DAEA # 2254
Roberta Wegener

12527

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Faithful Group

View of Vipond Park and Vicinity

with

Sheep Mountain in Background

E. R. Rice
Mining Engineer

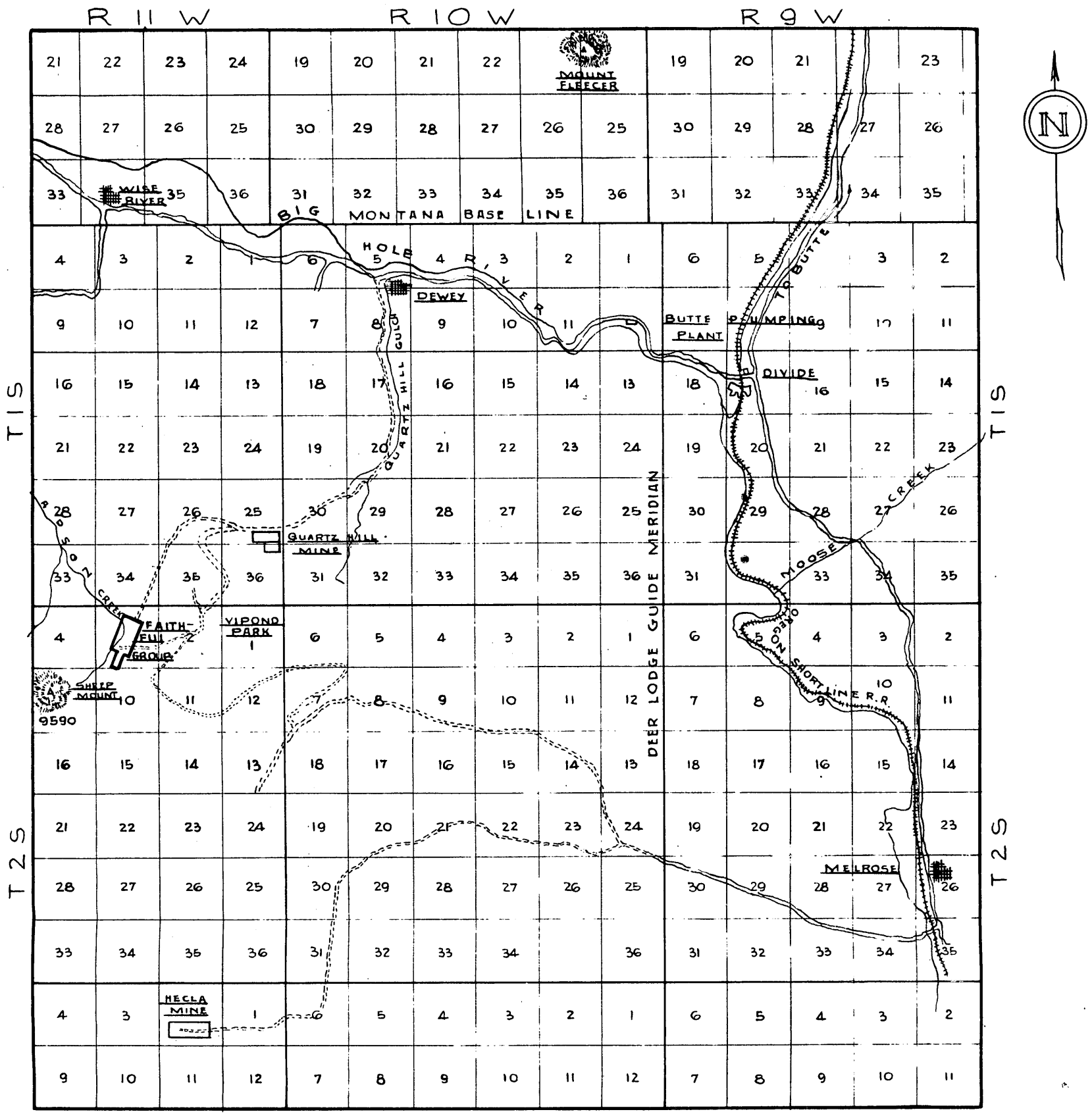
REPORT ON
FAITHFUL MINE
BEAVERHEAD CO., MONTANA.

CONCLUSIONS

All evidence, historical, geological, mineralogical, assays and work done to date, show this to be a property of exceptional merit and indicates the probability of the existence of ore occurences of great economic importance. Like all properties of similar type in this region, the outcrop of the vein and for a considerable distance below is highly leached, with the probability of there being at greater depth, a zone of secondary enrichment of great value. From the history of mines of similar type, this zone of secondary enrichment should lie at a depth of from 200 to 400 feet below the surface.

SITUATION

The property is situated in approximately the center of section 3, T 2 S, R 11 W of the Montana Base and Meridian and is in what is locally known as the Vipond district, Beaverhead County, Montana. The property is 17 miles from Divide which is on U. S. highway No. 91 and it is 25 miles from Divide to Butte. From Divide, the property is reached by following the state highway up the Big Hole river a distance of 6 miles to Dewey and then following the Quartz Hill road a distance of 11 miles to the property. See Fig. 1, page 2 for map showing the situation of the property.



MAP SHOWING LOCATION

OF

FAITHFUL MINE

Scale 1" = 2 Miles

Copied from U.S. Forest Service map

Fig. 1

GENERAL CONDITIONS

Climate-:

The property lies at an approximate elevation of 7,500 feet above mean sea level, which at this latitude means heavy snowfall during the winter. However with a snow plow, the property would be accessible at all times. Without a snow plow, one can usually get in to the property by automobile in May and can remain until the first of November up to late in December, depending on the season. The neighboring Quartz Hill mine operates the year round.

Topography-:

At the property, which is on the west slope of the divide between the Big Hole and Wise rivers, the slope of the ground is moderate. However, below, the slopes are steep.

Timber-:

All of the timber necessary for mining and fuel purposes occurs on the property. The topography and occurence of timber is well shown in the photograph of Vipond Park.

Water-:

Water sufficient for all purposes is held under a water right at the source of Adson creek.

Transportation-:

The transportation problem is an easy one as there is a good road to the property and this road is easily kept in repair. Supplies may be shipped to Divide either by railroad or motor transport. However most of the supplies would be hauled from Butte which is one of the major supply points in the northwest.

Power-:

During the initial stages of operation on the property, internal combustion engines would be used. However should development warrant, it would be a simple matter to obtain electric power from the Montana Power Co. which has a transmission line in to Quartz Hill, a distance of 2-3/4 miles from the property.

Labor-:
The availability of skilled mining labor is as good as in any mining district in the West on account of the property being in the Butte region where there are numerous mines and prospects operating outside of Butte proper.

Ore Treatment-:
While eventually, the property will require a concentrating plant; in the initial stages, ore that may be profitably treated would be shipped to a smeltery. Copper and lead smelteries are situated at Anaconda and Helena respectively and treatment charges are reasonable. The shipping point would be Divide, where there is a loading ramp. Freight rates from Divide to Anaconda and Helena are reasonable.

