# THE TAYLOR CREEK TIN DEPOSITS, NEW MEXICO.

By J. M. Hill.

## INTRODUCTION.

In August, 1920, the writer spent 10 days in a reconnaissance examination of the reported occurrences of tin ore in the Taylor Creek district of Sierra and Socorro counties, N. Mex. To all the operators in the district, particularly to Mr. Frank P. Davis, one of the pioneer prospectors, and to Mr. Cole Railston, of the Red River Land & Cattle Co., he is indebted for much information and many courtesies.

## LOCATION AND ACCESSIBILITY.

The Taylor Creek district is on the west side of the Black Range, about 70 miles in an air line southwest of Magdalena and 48 miles west of the Rio Grande. The line between Sierra and Socorro counties turns south in the center of the district. The prospects are all in the Datil National Forest and lie in Tps. 8 to 11 S., Rs. 10 and 12 W. New Mexico meridian. Their location is shown on the sketch map (fig. 52), drawn from the Forest Service maps of the Datil National Forest, which show all the roads, trails, and ranches, as well as the land net in this region. The southwestern part of the district is shown on the Alum Mountain topographic map of the United States Geological Survey. The stream in Whitewater Canyon, shown on this map, is locally known as Taylor Creek, and from it the district takes its name.

There are no towns in the district, and the several ranches in the vicinity obtain their supplies from Magdalena. The town of Chloride, 24 miles southeast of the center of the district, can be reached by trail. The roads from Magdalena are good desert roads and can be traversed in dry weather by heavy trucks as far as the Grogan ranch, on Beaver Creek, and almost to the Inman ranch, on upper Taylor Creek. Beyond these points all supplies must be carried on pack animals. In August, 1920, freighters from Magdalena were charging $1 a hundred pounds to the Adobe ranch, a distance of 60 miles, and $1.50 a hundred pounds to the Evans ranch, a distance of 80 miles. Passenger cars could be hired at Magdalena at 25 cents a mile each way.

