UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

MINERAL INVESTIGATION OF THE HIGHLAND RIDGE ROADLESS AREA, WHITE PINE COUNTY, NEVADA

By
S. Don Brown

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This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

FOREWORD

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a mineral investigation of the Highland Ridge Roadless Area in the Humboldt National Forest, White Pine County, Nevada. The Highland Ridge Roadless Area was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

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By S. Don Brown, Bureau of Mines

INTRODUCTION

During the summers of 1980 and 1981 the Bureau of Mines made a field investigation of the Highland Ridge Roadless Area, White Pine County, Nev. (fig. 1) as part of a joint effort with the Geological Survey to make a mineral assessment of the area.

Prior to field investigations a comprehensive background search was conducted on the geology, mines, and mineralized areas in and near the roadless area, and people known to have information concerning mining activity and mineralized areas were consulted. Mining-claim location notices were examined at the White Pine County Courthouse and at the Nevada State office of the Bureau of Land Management.

Mines, prospects, and mineralized areas were investigated within and about 1 mi beyond the boundary of the roadless area. Samples collected were chip, grab, specimen, channel, and stream pan-concentrate. All assay results, including spectrographic analysis and detailed sample descriptions, are available for inspection at the Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, Colo. 80225.

Location, size, and geographic setting

The Highland Ridge Roadless Area includes a part of the southern Snake Range in the Humboldt National Forest in eastern White Pine County, Nev., and encompasses 76,017 acres. The rugged northerly trending Snake Range is bounded on the west by Spring Valley and on the east by Snake Valley. The Wheeler Peak Roadless Area lies just north of the Highland Ridge Roadless Area. Lincoln Peak (11,597 ft) is the highest point in the Highland Ridge

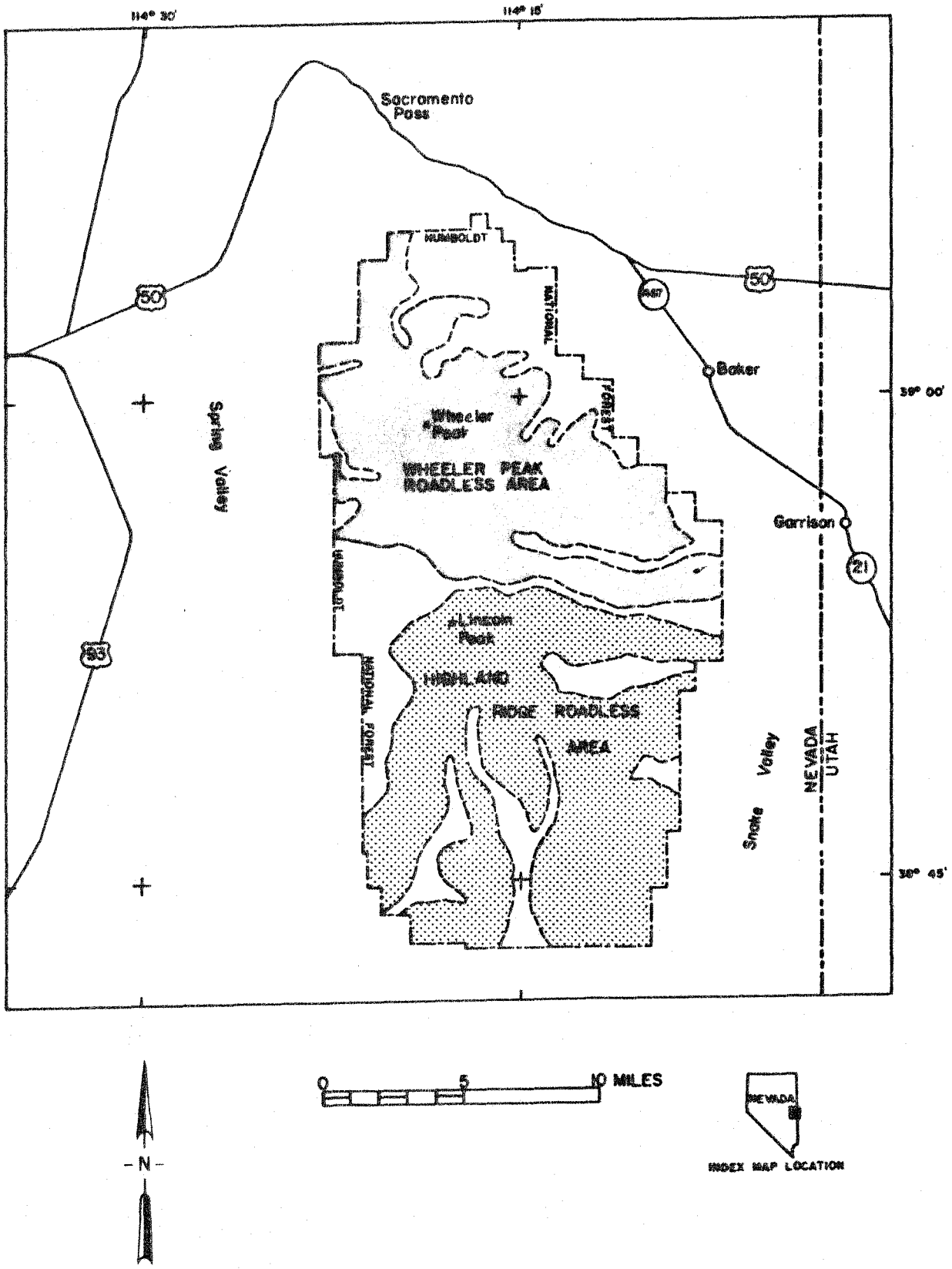

Figure 1.--Index map of the Highland Ridge Roadless Area and vicinity, White Pine County, Nevada.

Roadless Area; the lowest altitude is 6,200 ft at the southwest border of the roadless area, near the base of the Snake Range.

The Utah State boundary is 3 mi east of the roadless area (fig. 1). Baker, Nev., and Garrison, Utah, are the only permanent communities in the immediate area. The nearest main population centers are Ely, Nev. (about 35 mi northwest), and Delta, Utah (about 85 mi northeast). U.S. Highway 50 crosses the Snake Range at Sacramento Pass about 17 mi north of the Highland Ridge Roadless Area, and U.S. Highway 93 is about 10 mi west. Nevada Highway 487 and Utah Highway 21 are about 6 mi distant from the roadless area, on the east side. From these major highways, numerous dirt roads pass near the roadless area boundary.

Mining activity

Within the Highland Ridge Roadless Area, a short adit and two small surface cuts in Arch Canyon in the Lexington mining district are the only known surface evidence of mining activity; however, in the Shoshone mining district on the west side of the roadless area, the eastern extension in the Chief-Silver Bell underground workings may extend inside the roadless area.

Outside the Highland Ridge Roadless Area and near the boundary, mining activity in the early days was extensive. Both silver and tungsten were mined.

In the Shoshone mining district, mining began in 1869 with the discovery of silver in the Chief vein. But, the vein did not prove profitable and mining activity was abandoned in 1876 (Lincoln, 1923, p. 254). In 1915, tungsten ore (scheelite) was discovered in the Shoshone district and was mined until 1918 when the price of tungsten fell below production costs (Newman and others, 1950, p. 3-4). In 1936, mining resumed and tungsten was produced nearly every year until 1957 when its price again fell below production costs.

The period of most intensive mining in the Shoshone district was 1940-45. Mines that have produced in the Shoshone district that are near the roadless area are the Chief-Silver Bell, Oriole, West Everit, East Everit, Tungsten Queen, Hill Top, and Tony.

In the Lexington district, some small-scale mining activity in 1883 was reported (Smith, in Hose and others, 1976, p. 56), but no production records are available for that time. Tungsten was mined at the Lexington Mine in 1918 and during 1941-42 (Smith, in Hose and others, 1976, p. 76). Tungsten was also produced at the Good Hope Mine in the Lexington district.

At the time of the present field investigation, no evidence was found of recent mining activity inside the Highland Ridge Roadless Area. Outside and close to the boundary, the Lexington and Good Hope Mines had been active recently--work consisted mainly of extensive backhoe trenching and surface bulldozing.

MINING DISTRICTS AND MINERALIZED AREAS

The Highland Ridge Roadless Area lies within parts of the Lexington, Shoshone, and Washington mining districts (Hose and others, 1976, pl. 2). Within these three mining districts, large blocks of unpatented claims and several patented claims lie both inside and outside of the sinuous roadless area boundary. Mining claim information was current as of February 1981.

The Lexington mining district covers the northeast quarter of the roadless area, and mining and prospecting occurred at three sites in this area. The workings are: 1) prospects in Arch Canyon, 2) the Good Hope Mine and prospects near the headwaters of Lexington Creek (fig. 2), and 3) the Lexington Mine (fig. 3) also located near the headwaters of Lexington Creek, midway between the Arch Canyon prospects and Good Hope Mine.

The most extensive mining near the Highland Ridge Roadless Area took place in the Shoshone mining district on the west edge of the roadless area. Mines in the Shoshone district that are near the roadless area are the Chief-Silver Bell, Oriole, West and East Everit, Tungsten Queen, Hill Top, and Tony.

No mine workings were found in the part of the Highland Ridge Roadless Area that includes the Washington district. For information regarding mining in the Washington district, outside of the roadless area, see Kluender (1983). Mineral commodities, geologic setting and control, size of veins or outcrops, and development and production for prospects and mines in Highland Ridge Roadless Area are tabulated in table 1.

Mineralized areas within the Lexington district

Arch Canyon prospects

In Arch Canyon, a southward-dipping, east-trending quartz vein, as much as 7 ft thick, crops out discontinuously for about 300 ft along strike. The vein is exposed inside the roadless area, 100-200 ft south of the roadless area boundary. Disseminated sulfide minerals containing copper, lead, silver, and zinc are present in two small cuts along the vein (samples 39-41, table 9). Assays of samples from a nearby adit in the vein have negligible metal values. The mineral exposure at the surface is small, but the mineralization may extend along strike and down dip. If the mineralization is present in the vein at depth, a resource exists. Workings here are small and production was probably small or none.

Good Hope Mine area

The Good Hope Mine and prospect pits (table 2; fig. 2) are in a narrow corridor surrounded by the roadless area boundary, and the workings are about 100-1,700 ft outside the boundary. Because of a lack of surface

exposures, the extent of the mineralized zones could not be traced into the roadless area. Production from the small workings at the Good Hope probably was small and came from quartz-calcite veins up to 3 ft thick that parallel the limestone bedding; assays from these veins gave low percentages of tungsten. Scheelite exposed in colluvium and in dump material from an inaccessible adit about 300 ft outside the roadless area boundary, however, appears to be more abundant, when viewed under a blacklight, than assays indicated. Tungsten mineralization may occur here at shallow depth inside the Highland Ridge Roadless Area.

Lexington Mine

The Lexington Mine (also called the Bonanzy Mine) is geologically similiar to the Good Hope Mine; the scheelite occurs in calcite veins that parallel bedding in the flat-lying limestone. At the Lexington Mine (table 3; fig. 3), the mineralized exposure nearest the roadless area is about 700 ft north of the boundary. There is no surface evidence that this mineralized zone extends into the Highland Ridge Roadless Area. Total scheelite production from the Lexington Mine, through 1942, was valued at $100,000 (Smith, in Hose, 1976, p. 56, 57). Production from more recent years, if any, is unknown.

Platinum and palladium

Several small specks of platinum-palladium were seen in two stream pan-concentrate samples, from Lexington Creek and the South Fork of Lexington Creek (samples 49, 50; pl. 1, table 9). The source of the platinum-palladium is unknown and no likely source rocks were noted upstream from these samples.

Mineralized areas within the Shoshone district

All the mines and major prospects in the Shoshone area are in tungsten and silver-bearing quartz-calcite veins in limestone of Middle Cambrian age. Within the quartz-calcite veins, tungsten and some silver occur in ore shoots; the longest ore shoot is about 900 ft along strike. Post-mineralization faults offset the veins by as much as 400 ft. The veins are as wide as 30 ft but the maximum width of an ore shoot is about 10 ft. The grade of ore mined from the district averaged nearly 1 percent WO_3; WO_3 concentrates were reported to contain as much as 4 oz silver per ton (Lemmon, 1944, p. 9, 10). Production data were reported by Smith (in Hose and others, 1976, p. 77) for the total district, rather than for individual mines.

Chief-Silver Bell Mine

The Chief and Silver Bell Mines (table 4; figs. 4-A, 4-B), just west of the roadless area, were once separate workings but joined underground after extensive mining (fig. 4-C, shows workings on an outcropping mineralized part of the Chief vein). The Chief vein was mapped for about 4,000 ft along its eastward strike; the dip varies between 40° to 75° north. The easternmost adit in the Chief-Silver Bell Mine may extend several hundred feet inside the roadless area, depending upon the exact boundary location. An inferred resource of more than 1,000 units of tungsten (short ton units), from ore of 0.5-1 percent WO_3, are present inside the roadless area, on the basis of exposures in this adit. Because of the continuity of the Chief vein, and of ore shoots within the vein, a much larger tonnage probably exists deeper inside the roadless area in unexplored portions of the vein. Because younger sedimentary formations overlie the ore-bearing limestone formation, the vein could not be traced on the surface inside the roadless area. The Chief-Silver Bell Mine was the largest tungsten producer near the Highland Ridge Roadless Area.

Oriole Mine

The Oriole Mine (table 5; fig. 5) is about 4,500 ft west of the boundary of the Highland Ridge Roadless Area; however, the vein extends eastward and is shown by Lemmon (1944, fig. 2) to crop out within about 1,500 ft of the roadless area boundary. Samples 133 and 134 (pl. 1) were taken on the eastern extension of the vein, and assays show tungsten is present (table 5). This vein probably extends into the roadless area and if so a tungsten resource would be present.

West and East Everit Mines

The West and East Everit Mines are probably on segments of the same vein (table 6; figs. 6-A, 6-B, 6-C). The eastward-trending drift in the East Everit Mine ends about 400 ft west on the approximate boundary of the Highland Ridge Roadless Area, but the vein is covered by overlying sedimentary rocks and could not be traced on the surface closer to the roadless area than several hundred feet. Nevertheless, the probability is good that this segment of the vein persists along strike into the roadless area at depth. The West Everit Mine is thought to be on the same vein as the East Everit, but farther west of the roadless area. The East Everit Mine was second only to the Chief-Silver Bell Mine in production near the Highland Ridge Roadless Area. The East Everit was a large producer (more than 20,000 units of WO_3) and the West Everit was a moderate producer (1,000-20,000 units of WO_3).

Tungsten Queen Mine

At the Tungsten Queen Mine (also called the Canary Yellow Mine) a cross-cut intersected an eastward trending vein (table 7; fig. 7). The end of the easternmost drift on this vein is about 400 ft west of the Highland Ridge Roadless Area, but on the surface the vein extends about 500 ft into the

roadless area. Although the vein had some high-grade ore, no ore was seen in its eastward extension (Lemmon, 1944, p. 15); nevertheless, a good possibility exists that more ore shoots occur within this vein at depth, both inside and outside the Highland Ridge Roadless Area. The Tungsten Queen Mine was a small producer (less than 1,000 units of WO_3).

Hill Top and Tony Mines area

The Hill Top Mine (table 8; figs. 8-A, 8-D) is similar to the Tungsten Queen Mine in that a crosscut intersects an eastward-trending vein. The mine is about 4,000 ft outside the roadless area but the vein trends eastward toward the roadless area where it may be present at depth; however, near the roadless area boundary, the tungsten-bearing limestone formation is covered by younger sedimentary rocks and the continuity of the vein into the roadless area cannot be confirmed. The Hill Top Mine was a "moderate producer" of tungsten.

The Tony Mine (table 8; fig. 8-B), southwest of the Hill Top Mine, is a small mine and was a small producer. The vein does not extend into the Highland Ridge Roadless Area.

Northwest of the Hill Top Mine, a 180-ft adit exposes a small tungsten-bearing vein that may be a faulted segment of the Hill Top vein (table 8; fig. 8-C).

Oil and gas

In June 1981, approximately 2-1/2 sq mi of land within the Highland Ridge Roadless Area were under oil and gas leases, and oil and gas lease applications were pending for about 17 sq mi within the roadless area (fig. 9). No oil or gas activity was seen in or near the Highland Ridge Roadless Area during this field investigation.

CONCLUSIONS

On the western side of the Highland Ridge Roadless Area more than 1,000 units of WO_3 are estimated to be present inside the approximate boundary of the roadless area, in the eastern extension of the Chief-Silver Bell Mine. Other similiar tungsten deposits may be present in unexplored parts of this vein, deeper inside the roadless area.

North of the Chief-Silver Bell Mine, other tungsten-bearing veins outside the roadless area trend eastward toward the roadless area, and some of these veins are visible on the surface, near or inside the roadless area. Because of overlying sedimentary formations, and due to a lack of underground exploration on these veins, additional tungsten resources were not noted inside the roadless area; however, the possibility of there being more tungsten resources in these veins at depth, inside the roadless area, is good.

Inside the north-central part of the Highland Ridge Roadless Area, on the east side of the Snake Range in Arch Canyon, two small cuts expose a vein containing copper, lead, silver, and zinc minerals. The mineral exposure at the surface is small, but the mineralization may extend along strike and down dip.

Northwest of the mineral occurrence in Arch Canyon, near the headwaters of Lexington Creek at the Good Hope Mine area, tungsten minerals are present as near as 100 ft outside the roadless area boundary. Owing to a lack of surface exposures, the extent of the mineralized zones could not be traced within the roadless area; however, tungsten mineralization may occur inside the Highland Ridge Roadless Area at shallow depth.

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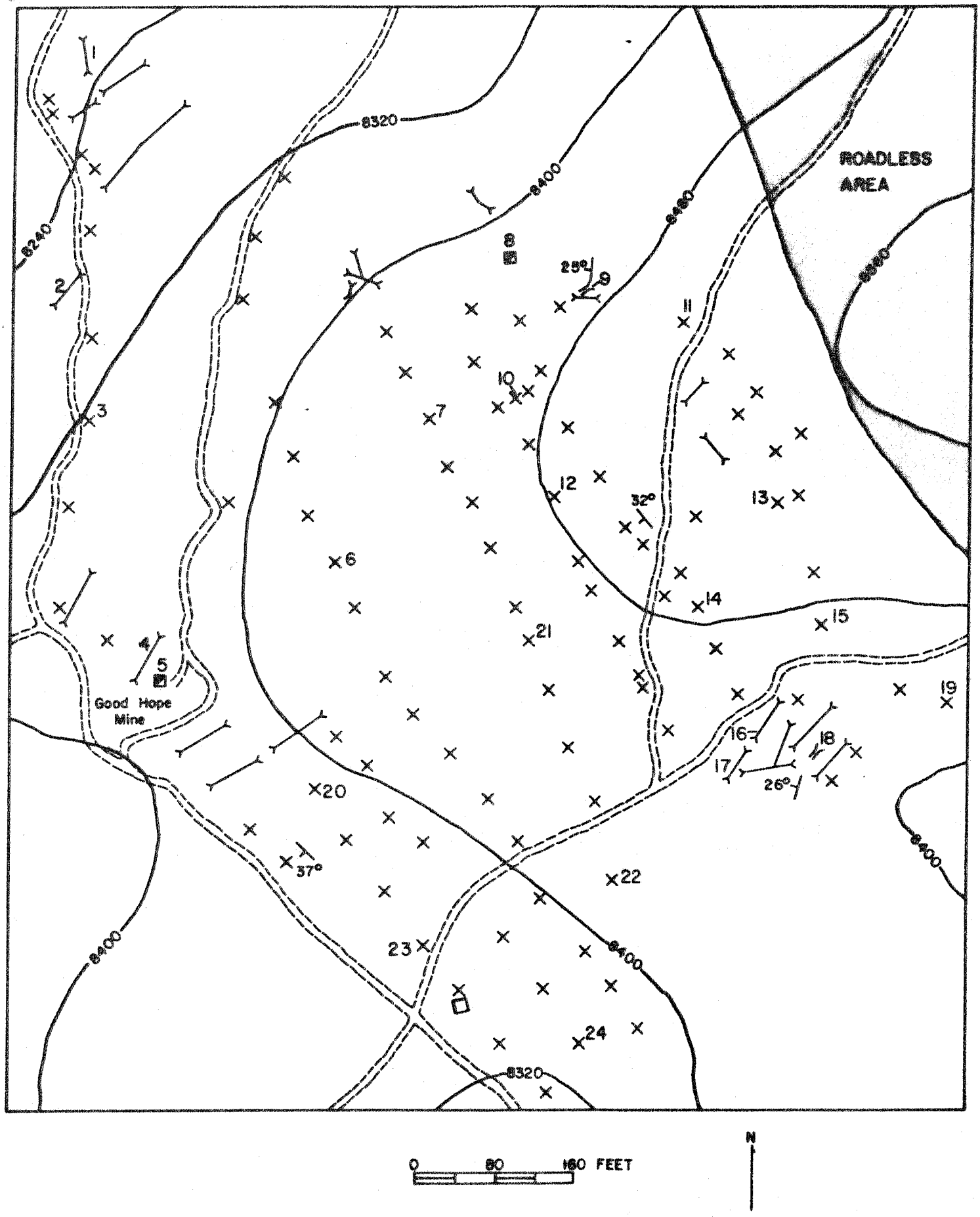


Figure 2.--Sketch map of the Good Hope Mine area showing sample localities 1-24.

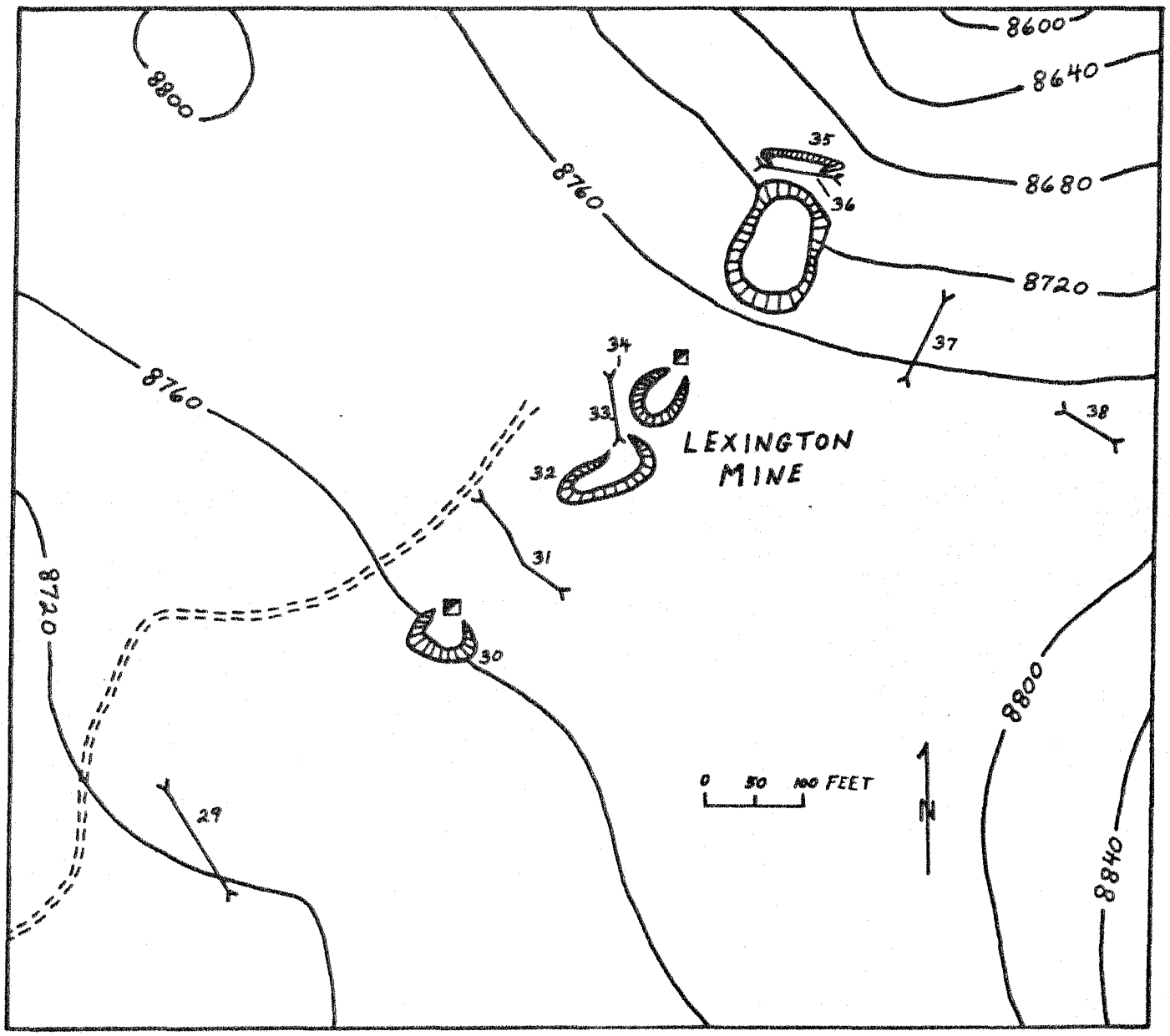


Figure 3.--Sketch map of the Lexington Mine area (outside roadless area) showing sample localities 29-38.

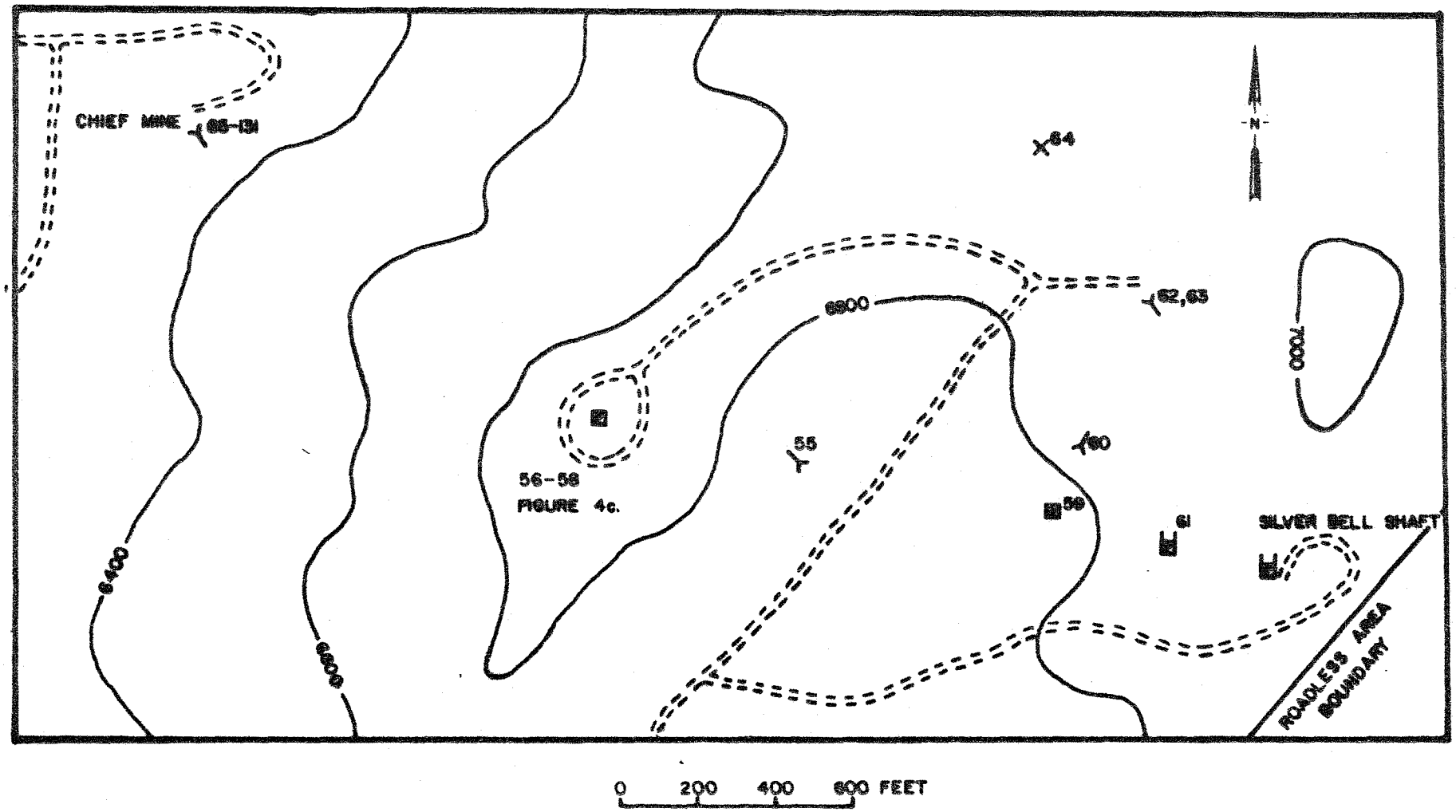


Figure 4-A.--Sketch map of the Chief-Silver Bell Mine area showing sample localities 55-131.