HOLDINGS

The property comprises one patented and six un-patented lode mining claims. The patented claim, the Faithful, Survey No. 4081, is held under a favorable, long term, lease and bond, while the other six claims are held by virtue of location. See Fig. 2, page 5 for claim map.

HISTORY

No incontrovertible record is to be had of the early history of the property; only information obtained from old-timers that can not be verified. It is reported that the Faithful claim was operated in the 1870's and 1880's and that operations ceased with the demonetization of silver in the 1890's. Considerable high-grade silver ore is reported to have been mined during this time, the ore being packed to the neighboring Hecla smeltery. The foregoing, I believe to be true on account of the existence of the old, caved workings. the substantial mining and residential buildings and stables that

are now rotted away and by personally finding rich silver ore near surface.

The Faithful claim was located in 1872, antedating most of the Butte mines and was patented in 1903. The remaining claims were located in 1947.

The property remained inactive from the 1890's until 1946 with the exception of some shipments made from the old dumps by leasers. The present operators started work in 1942, but owing to the war, were unable to do anything until 1946 with the exception of getting a new road constructed from the Quartz Hill mine to the property. Since 1946, they have erected a substantial head-frame and hoist house, sunk a 50 ft. shaft, driven a 30 ft. cross-cut from the bottom of the shaft and done a large amount of bulldozing to uncover the outcrop in the vicinity of the shaft.

GEOLOGY

General-:

The property lies within the confines of the Boulder batholith (See "Ore Deposits of the Boulder Batholith"; Billingsley and Grimes: Trans. A. I. M. E., 1918) and is in the sediments overlying this granitic mass.

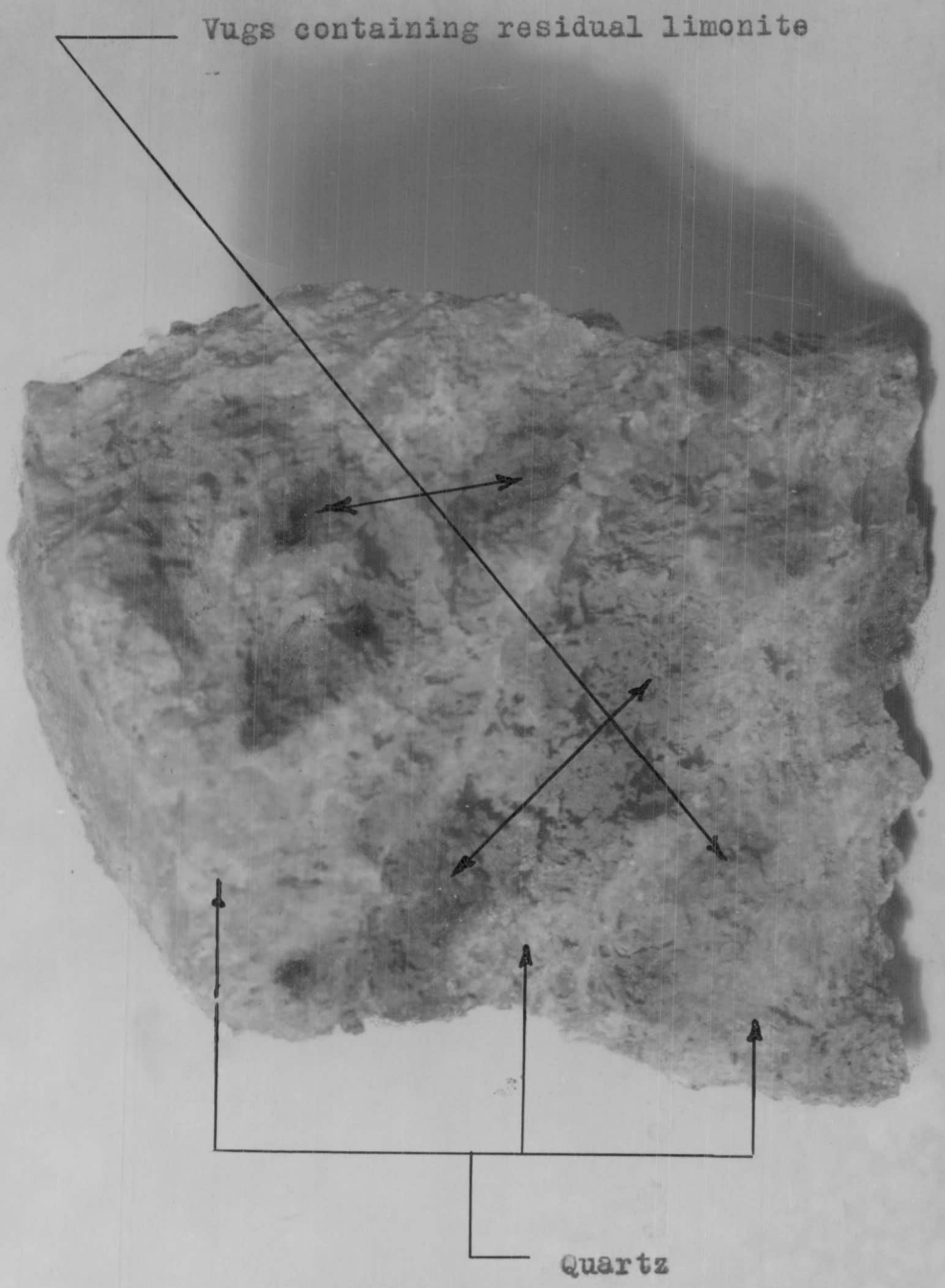
The property on the south side of Adson creek is covered by detritus from the erosion of Sheep mountain to the southwest, while on the north side of the creek, there is no overburden. The rock immediately beneath the detritus is a slightly tilted, dolomitic limestone known as the "Pilgrim" limestone and is one of the series of Paleozoic sediments overlying the Boulder batholith in this area. The Faithful vein occupies a fissure in this Pilgrim limestone.

