A Reconnaissance In
SOUTH CENTRAL IDAHO
Embracing the
THUNDER MOUNTAIN, BIG CREEK, STANLEY BASIN,
SHEEP MOUNTAIN, AND SEAFOAM DISTRICTS

BY
J. B. UMPLEBY and D. C. LIVINGSTON
(Published in cooperation with the United States Geological Survey)

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MOSCOW
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D. W. DAVIS, GOVERNOR
BUREAU OF MINES AND GEOLOGY
FRANCIS A. THOMSON, SECRETARY

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FOREWORD

The report herewith represents the unusual situation of one man writing a geological report on the basis of another’s field notes. Obviously such a combination of circumstances is not calculated either to develop the best kind of a report or to do justice to either of the men concerned in its authorship.

The Bureau therefore tenders its apologies to Dr. Umpleby for this inadequate development of his notes on South Central Idaho, but justifies itself by saying that had Dr. Umpleby done it himself before he left the United States Geological Survey it would have been unnecessary for us to take up the task.

The Bureau also tenders its thanks to Director Smith of the Survey for pursuing the unusual course of permitting Dr. Umpleby’s notes to be used for this purpose; and finally, the Bureau felicitates itself upon having had in Professor Livingston, a man with sufficient local knowledge and geological perspective to enable him to make a fairly presentable report from a collection of sketchy field notes. Personally I regard the preparation of this report as an interesting achievement in geologic interpretation.

A word of warning is perhaps necessary in regard to the assays quoted for various properties. It is not the province of a government geologist to sample the properties visited by him. This is the function of the private examining engineer. Therefore the values assigned to various ore bodies in this report are based mainly upon statements by owners or interested parties, some of whom have had little or no experience in mine sampling. As such they are indicative rather than conclusive.

It goes without saying that in the nature of the case this report is inadequate and open to criticism. It is issued, however, in the belief that no matter how imperfect it may be, its publication in any form is preferable to allowing this information collected in 1913 to remain indefinitely in the archives of the United States Geological Survey.

FRANCIS A. THOMSON.
A RECONNAISSANCE IN SOUTH CENTRAL IDAHO

Embracing the Thunder Mountain, Big Creek, Stanley Basin, Sheep Mountain, and Seafoam Districts.

By J. B. Umpleby and D. C. Livingston.

INTRODUCTION

The material in this report covers a region in South Central Idaho not previously visited by any geological party, and is chiefly of an economic nature.

The region in which the mining districts described are situated embraces a considerable part of the drainage of the Middle Fork of Salmon River and a small part of the upper drainage of the main Salmon River, in the vicinity of Stanley Basin.

The field work was done by Mr. J. B. Umpleby while on the staff of the U. S. Geological Survey, the time occupied in the work being between June 13th and July 28th, 1913. A large proportion of this time, of course, was spent in traveling from the railroad to the various mining districts, as the region visited is one of the most inaccessible in the United States, the larger part of it being traversed only by rough mountain trails.

Mr. Umpleby also revisited a part of this region in the latter part of July and early August, 1916, spending an additional four or five days in the Big Creek district. Mr. Umpleby's route in 1913 was from Mackay, Idaho, to Stanley Basin by way of Challis and Clayton, thence to the Middle Fork of Salmon River by way of Cape Horn and the Greyhound mine, thence down the Middle Fork to the mouth of Marble Creek, which comes in on the west side, thence up this stream to the Sunnyside mine, and then over the divide to Roosevelt on Monumental Creek. From Roosevelt his route was up the West Fork of Monumental Creek to Edwardsburg and thence to the head of Logan Creek. His return route was essentially the same except that he came down Big Creek to the mouth of Monumental Creek and thence to Roosevelt, and that he returned to the railroad at Ketchum on Wood River instead of at Mackay.
TOPOGRAPHY

The topography of Central Idaho, of which this region is a part, has been adequately described by Mr. Umpleby* and need not be reviewed here. This particular region is one of the most rugged in Central Idaho with elevations of from 9000 to 10,000 feet on the peaks and ridges, and from 4,500 to 7,000 feet in the valleys. The streams are all swift, particularly on the drainage of the Middle Fork of Salmon River. Rapid River is the longest tributary of the Middle Fork and is about 50 feet wide and fordable in a few places only. Indian Creek, Pistol Creek, Marble Creek, and Big Creek are all swift mountain streams flowing in steep sided canyons and vary in width from 25 to 60 feet, but can be forded in most places. Along the Middle Fork of Salmon River between Pistol and Indian Creeks are small benches suitable for agriculture, three of them containing from 100 to 300 acres each.

The country is well timbered, chiefly with yellow pine on the lower and warmer slopes and with fir, tamarack, and lodge pole and pinon pine in the higher altitudes. There is an abundance of game. Deer and bear are plentiful in the lower altitudes, and mountain sheep and goats are found on some of the higher and more inaccessible peaks.

GEOLOGY

Apart from recent alluvium and glacial wash the rocks of the region may be grouped in three main divisions.

(a) The oldest rocks, consisting of quartzites, slate, schists and a little altered limestone, are all presumed to be of the pre-Cambrian or Algonkian age. One of the best exposures of this series of rocks is on Big Creek between the mouth of Monumental Creek and Edwardsburg where the trail traverses it for a distance of about eight miles. The rocks here consist of quartzite, slate, and schist of variable strike and usually steep dip and are cut by an occasional granite or syenite dike. The slates are dark in color and resemble very closely the Prichard slate of the Belt series of the Coeur d'Alene region and their thickness is measurable in thousands of feet. The quartzite is shattered and coarsely crystalline, in many places having more the appearance of vein quartz than ordinary quartzite. Similar looking quartzite occurs on Ramey Ridge and in the Cinnabar district on the ridge between Monumental Creek and the South Fork of Salmon River.

The total thickness of this series cannot be estimated with any degree of accuracy but the probability is that it exceeds 10,000 feet and may be considerably in excess of this figure. The age of these rocks has been taken as pre-Cambrian but they may include some of the Paleozoic formations that crop out in the vicinity of the Seven Devils mountains to the west.

A. Middle Fork, from point 3 1/2 miles above Voller and McNearney's ranch, looking N. 65 deg. E.

B. Joins view above on west. View northward toward Salmon River.
(b) These ancient metamorphics have been extensively intruded and metamorphosed by the granite mass of Central Idaho and probably should be considered as a roof pendant of the great Idaho batholith that crops out over a continuous area of 24,000 square miles. The granite of this region, which is entirely similar to that in other parts of Idaho, is a light-colored biotite granite approaching a quartz monzonite in mineral composition. Locally, within it and within the roof pendant of sedimentary rocks, dikes of basic and intermediate composition are conspicuously developed.

