

Geology of the Jarbidge Mining District, Nevada

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E. R. Buckley.*

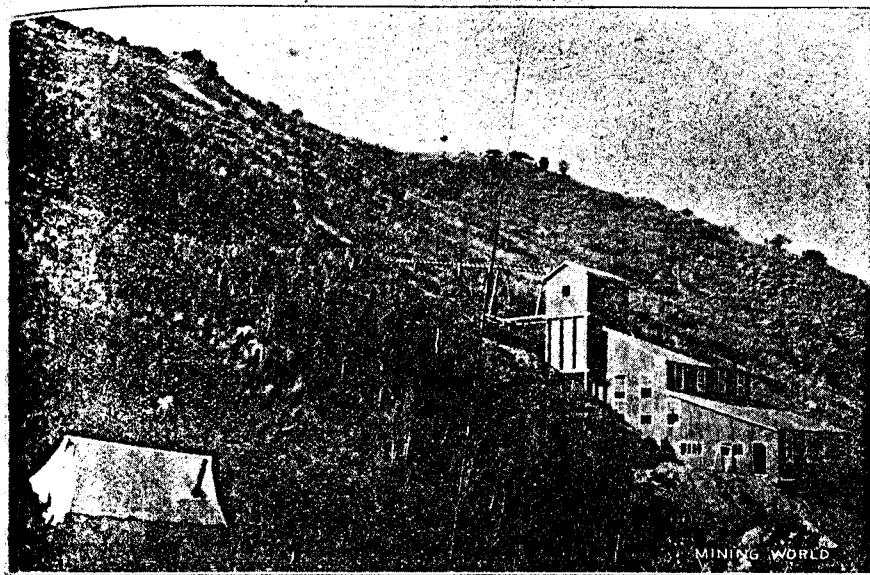
Two years ago it was a long, toilsome journey of 95 miles by wagon from Twin Falls, Idaho, to the new gold fields in the Jarbidge mountains of Nevada. Today the trip can be made in comfort by automobile in 8 hours, either from Twin Falls or Wells, Nev. The people of Twin Falls and Jarbidge have not only built roads, but they have also constructed a telephone line into the camp. And the camp has a weekly mail service. Hotel and café service is excellent, and the climate is superb. Stores are stocked with all the ordinary necessities of a mining camp. It is estimated that there are about 800 people in the camp this fall.

The first claims, known as the North Star group, were located by David A. Bourne and his partner, Ben Collins, in June and July, 1909. Later John Escalon located the Pick and Shovel group, and

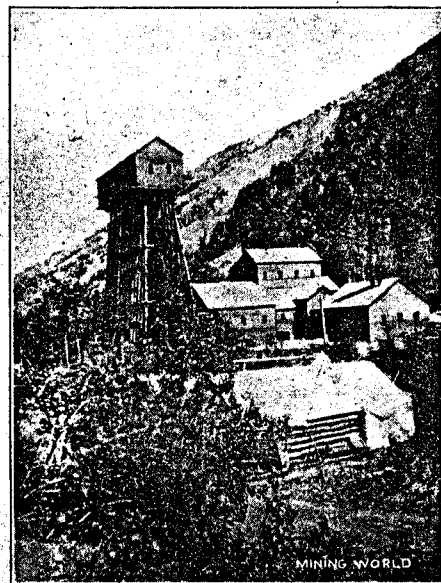
The region is very mountainous and is cut by deep canyons, through which flow perennial streams fed by snow fields, which seldom disappear during the warm summer months. The drainage of this district is chiefly into the Snake river, through the Jarbidge river and the East fork of the Bruneau and their tributaries.