No igneous rocks are exposed in the immediate vicinity of the property, though granitic dikes intruding the limestone are

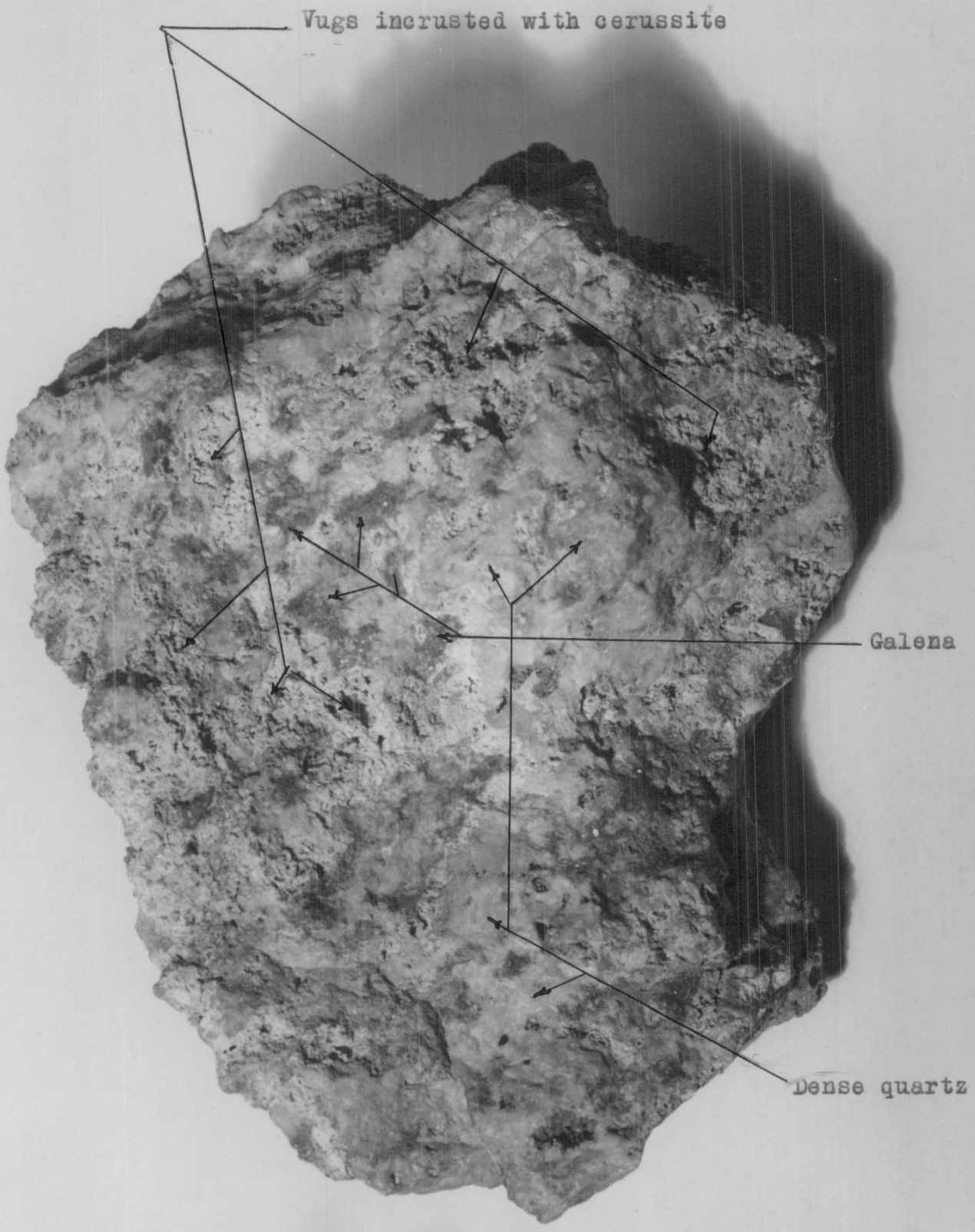
found to the north and to the southwest of the property. These probably emanate from an underlying cupola of the batholith.

Faithful Vein-: All ore encountered to date has been found either in the Faithful vein or in the limestone near the vein. The Faithful vein is of the typical quartz type occupying a fissure in the limestone and strikes approximately N 23 deg. E and dips to the west at approximately 85 degrees. Throughout its length on the Faithful claim, it is covered by detritus and a heavy growth of timber. However it has been exposed for a length of approximately 500 feet along its strike by trenching and bulldozing. Beyond this area in both directions, the vein is covered. The average width of the vein is unknown, but in one place it is definitely in excess of 40 feet.

Mineralization-: As before stated, the Faithful vein is of the typical quartz type. In places the quartz is of the dense, white variety and practically barren, tho always carrying some silver. In other places it may be vuggy, iron stained and leached of all metallic minerals as is shown by the photograph on page 8. Also it may contain disseminated silver-bearing galena or again it may be of the vuggy type containing silver-bearing lead carbonate as is shown by the photograph on page 9. In other places, the quartz has a greenish yellow color, showing no lead, but carrying an appreciable amount of silver. Traversing the vein at any angle of strike or dip and cutting through the above mentioned types of mineralization are fractures of varying width containing a silver-copper-lead mineralization. This type of ore is high in silver, probably due to the presence of a silver-bearing tetrahedrite.


