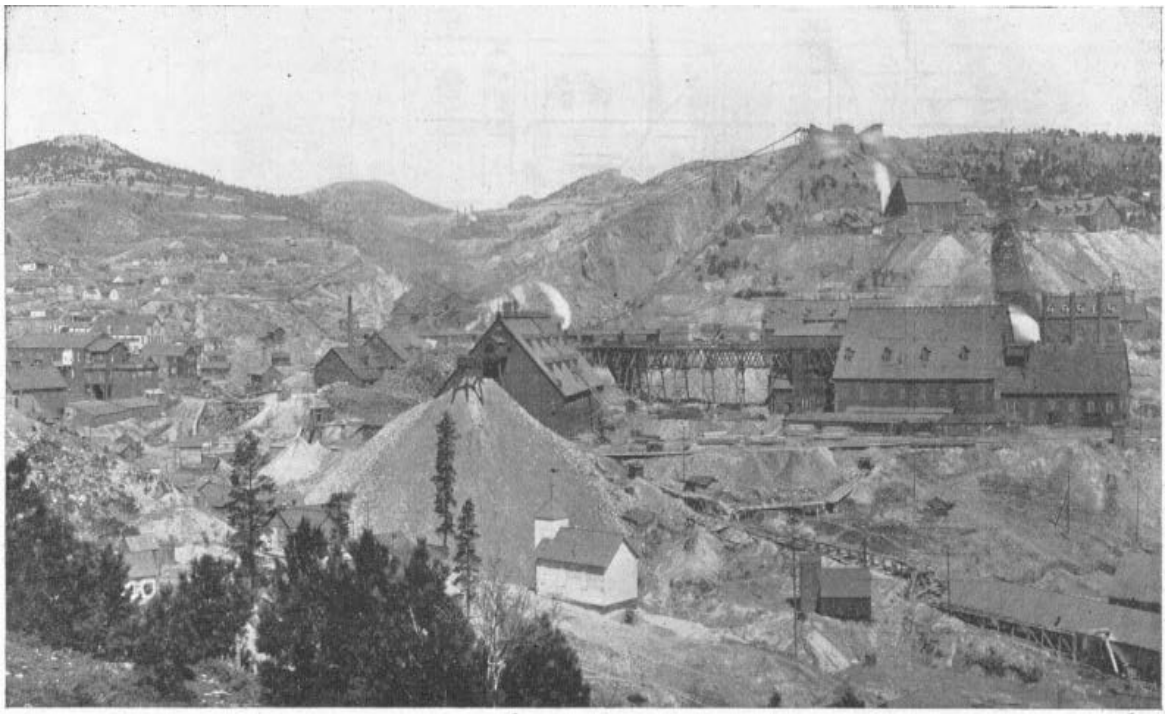
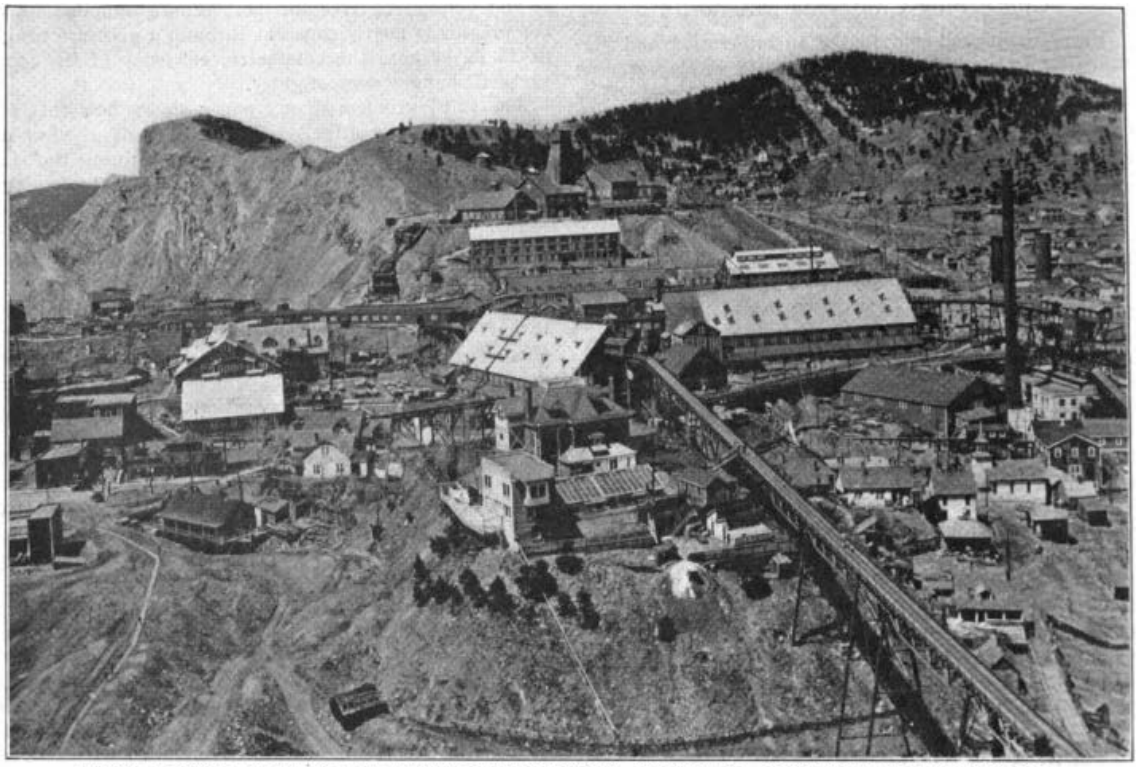
Mines And Mining In The Black Hills Survey: Contextual Information

By
Laurie Ann Everton



THE HOMESTAKE COMPANY'S STAMP MILLS, SOUTH DAKOTA.