The district is provided with a never-failing supply of pure water, sufficient for all milling operations and enough to supply power for many of the mines when once developed. The Jarbidge river has a minimum flow of 20 second-feet below the mouth of Jack creek and an average fall of 100 ft. per mile. The East fork of the Bruneau is a larger stream and has even greater possibilities for the development of power; while the tributaries of

Jarbidge mountains rise to an elevation of over 11,000 ft. above sea level. The mountain slopes are very steep, and much of the surface is covered with loose rock and soil, which in some localities must be nearly 100 ft. in thickness. Outcrops are almost continuous along the banks of the Jarbidge river, and occupy considerable areas above an elevation of 8000 ft. Scattered over the mountain side are narrow dike-like formations, which extend above the surface, from a few to a hundred feet in height. These so-called dikes occur in the bluffs along the Jarbidge river, and at irregular intervals along the mountain side to the crater region at the summit. These sheets of rock are known locally as "dikes," and as a whole are referred to as the "dike systems." The prospectors early recognized these dikes as being associated with



Clark & Fletcher Mill on North Star Group.



Pavlak Mill from South.

Mike Pavlak and Peter Thuro located the Pavlak claims, now owned by the Jarbidge-Pavlak Mining & Milling Co. Early in November of the same year came the "rush" into the camp. Before spring of the following year much of the land for miles around had been located. Since that time there has been spent, in assessment and development work, approximately \$250,000, and about an equal sum in mills and buildings.

The Jarbidge mountains are in the Humboldt National Forest Reserve, a district which has never been surveyed. The northern limit of the district is about 6 miles south of the Idaho-Nevada state line, and when surveyed the district will, according to A. L. Rinearson, fall in townships 45 and 46 N., ranges 57, 58 and 59 E., Mt. Diablo meridian and base.

Dr. Buckley, who is a mining geologist and engineer, with offices in the People's Building, Chicago, Ill., has spent several weeks in the Jarbidge district, first in the fall of 1910 and later in the fall of 1911.

both streams afford opportunities to develop power which should not be overlooked.

The upper slopes of the mountains are covered with a magnificent growth of spruce and pine, which will provide much timber for future mining operations, unless the cutting of this timber should be prohibited by the Forestry Bureau.

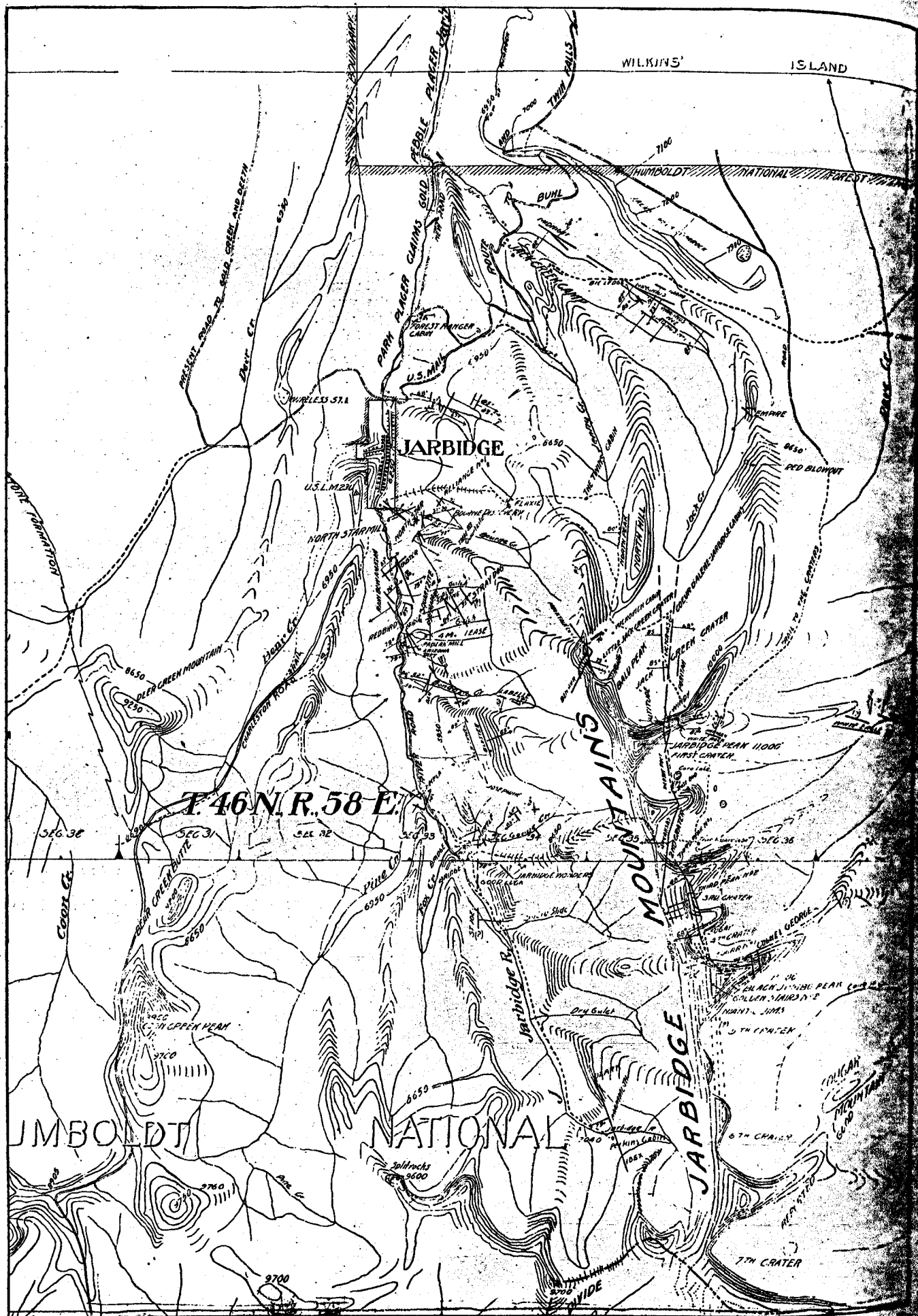
The top of the mountain range consists of a series of peaks on the sides of which have been formed amphitheatre-like areas, which are supposed to have been excavated by the corrosion of glaciers. There are nine of these amphitheatres, all on the east side of the range, seven of which drain into the East fork of the Bruneau, and the remaining two into the Jarbidge river. These amphitheatres are known locally as "craters," and the area which they occupy is known as the "crater region."

