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NAME F. WISSER

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CITY

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REWARD

In the event [illegible]s of the original parcel covered by this invoice, fin[illegible]ll receive reward for notifying BERKELEY BLUE PRINT CO. immediately - Phone at once.

December 24, 1955

Mr.J.Eldon Gilbert
Cordero Mining Co.
131 University Avenue
Palo Alto, Calif.

Dear Gil:

I was shocked to learn by your letter of December 22 of the flooding of Mt.Diablo mine.The rest of Northern California was taken by surprise also. There is one ironical compensation: conditions in the mine were sufficiently discouraging that if you had decided to keep going the flood waters would have changed your mind for you, tipped the balance the way it is now.

In spite of the discouraging aspect of the mine,I feel,as I wrote before,disappointed that the mine didn't get more of a trial,to the west and especially to the east,along the main structure. Over 30 years of eploration,and finding some 50 ore bodies in the process,have taught me that you must play the final card before giving up,unless the final card is a deuce or trey.Your cards were better than that.

On the other hand, I never criticize a company for giving up a prospect.Not being in on the financial end,I have no right to criticize. Without doubt your people know what they are doing and acted correctly. My remark about the final card was entirely from the standpoint of geological chances in exploration. I thought the chances at Mt.Diablo still good enough to have decided to ask your permission,should you have decided to close down,to interest another outfit in taking over.With the mine flooded,that idea is down the drain,I'm afraid.

Your check for $500.00 for professional services,and for $23.26 for expenses have been duly received. Nothing more is owed Wisser and Cox.

I have enjoyed this all-too brief association,and going down the mine. It was too good to last. By the way,I have partly solved the mistery of my Mexican contacts: one is at Grand Junction with AEC, and I received a Xmas card with a ftiendly note from the other,with no mention of having received my letter.The Mexican mails.

With best regards

Sincerely

Edward Wisser

J. N. PEW, JR.
PRESIDENT

S. H. WILLISTON
VICE-PRESIDENT

JOHN C. AGNEW
SECRETARY-TREASURER

CORDERO MINING COMPANY

131 UNIVERSITY AVENUE
PALO ALTO, CALIFORNIA

December 22, 1955

Mr. Edward Wisser
1986 Yosemite Road
Berkeley 7, California

Dear Ed:

The "powers that be", and by that I mean the powers who have the money, have decided to spend no more on Mt. Diablo. For various reasons, taxes and others, they suddenly decided to pull out before the end of the year.

We stopped work there as of December 21st.

We are going to continue pumping the water out for the next two or three weeks in hopes that someone else may be willing to go ahead with exploration. All we would want out of it is the actual cash value of our pumps and pipe, and other equipment if they wanted it.

We hate to see all of our good work going down the drain, which would happen if we pull the pumps.

If you know of anyone who might be interested have them get in touch with us or Vic Blomberg.

I would appreciate it if you would submit any outstanding statements which you or Mr. Cox might have.

Very truly yours,

Gil

J. Eldon Gilbert

JEG:L

Vic just called me to say that the rains have caused an increase in the Chandler ground water of about 400% of our pump capacity. We are now flooded. Gil.

☐ Concord

Blomberg

Mulberry 5 - 6684

Home

Walnut Creek Turn Left passed Union Oil

4 blocks Mt. Diablo & Clayton

Clayton - Take Marsh Creek

Road to Morgan Road (Right) says Livermore)

over Summit

go 100 yds - cross ~~gatt~~ on right

cattle guard

October 29, 1955

Mr.Worthen Bradley
Bradley Mining Co.
1022 Crocker Bldg.
San Francisco 4, Calif.

Dear Worthen:

At the request of Vic Blomberg of Mt.Diablo mine,I return herewith the two reports on the mine by Schuette you were so courteous as to lend him. He wishes me to thank you sincerely,and I add my own thanks,having been appointed by Cordero Mining Co. consultant in charge of Mt.Diablo exploration.

With best regards

Sincerely

Edward Wisser

October 17, 1955

Mr.J.Eldon Gilbert
Cordero Mining Co.
131 University Ave.
Palo Alto, Calif.

Dear Gil:

You and Sam have been so patient with me in ~~upcoming~~ of any use to you as a consultant that I feel an explanation is due you. I had to drop out of teaching the middle of last semester,so had to pull all th threads together this semester.Then before I was laid on the shelf last April I got sucked into two jobs that carry no pay but have to be got through with nevertheless:

1. Revision of Geologic Map of North America, Mexico portion.

2. Made Chairman, Program Committee,Geology Subdivision, AIME.

Both these jobs carry deadlines and are far from cinches.Now,however I have at last been able to put in some good licks in assembling and analysing the Mt.Diablo data.Enclosed please find my office thoughts on the subject. It is now high time to go and map your level. My free time during the week is Tuesday only; next Tuesday,the 25th,I have an appountment with my eye surgeon. He's a hard man to see and I don't dare cancel the appointment.What he says goes. I should like therefore to visit the mine Saturday,Oct.22. I don't know whether you work Saturdays but I hope so. Your company would be ~~desirable~~ but I suppose not absolut ly necessary until I come up with an exploration idea,which you would probably like to check in the field.

In any event Blomberg should be notified before I arrive. Suppose you call me here at the University, Ashberry 3-6000,Ext.309,when you receive this. Teach a class M W F 11-12, and one Thus.,2-4,otherwise free.

I should have tried to get to the mine before this except that my analysis indicates that you are exploring correctly,provided I am correct in an assumption: In your letter of October 7 you state that the ore bodies probably rake to the east,which is why you cut the ore zone east of the winze and expect to drift west. Since the Vertical Projection of stopes,plus Connie Martin's report plus Ross's USGS Bull. all state the ore rakes down to the west,I assume you believe the same. Schuette also in his No.2 project planned to drift on the ore zone 1300 ft.west to the Jones tunnel area. I assume you are drifting where I put the arrow on the accompanying sketch. Put me right if I am wrong.

Best regards

October 18, 1955

Mr.J.Eldon Gilbert
Cordero Mining Co.
131 University Avenue
Palo Alto, Calif.

Dear Gil:

I am sorry to say that all my efforts to get some dope on the quicksilver prospect SW of Matehuala, Mexico, have failed. Only one out of four friends I wrote answered at all;he promised to make an ~~xxxxx~~ investigation and let me know, but I have heard nothing since. I do not know whether you are still interested,but I am starting another batch of enquiries.

I have a little indirect evidence. Plotting the deposit 15 miles SW of Matehuala brings the d eposit within a few kilometers of the Wadley antimony mines. USGS Bull.946E(1946) by D.E.White and Jenaro Gonzales R. states on p.142:

"Cinnabar is not uncommon,generally occurring as a thin layer of 'paint" on oxidozed antimony ore,but eveh with seleftive mining it would be impossible to obtain a high-grade quicksilver ore."

Thisnstatement plus the well-known association of antimony and quicksilver might lend a little credence to the prospedt On the other hnnd, Boletin 18, Carta 6 ,by the Mexican Geological Institute,showing occurrences of quicksilver,tin,antimony,arsenic and bismuth,shows no quicksilver deposit anywhere near Matehuala,although it does show such well-known occurrences as Sain Alto,Huitzuezuco and others,and even minor deposits known to me lying north of Mazapil, Zacatecas. This seems to bely the promoter's statement that the deposit in question was worked at a profit in past years.

Very truly yours

Edward Wisser

Inst.Geologico de Mexico: Boletin 18,Carta 6, Recursos Minerales de Mexico, Hg-Sn-Sb-As-Bi,shows no Hg deposit anywhere near Matehuala, although it does show such well-known deposits as Sain Alto,Huitzuco and even the minor deposits north of Mazapil, Zac.

15 miles SW of Marehuala brings the Fatima deposit very close to Wadley. (See Sketch map). D.E.White and Jenaro Gonzales R.(1946): San Jose Antimony Mines near Wadley, State of SLP.M.,USGS Bull.946E,p. 142:

"Cinnabar is not uncommon,genrally occurring as a thin layer of "paint" on oxidized antimony ore,but even with selective minining it would be impossible to obtain a high-grade quicksilver ore."

J. N. PEW, JR.
PRESIDENT

S. H. WILLISTON
VICE-PRESIDENT

JOHN C. AGNEW
SECRETARY-TREASURER

CORDERO MINING COMPANY

131 UNIVERSITY AVENUE
PALO ALTO, CALIFORNIA

October 7, 1955

Mr. Edward Wisser
Wisser and Cox
55 New Montgomery Street
San Francisco 5, California

Dear Ed:

Enclosed are copies of the only reports we have.. To date they have had very little affect on the work we have done. Before we took the property over, we had decided to go ahead with the work Schuette had started. We are now in the "ore zone" with no ore and are wondering which exploration work will be our best gamble.

It is my belief that the ore bodies probably rake toward the east, that is the reason we intersected the "ore zone" east of the winze area and expect to drift west.

Very truly yours,

Gil.

J. Eldon Gilbert

JEG:L
Enc.

J. N. PEW, JR.
PRESIDENT

S. H. WILLISTON
VICE-PRESIDENT

JOHN C. AGNEW
SECRETARY-TREASURER

CORDERO MINING COMPANY

131 UNIVERSITY AVENUE
PALO ALTO, CALIFORNIA

October 4, 1955

Mr. Edward Wisser
Wisser and Cox
55 New Montgomery Street
San Francisco 5, California

Dear Ed:

Under separate cover, I am sending you the entire map file for Mt. Diablo. We have no copies of these so please treat them accordingly.

The one large map made by Bradley with penciling on it is work currently being done by Cordero.

I suppose you have no news from South-of-the-Border.

Very truly yours,

Gil

J. Eldon Gilbert

JEG:L

October 6, 1955

Mr.J.Eldon Gilbert
Cordero Mining Co.
131 University Ave.
Palo Alto, Calif.

Dear Gil:

Thanks a lot for the maps on Mt.Diablo.They shall be carefully preserved,and pertinent ones copied. In fact I intend to make a preliminary office study before visiting the mine,if that's OK wi you;in the course of the study I shall prepare compiled maps that should expedite the field study.

Have you no written reports at all? I should think both Schuett and Conrad Martin would have written reports for the Bradleys. Also, Spangler Ricker handled the DMEA loan the lessee from Texas got;I do not know whether the Government gives out reports (which hey must have received on this loan business) or not. I think it o great importance to get hold of any reports extant.One of my reaso for this follows:

I note on the large map that your current work seems to be directed toward a possible ore area based on the premise that the rake ofnthe ore zone is straight down the dip. Now I remember perfectly that Schuette told me that was Martin's notion and that it was 100% wrong,that the rake was fairly flat.But not being much interested at the time I can't remember which was he said the flat rake was.

