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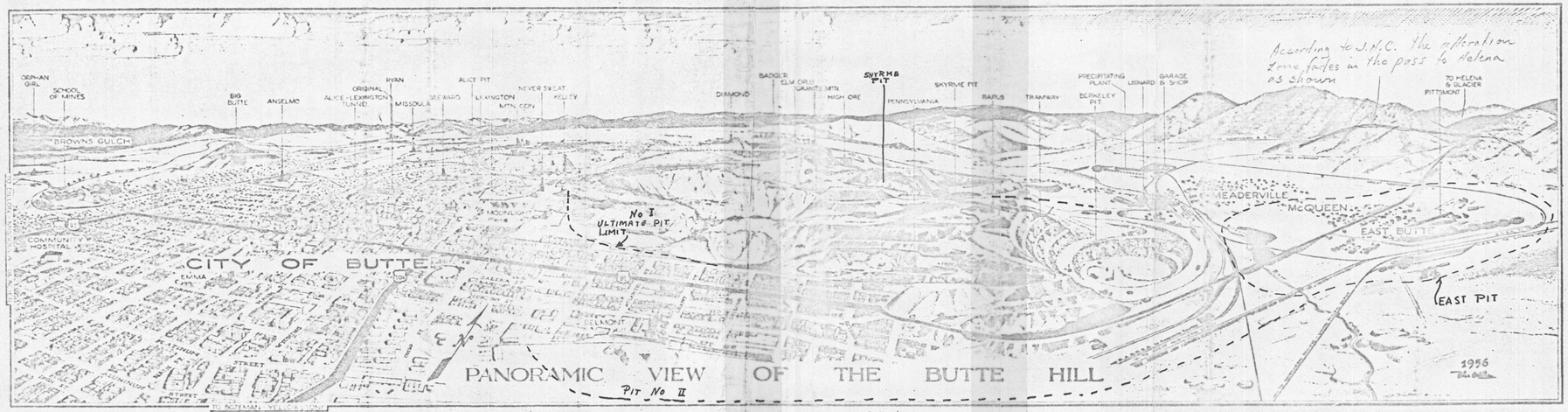


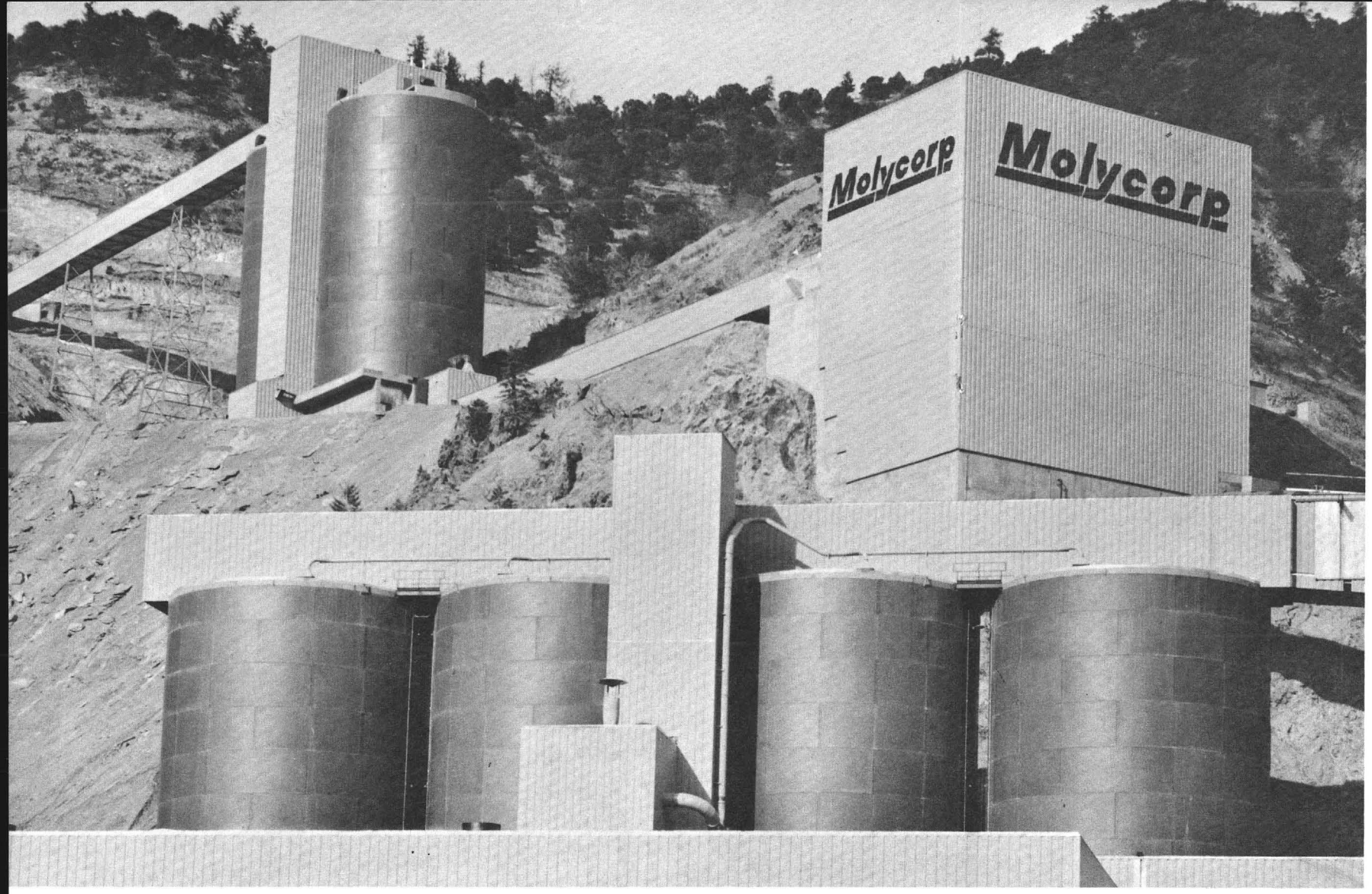
Pit No 1 - 100,000,000 tons - 1.0%
190,000,000 tons stripping

