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REPORT ON INSOLUBLE ANALYSES OF LIMESTONES FROM THE SILVER PEAK MINES

by
Richard Cooke

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September 13, 1936

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I. INTRODUCTION

During the summer of 1936, about 150 limestones and other specimens were collected from Mineral Ridge, principally by the writer. Although most are from sub-surface workings, a number of typical specimens were also taken from surface outcrops.

The work began as the nucleus of a representative petrological assembly of the main rock-types of the district, and was done largely incidentally, in the course of the field work. However, as the importance of the limestones became increasingly evident, the collection was used principally for insoluble analyses on the limes, and for comparison, on the other rock-types. The outcome of the work is embodied in the following report. (See Appendix I for the procedure and criticism of the analyses).

II. RESULTS

There are six principal rock-types of the district, the last three of small economic significance: quartz-ore, limestone, alaskite, diorite (dikes), schist, and dolomite. The sedimentaries are probably Cambrian, and were intruded by possibly Jurassic granitics, with the silicious ore-runs and diorite dikes as much later, probably complementary, residual products of the cooling magma.

Structurally, the district is on the east flank of a broad anticline, up-arched possibly, immediately prior to the granitics, which intruded as an irregular sill, interfingering with the sedimentaries, and working through above, as well as below the limestone. The limestone is apparently all comprised in one formation, with the petrological differences due to differential contact metamorphism of the alaskite, with some dynamic metamorphism due to the up-arching, and

later movement. Post-dating, and probably attendant on the anticlining and intrusion, two systems of faults formed roughly north-south, and east-west, which A.E. Kipps suggests are components of a thrust from late volcanic action to the northeast, below Clayton Valley. Supporting this view are two basic volcanic cones in the valley, probably of allied origin to the diorite dikes. One cone is nearly eroded away, while the second is practically untouched, showing that volcanic action here lasted an appreciable time, at least. The faults are characterized by drag-zones, with the total movement distributed on several planes, and probably, in great part, pre-mineral.

The structure section is essentially similar throughout the mine:

dolomite, at top
schist
alaskite
limestone
alaskite, at bottom

The quartz intruded into the limestone in probably three, mantos, or blanket runs, characteristically regular and continuous. (1) The intrusion is believed to be a concurrent process of chemical dissolution by acids concentrated at the snout of the manto, and physical thrusting by the quartz, the latter probably much more important. The mantos occassionally push into the overlying schist, but here are more irregular and tenuous.

The ore is practically confined to the mantos. The principle purpose of the present operations is to solve the components of post-mineral faults and rolls that have disturbed the mantos.

The mantos are about 15 feet thick at maximum, and generally over 100feet broad. They are thought to have intruded from the southeast, and now strike with the limestone and sedimentaries--N45W. The whole series dips from the nearly flat structure near the top of

(1) Basil Prescott, Trans., Am. Inst. Min. Met. Eng., 51, 1916, pp. 57-99. The Underlying Principles of the Limestone Replacement Deposits of the Mexican Province. Eng. Min. Jour.-Press, Aug. 14 and 21, 1926.

the anticline to 25 degrees at the Mary Level, well down on the flank.

There are two ore-horizons in the limestones--at the base of the lime, where the mantos first met the favorable formation, and at the top of the lime, where they were repelled by the unfavorable overlying alaskite and schist.

The footwall limes are generally gneissic, with intercalated silicious injections, while the hangingwall limes are pure, blue, usually well-bedded limestones. Analyses of the foot and hanging-wall limes indicate at least 15% less insoluble in the lime of the hanging-wall, due to stronger contact metamorphism at the base of the lime. (See Appendix III).