You can see the importance of this matter and why I should like to run down this matter of rake. I would not tackle Schuette without your permission and would hesitate even with it,knowing CNS as I do.Please let me know about the report situation at your earl convenience. Mt.Diablo is described in US Geol.Survey Bull.922B, but I have not had time to get hold of this yet. Will do so pronto

I am ashamed of my Mexican friends(?) Wrote 4 of those I considered tops,begging them to wire or phone collect. One reply,and he has nothing definite yet. I am trying 3 or 4 more today.

With best regards

Sincerely

Edward Wisser

Aguilera, J. G. (1916) Distribución geogr. de los criaderos minerales de la República Mex. Bol. Min 2, 120-125
Dist. geolog. etc. Bol. Min 2, 178-194

D. Segura
El Mercurio en Mexico
Bol. Minero Tomo 26, No. 1, 16-49
7/28

R. E. Chism: The Catorce Mining Dist
EMJ 48. (1889)
340-342, 388-389, 476-478
Map

September 14, 1955

Sr.Geo.L.Christian
Dolores 17-901
Mexico 1, D.F.
Mexico

Dear George:

How's the 3rd degree Tonopah duster? Long time no hear.

I enclose a card announcing my taking in a younger man as partner. Cox was with A.S.& R.10 years,ending as Chief Geologist in their Northwest Mining Department.He has had experience in Central and South America and pretty well over the world. If a play comes up where our services might be of use,please keep us in mind.

A client wants me to run down the dope on a quicksilver prospect called the Fatima, said to lie 15 miles SW of Matehuala.The prospect apparently is being promoted on the strength of a report by Wm.H. Owens,Mining Consultant,Aveida Juarez 30, Mexico. I have nothing for or against Owens,not knowing him. If you know or can find out anything about him, I should greatly appreciate the information, which will be kept strictly confidential. Possibly you may know also someone I could contact who might know the prospect I mention. It is rumored that the Deep Rock Oil Co.of Tulsa is doing some work ~~xxxx~~ there.

It is probably best that you keep my name out of any enquiries.

One final favor: please send me the name and address of Ed Little's law firm. He has my passport,which might still be revived (???)

Even if you can't do me any good,let's hear from you.old friend.

With kindest regards

Edward Wisser

September 14, 1955

Mr.J.G.Barry
Lopez 44-202
Mexico 1, D.F.
Mexico

Dear Jack:

When I was Chairman of the Publications Committee, Geology Subdivision, AIME, I was sent your vigorous criticism of Triplett's Concepcion del Oro paper. I got a kick out of it and helped to see that it was published.

As my letterhead indicates, I have taken in as partner a younger man. Cox was with A.S.& R. for 10 years, ending up as Chief Geologist for their Northwestern Mining Department.

Perhaps you can give me a little information. A client has asked me to try and run down the dope on a quicksilver prospect, 15 miles SW of Matehuala, called the Fatima, which is apparently being promoted on the strength of a report by Wm.H.Owens, Mining Consultant, Avenida Juarez 30, Mexico, D.F. Do you know him, and/or his reputation? Anything you may tell me will be kept strictly confidential. If you know anythi about the property I should be glad to learn that also; please understand that my client expects to pay for any information you might give us, although I am not as yet authorized to ask anyone to go out in the field and look at it.

It is rumored that the Deep Rock Oil Co. of Tulsa is interested in the property and may be exploring it.

With best personal regards

Sincerely

Edward Wisser

September 14, 1955

Mr.W.G.Kane
Privada Muguerza 770
Monterrey, N.L.
Mexico

Dear Bill:

I was mildly surprised to learn from the new AIME directory that you had moved back to the Pais. Let's hear about your reasons for picking Monterrey and your activities in general.

As the card indicates, I too have made a change, taking in Bill Cox as partner. He was 10 years with A.S.& R., and until this year was their Chief Geologist for the Northwestern Mining Division, working out of Wallace.

A client has me trying to track down the dope on a quicksilver prospect in Mexico, called the Fatima and said to lie some 15 miles SW of Matehuala; this would place it not far SE of the Wadley antimony mines. I thought perhaps you might know, or be able to find out something about this. I am not authorized to send anyone out in the field to look at it yet, but my client is willing to pay for any positive information received.

Apparently this prospect is being promoted on the basis of a report by one Wm.H.Owens, Mining Consultant, Avenida Juarez 30, Mexico. Do you know him, and/or his reputation? Have you any dope on the prospect, or about any quicksilver showings in the Sierra de Catorce? The rumor is that the Deep Rock Oil Co., of Tulsa is interested in the prospect and may be exploring it.

Anything you might dig up on this would be appreciated; of course you understand that I cannot let my client in at present for a big investigation; but I want to make it clear that we are not trying to bum free information. I have given out too much of this in the past not to be sensitive about asking others to do the same.

With best personal regards

As ever

Edward Wisser

September 14, 1955

Mr. Richard D. Ellett, Chief Geologist
Cia. Minera y Refinadora Mexicana, S.A.
Estacion Wadley, San Luis Potosi
Mexico

Dear Ellett:

Doubtless you remember me from our brief association in New Mexi last year. I still think we did right to drill that showing, although possibly Mr. Wiles thinks otherwise, since I have never been called in since by your company.

I have a client who has asked me to try to find out what I can concerning a supposed quicksilver mine or prospect, said to lie some 15 miles SW of Matehuala. Plotting this on the map locates the prospect only some 5-10 km. SE of your antimony mines, so it occurred to me that you might know something about it.

My information is quite limited. The prospect, called the Fatima, apparently is being promoted on the strength of a report by one Wm. H. Owens, "Mining Consultant", Avenida Juarez 30, Mexico, D.F. The Deep Rock Oil Co., of Tulsa, seems to be interested in it, and may be exploring it.

If you know anything about this matter, or can find out without too much trouble, I should greatly appreciate, as a personal favor, learning what you know. If you have any definite information you mighta wire me collect at my home address, 1986 Yosemite Road, Berkeley; if enquiries fail to elicit any information, just drop me a line, airmail.

If you can't wire me collect across the border, I shall gladly reimburse you, and that goes for any other expense involved, such as making local enquiries. I have worked quite a bit around Matehuala and the topography is such that the supposed quicksilver prospect would probably be reached from Wadley rather than Matehuala, which is why I thought you might know something about it, if there is anything to know.

With best regards

Sincerely

Edward Wisser

Mexico Contacts

W. G. Kane Privada Muguerza 770
Monterrey

José A. Garcia
Vaupelly Garcia
Dolores 3, Despacho 604
México

L. Garbrecht 1201 Robinson Blvd.
El Paso Tex.

J. G. Barry
Lopez 44-202 Mexico 1

Card Geo. L. Christian
Dolores 17-901
Mexico 1, D.F.

Topia Alfredo Terrazas
5 de Mayo 32-310
Mexico DF.

E.F. Salisbury Apt. 27, Monterrey NL

W. H. Triplett - Cia Minera Peñoles SA Apt. 251
Monterrey, N.L.

QUICKSILVER DEPOSITS OF THE MOUNT DIABLO DISTRICT, CONTRA COSTA COUNTY, CALIF.

C.P.Ross, USGS Bull. 922B,1940.

Location.- Low on E side of N Mt.Diablo peak. SE ¼ Sec.29,T 1N,R 1 E. Bradley Mining Co.

Production.-

	Tons ore	Lbs.Hg/Ton	Flasks
1937	2911	8	304
1938	8850	12.2	1422
1939	12000	9	1423
	23761	9.6	3149

35-ton rotaey

General Geology.- After J.A.Taff:Geology of Mt.Diablo and vicinity, GSA B Bull.46,1935,p.1079-1100.

Mt.Diablo and surrounding uplands consist of circular area about 5 mi.diam.,of 6000' of Franciscan with intrusive serp.and other metaig eous rox,surrounded by Ju-Plio rocks,total 35,000'. Small andesitic masses,Tert.? intruded into lower part of post-Franciscan;higher parts overlapped by remnsnts of basalt flows,Quat?

Fransiscan: Main wall rock for deposits;fragments in ore-bearing breccias. Sanfstone:moderately coarse-grained,dark grey where fresh;weathe ers tawney. Somewhat argillaceous, feldspathis. Hardened,darkened in irreg bands by addition of qtz.,chlorite;bedding obscured.

Shale:much as mere paetings between ss.beds,but considerable bodies of dark shale UG in Mill workings. In part thin-bedded,in part,hedding indistinct. Fault gouges in mineralized area derived in part from shale.

A little cherts.

Serpentine: Wall rock for some deposits;has in par5 controlled distribution of mineralized shear zones. Three big exposures (Plate 6). Roughly tabuler along bedding. Resist erosion better than surrounding seds. Three masses crop out strongly.So-called slickensides serp.facies.Pistachi io green;breaks on curved,smooth,glistening surfaces.

Silica-carbonate Rock.-Much of serp.altered to this;mainly chalcedony & qtz.,with some dolomite and minor py.,chromite,opal,nickel silicate. Residual serp.At surface much SC stained with Fe,Mnox. Much is indefinetly banded white and black.

In places SC shattered,recemented by additional chalcedny and carbs.

Structure. Taff thinks Franciscan complex block shoved up thru younger beds in Quat.

Local ore controls are shear zones near contact between serp.& Franciscan seds. Minor fractures roughly normal to shear zones may influence distribution of ore minerals. See Pates 6,8. Most conspicuous structural feature is a general NE dip of seds.;lical SW dips. Main serp.bodies also dip NE,but do not conform to bedding exactly and are bluntly terminated.

A few NW faults.

Lodes. Fracture zones near the footwalls of serpentine masses in Fran.

Mineralogy. Metacinnabar, cinnabar,marcasite,pyrite,qtz.Bitumen, H2S, SO2, methane.

Main ore mineral, Mill workings, metacinnabar.In good ore,80' level, altered ss.shattered to 1" minus frags.,angular,jumbled.some rounded. Matrix os sulphides.

Ore an intimate mixture of metacinnabar and cinnabar,as vaguely banded botryoidal masses. Cinnabar is younger than meta. Relative increase of metacinnabar with depth.

Marcasite,pyrite commonly present,locally abyndant.Pyrite as residual embayed grainsembedded in HG minerals. Marcasite more abundant than py. Much enclosed in H minerals,embayed,like py;,but much as uncorroded crystals. Marcasite in larger oOenings between ds frags as crustified bands.

Minor qtz.with sulphides cementing the ss breccia;impregnates ss. also. Rounded frsgs.of qtz.in breccia coated wiyh sulphides just as are ss frags.