This copy of an artist map from one of J.H. Courtright -- the comments on Pits are from pencil notes on Courtright's copy -- sketched on by J.H. Hart, in the middle 1950's.
Jck 1961

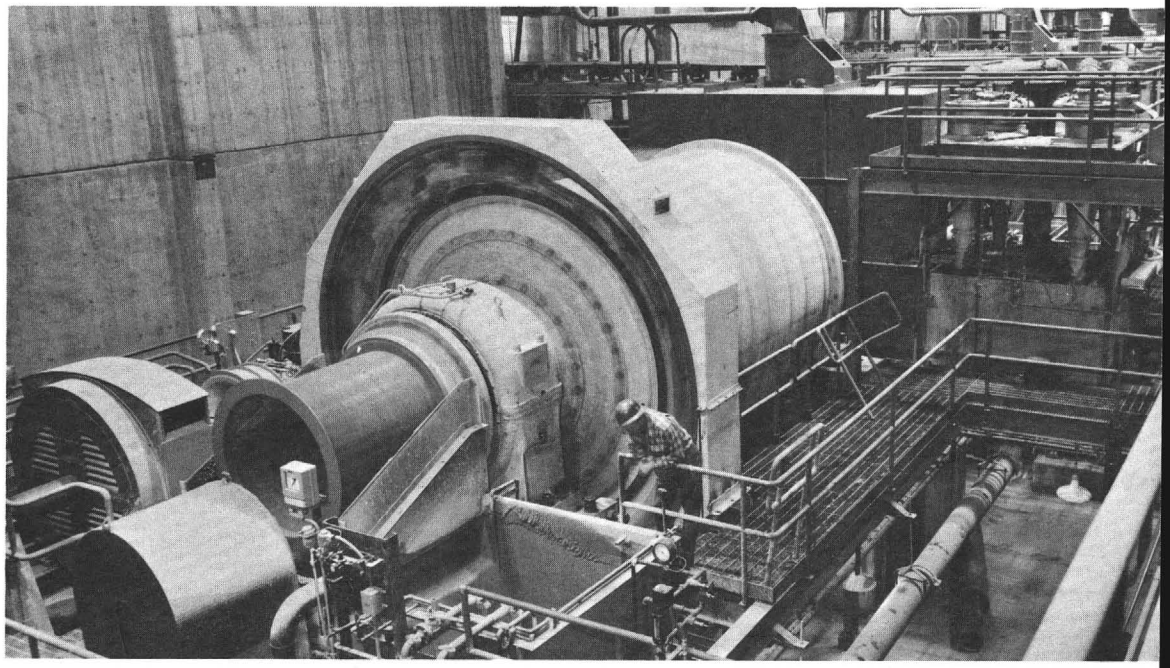
According to J.H.C. the alteration zone fades in the pass to Helena as shown