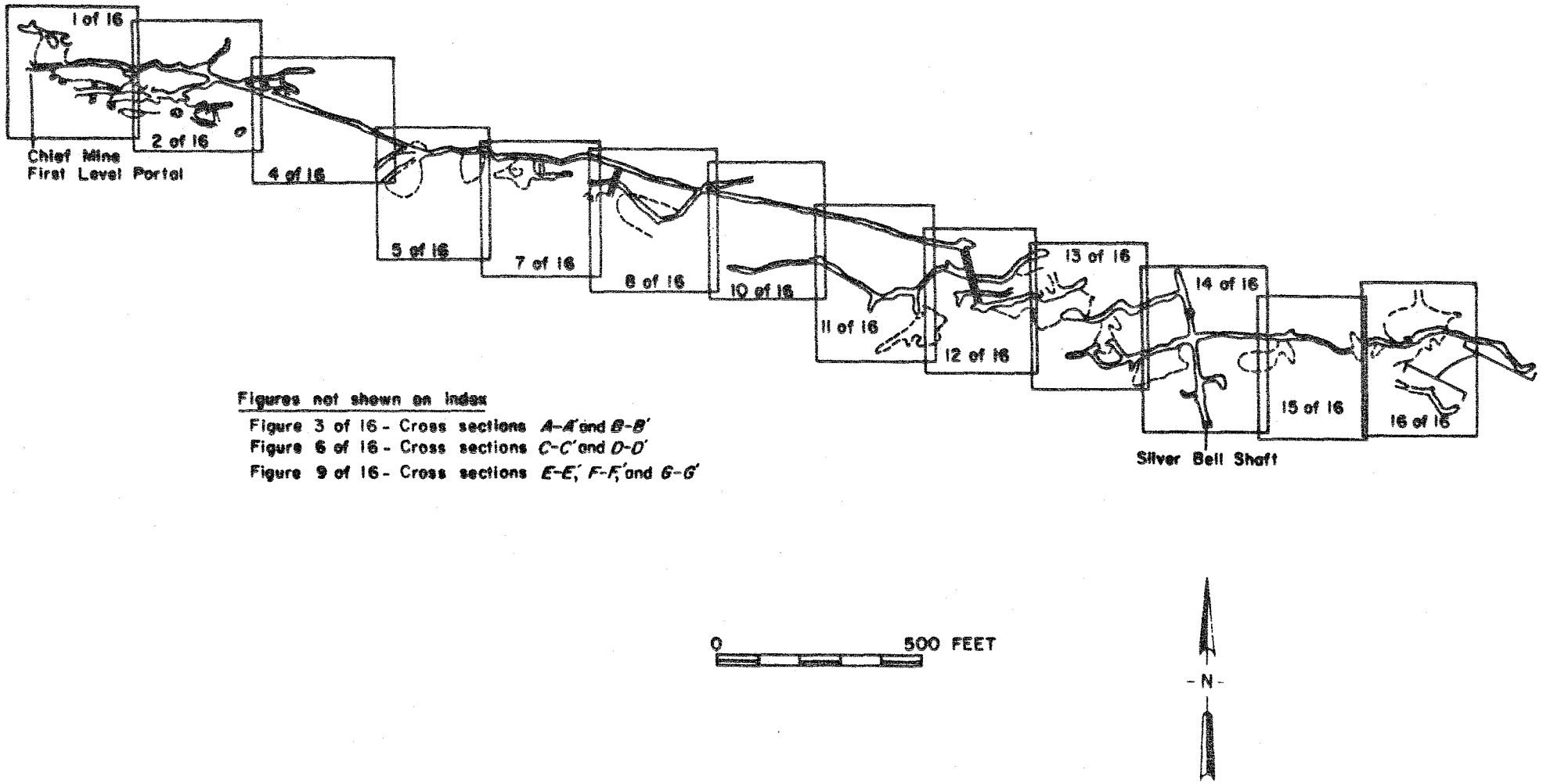
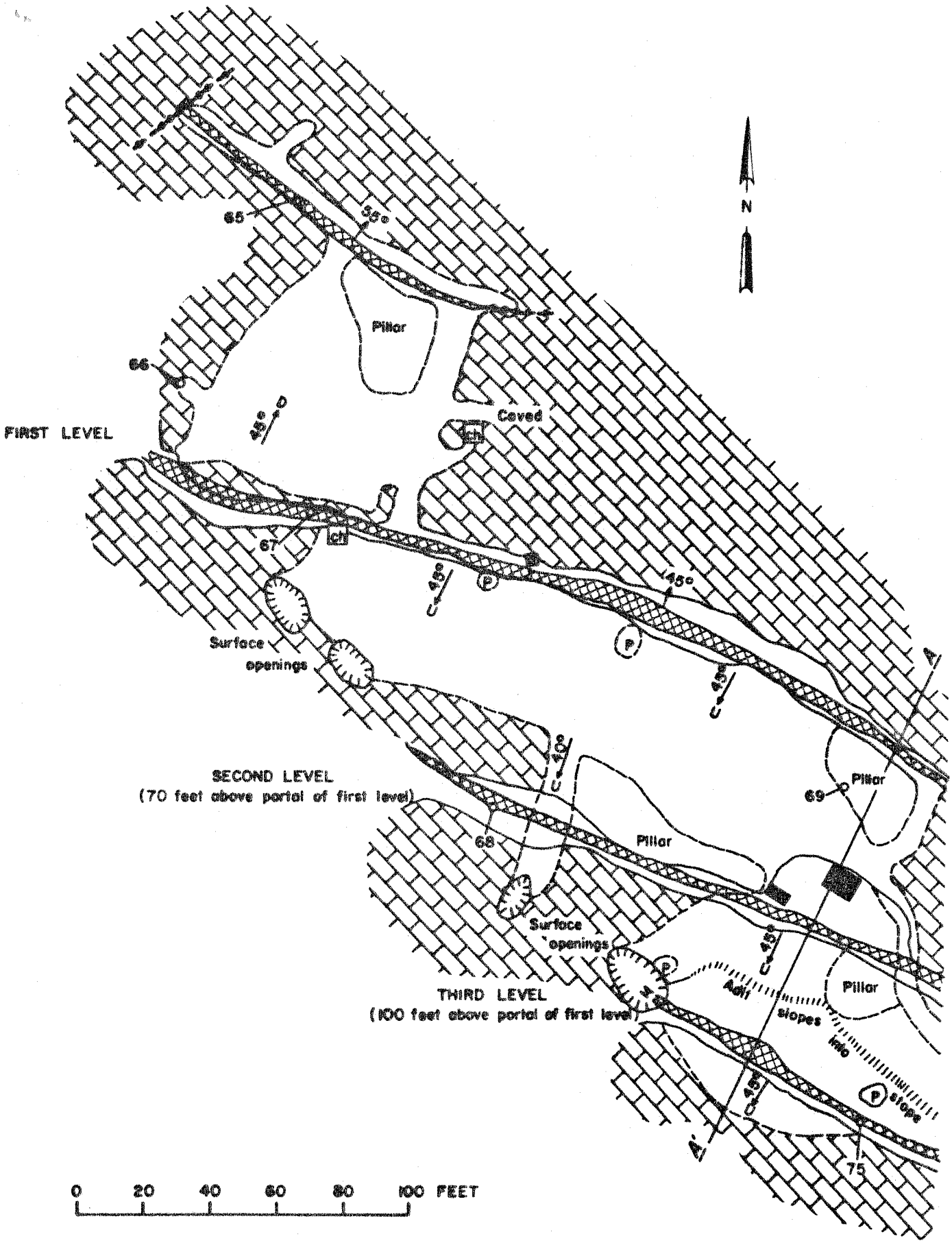


Figure 4-B.--Map of the Chief-Silver Bell Mine showing sample localities 55-131. (Map by Brown with modifications from map of Lemmon (1944).



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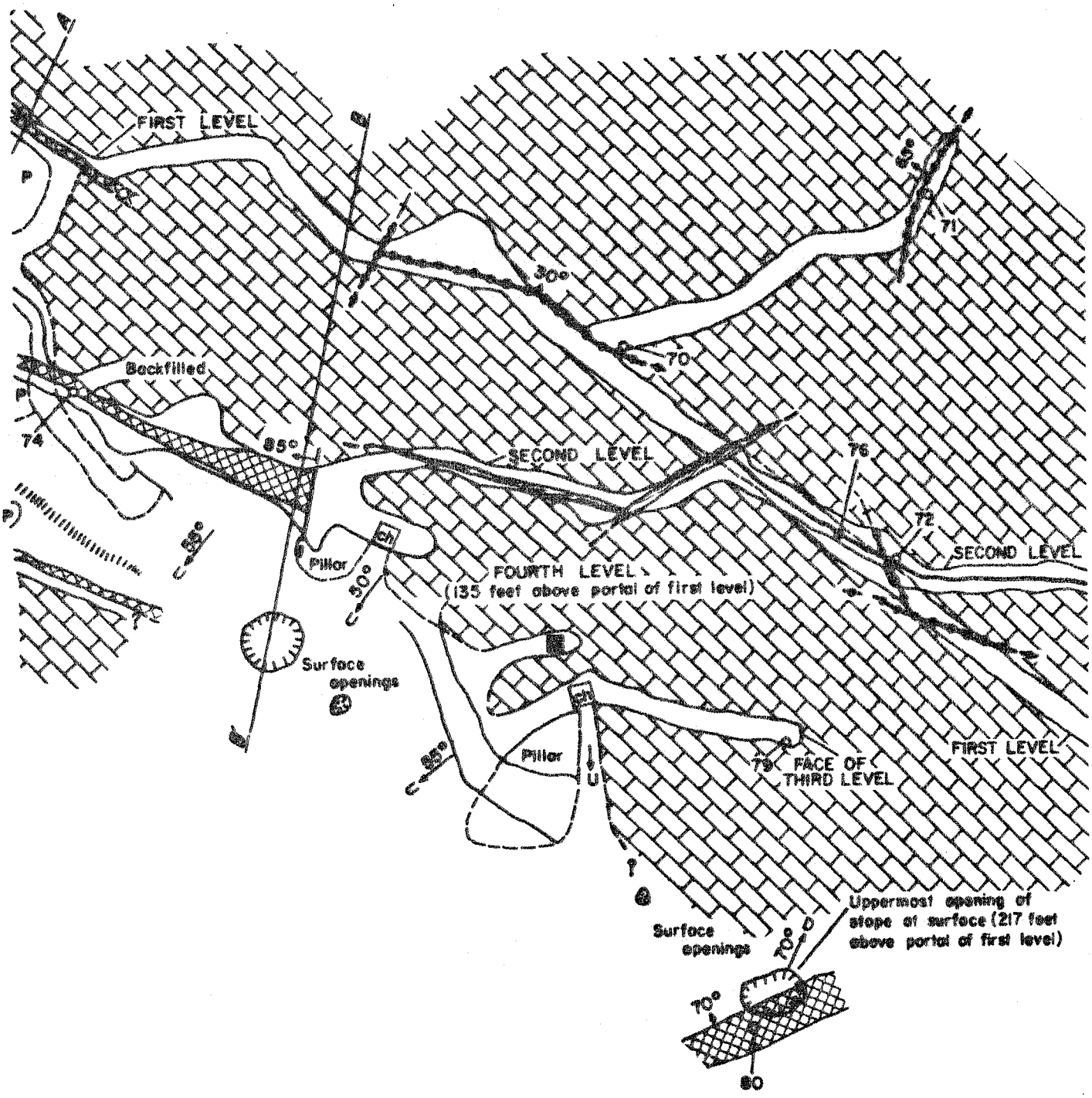

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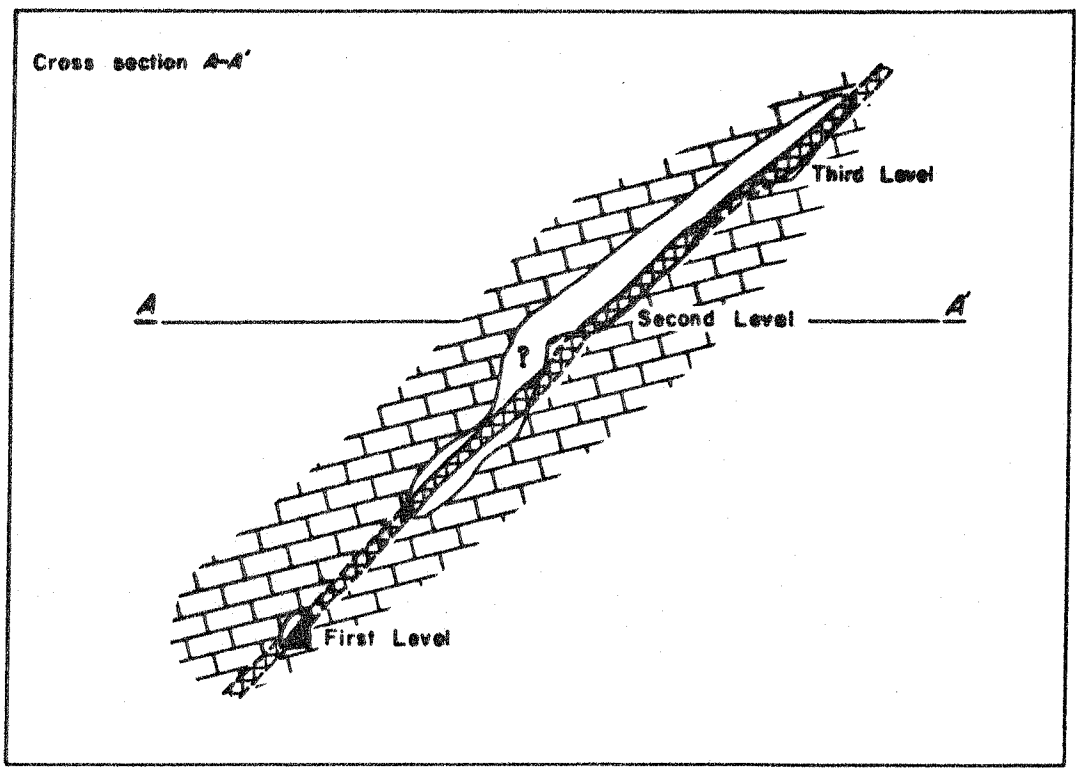

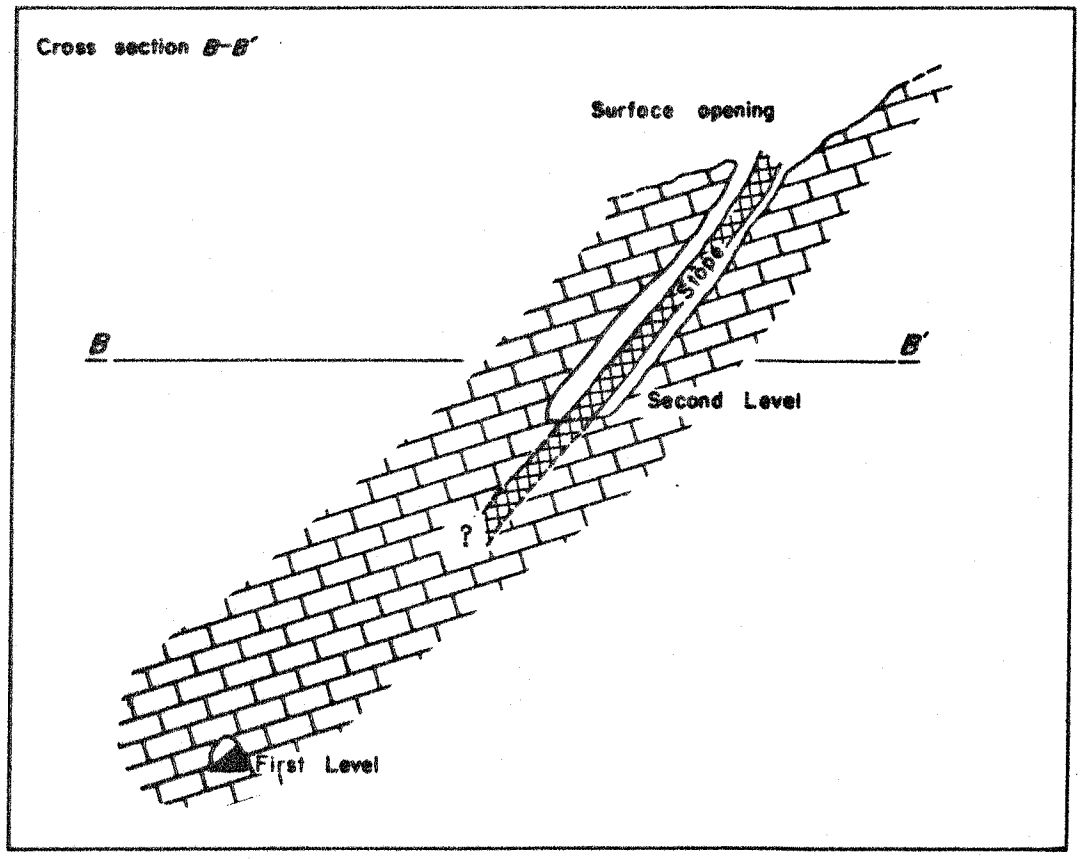

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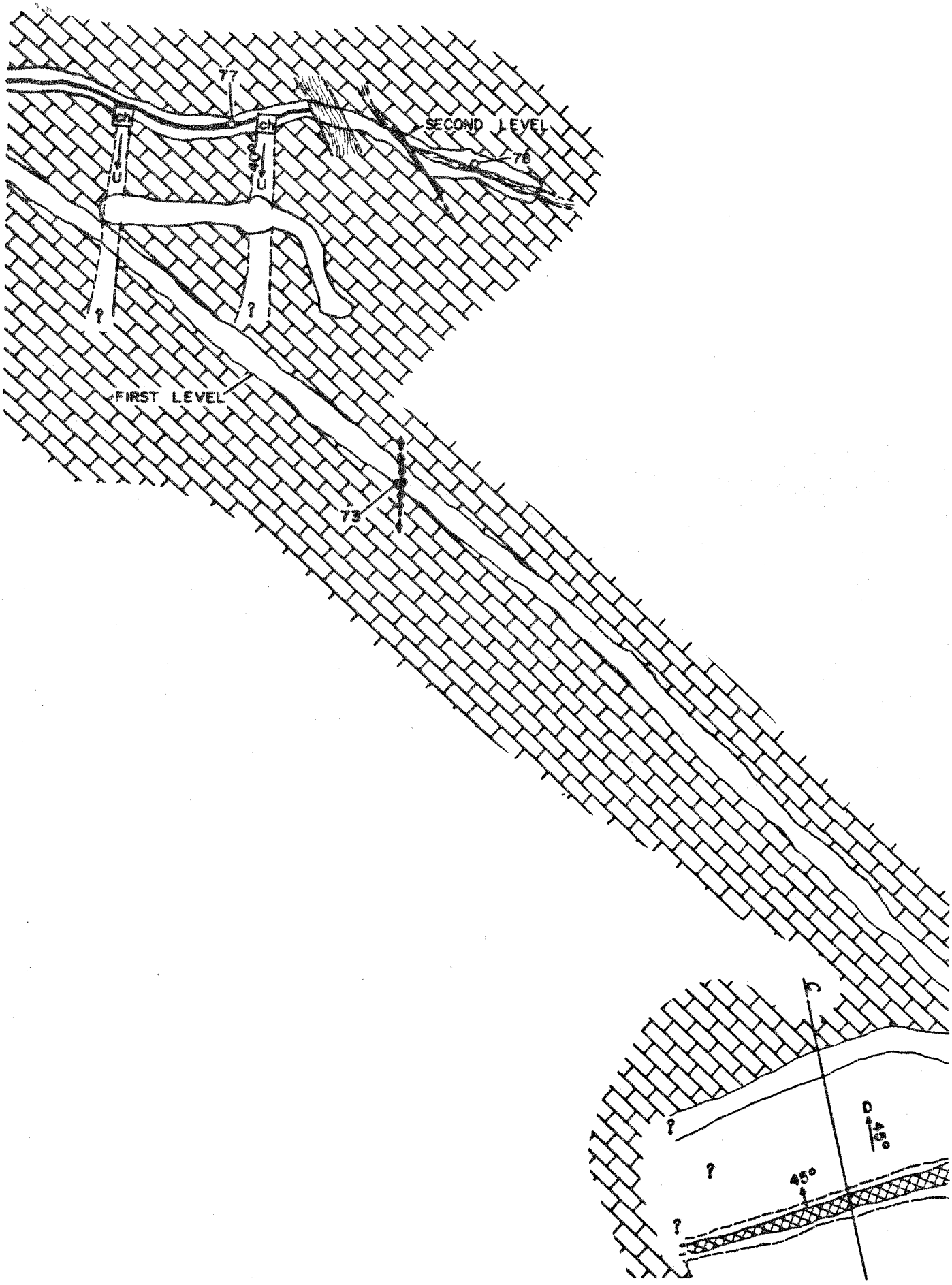

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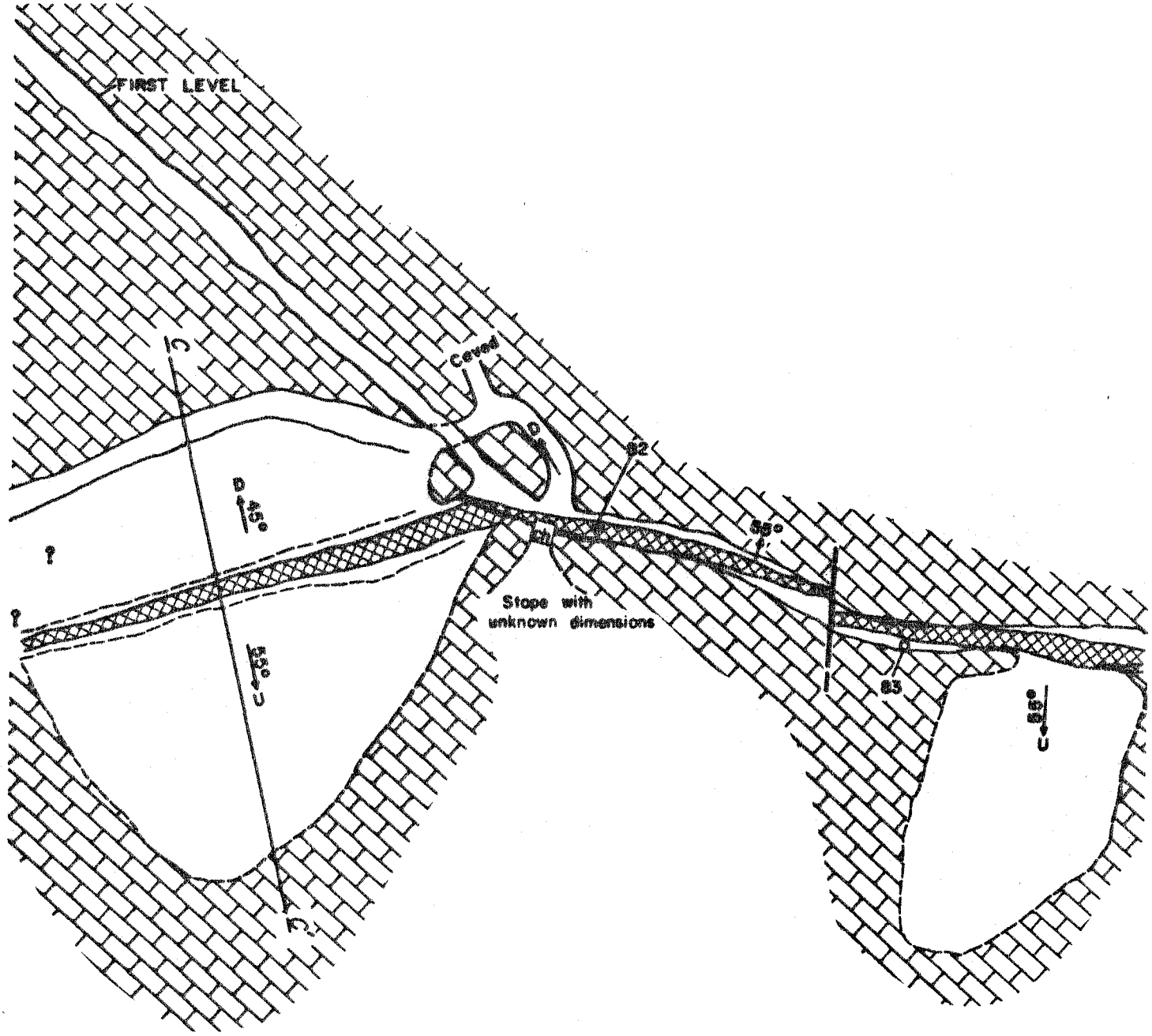

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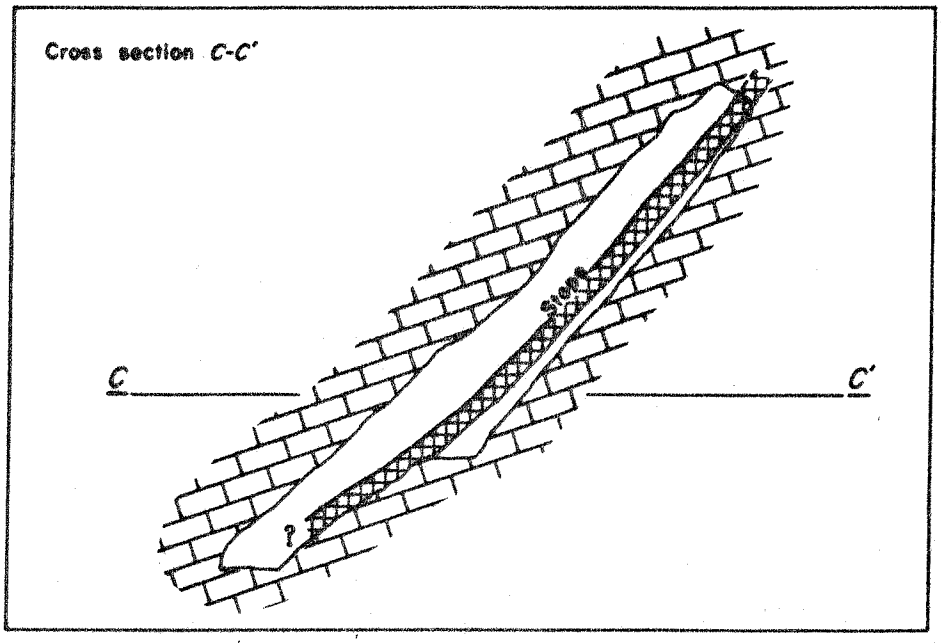

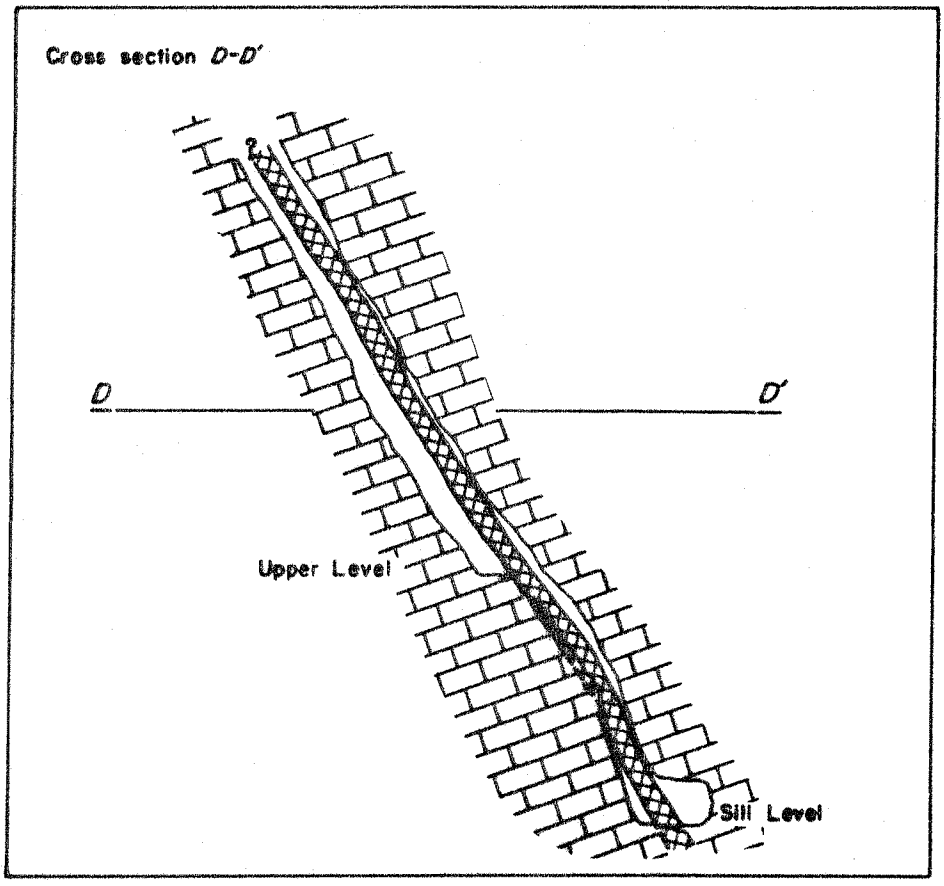

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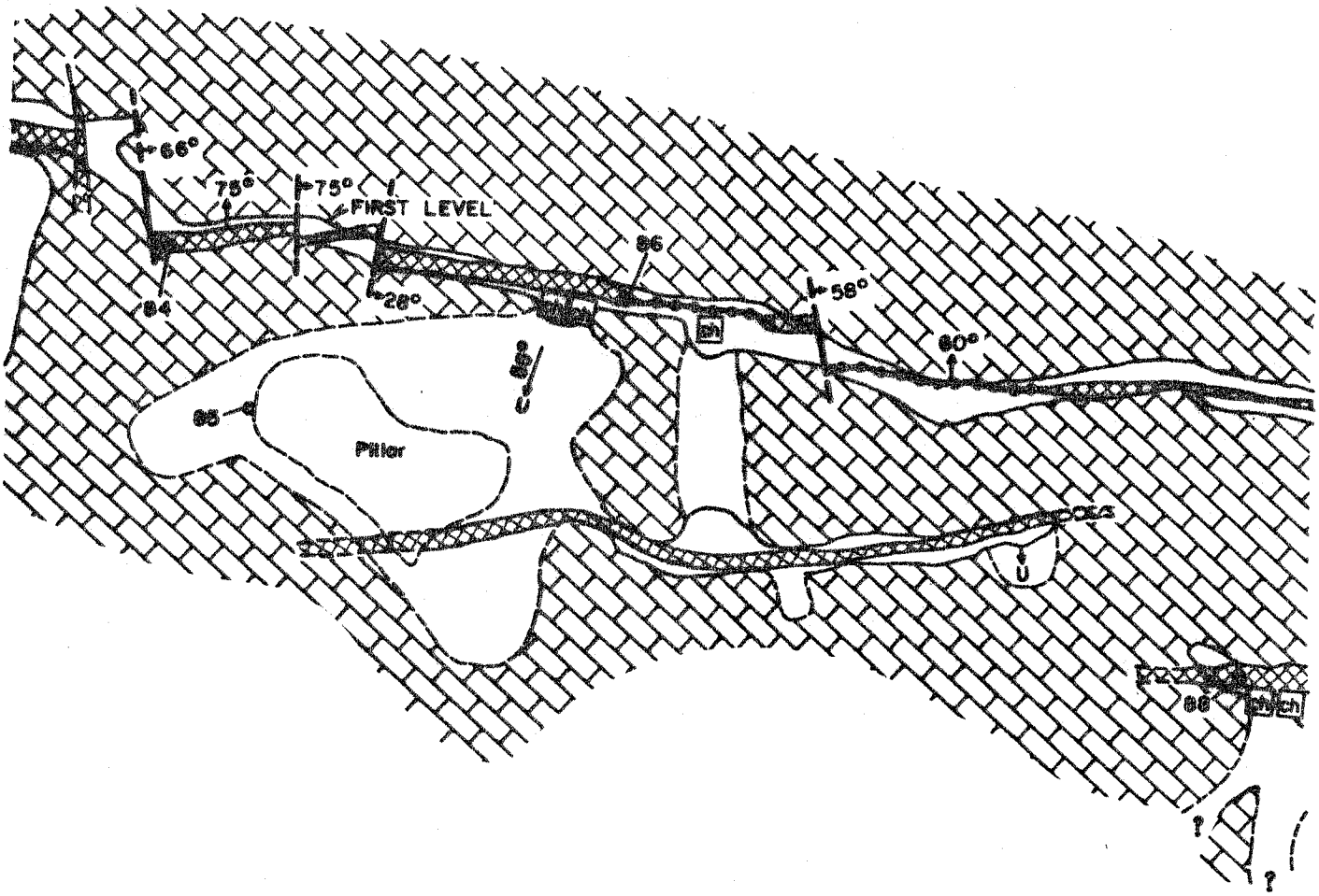

