CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Grover Heinrichs Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

Title: The Hedberg Area by E. H. Wisser Aug 19 '26

(1)

THE HEDBERG AREA

__Area Covered by this Report.__

The Hedberg area consists of a downfaulted block of Naco and ~~and~~ Escabrosa limestone at the extreme western edge of the Copper Queen holdings . On the surface, the block is about 6400 feet long, 1700 feet wide at the widest part, and tapers to a point at its northeastern and southwestern ends. Bounding the block on the west is the Quarry fault, which also bounds the main downfaulted block of Paleozoic limestone which so far has carried all of the important ore of the Bisbee district. The Quarry fault is a normal fault, dipping east about 75°, with an average displacement (dip-slip) of 950 feet. The Hedberg fault, also a normal fault, dipping west 60°-70°, bounds the Hedberg block on the east, and butts against the Quarry fault at the northeastern and southwestern ends of the Hedberg block. The displacement of the Hedberg fault is about 800 feet. The general direction of strike of both faults is about N30°E. A number of complicated sympathetic faults occur east of the Hedberg fault.

__Structure of the Block.__

The structure within the block is synclinal, the beds in the northeastern portion of the block dipping southwest, while those in the southwestern portion dip northeast. In the southwestern portion of the block, a distinct bowl structure is superimposed upon the southwestern limb of the main syncline, giving a deep local depression. This will be referred to as the Southern Bowl (Refer to the plan of the surface, and to sections A, B and 5.)

Granite Porphyry .

Porphyry dikes, sills and irregular masses are common within the block, especially in its southern half. These are later than both the Quarry and Hedberg faults, since they cross the former and follow the latter. The porphyry resembles that found in the Shattuck mine, little altered, and with abundant quartz phenocrysts. The dike crossing the block in an E-W direction just south of the 7000 E-W coordinate is exceptional in that it is locally well silicified and carries considerable disseminated pyrite.

Mineralization.

Silica, silica-breccia and hematite & Some Manganese occur at intervals around the whole periphery of the block, but principally along its eastern side, i.e. along the Hedberg fault and its sympathetic parallel faults. The Hedberg fault carries abundant silica near its northern end, on Escabrosa Ridge, and above the Hedberg tunnel, about 1800 feet south of the ridge. The fault shows some mineralization at intervals over a total distance along its strike of 4600 feet. In the southwestern portion of the Hedberg block, NW of the Lover's Leap shaft, an area about 800 by 1000 feet, crossed by the Hedberg fault, shows intense faulting and fracturing and widespread mineralization, although the individual showings are small. Within this mineralized area occurs the Southern Bowl.

Chances for Ore.

The Hedberg block contains the following favorable factors, among the outstanding proved ore guides of the Bisbee district.

1. It is a downfaulted block. The productive area of the Bisbee district is itself a great downfaulted block. The Gardner, Sacra-

mento, Southwest, Czar and Shattuck orebodies all occurred in downfaulted blocks. In addition, the structure of the block is synclinal, which further accentuates the depression of the center of the block. Flexures in the beds are favorable for ore.

2. The eastern border of the Hedberg block is well fractured. Fractures have been the dominant ore-controls in the country away from Sacramento Hill.

3. The surface showings, silica-breccia, hematite and manganese, have indicated ore in the Southwest, Briggs and Don Luis areas.

4. The association of the ore of the district with porphyry is well known. The Shattuck dike connected with the Shattuck ore is as fresh and unaltered as the Hedberg dikes.

Following are the unfavorable factors:

1. Sparseness of copper staining in the croppings.

2. Lack of any proved ore in the vicinity.

3. The surface appears to be at approximately the horizon of the top of the porphyry dikes, and this horizon was the ore horizon in the Gardner. But this rule does not hold in the Briggs and Cole mines, where dikes rose above the ore, nor in the Shattuck, where the Shattuck dike reached the surface, well above the ore.

The fact that most of the dikes stop at a definite horizon, roughly that of the surface; the number of the dikes and sills; the numerous small irregular masses of porphyry without definite orientation, all point to the probability of a considerable mass of pophyry within the Hedberg block at an unknown depth; in addition, the bowl-like structure

of the limestone in the southern end of the block suggests sagging due to shrinkage of the porphyry mass,as happened in the Gardner area. The widespread mineralization above the Southern Bowl, extending far to the northeast along the Hedberg fault,which bounds the eastern side of the bowl,indicates the possibility of a new mineralization center below the bowl. This is of course mere speculation where no underground workings exist. A possible unfavorable factor connected with the porphyry lies in the chance that a great mass of porphyry cuts out the favorable beds in the lower horizons of the Hedberg block. On the other hand,if the porphyry lies below the favorable beds,with irregular tongues reaching up into them,it may serve as an efficient localizer of ore in these beds. Only well-planned exploration can answer these questions.

Prospects.

For prospecting purposes,two areas merit consideretion,the neighborhood of the Hedberg tunnel,and the Southern Bowl area.

Hedberg Tunnel Area.

The Hedberg fault,exposed on the surface above the tunnel, carries the best mineralization inthe block,a mass of silica-breccia, hematite,specularite and pyrite about 500 feet in length and 20-50 feet in width. The tunnel cut the fault about 270 feet beneath its outcrop,and where exposed in the tunnel,the fault carries hematite,silica,calcite,a little pyrite and iron-stained gouge,and a granite porphyry dike ran along it. A sympathetic break in the footwall carried pyrite and copper staining,but except for this the footwall is unaltered limestone. The hangingwall on the other hand is well mineralized in the tunnel,carrying abundant irreguler silica,some pyrite and iron-

staining for a distance of 100 feet west of the fault. The tunnel is now 235 feet into the hangingwall of the fault. The limestone, probably lower Naco, is marbleized all the way, and a number of iron-stained breaks sympathetic with the Hedberg fault have been crossed. Two irregular masses of porphyry were encountered, possibly connected with each other, one rather strongly pyritized on its fracture faces along a break crossing the porphyry. The limestone in the face, west of the second mass of porphyry, is well fractured in an irregular manner and carries abundant white calcite and iron staining. We have therefore at least 230 feet of fractured and somewhat mineralized ground in the hangingwall of the Hedberg fault.

Drill hole No.1 shows a ~~somewhat similar~~ (See 2+) somewhat similar to that in the tunnel condition. At 218 feet the hole passed from Naco to Escabrosa limestone, crossing the normal contact; at 425 feet it entered a mass of irregular silica and continued in this for 75 feet. This silica carried a trace of gold, .20 oz. silver, and .10% copper, and is undoubtedly hypogene. At 615 feet a strong fault, undoubtedly the Hedberg, was encountered. The fault was accompanied by gouge, attrition pebbles, silica and pyrite. Beyond this fault, the ~~atrypa and the~~ Big Shale ~~were successively~~ was passed through, showing that the hole was in lower Martin. The Martin carries fairly abundant disseminated pyrite, and the hole should be continued past the Parting quartzite and at least 75 feet into the Abrigo, to test these two known ore-horizons.

Further drilling in the Hedberg Tunnel area should be done from the face of the tunnel, with the object of prospecting the mineralized hangingwall of the Hedberg fault in the lower Escabrosa and Martin limestones. Hole No.2, to be drilled from the present face of the tunnel, is designed as a pilot hole to determine the dip of the Hedberg

fault below the tunnel, and to test the footwall of the fault in the Parting quartzite and upper Abrigo horizons.

Hole No3, the direction and inclination of which will depend on the structure as shown by No.2, has for its purpose the exploration of the Martin ~~and upper Abrigo~~ limestone in the hangingwall of the Hedberg fault. As the face of the Hedberg tunnel is not far enough west of the fault to permit of drilling the hole with an inclination against the dip of the fault, this hole must be drilled parallel to the dip of the fault. To avoid crossing the fault, the inclination of the hole should be little if any greater than the dip of the fault as determined by hole No.2.

Southern Bowl Area.

Mineralization in the form of silicabreccia, hematite or iron-staining regardless of their orientation occurs along nearly every fault or fracture in this portion of the Hedberg block, ~~regardless of the orientation~~ if The bowl itself lies within this mineralized area, and in the hangingwall of the Hedberg fault. Prospecting should be directed toward the center of the bowl: the bowl-structure is analagous to that of a downfaulted block; in fact the southern edge of the bowl is broken and faulted, so that we have in effect a downfaulted block within a downfaulted block; judging by experience in the other areas, this should be exceptionally favorable for ore.