PARTIAL VIEW OF MILLS AND SHOPS OF HOMESTAKE MINING CO. OPEN CUT IN BACKGROUND

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Mines and Mining in the Black Hills of South Dakota

Introduction

Numerous mines are located within the Black Hills Mining District. The most important and longest running mine in the Black Hills District is the Homestake Mine. Other important mines in the northern Hills along what was known as the Homestake mineral belt include the Father DeSmet Mine in the mining camp of Central City, and the Caledonia, the Old Abe and the Deadwood Terra in the mining camp of Terraville. A western extension of the Homestake mineral belt occurred in the Bald Mountain, Ruby Basin and Terry Peak area, and included the mines in and around the mining camp of Portland (later Trojan) and the mines in and around the mining camp of Terry. Another important mining district in the northern Hills consisted of the Yellow Creek District, and specifically the Wasp No. 2 Mine and the Little Blue Fraction or Bismark Mine. Two other important districts located in the northern Hills included Galena which was mined mostly for silver, and an area where carbonates were found and where the mining camp of Carbonate was located. The Tinton area was also an important northern Hills district where both tin and gold were found in marketable quantities. The Maitland Mine and the Uncle Sam Mine were also located in the northern Hills. In the central Black Hills, the Rochford District, the Keystone District and the tin mines in and around Hill City played an important role in Black Hills Mining. In the southern Black Hills the St. Elmo/Clara Belle and Spokane mines were the only areas of extensive mining.

"There's gold in them thar Hills"

In the mid 1800's, the Black Hills was a relatively unknown part of the Louisiana Purchase in the north-central United States, but there were rumors of an 'Island in the Plains' where gold could be found. Some rumors talked of 'gold amongst the blades of grass' that could be 'easily found and collected'. These rumors were circulated by a handful of explorers and prospectors who had journeyed through the area, and the Government became interested when the Federal coffers needed more gold. In 1874, the Government sent an expedition into the area. The expedition was led by George Armstrong Custer, and was known as the Custer Expedition. They started out from Fort Abraham Lincoln in Dakota Territory and traveled south to the Wyoming side of the Black Hills, coming into the region around what is now known as Inya Kara Mountain. They explored the entire Black Hills, moving through the area and recording land forms, wildlife, minerals, timber and other natural resources. While they were camped along French Creek east of the present town of Custer, H.N. Ross panned the gravels of the creek and found gold. This became the first documented discovery of gold in the Black Hills.



(photo by Sanford)

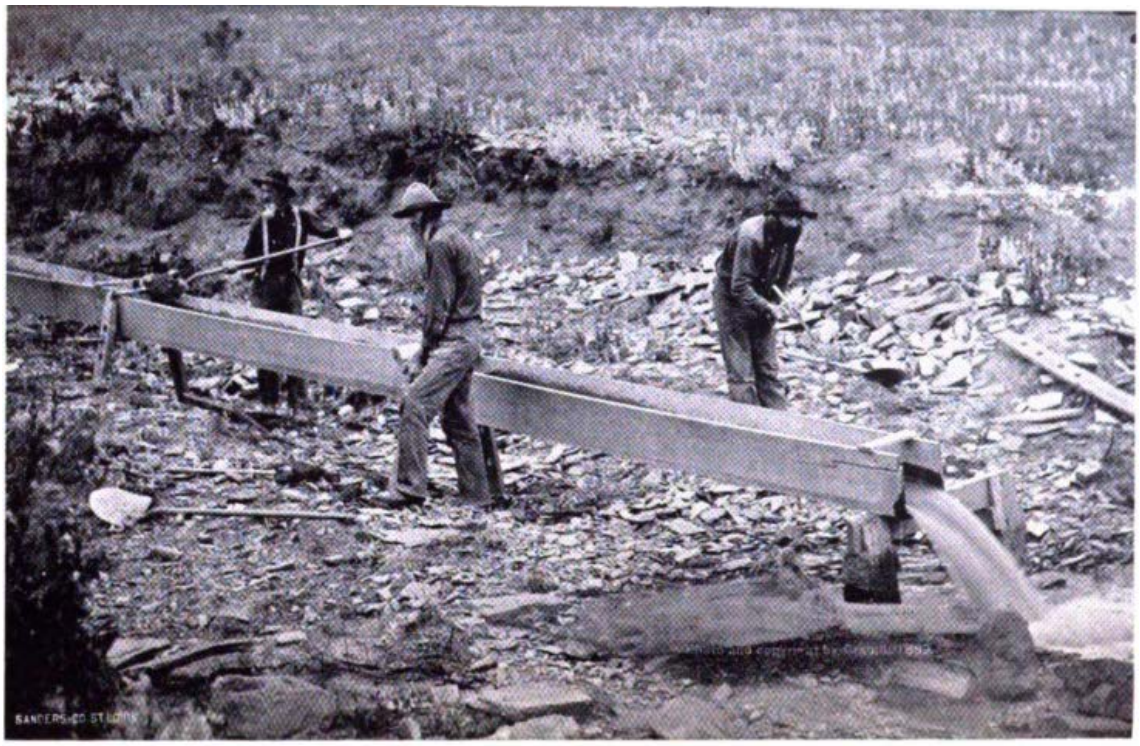
H.N. Ross at the approximate location of the discovery of gold in the Black Hills