(c) The third series of rocks occurring in the region comprises lava flows and tuffs probably of middle Tertiary age. These consist of rhyolite, latite, and andesite, with occasional patches of basalt together with their pyroclastic equivalents. Some of the tuffs are water-laid, probably in lakes formed by damming of the streams; and most of the lavas clearly occupy old valleys which cut the area to depths greater than those occupied by the present streams. With the exception of alluvium and glacial deposits these are the youngest rocks in the region as they either intrude or overlie both the granite and the metamorphosed sediments.

There were undoubtedly two distinct periods of mineralization in the region, one accompanied or closely followed the intrusion of the granite, while the other was associated with the later period of volcanic activity. The younger deposits are gold-silver veins in volcanic rock and are characterized by a banded structure and a gangue of cryptocrystalline quartz; the older veins are coarser in texture and, with the exception of the Edwardsburg gold lodes, have a considerable amount of the base metals in them. The Stanley Basin, Seafoam, and Edwardsburg deposits are representative of the older group and the Thunder Mountain deposits of the younger.

THUNDER MOUNTAIN DISTRICT

Situation

This district lies in the upper drainage basin of Monumental Creek, a tributary of Big Creek, which is itself one of the largest tributaries of the Middle Fork of Salmon River coming in from the west. The district lies in almost the geographical center of the state in a very remote and inaccessible region.

The usual approach to it is by wagon road from Cascade, a station on the Long Valley branch of the Oregon Short Line. This wagon road is about eighty miles long and is in abominable condition. The district can be reached also by trail from the north by way of Dixie and across Salmon River. This route which crosses Chamberlain Basin is known as the "Three Blaze Trail." Another trail comes up Big Creek and Monumental Creek from Salmon City by way of Leesburg, another from Warren across the South Fork of Salmon River, over Elk Summit.

and down Big Creek to Monumental Creek. In addition to these there is
the route taken by Mr. Umpleby from Stanley Basin down the Middle
Fork of the Salmon and up Marble Creek. There is little choice be­
tween these routes but the one from Cascade is probably the shortest
to railroad transportation.

**Brief Historical Sketch**

Placer gold was discovered in 1899 or 1900 by the Caswell
brothers who were grub-staked by a certain Huntley, a rancher on In­
dian Creek, near Cuprum, in the Seven Devils. While placer-mining
they uncovered a gold-bearing lode which was reported to be fabu­
lessly rich and they sold out their holdings to the late Col. W. H.
Dewey, of Nampa, Idaho. The news of this gold strike soon became
public and resulted in a stampede which assumed the proportions of a
miniature Klondike rush. People poured into the district over all the
available trails, one of which was the Three Blaze Trail just men­
tioned. This is said to have been so prominently blazed at that time
to prevent the large number of "tenderfeet" that travelled it daily
from getting lost.

The wagon road from Thunder City, close to the spot where the
town of Cascade now stands, was surveyed and built a year or so
later, and over the terrific grades on this road were hauled stamp mills
and other heavy machinery to equip the newly located mines. Rem­
nants of this heavy machinery in the form of mortar blocks, cam shafts,
etc. are still strewn along the road where they were evidently dump­
ed by disgusted freighters and never salvaged.

The whole surrounding country was staked and old discovery cuts
and blazes can still be found on mountains miles away from the Dew­
ey mine. The town of Roosevelt was of course founded and named in
honor of the late president who was in office at that time. The boom
was short lived as the rich surface ore gave way with depth to material
too low grade to be profitably extracted in so remote a region. The
mills closed down one by one, the last about 1908.

The town site of Roosevelt at the present time is covered by a
shallow lake caused by the damming of Monumental Creek by a land­
slide and the few houses projecting above the water were being dis­
mantled in 1918 and removed to the Cinnabar camp on Fern Creek.

**Geology**

Thunder Mountain is part of a ridge which forms the divide be­
tween Marble and Monumental Creeks, the elevation of the ridge be­
ing between 8,000 and 9,000 feet. The mines are located on both sides
of this ridge, the Sunnyside mine being on the Marble Creek side and
the Dewey mine on the drainage of Monumental Creek.

The country rock consists of rhyolite and andesite in the form of
flows and tuffs, mixed with hardened mud of probable volcanic origin.
A. View N. 120 deg. E. from same point as view below.

B. View N. 70 deg. E. from point 8300 feet above sea on trail at head of West Fork of Monumental Creek.
Gold occurs in some of these flows and in beds of tuff, following seams which are probably joint planes.

Brief mention should be made of the rather peculiar landslide which dammed Monumental Creek and flooded the little town of Roosevelt. This landslide started near the head of Mule Creek south of the Dewey mine at a point about two miles from Monumental Creek, and moved slowly down to Monumental Creek, damming the valley to a depth of about 28 feet overnight. The distance of two miles was traversed in the course of a few hours, but at no point was the movement more rapid than a man can walk.

**Mines and Prospects**

**SUNNYSIDE MINE.** This property consists of eighteen unpatented claims and is situated in a small gulch which is tributary to Marble Creek not far from its head. The mine is near the head of this gulch at an elevation of 8000 feet and the mill is near the mouth of the gulch at an elevation of about 5900 feet and about a mile and a half from the mine.

The gold occurs in a mineralized rhyolite breccia containing a considerable amount of tuff. This rhyolite is extensively fractured, probably due to jointing, and the gold occurs along these fractures or joints, associated with a considerable amount of clay. This mineralized flow varies from 15 to 30 feet in thickness, has a strike of N. 70 deg. E., dips to the northwest about 23 deg., and is traceable for 1000 feet. It is underlain by a rhyolite tuff from which it is separated by a seam of talc-y material and is overlain by a volcanic mud about 45 feet thick. Both of these form impervious barriers to underground water and therefore the gold is confined to the rhyolite breccia through which alone the gold-bearing solutions were able to percolate.

The values run from about $4 to $11 in gold between the walls of this rhyolite flow, although picked specimens running as high as $35 to the ton have been reported. The values are fairly uniform between the walls but along the strike and dip certain parts are richer than others. However, $11 might be considered the maximum value of any sample from wall to wall. The largest stope is said to have averaged $5.25 to the ton and there is reported to be $700,000 worth of rock in sight that will carry $4 to the ton. The gold is evidently alloyed with silver for the placer gold derived from the outcrop was worth only $11 per ounce and the ore is reported to run from 2 to 3 oz. of silver to the ton.

There are several thousand feet of workings on the mineralized flow, the mine being opened by two tunnels about 300 feet apart vertically. These tunnels are connected by raises and the workings were reported to be in good shape in 1913.