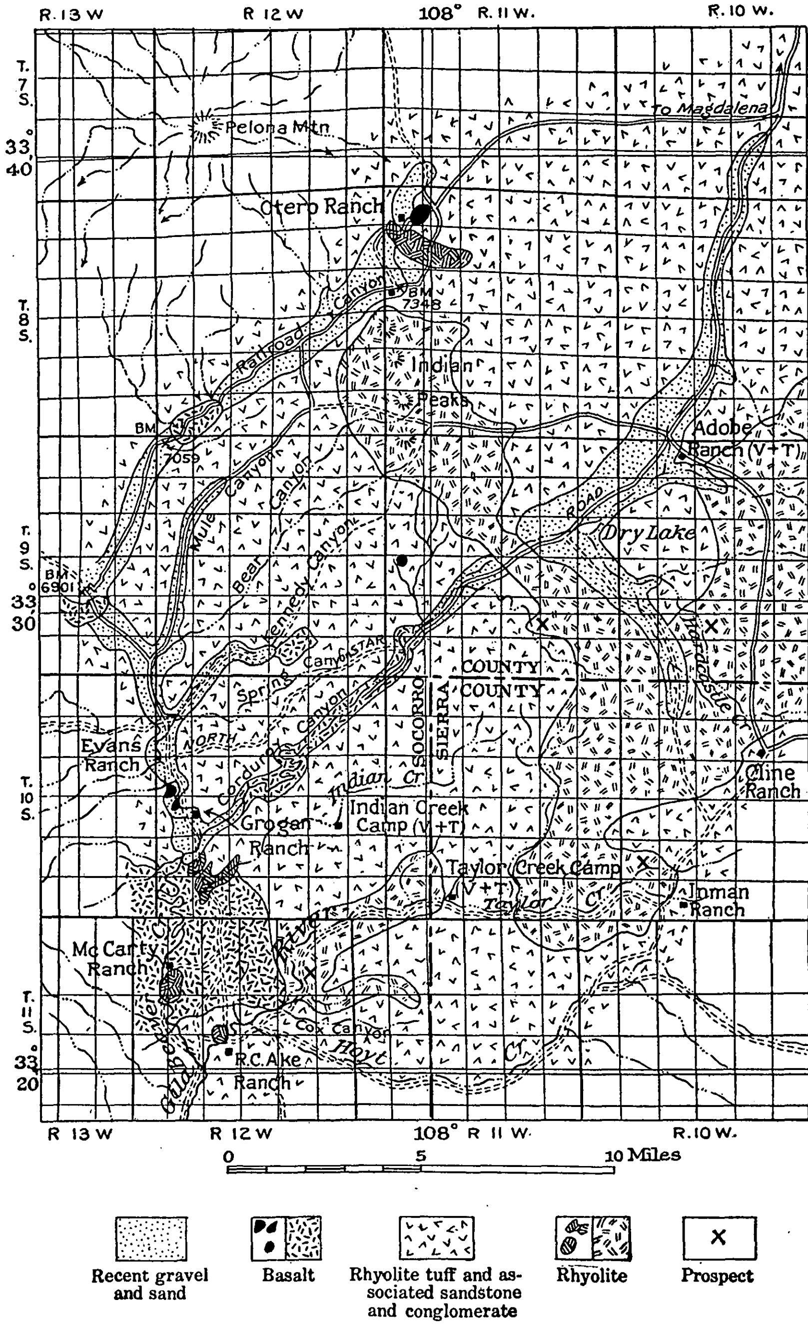


FIGURE 52.—Sketch map of the Taylor Creek district, N. Mex.

## TOPOGRAPHY AND DRAINAGE.

The Taylor Creek district is on the high volcanic plateau of west-central New Mexico. The average altitude of the flat interstream areas is about 7,500 feet in the northern and eastern parts of the district and 7,300 feet along the western border. Indian Peaks, in the north-central part of the area, with a maximum altitude of 8,328 feet, are a group of crags that stand conspicuously above the general level. The master drainage line, Beaver Creek, flows south and joins the Middle Fork of Gila River near Alum Mountain. The lateral streams—Railroad, Mule, Kennedy, Corduroy, Indian, and Taylor creeks—run southwestward in nearly parallel courses. All these drainage lines are sunk in box canyons from 200 to 800 feet below the upland surface. Most of the canyons are dry except during the wet season, but water flows in Beaver Creek below the mouth of Corduroy Creek and in Taylor Creek for a short distance above the mouth of Whitetail Canyon. Water can be had in shallow wells in most of the canyons, and at a few places in Railroad, Kennedy, upper Corduroy, and upper Taylor canyons water rises to the surface.

In the northwest corner of the area the upper parts of Corduroy and South Water canyons are broad, open valleys, along which are distinct terrace benches. In the south-central part of the area shown on the map, at a distance of 1 to 2 miles from the box canyons of Corduroy and Taylor creeks, there is a nearly flat triangular area in which the drainage is in shallow, open valleys. At the east this open country is broken by the ridge of rhyolite that runs south from Squaw Creek to Taylor Creek. In Railroad, Corduroy, and Taylor canyons small marshes have recently been formed by outwash cones that have been thrown completely across the canyons from lateral valleys.

## GEOLOGY.

### GENERAL FEATURES.

The rocks exposed in the Taylor Creek district are rhyolite, rhyolite tuff and associated sandstone and conglomerate, and basalt. Along the canyons there are narrow belts of recently formed sand and gravel, which in places are a mile wide. The district is in the southeastern part of the great area of Tertiary volcanic rocks that extends westward to the Arizona line. Lindgren [1] believes that the rhyolites in this region are of middle Tertiary age and the basalts of very late Tertiary and Quaternary age. So far as can be judged, the rhyolite of the Taylor Creek area corresponds rather closely to the lower rhyolite of the Mogollon district, described by Ferguson [2] in a recent paper.

[1] Lindgren, Waldemar, The ore deposits of New Mexico: U. S. Geol. Survey Prof. Paper 68, p. 33, 1910.

[2] Ferguson, H. G., The Mogollon district, N. Mex.: U. S. Geol. Survey Bull. 715, pp. 171-204, 1921 (Bull. 715-L).

## RHYOLITE.

The oldest rock seen in the Taylor Creek district is the rhyolite. When fresh, it is a light purplish-red, distinctly laminated rock, containing a number of orthoclase and quartz phenocrysts and a few small phenocrysts of plagioclase and biotite. In general, the phenocrysts are not large or prominent, but in places they constitute about a quarter of the rock mass. The quartz phenocrysts are ordinarily rounded and corroded and rarely exceed an eighth of an inch in diameter. The orthoclase feldspars are much more numerous and are in general larger than the quartz phenocrysts and ordinarily show crystal outline. The few plagioclase phenocrysts are thin laths, which in a few specimens have a bluish sheen. In the thin sections available no determinable plagioclase is present. A few flakes of biotite are occasionally seen in the rhyolite, though they are not at all common. The groundmass of the porphyry is very fine grained, in places glassy but more commonly cryptocrystalline. Spherulitic aggregates of quartz and orthoclase are more common in the groundmass than would be suspected from an inspection of hand specimens. Magnetite is rather widely distributed throughout.