Pit No 1 - 100,000,000 tons - 1.0 %
100,000,000 tons stripping

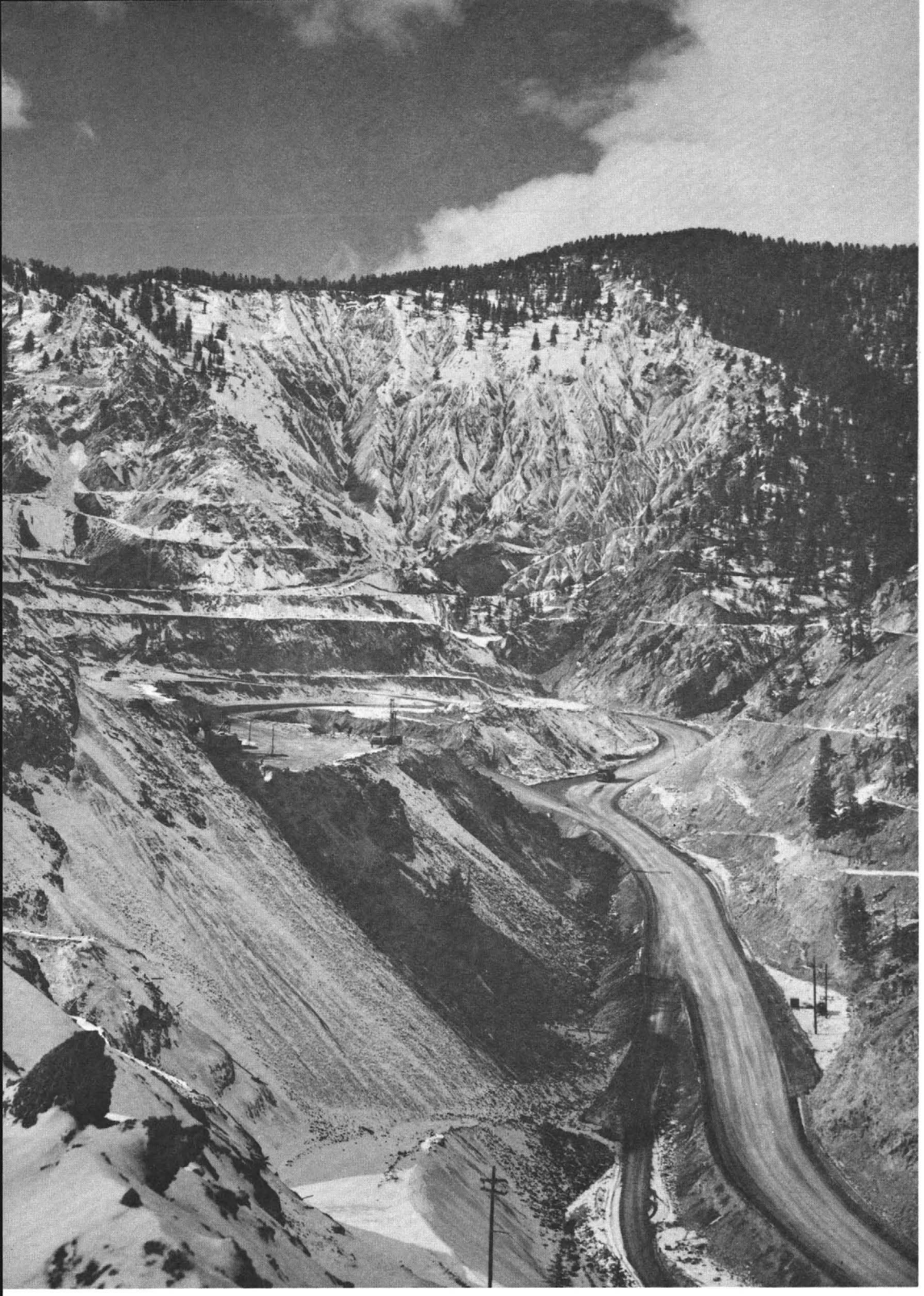
This copy of an artist map from one of J.H. Courtright -- the comments on Pits are from pencil notes on Courtright's Copy -- sketched on by L.N. Hart, in the Middle 1950's.
JCK 1961



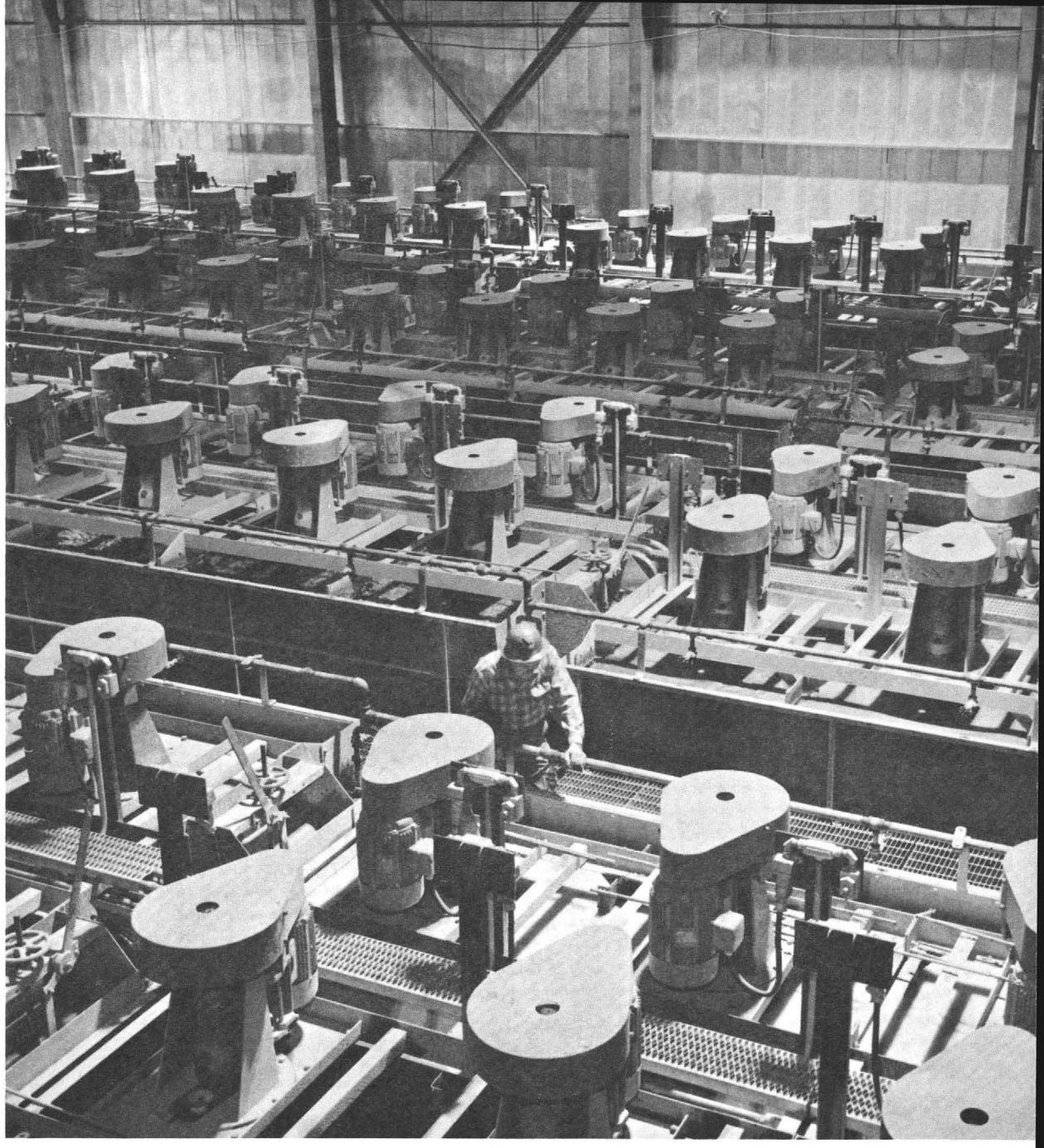
At the secondary and tertiary crushers ore is reduced to ½ to ¾ inch size. Huge storage bins assure an adequate supply of ore so that flotation operation can be maintained 24-hours-a-day, seven-days-a-week.