There is a forty-stamp amalgamating mill on the property with a cyanide plant that has never been unpacked. The ore was sent to the mill by means of a gravity rope tram 7150 feet long at a cost of
6. A RECONNAISSANCE IN SOUTH CENTRAL IDAHO

50 cents per ton. In addition to the stamp mill the equipment consists of a sawmill, hotel, blacksmith shop, bunkhouse, and five buildings, and is reported to have cost about a million and a quarter. The mill made three runs of about three weeks each, the last one of which was in 1906 and the aggregate clean up from these runs is reported at about $5000.

DEWEY MINE. This property lies on the Monumental Creek side of the Thunder Mountain ridge near the head of Mule Creek about two miles above its junction with Monumental Creek. The mine workings are at an elevation of about 7500 feet.

The geological conditions are practically identical with those at the Sunnyside mine except that the gold occurs in seams traversing a rhyolite tuff. This tuff is part of an eruptive series consisting of andesite tuffs varying from massive to thin water-laid beds of several hundred feet thick, then several layers of mud a few feet thick followed by the gold-bearing rhyolite which is interbedded with thin bands of tuffaceous conglomerate. These beds have an east-west strike and a dip of 30 deg. to the south.

The gold occurred practically free from gangue in the seams or joints of the tuff but away from these seams the rock was barren. The gold was sometimes found associated with pyrite, some nodules of pyrite containing leaf gold in the center, and as a general rule the pyrite would assay from $40 to $80 to the ton. Some was also found in fractures in charred wood buried in the tuff. The gold bearing rhyolite was mined to maximum widths of 25 feet but the ore occurred usually in bunches through the rock and was very irregularly dispersed.

The mine was worked by two tunnels about 100 feet apart, both of which are now caved, as well as many open cuts and shallow workings. The lower tunnel is in about 1000 feet but did not open up any ore. The upper tunnel has some 700 or 800 feet of workings and it was in this tunnel that the gold-bearing sulphides were found. There was one big stope that evidently extended from this tunnel level to the surface and from which most of the ore that was milled was extracted.

The average value of the ore was from $5 to $8 per ton and it is reported that $350,000 was taken out between 1900 and 1908 by means of a ten-stamp amalgamation mill. Some very rich pockets of ore were extracted near the surface and as many as 7 ounces of gold per day per man were rocked out from the wash above this ore body. One of the most remarkable features of these gold-bearing tuffs was the discovery of logs embedded in them. One of these logs, 60 feet long and 2 feet in diameter, was impregnated with free gold and was found 40 feet below the surface.

The origin of the gold does not appear to be entirely clear but it is undoubtedly very recent geologically, and is probably connected with the volcanic activity that is represented by the lava flow. The high-grade ore occurring near the surface is evidently due entirely to
the secondary enrichment of a very low-grade rock, since the lower workings of the two principal properties, the Sunnyside and the Dewey, appear to be in almost barren material. In fact gold can be panned from the surface over a large area where these volcanic tuffs occur, but the rock from which the gold has been concentrated by weathering and disintegration is itself too poor to work, at any rate under the unfavorable transportation conditions, with which the district is now handicapped.

Other properties in the district are the East Dewey, the H—Y and the Standard where the geological conditions are apparently the same as in the properties described.

BIG CREEK DISTRICT

Situation

This district is situated on the upper part of the drainage of Big Creek, one of the principal tributaries of the Middle Fork of Salmon River. Most of the mining properties lie near the headwaters of Smith, Government, and Logan Creeks along the east side of a high ridge forming the divide between the South and Middle Forks of Salmon River.

The easiest route into the district is either from New Meadows which is the terminus of the Pacific and Idaho Northern Railroad, or from Lakeport (or McCall as it was originally called), the terminus of the Long Valley branch of the Oregon Short Line. Automobile stages run from both of these points to Warren, during the summer months. From Warren there is a fairly good wagon road to Dustin's ranch on the South Fork of Salmon River, but from that point to Big Creek a saddle horse is the safest and most feasible mode of travel, as the road is in bad shape. After crossing the South Fork of Salmon River at an elevation of 3000 feet the road follows the steep and narrow valley of Elk Creek, a roaring mountain stream with a heavy gradient. At a distance of about 12 miles from the river the road crosses Elk Summit at an elevation of nearly 9000 feet and approximately at the timber line. On account of its elevation and exposed position this pass is only free from drifted snow a few weeks in the year and this high summit is a great hindrance to transportation into the district. The road then follows down Smith Creek and about a mile from the summit crosses over a divide to Government Creek which it follows down to the postoffice of Edwardsburg a few hundred yards from Big Creek.

Topography

The topography is rugged, the steep ridges bare of vegetation extending above the timber line with some of the higher points such as Mt. Logan exceeding 10,000 feet in elevation.

The country has been extensively glaciated and it is highly prob-
able that the glaciers have retreated but very recently. All the creeks head in wide cirques and valley glaciers extend to Big Creek in some cases, the limits of the glaciers being marked by extensive terminal and lateral moraines. Big Creek above Edwardsburg occupies a broad valley which maintains its glacial characteristics to almost as low an elevation as 5000 feet. Below the glacial valleys the streams flow in steep-walled rocky canyons, the lower slopes of which are covered with rock slides composed of enormous angular boulders and their sides scarred with the snow slides of early spring. It is a gloomy and forbidding region with few redeeming features in the canyons but from the higher points a panorama of the ridges, peaks and canyons that go to make up the topography of Central Idaho can be obtained, which is a relief to the eye after the somberness of the valleys. It is also a relief to the ear to rise above the ceaseless diapason of the swift mountain streams.

Geology

The district is near the center of the main granite core of Central Idaho. Extending eastward from the North Fork of Payette River and from Little Salmon River is a belt of granite 50 miles in width which reaches with minor interruptions almost to Stanley Basin. In general this belt contains practically no other rocks and except for the gold veins of Warren and Marshall Lake contains little mineral. On Big Creek to the east for a width of 25 to 50 miles lies the belt of ancient metamorphics previously described, and between the two is a belt (about five miles wide) of what are probably Tertiary eruptives consisting chiefly of rhyolite and striking almost due north and south. These have been intruded into the granite not far from the contact of that rock with the metamorphics.

The geology of the district is not quite so simple as outlined above as the contact between the different rocks is indented and irregular and the later intrusives are not confined to rhyolite, but are made up of a varied assortment such as quartz porphyry, granite porphyry, syenite porphyry, alaskite porphyry, diorite, and possibly lamprophyre. The principal mineralization of the district consists of a wide zone or lode that strikes a little east of north and follows the eastern flank of the South Fork—Middle Fork divide cutting across the heads of Government and Logan Creeks. This lode or zone may be found to extend continuously from Smith Creek to near the head of Moore's Creek, a fork of Logan Creek, a total distance of about four miles. It consists mainly of crushed and sericitized granite full of quartz seams. The granite has been locally intruded by later porphyries and in some places the lode apparently crosses the metamorphic series consisting here of schist and quartzite. The average strike of this lode is about N. 10 deg. E., with a dip of S. 60 deg. to 70 deg. E., and its width varies from 100 to 250 feet. The values lie chiefly in gold but a little copper, possibly one percent, occurs in places, as well as a little silver. The gold
contents obtained by careful sampling of some of the properties on the lode seem to indicate a value of between $1 and $3 a ton, an average sample of one of the principal exposures yielding $1.26 a ton. The gangue is chiefly sericitized granite and quartz with considerable pyrite in places, the latter carrying most of the gold.