Flow lines in the rhyolite are prominent and give an appearance of stratification to many of the exposures of this rock. The rhyolite flows are at least 700 feet thick, the base of the series being not exposed. In all the exposures of rhyolite the flow banding dips at angles which indicate considerable movement subsequent to the extrusion. The rhyolite suffered much erosion before the overlying tuffs, agglomerates, and sandstones were laid down, as marked differences of relief are to be seen at numerous places. Near the R. C. Ake ranch, on Taylor Creek, a small hill of rhyolite whose flow lines strike N. 40° W. and stand vertical is entirely surrounded by horizontally bedded white tuffs and sandstones. Near the Inman ranch, on upper Taylor Creek, on the east side of the rhyolite, the flow lines of which strike N. 40° W. and stand vertical, the tuffs have a low dip to the east directly at the contact but within a very short distance assume the normal horizontal position. It is believed that the dip at this place is due to deposition on a steep surface and not to postdepositional faulting. On the other hand, in Corduroy Canyon and upper Railroad Canyon there is clear evidence that the tuffs and sandstones were faulted and folded.

The caves on Taylor Creek were apparently formed by the arching of successive rhyolite flows. There are several of these caves; the largest is 15 by 30 feet and 4 to 10 feet high. In this vicinity the rhyolite is an agglomerate, in which more or less rounded masses of rhyolite are held in a matrix of similar material.

### TUFF, SANDSTONE, AND CONGLOMERATE

A large part of the Taylor Creek district is underlain by a thick series of white, buff, and red sandstones, white rhyolite tuff, and conglomerate composed of purplish rhyolite pebbles. Fine-grained pinkish-buff tuffaceous material is well exposed on the ridge west of the Cline ranch. South of Indian Peaks white tuff, buff and white sandstones in relatively thin beds, and some beds of fine conglomerate are exposed in all the canyon walls. At the mouth of Railroad Canyon and extending south along the west side of Beaver Creek there are excellent exposures of the horizontally bedded buff sandstone, which in places become reddish in tone. The sandstones are poorly exposed south of Corduroy Canyon as far as the canyon of Taylor Creek, but there similar light-colored tuff, sand, and fine conglomerate form the canyon walls. On the road just north of Indian Peaks a coarse conglomerate made up of pebbles and cobbles of rhyolite is exposed. This series of rocks is composed of detritus from the underlying rhyolite. The pebbles of the conglomeratic phases are all of the purplish porphyritic rhyolite. The sandstones are composed chiefly of angular grains of feldspar and quartz, with some biotite here and there, and are loosely cemented. A few beds are distinctly tuffaceous, with angular fragments of rhyolite in a fine-grained groundmass of quartz and feldspar and glass.

### BASALT.

The basalt of the Taylor Creek area is a black olivine basalt of normal type. In some exposures it is vesicular; in others dense. The best exposures of the dense facies occur along Beaver Creek, below the mouth of Corduroy Canyon, where in some places columnar structure is seen and in others there are huge rolled masses that in form, although not in whiteness, resemble immense snowballs. Practically all the specimens examined consist largely of glass with only a few crystalline minerals. In one place in Beaver Canyon an exposure was seen in which a very few long, thin crystals of plagioclase feldspar were noted. In places where the basalt flows were thin, as on the plateau north of Taylor Creek, the surface is strewn with boulders of vesicular glassy basalt, in which the vesicles make up more than half of the bulk of the rock.

Black Mountain, which rises as a prominent peak about 6 miles west of the southwestern part of the area shown in figure 52, appears to have been the center from which the basalt flowed. The main flow from this center has been cut across by Beaver Creek from the mouth of Corduroy Canyon nearly to the mouth of Taylor Creek. In places in this part of Beaver Creek the canyon walls are 700 feet high, all in basalt. Near the mouth of Corduroy Canyon it is well demonstrated that the canyon of Beaver Creek has been cut in the tuff and sandstone prior to the period of basalt extrusion.