Some fault fractures lined with black alta,soft dark stuff.Beidellite-montmorillonite clay.Low in iron;black due to bitumen.

Ore Bodies.-

Jones and Rhyne Tunnels.

These explore NW breccia zones.Jones tunnel,lower of 2,with branches aggregates 1200';caved 70' in. Hg ore retorted.

Rhyne tunnel,165' croxscut,has drift 50' from face. Portallin SC,rest in Fran.seds. Drift follows altered,intesnely brecciated zone in ss., N55W, 40NW. No ore,but may be lart of 19de from which production in '70s came.

Mill Workings

Surface:4 benches and a glory hole,power shovels.

Main feature serp.mass N35W,dip 50NE.See Fig.3.Now mainly SC. Beds.inruded strike N50-60W,dip 30-45NE.Main shear zone along lower contact of serp. but extends as far below it doen dip as workings have reacHedgnly parallel

There are roughly parallel secondary fracture zones within the serp.;one of these explored in Glory Hole. I addition,both serp.and beds are broken by cross-fractures (NE) roughly normal to those mentioned. Much of the better ore is associated with minor cross fractures within the main ore z one.

All the larger fracture zones made up of numerous subparallel shear planes.In main zone along base ofmserp,a single plane is more prominent and continuous than the rest.See Plate 8,Fig.3. S within the shear zones is extensively shattered.Breccias mainly ss.,but include also SC, silicof.ss.,vein qtz. "atter,confined to ore shoots"records movement that occurred after deposition of lode minerals began." p.49. In spite of gouge,breccia,etc.,displacemennt on shear zones is small.Inferred from fact that main shear zone follows the distinctly irreg.intrusive contact closely. In places there are projections of serp.that would have been s sheared off if much displacement had taken placeExample sharp bend in s serp.contact,tunnel level just E of shaft.

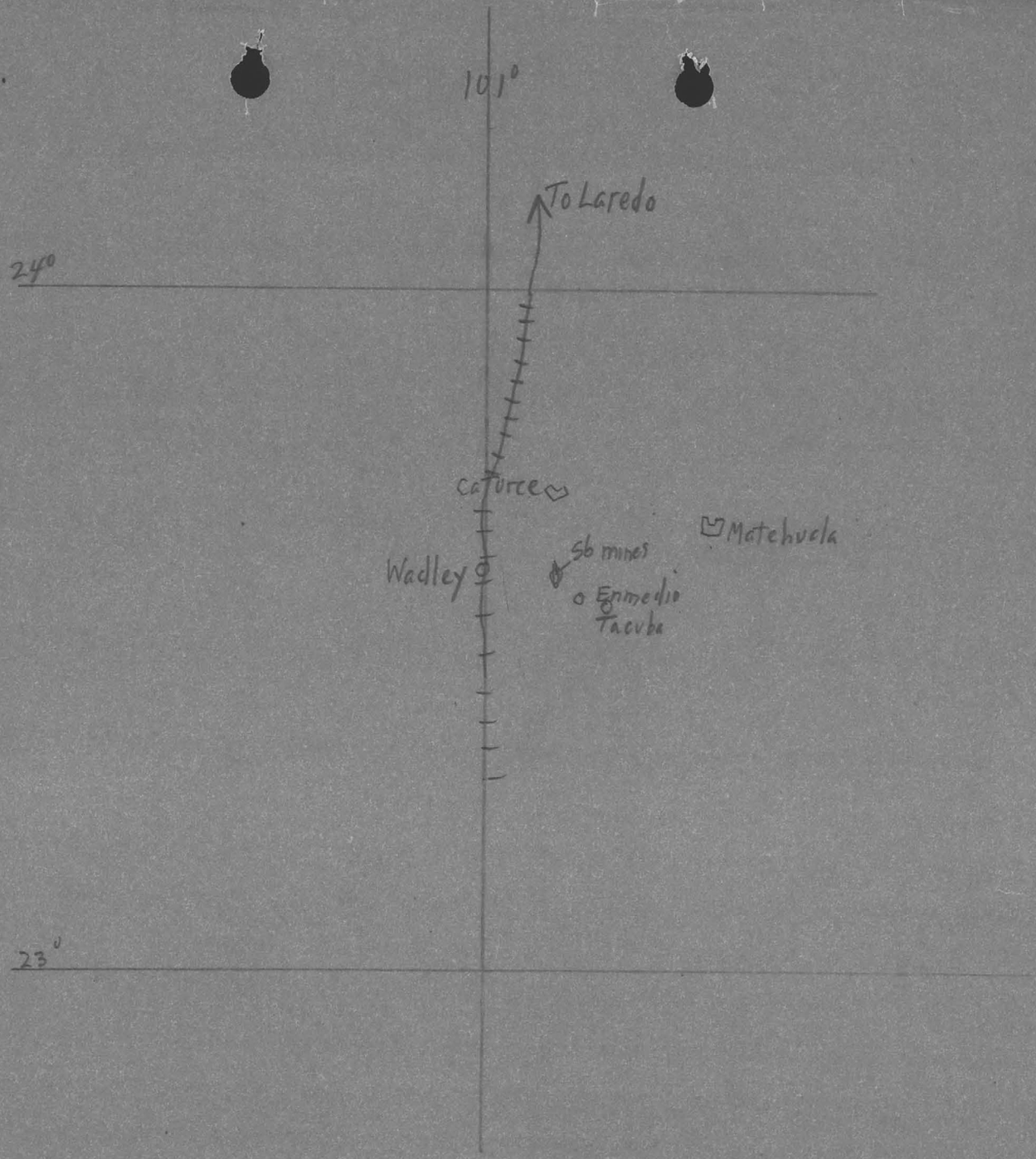
Origin:Deposition by hot solutions close to surface,relatively recently. Confined to crushed zones of shearing,c hannels for rising solutions and host rock by adequate oOen spaces in the breccia.

While a shallow-type deposit ,potential vertical range much greater than that yet explored. Erosion since metallization probably not great. However shoots so small and so erratically distributed that their position are hard to predict.

Thinks cinnabar,more stable form,mahe have formed in part by inversion from earlier metacinnabar. The metacinnabar,although un botryoidal crystalline aggregates,is not as usually supposed,supergene. R.M.Dreyer, Geochemistry of quicksilver mineralization,EG vol.35,1940,p.17-48 shows that metacinnabar may be formed from rising solutions in an acid environment and may invert to cinnabar.

Outlokk.Only a few Calif.Hg mines have attained any great proportion of their production at depths much greater than those attained here.Hence before sinking should test prospects laterally.HW crosscuts NG,so try FW If crushed zones found,they may contain ore shoots either at intersections of cinjugate fractures or where oberhanging bands of black alta may have dammed solutions.

Extend surface prospecting,esp.at FW sides of tilted serp.lobes and sills.where SC rock is plentiful. Breccia zones elsewhere should not be overlooked. Modern bulldoz ers.


101°
To Laredo
24°
Caborca
Matehuala
Sb mines
Wadley
o Enmedio
Tacuba
23°

MT. DIABLO QUICKSILVER MINE

Owner: Under lease to Ronnie B. Smith, 2106 Tower Petroleum Bldg., Dallas, Texas, from Vic Blomberg and others (Telephone Concord 6684). Formerly run by Phil Cox who now lives in Concord.

Lease: Present Smith lease is for $300 per month minimum royalty. Royalty has been reduced from 13% to 10%, which is suspended when quicksilver goes below $100. This is a 15 year lease. Smith is now out $74,000 on operation. He would like to get half back on override royalty.

Geology: See USGS Bulletin by C.P.Ross on Mt. Diablo Quicksilver Mine.

Production: As nearly as can be determined, the last Bradley production was 135 flasks per month from a 40 ton plant, or about 8½ pounds per ton.

Smith produced from open cut in August 1952. Fifteen days production is supposed to have been 86 flasks or about 10 pounds per ton.

There is reported to be some ore left in the cut but this has not been verified.

Schuette's proposal for DMEA loan:
Stage 1

330 ft. of shaft @ $135/ft.	44,500
625 ft. of x-cutting @ $40/ft.	25,000
Engineering and geology	3,500
	$73,000

Time to complete - 7 months (2 shifts)
Drift 250 ft. each way after x-cutting 125 ft.
(See sketch)

Cost breakdown

	Shaft (4x8'6 in clear 6' centers 55 sets)	x-cut and drift
Equipment	46.00 /ft.	13.50 /ft.
Labor	61.00 "	22.83 "
Supervision	6.00 "	2.00 "
	$113.00 /ft.	$38.33 /ft.

TOTAL $19,245.

Stage 2: Drift 1300 ft. to Jones Tunnel (Stage 2 not applied for).

Law Suit: In June, Smith has to appear in Sacramento to answer a law suit because of pollution of water below. The suit will be by the Central Valley District rather than any individual.

Bradley Report: On May 8, 1953 a conference with Worthen Bradley was held. He did not use maps but tried to recall the ore situation when he closed down.

He stated that on the 270 ft. level, the ore body was only 150 ft. wide (75 ft. on each side of shaft) and this indicated a "V" shape to the orebody. The winze ran into good ore which he thought was not mined out, or tested to see its width.

Bradleys did not have law suits but one was always imminent, especially with Gill, who blamed all his troubles on the mine. Bradley pumped water over the hill, and this probably would have started trouble if mining had continued much longer.

Conclusions: There is some evidence that ore continues to depth, and, likewise, there is a possibility of continuing on the strike as indicated by a surface show and the old workings to the northwest. If they are correct, the last assays in the shaft are encouraging. However, the following should be taken into account:

(1) Diamond drilling did not show up ore. The holes should be checked. If they were well placed, this evidence would be damaging to the property as a future large mine.

(2) No deal with the owners should be made until some satisfactory agreement on pollution is made with landowners in the region.

(3) The lease Smith has is a poor one and it would be necessary to negotiate a more satisfactory one.

(4) The amount of ore remaining in the pit should be determined.

Mt. Diablo (Continued)

5. Although the Government loan is liberal (except in time) if we were required to pay Smith any substantial sum, we would be better off to go at it alone and leave Smith out.

Lloyd W. Staples

1953

San Francisco, California
February 2, 1946

Mr. Worthen Bradley
425 Crocker Building
San Francisco, Calif.

Dear Mr. Bradley:

Submitted herewith are the maps and geologic sections of the Mt. Diablo Quicksilver Mine in Contra Costa County, California.

Altogether about five weeks were spent on the property during December and January just past. The Hill Workings were mapped and studied in detail. Some preliminary mapping was also done on the surface, particularly in the vicinity of the Camp and Jenny Tunnels at the upper mine. The reports of C. N. Schuette of December 1936 and August 31, 1938, and also U. S. G. S. Bulletin 922-B of 1940 by G. P. Ross on the Quicksilver Deposits of the Mt. Diablo District were a great help. Of particular value, however, were the many personal discussions with Victor Elsenberg, the superintendent, and the monthly operating reports by F. W. Cox from which the geology of some of the inaccessible workings has been inferred.