**Mines and Prospects**

The properties along the lode taken in their order from the north, are the Independence, Goldman-Macrae, Lauffer and Davis, and Moore.

THE INDEPENDENCE GROUP consists of eleven patented claims that lie between the head of Smith and Government Creeks. The property was located in 1898 and sold in 1902 to a Topeka company which did some 2000 feet of development work, chiefly in the form of tunnels. The lode here is said to be about 200 feet wide and to lie between a porphyry hanging wall and a rhyolite footwall, and is also reported to cut across the metamorphics which consist of slate, marble, and schist. The lode contains a considerable amount of sulphides of which pyrite is probably the most important, and is said to average about $3 a ton for a width of 200 feet, although 30 feet near the hanging wall is said to have carried $5.25 a ton in gold. Careful sampling of 60 feet gave returns of $3.50 in gold and a little copper. An extraction by cyanide of over 80 percent of the gold value is claimed. This property has been idle for several years.

THE GOLDMAN AND MACRAE PROPERTY consists of two claims and two fractions lying between Government Creek and the North Fork of Logan Creek and has an outcrop 200 feet wide consisting of quartz and altered country rock which is chiefly granite. The property was located in 1911 by D. C. Macrae and E. F. Goldman and has been opened by two tunnels 307 feet apart vertically and by numerous open cuts. The lower tunnel starts from near the creek and has been run on a course of N. 20 deg. E., which is about the strike of the lode, and in 1916 was in about 100 feet. This tunnel passes thru a chloritic igneous rock too altered for identification and containing a number of seams of quartz, and the zone as a whole is supposed to run about $2 to the ton in gold, although this appears open to question.

The upper tunnel, which has a course of N. 62 deg. W. and consequently cross-cuts the lode is in 130 feet and from it a drift extends north a distance of 100 feet. The tunnels do not cut either the foot or the hanging wall but for their entire distance are in lode formation which consists of quartz and altered country rock heavily pyritized. The whole of the workings are said to average $2.18 in gold. In the cross-cut there is 15 feet, which is reported to run $8, and 40 feet which will run $4. The average value of the lode however is undoubtedly much lower. The lode appears to line up with both the Moore and Independence properties and has a probable strike of N. 10 to 20 deg. E. with a dip of 60 deg. to 70 deg. to the northeast.
THE GOLDEN WAY UP group is owned by Geo. Lauffer and Joe Davis, consists of nine unpatented claims, and lies between the Goldman and Macrae and the Moore properties. It crosses the ridge between the North Fork of Logan Creek and Fall Creek. It is evidently the same lode as described in the other properties but altho it has the same course it is out of alignment with the others and has evidently been offset about 800 feet in a block bounded by two faults in which the valleys of the North Fork of Logan Creek and Fall Creek have been cut. There is a mineralized zone over 30 feet wide consisting of altered sericitized granite interbanded with quartz seams, one of which is 25 feet wide, but most of which are about 3 feet wide. The granite is frequently replaced by pyrite occurring in scattered cubes.

The vein was first located by Chas. Crown in 1899 and bonded in 1902 by John Campion who did about 2000 feet of development and then discontinued work; following this it was bonded by C. S. McKenzie who did several hundred feet in three tunnels and also abandoned the project. It was then located by Lauffer and Davis in 1908 who have worked it up to the present time.

There is little information as to the value of the lode from wall to wall tho specimens assaying as high $12.40 in gold and 60 cents in silver are reported. The probabilities are, however, that it will average about the same as the other properties, i. e. from $1 to $3 a ton.

THE MOORE PROPERTY, also known as the MOSCOW GROUP, consists of eight unpatented claims and was located in 1903 by Godlove and Boyle. It is the most southerly group on the lode, traversing the hillside east of Moore Creek which it practically parallels for about a mile. It was purchased by Mr. E. Moore in 1905 who started work upon the claims and put in a 300-lb. stamp mill in 1907 which he ran for 17 days, taking out $173 in that time. He replaced this mill with a 5-stamp mill in 1911 with which he has taken out a total of between $6000 and $7000.

The mineralization is entirely similar to that on the other properties of the lode and consists of sericitized granite traversed by quartz veins and is reported to be from 200 to 300 feet wide with an approximate course of N. 30 deg. E.

It is developed by a tunnel running N. 89 deg. E. which crosscuts the lode and was 350 feet long in 1913 with drifts to, the north and south near the face which were in 20 and 30 feet respectively. At a point 115 feet from the portal two other drifts have been driven, the northerly one being in 75 and the southerly 200 feet.

There is a well developed footwall exposed in the crosscut with from 6 to 18 inches of gouge separating barren from mineralized granite, but the hanging wall has not been exposed tho the lode at that point is supposed to be 250 feet wide. At a distance of 190 feet from the portal there is a quartz zone 14 feet wide and another quartz zone

...
A. View S. 10 deg. W. toward the Moore property from Gold King Cavern, Big Creek district.

B. View S. 35 deg. E. from Gold King Cavern, elevation 7400 feet, Big Creek district.
15 feet wide occurs near the footwall. Both of these are said to show good gold values. The gold is evidently associated with the pyrite, which contains about $100 to the ton when segregated. The entire workings of the property as determined by careful sampling are reported to average $2.20 to the ton although it is said that 120 feet of the lode will average more than this.

SUMMARY AND CONCLUSIONS. In summing up this particular part of the Big Creek district it is evident from the development work on the properties just described, that there is a well defined lode which at several places along a course of nearly 4 miles is from 100 to 300 feet wide. Careful sampling of one or two of the properties by several companies has revealed enough gold to make further explorations justifiable under normal labor conditions. If the lode or lodes prove to average sufficiently high the quantity of material available is sufficient to support a large industry and to warrant the building of a good road into the district. Transportation is prohibitive except for operations on a large scale. If this lode were as favorably situated in regard to transportation as the Alaska-Treadwell for instance, there would probably be many hundred thousands of tons of rock that could be mined at a profit. Under the present conditions, however, there is little chance for the development of a big gold-mining industry as the transportation facilities are probably worse than in any other part of the United States, and further development in the district awaits the solution of this problem.