In the footwall of the Hedberg fault occurs a block of limestone, uplifted with respect to the Hedberg block, but downfaulted with respect to the country XXXXXXXXXXXXXXXX further east. This block contains some porphyry dikes and carries good surface showings of silica -breccia and hematite. The position of the limestone formations in this block is such that the block can be tested in the favorable horizons by the same holes which test the Hedberg block, and for this

reason a diamond drill set-up has been selected near the eastern edge of this footwall block.

The results of the drilling now going on in the Hedberg tunnel area will determine, in large part, the position and direction of the holes in the Southern Bowl area; it is hoped that the position of the most favorable horizon will be obtained from the present drilling. Two tentative holes have been laid out in the Southern Bowl area, Nos.4 and 5. No.4, a pilot hole, is designed to determine the dip of the Hedberg fault and to prospect the footwall of the fault at the Escabrosa-Martin contact. No.5, the inclination of which depends upon the dip of the Hedberg fault as shown by hole No.4, is to be directed toward the center of the Southern Bowl, in the hanging wall of the Hedberg fault, to reach the bowl at about the Escabrosa-Martin contact or in the upper Martin. It is hoped that the hole can be carried past the Parting quartzite horizon into the upper Abrigo without getting too far away from the Hedberg fault; this depends upon the dip of the fault as shown in No.4, (See pection 5) XX and will be possible if the fault is not too steep; on the other hand, if the fault is too flat, No 5 may have difficulty in crossing it. If the fault is flat, Position B shown on the vertical surface map may be selected for a set-up for No.5, and a hole drilled from here ~~parallel to the dip of the Hedberg fault~~ directly into the Southern Bowl. XX The A location is preferable if it can be used, since it makes one set-up, at an accessible place, for all drill-holes, and also enables hole No.5, drilled from here, to prospect the footwall block at the Parting quartzite horizon, at the same time that it prospects the Hedberg block (hanging-wall) in the Martin. Location B is open to the further objection that the fault may flatten even further at any point below the

pilot hole,No.4,so that Hole 5 from B may cross the fault above the favorable horizons just as happened to hole No.1. But if the Hedberg fault is quite flat,it will clearly be impossible to cross it from its footwall side,and location B becomes imperative. Even in this case it will be worth while to test the Parting quartzite horizon in the footwall of the Hedberg fault by drilling hole No.5 as laid out from location A as far as the Hedberg fault. This will of course make 3 holes and two set-ups as against 2 holes and one set-up,so that if possible, the two holes from location A as outlined in the prospects should be drilled.

(9)

PROSPECTS IN THE HEDBERG AREA

No.1

1. Level: Surface

2. Object: To explore the Hedberg fault in the vicinity of the silica-breccia outcrop exposed above the Hedberg tunnel.

3. Location and Footage: Hole now running.

4. Remarks: This hole, originally designed to prospect the hangingwall of the Hedberg fault, crossed into the footwall at 615 feet, and is now in lower Martin. ~~It should be continued past the Parting quartzite and for at least 75 feet into the Abrigo~~ The hole ~~crossed the fault and entered the hanginleft~~ the hangingwall at a point over 300 feet above the bottom of the Escabrosa, so that it never reached the horizons ~~XXXXX~~ in the hanging-wall which have produced the bulk of the ore in the Bisbee district. Both hangingwall and footwall of the fault are pyritized, so that exploration of the footwall is justified, and the hole should be continued past the Parting quartzite and for at least 75 feet into the Abrigo

5. Map References: Surface plan; section 2 /

(11)

No.2

1. Level: Hedberg Tunnel

2. Object: To determine the dip of the Hedberg fault below the Hedberg tunnel and to prospect the footwall of the fault in the Parting quartzite and upper Abrigo horizons.

3. Location and Footage: From the face of the Hedberg tunnel, drill a hole bearing N63° 30' E with an inclination of 79° from the vertical. Probable distance to fault and Parting quartzite 450 feet.

4. Remarks: This hole is a pilot hole for No.3, but has further justification in that the footwall of the Hedberg fault carries pyrite and copper-staining, shown along the break exposed in the crosscut to the north from the Hedberg tunnel, 350 feet in from the portal. The direction of the hole was selected to bring it to its objective at a point beneath the mouth end of the silica exposed on the surface.

Map References: Plan of Hedberg tunnel; Sect. 3/4 Plan of Surface.

No.3

1. Level: Hedberg Tunnel.

2. OBject: To prospect the Martin and upper Abrigo limestones in the hangingwall of the Hedberg fault.

3. Location and Footage: To be drilled from the face of the Hedberg tunnel. The inclination will depend upon the dip of the fault as shown in drill hole No.2. No.3 must be drilled parallel or nearly so, to the Hedberg fault, since the face of the tunnel is not far enough away from the fault to enable a hole to be drilled which would cut across the mineralized hangingwall area. This is unfortunate, but conditions are very unfavorable for cross-cutting holes throughout the Hedberg area. The bearing of the hole should be about N40°W in order to reach the objective of the hole at a point beneath the silica-breccia exposed on the surface. Probable length of hole to the Parting quartzite-1400 feet.

4. Remarks: In determining the inclination of the hole, it should be remembered that the mineralized area in the hanging-wall of the Hedberg fault extends practically to the collar of the hole, or 250 feet from the fault. For this reason, the inclination of the hole can be made that of the fault, or a very little steeper ; this will reduce the chances of crossing the fault before reaching the favorable beds, as happened in hole No.1.

5. Map References: Plan of Hedberg tunnel; plan of surface; sec.3/

No.4

1. Level: Surface.

2. Object: To determine the dip ofthe Hedberg fault in the Southern Bowl area,and to prospect the footwall of the fault at the Escabrosa Martin contact.

3. Location and Footage: At a point A on the surface whose coordinates are: lat. 5190, dep. -10~~80~~40, drill a hole bearing N57W,with an inclination from the horizontal of 25°.(The point intended is in the gulch which runs past the Levers Leap shaft north of the shaft,at the base of the cliff,running N-S,about 550 feet NW of the shaft.)

4. Remarks: This is a pielt hole for No.5,but at the same time it tests the Escabrosa-Martin contact in the footwall of the Hedberg fault,beneath good surface showings.

5. Map References: Surface plan; sec.5,sec.B

No. 5

1. Level: Surface.
2. Object: To explore the Southern Bowl, in the hanging wall of the Hedberg fault, at the Martin and upper Abrigo horizons, and to test the footwall of the Hedberg fault at the Parting quartzite horizon.
3. Location and Footage: From Location A, same set-up as for No.4, drill a hole bearing N 57°W, with an inclination depending upon the dip of the Hedberg fault as shown in No.4, but so selected as to reach the fault slightly below the Escabrosa-Martin contact.
4. Remarks: If the dip of the Hedberg fault is shown to be less than 60°, it will probably be advisable to drill No.5 far enough to test the Parting quartzite in the footwall of the fault, and then move to point B, whose coordinates are lat. ~~5800~~ 5800, dep. ~~2050~~ 1940, and drill a vertical hole directly into the Southern Bowl.
5. Map References: Surface plan; Sections 5, B.

REPORT

ON

THE HEDBERG AREA

By E. H. Wisner - August, 1926

TABLE OF CONTENTS

LIST OF MAPS

THE HEDBERG AREA

Area Covered by this Report

The Hedberg area consists of a downfaulted block of Naco and Escabrosa limestone at the extreme western edge of the Copper Queen holdings. On the surface, the block is about 6400 feet long, 1700 feet wide at the widest part, and tapers to a point at its northeastern and southwestern ends. Bounding the block on the west is the Quarry fault, which also bounds the main downfaulted block of Paleozoic limestone which so far has carried all of the important ore of the Bisbee district. The Quarry fault is a normal fault, dipping east about 75°, with an average displacement (dip-slip) of 950 feet. The Hedberg fault, also a normal fault, dipping west 60°-70°, bounds the Hedberg block on the east and butts against the Quarry fault at the northeastern and southwestern ends of the Hedberg block. The displacement of the Hedberg fault is about 800 feet. The general direction of strike of both faults is about N 30°E. A number of complicated sympathetic faults occur east of the Hedberg fault.