The town of Jarbidge has an elevation of about 6400 ft., while to the east a distance of 2½ miles, the peaks of the Jar-

the vein systems of the district, and most of the early and late arrivals endeavored, in staking their claims, to include one or more of these dikes within their boundaries.

The Jarbidge district consists mainly of a mass of porphyritic igneous rock, here referred to as porphyritic rhyolite, which has not been studied by the writer in sufficient detail to give it the correct scientific name. Within the rhyolite are included areas of various metamorphosed sedimentary rocks, among which are conglomerate, quartzite, greywacke and slate. The porphyritic rhyolite exhibits several phases, but is chiefly a variety having a fine-grained ground mass, with large porphyritic crystals of quartz and feldspar, the former predominating. From all appearances, the coarsely porphyritic phase is the older part of the flow, since it is cut by dikes of the finer grained porphyritic rhyolite.

I am unable to give even an approximation of the areal extent of this porphyritic



Map of the Jarbidge District, Nevada.

Copyrighted by A. L. Rinearson, Jarbidge.

but it can be safely said that it is very large. East of the drainage area of the East fork of the Bruneau, and southwest of the Jarbidge drainage basin, are extensive areas of granite, reported to be much older than the rhyolite of the Jarbidge mountains. From 2½ to 3 miles west of the Jarbidge river is an area of impure limestone about which little is known. The writer has not seen either the granite or limestone areas.

North of the Jarbidge district, from Jack creek to the Snake river and beyond, stretches a broken sheet of black, scoriaceous lava. In some places the lava rests upon the more ancient porphyritic rhyolite, and in other places it apparently covers beds of gravel and silt, which mark ancient lake beds and the courses of Tertiary or pre-Tertiary stream channels.