Most of the tunnels do not reach a depth that is much in excess of 200 feet vertically below the surface and the question of whether the values are due to secondary enrichment of very low-grade material as at Thunder Mountain, or whether they are primary, has not been studied and decided. The general topography of the country and situation of most of the properties together with the climatic conditions would indicate rapid erosion with a consequently shallow zone of enrichment and the evidence introduced along this line would favor the hypothesis that primary conditions prevail to within a few feet of the surface. Further work in regard to mineral association etc. would have to be done before this point could be definitely proved but its importance is obvious, although under any circumstances there is a very large tonnage of low-grade material which may some day considerably augment the gold output of the state.

CHICAGO GROUP. This property consists of five unpatented claims lying on both sides of Big Creek, about a mile below Edwardsburg, at an elevation of from 5000 to 5500 feet.

The country rock is the metamorphic series, consisting chiefly of a rather fine-grained limestone with some siliceous slate, schist, and fine-grained quartzite. The ledge occurs along the contact of a rhyolite porphyry dike in limestone and consists of the latter rock crushed and brecciated, occurring in a zone about 10 feet wide. The strike is about north and south, the porphyry being on the hanging-wall side, and the
dip is 60 deg. to the west. The ore occurs in lenses and stringers in the crushed zone and consists of galena and pyrite with some other sulphides. A sample taken across 3½ feet is said to have contained 14 percent lead, 38 oz. of silver, and $28 in gold, but this is undoubtedly very much higher than the average for the whole ledge. The vein is exposed in two tunnels and in the creek bed and warrants further development.

THE EAGLE MINING COMPANY, of which Wm. A. Edwards is manager, owns several claims on the ridge between Logan and Government Creeks and a mill which is situated on Logan Creek about a mile and a half above Edwardsburg at an elevation of about 6000 feet. This mill contains 4 power stamps, 2 concentrating tables, and a cyanide plant. The claims were located in 1904 and the mill was begun in 1906 but made the first run in 1911, at which time about $1200 is reported to have been taken out. The capacity of the mill seems to have been low, as only 7 tons were put through in a day of 12 hours.

The vein is evidently a shear or fault zone in granite, and consists of from 5 to 10 feet of crushed country rock and quartz showing considerable gouge and slickensides, between walls of solid unaltered granite, and has a strike of N. 70 to 82 deg. E. Ore occurs as lenses and stringers in this crushed zone, the average value of the material sent to the mill being reported as $17 to the ton in gold with little silver.

The vein has been opened by three adit tunnels with an aggregate of over a thousand feet of drifting. The oxidation zone is very shallow as all of the ore in the middle and lower tunnels is sulphide, and much of that in the upper also, so that it is probable that most of the ore exposed in the workings is primary.

COPPER CAMP. This group of thirteen claims is situated on the north side of Big Creek 12 miles below Edwardsburg, between Ramey and Crooked Creeks. The claims are either bonded or owned by Wm. A. Edwards of Edwardsburg and are on the hillside about 1000 feet above the level of Big Creek. They lie east and west, following a series of veins which strike in that direction.

The country rock is the metamorphic series of supposed pre-Cambrian age and consists chiefly of quartzite. There are several veins, the principal one of which strikes N. 75 to 80 deg. E. and has an almost vertical dip. On the Black Bear claim this vein has been developed by a tunnel which follows it with a course of approximately S. 75 deg. W. and was in a distance of 120 feet in August 1916. In this tunnel two crosscuts have been driven in the hanging wall, one at a distance of 90 feet from the portal and the other at 105 feet. The first of these shows 16 feet of vein material, the second, 14 feet. The vein is a shear zone cutting the slates and quartzites almost at right angles, this shear zone of crushed country rock being impregnated with quartz which contains pyrite, chalcopyrite and sooty chalcocite with oxidation products consisting of azurite and malachite, and is reported to run about 3 percent in copper, altho this seems unlikely.
A crosscut tunnel about 200 feet lower than the tunnel just described has been driven from Camp Creek on a course N. 47 deg. W. a distance of 545 feet to intersect the Black Bear ledge which should be cut about 400 feet further in. This crosscut passes through blocky quartzitic slate for the whole distance.

This ledge is persistent for at least 2500 feet along its strike as exposed by open cuts, the most westerly of which shows the vein to be 8 feet wide and of the same general appearance as in the tunnel. Another open cut situated about 1000 feet west of the tunnel and several hundred feet higher shows the vein to be 21 feet wide with precisely similar ore.

In addition to this main vein there are five others lying within a strip about 1000 feet wide and appearing to converge to the east. These are narrower than the Black Bear vein, varying in width from 30 inches to 6 feet. They are all of the same general character, showing quartz, rather honeycombed in some instances, and copper stain. One of these veins is reported to run well in gold although very little development work has been done upon any of them so that their value has not been definitely determined.

**STANLEY BASIN DISTRICT**

Stanley Basin is a structural depression in Central Idaho where a number of streams unite to form the main fork of the Salmon River. This depression extends in a northwesterly direction for a distance of nearly forty miles, with an average width of about three miles and a general elevation of about 7000 feet above sea level. It is highly probable that it has much the same history as other structural valleys in Idaho and neighboring states, such as Long Valley in Idaho, the Bitterroot Valley in Montana, and Jackson Hole in Wyoming, and although its physiographic history has not yet been worked out, its origin is most likely due to a fault along the Sawtooth Range, which forms its western border. It was also probably occupied by a lake at one time, now represented by a few shrunken remnants as Red Fish, Alturas, and other smaller lakes.

Stanley post office is situated on Salmon River at the point where that stream leaves the basin at right angles and cuts thru the mountain mass of Central Idaho. It is about fifty miles northwest of Ketchum, the nearest railroad point, tho the distance by road is considerably farther than this, as the divide known as Galena Summit between Wood and Salmon Rivers has to be crossed at an elevation of about 9000 feet. Stanley may also be reached from the railroad at Mackay by way of Challis and up Salmon River, which latter route is much longer but avoids Galena Summit.*

Several streams that flow into the Salmon below Stanley contain placer gold and have been worked intermittently from the seventies

* There is now a first class highway over Galena Summit which thus becomes the natural approach to this area.—F. A. T.
until the present time. The most important of these are Joe’s Gulch, coming in from the north, and Little Casino, Big Casino, and Rough Creeks, coming in from the south.

Joe’s Gulch Placer

Joe’s Gulch is a small valley about 2½ miles long, emptying into Salmon River about a mile below Stanley. The placer ground is owned by Geo. M. Smith, W. W. Smith, and Dan Murphy, all of Stanley. The width of the channel ranges between 25 and 80 feet and averages from 35 to 40 feet deep. There is about 22 feet of cover over the channel and the gulch has been mined for a total distance of 4800 feet beginning at a point about 1200 feet above the mill. It is estimated to pay about 40 cents a square foot of surface and according to these figures the area mined has produced between $70,000 and $75,000, although an output of $100,000 has been asserted for it.