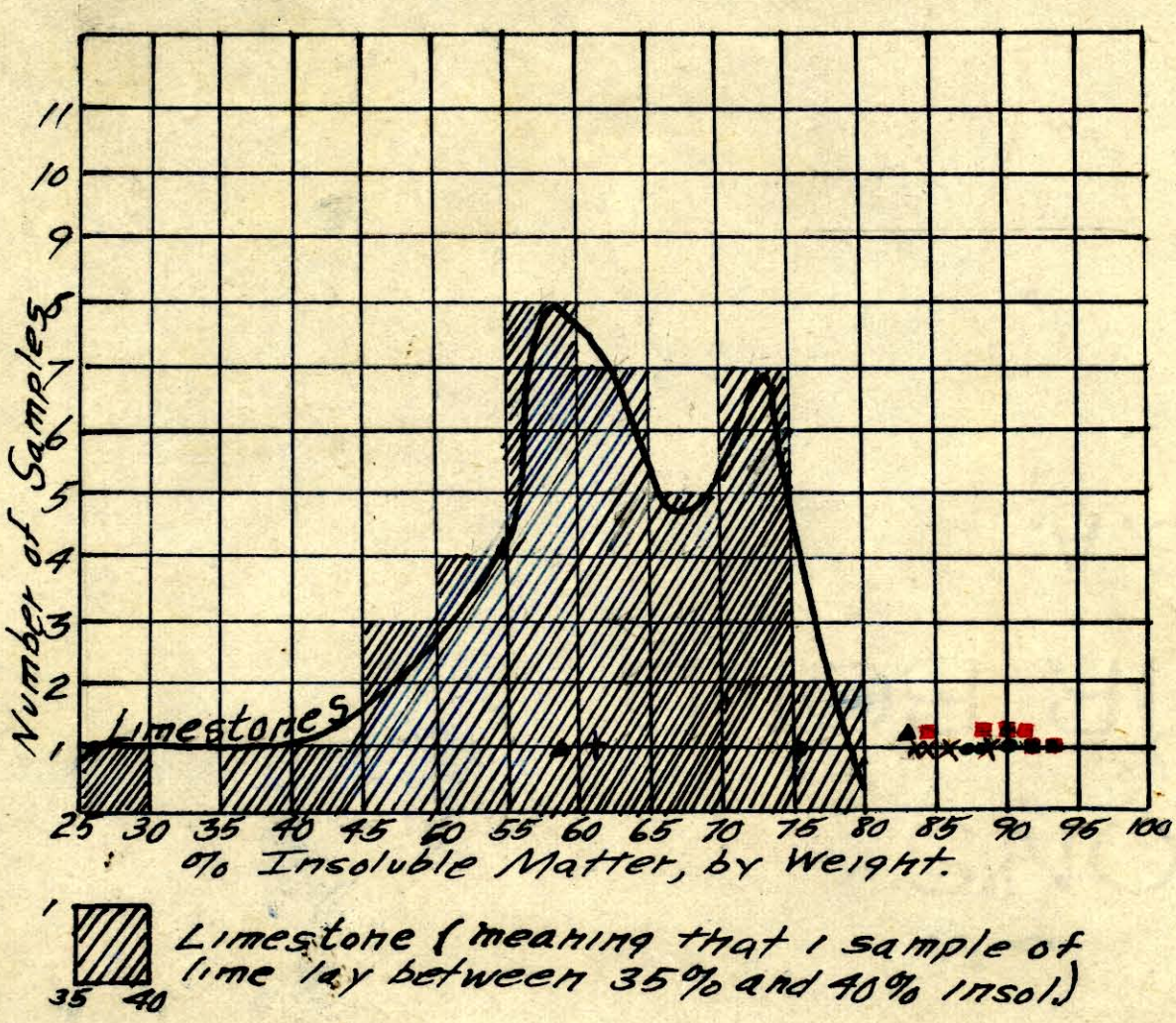
The plastic, basic, calcareous horizon was the easiest, both physically, and chemically, for the manto to invade; the overlying schist was the next easiest, and the massive, acid, alaskite the hardest. The silicious injections were pinched to small aplite dikes in the alaskite. Moreover, the lime had the additional advantage of being able to precipitate sulfide solutions of the metals, when the carbon of the lime was liberated by acids of the mantos.

The general result of the analyses was the crystallization of an inchoate conception, initiated by Spurr (2), that the rock-types of the district form a continuous series, grading into each other. Spurr postulated the quartz ore-runs as a silicious "scum" of the alaskite magma, with the diorite dikes as the coeval basic phase. From both field observation and analyses the conclusion evolves that this relation is yet more general. At the silcious end, the injections grade from pure arizonite and quartz dikes to aplites and silicious pegmatites. The pegmatites carry the dike phase through to the diorites, which terminate the basic end of the series. The granitics grade from silicious alaskite to monzonitic phases. The limes are extremely variable, from gneissic limestone in the footwall, to pure, blue, lime in the hanging; the gneiss grades into monzonites below and above, and to calcareous schist above. The schist is unusually calcareous, even away from the limestone; the soluble content appears to increase toward the lime. Only one sample of dolomite was tested, giving 62% insol., which is not far from the average lime test. The gradation of lime to schist is noticeable in the field.

(2) J.E.Spurr, Geology of the Silver Peak Quadrangle, Prof. Paper 55, U.S. Geol. Survey.

In general, then, the type-mames given the rock are merely pegs on which are hung a continuous series, verging toward the type as an average; only the type-names are practical in field-work. The curves in type-analyses show the variation in soluble content, as well as the overlapping (Fig. 1)