The story of the Expedition and the discovery of gold was reported in newspapers all over the US, including this from a newspaper in Colorado: *"General Custer Finds Gold*: While on the exploring trip through the Black Hills they camped on a small stream they named French Creek. While there the prospector (H.N.) Ross who was with the expedition panned some of the gravel. There was a string of gold in the bottom of the pan. This stream is located close to a big granite mountain."

Needless to say, this started a rush of gold seekers to the Black Hills, which created a problem as the Black Hills were part of the Indian Territories and were off limits to the trespassing prospectors. The Government had to remove the gold seekers from the area until a treaty could be signed and legal access to the Hills could be obtained. In 1876, the Fort Laramie Treaty was signed with the Native tribes, and the Black Hills gold rush officially started.

Placer Mining in the Black Hills

Most of the prospectors originally came into the Hills from the south on the Cheyenne and Sydney Trails, as this is where gold had first been discovered. They laid claim to the placer deposits along French Creek, and in a short time most of the creek was either being worked, or had already been 'worked out' as none of the deposits in this area were either deep or extensive.



SLUICE BOX — PLACER MINING IN THE HILLS.

This 'Relocation Certificate' for a placer claim along French Creek is from Joseph Reynolds' family information from Loren Harrison, grandson of Elsie May Reynolds, one of Joseph's daughters. Joseph Reynolds was among the first gold seekers into the Black Hills. He later ranched in the area known as Reynolds Prairie.

Relocation Certificate
Bonanza Lode

… J.T. Reynolds and S.K. Baken of the County of Pennington Territory of Dakota claim by right of Relocation fifteen hundred feet … horizontal measurement on the Bonanza Lode along the vein … all its dips variations and angles together with one hundred fifty on each side of the middle of said vein at the surface any veins lodes ledges and surface ground within the line of said claims 750 feet lying West of North and 750 feet lying East of South from center of discovery shaft … being situated within the lines of said claim in Custer Mining District Custer County Territory of Dakota
Said Bonanza Lode is situated about 4 miles west of Custer and about ¾ of a mile south of French Creek in Custer County Dakota Territory
Said Bonanza Lode was Located by J.T. Reynolds in March( ) A.D. 1875 and Relocated by J.T. Reynolds and S.K. Baken on the 22nd day of January A.D. 1878
Date of Certificate March 10th A.D. 1879
J.T. Reynolds
S.K. Baken

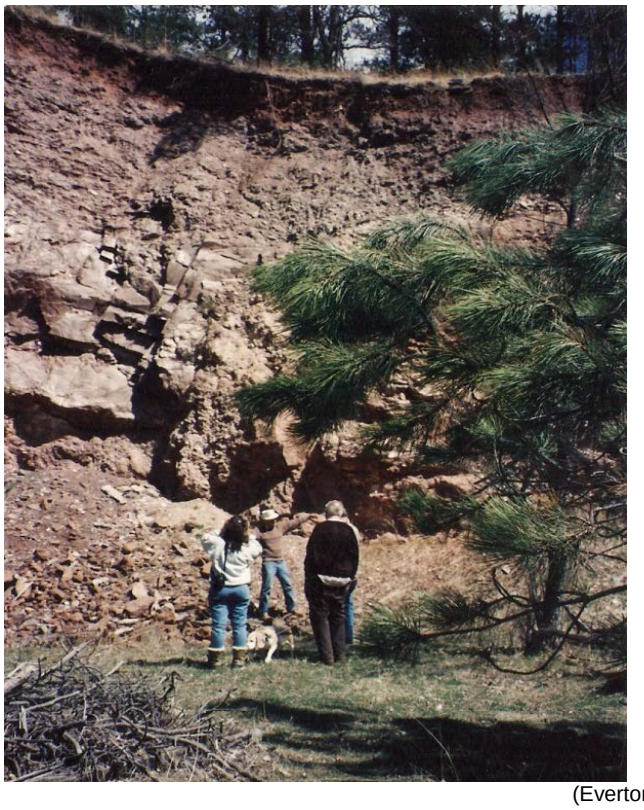
The prospectors moved north as the French Creek area became 'worked out', panning the creeks and streams as they spread out over the Hills. Placer gold was found in various quantities along most of the waterways.