The gold is coarse (from flax to wheat grains), well rounded and easily saved. It runs about 717 fine and nets the owners about $15 per ounce. It occurs in an arkosic gravel containing granite, andesite and aplite boulders averaging about 8 inches in diameter and seldom exceeding 18 inches. The boulders are scattered somewhat irregularly through the arkosic overburden, but are concentrated in the last six feet. The gold occurs in the irregularities of the bedrock, which is granite, and in cracks and crevices of the rock to a depth of two and occasionally three feet, with no gold occurring more than two feet above bedrock.

In the early days of the camp, the gold-bearing gravel was mined by drifting, but the present method of operation is by sluicing, utilizing the snow water in the spring and carefully cleaning up the bedrock, after removal of the boulders. In this way from $3000 to $4500 are taken out annually, the water lasting from two to three months.

The local theory for the origin of the gold is that it is derived from a rhyolite porphyry dike about 80 feet wide, which crosses the gulch about a half mile above the present workings with a strike of N. 30 deg. W. This dike contains oxidized cubes of pyrite, occurring principally along cracks, somewhat irregularly spaced, with free gold occasionally visible along the fractures. Whether this is the source of the gold is not clearly proved as the country rock is granite containing narrow auriferous quartz veinlets, and the smooth grassy slopes of the granite show long continued erosion. It is evident that the rhyolite dike has contributed some of the gold but it seems highly probable that most of it has come from the narrow veins in the granite.

Big Casino, Little Casino, and Rough Creeks

These three creeks all contain placer gold and flow into Salmon River on the south side. Little and Big Casino Creeks come in about three miles below Stanley, a quarter of a mile apart and in the above order, while Rough Creek comes in about four miles further down. All three of them head in the high mountains lying east of Stanley Basin;
Big Casino, the largest of the three, is about ten miles long, and has a lake near its head. These creeks contain the highest grade of gold in the district, running from $18 to $18.50 an ounce. Rough Creek has produced from $15,000 to $20,000, Big Casino about $8000, but the yield of Little Casino Creek is not known.

On Rough Creek the bedrock is about 60 feet deep, on Big Casino Creek about 17 or 18 feet, but the depth on Little Casino Creek is undetermined. The overburden on Big Casino Creek is very similar to that on Joe’s Gulch across the river, consisting of arkosic clay containing boulders of granite and aplite.

The placer ground on Big Casino is owned by David C. Hershey, of Clayton, who has a number of claims extending up the creek for about six miles with an average width of 100 feet. The ground was staked in the early days but has only been worked within the last ten or twelve years. The gold is about the size of rice grains and is found on the irregular granite bedrock in depressions and cracks. The boulders vary in size from 8 inches to 2 feet in diameter, consist of granite, aplite, diorite, and pegmatite, and are scattered chiefly thru the upper part of the overburden which is about 17 feet deep in the present pit. The channel has been worked for a distance of 700 feet, and if the $8000 reported as having been produced from this creek came from this 700 feet, it would give the ground a value of 18 cents to the cubic yard. Magnetite is abundant as in all parts of the basin, and a little cinnabar also occurs, but the rare metals suspected were not found. The elevation of the pit is 6675 feet and there is plenty of water all thru the summer for ordinary mining purposes.

On Little Casino Creek, there are twelve unpatented claims extending up the creek from Salmon River for over a mile. Bedrock has not as yet been reached on this creek altho preparatory work has been done in the form of trenches and tunnels amounting in all to about 1200 feet. About three fourths of a mile up the creek there is an aplite dike from 50 to 100 feet wide, running east and west, which is crossed at right angles by a similar dike of smaller size. In addition to these dikes there is a system of north-south fissures containing quartz and a considerable amount of fluorite. Alongside of one of these fissures is a gouge seam varying in width from a few inches to a foot which contains from $6 to $12 to the ton in gold. It is highly probable that the placer gold in Stanley Basin has been derived from these small, comparatively low-grade, gold-bearing seams in the granite, which by weathering and erosion have caused the placer ground in the same manner as in other parts of the granite area of the state, as for example at Elk City, Florence, and Dixie.

There is a striking similarity in the topography of all the placer camps in Central Idaho, except that the hills are rounded and mature here, whereas elsewhere the slopes are more abrupt and the canyons contain practically no flood plains. The placer region seems to indicate remnants of an old and more mature drainage system which have been
left behind in the process of erosion and denudation so characteristic of most of Central Idaho.

**Valley Creek Mine**

The Valley Creek mine is situated on Valley Creek, which is one of the principal tributaries of Salmon River and flows into the north end of Stanley Basin. This mine was located about twenty-five years ago. In 1903 a mill was built and in 1906 the property was purchased by D. P. Carpenter, of Pittsburg, Pa., who operated it until the fall of 1909, when the company became insolvent.

The ore occurs in a mineralized zone of granite from 10 to 26 feet wide, which has been greatly fractured, stained with iron, and impregnated with quartz, the latter making up probably 10 per cent of the whole zone.

Some of the ore that was milled ran as high as $5.50 per ton in gold and about 1½ oz. of silver, and there are from 200,000 to 300,000 tons of material which it is claimed will run $3.50 to the ton. The ore occurs in irregular masses in the mineralized zone from which about $20,000 has been extracted. There is reported to be about 3000 feet of development chiefly in the form of tunnels which start from a gulch back of the mill. The mill contains 20 stamps and some cyanide tanks but has not been operated for several years, the question of transportation being, as usual in Central Idaho, the main stumbling block to continuous operation.

**Willis Company's Dredge**

This is a 2000-yard-capacity Bucyrus dredge which was working on Stanley Creek across the divide from Joe's Gulch. In addition to the ordinary gold-saving equipment, the dredge is fitted with tables and screens for saving the black sands which are reported to contain platinum.

The dredging company, of which Mr. H. C. Willis is manager, owns about 480 acres of ground. The channel is about 200 feet wide and possibly a mile long and but a small portion of it had been worked prior to 1913.

The gold bearing gravel is made up of well rounded boulders varying in size but not over eight inches in diameter. About 60 percent of the material is sand and 20 percent boulders. The total depth of the ground is from 9 to 12 feet with from 1 to 5 feet of soil on top. The gold is about the size of wheat grains and is to some extent distributed thru the gravel, but in the main is concentrated on the bedrock, and is worth about $13 per ounce. The ground will run between 30 cents and $1 a yard.