Structure of the Block

The structure within the block is synclinal, the beds in the northeastern portion of the block dipping southwest, while those in the southwestern portion dip northeast. In the southwestern portion of the block, a distinct bowl structure is superimposed upon the southwestern limb of the

main syncline, giving a deep local depression. This will be referred to as the Southern Bowl. (Refer to the plan of the surface, and to sections A, B and S.)

Granite Porphyry

Porphyry dikes, sills and irregular masses are common within the block, especially in its southern half. These are later than both the Quarry and Hedberg faults, since they cross the former and follow the latter. The porphyry resembles that found in the Shattuck mine, little altered, and with abundant quartz phenocrysts. The dike crossing the block in an E-W direction just south of the 7000 E-W coordinate is exceptional in that it is locally well silicified and carries considerable disseminated pyrite.

Mineralization

Silica, silica-breccia, hematite and some manganese occur at intervals around the whole periphery of the block, but principally along its eastern side, i.e., along the Hedberg fault and its sympathetic parallel faults. The Hedberg fault carries abundant silica near its northern end (on Escabrosa Ridge), and above the Hedberg tunnel, about 1800 feet south of the ridge. The fault shows some mineralization at intervals over a total distance along its strike of 4600 feet. In the southwestern portion of the Hedberg block, northwest of the Lover's Leap shaft, an area about 800 by 1000 feet, crossed by the Hedberg fault, shows

intense faulting and fracturing and widespread mineralization, although the individual showings are small. Within this mineralized area occurs the Southern Bowl.

Chances for Ore

The Hedberg block contains the following favorable factors, among the outstanding proved ore guides of the Bisbee district.

1. It is a downfaulted block. The productive area of the Bisbee district is itself a great downfaulted block. The Gardner, Sacramento, Southwest, Czar and Shattuck orebodies all occurred in downfaulted blocks. In addition, the structure of the block is synclinal, which further accentuates the depression of the center of the block. Flexures in the beds are favorable for ore.

2. The eastern border of the Hedberg block is well fractured. Fractures have been the dominant ore-controls in the country away from Sacramento Hill.

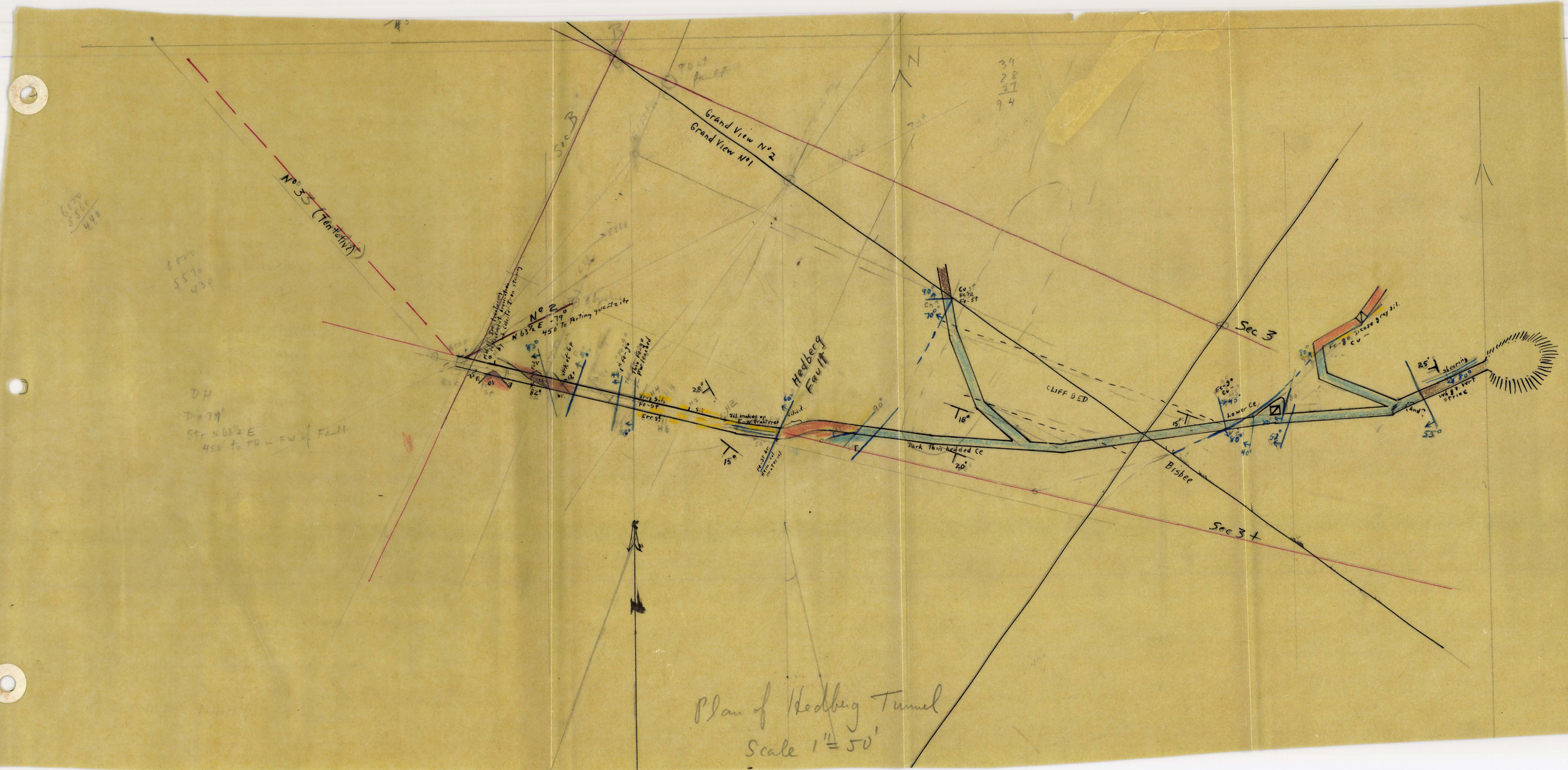
3. The surface showings, silica-breccia, hematite and manganese, have indicated ore in the Southwest, Briggs and Don Luis areas.

4. The association of the ore of the district with porphyry is well known. The Shattuck dike connected with the Shattuck ore is as fresh and unaltered as the Hedberg dikes.

Following are the unfavorable factors:

1. Sparseness of copper staining in the croppings.
2. Lack of any proved ore in the vicinity.
3. The surface appears to be at approximately the horizon of the top of the porphyry dikes, and this horizon was the ore horizon in the Gardner. But this rule does not hold in the Briggs and Cole mines, where dikes rose above the ore, nor in the Shattuck, where the Shattuck dike reached the surface well above the ore.

The fact that most of the dikes stop at a definite horizon, roughly that of the surface; the number of the dikes and sills; the numerous small irregular masses of porphyry without definite orientation, all point to the probability of a considerable mass of porphyry within the Hedberg block at an unknown depth; in addition, the bowl-like structure of the limestone in the southern end of the block suggests sagging due to shrinkage of the porphyry mass, as happened in the Gardner area. The widespread mineralization above the Southern Bowl, extending far to the northeast along the Hedberg fault, which bounds the eastern side of the bowl, indicates the possibility of a new mineralization center below the bowl. This is, of course, mere speculation where no underground workings exist. A possible unfavorable factor connected with the porphyry lies in the chance that a great mass of porphyry cuts out the favorable beds in the lower horizons of the Hedberg block. On the other hand, if the


No 35 (Tentative)
Grand View No 2
Grand View No 1
No 2
N 63½ E 79°
450' to Footing quartzite
Hedberg Fault
Sec 3
Sec 3+
CLIFF BED
Dark Thin-bedded Cc
Bisbee
Lower Cc
(Sand?)
Plan of Hedberg Tunnel
Scale 1" = 50'

porphyry lies below the favorable beds, with irregular tongues reaching up into them, it may serve as an efficient localizer of ore in these beds. Only well-planned exploration can answer these questions.