The formations have been faulted and folded, but the extent of this deformation will not be known until mining has progressed much further than it has at this writing. Evidences of faulting may be seen on the surface, and a careful geological survey of the district would assist greatly in elucidating the structures, a knowledge of which is so important to the

ity they have become. They vary in thickness from mere stringers up to broad zones 30 ft. in width. The more important veins thus far opened up have a width of from 5 to 12 ft. The matrix of these veins is a rather friable, porous quartz, in which are embedded fragments of porphyritic rhyolite. In some places the veins have much the appearance of badly decomposed pegmatite, while in other places the matrix is a white sugary quartz. The pegmatite-like portions of the ore

these veins varies from place to place, but in general, the trend is from northwest to southeast. In the so-called crater region the strike is more nearly north and south. A few veins having a southwest-northeast strike have been located. The North Star vein on the Bourne claims strikes N. 21° W. and dips 85° N. E. The vein on the 4-M lease of the Pavlak claims strikes N. 60° W. The strike of the vein on the Bluster and Success claims is N. 33° W. The strike of the vein on the Buckeye-Stray Dog No. 2 claims is N. 38°-43° W.

The residual soil, covering much of the west side of the Jarbidge mountains between Jack creek and Snowslide gulch, contains gold which can be recovered by panning. In close proximity to the veins, and overlying them, the soil is very rich, a single pan often revealing hundreds of grains of gold, commonly spoken of as colors. This discovery of veins concealed beneath the heavy mantle of residual soil and boulders has in a number of cases been brought about by persistent and systematic panning of the soil a foot to several feet below the surface. It is my experience that the soil directly at the

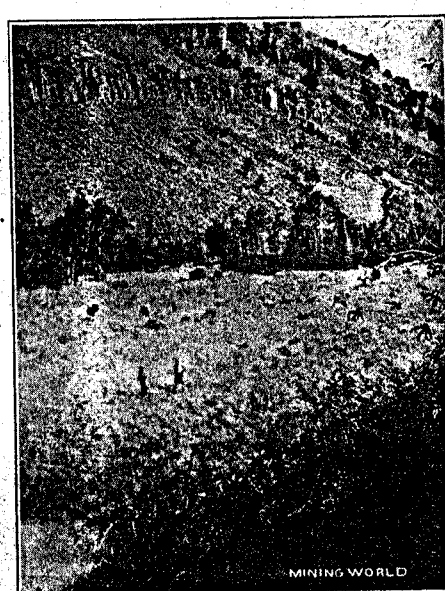


Open Cut on Buckeye Claim.

bodies have a yellowish-brown color, while the sugary quartz is nearly white. In places the quartz is discolored with manganese oxide, while small cavities containing clusters of manganese-tinted quartz crystals are not uncommon. Through the mass of the ore bodies occur dark colored, somewhat harder stringers of quartz, which usually constitute the richest part of the ore. In the case of most of the veins examined, the hanging wall is clean cut, while the foot wall is rough and poorly defined.

The so-called dikes, as a rule, are not the ore bodies, although the ore bodies usually occur in close proximity, sometimes constituting a part of them. It is thought that the porphyritic rhyolite adjacent to the veins is harder, and therefore more resistant to erosion than either the veins or the normal rhyolite beyond. For this reason, the rhyolite near the veins protrudes above the general level of the mountain slopes in the form of dikes. In some instances these dikes are evidently zones of rhyolite breccia, and in other cases they are outcroppings of quartzite. The veins have naturally been worn down below the surface, and where they occur, one would naturally expect decomposition to have extended deeper than elsewhere. This condition has not been fully appreciated by those who have been prospecting claims in the district.

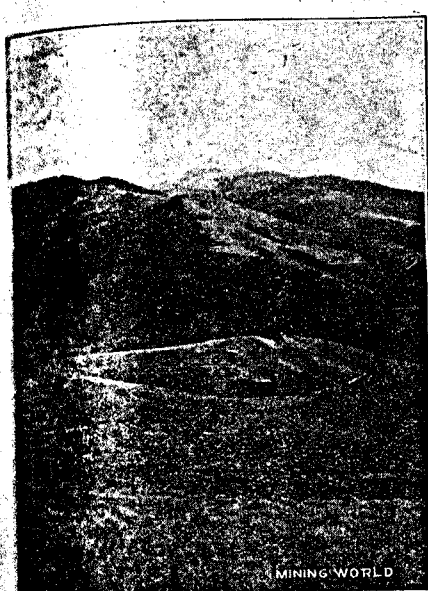
The vein systems are very well shown on the accompanying map, which is here reproduced through the courtesy of A. L. Rinearson, of Jarbidge. The strike of



Gravel Bar on Pebble Group.

surface may not give a true idea of the values below, for which reason it is necessary to pan the residuum for several feet below.