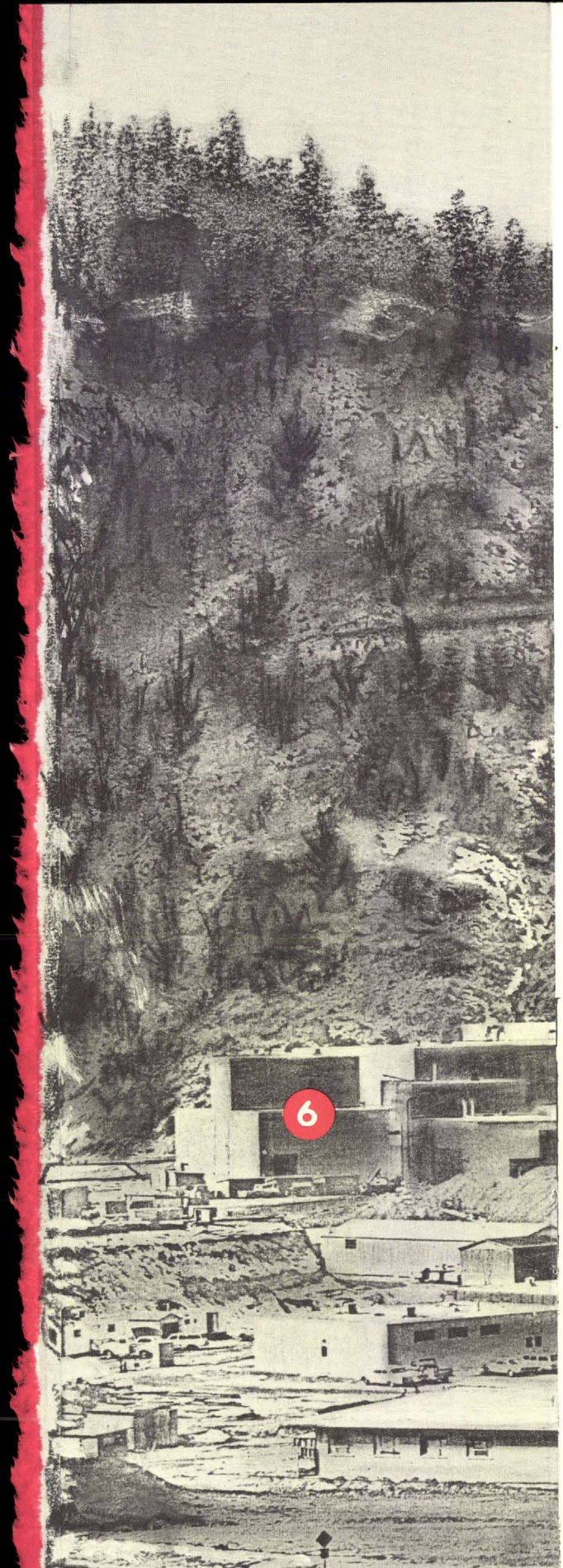
Fine grinding of molybdenum ore is accomplished by this ball mill. Crushed rock goes in, water is added and a slurry of finely ground ore and water emerges.