Prospects

For prospecting purposes, two areas merit consideration, the neighborhood of the Hedberg tunnel, and the Southern Bowl area.

Hedberg Tunnel Area

The Hedberg fault, exposed on the surface above the tunnel, carries the best mineralization in the block, a mass of silica-breccia, hematite, specularite, with some pyrite about 500 feet in length and 20-50 feet in width. The tunnel cut the fault about 270 feet beneath its outcrop, and where exposed in the tunnel, the fault carries hematite, silica, calcite, a little pyrite and iron-stained gouge, and a granite porphyry dike ran along it. A sympathetic break in the footwall carried pyrite and copper-staining, but except for this, the footwall is unaltered limestone. The hanging wall, on the other hand, is well mineralized in the tunnel, carrying abundant irregular silica, some pyrite and iron-staining for a distance of 100 feet west of the fault. The tunnel is now 235 feet into the hanging wall of the fault. The limestone, probably lower Naco, is marbleized all the way and a number of iron-stained breaks sympathetic with the Hedberg fault have

been crossed. Two irregular masses of porphyry were encountered, possibly connected with each other, one rather strongly pyritized on its fracture faces along a break crossing the porphyry. The limestone in the face, west of the second mass of porphyry, is well fractured in an irregular manner and carries abundant white calcite and iron-staining. We have, therefore, at least 230 feet of fractured and somewhat mineralized ground in the hangingwall of the Hedberg fault.

Drill Hole No.1 (Sec. 24) shows a condition somewhat similar to that in the tunnel. At 218 feet the hole passed from Naco to Escabrosa limestone, crossing the normal contact; at 425 feet it entered a mass of irregular silica and continued in this for 75 feet. This silica carried a trace of gold, .20 oz. silver, and .10% copper, and is undoubtedly hypogene. At 615 feet a strong fault, undoubtedly the Hedberg, was encountered. The fault was accompanied by gouge, attrition pebbles, silica and pyrite. Beyond this fault, the Big Shale was passed through, showing that the hole was in lower Martin. The Martin carries fairly abundant disseminated pyrite, and the hole should be continued past the Parting quartzite and at least 75 feet into the Abrigo to test these two known ore-horizons.

Further drilling in the Hedberg Tunnel area should be done from the face of the tunnel, with the object of prospecting the mineralized hangingwall of the Hedberg fault in the lower Escabrosa and Martin limestones. Hole No.2, to

to be drilled from the present face of the tunnel, is designed as a pilot hole to determine the dip of the Hedberg fault below the tunnel, and to test the footwall of the fault in the Parting quartzite and upper Abrigo horizons.

Hole No. 3, the direction and inclination of which will depend on the structure as shown by No.2, has for its purpose the exploration of the Martin limestone in the hangingwall of the Hedberg fault. As the face of the Hedberg tunnel is not far enough west of the fault to permit of drilling the hole with an inclination against the dip of the fault, this hole must be drilled parallel to the dip of the fault. To avoid crossing the fault, the inclination of the hole should be little, if any, greater than the dip of the fault as determined by Hole No.2.

Southern Bowl Area

Mineralization in the form of silica-breccia, hematite, or iron-staining occurs along nearly every fault or fracture, regardless of its orientation in this portion of the Hedberg block. The bowl itself lies within this mineralized area, and in the hangingwall of the Hedberg fault. Prospecting should be directed toward the center of the bowl: the bowl-structure is analagous to that of a downfaulted block; in fact, the southern edge of the bowl is broken and faulted, so that we have in effect a downfaulted block within a downfaulted block; judging by experience in the other areas, this should be exceptionally

favorable for ore.

In the footwall of the Hedberg fault occurs a block of limestone, uplifted with respect to the Hedberg block, but downfaulted with respect to the country further east. This block contains some porphyry dikes and carries good surface showings of silica-breccia and hematite. The position of the limestone formations in this block is such that the block can be tested in the favorable horizons by the same holes which test the Hedberg block, and for this reason a diamond drill set-up has been selected near the eastern edge of this footwall block.

The results of the drilling now going on in the Hedberg tunnel area will determine, in large part, the position and direction of the holes in the Southern Bowl area; it is hoped that the position of the most favorable horizon will be obtained from the present drilling. Two tentative holes have been laid out in the Southern Bowl area, Nos. 4 and 5. No.4, a pilot hole, is designed to determine the dip of the Hedberg fault and to prospect the footwall of the fault at the Escabrosa-Martin contact. No.5, the inclination of which depends upon the dip of the Hedberg fault as shown by Hole No.4, is to be directed toward the center of the Southern Bowl, in the hangingwall of the Hedberg fault, to reach the bowl at about the Escabrosa-Martin contact or in the upper Martin. It is hoped that the hole can be carried past the Parting quartzite horizon into the upper

Abrigo without getting too far away from the Hedberg fault; this depends upon the dip of the fault as shown in No.4 (See section S.), and will be possible if the fault is not too steep; on the other hand, if the fault is too flat, No. 5 may have difficulty in crossing it. If the fault is flat, Position B shown on the surface map may be selected for a set-up for No. 5, and a vertical hole drilled from here directly into the Southern Bowl. The A location is preferable if it can be used, since it makes one set-up, at an accessible place, for all drill-holes, and also enables hole No.5, drilled from here, to prospect the footwall block at the Parting quartzite horizon, at the same time that it prospects the Hedberg block (hangingwall) in the Martin. Location B is open to the further objection that the fault may flatten even further at any point below the pilot hole, No.4, so that Hole 5 from B may cross the fault above the favorable horizons just as happened to Hole No.1. But if the Hedberg fault is quite flat, it will clearly be impossible to cross it from its footwall side, and location B becomes imperative. Even in this case it will be worth while to test the Parting quartzite horizon in the footwall of the Hedberg fault by drilling hole No.5 as laid out from location A as far as the Hedberg fault. This will, of course, make three holes and two set-ups as against two holes and one set-up, so that, if possible, the two holes from location A as outlined in the prospects should be drilled.