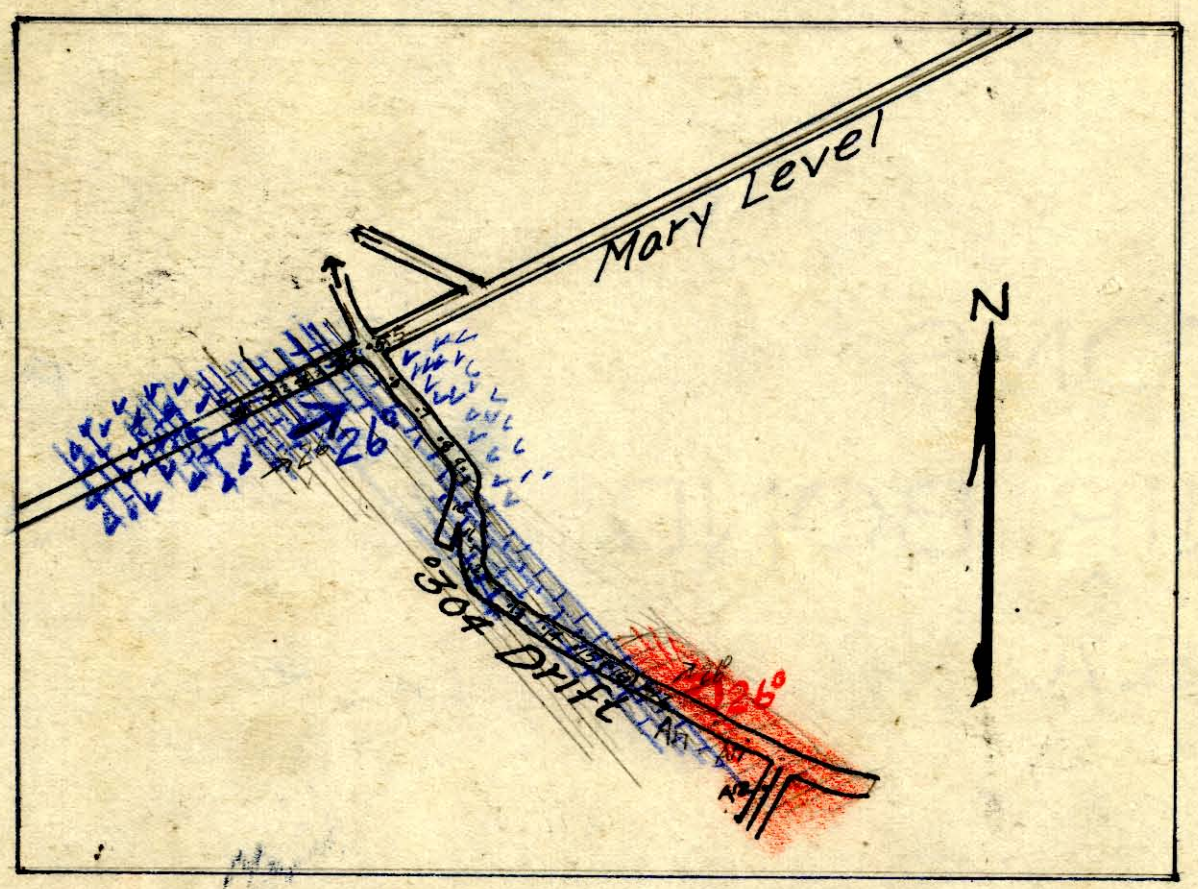
Fig. 1



The limestone gradually becomes less soluble toward the foot-wall alaskite, due largely to actual fine-laced, silicious injection, rather than chemical alteration. Reversely, the insoluble content appears

to decrease toward the mantos, which sought the purest limestone, and injected with much less interfingering than the alaskite sill. Figures 2 and 3 illustrate the general decrease in insoluble toward the manto.