At McCarty's ranch, in Beaver Canyon, a small knob of rhyolite is surrounded and capped by the basalt, but at the lower end of the canyon the basalt rests on horizontally bedded sandstone and tuff. East of Beaver Creek canyon, in the southwestern part of the area, the cover of basalt on the tuff and sandstone is relatively thin, and in places the underlying rocks are exposed. Long tongues of basalt flowed up Railroad, Kennedy, and Corduroy canyons. In Railroad Canyon remnants of the flow are seen 12 miles north of the main body of basalt, in Kennedy Canyon 6 miles northeast, and in Corduroy Canyon 8 miles northeast. In Corduroy Canyon the flow apparently dammed the canyon to a depth of 200 feet, and behind the dam a lake was formed in the area of the dry lake in Corduroy and South Water canyons south of the Adobe ranch. At one place in Corduroy Canyon the basalt flowed over a low hill on the inner side of a horseshoe curve. At this place the flow was a quarter of a mile wide and has a present thickness of 150 feet.

### RECENT GRAVEL AND SAND.

The most recent deposits are gravel and sand along the canyon bottoms. The largest area of these deposits is the former lake bottom in upper Corduroy and South Water canyons. The valley flat in this locality has a maximum width of 1½ miles and with the two arms covers approximately 8 square miles. The next largest area is along Beaver Creek at the mouth of Corduroy Canyon, where there is approximately 1 square mile of flat. In most of the canyons the recent gravels are so inconspicuous that they are not indicated on the map.

### STRUCTURE.

Apparently there was much folding and faulting of the old rhyolite prior to the deposition of the tuff and sandstone. At Indian Peaks the flow lines of the rhyolite strike N. 70° W. and dip 5° N. Along this belt south-southeastward to Corduroy Canyon extends a tightly compressed fold in the rhyolite, about a mile wide. In the middle of the belt the flow lines are nearly vertical, and at the margins the dips are very steep. Some movement took place along this line subsequent to the deposition of the tuff and sandstone, which are tilted on either flank of the rhyolite, though they show lower dips than the older rock and flatten to a horizontal position within short distances from the rhyolite on each side. What appears to be the continuation of this line of weakness is seen on the divide between the heads of Dogy and South Water canyons and again just west of the Inman ranch. In lower Taylor Creek near the caves the flow lines of the rhyolite strike N. 40° W. and dip from 20° SE. to nearly vertical.

In general, the tuff and sandstone beds are essentially horizontal and have not been disturbed to any considerable extent, except along the belt of weakness already mentioned as crossing the upper end of Corduroy Canyon. These beds, however, were subject to extensive erosion before the basalt was extruded, by streams that followed similar courses to those of to-day.

The basalt, which appears to have come from Black Mountain, completely filled a deep canyon along the present Beaver Canyon, flowed over the east rim, covered part of the mesa between Indian Creek and Taylor Creek with a thin flow, and sent long tongues up the old canyons now known as Railroad, Kennedy, and Corduroy. No evidence was noted of any folding or faulting later than the extrusion of the basalt.

## TIN DEPOSITS.

### GENERAL FEATURES AND HISTORY.

Stream tin has been found in the gravels of Taylor Creek, Squaw Creek, and Hardcastle Creek; and cassiterite, with specular hematite, occurs in veinlets in soft, altered rhyolite at several localities in the Taylor Creek district. The basalt and the tuff, sandstone, and conglomerate that overlie the rhyolite are barren of mineral deposits.

The discovery of stream tin in this district was made by J. N. Welch, who had been prospecting for gold along Taylor Creek. Late in 1918 he took some of the heavy black sands he had collected to Chloride, where he wintered. Some of this material was sent to Denver for assay, and the returns showed no gold but 30 per cent of tin. In 1919 he made locations near the caves on Taylor Creek. Moliter & Crumley also located ground in this vicinity early in 1919. These claims, together with Welch's ground and several locations in the upper part of Taylor Creek, near the Inman ranch, were taken over by the New Mexico Tin & Metals Co., of New York, during the summer of 1919. F. P. Davis and A. D. McDonald, who had been prospecting for tin during the early part of 1919, located placer ground in Taylor Creek below Whitetail Canyon and on Squaw Creek, where a small area of rhyolite containing tin veinlets was also located. These men in 1920 found and located the placer and lode claims on Hardcastle Creek, in the northeastern part of the district.