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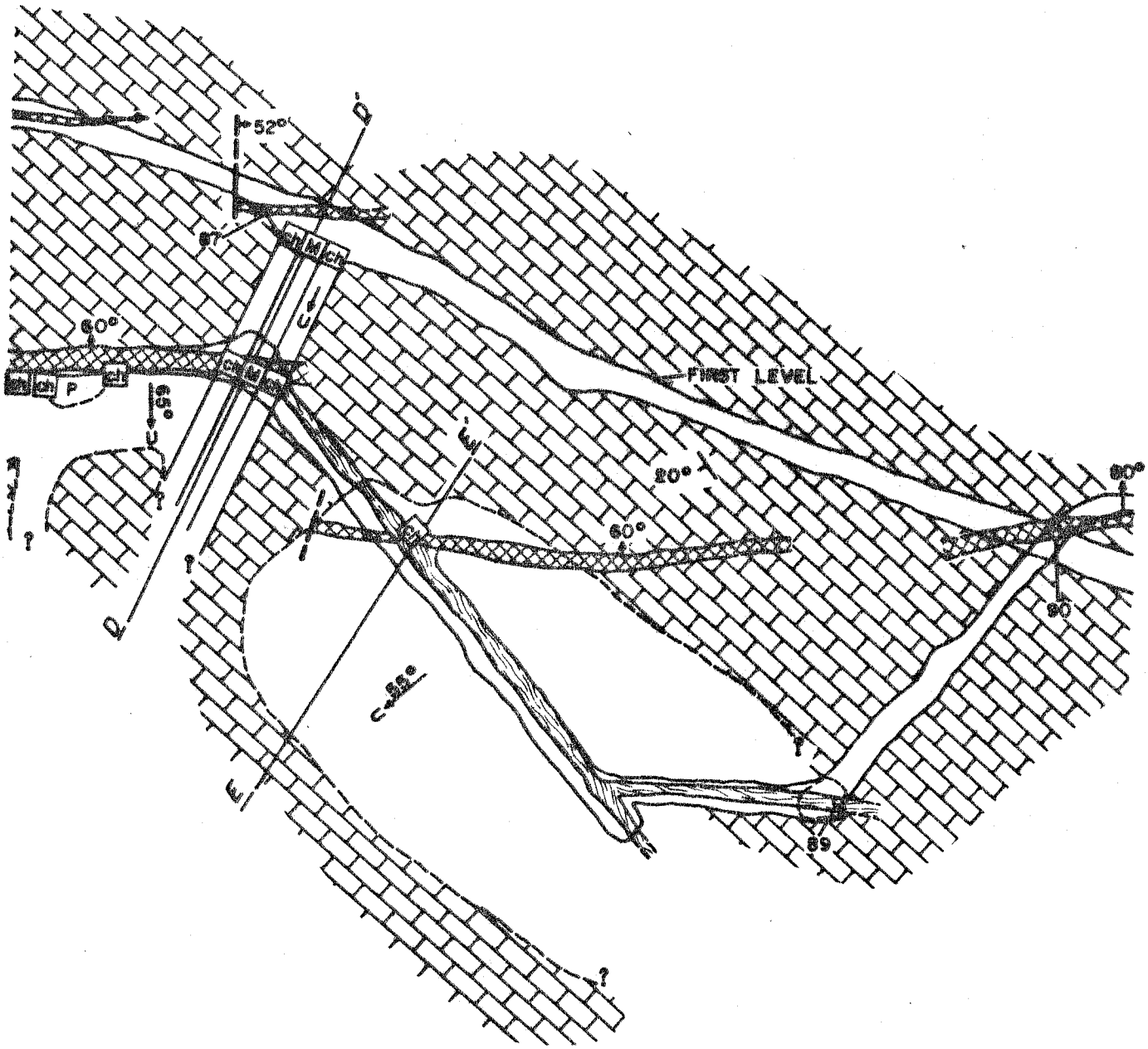

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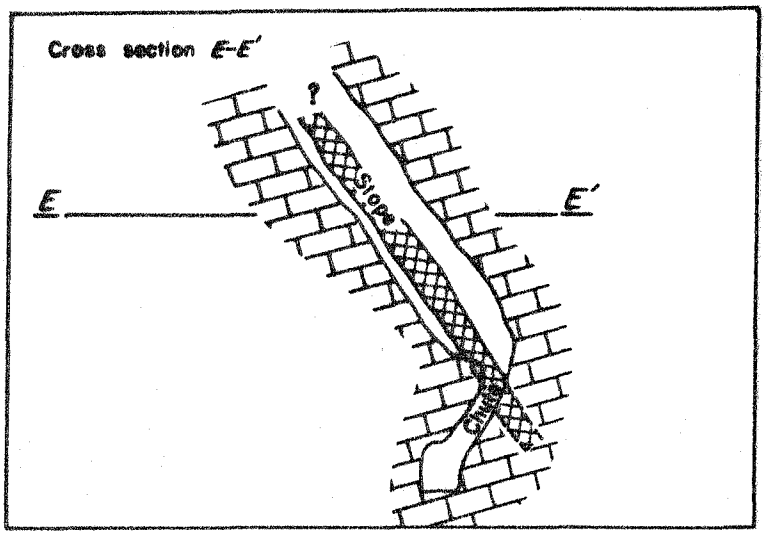

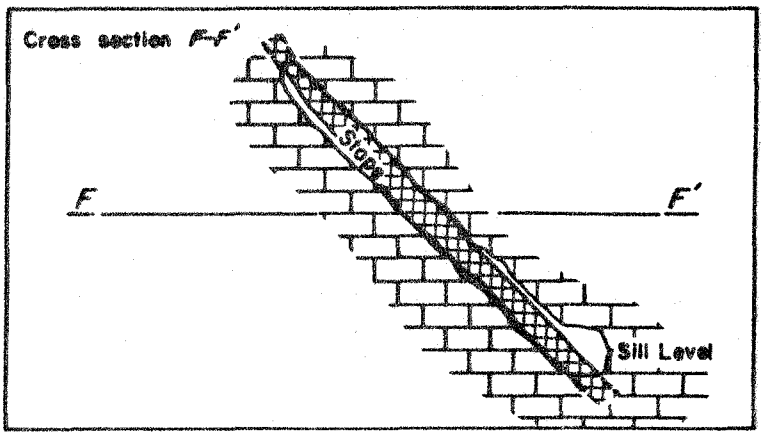

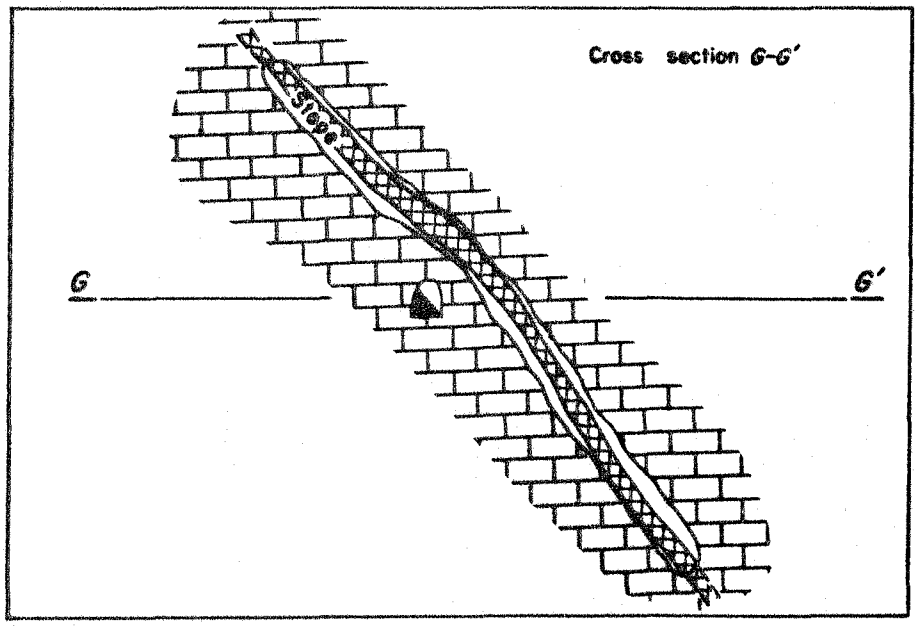

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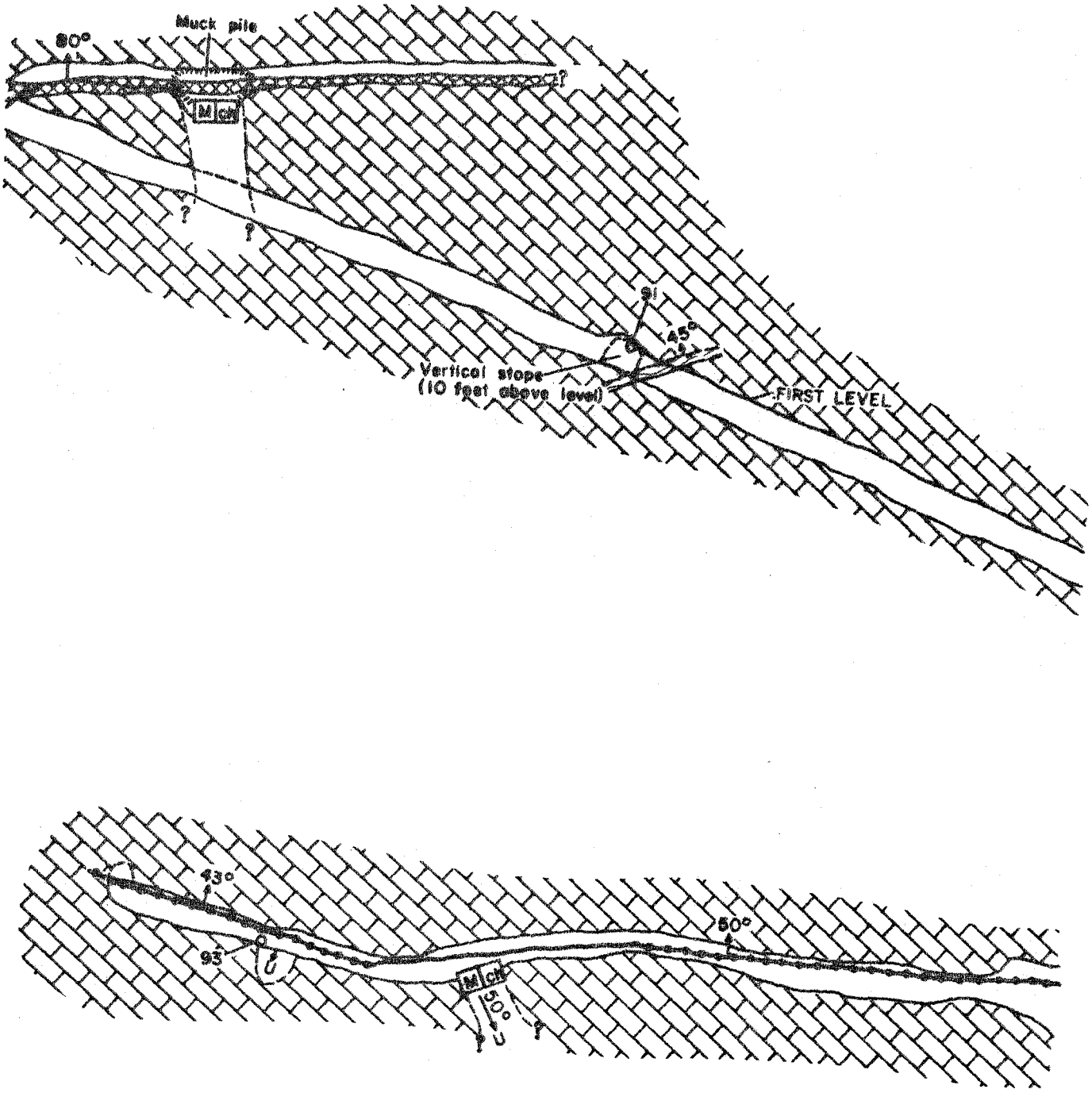

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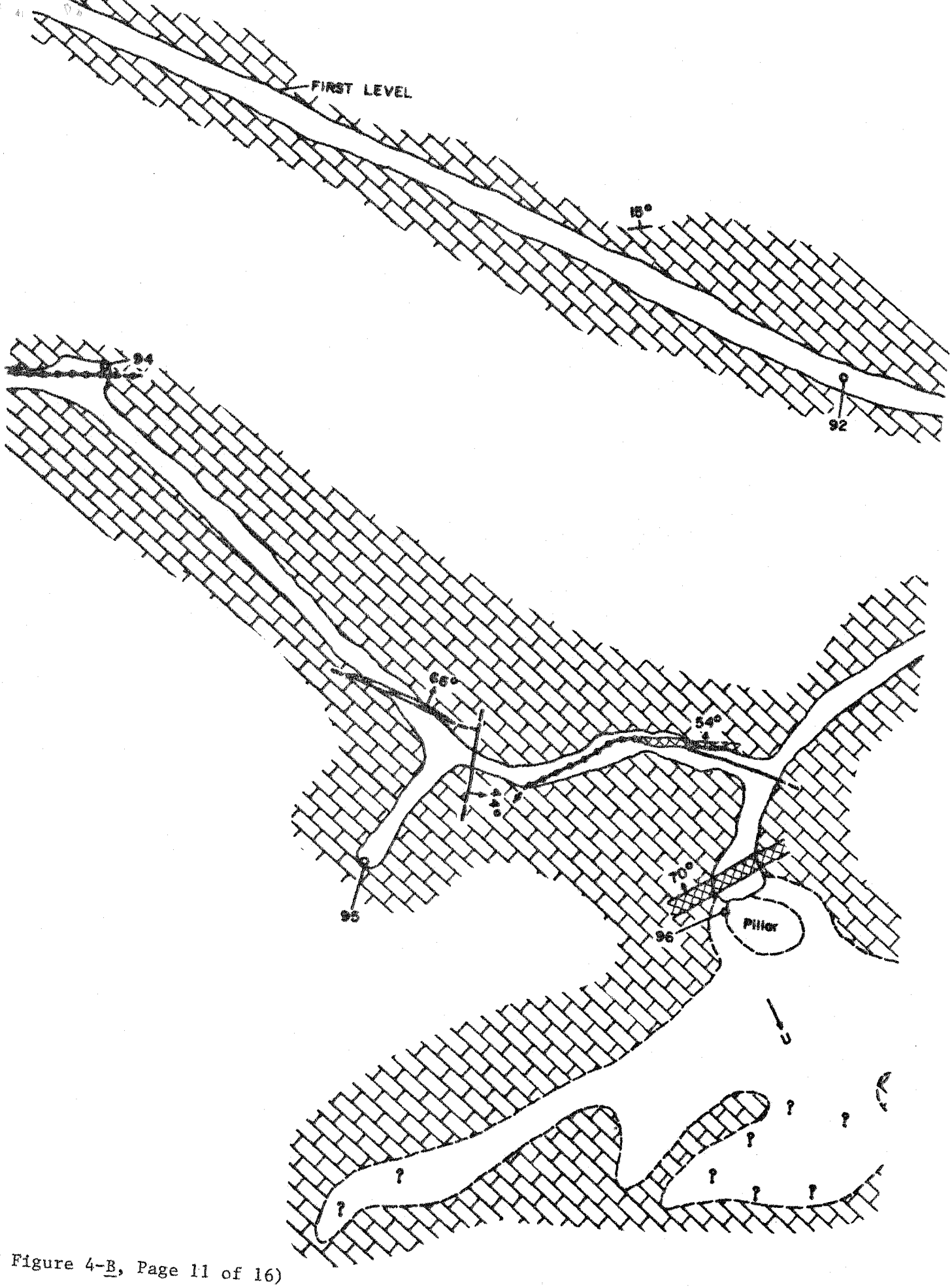

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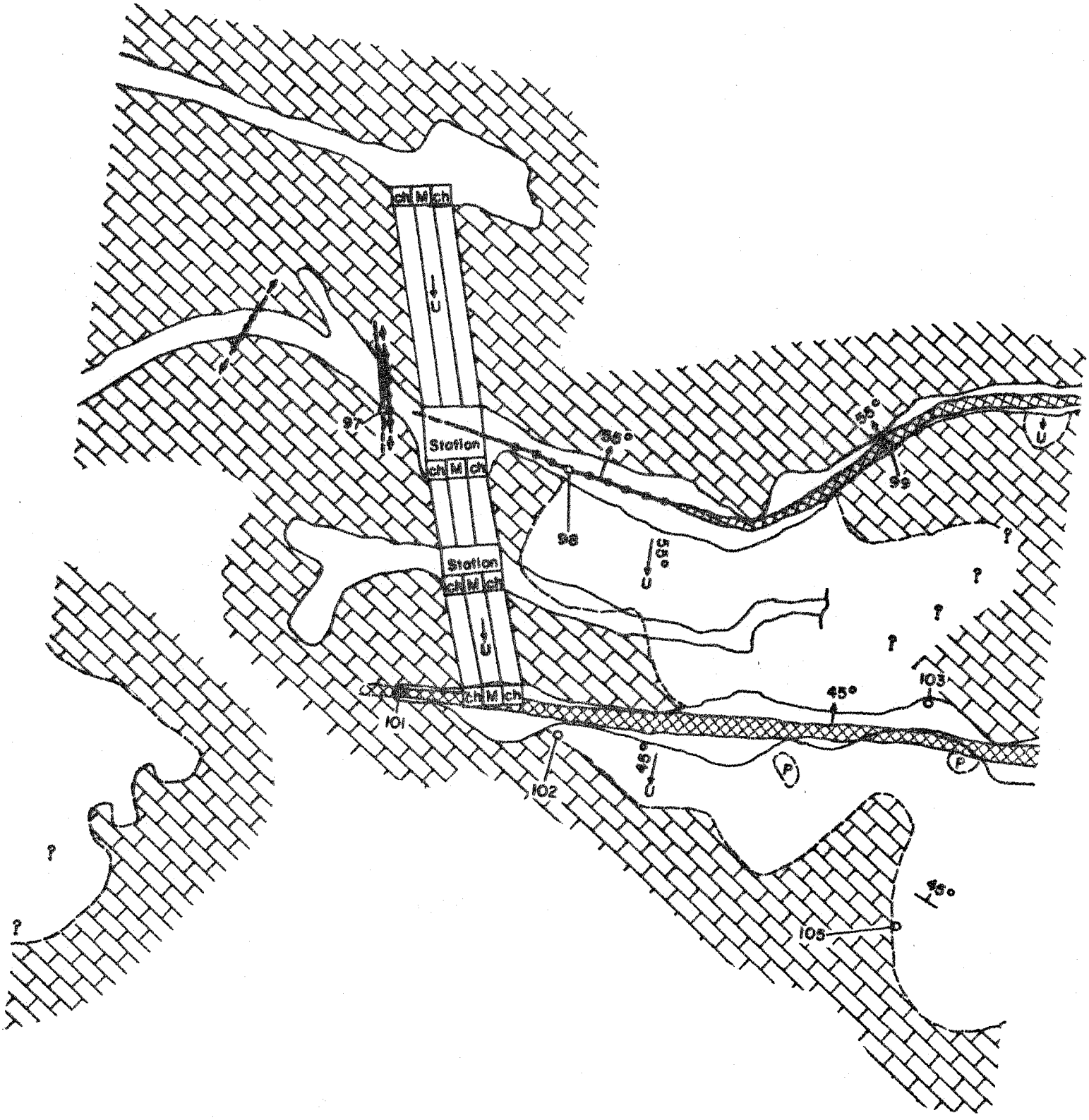

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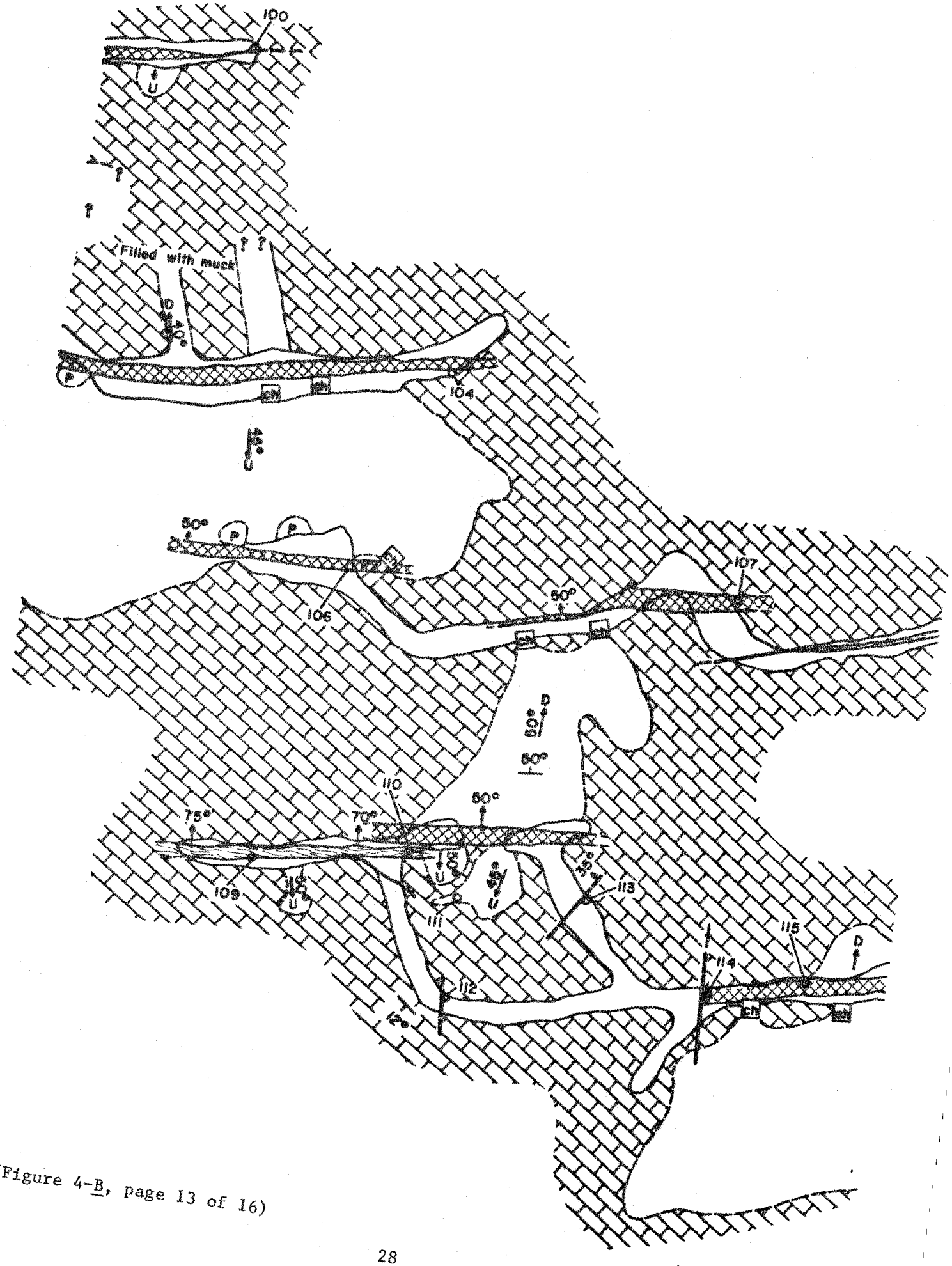

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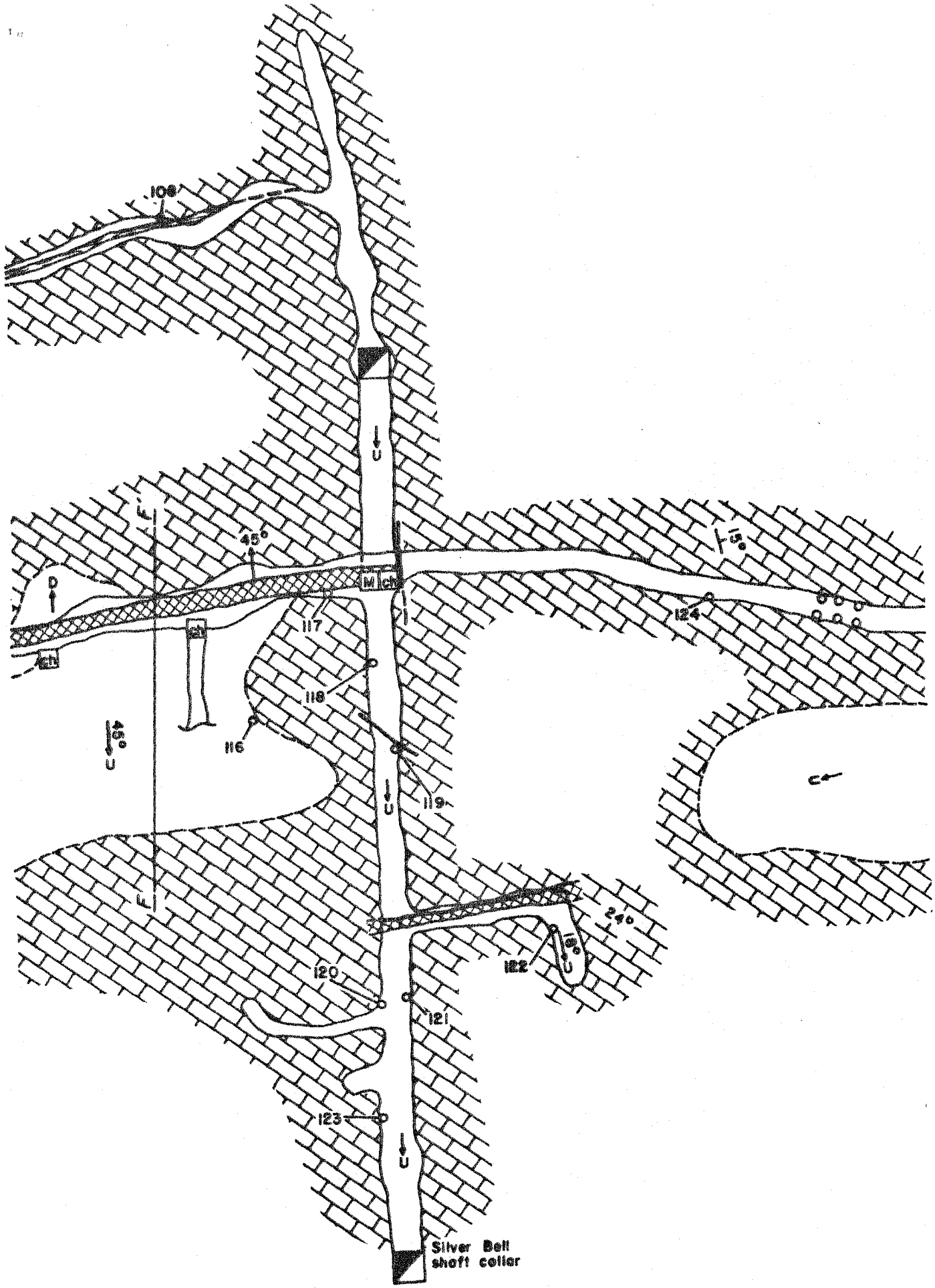

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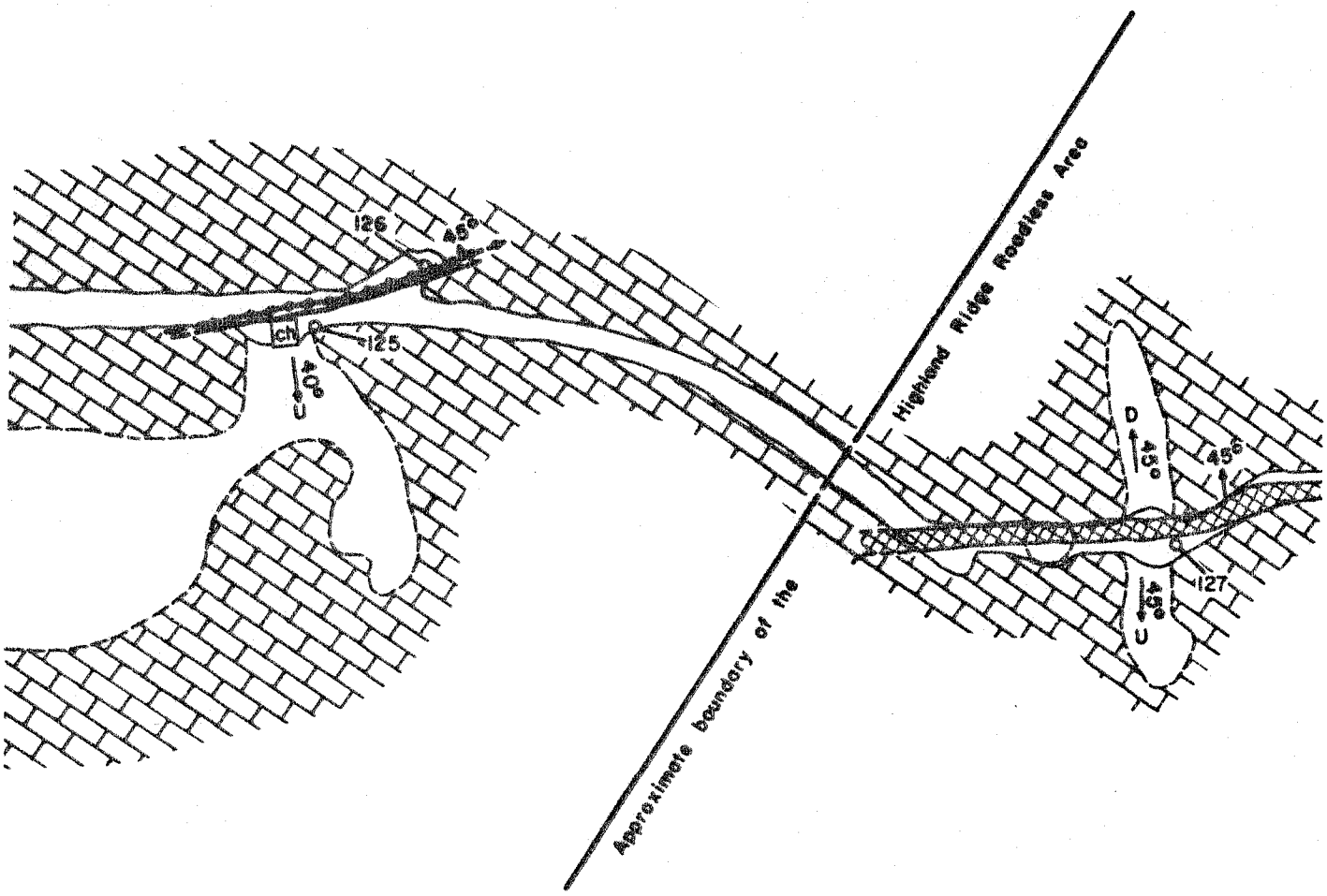