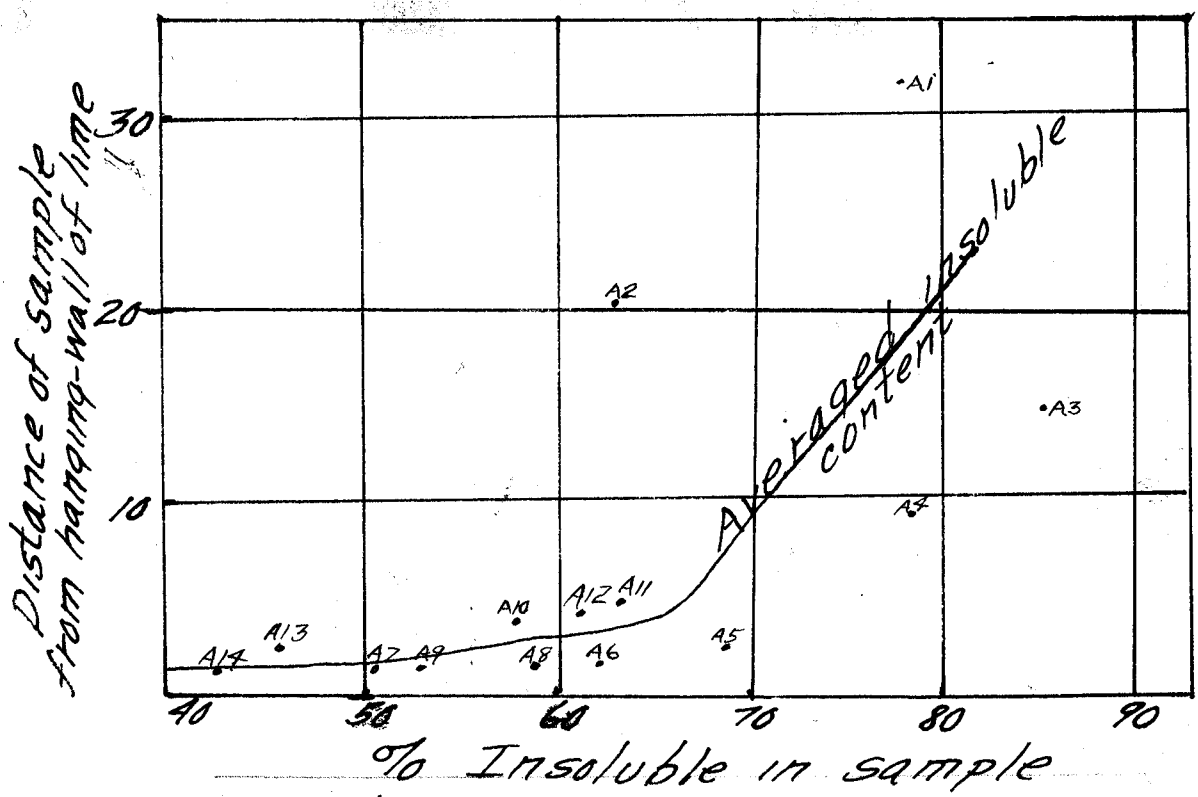
Fig. 2



Manto
Limestone
Alaskite

Map showing the relation of Limestone samples, A1-A17, to structure; °304 Drift, Mary.

Fig. 3.



Graph showing insoluble content of foot and hanging-wall limestone, °304 Drift, Mary.

The above map and graph show, 1) a dimunition in insoluble content from footwall to hanging-wall of the limestone, and 2) a dimunition in insoluble content as the manto is neared, along *304 Drift, from No. A5 to A14.

Insuffecient analyses were made on limes from other levels to show the relation of foot to hanging-wall analyses there, but the field appearance of the sections on other levels indicates that comparable results would be obtained. The following analyses are from hanging-wall limestone:

Number Rock	Number Analysis	% Insol., Wt.
17	2	55
65	11	47
72	14	38
73	18	28
71	20	53
78	29	63
79	30	50

Number Rock	Number Analysis		% Insol. Wt.
80	31		59
81	32		54
82	33		58
83	34		63
84	35		63
85	36		45
86	36a		42
87	37	near decomposed dior.	79
88	38	" " "	74
89	39	quartz bands	70
			49% average

(See Appendix III for locations of above specimens).

The average limestone was 62% insoluble. Insoluble tests on footwall limestone:

Number Rock	Number Analysis		% Insol. Wt.
28	3		65
74	25		63
75	26	quartz bands	85
76	27		78
77	28		68
78	29		63
			71% average

Insoluble tests of representative rock-types were made of the other five classes, principally for comparison with the limestones (See Fig. 1, and Appendix III). Too few analyses were made of any type for certain conclusions, but the gradation from type to type is evident. Three specimens of quartz averaged 86% insol., grading into alaskite, four samples of which averaged 83%. Four samples of diorite averaged 83%. One sample of dolomite ran 62%, and two specimens of schist ran 47% and 57% insol., indicating the variability in lime content.

The details of the analyses are given in Appendix I. In general, the insoluble content may be used in conjunction with field and mineralogical criteria to evaluate the lime content of a rock, and its place in its type-series, but the insoluble tests are not alone definitive.

Study of the analyses points to one general conclusion, based on the geologic mapping of the district: the maps demonstrate that the large ore-runs occur always in limestone. The analyses show that the ore-runs invade the most soluble limestone; in short, therefore, the ore occurs in the most soluble rock of the area.

Appendix I

A. Procedure Used
1. Crush rock.
2. Weigh wet filter paper.
3. Weigh crucible.
4. Sieve powder unto paper (writing paper).
5. Pour 3-5 gm. powder into crucible
6. Wet powder to a paste; weigh, in crucible.
7. Heat with 5-9 cc. of dil. HCL, about 1-10, for 1 to 2 minutes. If pyrite, add several drops HNO_3.
8. Pour through filter paper; wash.
9. Weigh filter paper plus residue.
10. Divide powder weight into residueX100 for % insoluble.

B. Standard Procedure (outlined by George Guillotte)
1. Grind rock to at least 50 mesh; mix powder.
2. Dry.
3. Weigh 1 gm. out.
4. Take up with dil. HCL, about 1-2, 15 cc. If pyrite is present, add several drops of HNO_3.
5. Take slowly to dryness.
6. Take up with 5 cc. HCL, dil. 1-2.
   Note: steps 6 and 7 may be omitted if the powder is highly silicious after the first boil.
7. Take slowly to dryness.
8. Take up with water.
9. Filter.
10. Wash with hot water.
11. Fold filter paper; dry-burn in a crucible.
12. Weigh.
13. Divide residue by powder and multiply by 100 for % insol.