Rockerville

One area where placer gold was mined was in the area of the mining camp of Rockerville. This area had no water to speak of to conduct placer mining, and an extensive flume to bring water from Spring Creek to Rockerville was constructed. This was a costly endeavor, however, and was in constant need of repair. Although some gold was extracted using the flume water, it became cost-prohibitive to continue working the placer deposits, and no promising hard-rock mines were ever located in the area. Rockerville became a 'ghost town' as the miners moved on to other more prosperous 'diggings'. The mining camp of Rockerville became a tourist destination in the 1960's, and a few of the placer areas are still being worked by 'hobby miners'.



This undated photograph from an unknown source shows the Rockerville flume and hydraulic mining at Rockerville. The flume was run across the top of the ridge and the water spilled over the edge and was used for hydraulic mining (note the hoses and water nozzles).



(Everton photo)

The same area at Rockerville in 1996

Castle Creek

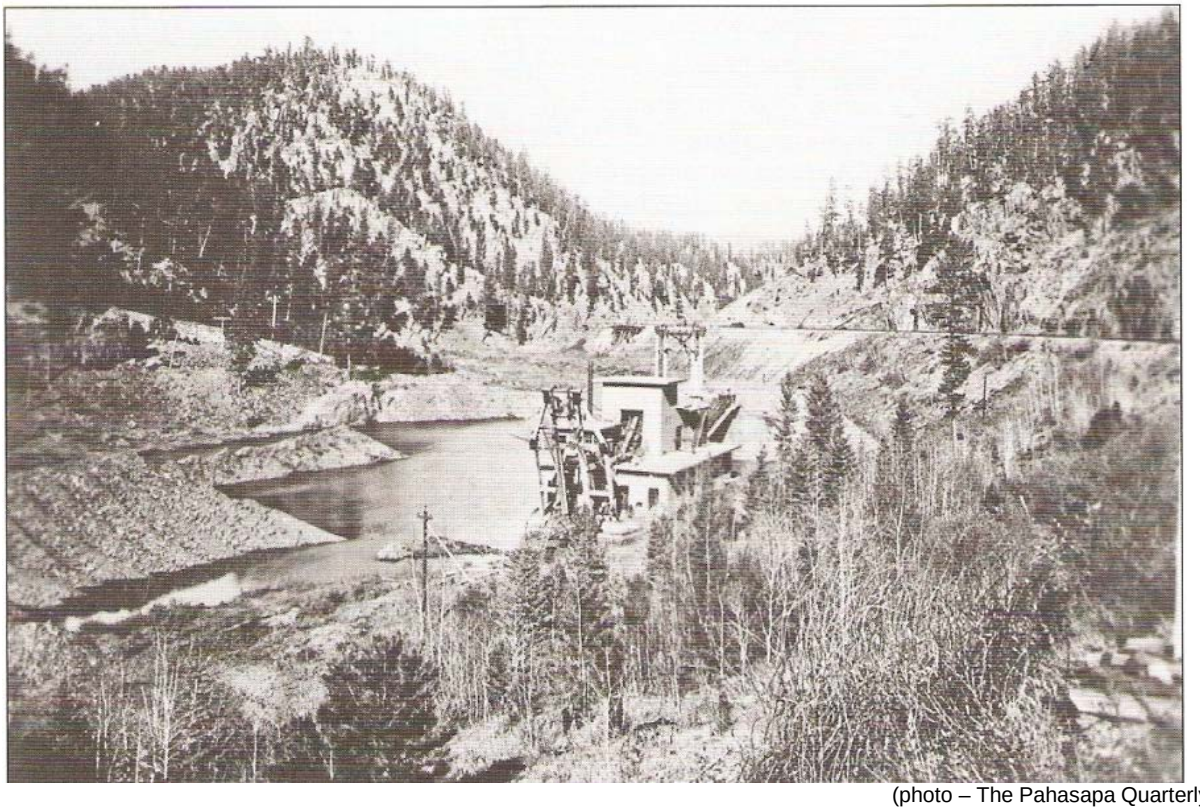
Another area that was extensively placer mined was along Castle Creek near the mining camp of Mystic in the Central Black Hills. This area was first discovered in 1879, and placer mining was conducted in several places along the creek during the 1880's and 1890's. In 1910 a mechanical dredge was built and used to mine Castle Creek in the Castleton area. This was the only mechanical dredge that was operated within the Black Hills Mining District.



GOLD DREDGE AT MYSTIC IN THE BLACK HILLS OF SOUTH DAKOTA

This dredge was built in 1911 and was operated until the latter part of 1913.

(photo - The Engineering and Mining Journal)



(photo – The Pahasapa Quarterly)

The Castle Creek dredge at Castleton



(Everton photo)