The veins which have been opened up at the surface are not unusually rich and there is nothing spectacular in most of the ore which thus far has been uncovered. A sample which I took across a 5-ft. vein, about 6 ft. below the surface, assayed seven-tenths of an ounce in gold and 3 ozs. in silver. While this may be taken as an average value for many of the veins at or near the surface, I am sure that much higher values, up to 2 ozs. in gold and 10 ozs. in silver, have been obtained from samples taken by reliable parties. The gold is free and often occurs in particles sufficiently large to be visible to the naked eye. Within the veins there frequently occur stringers,



Jack Hole.

operators of the district. During my visit to the camp in the fall of 1911, I examined two well-defined faults which had been encountered in the mine workings of two different properties. One of these had a strike of N 10° E. and the other had a strike of N. 30° E. The dip in each case was nearly vertical, and although there was no evidence by which we could positively determine the direction of the down-throw, it was thought to be about N. 80° W. in the case of the former. These faults are evidence, however, that the region has experienced those changes due to earth movements, which are so commonly met with in mining camps of mountainous regions:

The ore bodies in the camp are evidently fracture zones in the porphyritic rhyolite, which have taken on much the appearance of quartz veins, which in real-

which in places will assay as high as \$1500 in gold and silver. The ore is of such a character as to lend itself to easy methods of recovery. While iron sulphide has been observed in some of the tunnels near the base of the mountains, it has not been found in the workings farther up the slope. It is very probable that the veins occurring high up on the mountains will attain considerable depth before there is any likelihood of the ore becoming base.

There are two mills in the district, one of which has been operating intermittently for nearly 3 months, treating from 7 to 10 tons of ore per day. The other mill will be operating very soon, there having been some delay on account of insufficient crushing capacity in the original plans. The Clark and Fletcher mill, which is the one now operating, will have a capacity of about 20 tons, while the Brunn and

ploration. Few gold camps in the west have had so little of the speculative element surrounding their development. The men who moved into the camp in the early days were eager to promote legitimate development, and discouraged promotion based upon exaggerated statements as to the richness of the discoveries. While it is doubtful if the camp will ever experience a boom such as marked the early days in Goldfield, there is every probability that it will become one of the important gold producing camps of Nevada.

Like most new camps, it is suffering, and probably will continue to suffer, at the hands of those who should be most interested in its development. Many of the promising claims and groups of claims are held by parties who have no money for development. They have exaggerated ideas of the value of their holdings and are unwilling to sell or option except at prices which business men avoid. It is right that these men who have suffered the privation of long winters in a tent or cabin on a bleak mountain side should be well paid for their pluck and enduring faith in the richness of the mountains. They should however, temper their demands with reason, and share with those more fortunate, who have the money, the opportunity to make more.

It would probably be an unwarranted oversight should I omit mention of the possibilities of placer mining along the Jarbidge river between the town of Jarbidge and the Idaho-Nevada state line, and probably farther to the north. To my own knowledge the gravel bars along the river for a distance of 6 or 8 miles north of the town contain gold. The gravel along the river may be washed almost anywhere with a recovery of from 5 to 20 colors to the pan. The gold is not of the flour variety, so common to the Snake river, but occurs in well-defined grains of irregular and frequently angular shape. The river bars are in places as much as 700 ft. wide and a half a mile or more in length. Their thickness is unknown, not having as yet been prospected to bedrock. There is an abundance of water in the Jarbidge river and tributary streams for hydraulicking, and should the deeper gravels on bedrock prove but little richer than those at the surface, there is a possibility of profitable placer mining in this locality.

Poisoning by Cyanide.