C. Furman Procedure (Peele)
1. Crush rock.
2. Sieve unto paper.
3. Weigh crucible.
4. Pour 1 gm. powder into crucible.
5. Weigh powder and crucible.
6. Boil with 6-7 cc. dil. HCL till dry.
7. Weigh residue plus crucible.
8. Divide powder weight into residue X 100 for % insol.
   Note: steps 9-11 were not a regular part of the procedure, but were followed in analyses where "Reboil" is noted (see Appendix III).
9. Reboil with 6-7 cc. dil. HCL till dry.
10. Weigh residue plus crucible.
11. Divide powder weight into residue X 100 for % insol.

D. DISCUSSION

The deviations ~~from~~ of the method used from standard procedure were necessitated principally by abbreviated equipment. The only heater was an alcohol burner, with no hot plate, precluding more than one heating at a time. Steps (2) and (10)--(hot water)--were therefore impracticable. The absence of ashless filter paper necessitated weighing the paper and residue together. Otherwise, the procedure used conforms to standard procedure.

The disadvantages of analyses in a mill testing laboratory were minimized by the solution men. The principle difficulty in making the tests here is the lack of distilled water. The tap-water contains 1093 parts per million of mineral matter, and hypothetically, 624 parts of NaCl. (U. of Nevada Public Service Dep't., 1936).

An attempt was made to use the Furman procedure, with both one and two boils. The results are :

Number Rock	Analysis	% Insol. Wt. regular proc.	% Insol. 1 boil	Furman reboil
151	51A	89	48	
152	52	50	50	
	5		46	
52	43	83	27	
		88	54	
63	24	76	95	
			107	
			127	
			100	84
36	8	90	97	
			90	78
73	18	32	132	
		28		
49	46	87	116	139
				160
86	36a	42		141
60	15	58	112	218

Sources of error here were:

(1) Spitting during complete boiling.

(2) Some reaction of the HCL which precipitates more matter into the residue than the weight of solid matter removed; probably chiefly responsible for results of 100% plus.

(3) Differences in moisture content of the wet filter paper with a 1 gm. sample--a difference of 0.2 or 0.3 gm. in water weight in the filter paper between the paper weighed without, and with the residue--a quite possible difference--would make 20-30% difference in the insoluble percentage.

Both the Furman and standard procedures were

changed as described above, in Sect. A, since the immediate purpose of the tests was to secure self-consistent results, even if the analyses were all off some constant percent from the results which would be obtained in standard work. Although the above sources of error will decrease the consistency of the results, it is hoped that the errors are not too serious to prevent recalculation to the standard, on a correction curve obtained by running a number of samples through both procedures.

Appendix II
A. Specimens Collected From The Silver Peak Mines

Number	Locality	Date	Description
1.	Calumet Winze	6/8/36	Quartz, with galena
2.	same	same	same
3.	Mary Level	19/8/36	Quartz, with galena
4.	Calumet, upper level	4/8/36	Quartz
5.	Intermediate, on e.-w. fault	4/8/36	Faultzbreccia
6.	Calumet, lower drift	4/8/36	Limey quartz, with pyrite and wad
7.	Calumet, lower drift	4/8/36	Quartz, with pyrite
8.	*216 Raise	19/8/36	Quartz ore, with pyrite, galena, and specular hematite.
9.	Intermediate, *640 stope	5/8/36	Quartz ore
10.	Western Soldier, near *622	7/8/36	Lime, with aragonite
11.	Working face	3/7/36	Quartz ore, with pyrite and galena
12.	same	same	same
13.	same	same	same
14,	same	same	Quartz ore, with pyrite and chalcopyrite
15.	Mary, near Savage ladder	6/8/36	Dike, with alaskite fragment enclosed. This specimen is all alaskite.
16.	same	same	White alaskite, and dark dike, of above
17.	Western Soldier, near raise, near *622	7/8/36	Lime; 55% Insol.
18.	Wasson, face of faulted drift	10/8/36	Lime
19.	Intermediate, near *630	5/8/36	Lime
20.	*304 Drift	5/8/36	Quartz ore--highgrade, with marcasite, limonite, and hematite
21.	Upper Elix.-West. Sol. trail	5/8/36	Diorite sill, 86% insol.
22.	*304 Drift	5/8/36	Quartz ore--highgrade, with galena, hematite, pyrolusite, and cuprous? stain
23,	2 mi. e. of Mary portal, on Silver Peak road	5/8/36	Dolomite, 62% insol.
24.	Headhouse Drift, footwall of H.H. Fault	15/8/36	Lime, with pyrite; 62% insol.
25.	H.H. Drift, 20' w. of fault, in footwall	15/8/36	Lime, with pyrite and quartz