Since the regional geology has been covered in the reports mentioned above and the references in them, the present study has been confined to the structural details localizing the ore mineralization at Hill workings.

The lithologic units chosen for mapping are more or less arbitrary. For instance, on the surface map a distinction is made between silica-carbonate rock and chert. The base of the chert, which in some places may be 30' thick, is thin bedded. The upper section, however, is massive and may well be the same rock which elsewhere is mapped as silica-carbonate rock except that it lacks the ironstained coherous appearance generally associated with the latter. All silicious-calcarious hydrothermally altered material has been mapped as silica-carbonate rock. In places, this may be a silicified fault breccia or gouge; elsewhere, an alteration product of serpentine.

The principal ore localising structures (projected to the elevation of the adit level) in the pit area are shown on the 100 scale surface map and in detail on the 30 scale map of the pit. The strongest and most persistent is the footwall fault--or more accurately, sheer zone--striking generally N68°W and dipping about 50°NE. Just east of the surface raise on the adit level this structure turns and thereafter strikes about S45°E. However, strong faults on the original trend persist eastward and to the lower levels. The localization of the ore above the adit level horizon is in part controlled by the fracturing in the vicinity of the roll at the turn. Most of the mine production has come from the footwall sheer zone.

About 90 feet north of the footwall zone and parallel to it is the somewhat steeper dipping and less persistent glory hole fault. East-west trending local faults dipping generally about 35° N join the Glory Hole Fault from the hanging wall side. In the triangle of their junction, and in the general vicinity, are steep-dipping north and south fractures which

serve as receptacle for the ore mineralization. The original glory hole was in this area. This triangular structure pattern is repeated several times in the mine: weakly under the glory hole on the 80 level; in the East Stope on the 165 level; and in the general narrowing of the silica-carbonate rock in the west end of the 165 level. Since the intersection has a westerly rake, this may account for the westward trend with depth of the individual ore shoots.

A structure of considerable interest, and possibly greater significance for the future of the mine, is the anticlinal fault contact between shale in the hanging wall and silica-carbonate rock in the foot exposed in the west end of the No. 6 Bench. The trend of the axis is a little south of east with the plunge flatly (20° to 35°) to the east. This combination of relationships is much emphasized by Mr. Schuette in his writing. This structure tops the ore in the 165 East Stope, and the 80 underhand stope is on its southern limb. The comparatively abrupt termination of the ore above the adit level described by F. W. Cox as ending against "flat structures" in the back of the stope, and the staggering of the sets above #7 and #8 chute given by him in his reports would suggest just such structure. In order to evaluate its full significance additional work on this structure is indicated particularly in the vicinity of the footwall zone and in areas where the footwall of the structure is a competent rock which fractures to leave open spaces.

At the east end of No. 6 bench some ore was encountered whose relationship to the structures described has as yet not been determined. According to Mr. Blomberg, cinnabar has been found over a considerable area in this vicinity and traced around the hill to the plant. Although Mr. Cox reports that no values were encountered in diamond drill holes 10, 11 and 12, Mr. Blomberg says that 8# ore was cut in the #10 hole at 35'.

At any rate, additional surface exploration at the east end of #6 Bench should be done.

Besides the controls already described, all of which are terminated by the strong northeast fault at the west end of the pit, another, less obvious but no less important, is the character of the rock which the control structures traverse. Within a friable rock which fractures readily to leave open spaces the chances for ore deposition along a major structure are increased. This applies with particular emphasis to the mineralization at the Mill Workings of the Mt. Diablo Mine where the ore consists almost exclusively of botryoidal incrustations of metacinnabar--generally associated with pyrite--in open fractures, and only rarely as replacement of the host rock. Lack of fracturing would be equivalent to hardening of the arteries in this mine. A case in point is the 86 raise from the 80 level. It started on a strong structure in silicified gouge breccia and entered a soft shale where the walls "lost all definition" according to Mr. Cox. This is also true of the lower workings west of the main shaft. Although some silica-carbonate rock persists it is narrow (particularly on the 165 and 270 levels where both walls are exposed in the drift) as compared to the widths east of the shaft. The walls are soft sandstones and shales. Similarly the silica-carbonate rock in the winze and that cut by diamond drill hole #8 is narrow and enclosed by soft wall rock. In these areas, the external strains, except severe bending, are relieved by shearing within the soft walls rather than by fracturing of the silica-carbonate rock. In fact, Mr. Cox particularly remarks about the lack of brecciation on the 270 level. No detailed drill records of holes 10, 11 and 12 could be found.

In a great many quicksilver deposits, and particularly in surficial deposits like that at Mt. Diablo, some valuable inferences can

be made about the localization of the ore by considering the surface as a "structure". Ore bodies which at upper horizons are more or less tabular become pipe-like with depth degenerating eventually into isolated stringers. Although these pipes and stringers may often be high grade, exploring for them and mining them is generally quite costly unless their position and trend can be accurately predicted. This degeneration with depth is associated with the "tightening of the ground" which depends upon the depth, density and strength of the material above any particular horizon, and somewhat on the dip of the controlling structures. Since the occurrence of metacinnabar in sufficient quantities to constitute the principal ore mineral is comparatively rare, when it does occur it must be under special conditions which could not be expected to persist over great distances or, for that matter, over any considerable length of time. The deposit at Mt. Diablo may be quite sensitive to this "surface control."

From all of the foregoing, it may be tentatively concluded that additional exploration on the 270 level is, from present knowledge about the area, not warranted. The exploration to date has not been encouraging. In addition to the geologic gamble there are the hazards of gas and acid water to overcome. Although neither the east nor the west drift on the 270 level has been advanced far enough to be certain of intercepting the shoots on the rake from the 165 level, two controlling factors, lack of brecciation and soft wall rock, are against their continuation in any strength to this level. Of the two stopes, the East stope is the better gamble.

Some preliminary sniping was done on the surface in the vicinity of the Jones Tunnel in what has been known as the placer area. The narrow distribution zone of the cinnabar—the ore mineral in this area—is indicated roughly on the surface map. Several cuts along the trend testify to the

sniping done by the old timers. The topography seems to indicate a slide and the ore boulders may be detrital material from the upper outcrops. However, the outcrops above show only meager cinnabar mineralization. Although a little stoping has been done on some low grade material (4#-5#) in the west drift from the Camp Tunnel, nowhere (except in the Rhyne workings) has ore been encountered in the underground exploration in this area. With the help of the bulldozer a portion of the cut above the portal of the Jones tunnel was deepened. Boulders of ore estimated to assay 20# per ton were uncovered in a clay matrix. The matrix panned about 2#. The boundary between the material that panned well and that which showed only a few specks of cinnabar is sharp and abrupt. The material at the portal of the Jones tunnel did not pan at all. About 75' north of the Jones tunnel significant pannings were obtained in clay. In December 1936, under the supervision of Mr. Cox, the McDonald Prospect near the creek northwest of the Jones tunnel was run. This work encountered ore boulders in a clay matrix and finally barren sandstone. The possibility exists, then, of a flat lying ore zone over which the McDonald Prospect may have passed. This possibility should not be completely discounted until the bottom of the "clay" has been exposed in several places. The first point of attack might be the cut above the Jones Tunnel.

Mr. Blomberg tells of a stope in the Rhyne Tunnel (now caved) from which he mined some retort ore. A shallow winze on this ore shoot below the Rhyne tunnel is supposed to contain 12# ore. All of the exploration by Mr. Cox in the Jones Tunnel was intended to locate this ore. The unsuccessful search was made without a survey of the Rhyne workings which were caved, although the position of the raise from the Rhyne stopes was pointed out to me on the surface by Mr. Blomberg and is indicated on the surface map. Little can be added to this story until a detailed study is made of this area.

Yours very truly,

/s/ CONRAD MARTIN

this was typed from a dictabelt - I hope she improves!

WISSER AND COX

CONSULTING GEOLOGISTS

55 NEW MONTGOMERY STREET

SAN FRANCISCO

PHONE YUKON 2-1436

November 15, 1955

MEMORANDUM FOR EDWARD WISSER

Subject: Mount Diablo Quicksilver

I visited Mount Diablo on Saturday, November 12th and brought up-to-date mapping of the advance since your visit of the 22nd of October. 302 cross-cut has been extended to the footwall contact and 301 drift extended to the ~~winds~~ winze connection and a new cross-cut has been turned westward from 302 and a drift started eastward from 301.

The additional work done in 301 drift at the foot of the winze indicates that the main footwall structure containing sheared serpentine shale lies about 10 ft in footwall of winze. The connecting drift shows a dark gray soft rock that appears to siliceous ~~salacious~~ and seems to me to be altered shale although the nature of it is indeterminate, at any rate it is barren and forms quite a sharp cut-off to the ore mineralization. The ore now seems to occur in a roll of the footwall structure where crushed shale and silicate carbonate rock is strongly mineralized. The ore zone is about 10 ft thick and has a known length of 35 ft. It is all very high grade. Peterson and Blomberg plan to continue 301 drift along the contact after installing chutes ~~shoots~~ and a couple of sets of timber at the bottom of the winze. It seems to me that the "pinch out point" of the serpentine has been found by this work and lies directly at the bottom of the winze. It looks, right now, like the hanging wall and the footwall are coming together and in about another 15 or 20 ft there will be nothing but a storm footwall gouge. This is probably definitely worth following since the ore appears to occur in these rolls in the gouge.

A new drift turned off of 301 cross-cut where there is a little bit of ore mineralization along "the hanging wall member" of the target ~~the~~ zone. On the day of my visit had no mineralization other than small spots along two shears. This work comes under the head of what you called poking around.

302 cross-cut has definitely insected the footwall structure. There is almost 4 feet of strongly sheared black serpentine partly silicified making a contact between silicate carbonate rock and the hanging wall and thin bedded red chert ~~churchs.~~ These chert ~~church~~ strike northeast ~~stripe~~ noticed and dip flatly northwest. I understand from Cox and Bomberg that they are not and have not been seen elsewhere in the mine. However, they do outcrop at the base of the hoist house and cook schake. It is possible that there is another structure which corresponds to the ultimate foot wall structure, perhaps 10 feet ahead of the face, but the rock was so hard and complicated ~~confident~~ that it did not seem very likely. It would seem to me that the best move is now to turn and drift to the east along this footwall structure.