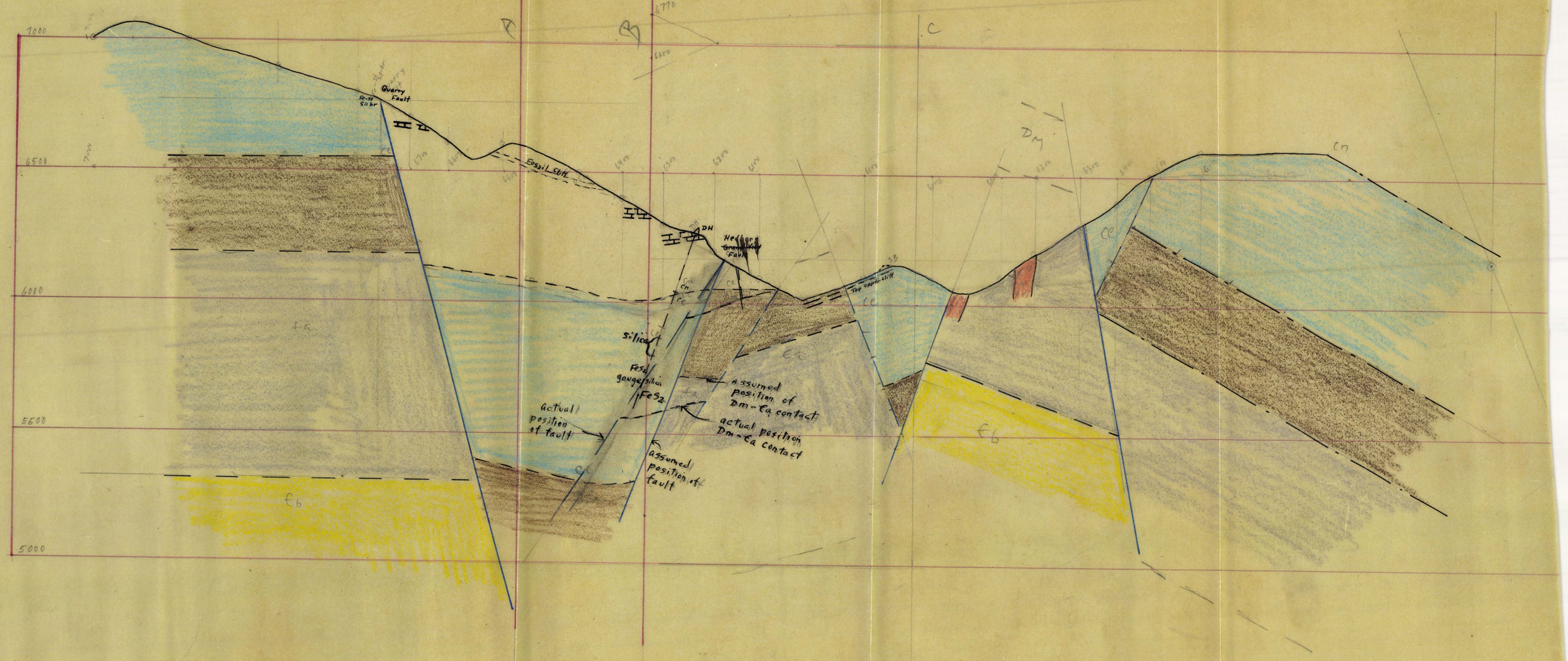
PROSPECTS

IN

THE HEDDING AREA

No. 1

1. Level: Surface.
2. Object: To explore the Hedberg fault in the vicinity of the silica-breccia outcrop exposed above the Hedberg tunnel.
3. Location and footage: Hole now running.
4. Remarks: This hole, originally designed to prospect to hangingwall of the Hedberg fault, crossed into the footwall at 615 feet, and is now in lower Martin. The hole left the hangingwall at a point over 300 feet above the bottom of the Escabrosa, so that it never reached the horizons in the hangingwall which have produced the bulk of the ore in the Bisbee district. Both hangingwall and footwall of the fault are pyritized, so that exploration of the footwall is justified, and the hole should be continued past the Parting quartzite and for at least 75 feet into the Abrigo.
5. Map References: Surface plan; Section 2 4

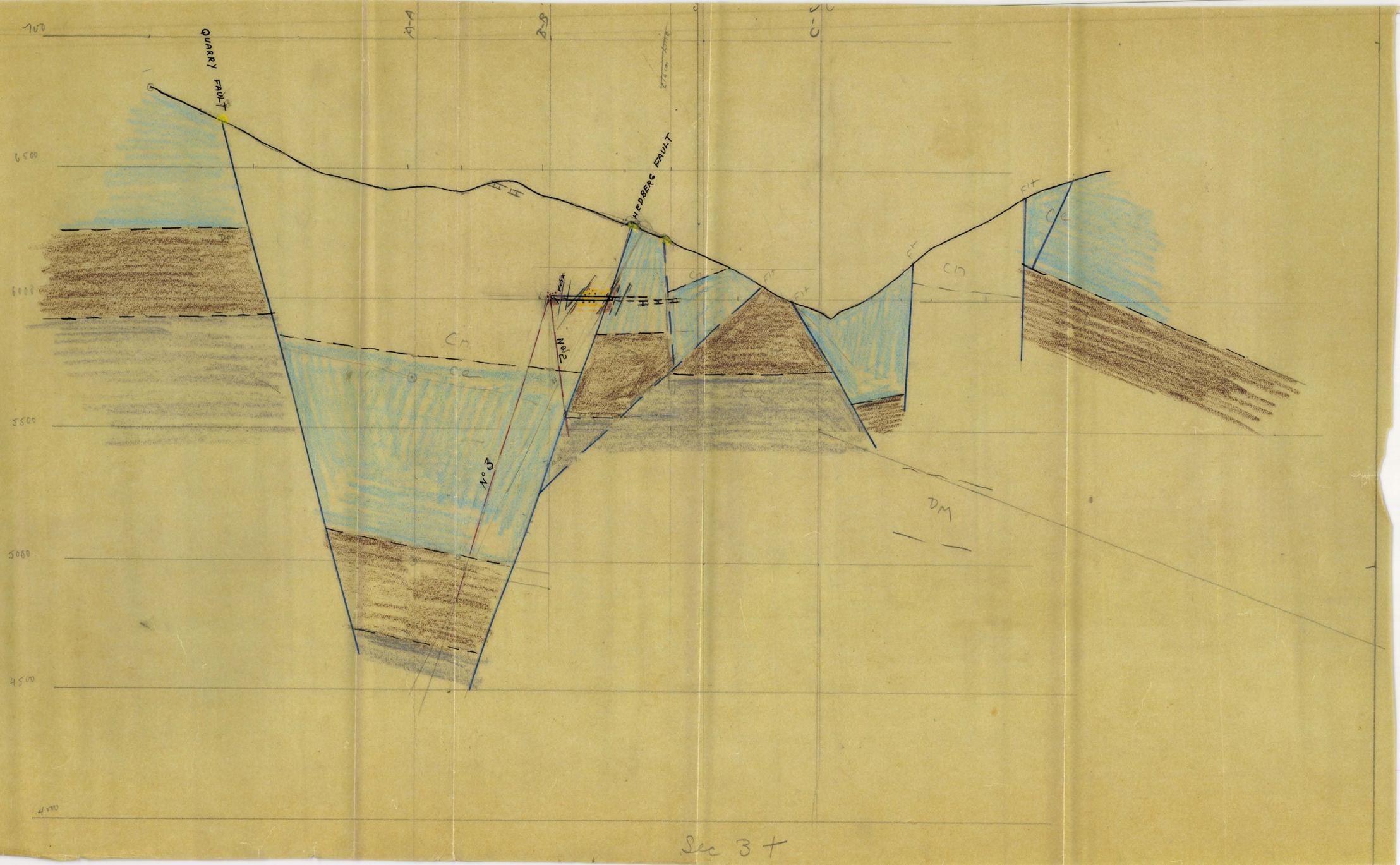


Sec 2+

Special Sec. thru D.D. Hole

No. 2

1. Level: Hedberg Tunnel.
2. Object: To determine the dip of the Hedberg fault below the Hedberg tunnel and to prospect the footwall of the fault in the Parting quartzite and upper Abrigo horizons.
3. Location and Footage: From the face of the Hedberg tunnel, drill a hole bearing N 63° 30' E with an inclination of 70° from the vertical. Probable distance to fault and Parting quartzite, 450 feet.
4. Remarks: This hole is a pilot hole for No.3, but has further justification in that the footwall of the Hedberg fault carries pyrite and copper-staining, shown along the break exposed in the crosscut to the north from the Hedberg tunnel, 350 feet in from the portal. The direction of the hole was selected to bring it to its objective at a point beneath the south end of the silica exposed on the surface.
5. Map References: Plan of Hedberg tunnel; Section 3 + Plan of Surface.


QUARRY FAULT
HEDBERG FAULT
No 3
No 2
DM
7500
6500
6000
5500
5000
4500
4000

Sec 3 +

No. 3

1. Level: Hedberg Tunnel.
2. Object: To prospect the Martin and upper Abrigo limestones in the hangingwall of the Hedberg fault.
3. Location and Footage: To be drilled from the face of the Hedberg tunnel. The inclination will depend upon the dip of the fault as shown in drill hole No.2. No.3 must be drilled parallel or nearly so, to the Hedberg fault, since the face of the tunnel is not far enough away from the fault to enable a hole to be drilled which would cut across the mineralized hangingwall area. This is unfortunate, but conditions are very unfavorable for crosscutting holes throughout the Hedberg area. The bearing of the hole should be about N 40° W in order to reach the objective of the hole at a point beneath the silica-breccia exposed on the surface. Probable length of hole to the Parting quartzite, 1400 feet.
4. Remarks: In determining the inclination of the hole, it should be remembered that the mineralized area in the hangingwall of the Hedberg fault extends practically to the collar of the hole, or 230 feet from the fault. For this reason, the inclination of the hole can be made that of the fault, or a very little steeper; this will reduce the chances of crossing the fault before reaching the favorable beds, as happened in hole No.1.
5. Map References: Plan of Hedberg tunnel; plan of surface; Section 3 +