Number	Locality	Date	Description
26.	Mary, near *305	11/8/36	Lime, band 2.5' thick, in alaskite
27.	see 17		
28.	West. Sold., bottom Mohawk Winze	7/8/36	Lime; 68% insol.
29.	Intermediate	4/8/36	Alaskite drag, decomposed, and grading into fresh alaskite
30.	Headhouse Drift, hanging-wall of HH Fault	5/8/36	Alaskite; decomposed drag
31.	Mary, *313	11/8/36	Alaskite
32.	Last Chance Face	11/8/36	Pegmatite; quartz and muscovite
33.	Mary, *313	11/8/36	Aplite; quartz, with lime country rock
34.	Wasson, near*558A	11/8/36	Pegmatite; quartz, muscovite, plagioclase, orthoclase, and limonite
35.	same	same	same
36.	Mary, near face in drift, to left at *305 junction	6/8/36	Alaskite--pegmatitic; 90% insol.
37.	Intermediate, near *636	?/8/36	Alaskite
38.	Intermediate, crosscut to s. from *636	5/8/36	Alaskite
39.	Mary, near *302	5/8/36	Alaskite
40.	Intermediate, in footwall, near *637	4/8/36	Alaskite
41.	West. Sold., near *622	6/8/36	Pegmatite
42.	Mary, near *330	6/8/36	Alaskite; 85% insol.
43.	Mary, 210' e. of *305	6/8/36	Alaskite, near lime contact; 75% insol.
44.	Mary, near *302	5/8/36	Alaskite, near lime
45.	Headhouse Drift, hanging-wall of HH Fault	5/8/36	Alaskite
46.	Mary, *305	6/8/36	Pegmatite; quartz, plagioclase, muscovite, with calcite coating
47.	Halfway between West. Sold. and Last Chance Raises	11/8/36	Lime--effervesces in cold dil. HCL; 72% insol.
48.	Mary, *305	6/8/36	Alaskite, micaceous; 87% insol.
49.	Mary, near *330	6/8/36	Diorite dike, 87% insol.
50.	Shovel , footwall crosscut, opening 50' se. of main drift	10/8/36	Lime; 50% insol.
51.	Wasson, near *561 Raise	10/8/36	Lime; 68% insol.
52.	Wasson	10/8/36	Quartz; 83% insol.
53.	Wasson, near *561	10/8/36	Diorite dike, 84% insol.
54.	Mary, near *330	6/8/36	Diorite dike, decomposed; 84% insol.
55.	Mary, 210' e. of *305	6/8/36	Lime-alaskite contact; lime--71% insol.; alaskite--75% insol.
56.	same	same	same
57.	Wasson, above Mary Savage, near stope with quartz	12/8/36	Lime

Number	Locality	Date	Description
58.	Mary, *322	6/8/36	Lime; 76% insol.
59.	Mary, *323	6/8/36	Lime; 57% insol.
60.	Mary, 200' e. of portal	6/8/36	Schist; 58% insol.
61.	Mary, *317	6/8/36	Lime; 55% insol.
62.	Mary Savage, near head of stairs	6/8/36	Lime; 72% insol.
63.	Mary, *302	6/8/36	Lime; 76% insol.
64.	Mary, 50' in left drift from *332 junction	6/8/36	Lime; 76% insol.
65.	Mary Savage, 20' w. of raise and chute	6/8/36	Lime; 47% insol.
66.	Mary, *324	6/8/36	Lime; near quartz; 74% insol.
67.	Mary, *321	6/8/36	Quartzose lime; 92% insol.
68.	Mary, 100' nw. of *303	6/8/36	Lime; 55% insol.
69.	Mary, *303	6/8/36	Lime; 75% insol.
70.	Mary, 20' se. *316	6/8/36	Quartzose lime; 93% insol.
71.	Mary, 100' nw. of *302	6/8/36	Lime; 53% insol.
72.	Mary, base of Flat Raise	6/8/36	Lime; 55%, 32% insol.
73.	Mary, 200' nw. of *303	6/8/36	Lime, 32%, 28% insol.
74.	Mary, 230' e. of *305	6/8/36	Lime; 63% insol. (A2)
75.	Mary, 250' e. of *305	6/8/36	Lime; quartz bands; 85% insol. (A3)
76.	Mary, 10(w. of *304	6/8/36	Lime; 78% insol. (A4)
77.	Mary, *304	6/8/36	Lime; 68% insol. (A5)
78.	Mary, 40' in *304 Drift	6/8/36	Lime; 63% insol. (A6)
79.	Mary, 60' in *304	6/8/36	Lime; 50% insol. (A7)
80.	Mary, 80' in *304	6/8/36	Lime; 58% insol. (A8)
81.	Mary, 100' in *304	6/8/36	Lime; 54% insol. (A9)
82.	Mary, 120' in *304	6/8/36	Lime; 59% insol. (A10)
83.	Mary, 140' in *304	6/8/36	Lime; 63% insol. (A11)
84.	Mary, 160' in *304.	6/8/36	Lime; 72% insol. (A12)
85.	Mary, 180' in *304	6/8/36	Lime; 45% insol. (A13)
86.	Mary, 200' in *304	6/8/36	Lime; 42% insol. (A14)
87.	Mary, 220' in *304	6/8/36	Lime; near decomposed diorite dike; 79% insol.
88.	Mary, 260' in *304	6/8/36	Diorite dike, continued from (A16), 220' in Mary; 75% insol.
89.	Mary, hanging-wall of *304 raise	6/8/36	Lime, quartzy; 70% insol.
90.	Intermediate, in stope, near *642	6/8/36	Slickensides; movement vertical
91.	Mary, near *328	21/8/36	Lime; silicious
92.	Mary, raise at end of drift, near Calumet chute	21/8/36	Lime; banded with quartz