The cross-cut going west off of 302 had abundant antimony along northeast

MEMO FOR EDWARD WISSER

trending fractures at the time of my visit and it certainly waa not over an additional ten feet into the footwall fault ~~and~~ there was no~~t~~ mercury mineralization at all.

~~Hillard~~ Gilbert raised the possibility of there being interesting nickel mineralization in the mine, the only evidence of mineralization that I ~~say~~ saw was the~~se~~ pods of soft bright green material that appears to be some kind of a silicate, I suspect it may be a nickel silicate. Bromberg tells me that Mr. Dietrick from the University got samples high as 5% selected mass of sulphides. Peterson pointed out the place where Dietrick took the samples out as being in the first west cross cut off 302. At this point there is abundant mass of ~~pirite, marquisite,~~ pyrite, marcasite, but certainly nothing that looks like nickel mineralization. In order for there to be a commercial occurance of nickel there were have to be material grading 5% or so of considerable magnitude. I would suspect that all of this ~~s~~alicate carbonate rock and the ~~surfacing~~ serpentine from which it is derived contain a trace amounts of nickel~~s~~ as almost all the serpentines I have ever seen do~~, and~~ it is possible that if one of these bright green spots which are no more than 2 or 3 inches in size were ~~a~~ sample alone it might run into 1 or 2% nickel. After studying the situation of the distribution of the old ore shoots it seems to me of prime importance to prospect the southeast continuation of the mineralized zone. I would feel that the general zone of mineralization makes strongly to the south, or to the east rather, underneath the footwall shale cover and that prospecting directly down the dip may not find any ore.

I am returning the field sheets and the map out of your report of October 22nd at your home address.

Respectfully,

Bill

M. W. Cox

MWC/te

Ed Wrsse

OFFICE MEMO ON MT. DIABLO QUICKSILVER MINE

Most of the ore seems to have occurred along the Footwall fault or shear zone, striking NW and dipping 50° NE. In the upper levels this zone marks in general the contact between reconizable sandstone, with some chert and shale, in the footwall, and silica-carbonate rock in the hanging. The latter wock is wide in a NE direction on the surface and on the 80' level, but narrows with depth, especially to the northwest, Ross thinks the thick silica-carbonate rock in the upper horizons is derived from a thick serpentine sill which ends abruptly and bluntly-down-dip above the 80' level. According to Martin (p.4) silica-carbonate rock in the northwest drifts on the 165 and 270 levels is narrow and vein-like; the walls here are soft sandstones and shales. In the main winze the silica carobonate rock is also narrow and enclosed by soft wall rock.

Since little or none of the ore formed by replacement or impregnation, but practically all of it by filling open spaces, brecciation and the formation of openings is necessary for ore; this means brittle sandstone or silica-carbonate rock. Shale would only be favorable where it formed an impervious roof above shattered sandstone-an alta.

The Footwall fault zone is a persistent feature which can probably be projected with some confidence to the 620 level horizon, and recognized there. The accompanying sketch map shows such a projection. The sedimentary column and the structure of the sedimentary beds is not, however, known in enough detail to permit prediction on the 620 horizon of sandstone areas, on the one hand, and shale on the other. Certainly the most favorable stretches of the Footwall fault zone would be where the latter has a footwall of hard, brittle sandsone and a relatively thin shale layer (alta) for a hanging. In the light of present knowledge, such stretches can only be found by drifting on the Footwall fault zone, with frequent but short crosscuts into the foot and hanging. (Silica-carbonate rock is of course also favorable).

Any definite rake to the ore shoots, such as the westward rake postulated by Martin (p.3) looks dubious to me. However, Martin points out ((p.2-3) that east-west breaks, dipping flatly north, join the Glory Hole fault (in the hanging of the Footwall faultzone) and that ore is localized in the triangle of intersection. Martin points out that the line of intersection plunges down to the west, wh ch may account for the westward rake of the ore bodies. Assuming such a westward rake, the projected position of the ore stretch on the Footwall fault zone is shown on the sketch.

Almost as good a case for rake could be made for an easterly rake of the east ore sgoots. This is also shown on the map. Mar in thinks that a downward extension of the east ore bodies is a better bet than one for the west shoots (p.5). He points out also that the rock, even the sandstone, is softer on the 270 than above, and that quicksilver deposits of this type tend to be large and tabular in upppr levels, turning at

depth to isolated pipes of small cross-section.I saw this happen at the Red Rock mine in Santa Barbara Co.,which I explored for Harvey Mudd. There the wall rock is all shale.

Chances for ore in depth do not look overly good from thos office, but field work may change this view. At present I believe that the tw possible ore stretches should be explored,by drifting west from the west leg of the "Y",and east from the east leg. Further,the fat ore k body mined on and above the 165 ft.level,east,made just under the eas west fault shown on the map.If this fault is recognized on the 620 le possibly some drifting on it would be justified.

If the above prospects find no ore,the entire venture should be re appraised. Schuette in his DMEA application,planned to drift NW on th Footwall fault zone to get under the Jones tunnel showings. He must assume that the Footwall fault zone persists that far,although this does not look very likely from Ross's surface map.

I believe that chances for further ore outside the Mill workings, and at levels near the surface,are better than those on the 620 level. Apparently nothing was known of the Mill ore lode until about 1936, I recommend therefore detail surface mapping with bulldozer trenching where indicated.

Some or all of the above dieas may be modified by field mapping,bu I have learned that it is better to start out with some ideas,even those later proved fallacious,than with none at all.

Edward Wisser

Berkeley,Calif.
Oct.18, 1955

"ALBANENE" No. 196M K&E CO., N.Y.
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Geology of the

Mount Diablo Quicksilver Mine

by

C. N. Schuette

Geology of the

Mount Diablo Quicksilver Mine

by C.N. Schuette.

Location: The Mt. Diablo quicksilver property comprises roughly 100 acres of land in the middle east half of Section 29, T. 1. N., R. 1. E., Mt. Diablo Meridian. Its location in relation to Mt. Diablo and to the town of Clayton is shown in Fig. 1, page 2.

The highway runs north and south, east of the property as shown. Distance from San Francisco is 40 miles and the mine can be reached from San Francisco in a little over and hours time.

The topography of the property is rough and steep. Much of its area is covered by land slides. Scrub timber and brush grow on most of it so that it is difficult to survey and geologic observation is hindered.

General Geology: Mt. Diablo marks the north end of the Mt. Diablo Range, one of the central ridges of the Coast Range group of mountains, which all trend NW and SE.

Mt. Diablo itself is a great complex of Franciscan Jurassic rocks which was pushed upwards in the center of a great anticlinal fold some 55 miles long. This protruding mountain mass, culminating in Mt. Diablo has an area of some 15 square miles. The Mt. Diablo anticline extends from south of Tracy some 55 miles NW thru Mt. Diablo, across Carquinez Strait to Sulphur Springs Mountain north east of Vallejo, where the St. Johns quicksilver mine is located.

Northeast and wouthwest of Mt. Diablo are sedimentary rocks of Cretaceous and Tertiary age which dip away from the mountain

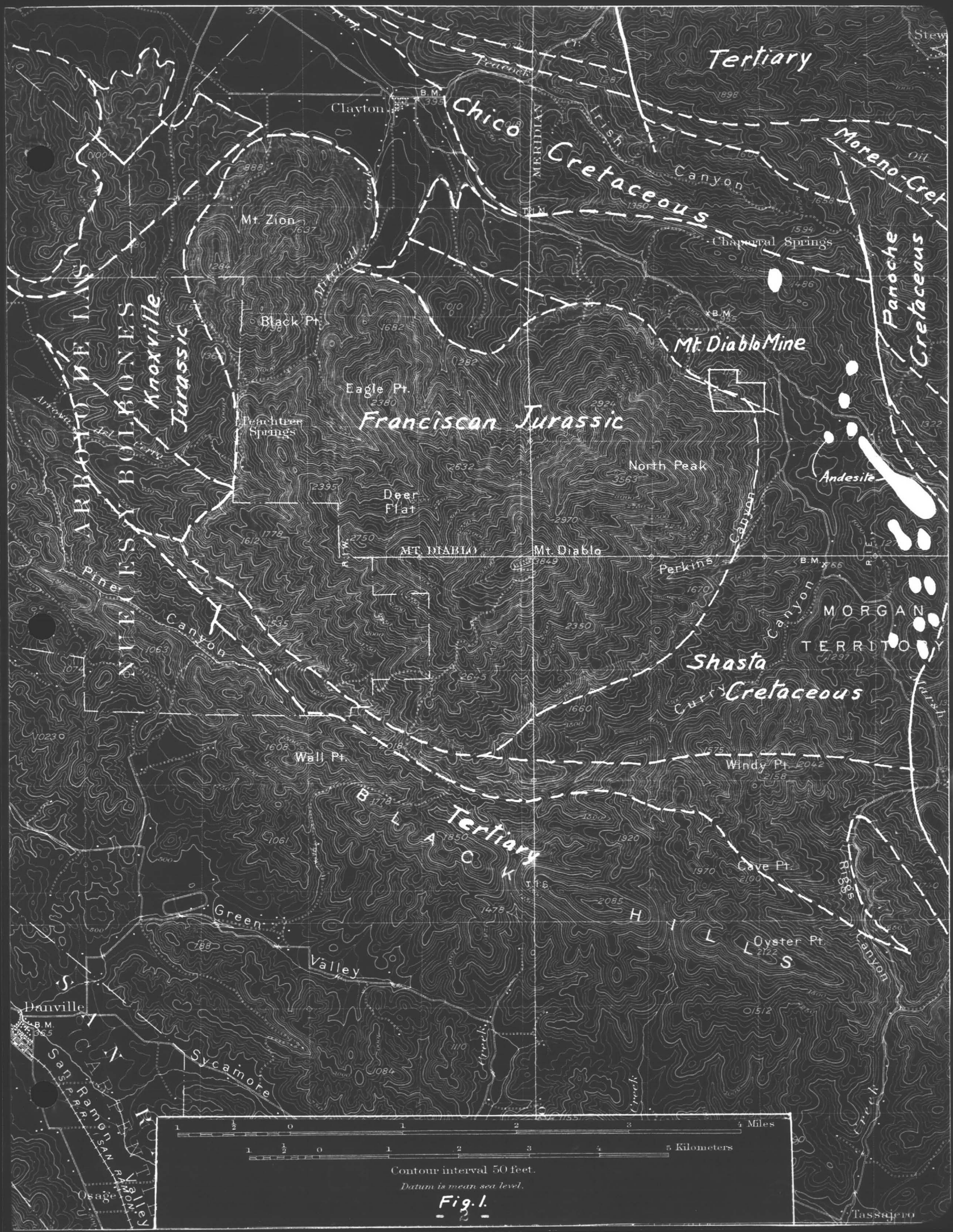
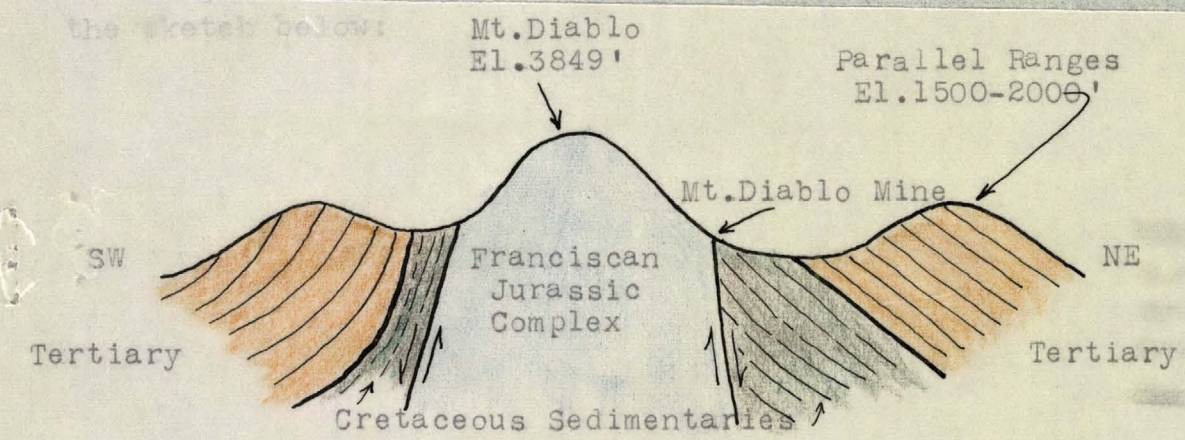