Prior to August, 1920, the prospectors had not extended their operations northwest of Corduroy Canyon. In fact, no development work had been done except at Cave City, near the mouth of Taylor Creek, on Squaw Creek, at the then newly discovered locality on Hardcastle Creek, and near the McCarty ranch. The gravels of Squaw Creek had been tested in a rather systematic manner. and desultory tests of the gravels in other streams had shown the presence of tin. The testing of the gravels of Taylor Creek in the vicinity of Cave City had reached only to water level, as there is a considerable flow of water along this valley. Nowhere was sufficient work done to prove that the deposits could be profitably worked. The developments were confined to the more conspicuous deposits but give a fair idea of the general characteristics of the deposits.

## LODE DEPOSITS.

### CHARACTER AND DISTRIBUTION.

All the lode deposits in the district are in the rhyolite (fig. 52). The largest area of rhyolite is the belt which, starting at Indian Peaks, bends south-southeast past Corduroy Canyon to Taylor Canyon in the vicinity of the Inman ranch. A much smaller area of rhyolite is exposed by the erosion of Taylor and Whitetail creeks, whose canyons are cut through the overlying tuffs and sandstone to a depth of 500 feet into the older rhyolite. A very small exposure of rhyolite entirely surrounded by basalt appears in the canyon of Beaver Creek, just south of the McCarty ranch. The small rhyolite exposure in Squaw Creek is on a high point of the old rhyolite surface and is nearly surrounded by horizontally bedded tuff and sandstone.

In all the deposits that have been discovered the characteristics are similar. The rhyolite in these places is cut by an irregular network of nonpersistent, narrow fractures. In general there are two fairly distinct sets—one striking north to N. 20° E. and the other N. 60° E. to east. Where the fracturing is more intense the rhyolite has been kaolinized to a soft white rock. Immediately adjoining the fractures in some places there are narrow zones in which the white rock has been colored purplish red by iron. Along some of the fractures an intimate mixture of cassiterite (tin oxide) and hematite (iron oxide) is found. In a few places brilliant red flaky crystals of cassiterite were seen, but in general the dark-brown to black tin oxide is deposited as rather dense botryoidal forms that are called "stream tin" when found in placers. The hematite usually is crystallized in brilliant black plates, which have a tendency to form in clusters, making small rounded knobs on the walls of open fractures. At some places specimens were seen in which tablets of red cassiterite were coated with black hematite, and this in turn was covered with a thin layer of chalcedonic silica. Calcite was found at one locality on Squaw Creek but nowhere else in the district. At this one place it was the last mineral formed. At a few places the hematite is the red botryoidal variety, though this form is not so common as the splendent black crystals.

As a rule the mineralized fractures are not completely filled, the coatings on the walls ranging from a sixteenth to an eighth of an inch in thickness. Rarely a fracture as much as an inch in width is almost entirely filled with the mixture of cassiterite and hematite. These bunches are relatively small and do not persist far in any direction.

Some of the stream-tin nuggets from Hardcastle Creek shown to the writer indicate that there are a few bunch deposits of cassiterite as much as 3 inches thick.

In general the tin and iron minerals are frozen to the walls. At some places the adjacent porous, altered rhyolite contains small crystals of hematite and cassiterite for short distances away from the fractures. It is stated by the operators near the caves in lower Taylor Creek that the soft rhyolite, which here is much altered and cut by an innumerable number of fractures, carries some cassiterite to a depth of 300 feet below the croppings.

At one place on Hardcastle Creek a narrow fracture in hard, unaltered rhyolite is filled with cassiterite and hematite. At another place in the same locality a small area of black volcanic glass, with much altered phenocrysts of quartz and what appears to have been orthoclase feldspar, is surrounded by silicified, hard white rhyolite. Near this silicified rock crevices in the rhyolite are filled with opaline and chalcedonic quartz. In this locality no tin or iron minerals were noted, though not far distant there are pits in soft kaolinized rhyolite that show the usual mineralization.