One of the ponds and the rock piles from the Castle Creek dredge

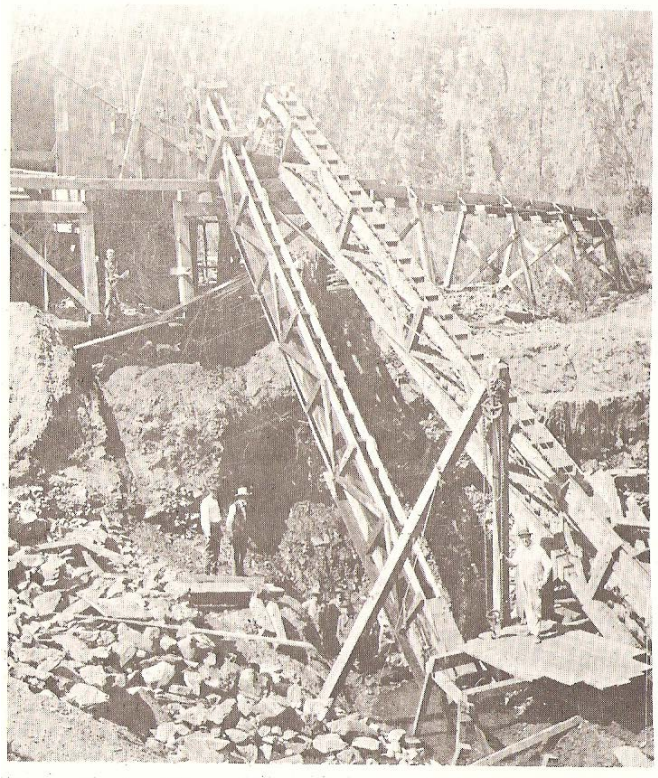
Placer Mining Along Rapid Creek

Another area where extensive placer mining occurred was along Rapid Creek, from the Big Bend area to the mining camp of Pactola.



This undated photo from an unknown source shows the Big Bend placer mining camp

In the Big Bend area, not only was placer mining conducted, but a large tunnel was also dug through the mountain at Big Bend by the Ft. Meade Company to divert and drain a part of Rapid Creek for mining purposes.



THE WORKS at Big Bend, now known as Thunder Head falls
(photo - Carl Leedy)

Unfortunately the Ft. Meade tunnel was a mining scandal that was perpetrated by a well-known swindler in Black Hills mining, Robert (Bob) Flormann. Carl Leedy, The 'Old Timer' of the Black Hills, had this information on the Fort Meade tunnel and Thunder Head Falls in his book ***Golden Days in the Black Hills:***

Thunder Head Falls

Many people drive past Big Bend every year and never see the bend. It is now used for a tourist attraction called Thunder Head Falls. It was originally a mining operation, begun in 1883.

There were known to be many deposits of placer gold along the creek in that area and the big bend in the stream gave the miners a chance to drain a mile and a half of it by cutting a tunnel through the hill. This operation was undertaken by Bob Flormann, who already had a reputation as a promoter. He hired a big crew of men to do the work.

They started a shaft on the north side of the bend and sank down a distance of 60 feet. At the same time, they started drilling a tunnel from the south. After spending $40,000, they had the big tunnel completed and the mile and a half of the creek drained.

Then they went to work prospecting the area for placer gold. Several deposits were found, but as a whole it was a disappointing venture.

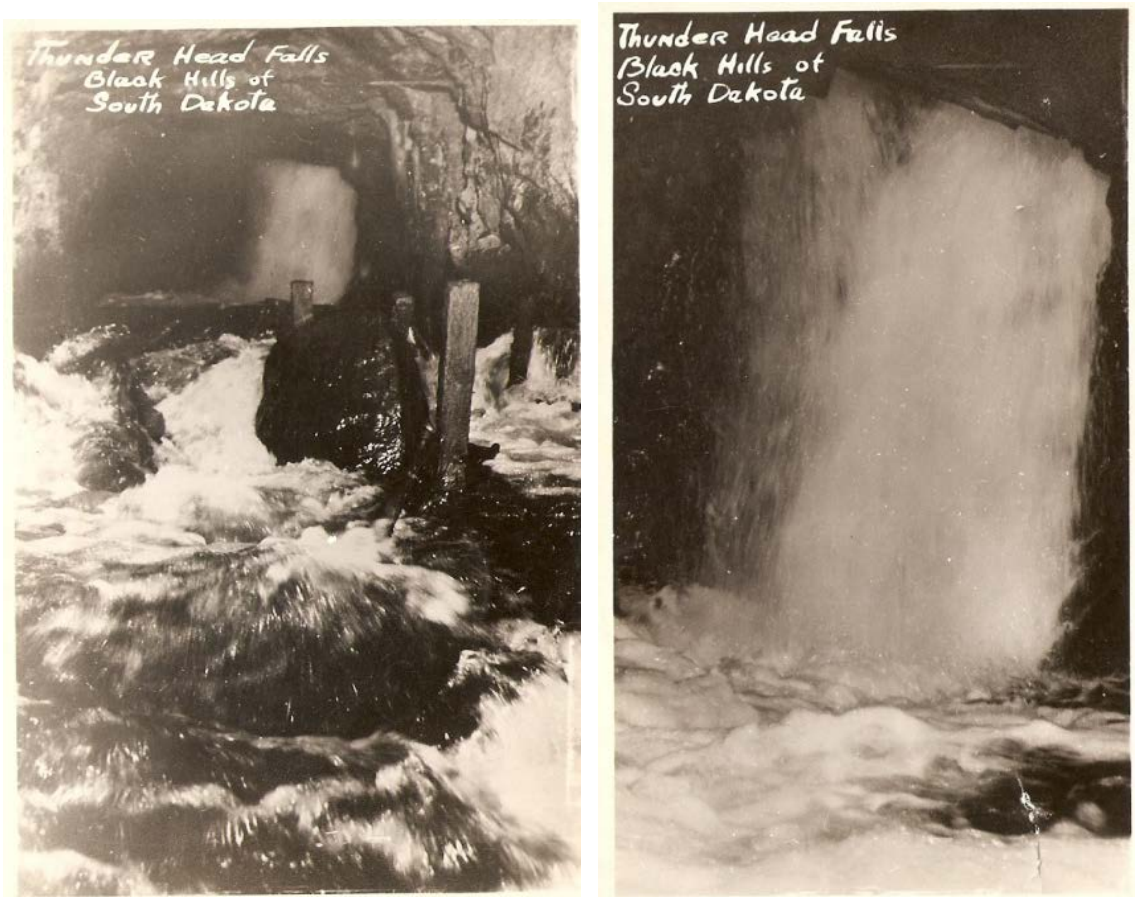
After spending all that money, Flormann figured he had to do something to recoup. So he started a drift in the hill close to the entrance in the tunnel, built a railroad track from the new mine over to the entrance and then constructed a set of riffles down in the main part of the tunnel. This looked like a big mining operation. The men on the north side hauled dirt and dumped it into the entrance and the other men were down in the tunnel taking care of the riffles. Everything was there except gold.