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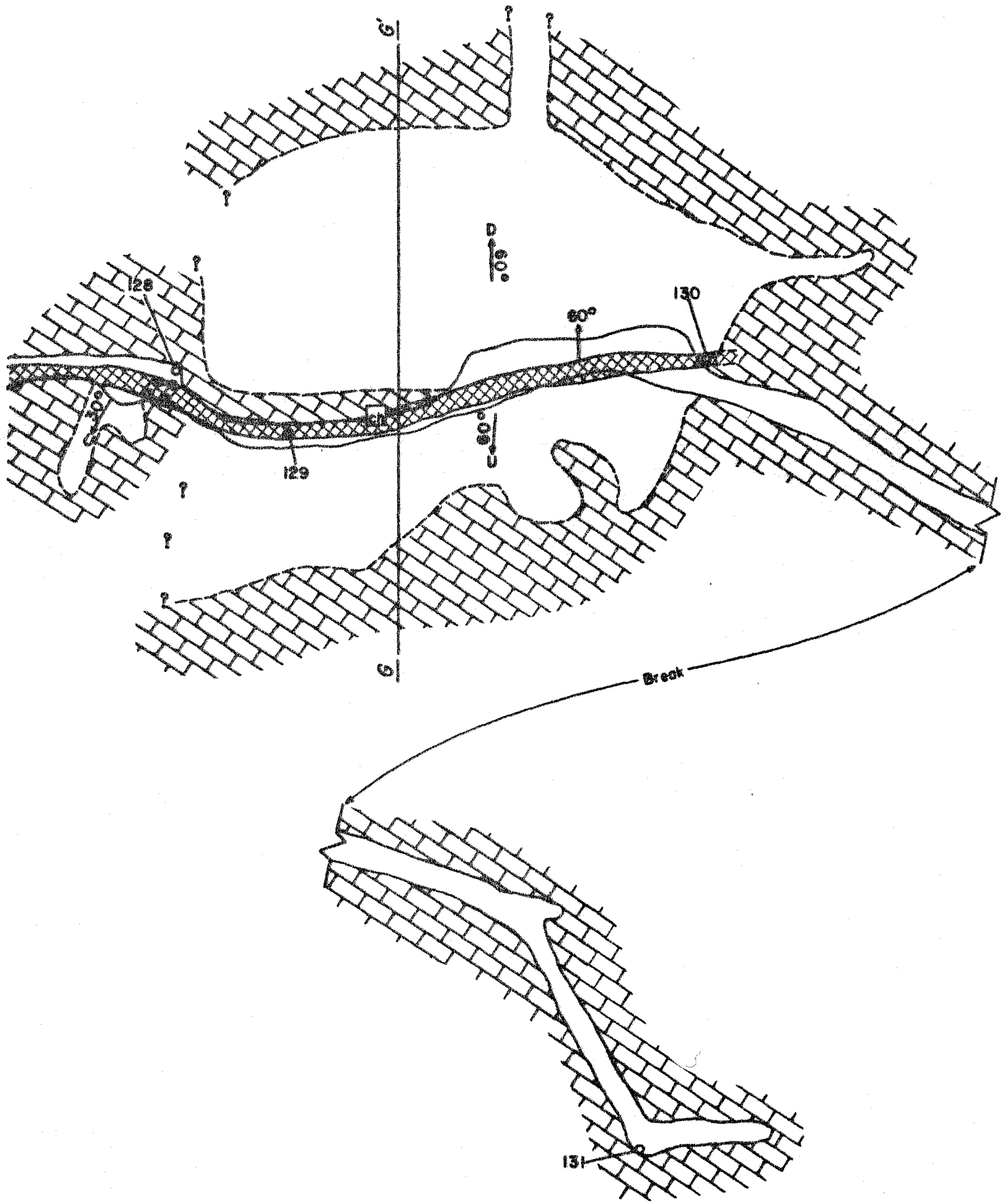

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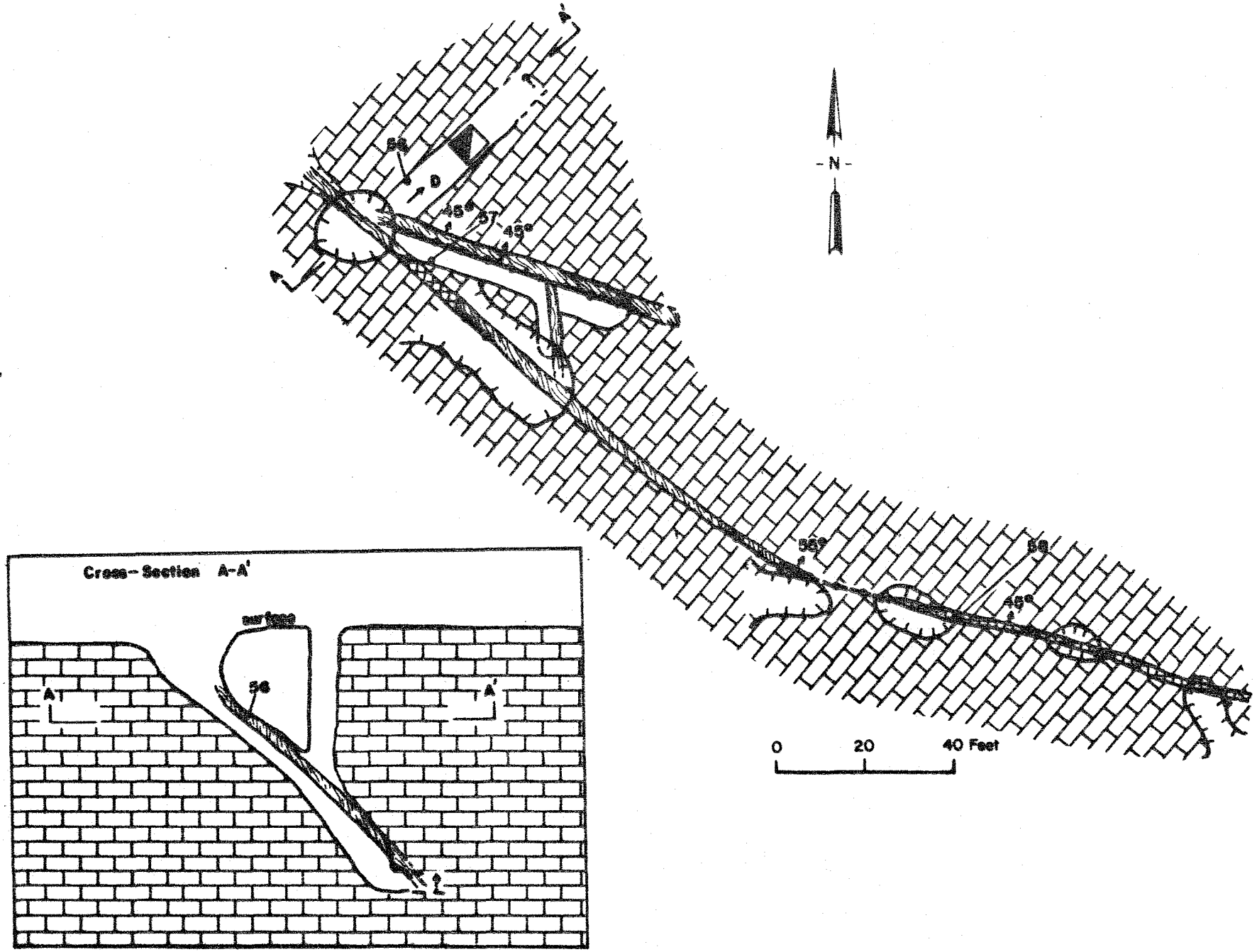


Figure 4-C.--Map showing workings at sample localities 56-58 (outside roadless area).

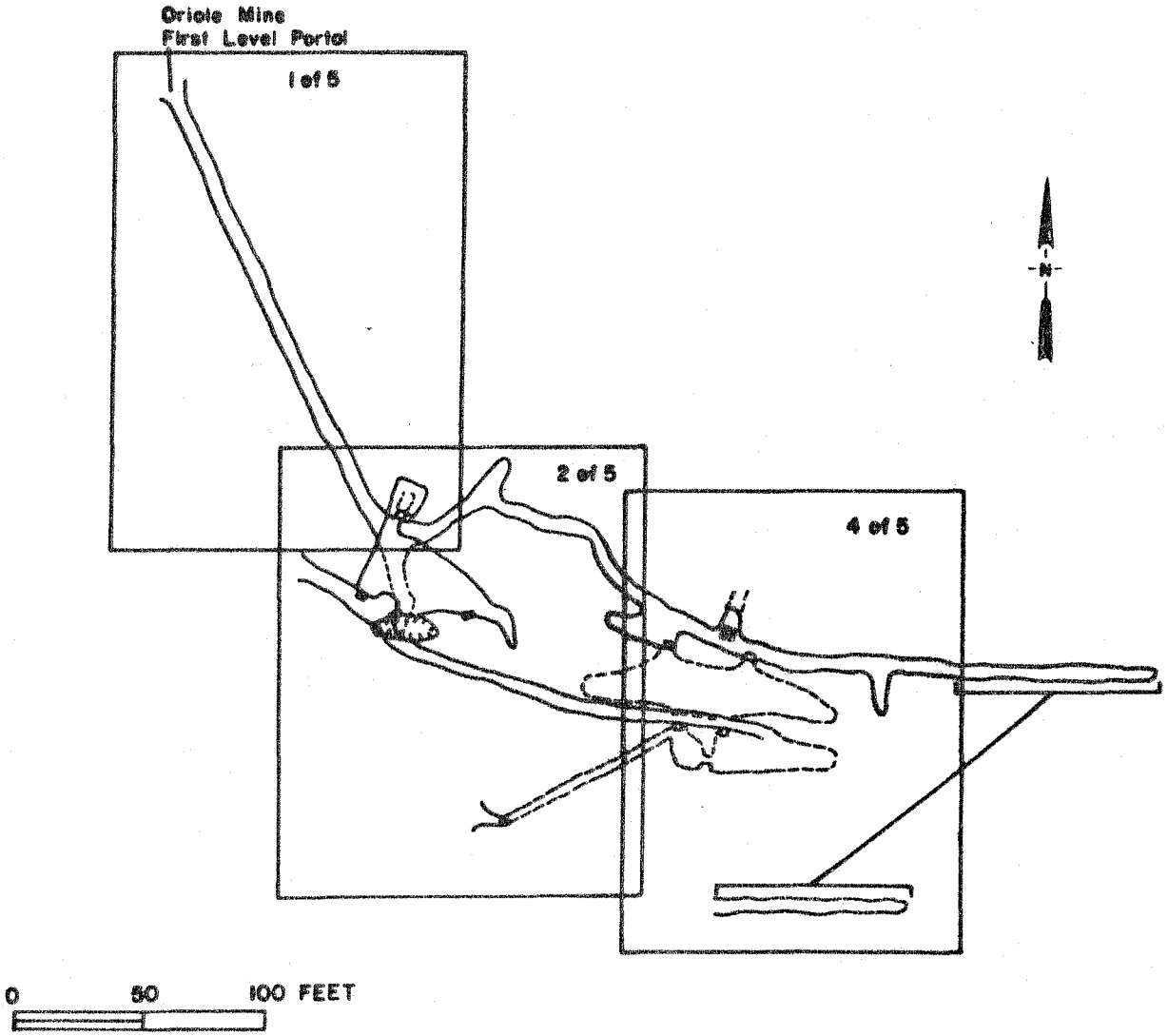
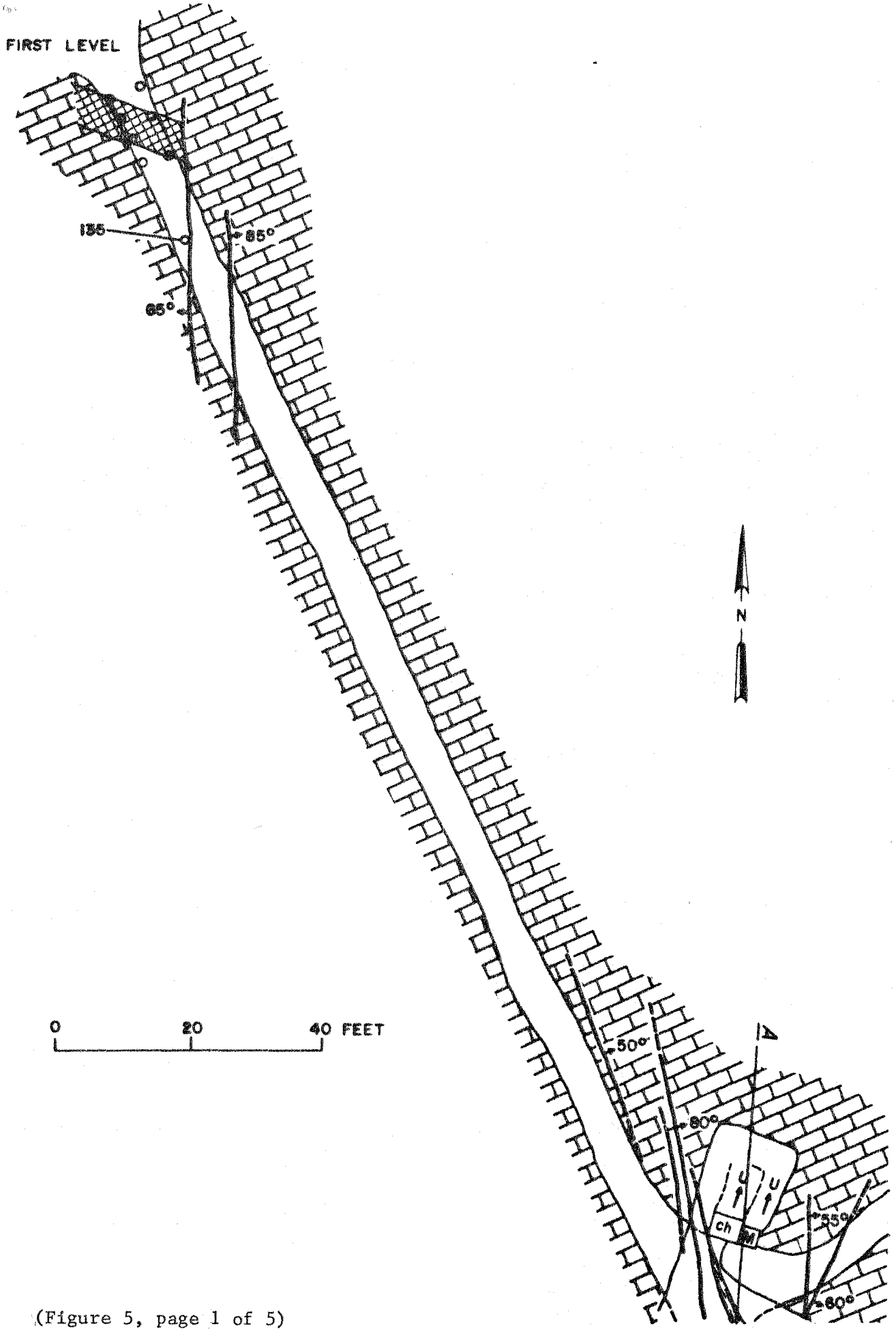
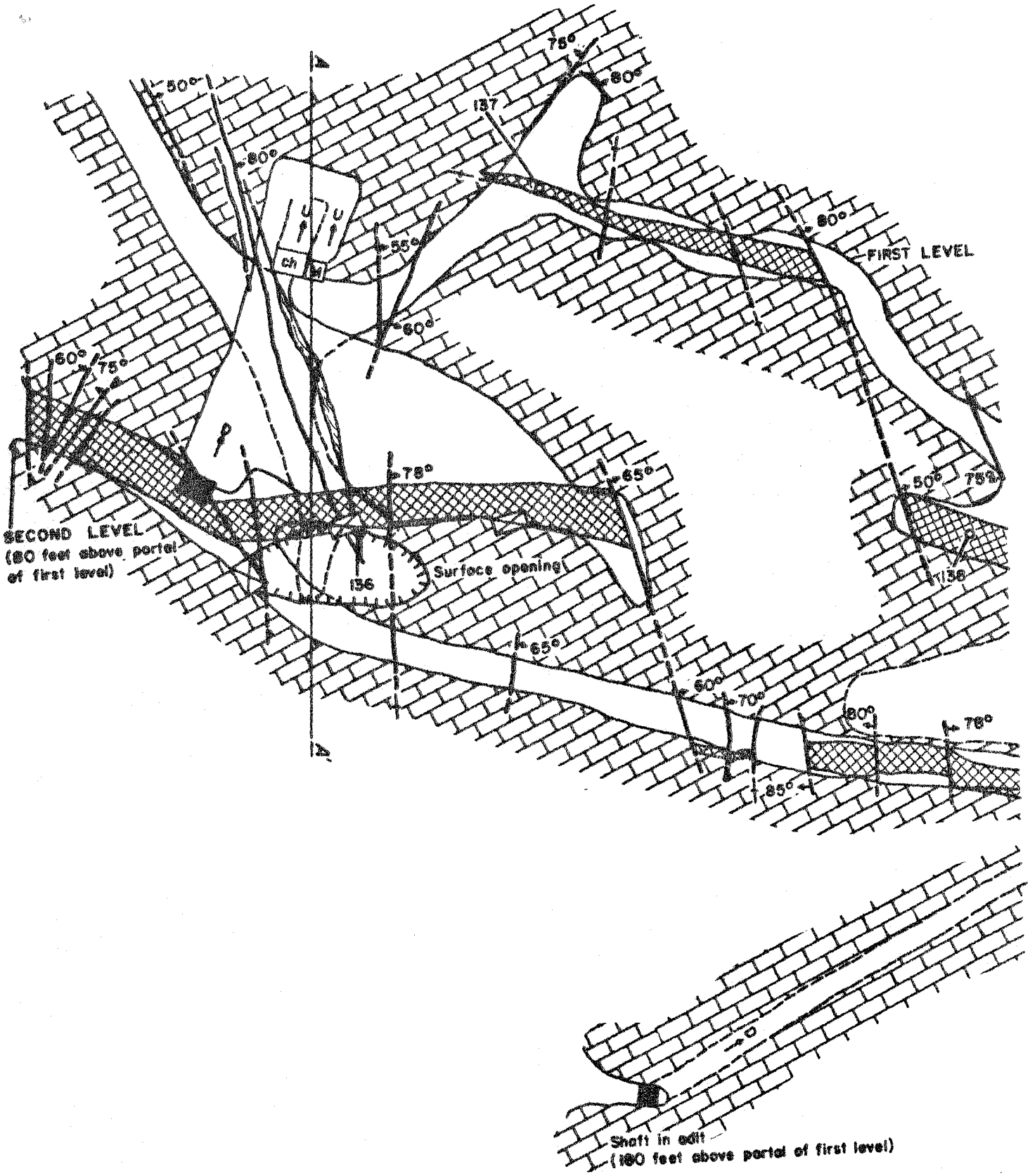


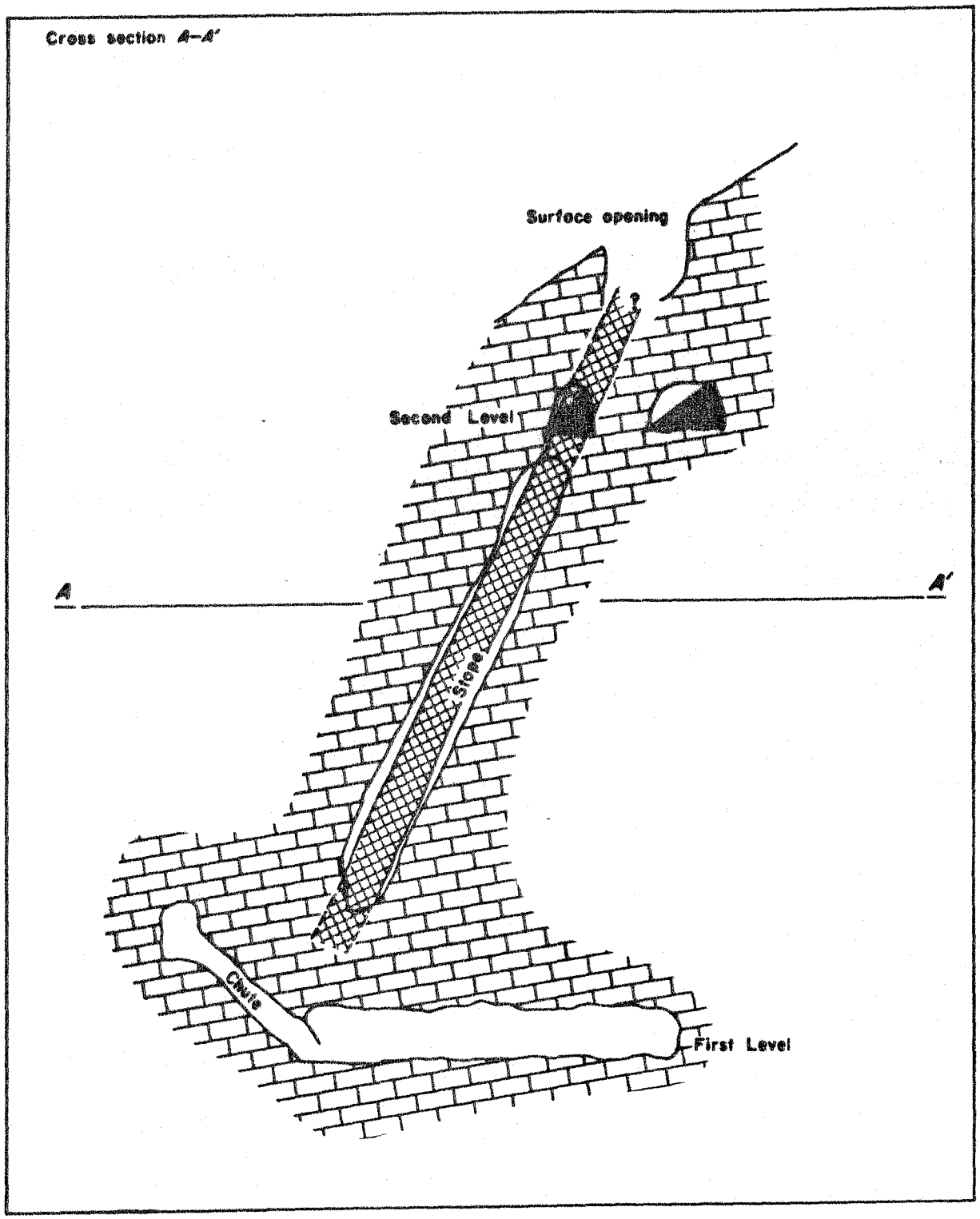
Figure 5.--Map of the Oriole Mine (outside roadless area) showing sample localities 135-140. (From map of Lemmon (1944) with modifications by Brown.



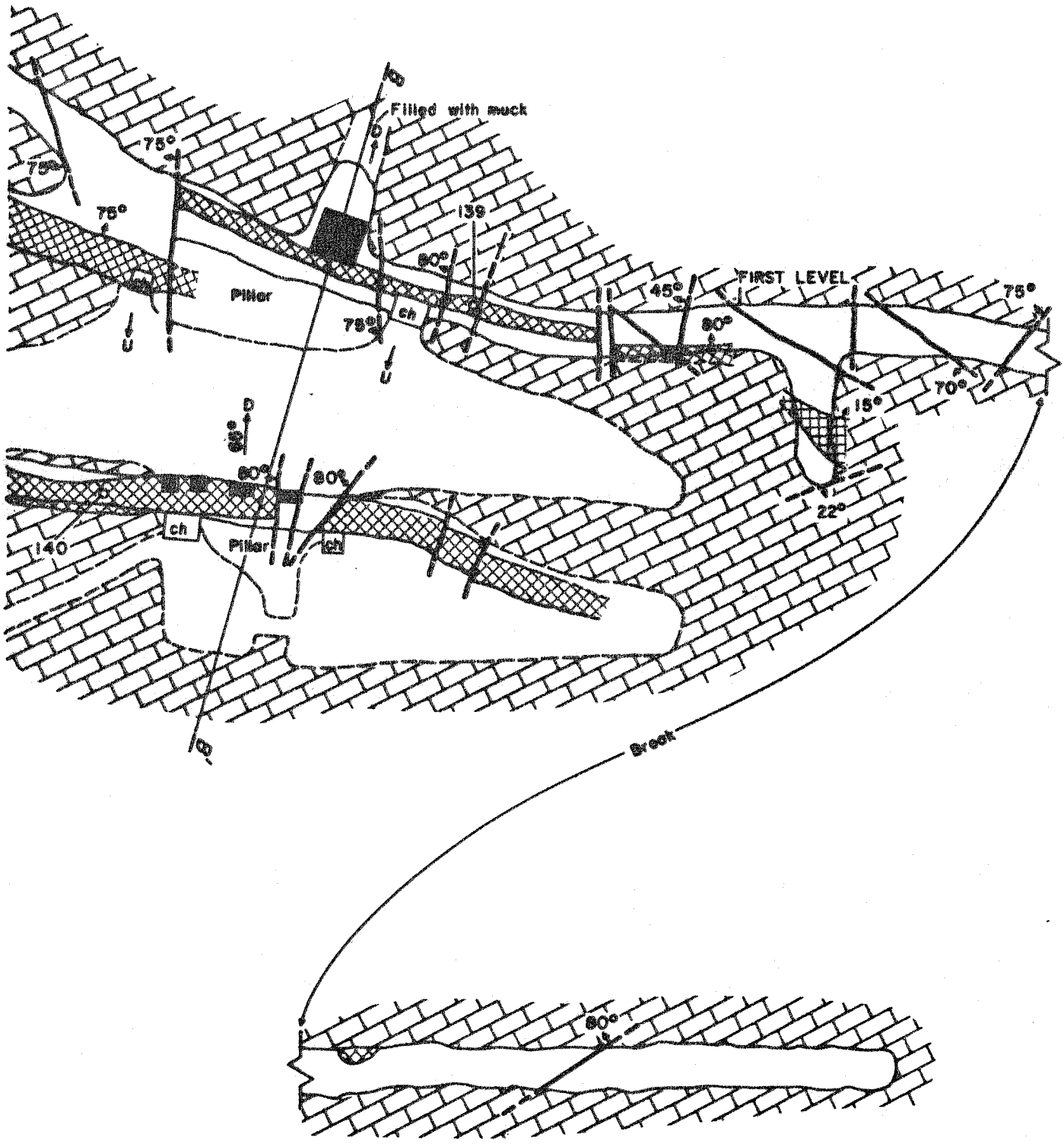
(Figure 5, page 1 of 5)



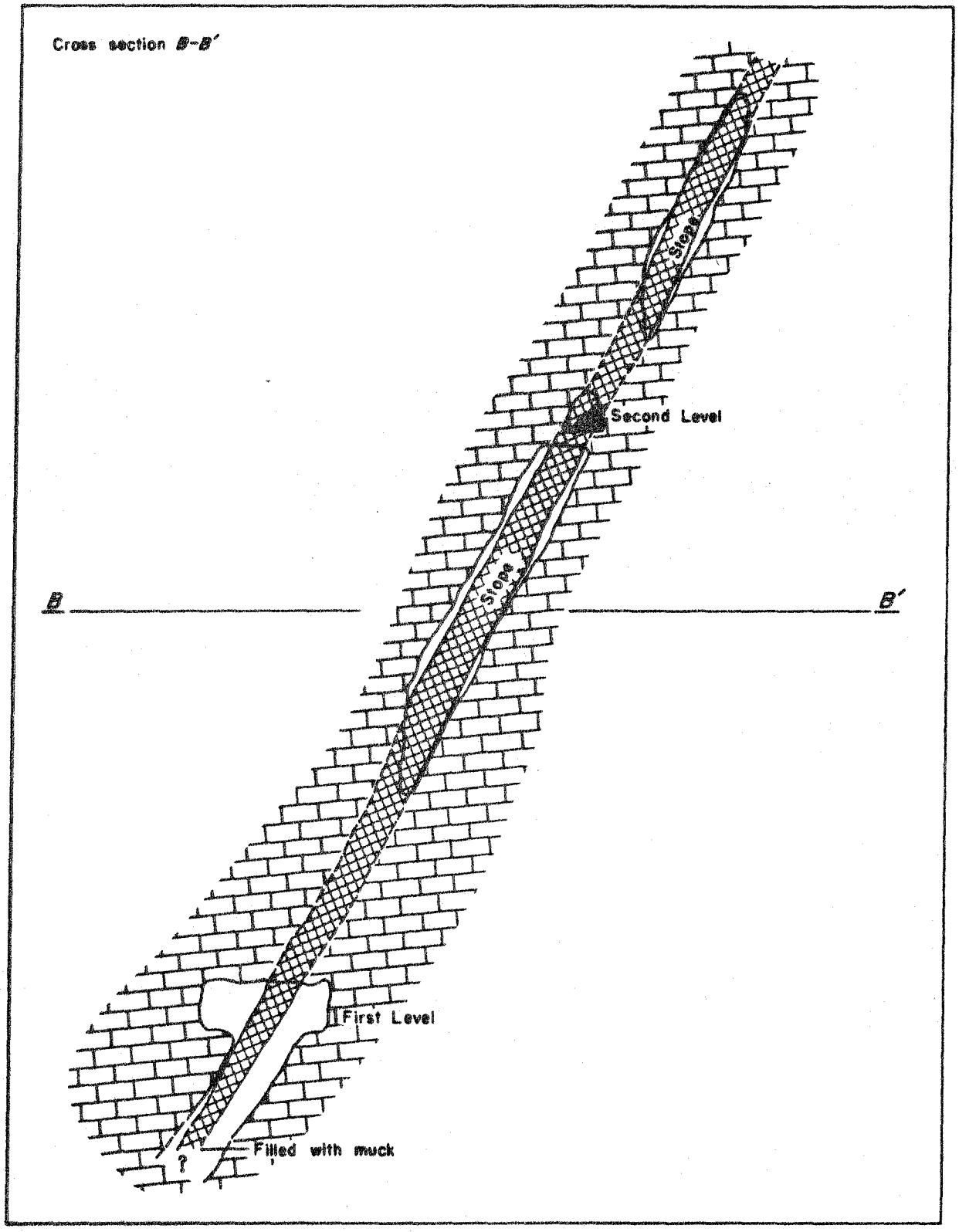
(Figure 5, page 2 of 5)



(Figure 5, page 3 of 5)



(Figure 5, page 4 of 5)



(Figure 5, page 5 of 5)

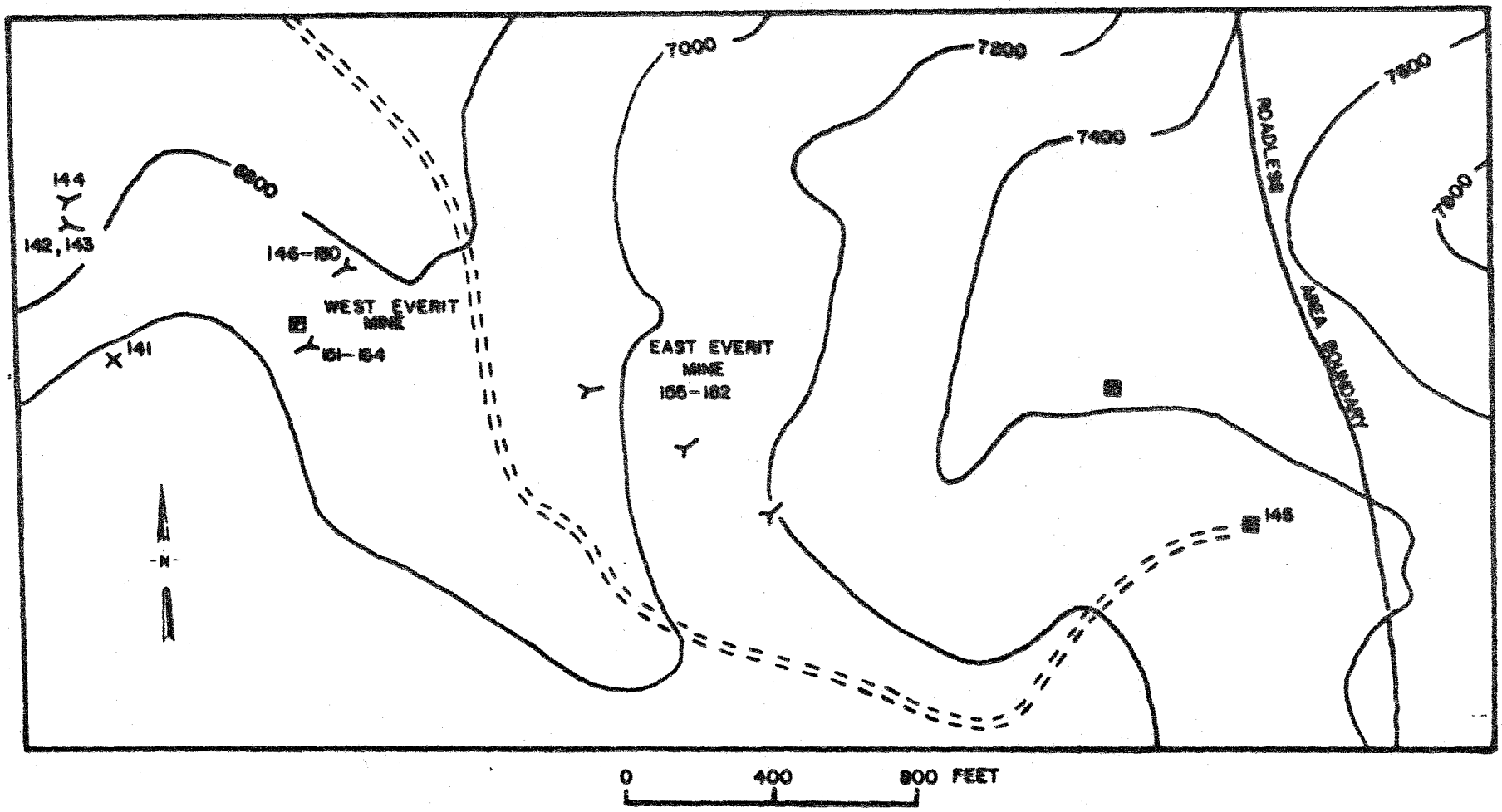


Figure 6-A.--Sketch map of the West and East Everit Mines area.