Tertiary
Chico Cretaceous
Moreno-Cret
Panoche Cretaceous
Shasta Cretaceous
Franciscan Jurassic
Knoxville Jurassic
ARBUCKLE LIMESTONE
BOLBONES
Clayton
Mt. Zion
Black Pt.
Eagle Pt.
Peachtree Springs
Deer Flat
North Peak
Mt. Diablo Mine
Andesite
Chaparral Springs
MT. DIABLO
Mt. Diablo
Perkins Canyon
Piner Canyon
Curry Canyon
MORGAN TERRITORY
Wall Pt.
Windy Pt.
Cave Pt.
Oyster Pt.
BLACK HILLS
Green Valley
Danville
Sycamore Creek
Riggs Canyon
Tassajero
Osage
Irish Canyon
Mitchell Creek
Marsh Creek
Oil Creek
Stew
Contour interval 50 feet.
Datum is mean sea level.
Miles
Kilometers

Fig. 1.

In these rocks, parallel ranges have been formed by erosion that trend in the same NW and SE direction as the Mt. Diablo range. The Mt. Diablo range rises to 3849 feet at Mr. Diablo while the parallel ranges are only 1500 to 2000 feet high.

The areal geology around Mt. Diablo, as worked out by Taff is shown on Fig. 1, on page 2.

A cross section thru Mt. Diablo is roughly as shown in the sketch below:



The steep-angle faults as shown in the sketch seem to surround the central mountain complex on all sides. The fault contact between the Jurassic and Cretaceous rocks is obscured in many places by rock slides.

The Franciscan series of rocks, in which nearly all the quicksilver mines of California are found, consists mainly of sandstones and shales with some radiolarian chert beds and limestone lenses. These sedimentary rocks were intercalated with igneous rocks, now much altered and generally grouped as greenstones.

At a later date, peridotites (now changed to serpentine) intruded the Franciscan rocks and generally thru faults or rifts trending NW and SE.

During this volcanic activity the entire Franciscan complex was tremendously folded, faulted and crumpled. Toward the end of the Franciscan peroid an erosional interval set in during which the change from peridotite to serpentine was at least initiated. This metamorphsis in which the peridotite absorbs water, is accompanied by an increase of volume estimated to be about one fourth of the original, so that this swelling crushed both the serpentine itself and also the rocks with which it was in contact.

At a much later date, perhaps as late as the Pleistocene, another period of volcanic activity set in and this time sills and dykes of basalt and diabase were intruded into the Franciscan rocks. These generally came up along planes of weakness previously established in the rocks, that is along the same planes on which the peridotite had preceded them.

The deposition of the cinnabar is associated with these later intrusions and that is why we have so many quicksilver deposits on the contacts of serpentine with the Franciscan sedimentary rocks.

Geology of the Mt. Diablo Mine : The Mt. Diablo mine is marked by the typical silica carbonate outcrop rock (quicksilver rock) along the contact faults between the Franciscan and Cretaceous (Shasta Formation) rocks. The exact location of this fault is obscured by slide material at many places but the approximate course of the fault or series of faults as determined by a few exposures is given in the map of the property in the pocket at the end of this report.

As shown on the map, three paralled fault fissures, named for convenience the upper, middle and lower fault can be traced thru the property. They are particularly well marked along cross-section line A-A, where they traverse a hard quartzite and prominent scarps have developed. Other fractures in this fault system are indicated as running under the furnace plant, thru the Jones Tunnel at its first crosscut to the right and another running from the Sulfur Spring towards the old coarse-ore furnace.

At survey station C-8 on the middle fault, a slickensided face is exposed showing striae dipping down 34° to the east. Thus the rock north of the fault plane moved down and eastward in relation to the southern block which moved up and westward. The general strike of the fault planes at the mine is N 70 W.

The middle fault is well marked at survey station C-8 because here it traverses hard rock while farther to the south east it passes thru sandstones and shales and in these softer rocks the original escarpment has been eroded away except at a few points where silicification of the outcrop hardened it sufficiently to resist erosion. In these rocks steep as contrasted to gentle slopes were formed by erosion to mark the fault in addition to the "quicksilver rock" croppings.

The general course of the faulting as seen to the northwest from the top of the scarp some 50 feet SE from survey station C-10 is shown in Photo No.1, on page 6. The change in slope that marks the line of faulting can be plainly seen in the photograph. In taking this photograph the camera was leveled and was pointing N 65 W.

Photo. No. 1. Expression of the fault, looking N 65° W. Camera leveled. Taken from top of scarp about 50' S 53° E from survey station C-10.

Photo. No. 2, on page 7, also taken with a leveled camera, illustrates the steepness of the fault scarp between survey stations C-7 and C-8. Photo. No. 3, on page 7, shows the striated face at survey station C-8.

The evidence of the silica-carbonate outcrop rock containing cinnabar, along these faults, makes it certain that we have here a series of source fissures of ore-bearing solutions. The source magma of these ore-bearing solutions was no doubt the pre-Franciscan and presumably early Mesozoic complex of granitic rocks which underlies the Franciscan thruout this region and is believed to be the same or a similar complex as that of the Tehachapi and Sierra Nevada mountains.

Photo. No. 2. Fault scarp from survey station C-7, looking at C-8 in direction N 87° W. Camera level. The face of the scarp is about 40 feet high at this place.

Photo. No. 3. The striated face of the fault scarp at survey station C-'. Camera points S 74° E. Striae dip down and away from camera. The camera is set up on cinnabar bearing outcrop rock.

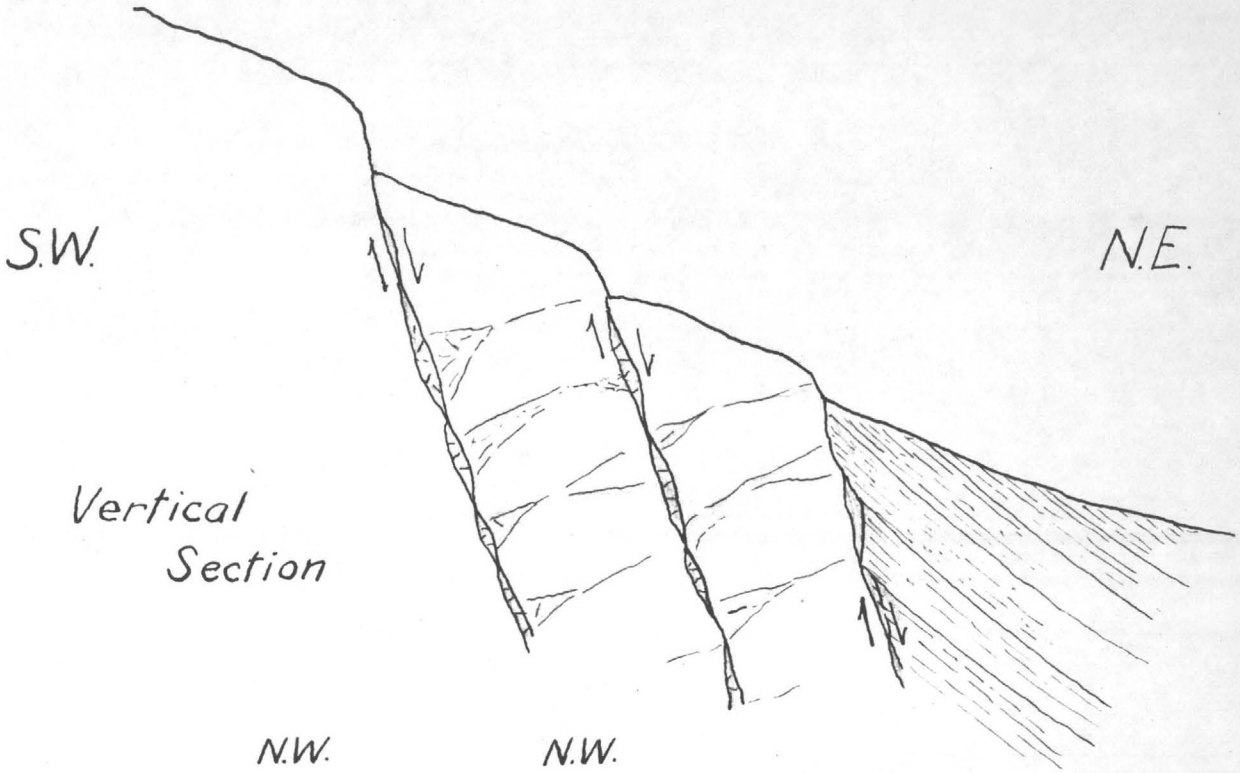
Orebodies must be looked for along the course of these source-fissures in structures favorable to an entrapment of the ascending mineral-bearing solutions.