Flormann had some suckers in mind, so he went back east and brought some gullible souls out and sold them the whole deal at a nice profit. My father was employed by the new owners to install some pumps. The mine had been operating about a month when Bob Flormann drove up with his fancy team all spanking with nickel-plated hames and buckles—comparable to a long Cadillac of today. He asked the mining foreman how much gold they had cleaned up and the foreman, thinking they had done pretty well, said "Something over $3,000."

"Hell," said Flormann, "you didn't even get my salt by $2,500."

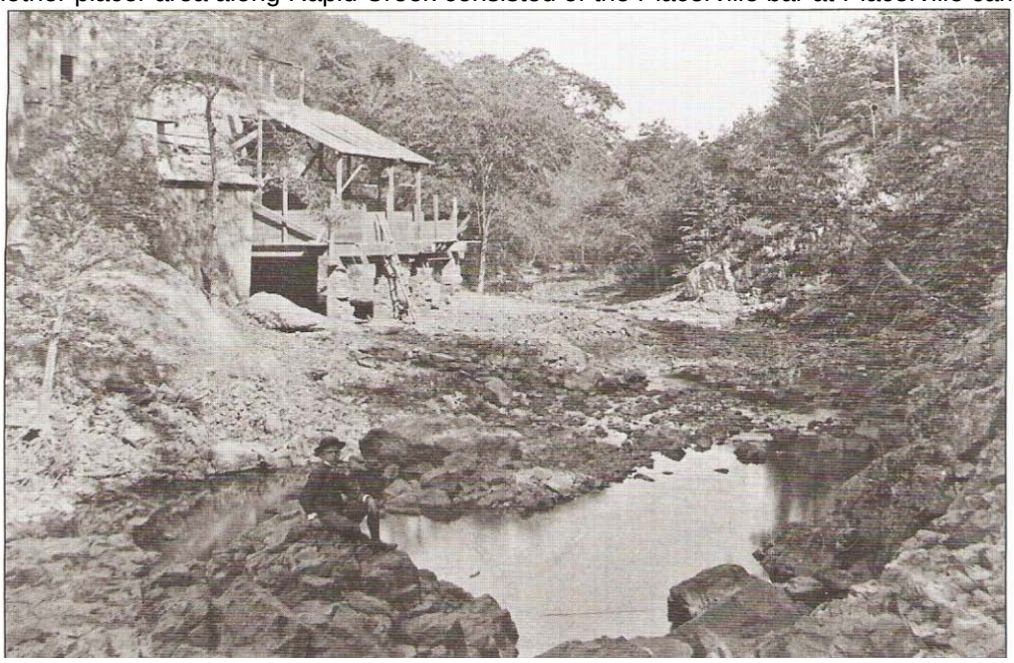
So that is the history of Thunder Head Falls, which has been falling for 70 years.

Thunderhead Falls is now a tourist destination in the Black Hills. You can go inside the mountain and see the falls.



These two undated picture post cards are of Thunderhead Falls

Another placer area along Rapid Creek consisted of the Placerville bar at Placerville camp.



This undated photo from an unknown source is of the Placerville gold bar

Placerville was only a few miles below Pactola on Rapid Creek, and there were placer mining operations all the way to Pactola from Placerville Camp.



PACTOLA (The River of the Golden Sands)

(photo – Pahasapa Quarterly)