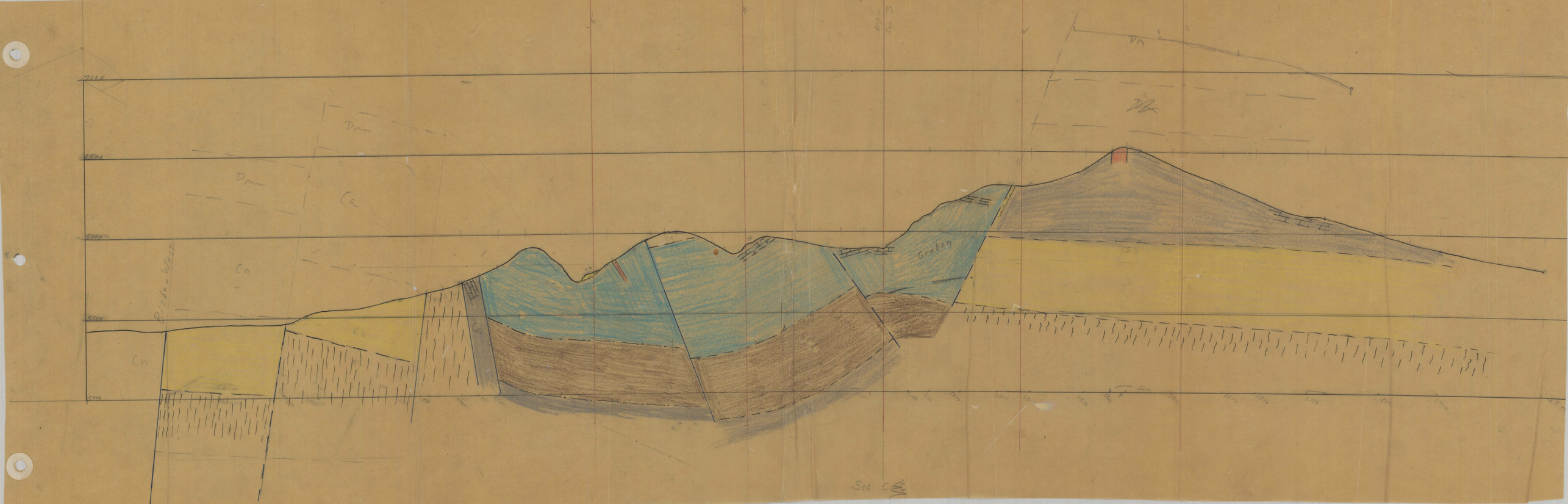
No. 4

1. Level: Surface
2. Object: To determine the dip of the Hedberg fault in the Southern Bowl area, and to prospect the footwall of the fault at the Escabrosa-Martin contact.
3. Location and Footage: At a point A on the surface whose coordinates are: lat. 5190, dep. 1040, drill a hole bearing N 57 W, with an inclination from the horizontal of 25°. (The point intended is in the gulch which runs past the Lovers Leap shaft north of the shaft, at the base of the cliff, running N-S, about 550 feet NW of the shaft.)
4. Remarks: This is a pilot hole for No. 5, but at the same time it tests the Escabrosa-Martin contact in the footwall of the Hedberg fault, beneath good surface showings.
5. Map References: Surface plan; Sec. 5, sec. B.

