rse =Raise

Xc = crosscut