Number	Locality	Date	Description
93.	Mary, crosscut to right at *330	21/8/36	Pegmatite; calcite crystals
94.	Mary, raise at end of drift near Calumet chute (raise and short drift from it)	21/8/36	Lime
95.	same	same	Lime
96.	same	same	Lime, with alaskite
97.	same	same	Lime
98.	same	same	Quartz, with lime, pyrite, chalcopyrite, and bornite?
99.	same	same	Quartz, with lime and pyrite
100.	same	same	Quartz, with galena, pyrite, and lime bands
101.	same	same	Lime
102.	same	same	Lime
103.	same	same	Lime
104.	same	same	Alaskite
105.	same	same	Lime
106.	same	same	Lime
107.	same	same	Quartz, with lime bands
108.	same	same	Lime
109.	same	same	Lime
110.	same	same	Lime; 65% insol.
111.	same	same	Lime
112.	Mary, near*330	21/8/36	Alaskite
113.	Intermediate, near *661	6/9/36	Lime, quartzose
114.	Lower Eliz., at turn in drift, 100' s. of *402	6/9/36	Lime
115.	Headhouse, 25' w. of *962	6/9/36	Lime
116.	Drinkwater, *770	6/9/36	Lime
117.	Lower Eliz., at turn to rt. S50E, in main drift	6/9/36	Quartz, limey
118.	Upper Eliz., 30' in drift from *423	6/9/36	Lime
119.	Upper Eliz., left drift at *423 junction, 20' so. of *423	6/9/36	Dike
120.	Lower Eliz., face of drift ended in e.-w. fault, running over small stope	6/9/36	Lime; 69% insol.
121.	Croppings, face of drift running to ore-bin	6/9/36	Alaskite
122.	Shovel, *804 face	6/9/36	Lime ; 47% insol.
123.	Croppings, in outside stope, near fault, where 100 ton sample is taken	6/9/36	Schist
124.	Upper Eliz., *426	6/9/36	Lime
125.	Croppings, face of right drift, in main workings	6/9/36	Lime
126.	Wasson, near 509	6/9/36	Dike
127.	Upper Eliz., 50' in rt, drift, at *423 junction--face of drift	6/9/36	Lime

Number	Locality	Date	Description
128.	Lower Eliz., 35' in from portal	6/9/36	Lime
129.	Drinkwater, 100' in drift from *784, in face, near chute.	6/9/36	Alaskite
130.	Intermediate, *604	6/9/36	Lime and quartz
131.	Croppings, portal of drift feeding ore-bin	6/9/36	Lime, argillaceous
132.	Wasson, *514	6/9/36	Lime
133.	Croppings, portal of main drift, at winze	6/9/36	Lime
134.	Shovel, crosscut at *805 junction, start of cc.	6/9/36	Lime
135.	Headhouse, surface, by road, 100' n. of drift portal	6/9/36	Schist, calcareous 47% insol.
136.	Drinkwater, *785 drift	6/9/36	Lime; quartz veins, pyrite; 83%, 82% insol.
137.	Upper Eliz., 25' se. *421	6/9/36	Lime
138.	Lower Eliz., in stope at portal	6/9/36	Lime
139.	Upper Eliz., *423	6/9/36	Alaskite
140.	Intermediate, *620	6/9/36	Lime
141.	Intermediate, *644	6/9/36	Lime
142.	Lower WElizebeth, at Mary Winze, in face of drift, from *423 junction	6/9/36	Alaskite, slickensided
143.	Lower Eliz., 70' in from *402	6/9/36	Lime
144.	Calumet, near face of drift running w. from winze, near e.-w. fault	6/9/36	Drag, with pyrite and chalcopyrite, zeolites secondary, copper stain
145.	Wasson, near face of short drift in vicinity of *514	6/9/36	Pegmatite; muscovite
146.	same	same	same
147.	to 151.--not collected		
151.	Mary, near Corkscrew Raise	9/9/36	Alaskite; 89% insol.
152.	West Sold., *525	9/9/36	Lime; 50% insol.
153.	Last Chance, near portal	10/9/36	Lime
154.	Last Chance, near 23, (stope station)	10/9/36	Lime