Vugs containing residual limonite
Quartz

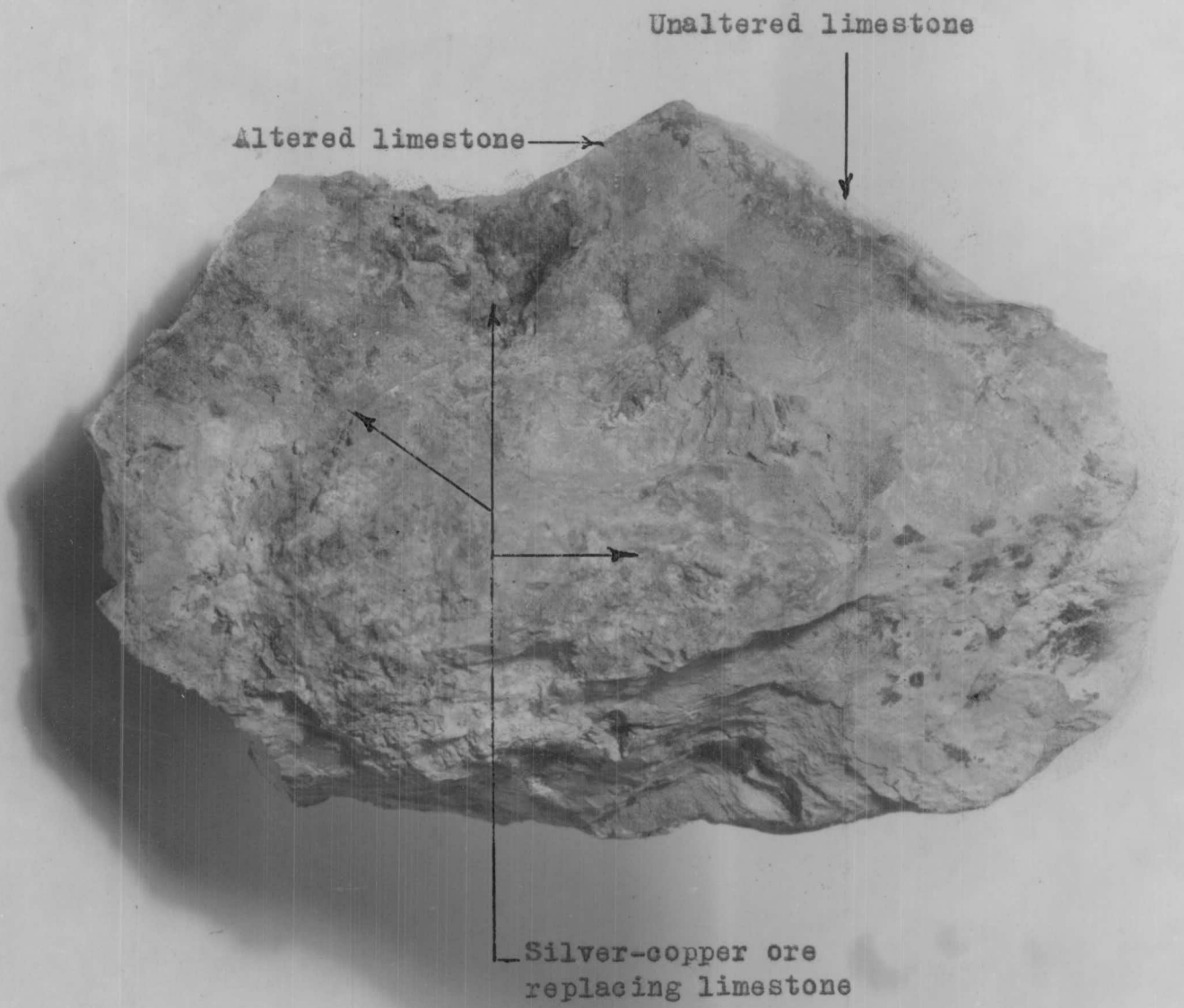
9

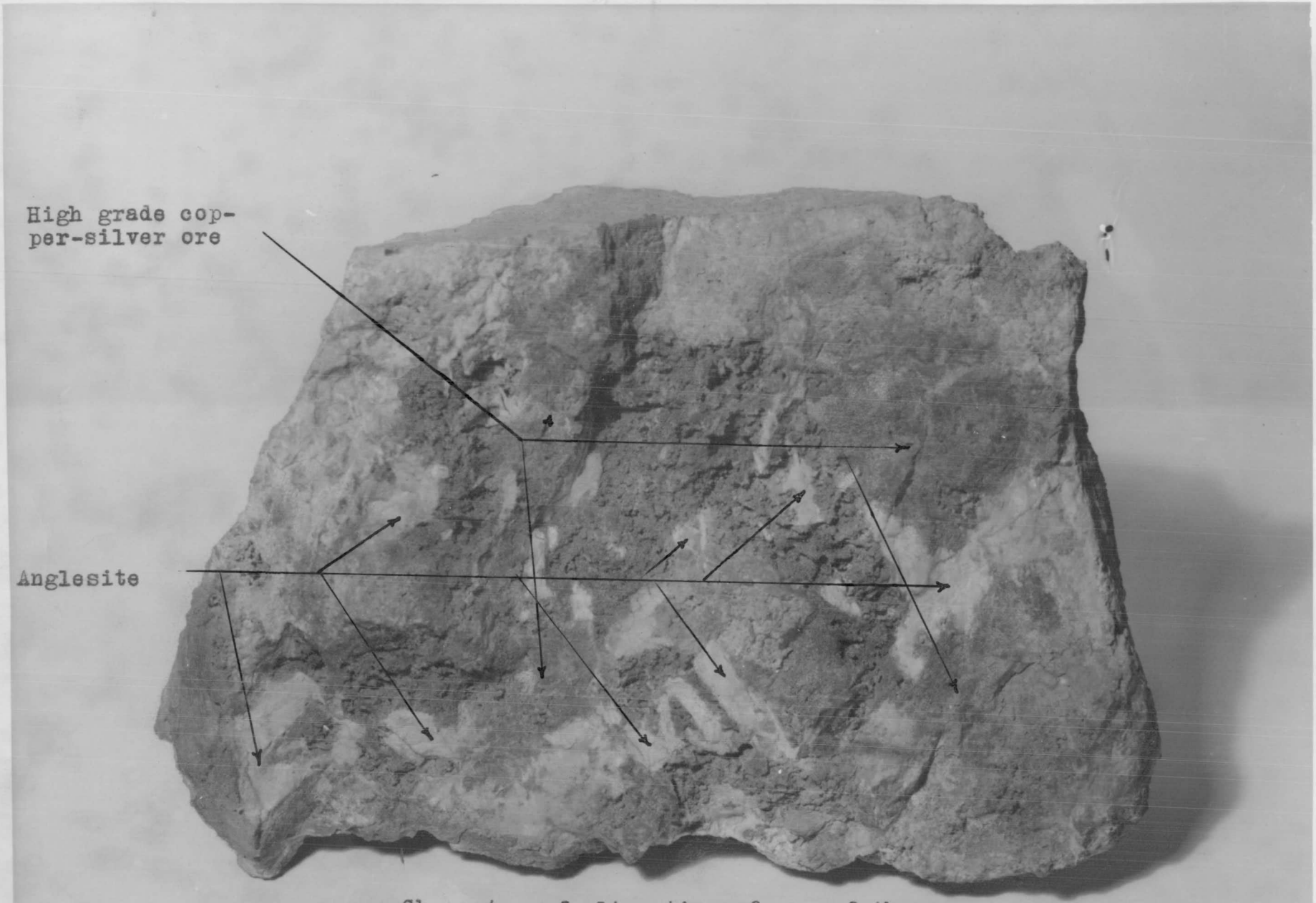


From the foregoing, it is evident that there were two distinct periods of mineralization. The first was practically contemporaneous with the deposition of the quartz of the Faithful vein and was a silver-bearing galena, the ratio of silver to lead being approximately one ounce of silver to each per cent of lead. The mineralization of this period is confined to the vein proper and does not extend into the adjoining limestone. Subsequent to the formation of the vein with its silver-lead mineralization, there was a fracturing of the vein and the adjoining limestone and along these fractures a silver-copper-lead mineralization took place; both in the vein and in the limestone. From the evidence at hand, it appears that this second mineralization slightly replaced the quartz of the vein proper, and extensively replaced the limestone. This replacement of the limestone is well illustrated by the photograph on page 11.

The second period of mineralization is of much higher grade than the first, especially in silver. In fact, the presence of copper in any of the ore is indicative of good silver values. The photograph on page 12 well illustrates the oxidation and alteration of the ore of the second period of mineralization.

Leaching and Alteration-: One of the most striking features encountered is the evidence of a most intensive leaching and alteration of the ore forming minerals in the vein and in the limestone. In dense portions of the quartz vein, galena will be found, but where exposed, it will be altered to anglesite or cerussite or entirely leached away. The copper minerals will have been leached away or altered to malachite, azurite and chrysocolla; pyrite will have been leached away or altered to limonite and hematite. Manganese where found is in the form of pyrolusite and all aluminous minerals in the form of clay.