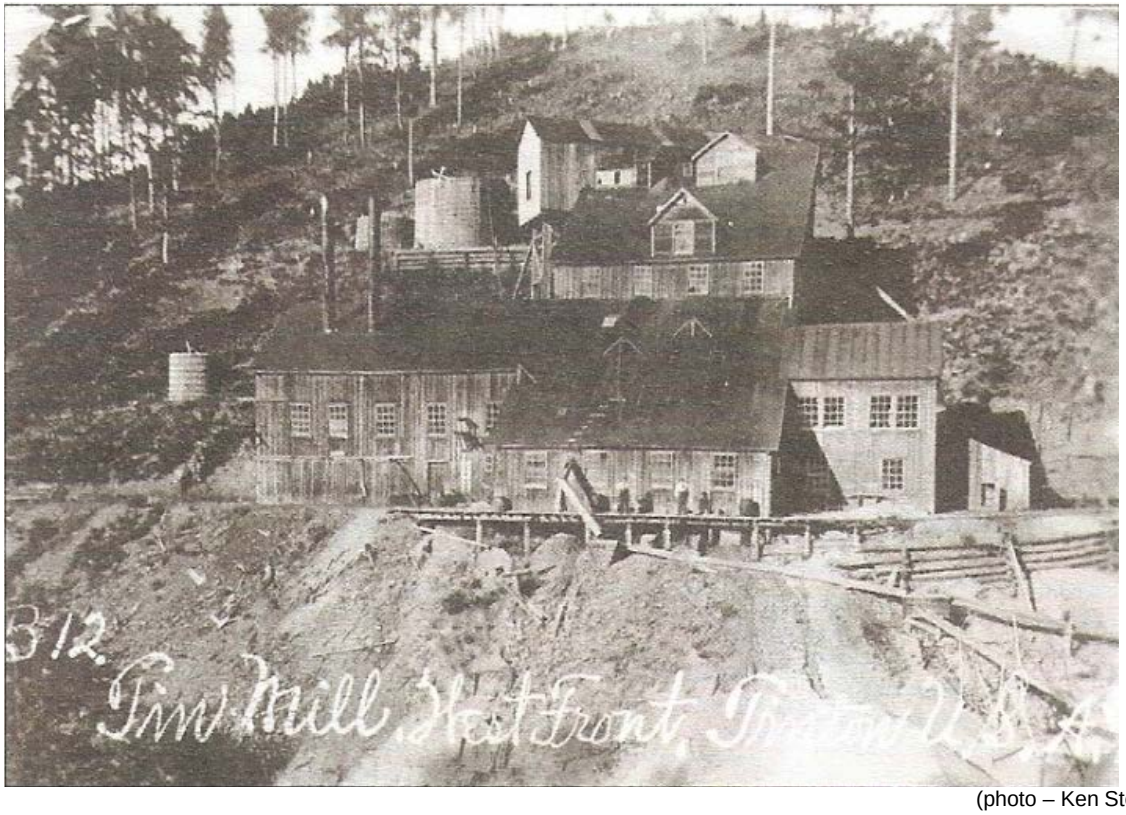
The mining camp of Pactola on Rapid Creek. Pactola reservoir has inundated this valley.

Potato Creek and Tinton

Several less extensive areas were also placer mined in the Black Hills. One of these areas was Potato Creek in the Northern Black Hills where 'the largest specimens of nugget gold ever found in the Black Hills was panned here. Upward of $50,000 has been exhumed from the gravel of that narrow ravine, one nugget of which brought $128. Nearly all of the gold is exceedingly coarse, varying in size from that of a hazel-nut to that of an egg. Many lumps were found imbedded in quartz, thus showing that it had washed out of a decomposed quartz vein not far from where it was found.' Hobby gold panning occurs on Potato Creek to this day. *The Engineering and Mining Journal;* January 31, 1880.

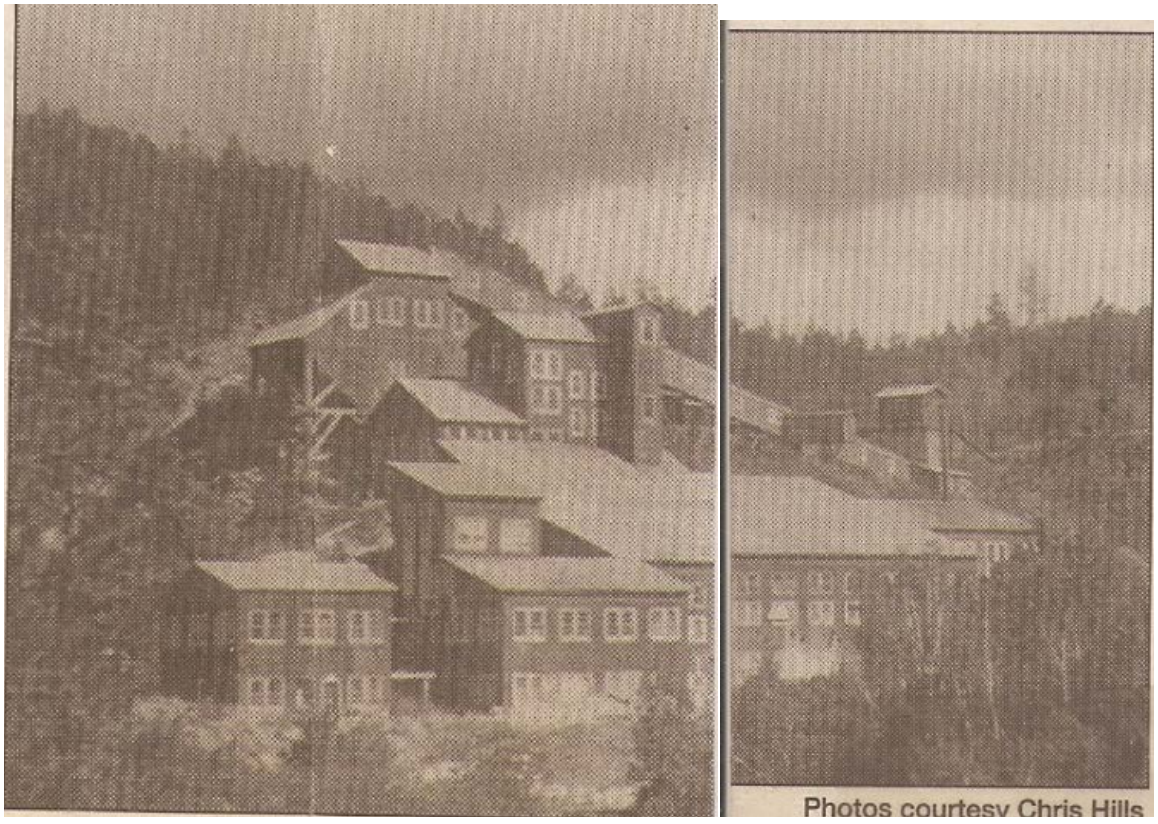
One interesting aspect of the Potato Creek area was that hard rock mining also occurred here. In most of the placer areas in the Black Hills, the gold was elusive, and very few or no hard rock mines were located near the placer mined areas.