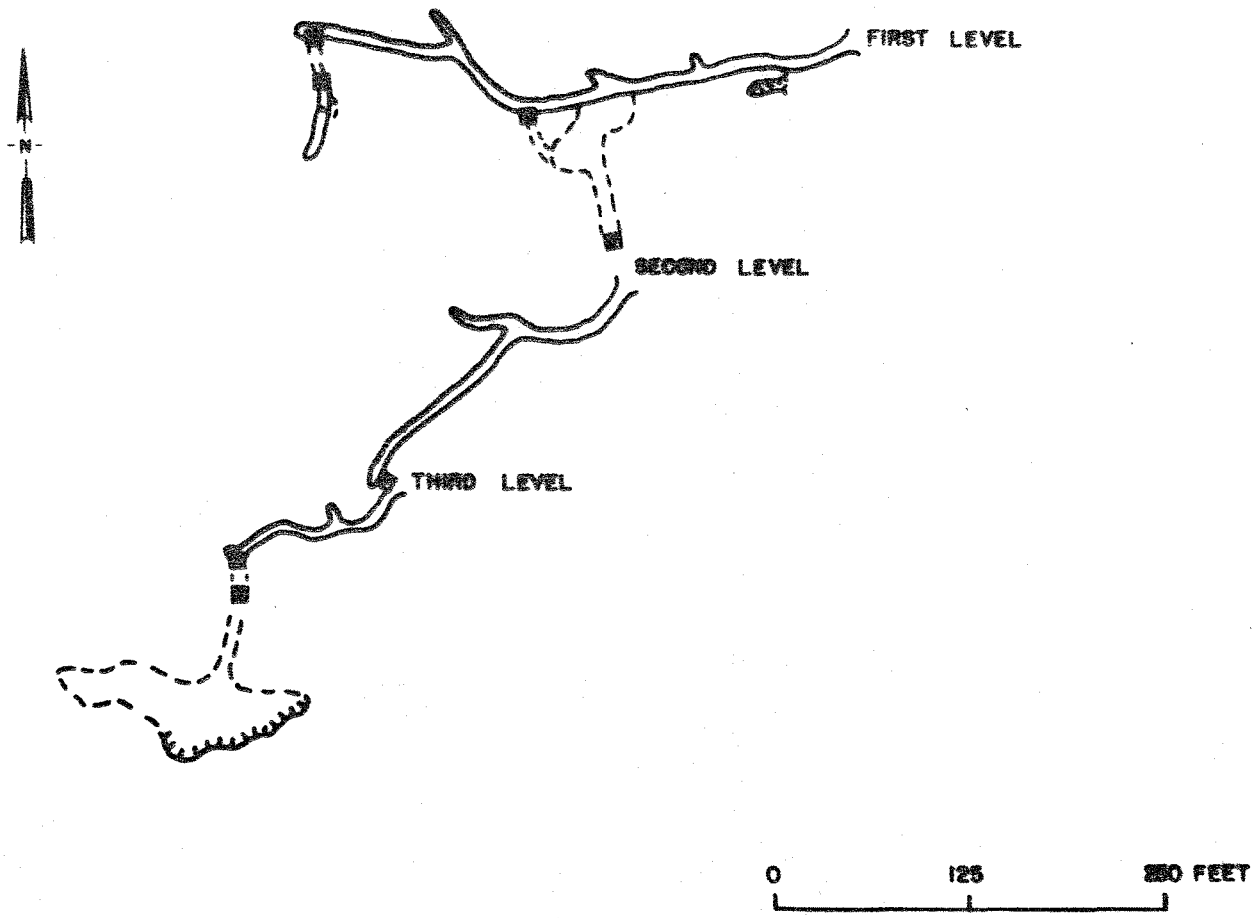
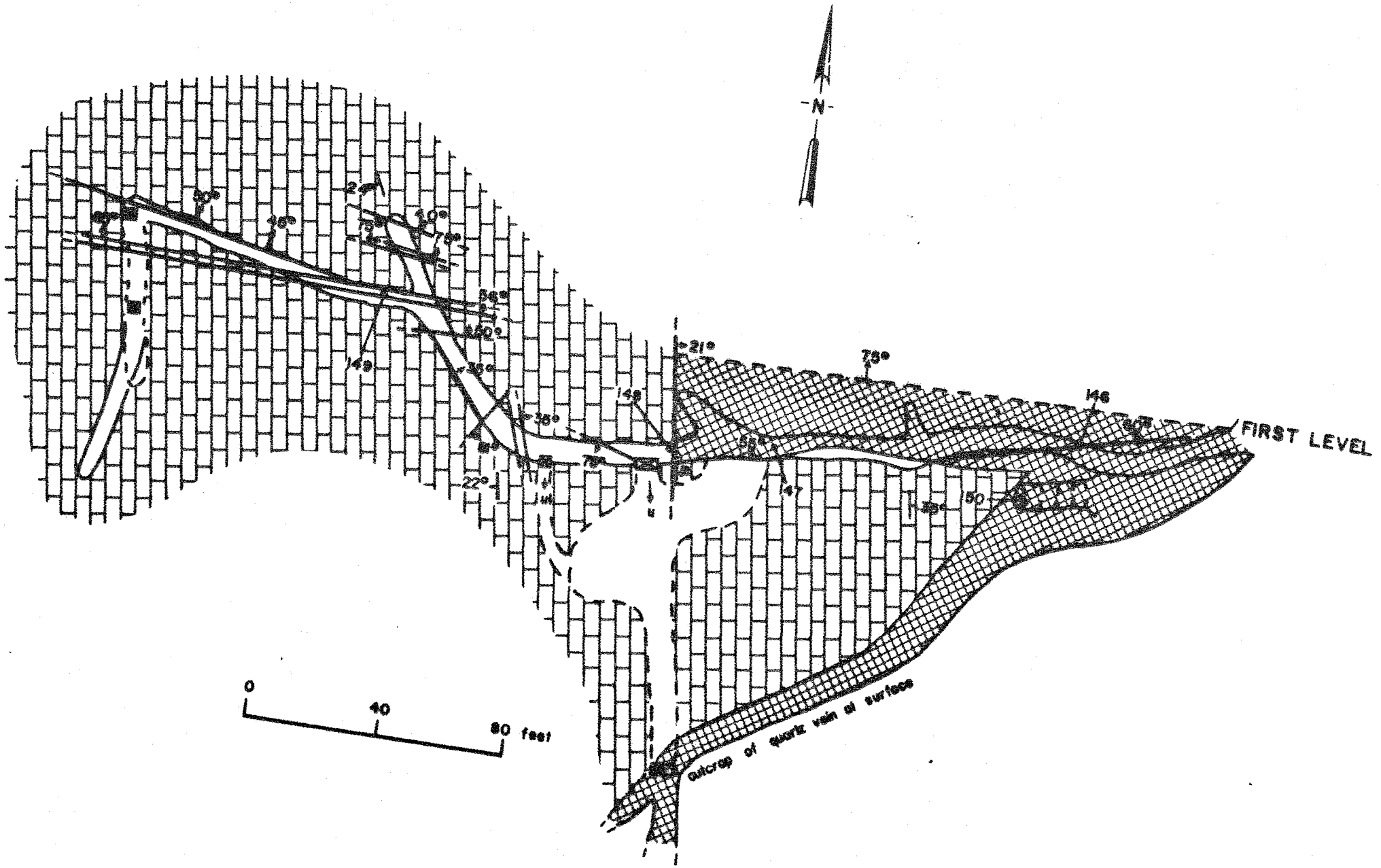


Figure 6-B.--Map of the West Everit Mine (outside roadless area) showing sample localities 146-154. (Map from Lemmon (1943), with modifications by Brown.)



(Figure 6-B, page 1 of 3)

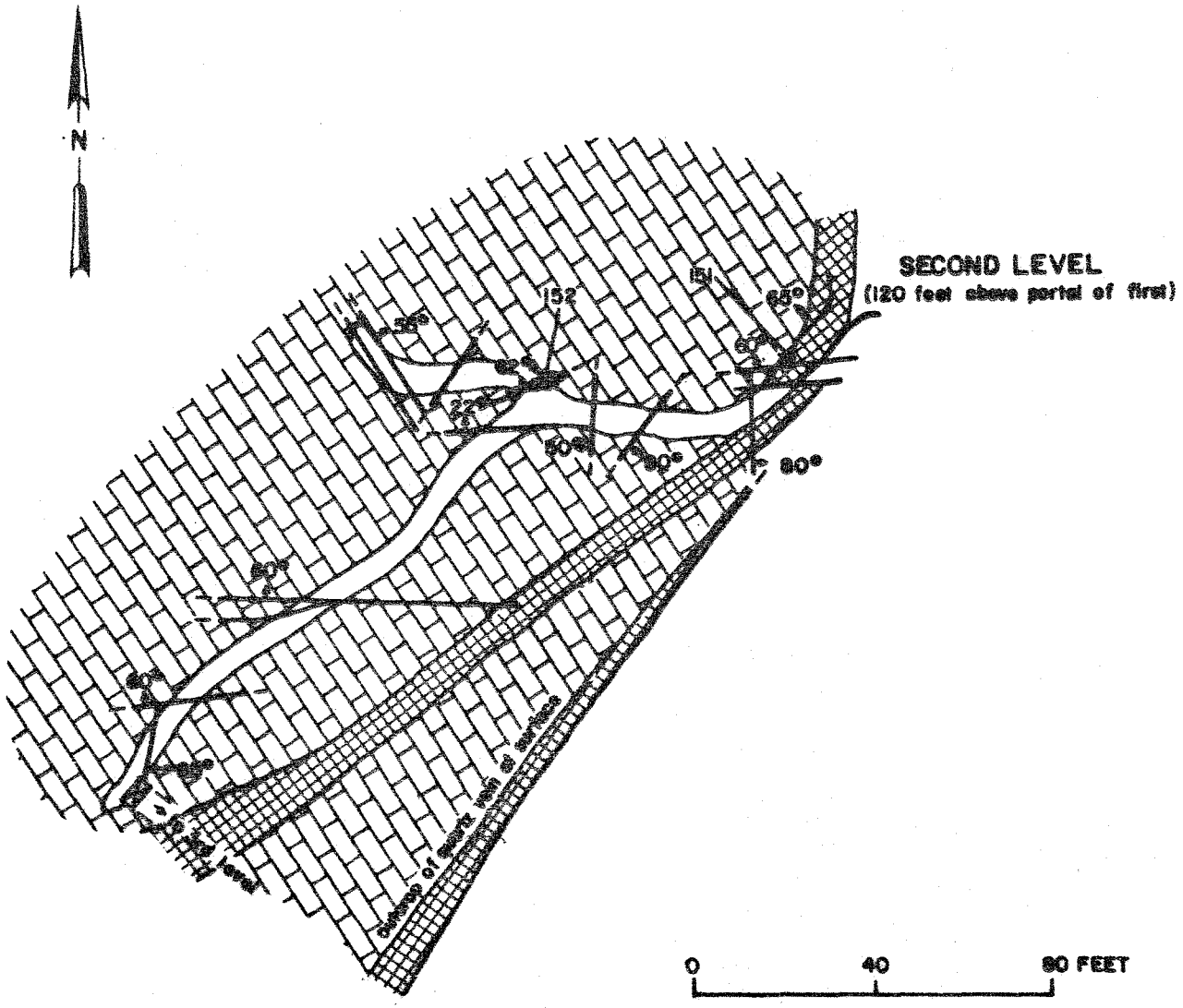
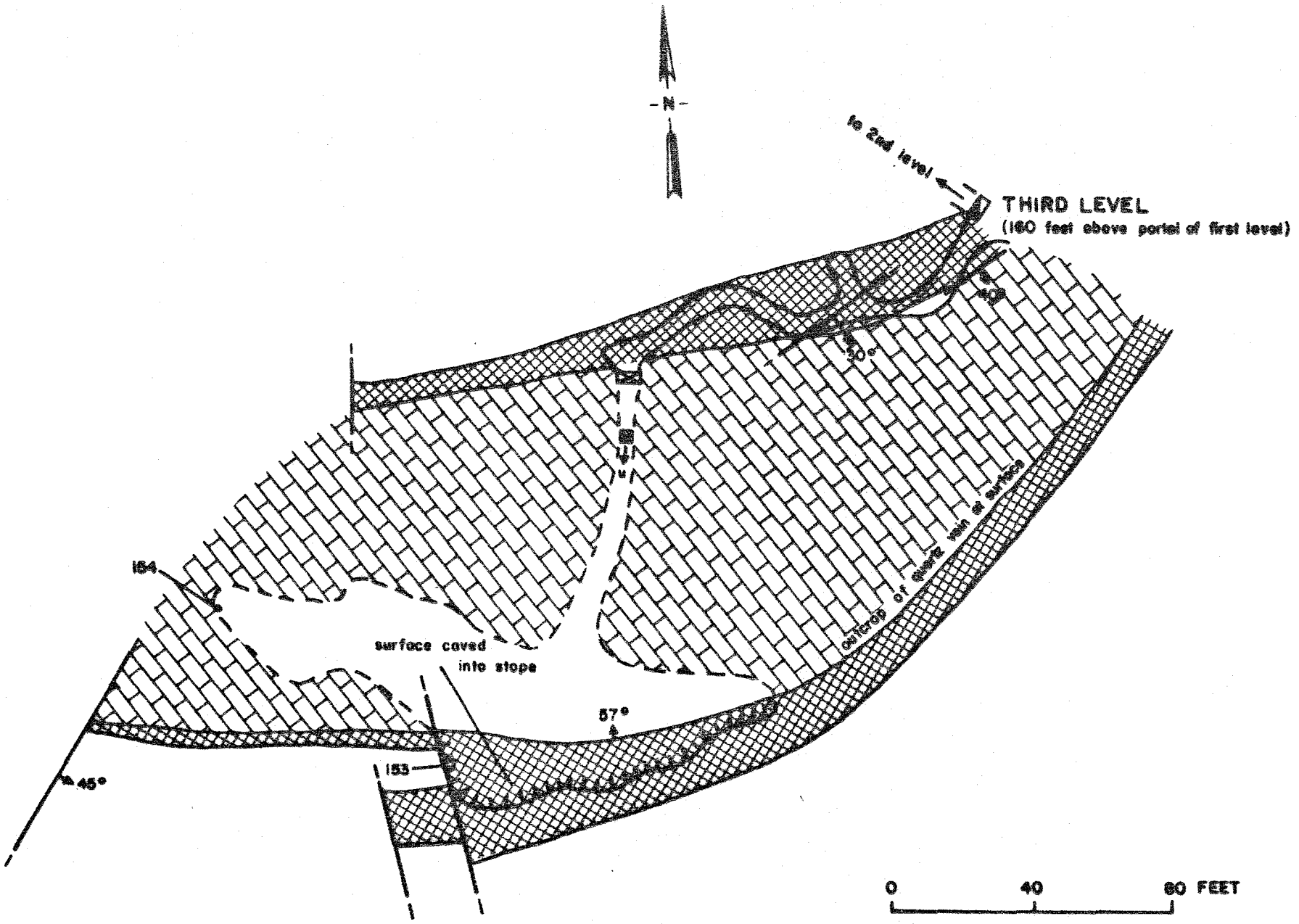


Figure 6-B, page 2 of 3)



(Figure 6-B, page 3 of 3)

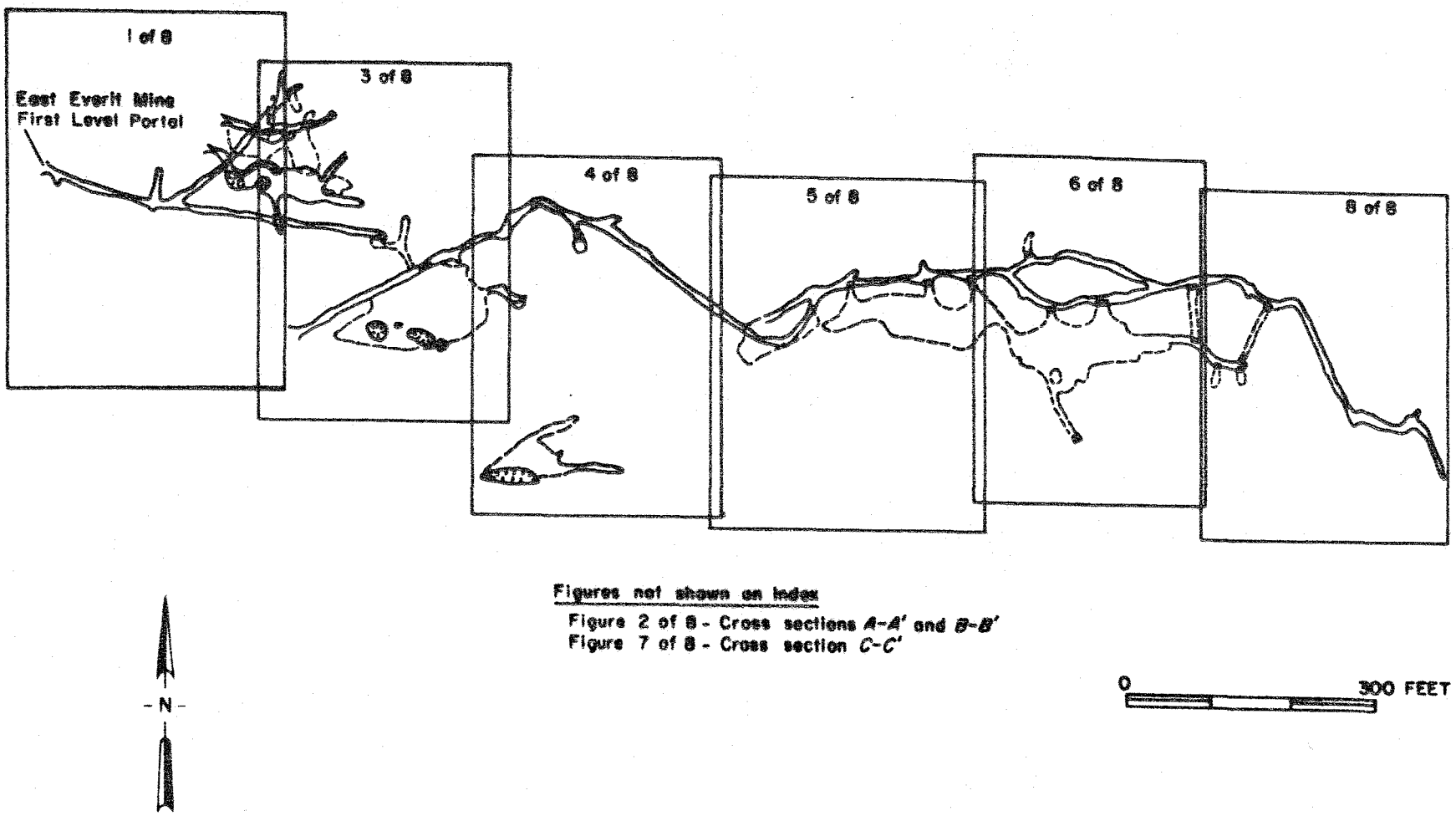
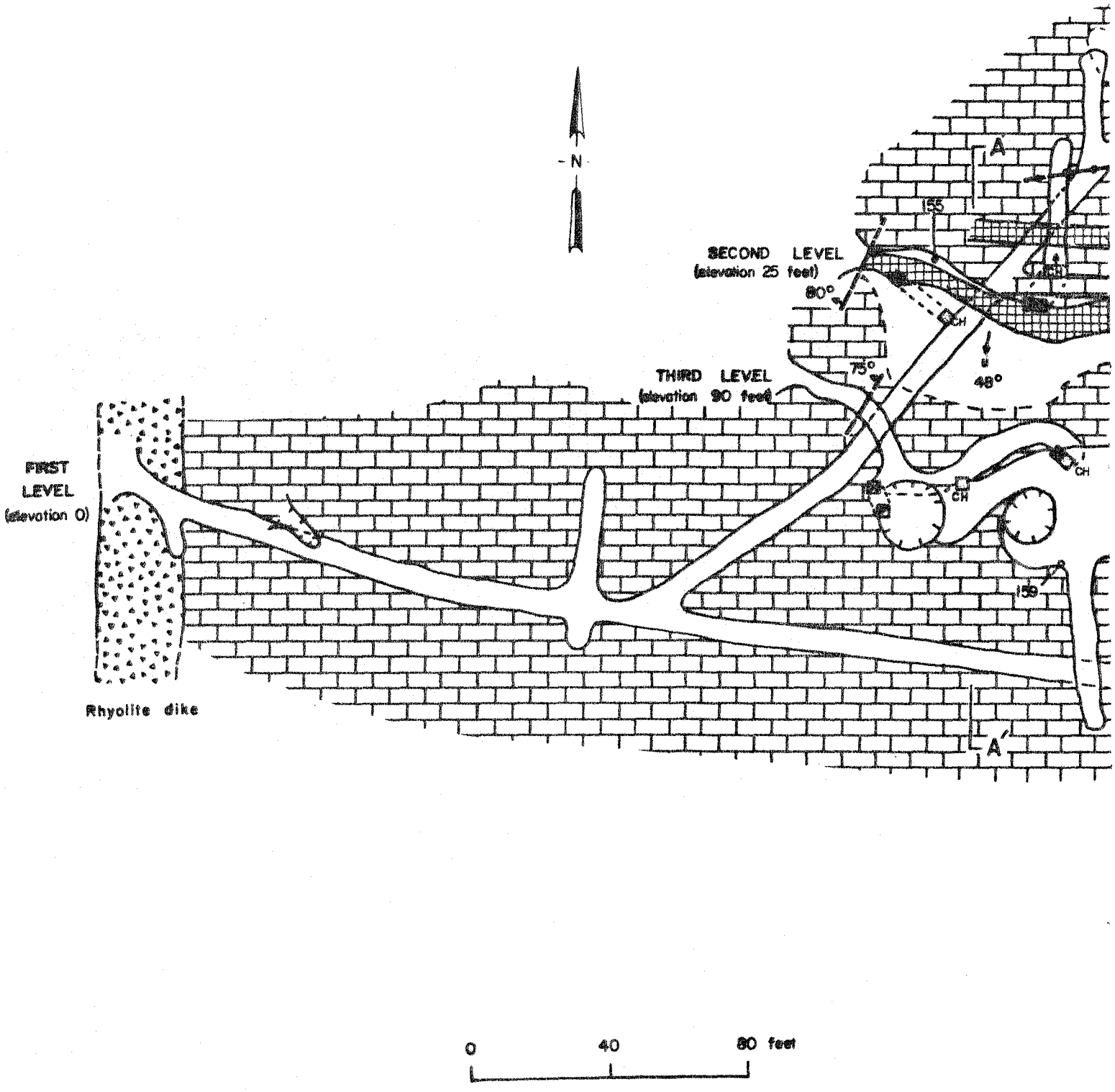
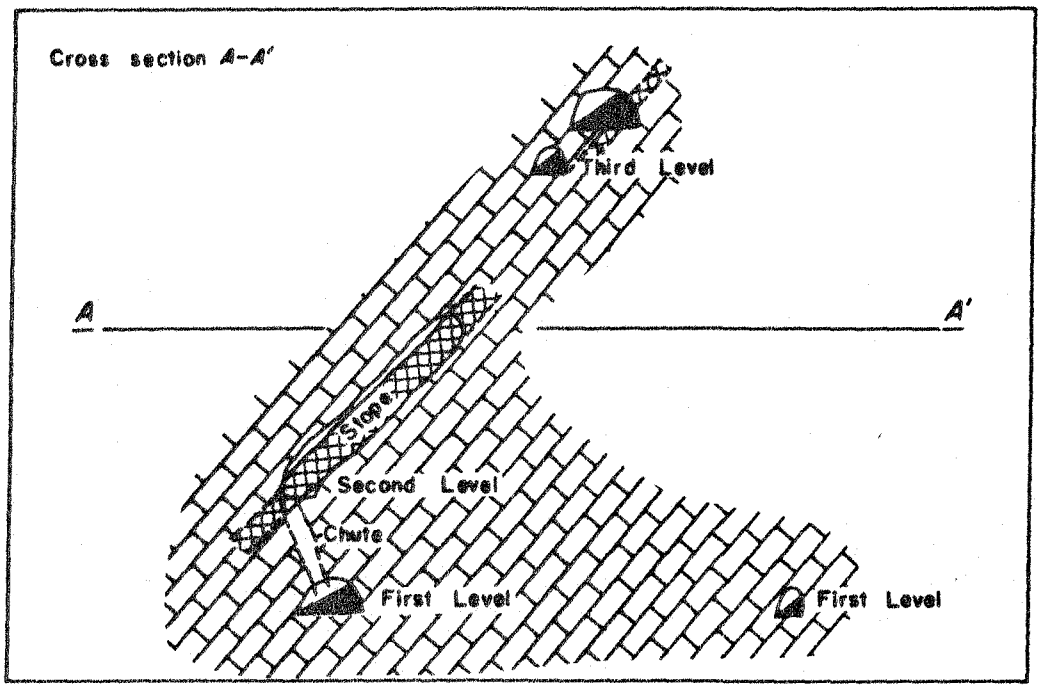
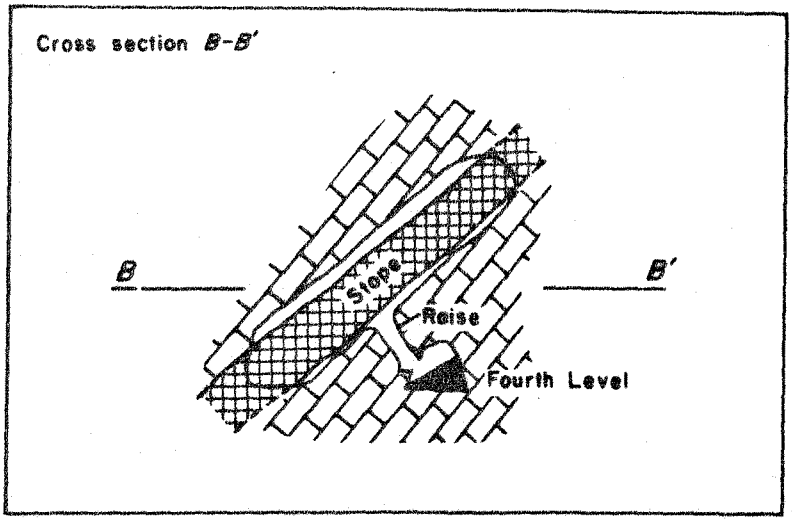


Figure 6-C.--Map of the East Everit Mine (outside roadless area) showing sample localities 155-182. (Map from Lemmon (1943), with modifications by Brown.)