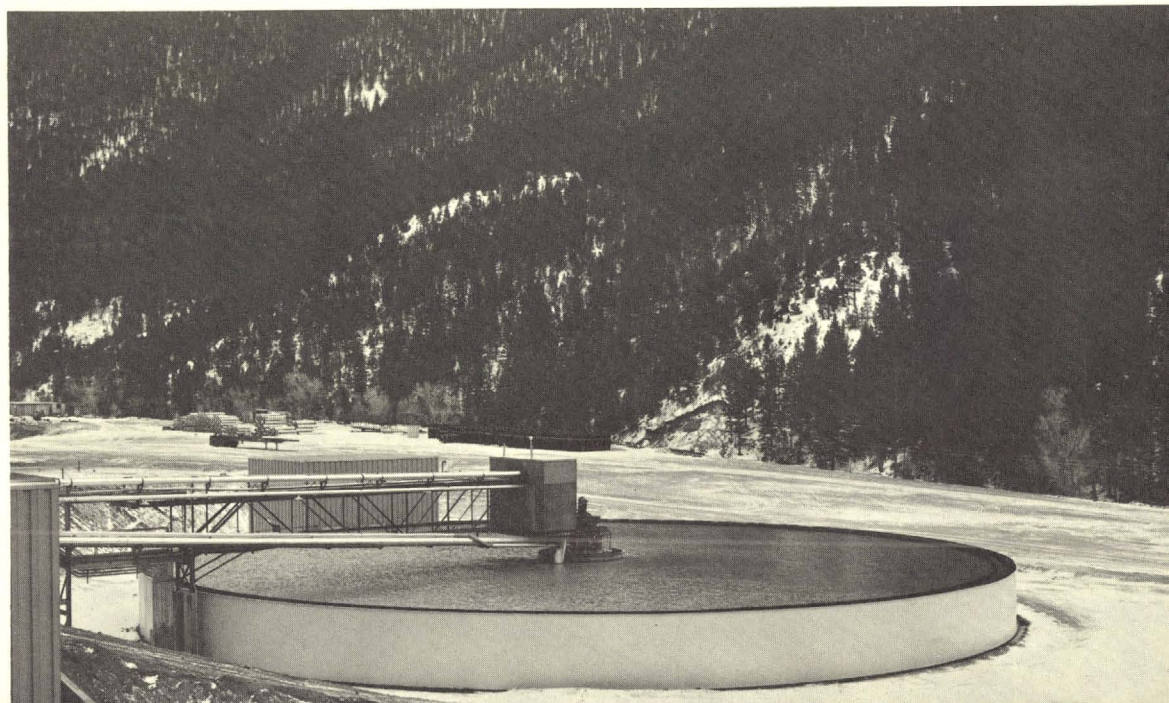
PIT AREA



128 flotation cells extract molybdenum concentrate from rough ore in the first of several separation processes. At left, 100-ton diesel electric truck, used to transport ore from pit to crusher, dwarfs sedan alongside.



Molybdenum concentrate is piped from flotation cells to thickening tank where rough concentrate is prepared for re-grinding and more flotation.



Questa Mine History...

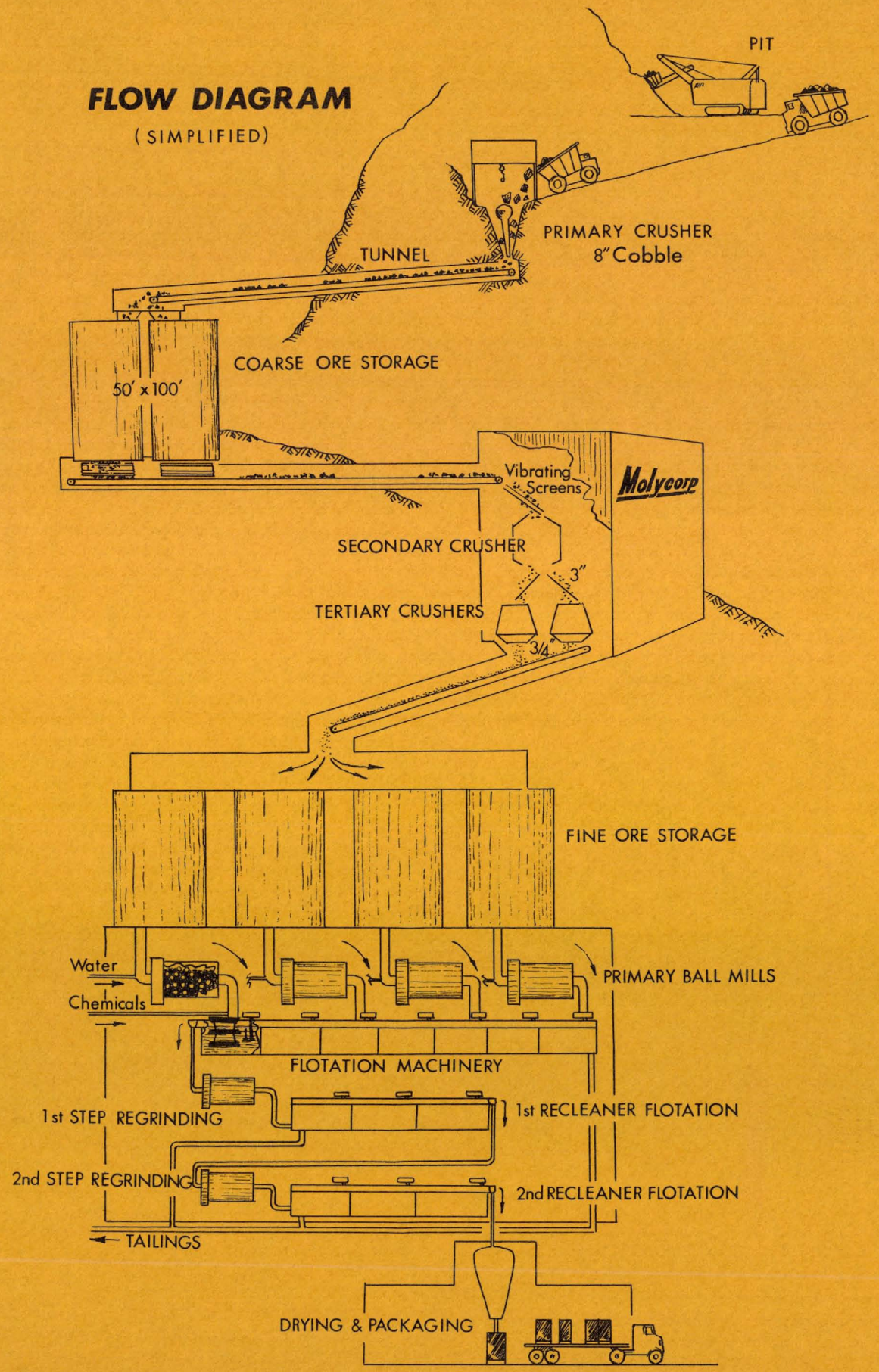
The northern New Mexico mountain country has had its share of prospectors. Back in the nineteenth century gold was the object of the search. In 1914 a prospector named Fahey staked claims in the Questa area. Molybdenum then was very little known, but Fahey and other people reasoned that it must have some use. One of the first uses of Questa molybdenum was as a primitive shoe polish, used by natives in the area.