Mercury is found in the fine gravels in the form of native amalgam, and also in the mineral cinnabar. The latter is becoming more abundant as the dredge is moved up stream, suggesting a cinnabar deposit at some point further up the creek.
There is plenty of timber to supply the dredge with firewood and sufficient water for its operation.

**Starkey Placer**

This property is located on a bench about 150 feet above the level of the bed of Stanley Creek. The average depth of the gravel, which is rounded and sub-angular arkosic material, is ten feet and the gold is found up to 3 or 4 feet above the granite bedrock. There are about 100 acres of this ground of which 30 or 40 acres have been worked with a reported production of $150,000. This would give a value of between 35 and 40 cents a cubic yard for the ground that has been worked. The soft granite bedrock is seamed with iron oxide and locally studded with pyrite. This condition does not exist in the overlying gravels and is possibly the source of the placer gold.

**SHEEP MOUNTAIN AND SEAFOAM DISTRICTS**

Both of these districts lie chiefly within the drainage area of Rapid River, one of the larger tributaries of the upper Middle Fork of the Salmon and the general conditions in them are similar.

The nearest railroad point is Ketchum, on the Wood River branch of the Oregon Short Line Railroad. The wagon road passes through Stanley Basin and thence by way of Cape Horn and up Beaver Creek over Vanity Summit (7700 ft.) to the headwaters of Rapid River. A wagon road extends as far as the Greyhound mine, about thirty-five miles from Stanley or very close to one hundred and five miles from Ketchum. There is no wagon road to the Sheep Mountain district, but it can be reached by trail from the wagon road on Beaver Creek or from the Lost Packer mine at Ivers on Loon Creek.

The topography is of the mature erosion type common to all Central Idaho. Sheep Mountain forms one of the highest and most prominent landmarks, and is in plain sight from the Thunder Mountain wagon road on the other side of the Middle Fork. It is probably over 10,000 feet high.

Geologically the region lies in the granite batholith not far from its eastern border and consists of sedimentaries, largely limestone, intruded by the granite in a very irregular manner. Both the granite and the limestone have been intruded by later dikes of rhyolite, rhyolite porphyry, etc. of probable Tertiary age.

The age of the limestone is not clear but it is probably late Paleozoic, possibly Carboniferous.

**Mines and Prospects on Sheep Mountain**

THE GOLCONDA GROUP consists of six unpatented claims, located on the northwestern slope of Sheep Mountain and owned by W. H. Casto. The elevation at the Casto cabin, which is on the claims, is about 7500 feet. The claims were located in 1903 and were at one time bonded to the American Smelting and Refining Company.
The country rock is a limestone of medium grain and of bluish-gray to brown color, in thin siliceous beds verging to a shaly texture in places. The limestone has been intruded by diorite porphyry dikes 20 feet or more in width. The average strike of the limestone is between N. 25 and 60 deg. W. with a dip to the northeast between 60 and 70 deg. There is a quantity of granite and granite-porphyry float on the mountain side, showing that the claims are close to, if not upon, the contact between the sedimentaries and the granite.

At the Golconda No. 1 discovery, a fissure vein in limestone has been exposed showing a strike of N. 65 deg. W. and a dip of 85 deg. to the southeast. This fissure is five feet wide with 12 inches of gouge on the hanging wall side and contains from 2 to 3 feet of quartz shot thru with galena. It is apparently continuous for several hundred feet and where opened in another cut shows from 6 inches to a foot of galena, sphalerite, pyrite, and pyrrhotite in a limestone country rock. From near Mr. Casto’s cabin a two hundred foot tunnel has been driven which commences in granite and encounters blue limestone about 175 feet from the mouth. The vein in this tunnel is reported to contain 60 ounces of silver to the ton with considerable sphalerite, and occurs along an east and west course in lenses and bunches in both the granite and the limestone. The vein is accordingly younger than the granite intrusion as it traverses both this rock and the limestone. In the neighborhood of the vein the granite is sericitized and chloritized although the limestone next to the ore is but little altered.

About 400 feet west of the Golconda No. 1 discovery, where the lead vein outcrops, there is a flat-lying vein of pyrrhotite about five feet wide, which strikes about east and west and dips north about 30 deg. It lies between limestone walls and has been exposed for a distance of about 20 feet in a drift. According to results obtained by careful sampling this vein will run $14 to the ton in gold, the general appearance of the ore being strikingly similar to the gold bearing pyrrhotite of the Le Roi and Center Star mines at Rossland, B. C. It is entirely different from the lead-bearing veins and probably represents a distinct phase of mineralization, containing as it does practically no quartz intermixed with the sulphides. This vein would seem to be worthy of more extensive development.

THE KING PROPERTY consists of a group of three unpatented claims, owned by R. H. Hull of Challis, and situated about a mile northwest of Sheep Mountain at an elevation of about 8300 ft.

The mine produced a considerable amount of high-grade lead-silver ore in the early days of the camp, but how much it is difficult to determine as reports vary all the way from $80,000 to $500,000. Some of this ore was shipped to Bay Horse and some to Ketchum. There was a small mill on the property containing some improvised jigs but the mill is now collapsed and most of the mine workings are either caved or too dangerous to enter.
THE SEAFOAM DISTRICT

The ore consisted of silver-bearing galena (some of which contained as much as 170 ounces of silver to the ton), pyrite, sphalerite, and a little chalcopyrite in a quartz gangue, and occurred as a replacement of limestone. The principal ore body was in the form of a pipe or chimney in a dark blue, medium-bedded, siliceous and argillaceous limestone and at the present time the outcrop appears as a caved area about 30 feet across.

The mine was opened up by two tunnels of which the upper one is now caved and the lower one eighty feet below, evidently comprised about 800 feet of workings, to judge from the dump. It is evident that from the upper tunnel this ore body was stoped to the surface in several places, the stope being reported as 60 to 70 ft. long and 8 to 12 ft. wide. In the lower tunnel the ore split into east-west veins which were apparently unproductive.

The condition of the workings rendered a complete examination of the property impossible. Apparently the low price of silver, prevailing in the last few decades, together with the remote situation have prevented more extensive development in search of another ore body.

THE GREYHOUND MINE is in the Seafoam mining district and consists of seven unpatented claims near the head of Sulphur Creek, a tributary of Rapid River, in T. 14 N. R. 10 E., the altitude of the property varying from about 7000 feet at the mill to 8500 feet on the ridge above. There is a well graded wagon road to the property from Cape Horn, the total distance from the railroad at Ketchum being one hundred and five miles.

The vein is a well defined fissure, probably a fault or shear zone in granite, the vein filling consisting of crushed granite cemented and impregnated with quartz. Silver-bearing sulphides occur in the quartz which probably comprises from 20 to 30 percent of the total vein filling.