The alteration of the rhyolite rarely extends more than 1 foot on either side of an individual fracture. It is only where several closely spaced fractures occur that there is any great amount of alteration or mineralization of the rhyolite. The altered rhyolite in the vicinity of the mineralized veinlets consists essentially of kaolin, which has formed largely from the groundmass of the original rock and residual quartz. The feldspar phenocrysts have in some places been entirely altered, but at most places alteration of the feldspars has not been completed and outlines of the original phenocrysts have been preserved. The quartz phenocrysts have escaped alteration. Next to the tin-bearing fissures the soft white altered rhyolite is porous for half an inch to an inch and is stained a characteristic purplish-red color. Under the microscope material of this character is seen to consist of grains of quartz, remnants of feldspar, iron-stained kaolin, small flakes of hematite and cassiterite, and a yellowish-green chlorite. The quartz is all residual from the decomposition of the original constituents of the rock. Silicification is conspicuously absent from practically all the rocks in the vicinity of the tin-bearing fissures. In this respect the deposits are in marked contrast to the tin deposits in rhyolite near Battle Mountain, Nev., concerning which Knopf[3] says:

> A notable feature of the deposits is the comparatively small amount of alteration of the rhyolites near the veinlets. The microscope shows that the groundmass of the rhyolite close to the ore has been wholly replaced by an aggregate of hematite, chalcedony, and other forms of silica.

[3] Knopf, Adolph, Tin ore in northern Lander County, Nev.: U. S. Geol. Survey Bull. 640, p. 130, 1917.

In many respects the Taylor Creek tin veinlets resemble the deposits in Durango, Mexico, which, according to Ingalls,[4] are veinlets in much-altered rhyolite tuff. The tin of these deposits occurs both in mammillary form and as brilliant red and yellow crystals. Ingalls[5] cites Baron von Richthofen as believing that the altered tuff in the vicinity of the ore bodies is similar "to rhyolite when decomposed by solfataric action."

No topaz, tourmaline, or other fluorine or boron bearing minerals or sulphides were noted in the Taylor Creek district, and in this respect these tin deposits resemble the deposits in Nevada.

It is believed that the fractures were formed in part by strains developed during the closing stages of the rhyolite extrusion, possibly owing to differential cooling, but also without much question in part by movements subsequent to the extrusion. As is shown by the developments at Taylor Creek the rhyolite is fractured and altered to a depth of at least 300 feet, and there is no reason to believe that the fractures do not persist to greater depths.

The mineralizing solutions or vapors that followed these fractures were probably residual from the segregation of the rhyolite magma. They were apparently not very hot, were meager in quantity, were not particularly strong chemically, and carried no fluorine, boron, nor sulphur and almost no silica.

## DEVELOPMENTS.

The largest area of altered rhyolite noted by the writer lies at the head of Nugget Gulch, a small dry tributary of Hardcastle Creek. No work has been done at this place, however, and no hematite or cassiterite was noted, though operators report having found some stream tin in the gravels of the gulch below. Lower down in Nugget Gulch several shallow pits and open cuts had been dug by Davis & McDonald on iron-stained altered rhyolite, in which there were showings of cassiterite in place. The tin mineral here is of a dark reddish-brown color, and there was not much hematite in the ore. Picked specimens are said to carry 50 per cent or more of tin.

On Squaw Creek about 2½ miles up from Corduroy Canyon Davis & McDonald had run two short tunnels into a zone of soft altered rhyolite cut by a series of east and N. 20° E. fractures. In the fractures next to the walls there is a thin layer, usually one-eighth but locally half an inch thick, of brilliant red platy cassiterite. This is thinly coated with black hematite, which in places is covered with chalcedony and finally by calcite. All the minerals are tabular and set

[4] Ingalls, W. R., The tin deposits of Durango, Mexico: Am. Inst. Min. Eng. Trans., vol. 25, pp. 152, 155, 1896.

[5] Idem, p. 157.

perpendicular to the walls of the fracture. The altered rhyolite walls are impregnated with red cassiterite and a small amount of hematite for an inch from the fractures, and a red color is imparted to the otherwise white rhyolite for 6 to 8 inches from the fractures.

Just below his ranch on Beaver Creek Mr. McCarty has sunk some shallow workings in soft altered rhyolite along fractures in which he has found films of hematite and a small amount of cassiterite.