Unaltered limestone
Altered limestone
Silver-copper ore
replacing limestone



Character of alteration of ore of the second period of mineralization

In no place have I been able to find a sulphide mineral, other than galena.

In bulldozing along the footwall of the vein near the new shaft, the white, dense limestone was altered to a light yellowish color and was of a sandy nature. While it is impossible to bulldoze the unaltered limestone, this leached material bulldozes readily.

In the sinking of the 50 foot vertical shaft, the shaft was started in the footwall immediately alongside of the vein. This was done on account of it being cheaper to sink in the limestone than in the dense quartz of the vein proper. However it was found that the shaft was not in limestone, but in a ferruginous clayey material and remained in this throughout most of its depth; gradually passing into limestone as depth was attained. The bottom of the shaft is in limestone and there is a width of some 5 feet of this ferruginous material between the shaft and the vein proper. In the sinking of the shaft, pieces of ore replacing limestone were encountered, this ore being of the character shown by the photograph on page 11. Two random samples of the ferruginous material taken while sinking was in progress assayed .6 and 4.0 ounces of silver per ton respectively. It is in this ferruginous clayey material that the discovery shaft some 50 feet to the south was sunk and it is in this same class of material that the old timers did all of their work, some 200 feet to the north. Leaching and alteration of ore of both periods of mineralization are well shown in the accompanying photographs of ore samples.

ASSAYS

It is to be specifically noted that the following are what may be termed type assays and do not represent any specific tonnage of ore. The samples on which these assays were made were

taken for the purpose of determining the grade of certain types of ore and for determining the phase and order of ore deposition and to serve as a guide in exploration work.

	Per Ton			
	Gold Oz.	Silver Oz.	Lead %	Copper %
18 tons shipped from old dumps	.08	24.1	6.2	.7
6 ton sample shipped from outcrop in 1942	.01	4.9	5.8	
(1) 14 ft. chip sample from outcrop	.01	7.1	6.3	
(2) Copper stained float from below outcrop		30.3		.9
(3) Copper stained rock from dump of old discovery shaft		52.7		2.0
(4) Gray, vuggy, heavy quartz from dump of old discovery shaft		13.6	13.2	
(5) Limonitic, cellular gossan from dump of old discovery shaft		7.7		
(6) Dense white quartz showing specks of galena		2.8	3.7	
(7) Highly leached quartz gossan. No mineral visible under glass.		.6	.6	
(8) 4 ft. width of dense quartz showing small amount of galena		4.4	3.8	
(9) 100# piece of ore bulldozed from footwall	.02	10.0	11.3	
(10) Yellow stained quartz showing no mineral, but some vugs		4.1		
(11) Hard, dense, greenish quartz		7.8		
(12) 100# piece of vuggy quartz bulldozed from outcrop, showing cerussite and some galena		22.6	21.8	
(13) 3" stringer in footwall limestone encountered while bulldozing		374.6	21.8	11.3
(14) Limestone replacement ore encountered in sinking shaft	.03	62.4	12.8	7.7
(15) Dark, unaltered limestone		1.6		
(16) Ferruginous clay from shaft		.6		
(17) Do. above		4.0		

The places at which the foregoing samples were taken are indicated by the corresponding numbers in parentheses on figures 3 and 4, pages 16 and 17.