In 1921 Molycorp, with offices in Pittsburgh, Pennsylvania, acquired claims to the Questa site, and in 1922 began production, using an existing 50-ton gold mill near Red River. This was Molycorp's first mining operation. Underground mining was the initial method of operation, following veins of high grade ore through tunnels. In 1923 production warranted Molycorp's construction of their own 50-ton mill.

As years went by the uses of molybdenum steadily increased, as did demand. However, in 1957 production slowed, and an underground exploration program was inaugurated. In 1960 a surface drilling program was started and by 1964 sufficient reserves had been blocked out to make feasible a new plant and expanded operation.

In the past three years a total investment of $40 million has been made by Molycorp at the Questa property. Annual production of molybdenum at Questa, utilizing the open pit method, has been estimated at approximately 10 million pounds. This new production represents about 10 percent of the total free world output and 15 percent of the molybdenum consumed in the United States.

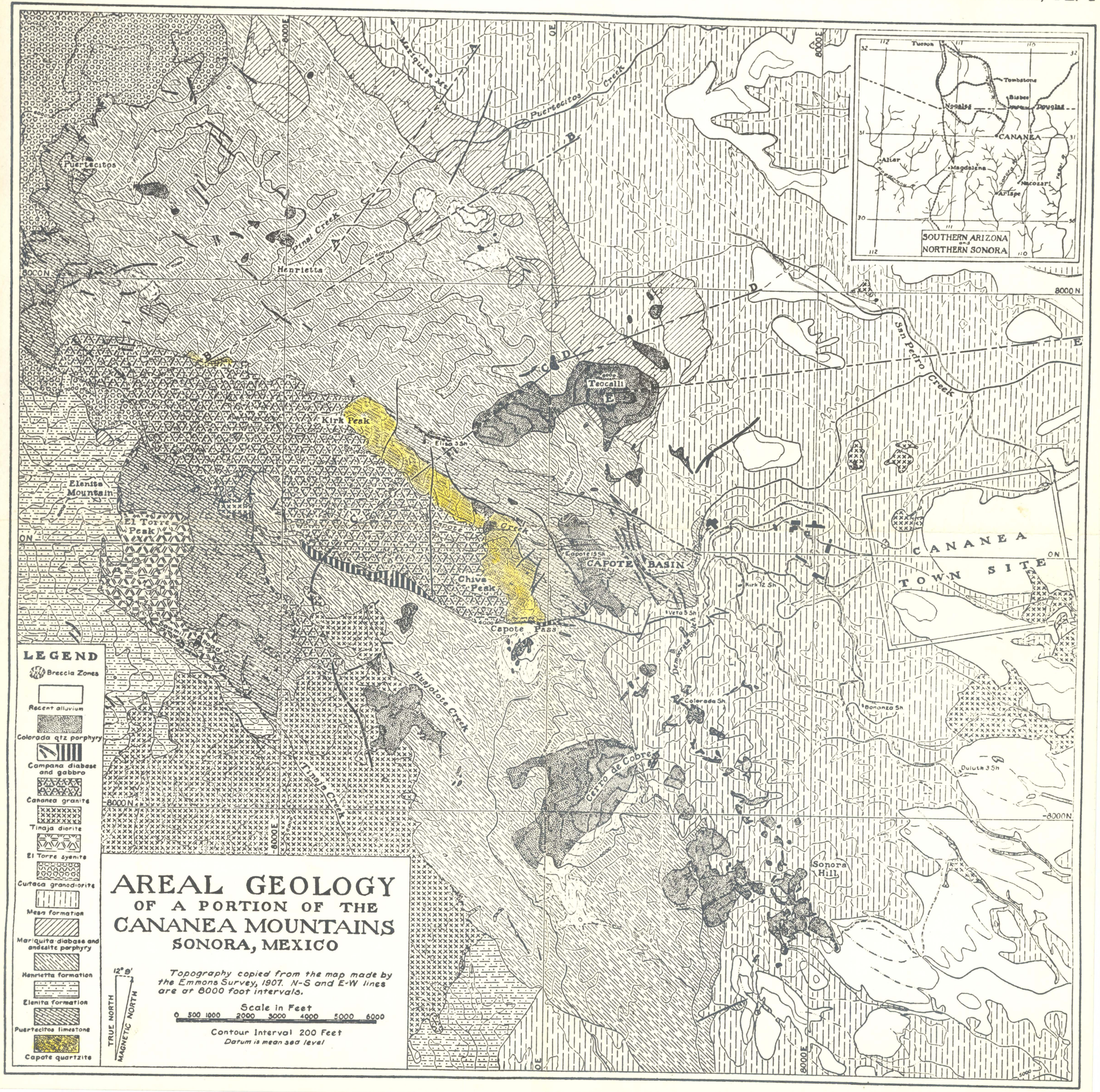
In little more than 50 years a prospector's claim in the remote northern New Mexico mountain country has become one of the primary molybdenum mines in the world — an ultra-modern, efficient mining and milling operation under the auspices of Molycorp.