Appendix LII

A. Insoluble Tests on Specimens From The Silver Peak Mines

A. Limestones

Number Rock	Anal.	Procured	Tested	Locality & Remarks	% Insol. by Wt.
17	2	7/8/36	8,9/8/36	Raise near *622, West. Sold.	55%
28	3	7/8/36	9/8/36	Bottom Mohawk Winze, West. Sold.	68, 65
24	7	5/8/36	9/8/36	Face Headhouse drift, at HH fault	62%
65	11	6/8/36	9/8/36	20' w. Mary Savage Raise and stairs	47
66	12	6/8/36	9/8/36	*324, Mary	74
62	13	6/8/36	9/8/36	Mary Savage, head of stairs	72
72	14	6/8/36	9/8/36	Base of Flat Raise, Mary (long heat)	55
				(short heat)	37
68	16	6/8/36	9/8/36	100' nw. *303, Mary, (near small stope)	55
59	17	6/8/36	9/8/36	Mary, *323 (short heat)	58
73	18	6/8/36	9/8/36	200' nw. *303. Mary (very short heat)	32
				(short heat)	28
71	20	6/8/36	9/8/36	110' nw. *302, Mary	53
69	21	6/8/36	9/8/36	*303, Mary	74
58	22	6/8/36	9/8/36	*322, Mary	75
64	23	6/8/36	9/8/36	Rt. drift, 50' before *322 junction, Mary	76
63	24	6/8/36	9/8/36	Mary, *302	76
lost	24a	6/8/36	13/8/36	Mary, 250' e. *305 (A1)	78
74	25	6/8/36	13/8/36	230' e. *305, Mary (A2)	63
75	26	6/8/36	13/8/36	(A3), 20' e. of (A2) Quartzose lime	85
76	27	6/8/36	13/8/36	(A4), 20' e. of (A3), or 10' w. *304	78
77	28	6/8/36	13/8/36	*304, Mary (A5)	68
78	29	6/8/36	13/8/36	20' in *304 (A6)	63
79	30	6/8/36	13/8/36	(A7) 60' in *304	50
80	31	6/8/36	13/8/36	(A8) 80' in *304	59
81	32	6/8/36	13/8/36	(A9) 100' in *304	54
82	33	6/8/36	13/8/36	(A10) 120' in *304	58
83	34	6/8/36	13/8/36	(A11) 140' in *304	63
84	35	6/8/36	13/8/36	(A12) 160' in *304	62
85	36	6/8/36	13/8/36	(A13) 180' in *304	45
86	36a	6/8/36	13/8/36	(A14) 200' in *304	42
87	37	6/8/36	13/8/36	(A15) 22' in *304 Near decomp. dior.	79
(88	38	6/8/36	13/8/36	(A17) 260' in *304 dike, continued from 240' in *304. See under diorite, Append. III, C	75)
89	39	6/8/36	13/8/36	(A18) hanging of raise in *304	70
61	40	6/8/36	13/8/36	Mary, *317	55
55	42	6/8/36	13/8/36	Mary, 210' e. *305, lime-alask. cont.	71
56					
50	47	6/8/36	13/8/36	Shovel, footwall crosscut	50
51	48	6/8/36	13/8/36	Wasson, near *561 raise	68
47	50	11/8/36	13/8/36	Half way between Last Chance and West Sold. Raises. Effervesces in cold dil. HCL	72
#120	120	6/9/36	11/9/36	Low. El., face of drift ending in e.-w. fault, above small stope	69
#110	110	21/8/36	11/9/36	Mary, raise, end Calumet chute drift	65
#122	122	6/9/36	11/9/36	Shovel, *804 face	47

#: specimens so marked were added after the report was written.

B. Alaskite

Number Rock	Anal.	Procured	Tested	Locality and Remarks	% Insol. by Wt.
43	5	6/8/36	9/8/36	Mary, 210' e. *305. near lime contact	75
36	8	6/8/36	9/8/36	Mary, in left drift at *305 junction; pegmatite	90
42	99	6/8/36	9/8/36	Mary, *330	85
48	45	6/8/36	13/8/36	Mary, *305, micacous alaskite	87
#127		6/9/36	11/9/36	Up. El., 50' in rt. drift at *423 junct. In face.	83

C. Diorite

21	4	5/8/36	9/8/36	Eliz.-West.-Sold. Trail; sill	86
54	41	6/8/36	13/8/36	Mary, *330, decomposed dike	84
53	44	10/8/36	13/8/36	Wasson, *561 raise	84
49	46	6/8/36	13/8/36	Mary, *330	87
#88	38	6/8/36	13/8/36	Mary, 260' in *304 (A17)	75

D. Quartz

	6	?/8/36	9/8/36	A working face--ore	90
67	10	6/8/36	9/8/36	Quartzose lime, *321, Mary	92
70	19	6/8/36	13/8/36	Mary, 20' se. *316	93, 87
52	43	10/8/36	13/8/36	Wasson, bull quartz	87, 82, 88
#10st	49	12/8/36	13/8/36	Wasson, above Mary Savage; lime and quartz	84
#136		6/9/36	11/9/36	Drinkwater, *785 drift	83, 82

E. Schist

135		6/9/36	11/9/36	Headhouse, surface, by road, 100' n. of portal of HH drift. Calcareous.	47
60	15	6/8/36	9/8/36	Mary, 200' e, of portal, on surface	58

F. Dolomite

23	1	5/8/36	5/8/36	Road cut, 2 mi. e of Mary, on Silver Peak Road	62

#: specimens so marked were added after the report was written.