The vein has a strike of NW. and SE. and dips to the SW. about 75 deg. and is supposed to have been traced on the surface thru four claims. It varies in width from one foot to over eight feet. The values are in silver which evidently occurs in the form of sulphides or sulphantimonides, as the vein contains very little galena or other base metal sulphides. The silver ore occurs in shoots in the vein and a series of samples taken along one of these shoots in the main drift for a length of 50 feet gave a value of 27 ounces of silver over an average width of about 2.5 feet.

The vein has been opened by an adit tunnel or drift which has been run a distance of 560 feet and follows the vein for this entire distance. The tunnel is reported to have ore in the face that will run about 20 ounces of silver to the ton. Two stopes were put up from this tunnel one at about 100 feet from the portal and about 75 feet long, and another about 200 feet from the portal. The first of these stopes was worked for a width of about 8 feet to a con-
siderable height above the tunnel and is reported to have averaged about $17 to the ton in silver. At the present price of silver ($1 an ounce) this ore would be now worth between $25 and $30 a ton.

The mine is equipped with a 10-stamp mill and concentrating tables, and also a 50-ton lead-blast furnace, and the present idle condition of the mine is largely due to wrong metallurgical treatment as the expense of smelting this class of ore in so remote a region must have been prohibitive. Coke had to be hauled from Ketchum 105 miles over a mountain road crossing three summits at a cost of about $30 per ton, while lime and iron had to be packed on horses 6 and 7 miles from other claims.

The property seems to have considerable merit and with a carefully designed mill might be developed into a profitable producer.

BULLDOG MINE. This property is situated about three miles west of the Greyhound mine near the head of a small tributary of the middle fork of Salmon River. There are three patented claims, four cabins, a small shaft and a cabin on one of the claims called the Ivanhoe, and a 500-foot tunnel and a long open cut on another called the Bulldog. The upper tunnel on the Bulldog starts at an elevation of 8050 feet and extends S. 38 deg. E. for a distance of about 250 feet following the strike of the vein. The vein is about 25 feet wide at the portal of this tunnel and consists of silicified granite banded with quartz and impregnated with galena, sphalerite, pyrhotite, arsenopyrite, chalcopyrite, magnetite and pyrite, in a very finely divided form thus giving a bluish color to the quartz. The vein dips about 65 deg. to the southwest and has been stripped for a distance of 500 to 600 feet southeast from the tunnel. There is about 125 tons of ore on the dump of the upper tunnel but there is no ore on the dump of the lower tunnel which is about 120 feet lower. Ore from this vein, it is maintained, runs about $11 to the ton in gold and 30 ounces of silver.

LAKEVIEW GROUP. This consists of three unpatented claims belonging to S. M. Burns, of Meridian, Idaho. The claims are located on the south side of Float Creek at an elevation of 7500 feet. They are three miles above the switchback on the Greyhound wagon road between Float and Sulphur Creeks.

The mineral deposit is in a shear zone in granite and has been developed by two tunnels 100 feet apart vertically. The upper one had been driven a distance of about 20 feet at the time the property was visited by Mr. Umpleby and showed a shear zone from 6 to 18 inches wide, filled chiefly with clay gouge. There was a little ore on the dump which was reported to run $87 to the ton in gold and from $3 to $4 in silver. The lower tunnel was in 125 feet but showed nothing definite.

THE SILVER BELL GROUP is also owned by Mr. Burns and associates and consists of eight unpatented claims. The cabin, on
A. Sheep Mountain district from the west.

B. Topography west from near Sheep Mountain. The central cirque is at the head of Seafoam Creek.
A. Greyhound Mill and Smelter, from south side of canyon.

B. View S. 80 deg. W. across valley of Middle Fork, from point 8850 feet elevation on trail from Greyhound to Soldier Creek.
the claims is on the north side of Harlan Creek cirque, at an elevation of 7800 feet.

The country rock is granite and the workings consist of two tunnels, the lower one of which is in 100 feet. No ore was seen in the face, but a pocket of galena is reported to have been found in this tunnel from which about two tons of high-grade ore was extracted. The upper tunnel is 50 feet above the lower and runs in a northwesterly direction. If we may judge from the dump this tunnel is about 150 feet long and from it about 100 tons of ore were taken out which is now piled on the dump. The tunnel was caved and inaccessible at the time the property was visited but is reported to have passed thru ore along its entire distance.

FLOAT CREEK PROPERTY. This consists of three unpatented claims situated in the valley bottom at Josephus Lakes 7000 feet high. The claims are about three miles west of the switchback on the Greyhound wagon road.

The ore occurs in the form of detached blocks which cross a glacial valley in a zone about 75 feet wide with a general direction of N. 60 deg. W. This zone of blocks or boulders of ore extends up the northwest bank of the creek for several hundred feet. The ore consists chiefly of iron-stained and silicified granite which is reported to contain on an average about $20 to the ton in gold and silver, the latter predominating. The general appearance of the blocks of ore suggests that it occurred in a shear zone in the granite but the original source of the material has not been discovered. It is possible that these mineralized blocks are part of the recessional moraine of a glacier and their source may be at some distance from their present location. An improvised smelter was erected in the early eighties to treat this ore but it had a negligible production.

MAHAN CLAIM. This property is owned by E. H. Hasbrouck and Mrs. Mary Ridenbaugh. It lies on the southwest slope of Sheep Mountain and the tunnel opening is about 1000 feet from the summit near the head of the northern tributary of Lime Creek.

The minerals of the vein are galena, sphalerite, pyrite, and siderite in a quartz gangue. The vein has a strike of S. 80 deg. W. and dips to the southeast about 60 deg. It occurs in a shaly limestone with a well defined hanging wall along which the ore lies in an irregular manner. The limestone has been intruded by granite and diorite porphyry. Granite and limestone are the most important rocks on the property. There was one shipment of ore from the mine.

**Mines and Prospects on Seafoam Creek**

There are several properties on Seafoam Creek upon which a little development work has been done. The country rock is granite and the ore is chiefly lead-silver which occurs in northwest veins. The most important of these are:
THE COLLISTER PROPERTY, which consists of four patented claims on the north side of the canyon of Seafoam Creek from 2½ to 3 miles above its junction with Rapid River. There is one principal vein with about 150 feet of development work. There has been no production from the property.

POST'S PROPERTY is situated about one-half mile above the Collister group and on the same side of the creek. Gold and silver ore worth about $4000, of which gold was the chief value, has been shipped from the property. This ore was reported to run from $150 to $200 to the ton and some of it contained as much as 300 ounces of silver. There are three unpatented claims.

TRADE DOLLAR consists of two unpatented claims which lie on the opposite side of the creek from the Post property. This ground is reported to contain a thirty-inch vein carrying a foot of galena. There is a forty-foot tunnel on the property.
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