Molycorp

280 Park Avenue, New York, New York

Questa Mine and Mill Questa, New Mexico


AREAL GEOLOGY
OF A PORTION OF THE
CANANEA MOUNTAINS
SONORA, MEXICO
Topography copied from the map made by the Emmons Survey, 1907. N-S and E-W lines are at 8000 foot intervals.
Scale in Feet
0 500 1000 2000 3000 4000 5000 6000
Contour Interval 200 Feet
Datum is mean sea level
TRUE NORTH
MAGNETIC NORTH
LEGEND
Breccia Zones
Recent alluvium
Colorada qtz porphyry
Campana diabase and gabbro
Cananea granite
Tinaja diorite
El Torre syenite
Cuitaca granodiorite
Mesa formation
Mariquita diabase and andesite porphyry
Henrietta formation
Elenita formation
Puertecitos limestone
Capote quartzite
SOUTHERN ARIZONA and NORTHERN SONORA
Tucson
Tombstone
Bisbee
Nogales
Douglas
CANANEA
Altar
Magdalena
Nacozari
Arizpe
Puertecitos
Henrietta
Pinal Creek
Puertecitos Creek
Kirk Peak
Elenita Mountain
El Torre Peak
Chiva Peak
Capote Pass
Capote Creek
CAPOTE BASIN
Teocalli
San Pedro Creek
CANANEA TOWN SITE
Huajolote Creek
Tinaja Creek
Cerro de Cobre
Sonora Hill
8000 N
8000 E
0 N
0 E

Porphyry Cu Notes
Central Cordillera

Feb 72
Oakland Expl Meeting
Dunek —

Extent - Nevada - Washington

Mines

1. Bingham 35 myr
2. Butte - Host is a marginal area of the Boulder Batholith. No porphy. plugs, but dikes are present in Berkely pit.
3. Climax 30 myr
   Mo, WO_3 - Vy little Cu.
4. Ely - Jurassic
5. Yerington - Jurassic
   Mickey Pass is a faulted segment, and one edge was exposed on a main mountain Rd, within sight of Pit.
6. Battle Mtn
7. Glacier Pk - Bear Creek was host of several drilling programs. Qtz diorite host - "Several M.T." tons of 1% Cu + .1% MoS_2. More tonnage avail @ .6% Cu and .03% MoS_2.

Porphyry Cu Note

KEM Expl. meeting
Feb 72

John D'Leve —

Canada - B.C. —

19 properties on or near production
in the +2000 tpd class

10 Small bigneels.

Ed Vickers - Casual comments on B.C. mining Costs,
say, at Brenda or other Vy low-gr deposits.
predicated on $1.50/ton total Cost.

45¢/ton Milling
15¢/ton Mining ore. - Vy little stripping.
60¢

25¢ Smelting Freight Main office overhead
85¢

Remaining 15¢ other expense?

Corresponds closely to 7¢/lb deduction.
@ 29¢ Cu
used in Asarco Secaton outcome 1962
for Smelting & New York office. (± 25%)