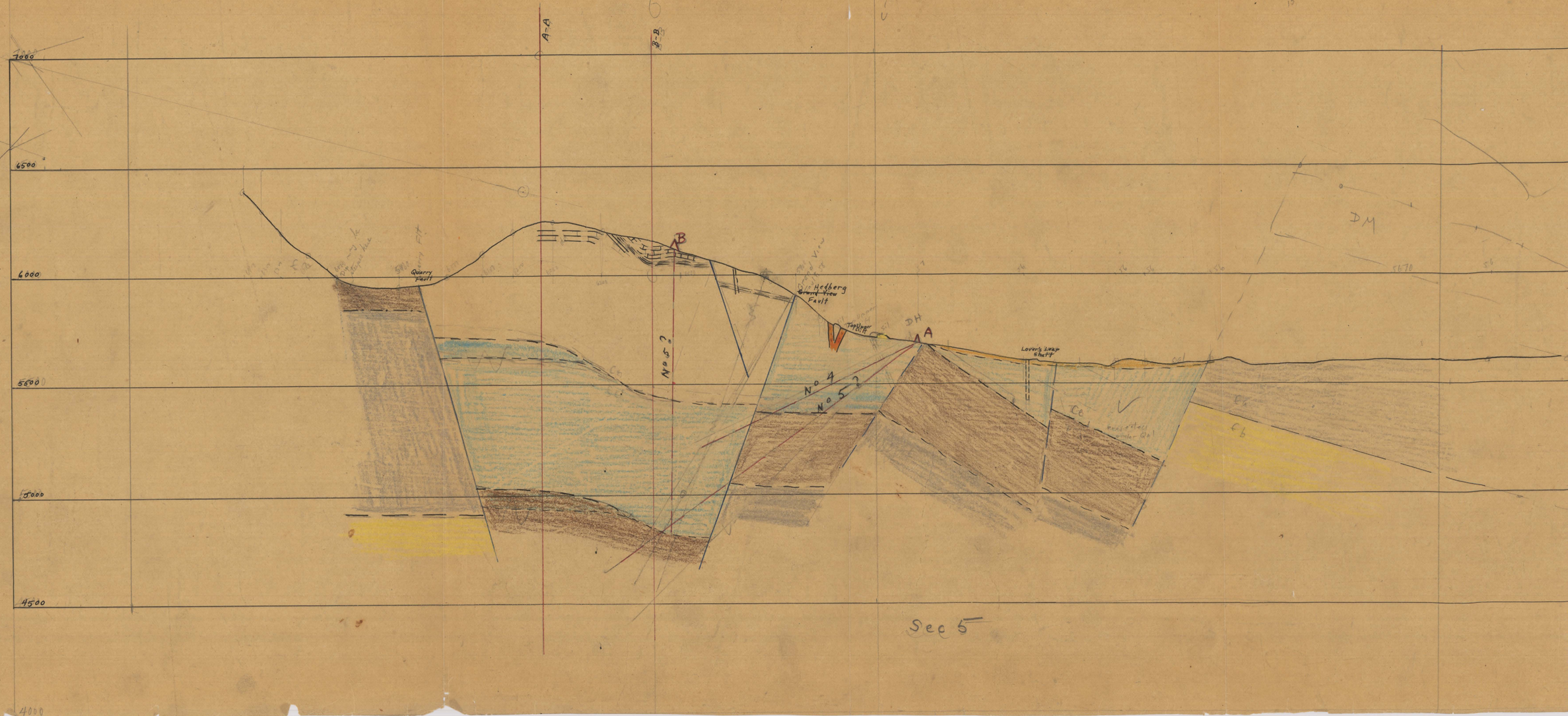
No. 5

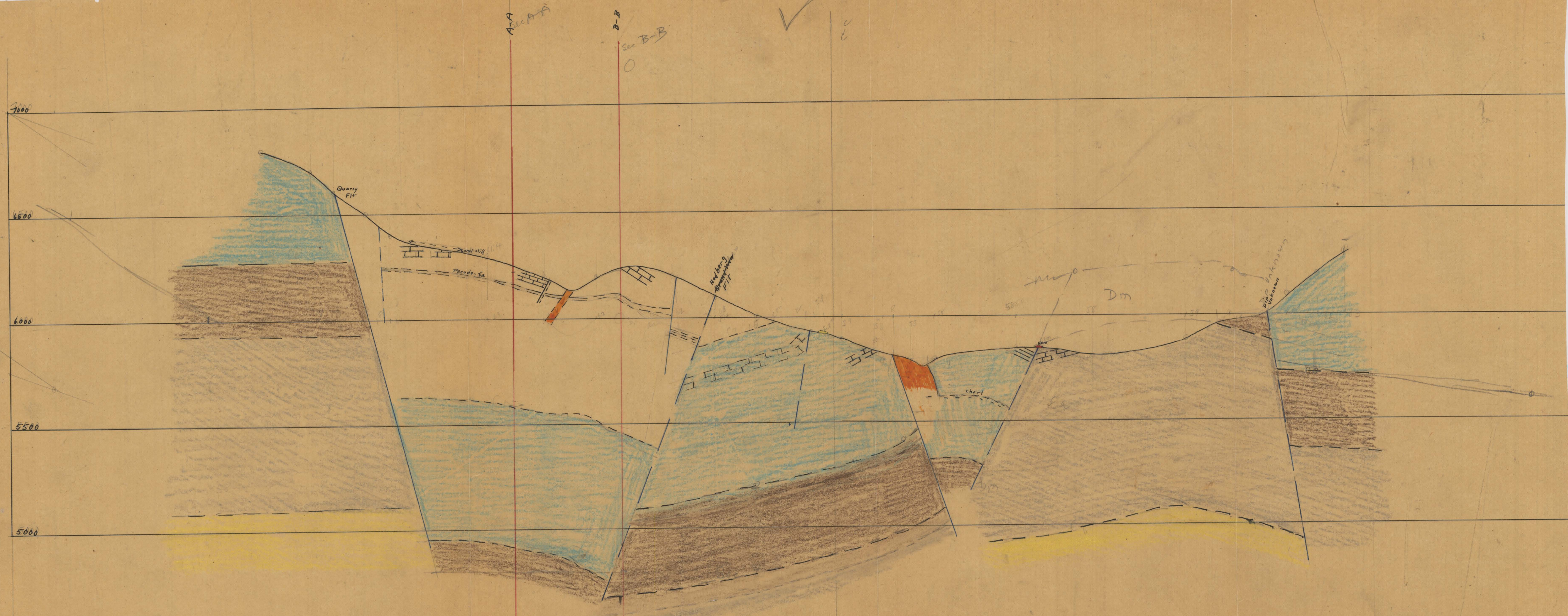
1. Level: Surface.
2. Object: To explore the Southern Bowl, in the hanging wall of the Hedberg fault, at the Martin and upper Abrigo horizons, and to test the footwall of the Hedberg fault at the Parting quartzite horizon.
3. Location and Footage: From Location A, same set-up as for No.4, drill a hole bearing N 57°W, with an inclination depending upon the dip of the Hedberg fault as shown in No. 4, but so selected as to reach the fault slightly below the Escabrosa-Martin contact.
4. Remarks: If the dip of the Hedberg fault is shown to be less than 60°, it will probably be advisable to drill No.5 far enough to test the Parting quartzite in the footwall of the fault, and then move to point B, whose coordinates are lat. 5800, dep. 1940, and drill a vertical hole directly into the Southern Bowl.
5. Map References: Surface plan; Sections 5, B.


AL HASSIN
TWIGHLIGHT
11000
10000
BACKBONE
BLACK PRINCE
9000
8000
7000
6000
5000
4000
3000
1" = 300'
N
Section 1
2
3
4
SOUDAN
CONTACT
Cn
Ce
ODEN
GREENE
MOONLIGHT
MAGANESE
SILICA
Єb
CALCUTTA
WORCESTER
KITE
BUCK
Dm
D.D. hole
BISBEE
B.C. DUNLAP No 1
B.C. DUNLAP No 2
LOVERS LEAP No 1
LOVERS LEAP No 2
SUMMIT
ORPHAN BOY No 2
Qal
176 Deep
Cliff Bed
SUMMIT No 2
SUMMIT No 3
SADDLE No 1
SADDLE No 2
Ps
GRAND VIEW No 2
GRAND VIEW No 35
Єa
ALFREEDA
CLIFF
NORTH STAR No 1
NORTH STAR No 2
NORTH STAR No 3
Middle Dm
BONITA
Sec 2+
Sec 3+
Unaltered ls
BISBEE
WEST
FAULT
5400
5500
5600
5700
5800
5900
6000
6100
6200
6300
6400
6500
6600
6700
6800
6900
7000