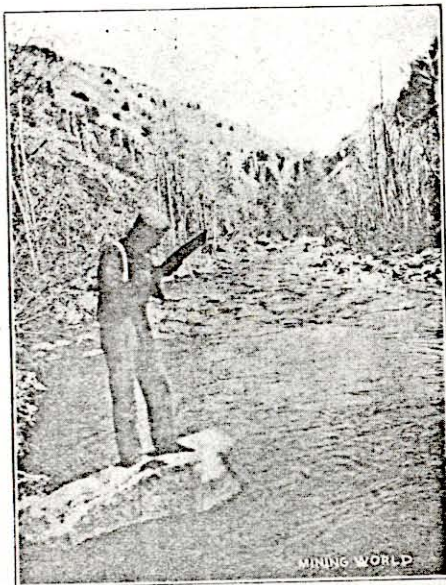
The following are the measures advocated by the Mining Regulations Commission of the Transvaal for the prevention and treatment of cases of poisoning by cyanide:

Preventive Measures.—(1) Provision of an adequate supply of wholesome drinking water about plants and assay offices, the same to be distinctly labeled "Drinking Water"; (2) the replacement of strong cyanide solution used in the precipitation-boxes by water previous to the zinc being handled; (3) the effective hooding of the dissolving bath in which the gold precipitate is treated, and the

use of some form of mechanical raising the hood.

Treatment.—It is recommended that boxes labeled "Antidote for Cyanide" with directions for use affixed to the boxes, should be kept in prominent and easily accessible parts of the cyanide plants. Each box should contain a spoon and a metal receptacle about 1 pint; one blue hermetically sealed vial containing 30 c.c. of 33% solution of ferrous sulphate; a white vial containing 30 c.c. of caustic potash, and one packet of oxide of magnesium (light). The directions for the use of the antidote should be as follows:

1. Preparation of antidote. Empty the contents of the blue vial, of the white vial, and of the magnesia

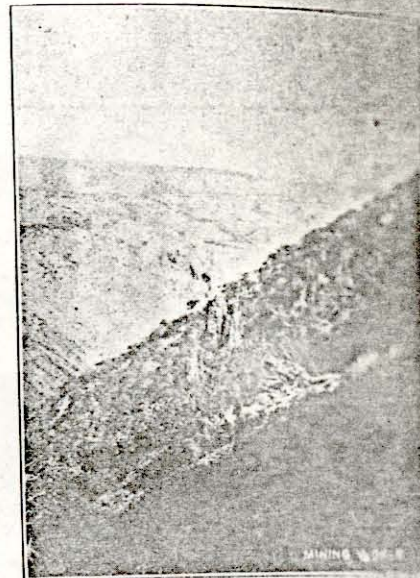


Jarbidge River.

Kinney mill on the Pavlak group will have a capacity of about 200 tons. In August George Wingfield took an option on the Success group, since which time he has taken options on two additional groups of claims, the latest being the well known Bluster. The work which Mr. Wingfield and his engineers are doing in this camp is, in itself, a substantiation of the claim that the district has showings that warrant the serious consideration of those interested in mining.

There are a number of properties in the camp being developed in a small way by local capital, among which may be mentioned the Buckeye-Stray Dog No. 2, the Cold Springs and the Alpha groups, which invite the special attention of capital. The Buckeye-Stray Dog No. 2, for example, has a tunnel in about 70 ft. on a quartz ledge. This ledge is about 7 ft. wide, and some of the ore is so rich that it is being sacked. I have not sampled the ledge since the tunnel was started, but it is reported upon reliable authority that the ore will average about \$100 in gold and silver.

The camp as a whole offers much promise to the man who is willing to engage in conservative and systematic ex-



Mountain Slope Near Last Chance.

into the metal receptacle, and stir with the spoon. This should be done as rapidly as possible, as the patient's chance of life depends on promptness.

2. Administration of the antidote. If the patient is conscious, make him swallow the mixture at once, and lie down for a few minutes. If the patient is not conscious, place him on his back and pour the mixture down his throat in small quantities, if necessary pinching his nose in order to make him swallow.

3. Incite vomiting. After the antidote has been given, try to make the patient vomit by tickling the back of his throat with a feather or with the finger, or give a tumblerful of warm water and mustard.

It must always be kept in mind that promptness of action is the first essential, as the poison acts quickly.

Transmission in Europe.—A 110,000 volt transmission system has been installed at Lauchhammer, Germany, being the first European system exceeding 100,000 in voltage. The current is transmitted only 35 miles, and is furnished by a steam-turbine station with two 500 kw units.