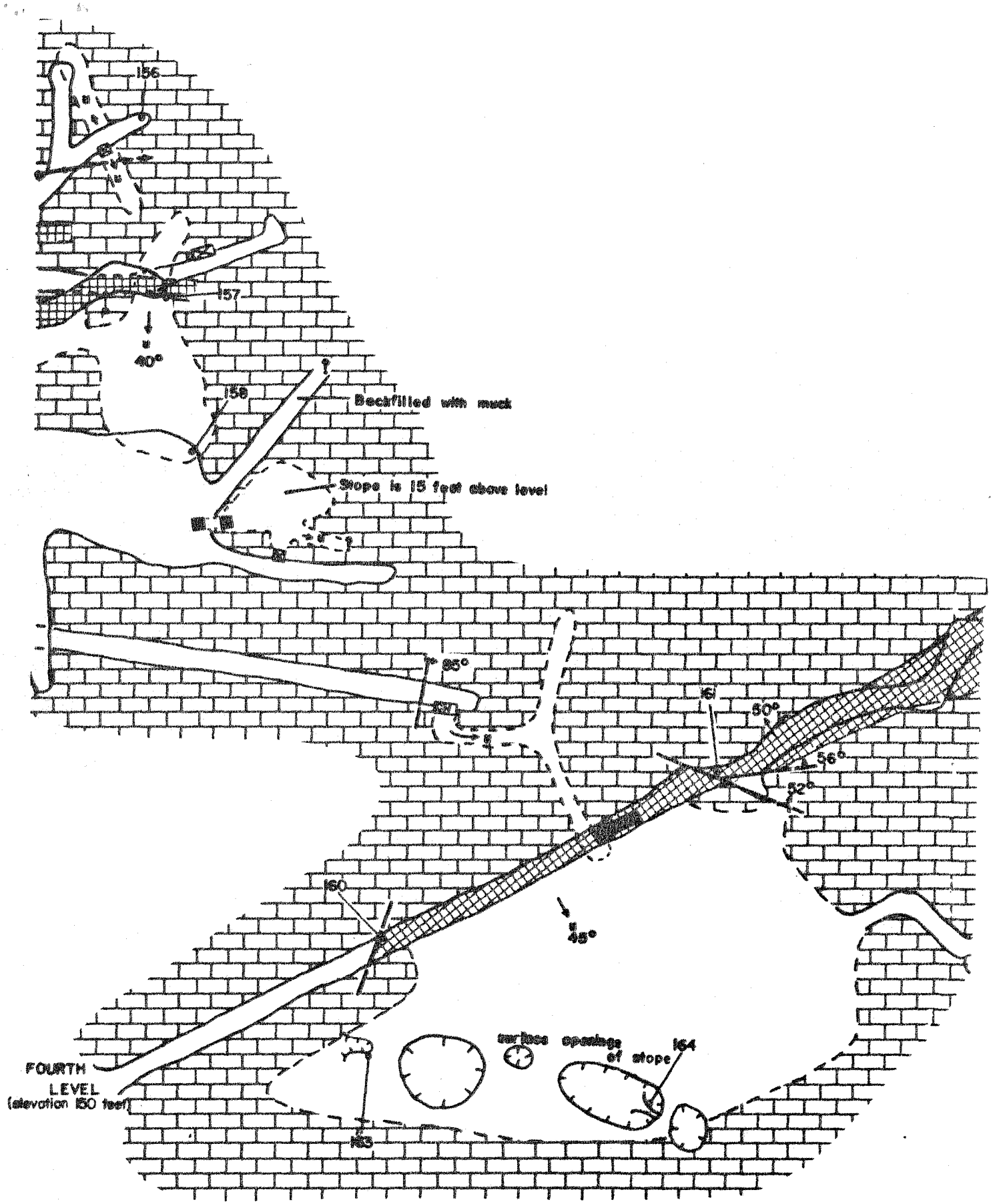


(Figure 6-C, page 1 of 8)

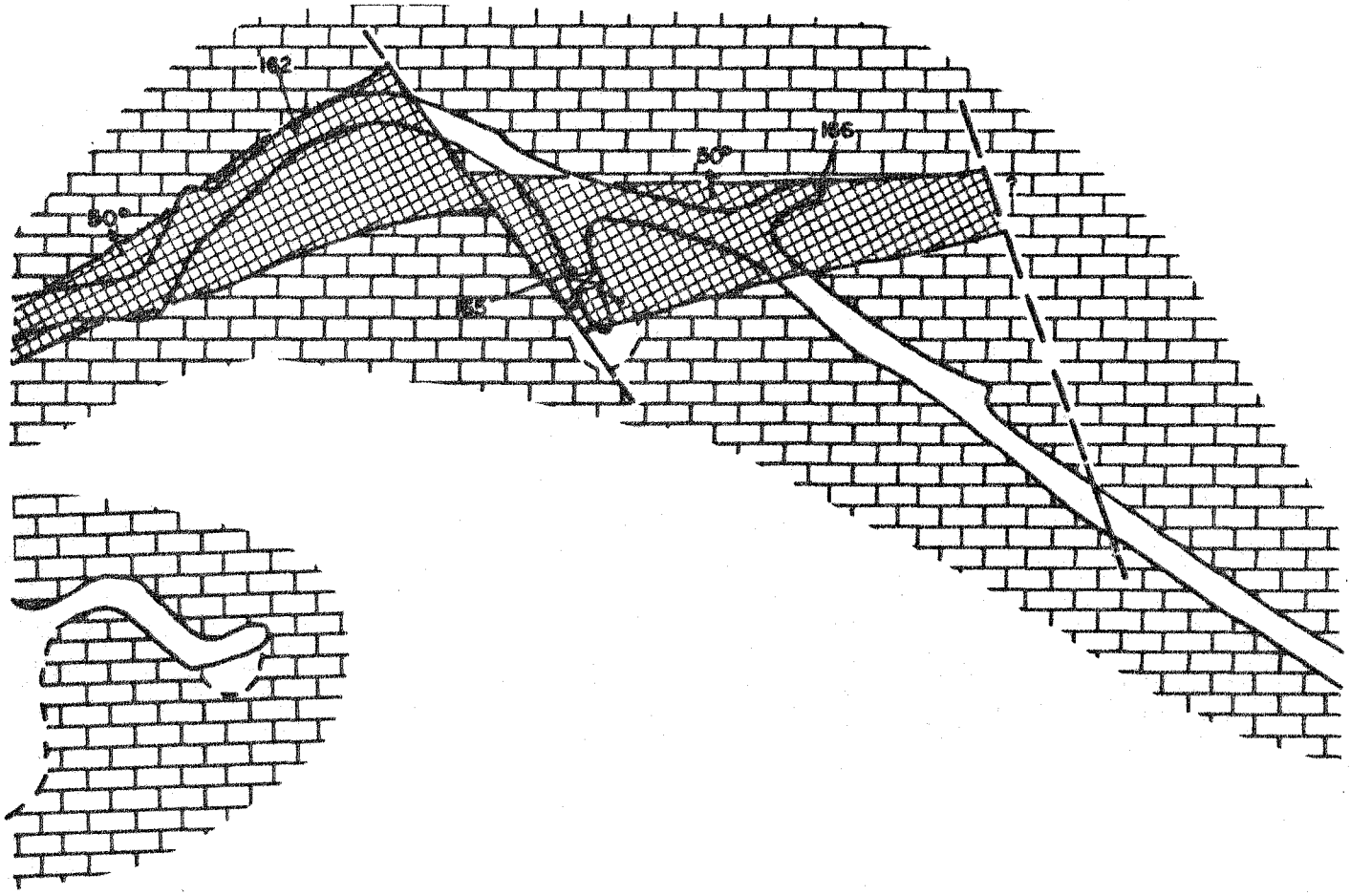


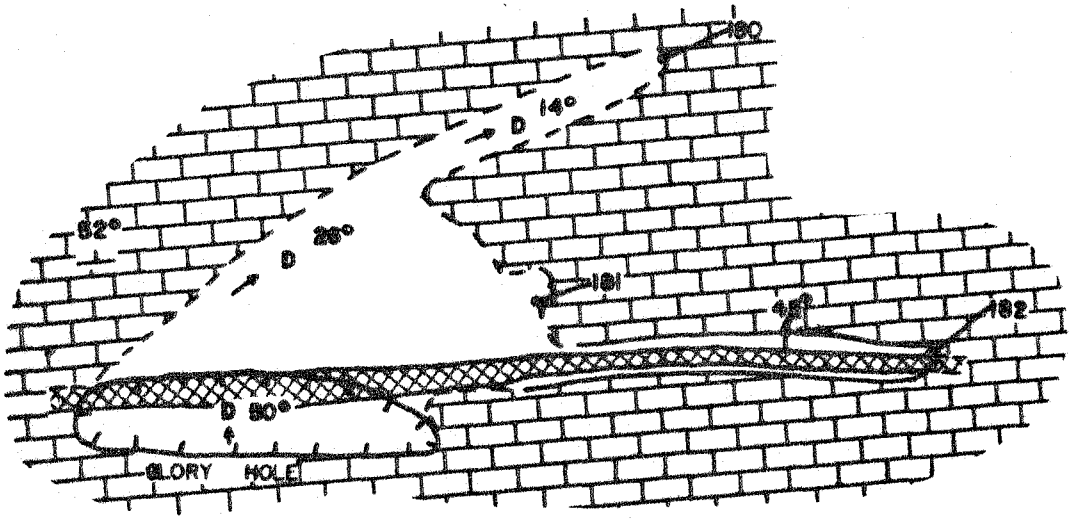


(Figure 6-C, page 2 of 8)

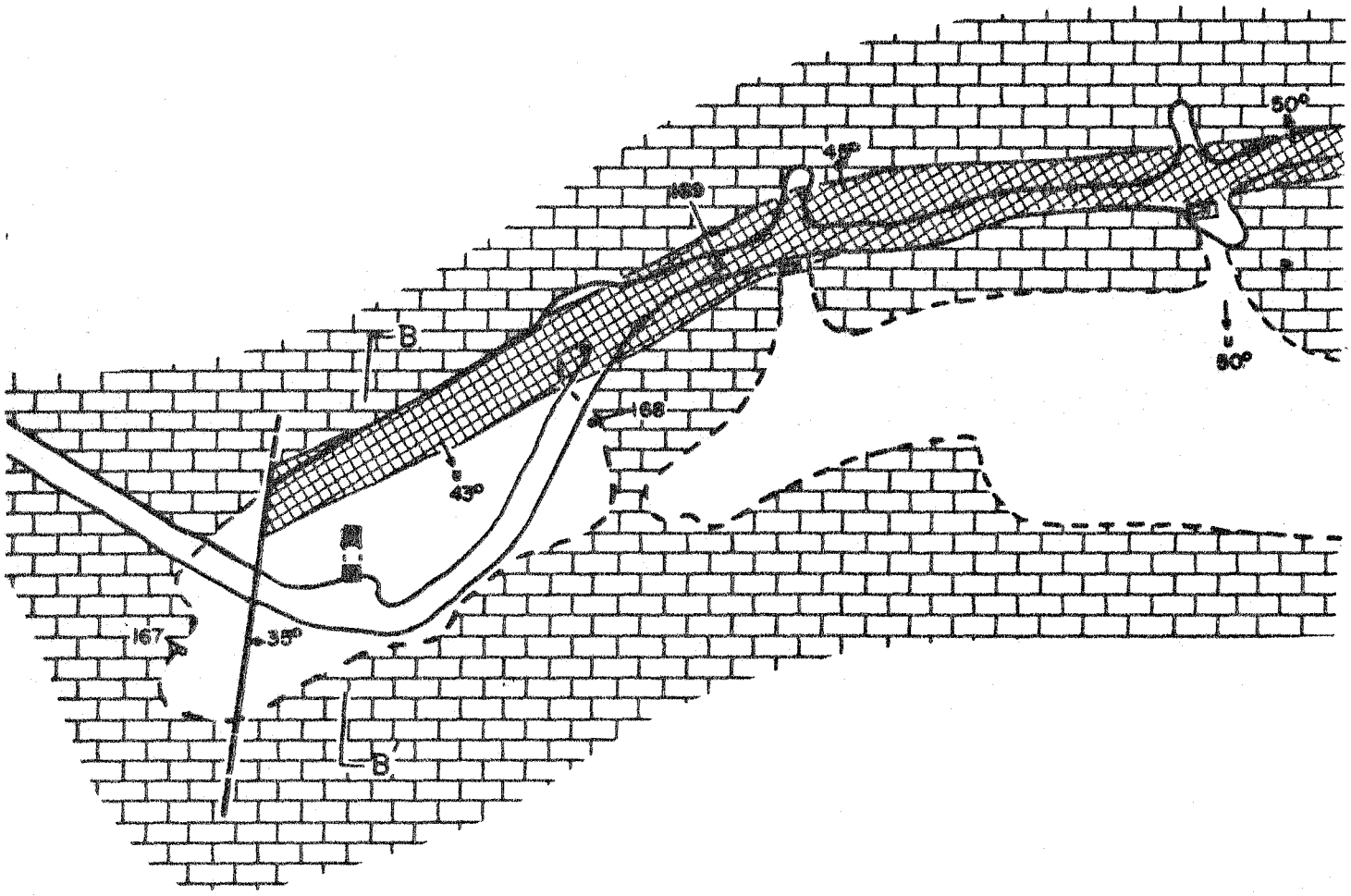


(Figure 6-C, page 3 of 8)

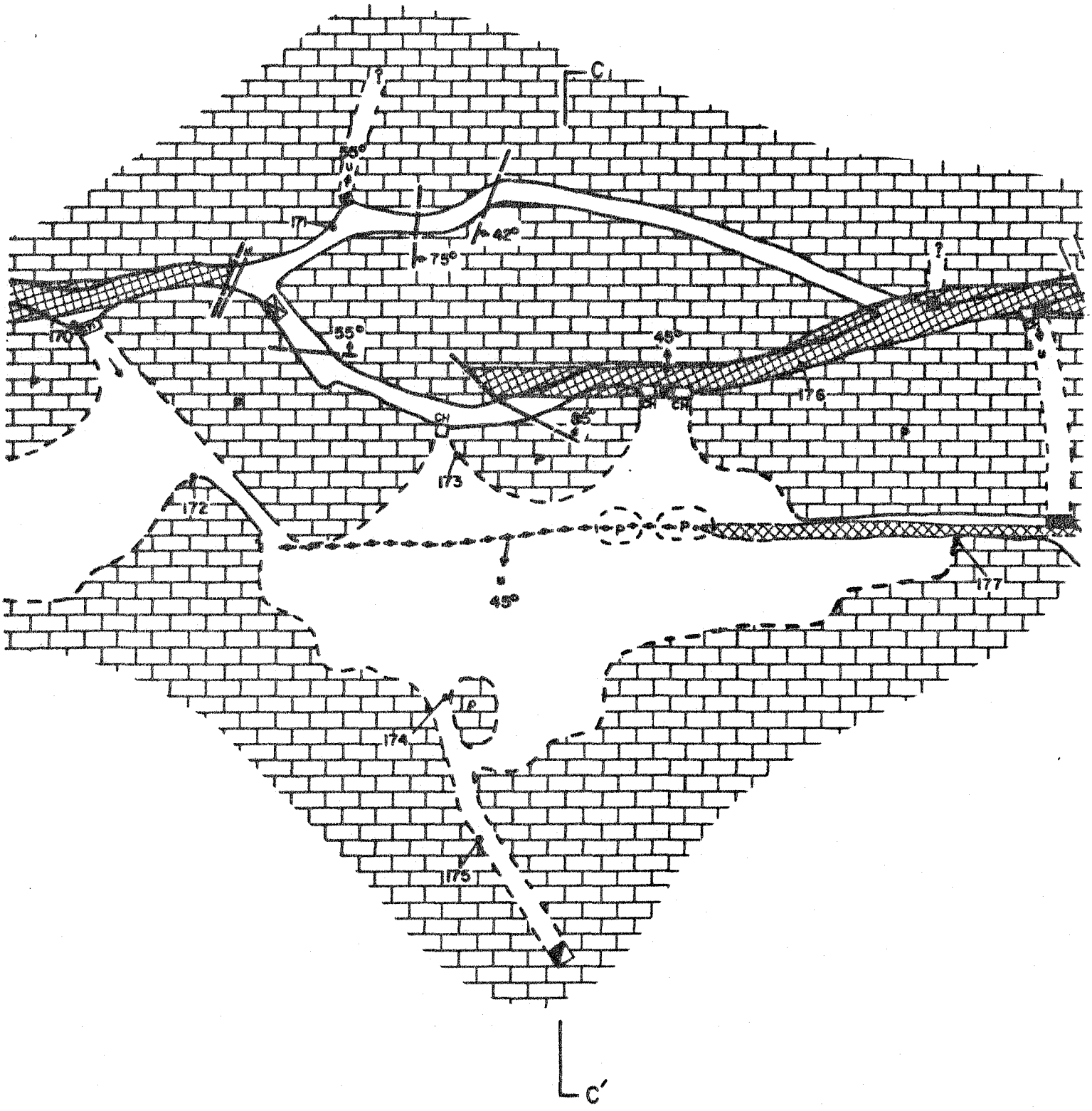




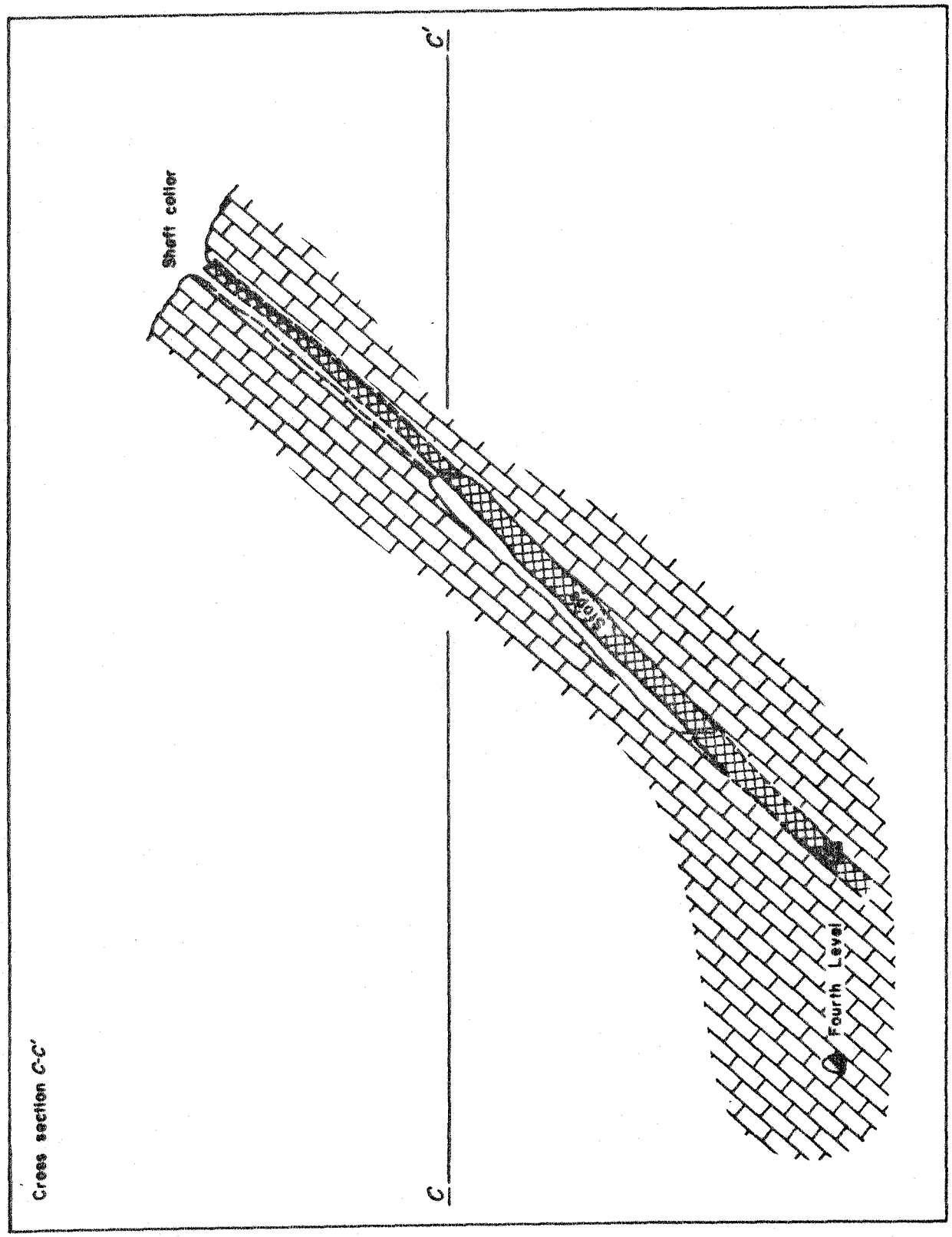
(Figure 6-C, page 4 of 8)



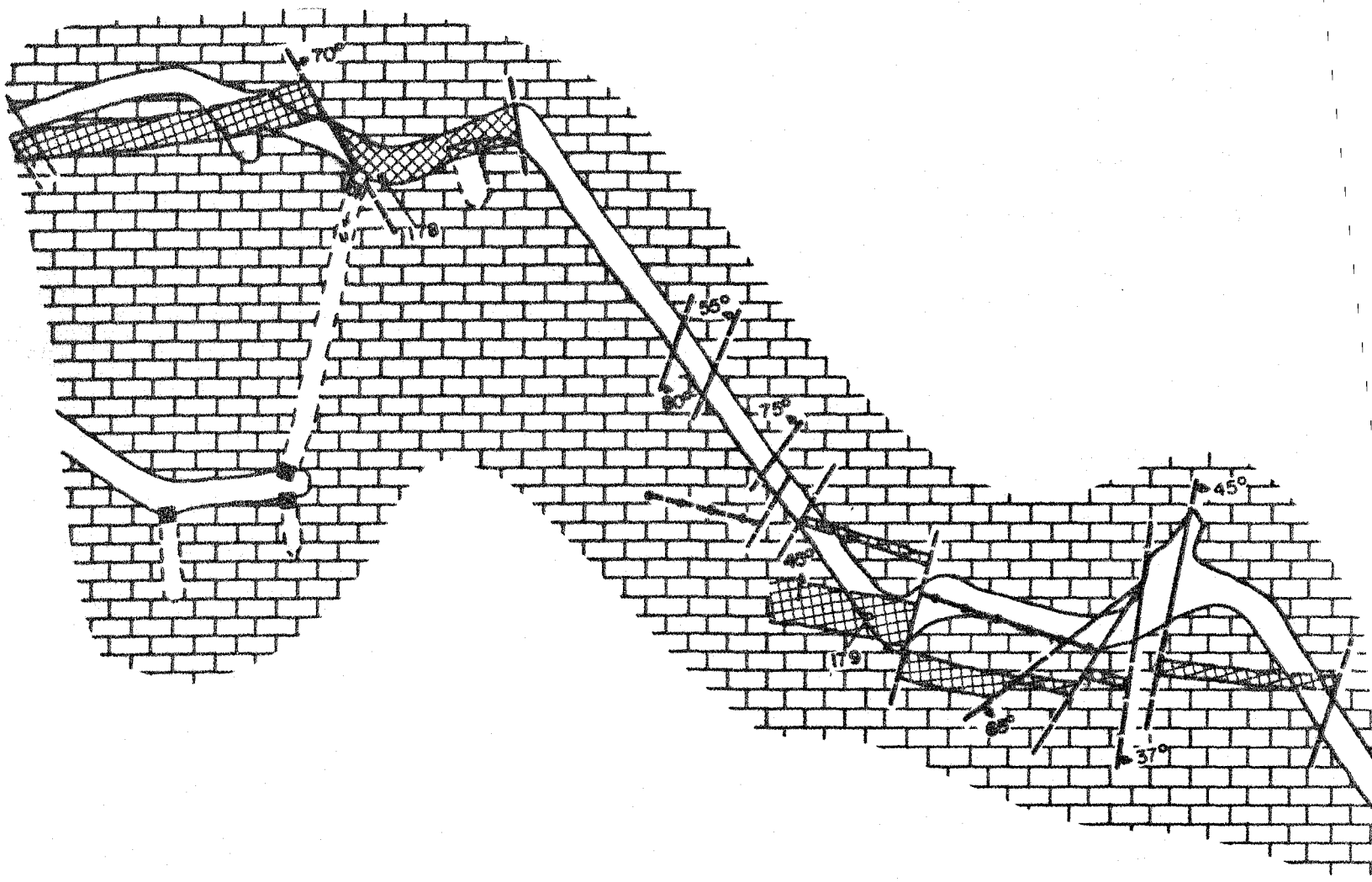
(Figure 6-C, page 5 of 8)



(Figure 6-C, page 6 of 8)



(Figure 6-C, page 7 of 8)



(Figure 6-C, page 8 of 8)

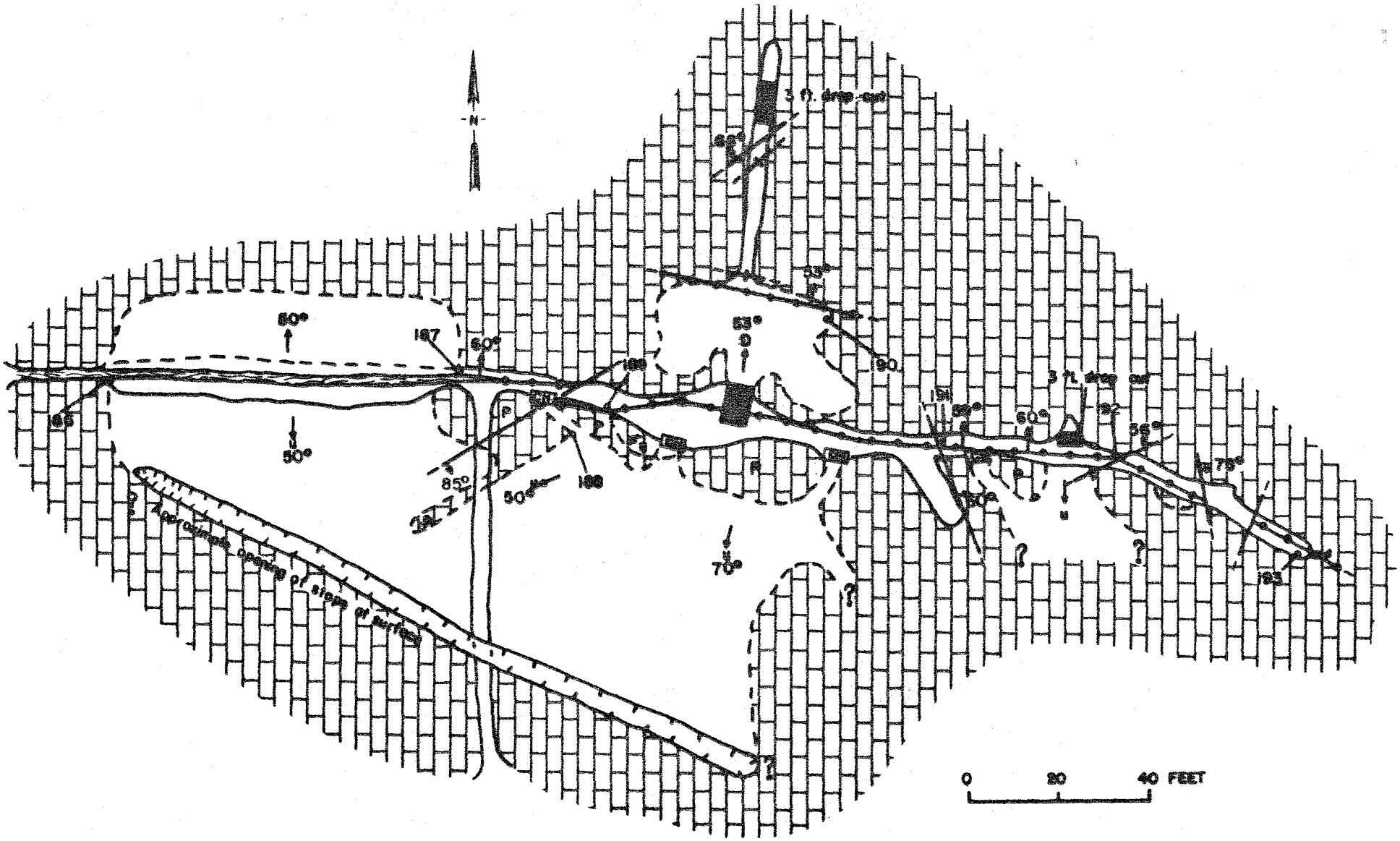


Figure 7.--Map of the Tungsten Queen Mine (outside roadless area) showing sample localities 186-193.

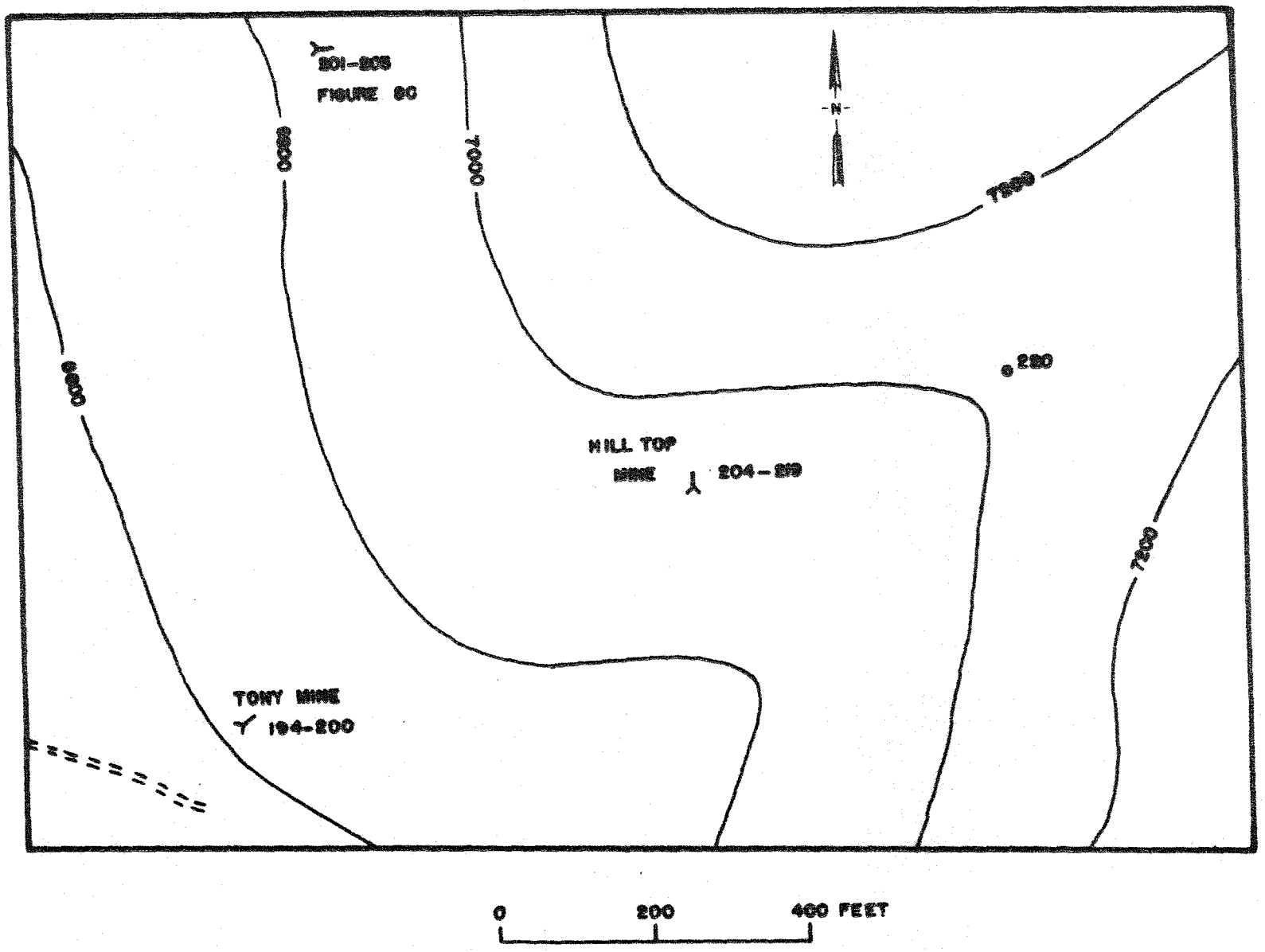


Figure 8-A.--Sketch map of the Hill Top and Tony Mines area showing sample localities 194-220.