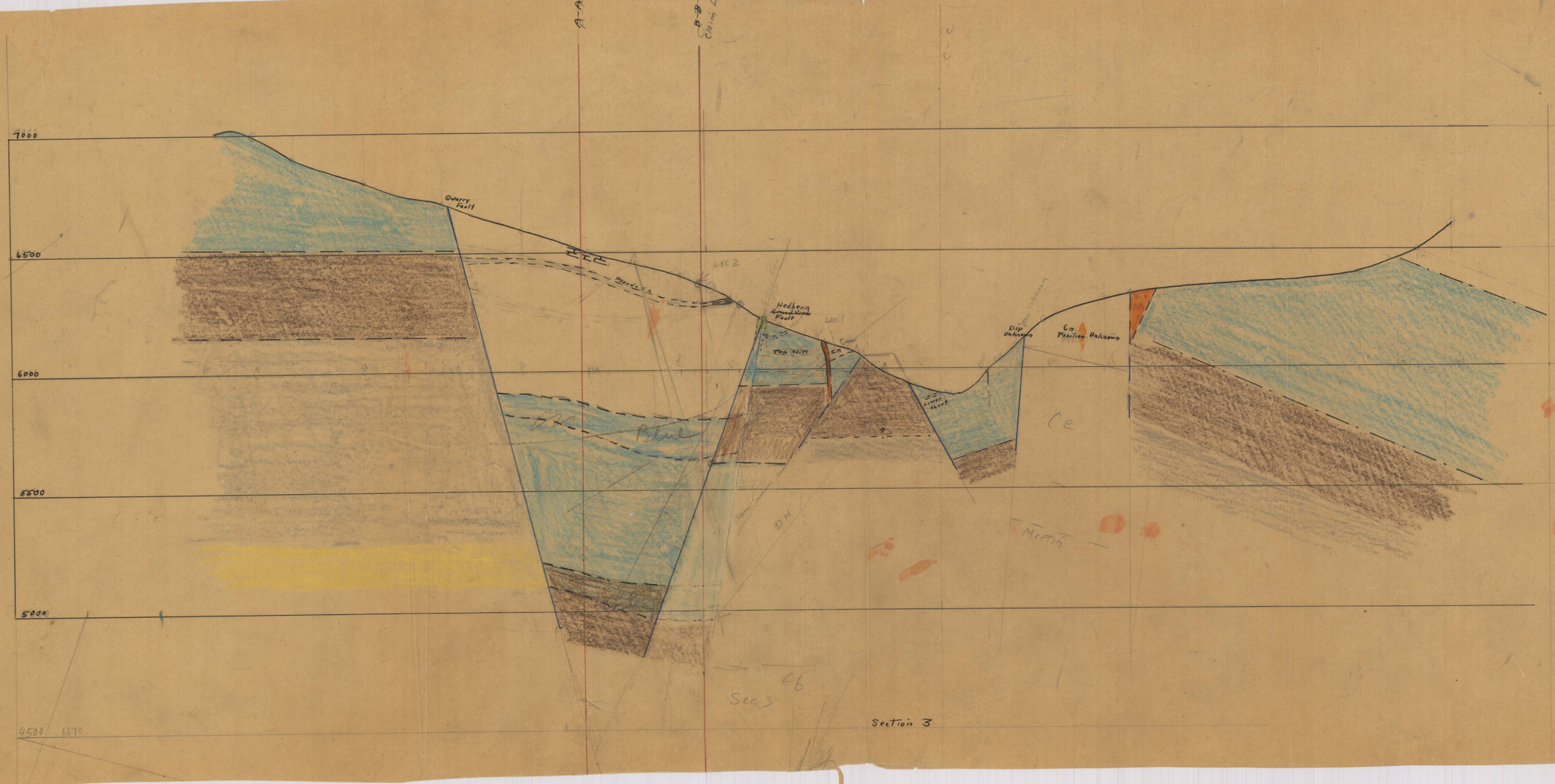

Dm
Dm
Ca
Ca
Pisolo-Kalk
Graben
Cn
Ca
Ca
Sec. C

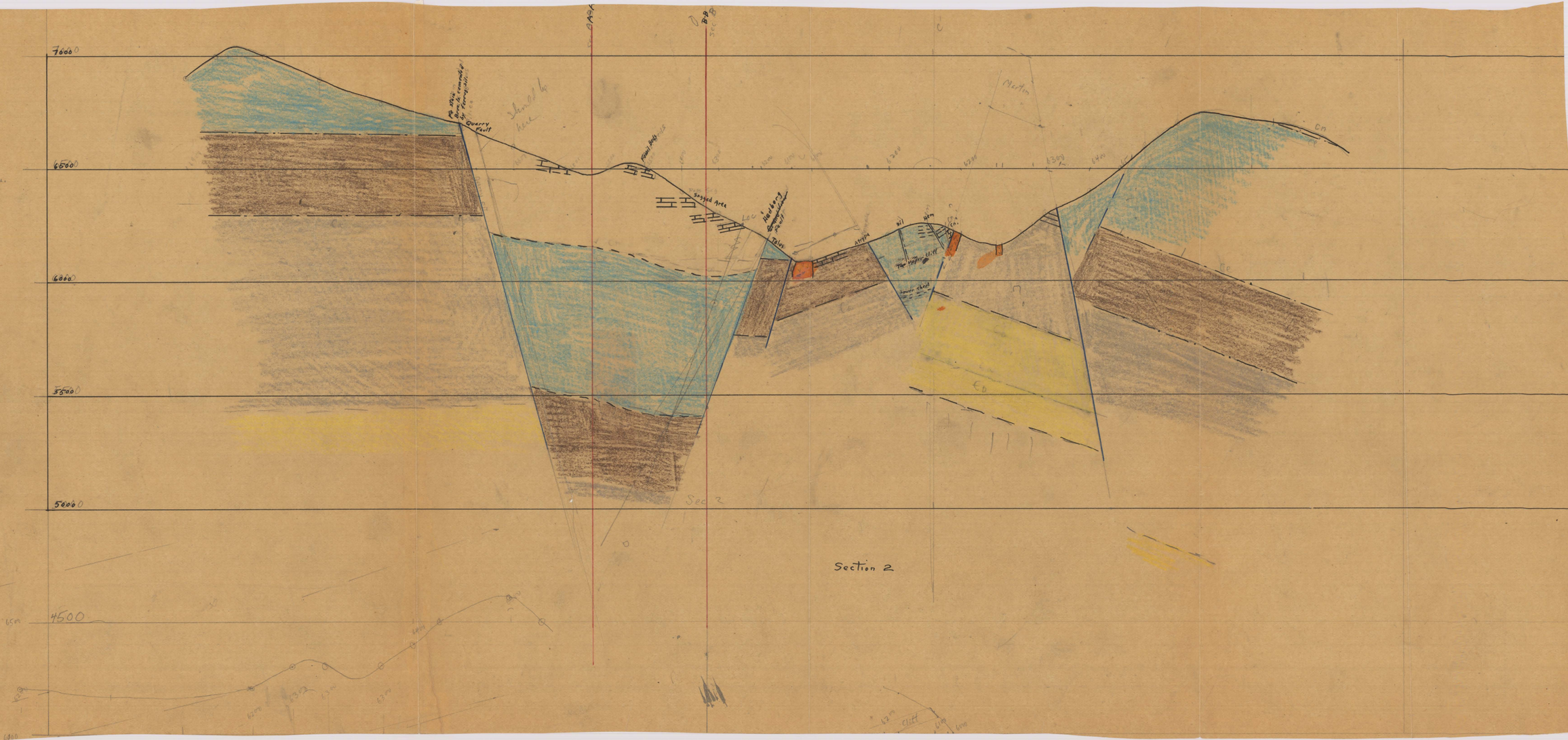
Beds sagged apart
Upper Ce Cliff
Worcester Fault
Dark Fossil Beds
B-B
Dark Fossilit Beds
E Branch Quarry Fault
Worcester Fault
Calcutta Fault
BISBEE WEST FAULT
A-A

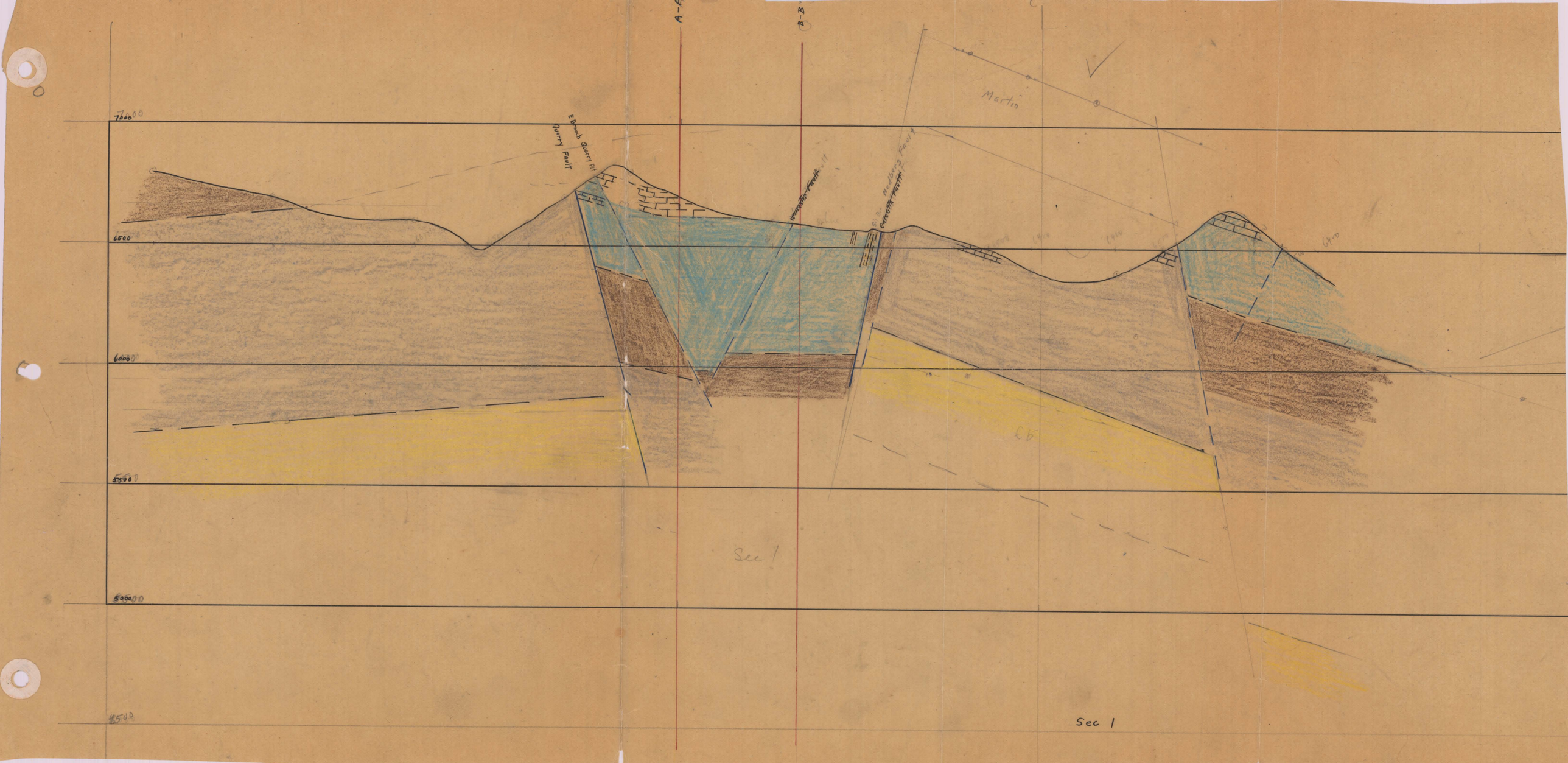

A-A
B-B
7000
6500
6000
5500
5000
4500
4000
Quarry Fault
Hedberg Fault
Topkick
Lover's Leap Fault
No 3?
No 4
No 5?
A
B
DH
DM
Ce
Cb
Sec 5


A-A
Sec A-A
B-B
Sec B-B
7000
6500
6000
5500
5000
4500
Quarry Flt
Coral cliff
Pseudo-fa
Hedberg
Grand View
Flt
Dm
chert
Dip Unknown

Section 4


A-A
B-B
7000
6500
6000
5500
5000
4500
Quarry Fault
Hedberg Conglomerate Fault
Top Cliff
Dip Unknown
Dip Positive Unknown
Blue
Sec 3
Section 3


7600
6500
6000
5500
5000
Quarry fault
Fault blocks
Talus
Section 2


A-A'
B-B'
7000'
6500
6000
5500
5000
4500
E. Branch Quarry Fault
Quarry Fault
Martin
Sec 1
Sec 1