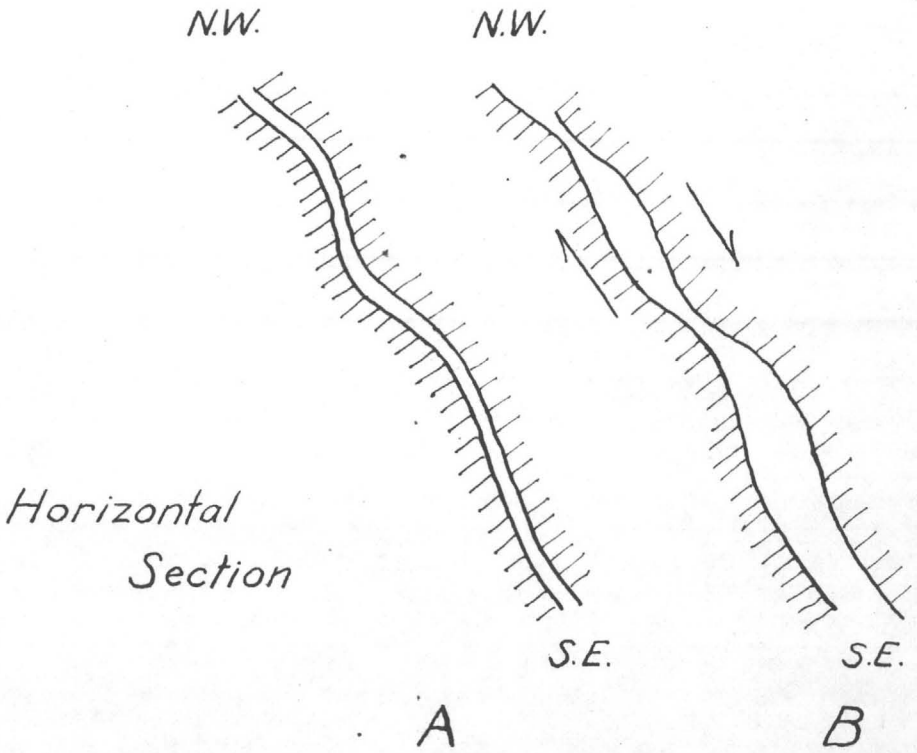
In general, the structure at the Mt. Diablo Mine, is as shown in the sketch on page 9.

The fault fissures are steep, dipping between 75 and 80 degrees. Since there are a number of paralled fissures some 150 feet apart, the blocks between these fissures must be broken and crushed to a considerable extent. It is to be expected that flat fractures extend across the blocks roughly at right angles to the dip as shown in the vertical section on page 9. Where the rock of the fault blocks is relativly soft, heavy gouges may be expected on these fractures as well as on the fault fractures.

Since the striae on slickensided fault faces at survey station C-8 show that the fault movement had a large horizontal as well as a vertical component, and since a fault plane is never flat, such horizontal movement would tend to form openings along the fault that are lense-shaped in horizontal section as shown in the horizontal section on page 9. A is the incipent fracture and B the same fracture after horizontal movement. Actually of course the fracture would not be open as shown but would be filled with breccia formed by the grinding movement of wall upon wall and the formation of gouges from the softer rocks. Such breccias were the receptacle rocks in which the ore-bearing solutions were trapped by gouges on the walls.

Thus in the type of geological structure found at the Mt. Diablo Mine, orebodies can be formed in breccias along the


S.W.
N.E.
Vertical
Section


N.W.
N.W.
Horizontal
Section
S.E.
S.E.
A
B

fault fractures and in cross fractures in the fault blocks as well. Orebodies might also be formed in the Cretaceous sandstones under shale cap rocks on the contact of the upthrust Franciscan rocks with the Cretaceous shales and sandstones.

The upthrust of the Franciscan complex which brought Mt. Diablo to its approximate present position occurred after the close of Pliocene time and continued probably into the late Quaternary.

It was sometime in this interval when the quicksilver-bearing solutions came up. Both the sulfur spring in the creek below the old furnace and the travertine spring south east of the new plant are evidence of comparativly recent solfataric action. All the evidence points to the fact that the topography at the time of quicksilver deposition was not very greatly different than it is today.

This brings us to another important consideration: Such mineralizing solutions as reached the surface, no doubt became diluted by meteoric, that is surface waters, thus lost their identity and ran off on the surface depositing little or no cinnabar. Henve the outcrops here, as is usual with quicksilver mines, show but little ore. Hence again, the main zone of ore deposition must have been below the former, and practically the present level of the springs, that is below the table of meteoric waters.

No doubt there were some channels, cased off by gouges, thru which the ore-bearing solutions at least approached the surface without admixture of surface waters and so deposited pipe-like orebodies reaching to the surface. These, when found, should be

accepted as leads and followed down in search for orebodies below the presumable level of the water table as it existed at the time of ore deposition.

The present tunnels are approaching the faults from the hanging wall side. This will furnish an opportunity to study the fracturing of the individual fault blocks and the extent and habit of gouge formation.

Since the material in the fault blocks varies from hard silicified metamorphic rock and quartzites to soft shales, a great variety of conditions will be encountered. Each of these should be studied in order to determine its bearing on ore deposition.

Another point to be considered is the multiplicity of faults and fault blocks. This will become important on sinking a shaft when both solid ground and absence of excessive water will be desired.

The preliminary development work now in progress should be directed to crosscutting to the faults and to drifting on the faults in search for shoots of ore that will indicate where the main channels of mineralization are located so that these may be explored in depth.

The faults as determined on the property so far are at least three in number and are definitely mineralized for over 2000 feet along the strike. Cinnabar has been detected in the croppings from elevation 870 to elevation 1220 or over a vertical range of 350 feet.

It is possible to explore the ore zone to a vertical depth of some 400 feet below the croppings by either a drift or a crosscut tunnel, but these would be 2000 and 1300 feet long respectivly and might be expensive to maintain because of the broken nature of the ground.

If the preliminary development work of drifting on the faults between the Glory Hole and the Jones Tunnel finds orebodies that go down, it will probably prove more economincal to sink a shaft for their development in depth.

Thus far, the ore mined seems to have come:

1. From the lower fault in the Rhyne Tunnel.

2. From a still lower paralled fracture crossing the Jones Tunnel near its second crosscut to the right. The ore came from the tunnel in the creek below the drinking-water spring.

3. From the lower fault in the Glory Hole.

In the central area between the Glory Hole and the Rhyne and Jones Tunnel workings, both the lower and middle faults show prominent croppings of quicksilver rock as well as some unaltered serpentine. This area is closer to the Jones Tunnel but if explored from there would give only 40 to 100 feet of backs. If explored from the Main Tunnel the backs developed would be some 70 feet greater.

In the course of the development work an effort should be made to keep the main drifts on or near the main fault fractures. All orebodies found should be carefully mapped for geological detail of structure, gouges and character of rock. A study of these details should bring out the general characteristics of the ore deposition to serve as a guide for further exploration and development.

Conclusion: The Mt. Diablo Property is a prospect well worth developing for these reasons:

1. The mineralization along the strike is extensive and this is a favorable indication for depth of ore deposition.

2. The general geologic structure favors the formation of traps in which high grade ore shoots can be expected.

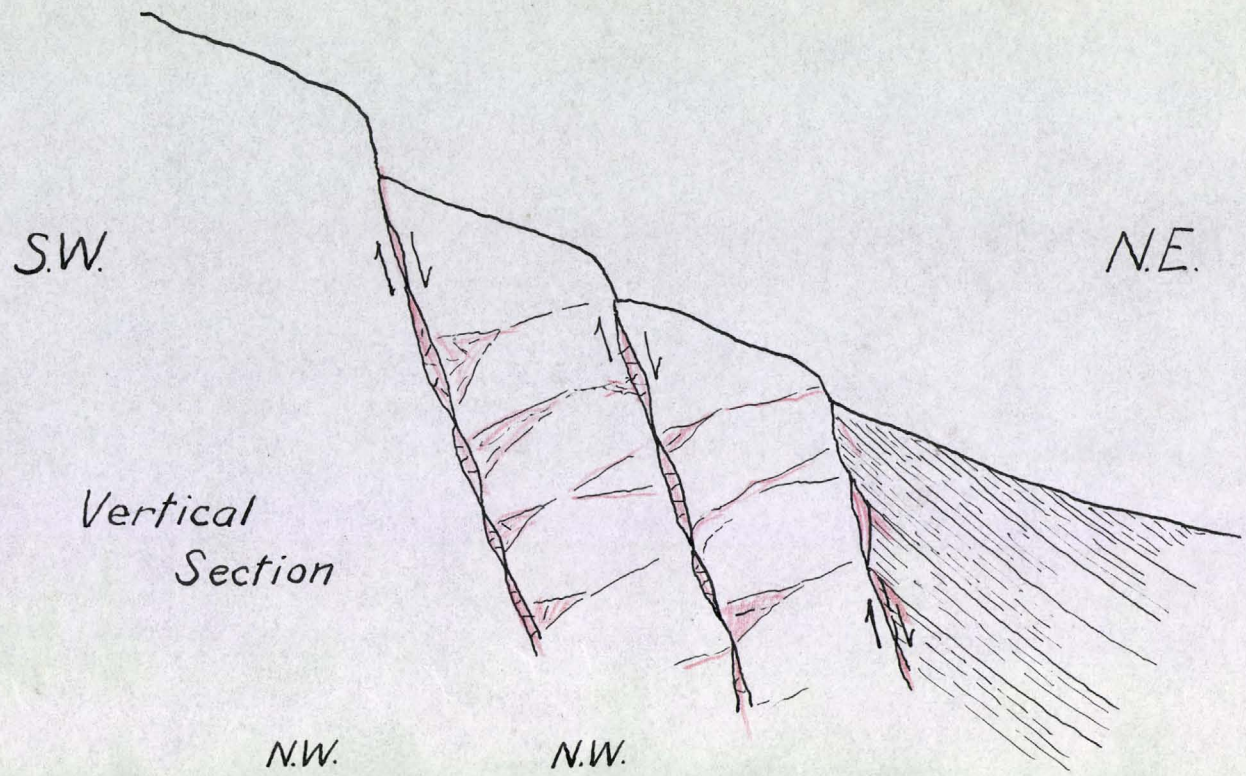
3. The small amount of development work done by various former operators has yielded several small shoots of high grade ore from crosscut tunnels to only one of the faults. In view of the prominent croppings along the strike on several faults, drifitng on the various faults should produce much better results.