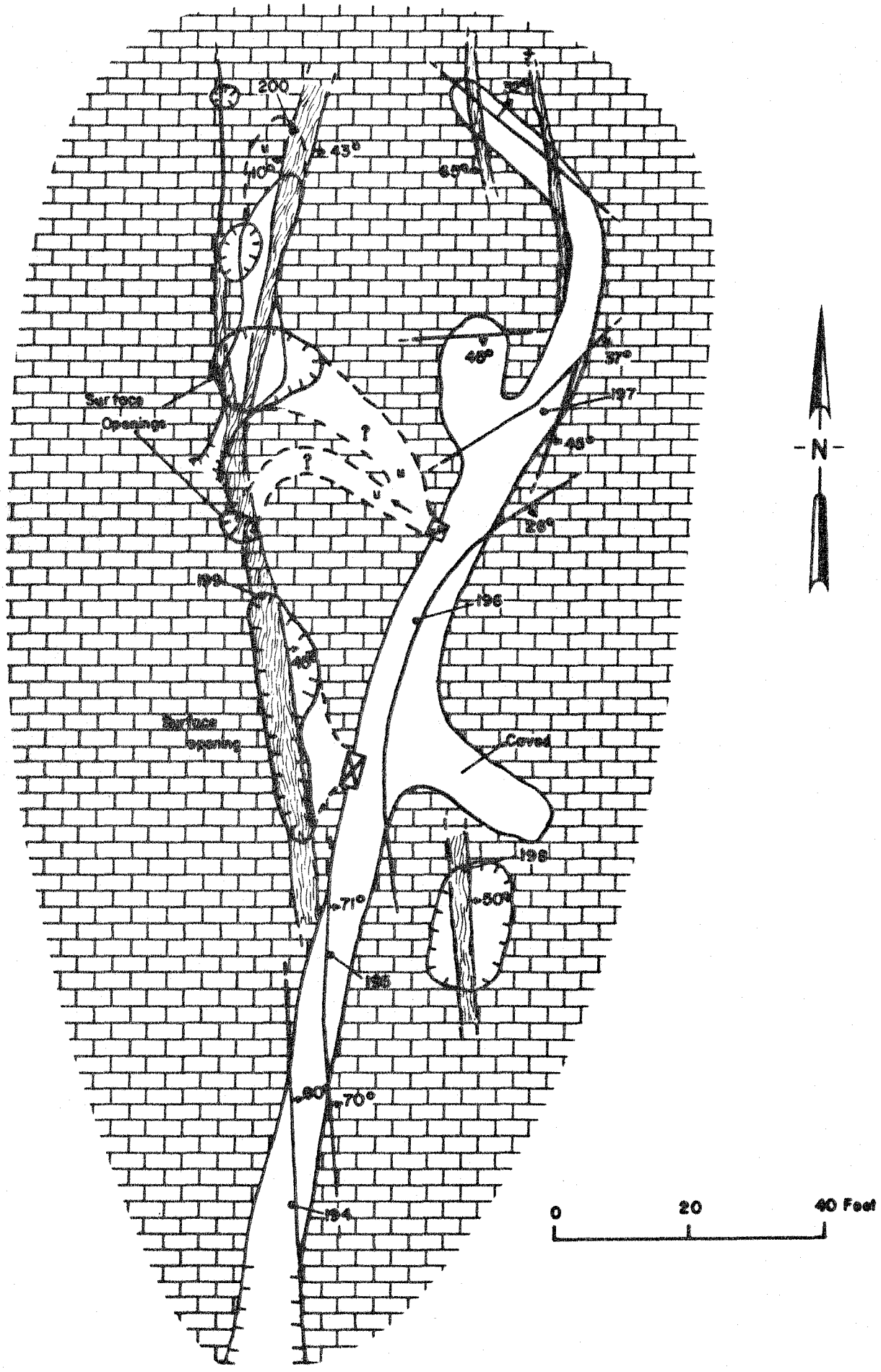


Figure 8-B.--Map of the Tony Mine (outside roadless area) showing sample localities 194-200.

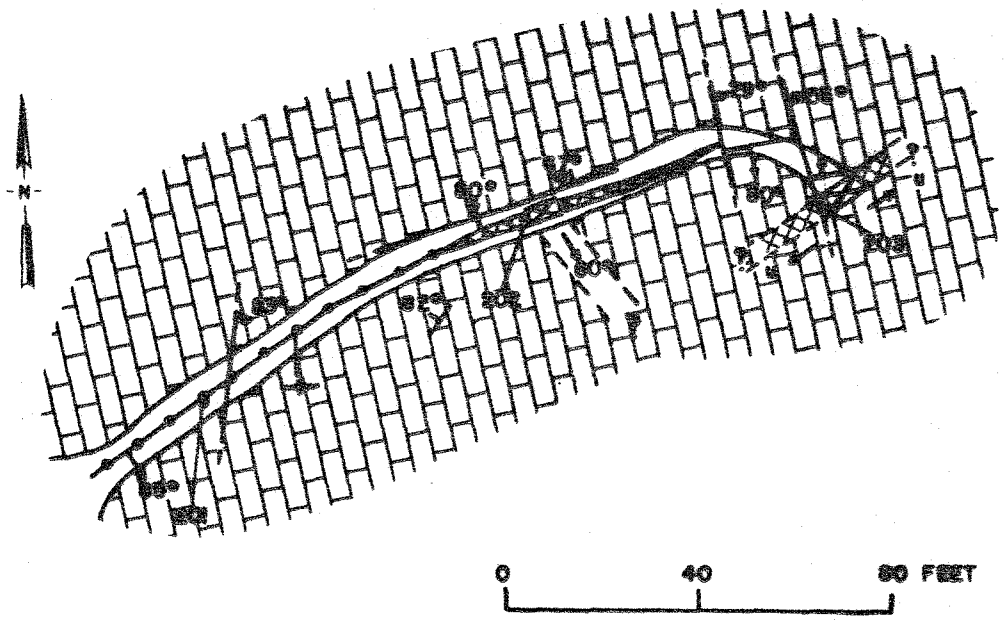
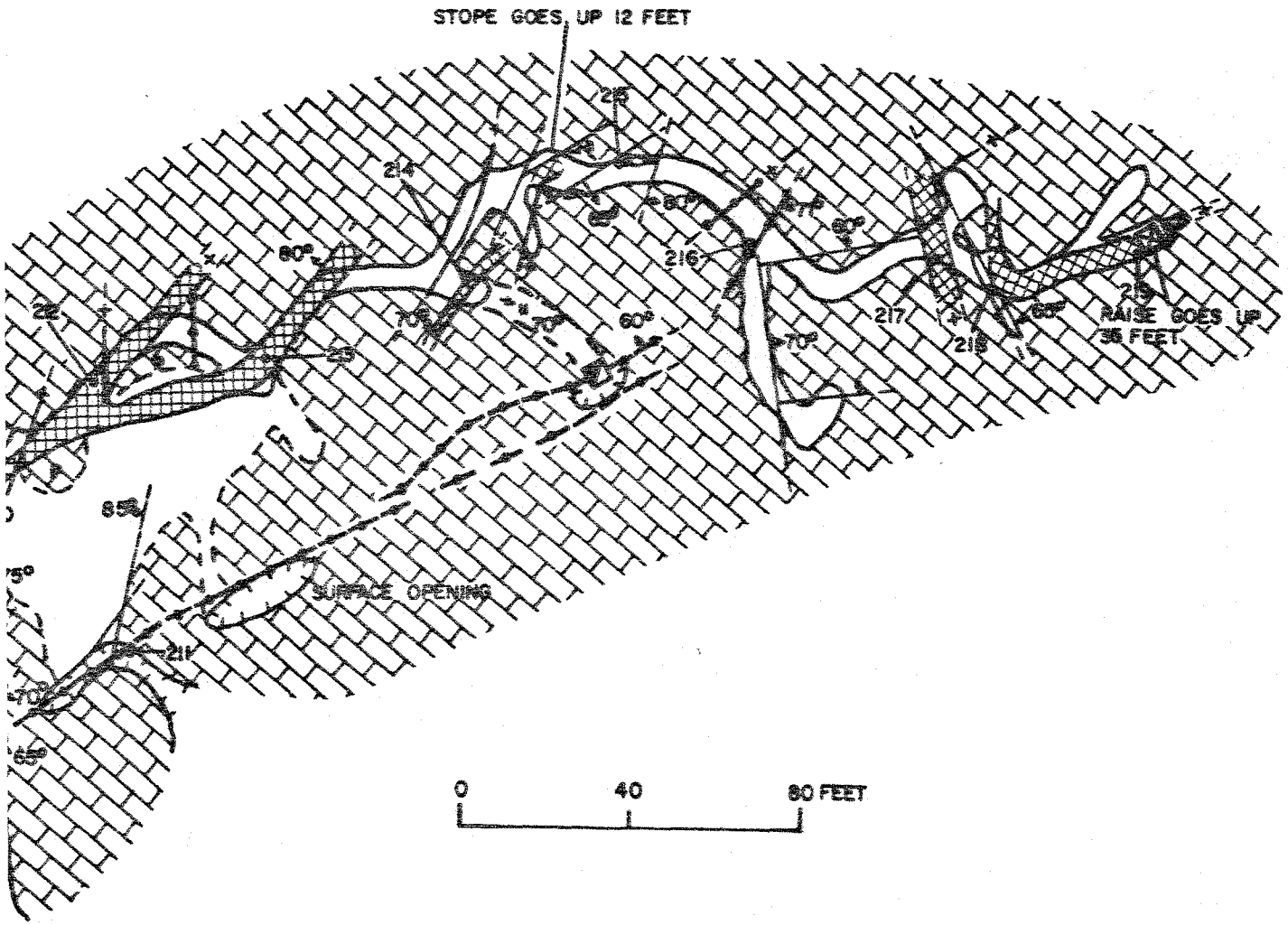


Figure 8-C. - Map showing adit at sample localities 201-203 (outside roadless area).



(outside roadless area) showing sample localities 204-219.

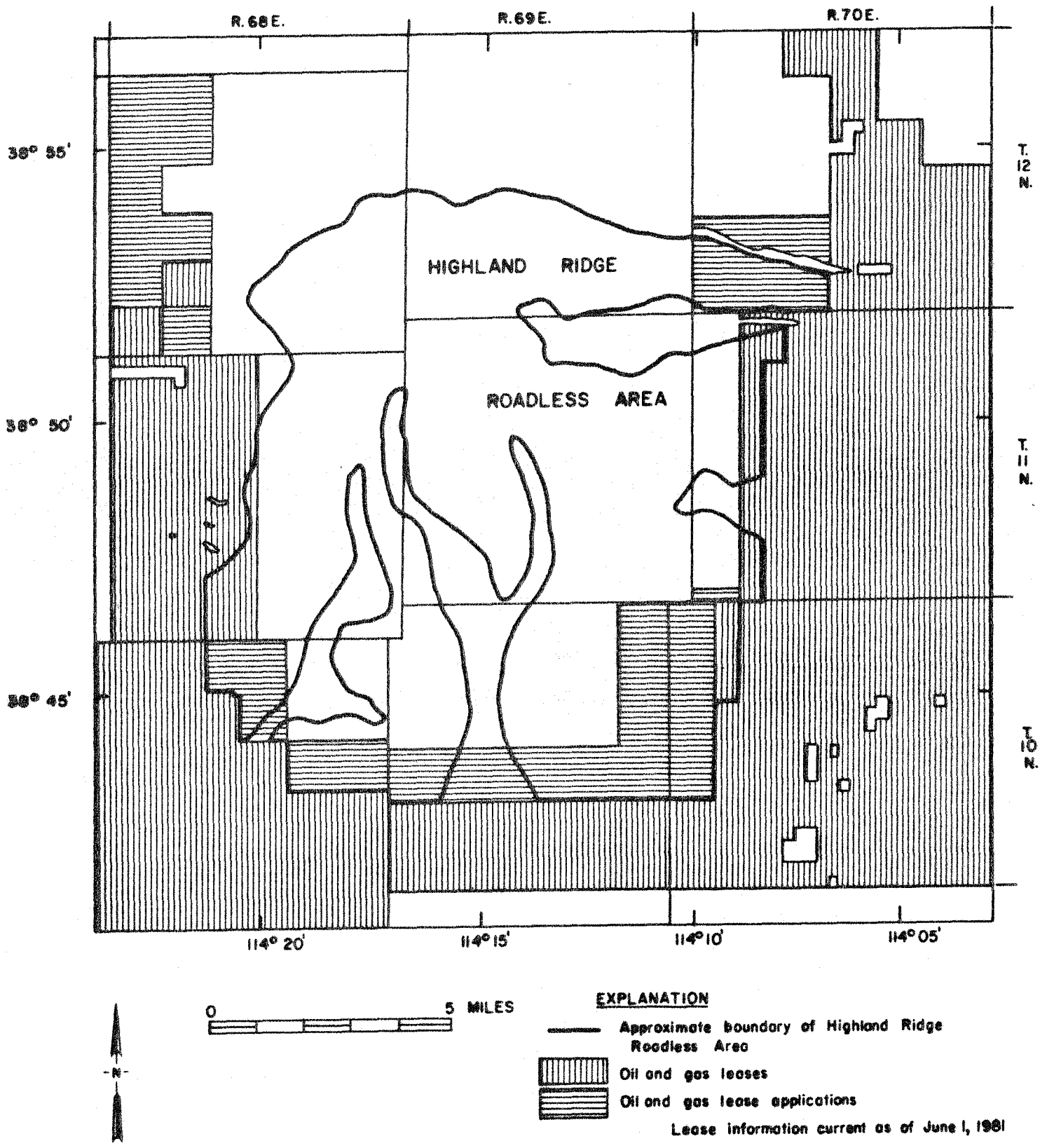


Figure 9. - Oil and gas leases in the vicinity of the Highland Ridge Roadless Area.

Table 1.--Summary of information on mineral deposits in and near the Highland Ridge Roadless Area

[Small production or resources: WO_3, less than 1,000 units; Ag, less than 1,000 oz. Moderate production or resources: WO_3, 1,000-20,000 units; Ag, 1,000-10,000 oz. Large production or resources: WO_3 greater than 20,000 units]

Deposit and location	Commodities	Setting	Control	Size	Development	Production	Resources
Arch Canyon Prospects sec. 11, T. 11 N., R. 69 E. unsurveyed.	Ag, Pb, Cu, Zn.	Pole Canyon Limestone.	Shear zone and quartz vein, strikes eastward, dips 15°-45° south.	Crops out discontinuously for 300 ft along strike.	One short adit, 2 small open cuts, 1 prospect pit.	Unknown, small if any.	Small indicated.
Good Hope Mine secs. 33, 34, T. 12 N., R. 69 E. secs. 3, 4, T. 11 N., R. 69 E. unsurveyed.	W, Ag(?)	Corset Spring Shale, Johns Wash Limestone, and Lincoln Peaks Formations, undivided.	Quartz-calcite veins along bedding in limestone; bedding strikes northward, dips 25°-60° W.	Veins as much as 3 ft thick, exposed in several places in an area 1,800 ft wide, continuity concealed by overburden.	Three short adits, 2 shafts, about 90 backhoe trenches, and numerous prospect pits and bulldozed trenches.	Unknown amounts of Ag, W; probably small.	Unknown, probably small to moderate size.
Lexington Mine (also called Bonanzy) sec. 3, T. 11 N., R. 69 E. unsurveyed.	W	do.	Calcite veins along bedding in flat-lying limestone.	Veins as thick as 1-1/2 ft, extent unknown due to overburden.	Two shafts, 4 backhoe trenches, extensive surface bulldozing.	Moderate WO_3; 1918-$20,000 WO_3; 1941-42-$80,000 WO_3; (Smith, in Hose and others, 1976, p. 77).	Unknown, probably small to moderate size.

Table 1.--Summary of information on mineral deposits in and near the Highland Ridge Roadless Area--Continued

Deposit and location	Commodities	Setting	Control	Size	Development	Production	Resources
Shoshone (Minerva) mining district T. 11 N., R. 68 E. unsurveyed. (individual mines summarized below).	W, Ag	Pole Canyon Limestone.	Seven major quartz-calcite veins strike westward, dip 35° N. to vertical.	As long as 4,000 ft along strike and 800 ft down dip, several inches to 30 ft wide.	One major shaft, several major adits, extensive stoping; numerous small shafts, adits, prospect pits, and trenches; 45 drill holes; operated 1869-76, 1916-18, 1936-57.	More than 93,500 units WO_3; 1,658 oz silver (Smith, in Hose and others, 1976, p. 77).	Large.
Chief-Silver Bell Mine secs. 21, 28, T. 11 N., R. 68 E. unsurveyed.	W, Ag	do.	Quartz-calcite vein strikes eastward, dips 40°-75° N.	Mined 3,300 ft along strike, vein traced 500 ft farther to west, mined 800 ft down dip, 6 in.-20 ft wide.	Several major working levels throughout 800 vertical ft, 1 major shaft, more than 8,000 ft of drifts and crosscuts, and large open stopes.	Large amount WO_3; small, Ag.	Large.

Table 1.--Summary of information on mineral deposits in and near the Highland Ridge Roadless Area--Continued

Deposit and location	Commodities	Setting	Control	Size	Development	Production	Resources
Oriole Mine sec. 21, T. 11 N., R. 68 E. unsurveyed.	W	Pole Canyon Limestone.	Quartz-calcite vein, general strike N. 75° W., dips 60° N. to vertical.	Mined 250 ft along strike and more than 160 ft down dip; vein is 1-1/2-5 ft wide; vein extends eastward unknown distance.	Two levels, 920 ft of drifts and crosscuts; large open stopes.	Moderate amount WO_3.	Unknown, probably moderate size.
West Everit Mine sec. 21, T. 11 N., R. 68 E. unsurveyed.	W, Ag(?)	do.	Quartz-calcite vein, strikes eastward to N. 40° E., dips 45°-75° N.	Mined about 600 ft along strike, 200 ft down dip; 5-25 ft wide; vein extension unknown.	About 900 ft of drifts and crosscuts; moderate size stopes.	Moderate amount WO_3; unknown amount Ag.	Unknown, probably moderate size.
East Everit Mine sec. 21, T. 11 N., R. 68 E. unsurveyed.	W, Ag(?)	do.	Quartz-calcite vein, strikes eastward, dips 45°-75° N.	Mined 1,300 ft along strike, 250 ft down dip, 4-20 ft wide; eastern extension unknown.	About 3,200 ft drifts and crosscuts; extensive stopes.	Large amount WO_3; unknown amount Ag.	Probably large size.

Table 1.--Summary of information on mineral deposits in and near the Highland Ridge Roadless Area--Continued

Deposit and location	Commodities	Setting	Control	Size	Development	Production	Resources
Tungsten Queen Mine (also Canary Yellow) sec. 16, T. 11 N., R. 68 E. unsurveyed.	W	do.	Quartz-calcite vein, strikes eastward, dips 50°-70° N.	Mined 300 ft along strike, 220 ft down dip, 1-6 ft wide; vein continues about 1,000 ft east of mine.	300 ft of drifts; 150 ft of crosscuts; major stoping.	Small amount WO_3.	Small.
Tony Mine sec. 16, T. 11 N., R. 68 E. unsurveyed.	W	Pole Canyon Limestone.	Shear zone filled with breccia, gouge, and quartz and calcite veinlets; strikes northward, dips 45° N.	Mineralized zone exposed about 100 ft along surface, can not be traced down dip, 1/2-3 ft wide.	200 ft adit, 2 small raises; several surface cuts and pits.	Small amount WO_3 (32.5 units, 1941) (Lemmon, 1944, p. 16).	Small.
Hill Top Mine sec. 16, T. 11 N., R. 68 E.	W	do.	Quartz-calcite vein, general strike N. 60° E., dip 35°-80° N.	Mined about 400 ft along strike, 120 ft down dip, 6 in. to 8 ft wide; eastern extension unknown.	About 800 ft of drifts and crosscuts; moderate size stopes.	Moderate amount WO_3.	Moderate size.

Table 2.--Sample and assay data for the Good Hope Mine area

[---, not detected; NA, not analyzed; grab samples of dumps were taken on a 2 ft to 4 ft grid]

Sample		Assay data				Remarks
		Ag	Cu	Pb	W	
No.	Type	oz/ton	percent			
1	Grab	---	NA	NA	0.04	Dump of trench; abundant quartz and calcite veins in limestone; scheelite stringers as wide as 1/2 in.
2	Grab	---	NA	NA	---	Dump of dozer cut; limestone colluvium, some calcite stringers.
3	Channel, 3.5ftx0.2ftx0.2ft	---	NA	NA	---	Backhoe trench, 4 ft deep; limestone colluvium.
4	Grab	---	NA	NA	---	Dump of trench; dark-gray to black limestone abundant quartz and calcite veinlets, sparse scheelite.
5	Grab	---	NA	NA	.02	Dump of caved inclined shaft (dump size indicates less than 100 ft of workings); blocky limestone with numerous quartz and calcite veins, abundant scheelite on dump.
6	Grab	---	NA	NA	---	Dump of trench; limestone colluvium with numerous calcite veins and some quartz veins.
7	Grab	0.2	NA	NA	---	Dump of prospect pit; limestone colluvium with abundant calcite and quartz veins and pods.
8	Grab	.2	NA	NA	---	Dump of caved decline (dump size indicates working of at least 40 ft); dark-gray to black blocky limestone with abundant calcite stringers and some quartz.

Table 2.--Sample and assay data for the Good Hope Mine area--Continued

Sample No.	Sample Type	Assay data Ag oz/ton	Cu percent	Pb percent	W percent	Remarks
9	Grab, select material.	0.8	0.01	0.25	---	Dump of decline; large quartz vein contains a small amount of disseminated galena and iron oxide.
10	Grab	---	.01	NA	---	Dump of caved decline (dump size indicates working of at least 35 ft); thin-bedded dark-gray to black limestone with numerous calcite and quartz veins; small amount of malachite and azurite staining on the quartz.
11	Chip, 2.5 ft	---	NA	NA	---	Prospect pit; quartz vein several feet thick; minor iron staining.
12	Grab	.4	NA	NA	---	Dump of backhoe trench (2.5 ft deep); limestone colluvium.
13	Grab	.4	NA	NA	---	Dump of trench; limestone colluvium with abundant calcite and quartz veins.
14	Grab	---	NA	NA	---	Dump of prospect pit; bedrock at 3-ft depth consists of dark, blocky limestone with abundant quartz; some limonitic material and gossan structure present in the quartz.
15	Grab	---	NA	NA	---	Dump of trench; limestone colluvium.
16	Grab	---	NA	NA	0.02	Dump of backhoe trench (9 ft deep); no bedrock exposed, colluvium ranges from soil to blocky, dark-gray limestone; limestone contains numerous veins and pods of calcite and scheelite.
17	Grab	---	NA	NA	---	Dump of trench; limestone and some calcite.

Table 2.--Sample and assay data for the Good Hope Mine area--Continued

Sample No.	Sample Type	Assay data Ag oz/ton	Cu percent	Pb percent	W percent	Remarks
18	Grab	---	NA	NA	0.09	Material piled outside portal of inclined adit.
19	Grab	0.2	NA	NA	.01	Dump of trench; limestone colluvium.
20	Grab	---	NA	NA	---	Dump of backhoe trench (5 ft deep); bedrock at 3 ft consists of thinly laminated limestone.
21	Grab	.2	NA	NA	---	Dump of backhoe trench (2 ft deep); blocky limestone colluvium.
22	Grab	---	NA	NA	---	Dump of backhoe trench (10 ft deep); bedrock near bottom consists of thinly bedded limestone.
23	Grab	---	NA	NA	---	Dump of backhoe trench (8 ft deep); thinly laminated limestone colluvium.
24	Grab	---	NA	NA	---	Dump of backhoe trench (5 ft deep); fine, limestone colluvium.

Table 3.--Sample and assay data for the Lexington Mine area

[---, not detected; NA, not analyzed; grab samples were taken on a 3 ft to 5 ft grid]

Sample No.	Sample Type	Assay data Ag oz/ton	Assay data W percent	Remarks
29	Grab	---	---	Backhoe trench; limestone colluvium, numerous calcite stringers.
30	Grab	---	---	Dump at shaft, unknown depth; 10 ft overburden over bedrock, dark-gray limestone, numerous calcite stringers.
31	Grab	---	---	Backhoe trench 3 ft deep; dark-gray limestone, numerous calcite stringers.
32	Grab	0.4	---	Dump at shaft; dark-gray limestone, numerous calcite stringers.
33	Chip, 3.5 ft	---	0.11	Backhoe trench 5 ft deep; limestone colluvium material contains numerous calcite veins.
34	Grab	---	.22	Do.
35	Grab	---	.2	Backhoe trench 6 ft deep; limestone colluvium material.
36	Chip, 5 ft	---	---	Do.
37	Grab	---	---	Bulldozer trench; limestone contains calcite stringers.
38	Grab	---	---	Do.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area

[Tr, trace; ---, not detected; NA, not analyzed; ***, not applicable]

Sample			Assay data				
		Length	Au	Ag	W	Cu	
No.	Type	(feet)	oz/ton		percent		Remarks
			PROSPECTS IN CHIEF-SILVER BELL AREA				
55	Chip	3	---	---	0.12	NA	Adit by road between Silver Bell and Chief; fault up to 4 ft wide; gouge and brecciated limestone, abundant calcite, intense iron staining, gray limestone country rock.
56	Chip	2	---	1.87	---	NA	Decline; fault zone 2-3 ft wide, with altered, iron-stained limestone, quartz.
57	Chip	3.5	0.038	3.57	.01	0.03	50 ft adit; major fault with 2 in. clayey gouge, 1 ft altered, iron-stained limestone, and 2 ft milky quartz; minor amount of malachite staining.
58	Chip	3	---	---	.04	NA	Prospect pit; fault with 2-1/2 ft wide quartz vein, several inches clayey gouge, thin-bedded limestone above and massive limestone below the fault.
59	Dump, 6 ft grid.	***	---	.33	.06	NA	Dump of 50 ft shaft east of Silver Bell Mine; shaft sunk on 6-8 ft wide fault, dark gray to black limestone, quartz, calcite, and oxidized gossan material.
60	Chip	2.5	---	---	.01	NA	Portal of 20 ft adit east of Silver Bell Mine; vertical fault up to 4 ft wide with altered limestone, gouge, and calcite.
61	Stockpile grab	***	---	2.74	.01	NA	Stockpile at small shaft west of Silver Bell Mine; on Silver Bell vein, milky quartz with iron and malachite staining, dark gray limestone country rock.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			PROSPECTS IN CHIEF-SILVER BELL AREA--Continued				
62	Chip	2.5	---	1.262	0.03	NA	50 ft inclined adit N-NW of Silver Bell Mine; driven on fault zone several feet thick; black, fractured limestone country rock, quartz pods and stringers, several inches of limonitic, clayey gouge.
63	Chip	2	---	---	.63	NA	Do.
64	Chip	4	---	.3	---	NA	Prospect pit, 6 ft deep; contact between rhyolite and limestone, 4 in. wide alteration zone at contact, abundant hematite staining.
			CHIEF-SILVER BELL MINE				
65	Chip	3	---	---	.05	NA	Drift; 2 ft calcite vein, good showing of scheelite.
66	Chip	5	---	---	.33	NA	Stope; calcite-quartz veins up to 1/2 in. wide, scattered scheelite.
67	Chip	6	---	---	.19	NA	Near portal; fractured black limestone with quartz-calcite veins up to 1 ft wide, good scheelite showing.
68	Chip	4	---	---	---	NA	Near portal of upper level; major vein, black limestone with calcite-quartz veins up to 1 ft wide, good scheelite showing.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Type	Length (feet)	Assay data Au (oz/ton)	Ag (oz/ton)	W (percent)	Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
69	Chip	4	---	---	0.15	NA	Stope; black limestone with calcite-quartz veins up to 4 in. thick.
70	Chip	3	---	---	---	NA	Calcite stringers and limonite staining associated with fault; dark gray to black limestone country rock.
71	Chip	3	NA	NA	NA	NA	Fault zone; calcite-quartz veinlets up to 6 in. wide, scheelite spotty, sample lost in preparation.
72	Chip	2	---	3.51	---	NA	1 ft wide calcite-quartz vein; no scheelite observed.
73	Chip	4	---	---	---	NA	Fault zone; limonite gouge, limestone fragments, calcite stringers, no scheelite observed.
74	Chip	4	---	---	.17	NA	Major vein in upper level; black limestone with calcite and quartz veins, some scheelite present.
75	Chip	4	---	.2	---	NA	3rd level; calcite-quartz vein in limestone.
76	Chip	5	---	---	---	NA	Fault, upper level; black limestone with thin veinlets of quartz and calcite, minor amount of scheelite.
77	Chip	3	---	---	.12	NA	Upper level; 2 ft calcite-quartz vein, iron stained and fractured, good show of scheelite.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
78	Chip	4	---	---	---	NA	Upper level; highly fractured, iron stained limestone with intermixed calcite, scheelite spotty.
79	Chip	5	---	---	0.16	NA	3rd level; black limestone with calcite-quartz veins, some scheelite present.
80	Chip	5	---	0.4	.38	---	Stope; quartz vein 15 ft wide, limestone brecciated near vein, small amount of malachite staining on quartz.
81	Chip	4	---	---	.38	---	Drift; major vein containing quartz-calcite veins up to 1 ft wide, good scheelite showing.
82	Chip	4	---	.90	.13	NA	Drift; brecciated limestone and calcite, scheelite spotty.
83	Chip	4	---	---	.05	NA	Drift; calcite-quartz veins 1 ft thick, good showing of scheelite.
84	Chip	2	---	---	.20	NA	Drift; major vein 2-5 ft thick; intermixed calcite and quartz, good showing of scheelite.
85	Chip	5	---	.21	.19	NA	Stope; black limestone with calcite-quartz veins as much as 2 ft wide, good showing of scheelite.
86	Chip	4	---	---	.01	NA	Drift; breccia zone; limestone, with calcite veins and veinlets.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Type	Length (feet)	Assay data Au (oz/ton)	Ag (oz/ton)	W (percent)	Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
87	Chip	5	---	---	---	NA	Drift; black limestone, with quartz-calcite veinlets as much as 1/2 in. wide, no scheelite observed.
88	Chip	3	---	---	0.01	NA	Calcite vein 2 ft wide in highly fractured iron-stained limestone.
89	Chip	4	---	---	---	NA	Fault zone; black limestone cut by thin veinlets of quartz and calcite, no scheelite observed.
90	Chip	5	---	---	.17	NA	Upper level drift; major vein; iron-stained veinlets in limestone, scheelite present.
91	Chip	4	---	---	.10	NA	Drift; pocket of scheelite mineralization 20 ft in diameter, black limestone, with calcite veins and stringers.
92	Chip	4	---	0.88	.01	NA	Drift; folded and faulted black limestone, iron staining and gouge as thick as 3/4 in. on bedding planes, calcite stringers, no scheelite observed.
93	Chip	3	---	1.55	.37	NA	Fault; calcite, heavy iron staining, good showing of scheelite.
94	Chip	4	---	.38	---	NA	Quartz-calcite veinlets as much as 3/4 in. wide in black limestone; scheelite spotty.
95	Chip	6	---	1.10	---	NA	Calcite and quartz veinlets as much as 3/4 in. wide in fractured, black limestone.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
96	Chip	4	---	0.05	0.16	NA	Quartz-calcite vein, width unknown, highly fractured, iron stained; 2 ft of vein has abundant scheelite.
97	Chip	4	---	---	---	NA	Iron-stained calcite-quartz vein; black limestone; scheelite spotty.
98	Chip	4	---	---	.28	NA	Stope; quartz-calcite vein; good showing of scheelite.
99	Chip	3	---	---	.25	NA	Vein; highly fractured, iron-stained limestone and calcite, scheelite spotty.
100	Chip	6	---	---	---	NA	Iron-stained calcite-quartz veinlets; fractured, black limestone, scheelite spotty.
101	Chip	5	---	---	.06	NA	Drift; shear zone on contact with quartz-calcite vein, iron-stained gouge as much as 4 in. thick; good showing of scheelite.
102	Chip	6	---	---	.31	NA	Stope; shear zone; thick calcite vein, iron staining, good showing of scheelite.
103	Chip	2	---	---	.04	NA	Drift; shear zone as much as 9 in. wide; iron-stained gouge and calcite.
104	Chip	4	---	---	.07	NA	Drift; calcite vein as much as 1-1/2 ft wide; scheelite sparsely distributed.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
105	Chip	5	---	0.558	---	NA	Stope; major vein; calcite, fractured limestone, iron staining.
106	Chip	3	---	.508	0.38	NA	Stope; calcite, fractured limestone, iron staining, some scheelite.
107	Chip	5	---	---	.01	NA	Drift; fractured, black limestone with calcite and quartz veins; iron staining, sparse scheelite.
108	Chip	5	---	---	---	NA	Drift; intensely fractured limestone; calcite and quartz veinlets as wide as 3 in., iron-staining, no scheelite observed.
109	Chip	4.5	---	---	.04	NA	Drift; large quartz and calcite pod with 3-ft zone of scheelite.
110	Chip	4.5	---	---	---	NA	Stope; quartz-calcite vein, several feet wide; 3-ft zone of scheelite.
111	Chip	3	---	---	.22	NA	Stope; zone of scheelite in massive quartz vein.
112	Chip	5	---	---	---	NA	Fault zone as much as 1 ft wide; heavily iron stained, clayey gouge and altered limestone.
113	Chip	4.5	---	---	.01	NA	Fault zone; heavily iron stained, clayey gouge and altered limestone.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
114	Chip	4	---	---	0.01	NA	Fault zone 2 ft wide; limonitic, clayey gouge, brecciated calcite, limestone, quartz.
115	Chip	4.5	---	---	1.20	NA	Drift; quartz and calcite vein in limestone; good showing of scheelite.
116	Chip	2.5	---	---	.13	NA	Stope; lens of scheelite mineralization in major quartz vein.
117	Chip	5	---	0.2	.56	NA	Drift; bottom of stoped ore shoot; good showing of scheelite.
118	Chip	5	---	---	.25	NA	Main shaft; good showing of scheelite throughout width of shaft.
119	Chip	5	---	.8	1.14	NA	Main shaft; small lenses of scheelite in sample interval.
120	Chip	4	---	.2	.51	NA	Main shaft; scattered scheelite in patches and veinlets as much as 1/2 in. wide.
121	Chip	4	---	.6	.40	NA	Main shaft; scheelite zone about 3 ft wide.
122	Chip	3	---	.6	.29	NA	Stope off main shaft; scheelite zone about 3 ft thick.