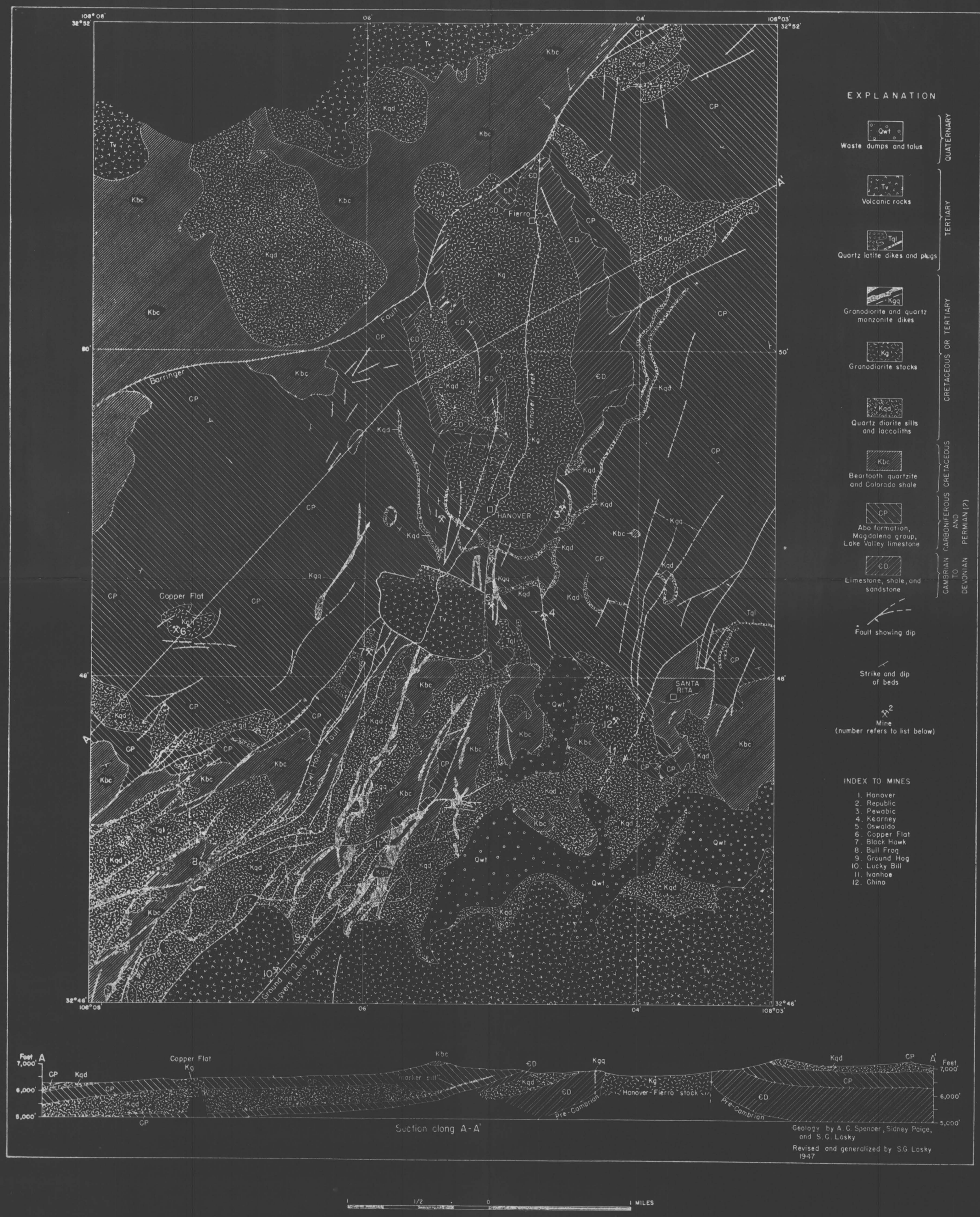


FIG. 29.—*Generalized geologic map and section of the main part of the Central mining district, New Mexico.*

M E M O R A N D U M

TO: J. David Lowell

FROM: John E. Kinnison

DATE: June 28, 1978

SUBJECT: Grasshopper Prospect
Outcrop Samples

Thirty-one samples of leached capping ranging in size from a fistful down to the size of a peanut were briefly studied, and the following are my comments thereon.

The rocks appear to be divisible into three categories; two of which are graditional and difficult to separate and a third which is somewhat different. The first category consists of rocks which contain smears and seams of transported limonites varying from yellow jarositic colors to brown goethites. At least one of the samples, and possibly two, exhibits somewhat of a granitic, coarse grained texture, whereas the others are, in general, finer grained and contain small resorbed quartz "eyes" - although these latter are not prominent. Alteration consists of a probable mixture of both sericite and clay, with some of the coarse grained types seemingly somewhat less altered, although all the feldspars are chalky and kaolinized to some extent. The limonites are generally slaggy although fine textured boxwork diagnostic of pyrite is present in the samples with the brown goethite limonite. One small fleck of yellow material is questionably identified as moly ocher, but this is a difficult mineral to identify by color alone and it may be simply a jarositic phase of the limonite in the capping. Although I did not find any pyrite present, one of the pieces exhibits the very characteristic pale yellow limonite derived from very freshly leached pyrite, and I expect that in this instance the leaching is very recent. It may be expected, therefore, that some pyrite might be found near the outcrop, within a few inches, and might be turned up on a sampling program. The total sulfides formerly present was in the range of 3% to 5%, and possibly greater in some of the samples based on volumetric, visual estimates.

The second group of samples exhibits a variety in the degree of total sulfides but have the following in common: 1) All are finer grained than the first set and are almost surely quartz porphyry. Little quartz "eyes" are present in most of the samples. Alteration to clay with perhaps lesser sericite, is pervasive and very strong. 2) The second category is dominated by disseminated grains of limonite derived from former sulfides with much lesser amounts of limonite which has been transported, and the more strongly sulfidized of these rocks now exhibit a sintery siliceous boxwork which is clearly derived from pyrite.

Most of the second category of rocks contain limonites in the jarosite color range bur are also notable in that they contain goethite, both in the disseminated grains and as transported limonite. Some of the seams of boxwork display a mixture of both colors, although the colors of the limonite material are almost surely from pyrite. I have some reservations about the origin of

the goethite in these rocks and it seems possible that since some of the veinlets (one of which is one-half inch thick) contain brown indigenous limonite, that this could represent limonite derived from chalcopyrite or even conceivably from chalcocite. Alternately, the material in the boxworks does not "look right" even though it is indigenous and I have seen similar boxworks which exhibit a "false copper limonite" from other places. On the other hand, these rocks are very reminiscent of the capping over Michiquilli, in northern Peru. That deposit contains relatively little chalcocite but does contain a relatively higher grade of chalcopyrite with enough chalcocite enrichment to bring the grade up to about 0.9% Cu. The diagnostic test is whether the limonites retain copper or not, and this can be ascertained by either whole rock geochemistry, or by having the limonites analyzed quickly at the Bureau of Mines by visual observation on the spectrometer. The total sulfide ranges from less than 1% to a maximum of about 20%, with a median range of about 10% of sulfides by volume estimated by eye.

The third category consists of a porphyritic igneous rock, possibly a dike, or possibly the porphyry beyond the limits of pervasive alteration. The groundmass is dark gray and the texture can be seen only when the rock has been wet. There seems to be an association of peculiar caverneous deposit which may represent some type of silica or lime leached out and filling cracks near the surface. The actual outcrop of the rocks of this nature are abundantly covered with dark to white dead lichens, whereas the rocks of the altered zone are not so affected. These rocks of the third category appear to have had very low amounts of pyrite, as evidenced by scattered, tiny grains of limonite. The cavernous encrustations appear to have been affected by limonitic bearing, perhaps one should say iron bearing, solutions and therefore tend to have a yellowish cast as though they were a true limonite - which I do not believe they are.

John E. Kinnison

JEK:sbc