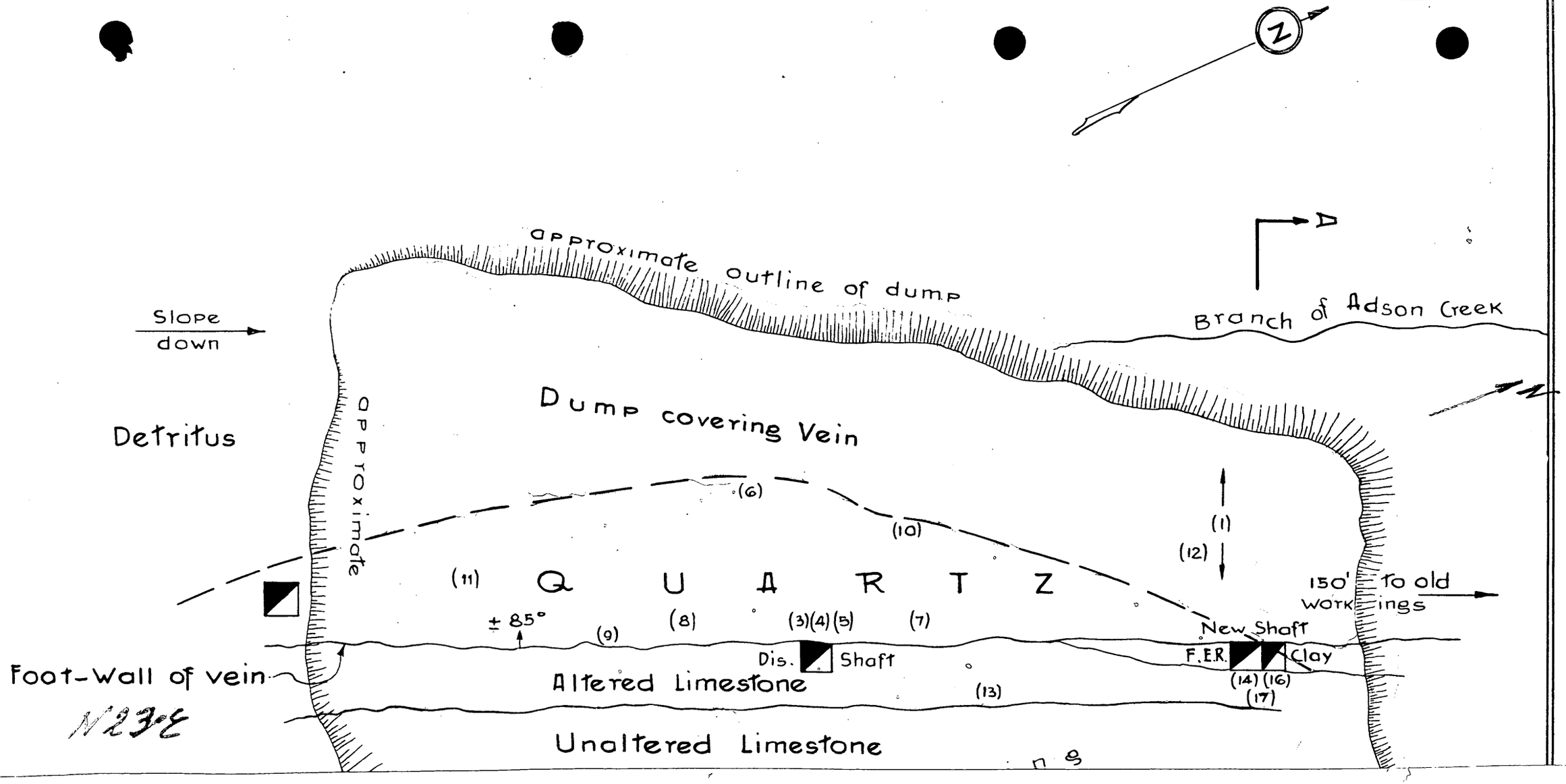
NEIGHBORING MINES

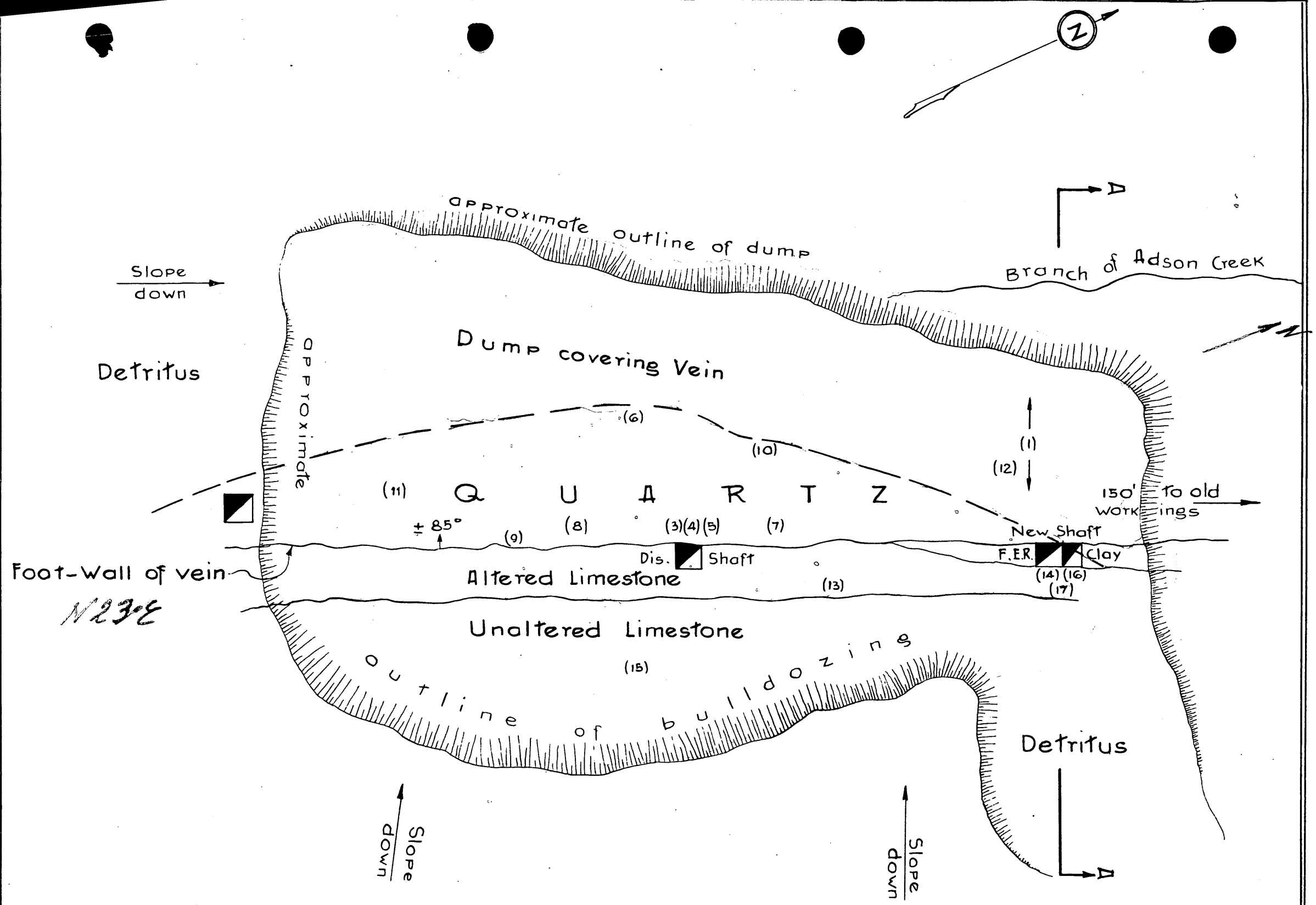
In the early days, there was a considerable production of silver from many small properties to the north of the Faithful. Two small gold mines nearby were also in production. However the two largest producers were the Quartz Hill mine, 2-3/4 miles to the northeast and the Hecla mine, 6 miles to the south. The former has a production record of some $3,000,000.00 in silver, while the latter has a production record of some $25,000,000.00, in silver, lead and copper. All of the above properties are in the Pilgrim limestone. The ore of the Hecla mine is identical in character to that of the later mineralization of the Faithful and their outcrops are similar. The main point of difference is that the Hecla orebodies follow the dip of the limestones, while the Faithful fracture crosses the bedding.

IMPROVEMENTS

Buildings-: There is on the property, a small log cabin used at present for living purposes. There is also a head-frame at the shaft and a substantial combination hoist house and shop.

Equipment-: The present operators own complete mining equipment as hoist, bulldozer, trucks, air compressor, drills, tools, etc., but remove all of same each Fall, with the exception of the hoist. This hoist is of the geared type and is suitable for operation to a depth of 500 feet.


Approximate outline of dump
Branch of Adson Creek
Slope down
Detritus
Dump covering Vein
Approximate
(6)
(10)
(1)
(12)
(11)
Q U A R T Z
150' to old workings
± 85°
(9)
(8)
(3)(4)(5)
(7)
New Shaft
Dis.
Shaft
F.E.R.
Clay
Foot-Wall of vein
Altered Limestone
(13)
(14) (16)
(17)
N23E
Unaltered Limestone



SURFACE PLAN OF PORTION

OF

FAITHFUL VEIN

Scale 1"=20'

Fig. 3

Note -: Owing to topography, the hanging wall of the vein has not been uncovered.

Workings-:

All old workings are caved or inaccessable. The new shaft, sunk to a depth of 50 feet by the present operators is 4½ x 9 feet in the clear and is in excellent condition as is the 30 foot cross-cut driven from the bottom of the shaft. This cross-cut was driven for the purpose of cross-cutting the vein from foot to hanging to determine the characteristics of the vein, both mineralogically and structurally and to find out what was on the hanging wall, for owing to the topography and the overburden, the hanging wall and what lies alongside it has not been exposed. To date, this cross-cut has not been completed. In the driving of the first 30 feet, nothing of economical importance was encountered with the exception of an occurence of high grade ore of the second period of mineralization. This ore extended the width of the drift and reached about 2/3 of the distance from the floor to the back. This ore occurence was about a foot thick in the floor of the cross-cut and feathered out at the top. Ore is still in the bottom of the cross-cut. Whether or not this occurence is just local or is the top of an ore shoot, it is impossible to say at this time.