Table 4.--Sample and assay data for the Chief-Silver Bell Mine and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Au (oz/ton)	Assay data Ag (oz/ton)	Assay data W (percent)	Assay data Cu (percent)	Remarks
			CHIEF-SILVER BELL MINE--Continued				
123	Chip	4	---	1.6	0.16	NA	Main shaft; dark-gray to black limestone, abundant quartz veinlets, some calcite, scheelite present throughout 4 ft width.
124	Chip	4	---	---	---	NA	Drift; dark-gray to black limestone, containing minor amounts of calcite, quartz, and scheelite.
125	Chip	4.5	---	---	.34	NA	Major quartz-calcite vein next to ore chute; good showing of scheelite.
126	Chip	4	---	.2	.26	NA	Quartz-calcite vein 3 ft wide; clayey, limonitic gouge 1 ft wide in footwall, abundant scheelite.
127	Chip	6	---	---	.43	NA	Drift; vein of massive, white calcite; good showing of scheelite.
128	Chip	5	---	---	.06	NA	Stope; calcite veinlets in limestone, limonite staining.
129	Chip	6	---	---	.15	NA	Drift; limestone with calcite veins and heavy iron staining, good showing of scheelite.
130	Chip	6	---	---	---	NA	Stope; limestone with calcite veinlets, limonite staining, sparse scheelite.
131	Chip	6	---	---	.13	NA	Drift; small lens of disseminated scheelite near end of drift.

Table 5.--Sample and assay data for the Oriole Mine

[---, not detected]

Sample No.	Sample Length of chip (feet)	Assay data Au oz/ton	Assay data W percent	Remarks
135	3	---	---	Intensely fractured fault zone; iron-staining, abundant calcite, and 1 in. of gouge; gray limestone country rock, calcite stringers.
136	3	---	---	Major fault; brecciated limestone and calcite; some quartz and iron staining.
137	3	---	0.30	3-ft wide calcite vein; wide zone of iron staining, good showing of scheelite.
138	4.5	0.128	.59	Shear zone; brecciated limestone intermixed with calcite; some iron staining, good show of scheelite.
139	4	---	.28	Drift at the bottom of a stope; gray limestone, abundant calcite veins, good showing of scheelite.
140	4	---	.47	Upper level of Oriole; quartz-calcite vein, good showing of scheelite.

Table 6.--Sample and assay data for the West and East Everit Mines and area

[---, not detected; ***, not applicable]

Sample			Assay data		
No.	Type	Length (feet)	Ag oz/ton	W percent	Remarks
			PROSPECTS IN EAST AND WEST EVERIT MINES AREA		
141	Chip	3.5	---	0.12	Prospect pit, west of West Everit workings; fault with iron-stained clayey gouge; fractured gray limestone country rock, intermixed calcite veinlets.
142	Chip	4	---	---	Short adit, north of West Everit workings; shear in gray limestone; some calcite and quartz, some iron staining.
143	Chip	2.5	0.2	---	Same adit as sample 142; 6 in.-wide fault in fractured gray limestone; quartz, calcite, malachite staining.
144	Chip	2.5	---	---	Intersection of short adit and vertical cut adjacent to samples 142 and 143; massive calcite vein; dark-gray limestone country rock.
145	Dump, 3 ft grid.	***	---	---	Small shaft east of East Everit Mine; fault; abundant calcite stringers in limestone, limonite and hematite present.
			WEST EVERIT MINE		
146	Chip	4	.7	.01	Lowest level adit; massive quartz vein; fractured, intermixed, black limestone, 2-6 in. beds of limestone country rock.
147	Chip	5	1.3	---	Same adit as sample 146, stope; massive vein; fractured quartz-calcite, heavily iron stained.
148	Chip	5	---	---	Same adit as above, drift under stope; major cross cutting fault; clayey gouge, quartz, calcite, and limestone fragments.

Table 6.--Sample and assay data for the West and East Everit Mines and area--Continued

Sample			Assay data		
No.	Type	Length (feet)	Ag oz/ton	W percent	Remarks
			WEST EVERIT MINE--Continued		
149	Chip	5	0.3	---	Same adit as above; shear zone with limestone and calcite breccia; abundant hematite staining.
150	Chip	4	1.5	0.03	Prospect pit above portal of lowest Everit adit; about 20-ft wide quartz vein outcrop; calcite, hematite, epidote, minor amount of malachite staining, 0.02 percent Cu.
151	Chip	4	---	---	2nd level adit; highly fractured, 7-ft wide, calcite-quartz vein; gray limestone country rock.
152	Chip	4	---	---	Same adit as above; shear zone with brecciated calcite and limestone associated with calcite and quartz veinlets.
153	Chip	4	---	.02	Caved stope; quartz vein 20-25 ft wide; intermixed brecciated limestone, some oxidized gossan material present.
154	Chip	2.5	---	.40	Same stope as above, shear zone with calcite and iron-stained gouge; gray limestone country rock.
			EAST EVERIT MINE		
155	Chip	4	---	.22	2nd level drift; calcite-quartz vein in gray limestone; some scheelite present.
156	Chip	4	---	.04	1st level, under 15-ft stope; calcite-quartz stringers in gray limestone, some scheelite present.
157	Chip	3	---	.13	2nd level stope; calcite vein 3-ft wide; fractured and iron-stained, some scheelite present.
158	Chip	5	---	.21	Flat-lying stope connects with 3rd level; massive calcite zone, width undeterminable.
159	Chip	5	---	---	Do.

Table 6.--Sample and assay data for the West and East Everit Mines and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Ag oz/ton	Assay data W percent	Remarks
			EAST EVERIT MINE--Continued		
160	Chip	3	8.4	0.04	4th level, major vein under stope; massive calcite-quartz vein 15-ft thick; gray limestone country rock, good showing of scheelite.
161	Chip	3	---	.10	Wide calcite-quartz vein under stope; some iron staining, some scheelite present.
162	Chip	4	---	---	Drift; quartz-calcite vein; some iron staining, some scheelite present.
163	Chip	4	1.9	.13	Surface opening of stope; quartz-calcite vein; gray limestone country rock.
164	Chip	4	2.9	.22	Surface opening of stope; contact between limestone and limestone with intermixed quartz; epidote present.
165	Chip	3	.2	.09	Stope; major calcite-quartz vein; iron-stained and highly fractured, some scheelite present.
166	Chip	4	.2	.24	Short crosscut; wide, massive, highly fractured quartz vein; good showing of scheelite.
167	Chip	5	.3	.05	Stope; wide, highly fractured, quartz-calcite vein; some iron staining, good showing of scheelite.
168	Chip	3	.3	.37	Stope; massive quartz-calcite vein as wide as 15 ft; good showing of scheelite.
169	Chip	4	---	.05	Drift, under stope; calcite-quartz vein in gray limestone; some scheelite present.

Table 6.--Sample and assay data for the West and East Everit Mines and area--Continued

Sample No.	Sample Type	Sample Length (feet)	Assay data Ag oz/ton	Assay data W percent	Remarks
			EAST EVERIT MINE--Continued		
170	Chip	3	---	0.33	Drift, under stope; massive calcite-quartz vein; abundant scheelite in places.
171	Chip	4	---	.03	Drift, near raise; gray limestone with calcite and quartz stringers; some scheelite present.
172	Chip	4	---	.28	Stope; massive quartz-calcite vein; good showing of scheelite.
173	Chip	4	1.656	.14	Stope, under shaft; major quartz-calcite vein.
174	Chip	3	.976	.30	Pillar, bottom of East Everit manway; scattered scheelite.
175	Chip	2.5	.642	.08	East Everit manway; quartz-calcite vein, scattered scheelite.
176	Chip	4	---	.31	Drift, under stope; massive quartz-calcite vein; scattered scheelite.
177	Chip	5	.7	.10	Stope; massive quartz-calcite vein; scheelite spotty.
178	Chip	3	.3	.33	Drift, under stope; massive quartz vein, several feet wide; good showing of scheelite in sample interval, not continuous throughout vein.
179	Chip	3.5	.5	.60	Massive calcite vein; fractured and iron-stained, good showing of scheelite.
180	Chip	5	.5	.02	Drift, bottom of open stope; fractured quartz-calcite vein, some iron staining.
181	Chip	5	---	.14	Same stope as above; gray limestone, with quartz and calcite; 1 ft wide iron-stained shear zone.
182	Chip	3	---	---	Upper level drift, same stope as above; quartz-calcite vein 2 ft wide.

Table 7.--Sample and assay data for the Tungsten Queen Mine

[---, not detected]

Sample No.	Length of chip (feet)	Assay data Ag oz/ton	Assay data W percent	Remarks
186	2.5	---	0.05	Edge of stope; calcite vein, with some quartz; iron-staining, a little scheelite.
187	4.5	---	.02	Drift at entrance to stope; 3-ft wide vein of massive calcite, with some scheelite; gray limestone country rock, with calcite veinlets.
188	4	---	.04	Stope above drift; 2-ft wide vein of massive calcite, some scheelite.
189	4	---	.23	Drift under stope; 1-ft wide vein of calcite; good showing of scheelite.
190	3	---	.01	Bottom of underhand stope; vein of massive calcite as wide as 1-1/2 ft; no scheelite observed.
191	4	---	.27	Drift near ore chute; major vein of massive calcite and some scheelite; gray limestone country rock with calcite stringers.
192	3	---	.02	Drift under stope; 1-1/2-ft wide vein of iron-stained massive calcite; some scheelite.
193	3	0.5	---	Face of drift; 1-ft wide vein of calcite; spotty scheelite.

Table 8.--Sample and assay data for the Hill Top and Tony Mines area

[---, not detected]

Sample No.	Sample Length of chip (feet)	Assay data W percent	Remarks
			TONY MINE
194	4	---	Adit; 1-1/2-ft wide fault; gouge, limestone and quartz breccia; heavily iron-stained.
195	2	---	Same adit as above; 1-1/2-ft wide fault; gouge, brecciated limestone, calcite veinlets; gray limestone country rock.
196	4	0.02	Same adit as above; intensely fractured zone; narrow fault with iron-stained gouge; brecciated limestone, calcite veinlets.
197	3	---	Same adit as above; sample taken across two intersecting faults; highly fractured limestone and iron-stained gouge, some calcite.
198	3	---	Small underhand stope; 2-ft wide fault; iron-stained and intensely altered limestone.
199	2.5	.27	Top of stope at surface; fault zone; intensely fractured limestone, quartz, and calcite, iron-stained.
200	2	.08	Stope; structure same as above.
			ADIT NORTHWEST OF HILL TOP MINE
201	5.5	.01	Adit below Hill Top Mine; quartz-calcite vein; heavily iron stained, gray limestone country rock with intermixed quartz and calcite veinlets.
202	5	.23	Same adit as above, near bottom of raise; quartz-calcite vein.
203	2.5	.05	Do.

Table 8.--Sample and assay data for the Hill Top and Tony Mines area--Continued

Sample No.	Sample Length of chip (feet)	Assay data W percent	Remarks
			HILL TOP MINE
204	4	1.49	Short adit above Hill Top Mine; two intersecting faults; limestone breccia, with quartz and calcite, abundant iron stain.
205	4	.01	Face of above adit; vein of fractured calcite in fault zone; some iron stain.
206	1	---	Fault; prominent fracture, with slickensides, iron stain.
207	3.5	.02	Intersection of fault and vein; fault contains brecciated limestone and calcite, 5-in. wide clayey gouge; cuts off vein that stopes are on; vein contains calcite, brecciated limestone, iron stain.
208	2	.09	Sill level at edge of stope; massive, iron-stained calcite vein, about 2 ft wide.
209	3.5	---	Drift near stope; major fault; calcite and other mineralization spotty.
210	3.5	.10	Drift, under stope; major vein about 3-1/2-ft wide; intensely fractured massive calcite, iron stained, gray limestone country rock.
211	3	.94	Surface opening, top of stope; 1-1/2-ft wide quartz-calcite vein; gray limestone country rock, with quartz and calcite stringers.
212	4	.02	Drift near stope; massive calcite vein as much as 6 in. wide.
213	5	.02	Major fault, gray limestone; abundant calcite stringers and iron staining, some travertine present along fault plane.
214	3	.01	Bottom of narrow stope; massive calcite vein as much as 5 ft thick.
215	2.5	.16	Fault; iron-stained fractures in limestone, some calcite.

Table 8.--Sample and assay data for the Hill Top and Tony Mines area--Continued

Sample No.	Sample Length of chip (feet)	Assay data W percent	Remarks
			HILL TOP MINE--Continued
216	4	---	Fault zone; gray limestone and fractured, heavily iron stained calcite.
217	4	---	Fault; gouge and some calcite, iron stain.
218	4	---	Intersection of two faults; altered limestone, some calcite and quartz, abundant iron stain.
219	2.5	0.12	Bottom of raise at face; vein; some calcite.
220	4	.31	Bottom of drainage under Hill Top Mine; major iron-stained alteration zone as much as several ft wide; brecciation and clayey gouge, zone crops out for 150 ft along surface.

Table 9.--Sample and assay data for samples that are not shown on tables 2-8

[Tr, trace; ---, not detected; NA, not analyzed; ***, not applicable; PC, pan concentrate]

Sample			Assay data							
			Au	Ag	Cu	Pb	W	Pt	Pd	
No.	Type	Length or size	oz/ton		percent			oz/ton		Remarks
					LEXINGTON DISTRICT					
25	Grab	4-ft grid	Tr	---	NA	NA	---	NA	NA	Dump of trench that cuts altered granodiorite and limestone contact; skarn, epidote, quartz, iron-staining, and gossan structure present.
26	Channel	2.5 in. wide .2 in. deep .2 ft long	---	---	NA	NA	---	NA	NA	Prospect pit; dirt and fine colluvium.
27	Grab	***	---	---	NA	NA	---	NA	NA	Prospect pit; granodiorite porphyry, containing disseminated pyrite pseudomorphs.
28	Specimen	***	---	8.0	0.18	0.10	---	NA	NA	Shaft; dark-gray to black limestone and numerous quartz and calcite veins; small blebs of sulfide minerals, minor azurite staining.
					SAMPLES 39-48 FROM ARCH CANYON PROSPECTS					
39	Chip	4 ft	Tr	.2	.04	.05	---	NA	NA	Sample 39 from 10-ft adit; dark-gray to tan limestone, 5-in. quartz vein, disseminated sulfides, malachite and azurite.
40	Specimen	***	Tr	5.4	.60	.3	---	NA	NA	Same adit as sample 39; sample is from most mineralized quartz; spectrographic analysis shows 0.3 percent zinc.

Table 9.--Sample and assay data for samples that are not shown on tables 2-8--Continued

Sample No.	Type	Length or size	Assay data Au (oz/ton)	Ag (oz/ton)	Cu (percent)	Pb (percent)	W (percent)	Pt (oz/ton)	Pd (oz/ton)	Remarks
SAMPLES 39-48 FROM ARCH CANYON PROSPECTS--Continued										
41	Chip	2 ft	Tr	0.6	0.04	0.05	---	NA	NA	Quartz vein in small cut; same vein as sample 39, 2 ft wide.
42	Chip	6 ft	Tr	---	NA	NA	---	NA	NA	Adit in Arch Canyon, 70 ft long; 6-ft wide quartz vein at portal; milky-white bull quartz, some iron staining.
43	Chip	4 ft	Tr	---	NA	NA	---	NA	NA	Same adit as sample 42; fault zone contains fissile, calcareous shale and limestone, gouge, some iron staining.
44	Chip	4 ft	Tr	---	NA	NA	---	NA	NA	Same adit as sample 42; fault zone; contains limestone fragments, gouge, quartz, iron staining.
45	Chip	2 ft	Tr	---	NA	NA	---	NA	NA	Same adit as sample 42; 2-ft wide quartz vein.
46	Chip	2 ft	Tr	---	NA	NA	---	NA	NA	Same adit as sample 42; fault zone adjoins footwall of quartz vein; limestone breccia and gouge, heavy iron staining.
47	Chip	2.8 ft	---	.8	.04	.07	---	NA	NA	Fault zone at portal of 15-ft decline; gouge, brecciated gray aphanitic schist, quartz, heavy iron staining.
48	Stockpile grab	***	---	.4	.02	---	---	NA	NA	Same as sample 47; stockpile contains quartz, gossan structure, finely disseminated galena and chalcopyrite, malachite.

Table 9.--Sample and assay data for samples that are not shown on tables 2-8--Continued

Sample			Assay data							
			Au	Ag	Cu	Pb	W	Pt	Pd	
No.	Type	Length or size	oz/ton		percent			oz/ton		Remarks
49	PC	***	0.15	NA	NA	---	---	0.02	0.054	Lexington Creek, above confluence with South Fork Lexington Creek; small amount black sand in gravel, fine specks of gold and platinum.
50	PC	***	---	NA	NA	NA	NA	.026	.017	South Fork Lexington Creek, above confluence with main fork; small amount black sand in gravel, several specks of platinum seen in sample.
					SOUTH OF SHOSHONE DISTRICT					
51	PC	***	---	---	NA	NA	NA	NA	NA	Johns Wash; dry creek bed; abundant black sand in gravel.
52	PC	***	---	---	NA	NA	NA	NA	NA	Murphy Wash; large dry creek bed; abundant black sand in gravel.
53	Grab	***	---	---	NA	NA	---	NA	NA	Prospect pit near mouth of Murphy Wash; contact between quartzite and rhyolite; iron-stained, altered rock, some gossan structure.
					SHOSHONE DISTRICT					
54	Channel	5 ft long 2 in. wide 2 in. deep	---	---	NA	NA	---	NA	NA	Trench 8 ft deep in alluvium at mouth of Minerva Canyon.
132	Chip	4 ft	---	0.28	NA	NA	1.12	NA	NA	Prospect pit on ridge above Oriole Mine; large lens of quartz and calcite with intermixed limestone; country rock dark-gray to black limestone.

Table 9.--Sample and assay data for samples that are not shown on tables 2-8--Continued

Sample			Assay data							
			Au	Ag	Cu	Pb	W	Pt	Pd	
No.	Type	Length or size	oz/ton		percent			oz/ton		Remarks
SHOSHONE DISTRICT										
133	Chip	4 ft	---	0.47	---	NA	0.11	NA	NA	Prospect pit; 8-ft wide vein of massive milky quartz; several specks malachite, some gossan structure.
134	Chip	3 ft	---	.4	NA	NA	.02	NA	NA	Decline 8 ft deep; lens of quartz, chunks as wide as 1 ft diameter on dump; country rock iron-stained, dark-gray limestone.
183	Chip	4 ft	---	---	NA	NA	.43	NA	NA	Trench 20 ft long, 6 ft deep; 4 in. wide fault zone with calcite vein and gouge; country rock gray limestone.
184	Chip	4 ft	---	---	NA	NA	---	NA	NA	80 ft adit; 4 ft wide fault with quartz, calcite, breccia, and gouge; country rock gray limestone.
185	Chip	4 ft	---	---	NA	NA	.04	NA	NA	Same adit as sample 184; major fault zone; country rock brecciated and altered, near contact of limestone and rhyolite.
221	Grab	***	---	---	NA	NA	.01	NA	NA	Dump of 135 ft long adit in Swallow Canyon; limestone country rock with some alteration.

Table 9.--Sample and assay data for samples that are not shown on tables 2-8--Continued

Sample			Assay data							
			Au	Ag	Cu	Pb	W	Pt	Pd	
No.	Type	Length or size	oz/ton		percent			oz/ton		Remarks
SHOSHONE DISTRICT--Continued										
222	Chip	2 ft	---	---	---	0.09	---	NA	NA	Same adit as sample 221; 6 in. vein of gouge; altered limestone, and oxidized material.
223	Chip	2 ft	---	---	---	.26	---	NA	NA	Same adit and vein as sample 222.
224	Grab	***	---	---	NA	.09	---	NA	NA	Shaft above adit at samples 221-223; same vein as in adit; shear zone with altered limestone and some galena.
225	Stockpile grab	***	---	1.6	NA	3.04	0.05	NA	NA	Ore stockpile from adit and shaft at samples 221-224; vein material, altered limestone, some pyrite and galena.
WASHINGTON DISTRICT										
226	Chip	5 ft	---	---	NA	NA	---	NA	NA	Massive calcite vein 5 ft thick in dark gray limestone, crops out for approximately 200 ft along strike, minor amount of iron staining.

EXPLANATION OF SYMBOLS FOR MINE AND PROSPECT MAP

APPROXIMATE BOUNDARY OF THE HIGHLAND RIDGE ROADLESS AREA

APPROXIMATE BOUNDARY OF MINING DISTRICTS

PATENTED MINING CLAIMS OR MILL SITES

UNPATENTED MINING CLAIMS

●50 PANNED CONCENTRATE SAMPLE, showing sample locality number

○226 SAMPLED OUTCROP, showing sample locality number

SURFACE OPENINGS--Showing sample locality number; symbol may represent more than one working.

104, 105 Adit

×54 Prospect pit

28 Shaft

AREA OF FIGURE 2 GOODHOPE MINE SAMPLES 1-24 AREA OF DETAILED FIGURE

EXPLANATION OF SYMBOLS FOR FIGURES 2-8

APPROXIMATE BOUNDARY OF THE HIGHLAND RIDGE ROADLESS AREA

STRIKE AND DIP OF BEDDING

SAMPLED OUTCROP, showing sample locality number


MINE DUMP


BUILDING


DIRT ROAD

CONTOUR LINE, showing elevation in feet

SURFACE OPENINGS--Showing sample locality number.

Adit


Inclined shaft

Shaft

Prospect pit or surface opening of underground workings

Trench

UNDERGROUND OPENINGS


Adit

Manway

Ore chute


Raise


Winze (top)

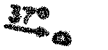
UNDERGROUND SYMBOLS


Limestone


Outline of stope projected to plan view

Outline of higher level crossing lower level in plan view

Direction and angle of stope going up from sill level



Direction and angle of stope going down from sill level

Strike of fault, vein, or shear with vertical dip

UNDERGROUND SYMBOLS (cont.)

Vein or mineralized fault zone showing dip (dashed where inferred)

Fault or shear showing dip; may represent fracture, zone of brecciation, altered country rock, or gouge (dashed where inferred)

Pillar

Underground station

Timbered workings

Levels heading east (shown in cross section only)

Levels heading west (shown in cross section only)

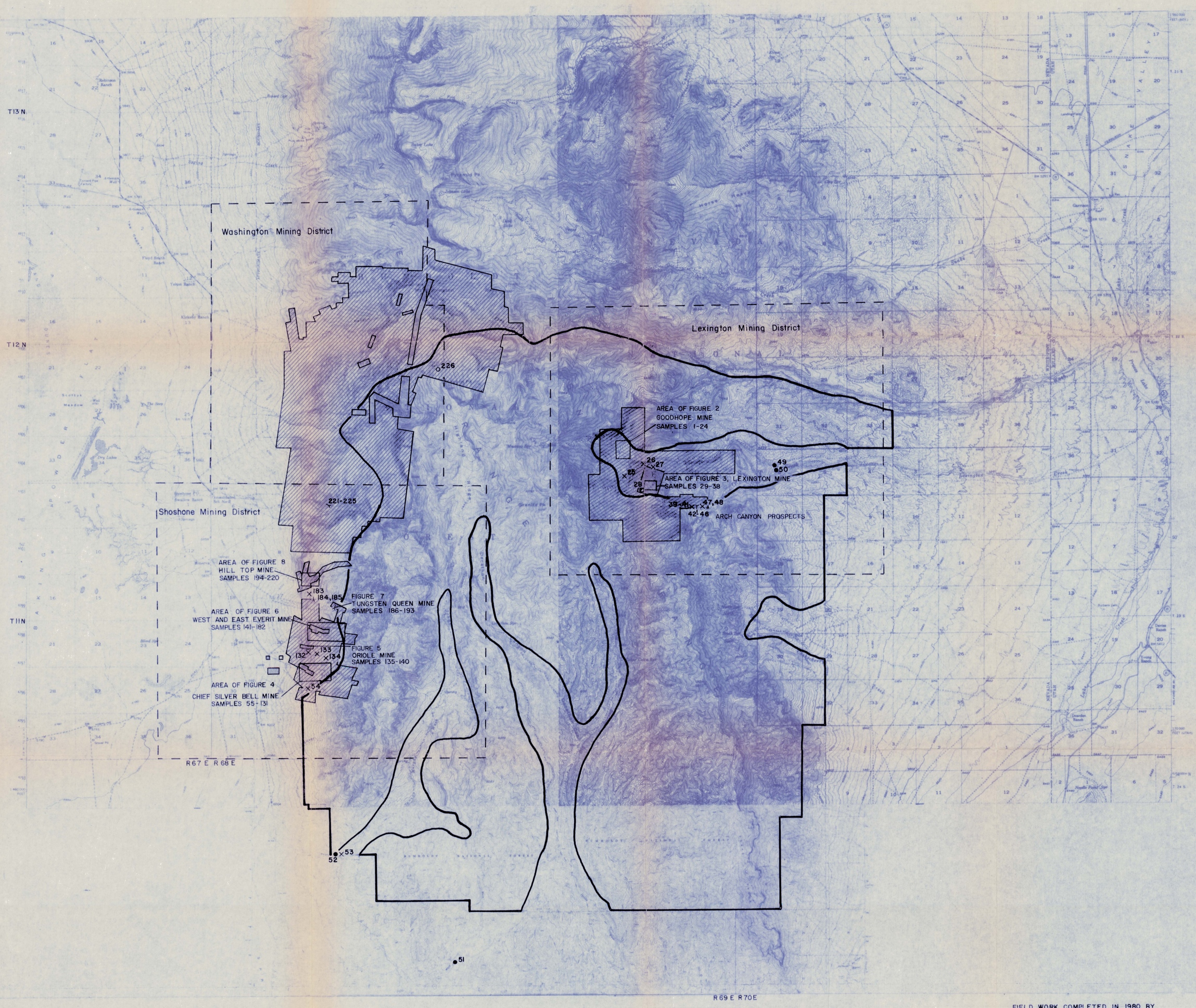
Sample locality and number

Intersection of level and stope

DEPARTMENT OF INTERIOR

BUREAU OF MINES

OPEN FILE REPORT
MLA 68-83
PLATE 1



BASE MAP FROM U.S. GEOLOGICAL SURVEY
BIG SPRINGS, 1972; GARRISON, 1949;
RED LEDGES, 1973; WHEELER PEAK, 1948;

0 1 2 3 4 MILES

MN

NEVADA

FIELD WORK COMPLETED IN 1980 BY
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AND JEANNE E. ZELTON.

MINE AND PROSPECT MAP OF THE HIGHLAND RIDGE ROADLESS AREA, WHITE PINE COUNTY, NEVADA

BY

S. DON BROWN, 1983 BUREAU OF MINES