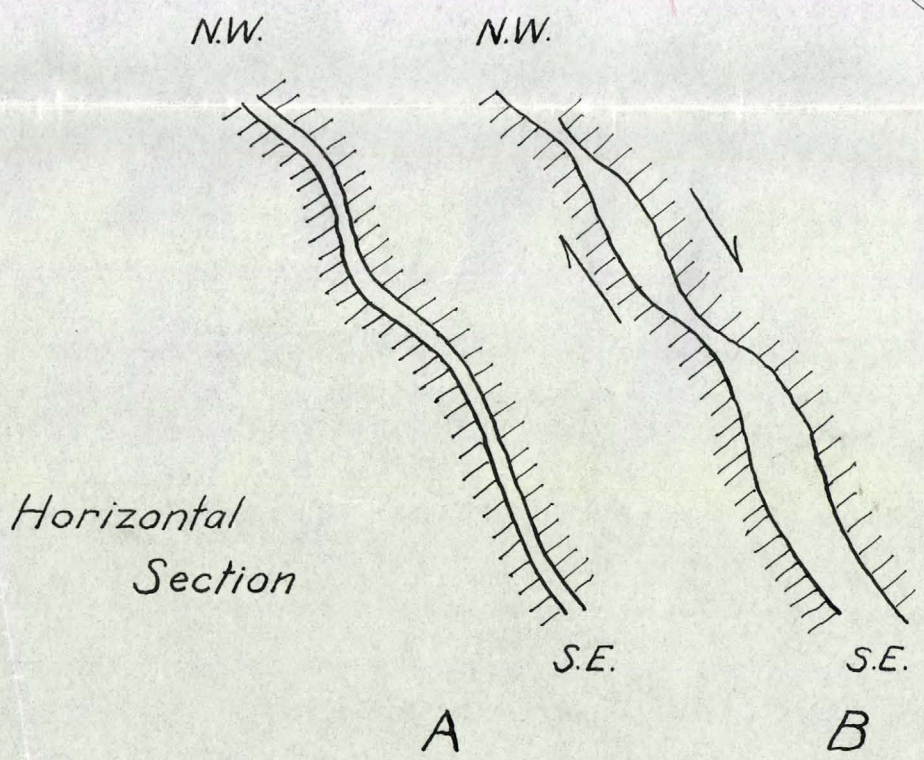
4. Preliminary development is possible by tunneling.

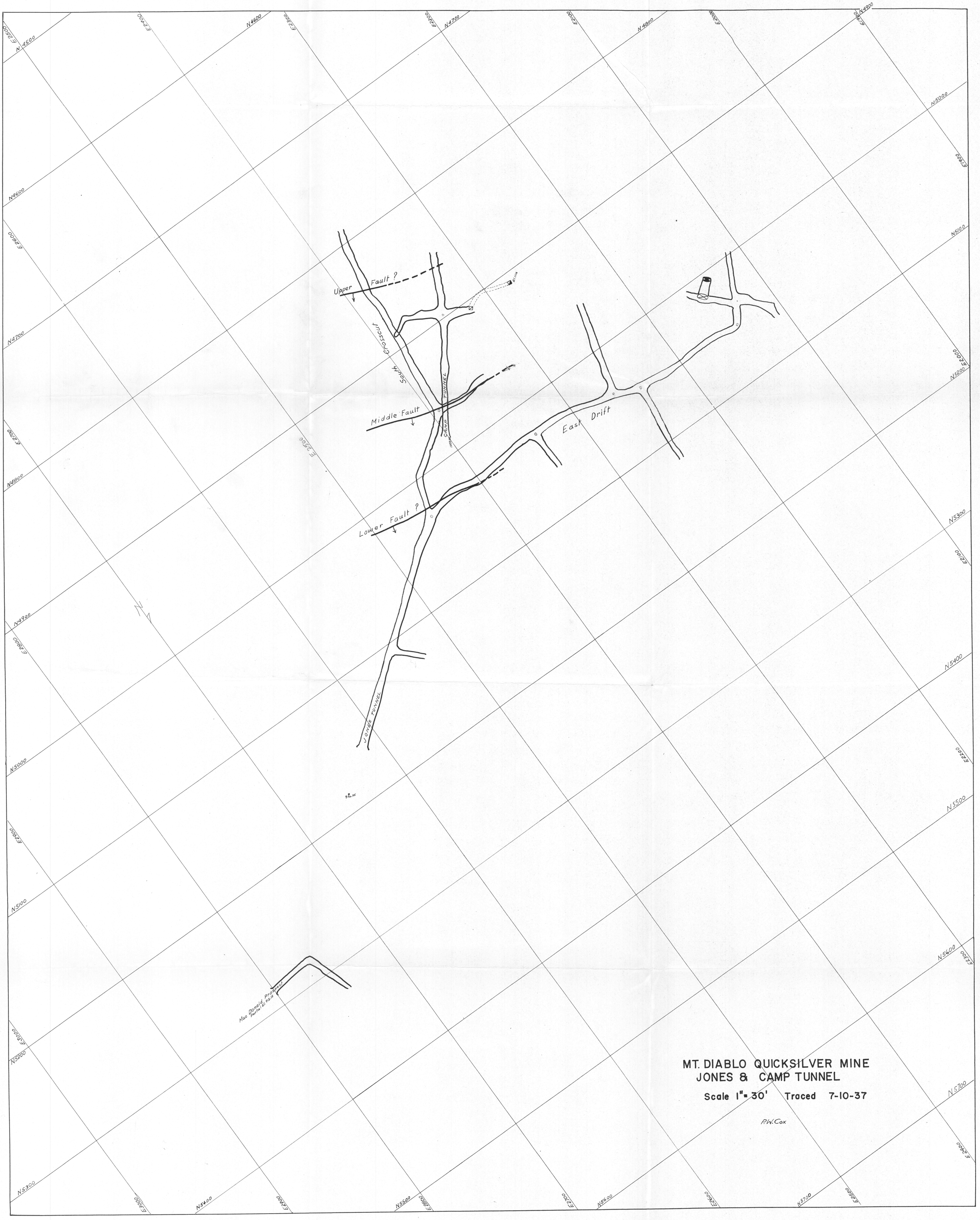
5. The property is favorably located.

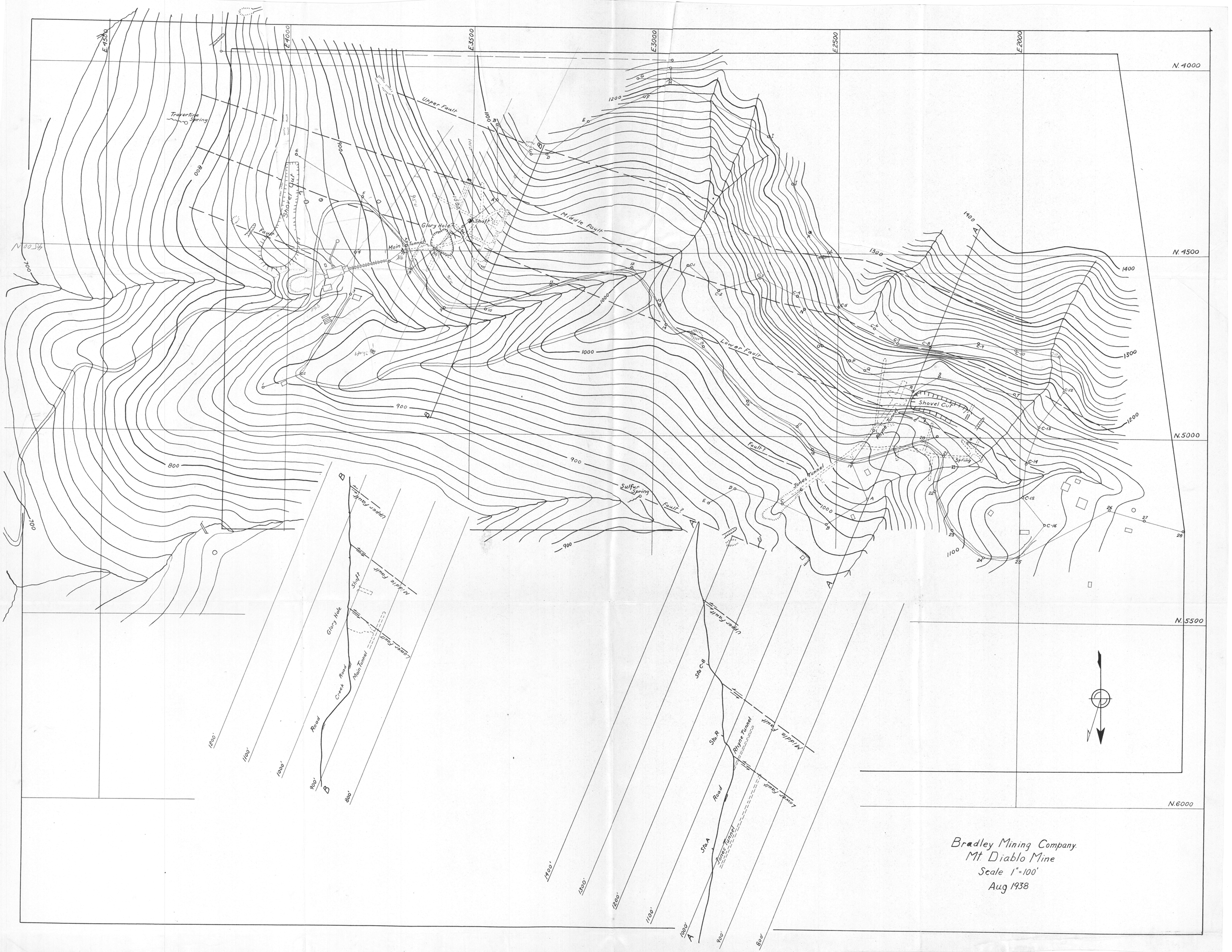
6. A plant is available to treat such ore as is found in the course of development.

7. The terms under which the property is held, are fair.


S.W.
N.E.
Vertical
Section


N.W.
N.W.
Horizontal
Section
S.E.
S.E.
A
B


Upper Fault ?
Cross cut
Middle Fault
CAMP TUNNEL
East Drift
Lower Fault ?
JONES TUNNEL
Mac Donald Prospect
Portal El. 913.12
N
MT. DIABLO QUICKSILVER MINE
JONES & CAMP TUNNEL
Scale 1" = 30' Traced 7-10-37
P.W. Cox


Bradley Mining Company.
Mt. Diablo Mine
Scale 1"=100'
Aug 1938
E.4500
E.4000
E.3500
E.3000
E.2500
E.2000
N.4000
N.4500
N.5000
N.5500
N.6000
Upper Fault
Middle Fault
Lower Fault
Fault ?
Traverstide Spring
Shover Gulch
Glory Hole
Shaft
Main Tunnel
Shovel Cut
Rhyne Tunnel
Jones Tunnel
Sulfur Spring
Spring
Road
Creek Road
Sta C-8
Sta R
Sta A
1400'
1300'
1200'
1100'
1000'
900'
800'