SUMMARY

In the evaluation of the potentialities of the Faithful from a mining standpoint, it is necessary to review the data disclosed to date along with the probabilities to be deduced therefrom. These are as follows:

1-:
The Faithful lies within the confines of the Boulder batholith.

2-:
It occurs in the sedimentary formations overlying a probable cupola of the batholith; in the Pilgrim limestone to be exact.

3-:
There are two distinct periods of mineralization occuring on the property. These are

3.1-: The formation and accompanying silver-lead mineralization of the Faithful vein proper.

3.2-: The later fracturing of the vein proper and the adjacent wall-rock with the deposition of high-grade silver-lead-copper ore along these fractures.

4-:
The subsequent leaching of the economic minerals from the outcrop and for some distance below.

5-:
The precipitation of these minerals in a zone of secondary enrichment below.

Summarizing the foregoing facts in order, we have:

1-: The Boulder batholith, as outlined to date, extends roughly from Dillon on the south to Helena on the north, and from Elkhorn on the east to Phillipsburg on the west, being approximately 125 miles long by 75 miles wide. This is one of the richest metalliferous provinces in the world, having produced several billions of dollars in gold, silver, copper, lead, zinc and manganese; all of which had its origin in the magma of the batholith.

2-: The ores of the Faithful occur in the Pilgrim limestone; this formation being the same as in which occur the orebodies of the neighboring Quartz Hill and Hecla mines.

3-: There were two distinct periods of mineralization as evidenced by the ores of the two periods being different in their mineralogical constituents, by one type of ore being confined to the Faithful vein proper, while the other is found in both

the vein proper and in the adjoining limestone, and by one type of mineralization intersecting and crossing the other.

3.1-: The ore of the first period of mineralization is confined to the Faithful vein proper and does not extend into the adjoining limestone. As the type assays show, this ore is of varying grade, tho the ratio of silver to lead is fairly constant.

From a mining standpoint, there has been practically no work done on the Faithful vein proper and the ore controls of this period of mineralization are as yet undetermined. There are two possibilities of orebodies of economic importance occuring in the Faithful vein. As explained before, there has been an intensive leaching of the vein, with the probability of there being at depth, a zone of secondary enrichment of great economic importance. All of the highly productive silver mines within the confines of the Boulder batholith have shown this condition. Besides the probability of there being orebodies of secondary ore, there is the distinct possibility of there being shoots of primary silver-lead ore that may be worked at a profit. Not enough work has been done as yet to locate and delimit such shoots.

3.2-: Subsequent to the formation of the Faithful vein with its accompanying mineralization, the vein and adjacent limestone were fractured and along this fracturing, a high-grade silver-lead-copper ore was introduced. Besides filling fractures, this ore definitely replaces the limestone. The main ore control of this period, which is the major zone of fracturing, has not been definitely determined to date. In the light of existing evidence, this fracturing appears to have taken place along the Faithful vein. The main criteria that support this assumption are the occurence along the footwall

of silver-bearing ferruginous clayey material in which remnants of high-grade ore have been found and the existence of dumps of similar material from the workings of the original operators. Another possible criterion is the existence of the gulch on the hanging wall side of the vein and the outcrop of the vein having been eroded down on the hanging wall side. This indicates a zone of weakness along the hanging wall. It is interesting to note that there is a large amount of float of the later period of mineralization down Adson creek, below the outcrop of the Faithful vein.

While to date, ore of the second period of mineralization has been found only in or near the Faithful vein, it must not be overlooked that fractures in the limestone away from the vein may exist and be ore-bearing. Any such fractures are now covered by detritus.

4 and 5-: Leaching on the Faithful has been intense as evidensed by the presence of typical siliceous gossan; by the alteration of galena to anglesite and cerussite; by the presence of secondary copper minerals; by the presence of ferruginous clay and limonite; by the presence of pyrolusite and by the absence of sulphides other than galena.

It is evident therefore that the major portion of the silver and copper has been leached from the upper portions of the vein and from the replacement orebodies in the limestone and has been reprecipitated at depth to form a zone of secondary enrichment. This is borne out by mines of similar type within the confines of the Boulder batholith.

None of the work done on the property to date has been deep enough to reach the zone of secondary enrichment. At what depth, the zone of secondary enrichment occurs, it is of course impossible to say, but judging from the Hecla, the Ardsley*Butte

the Elkhorn, the Butte mines proper, the Granite-Bimetallic and from other mines in the region, I would estimate this depth to be at from 200 to 400 feet. The probability of there being at depth, large bodies of ore that may be profitably worked is especially promising.

RECOMMENDATIONS

It is recommended that the present shaft be sunk to a depth of 200 feet and that drifting be done from the bottom of the shaft along the footwall to the south for a distance of from 100 to 200 feet. That from this drift, a cross-cut be driven through the vein and into the hangingwall; this cross-cut to be roughly under the area where bulldozing was done on surface. It is un-necessary to state that the foregoing program may be altered in the light of discoveries that may be made during the course of exploration work.

From the standpoint of the physical aspects of the property and mode of ore occurence, there is no question as to the advantages of underground exploration as compared to diamond drilling as the second period of mineralization occurs in a fracture system in both the vein and adjoining limestone and it is of the utmost importance that this fracture system be solved. The best way to do this is by underground work where ore-bearing fractures may be followed and their characteristics studied and their location, size, dip and strike mapped.

Exploration at the horizon recommended, if not down to the zone of secondary enrichment, would shed much light on this subject as islands of enriched oxidized ore should be encountered, even though the zone of secondary enrichment were not reached.