North of the caves on Taylor Creek there is a second fairly large area of soft altered rhyolite, into which the New Mexico Tin & Metals Co. was driving a tunnel in August, 1920. Near the top of the canyon wall a number of pits, open cuts, and shafts have been sunk on a closely spaced series of vertical fractures in kaolinized rhyolite. In most of these fractures there are thin coatings of hematite and red cassiterite. At a few places bunches of the mixed minerals were noted, and the rhyolite on either side of the fractures here and there showed disseminated grains of the two oxides. In August, 1920, the tunnel at the creek level, driven to cut under the zone of altered rhyolite exposed in the surface workings, was 90 feet long. Although the rhyolite cut by the tunnel is kaolinized, it does not appear to be mineralized to any considerable degree. The operators report that at a distance of 250 feet from the mouth the tunnel was in altered "porphyry" carrying between 1 and 2 per cent of tin. Picked samples of ore from this locality were tested in the laboratory of the United States Geological Survey and found to carry 49.9 per cent of tin. Samples of the altered rhyolite were found to be barren. The samples of picked tin ore were reported to carry considerable platinum, but none was found in the samples taken by the writer.

East of the Inman ranch, on upper Taylor Creek, a group of claims belonging to the New Mexico Tin & Metals Co. covers some kaolinized rhyolite along fracture zones. At this place a few pits had been dug on what appeared to be the more promising localities, and a few stringers of hematite, with a little cassiterite, were exposed.

## PLACER DEPOSITS.

During the present cycle of erosion, though the main streams have cut deep box canyons, they have not cut deeply into the rhyolite in which the lode tin deposits are found. As a consequence only a few of the streams have been shown to contain stream tin. Prospecting had not been carried far enough in 1920 to indicate much about the possibilities of Hardcastle Creek, though some large nuggets and considerable small cassiterite had been found. The gravels of this area are not extensive, having possibly an average width of 100 feet and a depth of 6 to 8 feet, to judge from the topography. The creek is dry most of the year.

In Squaw Creek the gravels are from 50 to 150 feet wide and from 6 feet thick near the head to 15 feet thick in the vicinity of Corduroy Canyon. A little stream tin has been found throughout this gravel by rather systematic prospecting, though it is not certain that the quantity is sufficient to pay for extraction, especially as an adequate water supply does not exist.

A little tin has been found in the gravels of Beaver Creek, though so far as could be learned the ground has not been thoroughly prospected. The gravels lie in a narrow box canyon cut in basalt, and many large blocks of basalt would have to be handled. Presumably the gravels are not very thick, but their thickness has not been determined on account of the flow of water through this part of the canyon.

Stream tin has been found in Taylor Creek below the mouth of Whitetail Canyon. The ground has been roughly prospected to water level, but as there is considerable water in the lower part of the canyon, bedrock has not been reached in any of the work. The valley floor is from 150 to 250 feet wide. There are many large boulders of hard rhyolite mixed throughout the gravel.

## FUTURE OF THE DISTRICT.

The tin-bearing veinlets that had been exposed at the time the writer visited the Taylor Creek district are all of very small size, are not persistent, and did not appear to be sufficiently rich to be workable alone. The only possibility for successful operation of the deposits which had been opened in 1920 seemed to be that some of the zones of altered rhyolite in the localities where many veinlets are present might carry sufficient disseminated cassiterite to form a mass of low-grade ore that might be amenable to concentration. The cassiterite is everywhere intimately mixed with hematite, however, and the separation of the two minerals would be difficult.

The more promising localities seen by the writer are at the caves on lower Taylor Creek and on Squaw Creek. At Taylor Creek the proportion of hematite to tin is higher than at Squaw Creek. It is reported by the operators that picked samples of stream tin and nuggets run from 38 to 50 per cent of tin. As is well known, it is difficult to market tin concentrates carrying less than 50 per cent of tin. There is also the chance that tin veinlets and zones of altered rhyolite carrying tin may be found in the rhyolite areas north of Corduroy Canyon and between Squaw Creek and Taylor Creek. These areas had not been prospected in August, 1920.

Little can be said with regard to the possibilities of the placers, beyond the facts that there has not been a great amount of erosion to supply the gravels with tin, that the tin-bearing gravels are limited to rather narrow channels of relatively shallow depth, that in some of these channels there are large boulders that would be difficult to handle, and that in some localities the development of water for washing would cost a great deal of money. The most favorable placer localities seen by the writer are Hardcastle Creek, that part of South Water Canyon near the mouth of Hardcastle Creek, Squaw Creek, Corduroy Canyon below the mouth of Squaw Creek, Taylor Creek below Whitetail Canyon, and particularly the flat west of the R. C. Ake ranch.