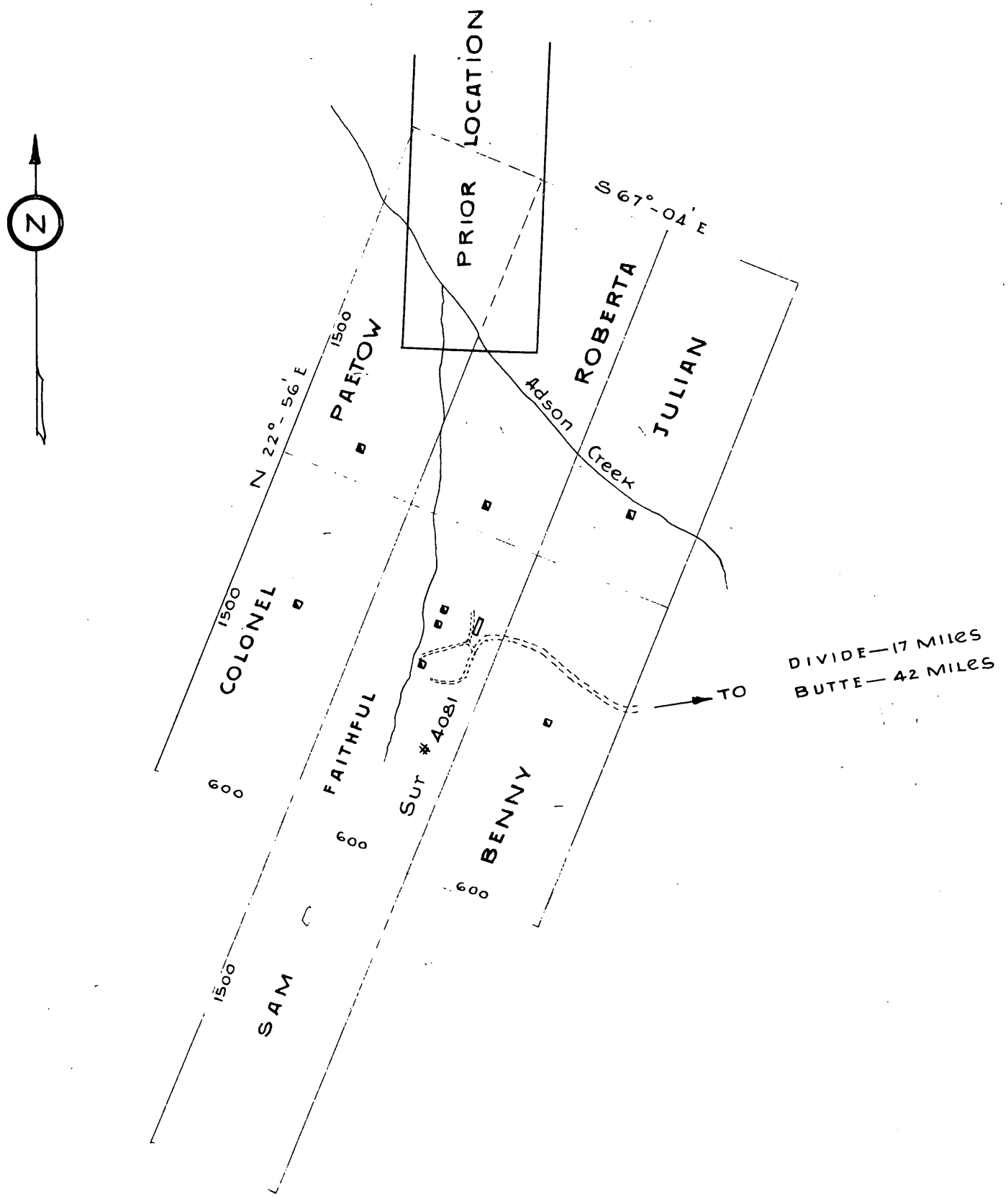
It is highly probable that shipping ore would be encountered during the course of lateral exploration for the old timers shipped ore from a much shallower depth and the present operators have encountered excellent ore, but due to lack of development work, have opened up no large ore-bodies.

Basin, Montana,
April 25, 1951.

Respectfully submitted,

E. R. Rice

E. R. Rice, E.M.



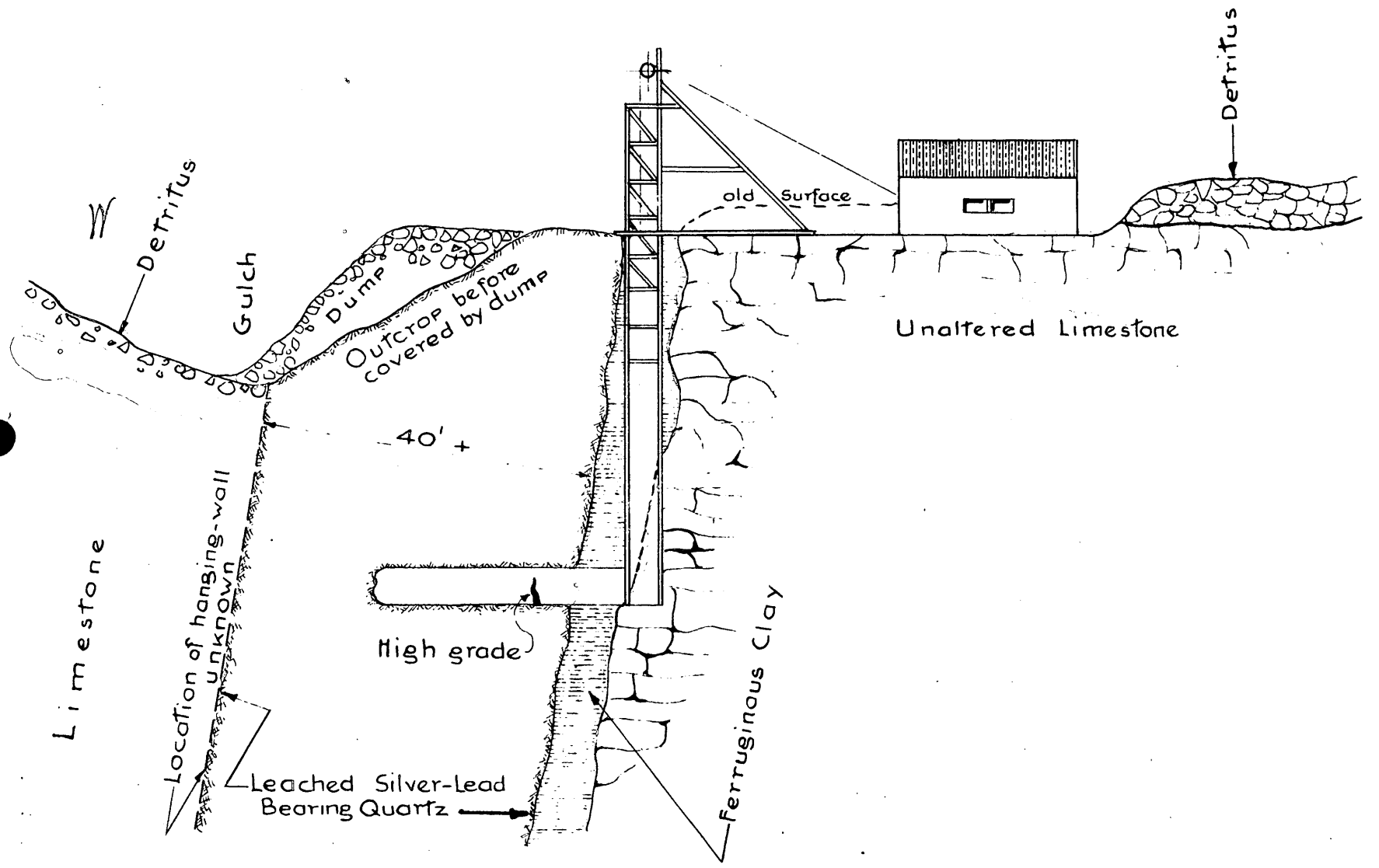
DMEA 2254 Figure 1

CLAIM MAP

OF

FAITHFUL MINE

Scale 1"=600'



DMEA 225A Figure 2

FAITHFUL MINE

SECTION TROUGH A-A

Scale 1" = 20'