In the Potato Creek area, however, not only was gold found in the creek, but there was also some gold and especially tin found in hard rock mines in the area. The Tinton mining camp grew up around this tin mining boom that occurred in the late 1880's, and mining was conducted in the area for a number of years. In 1910 the area experienced a bust when the tin could no longer be found in marketable quantities, and Tinton became a ghost town as miners moved on to more prosperous areas. 'Captain' Edgar St. John was one of the few prospectors who stayed in Tinton, and in 1925 he formed the Black Hills Resort Company with plans to rebuild the mining camp as a vacation spot, and bring in paying guests on busses. The resort plan was put on hold in 1926 when a road grader that was building a new road into town ripped up some hard black crystals that turned out to be tantalite. This mineral was super hard and heat resistant, and it turned ordinary steel into stainless steel. Tinton became the only domestic commercial grade source of tantalite in America, and on September 29, 1926 the Black Hills Tin Company was created, and Tinton experienced a second boom.



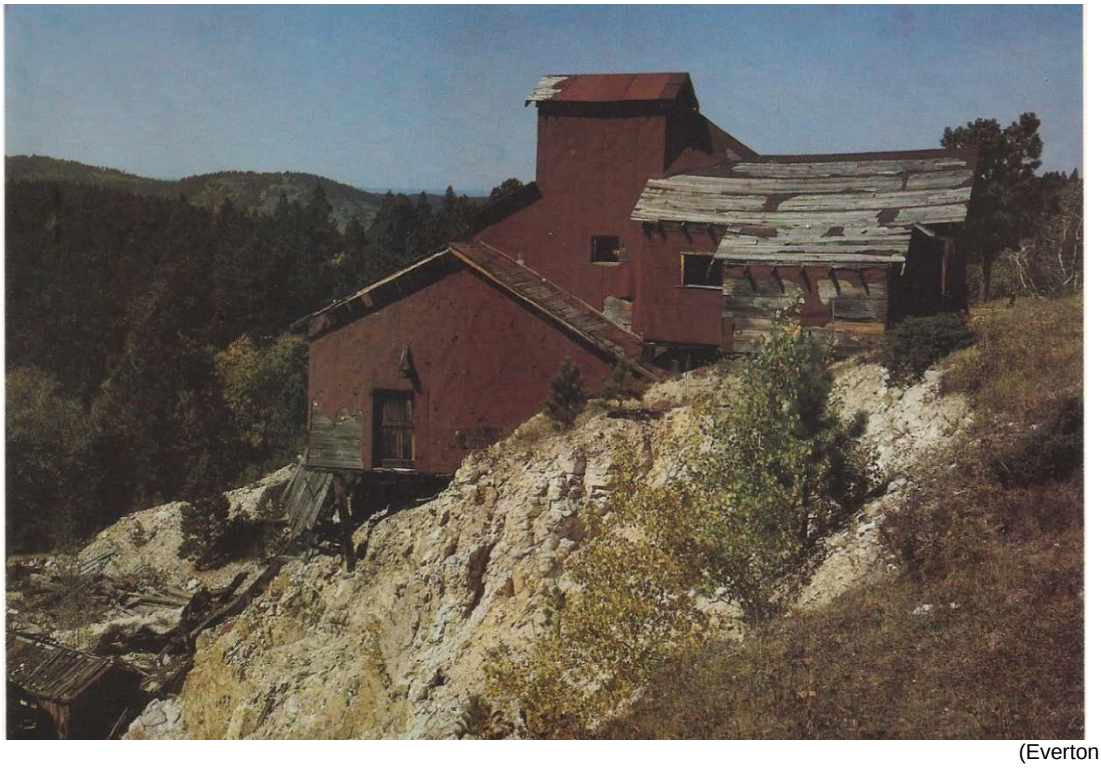
(photo – Ken Stewart)

The original tin processing mill in Tinton



The Black Hills Tin Company tantalite processing mill after completion in 1928.

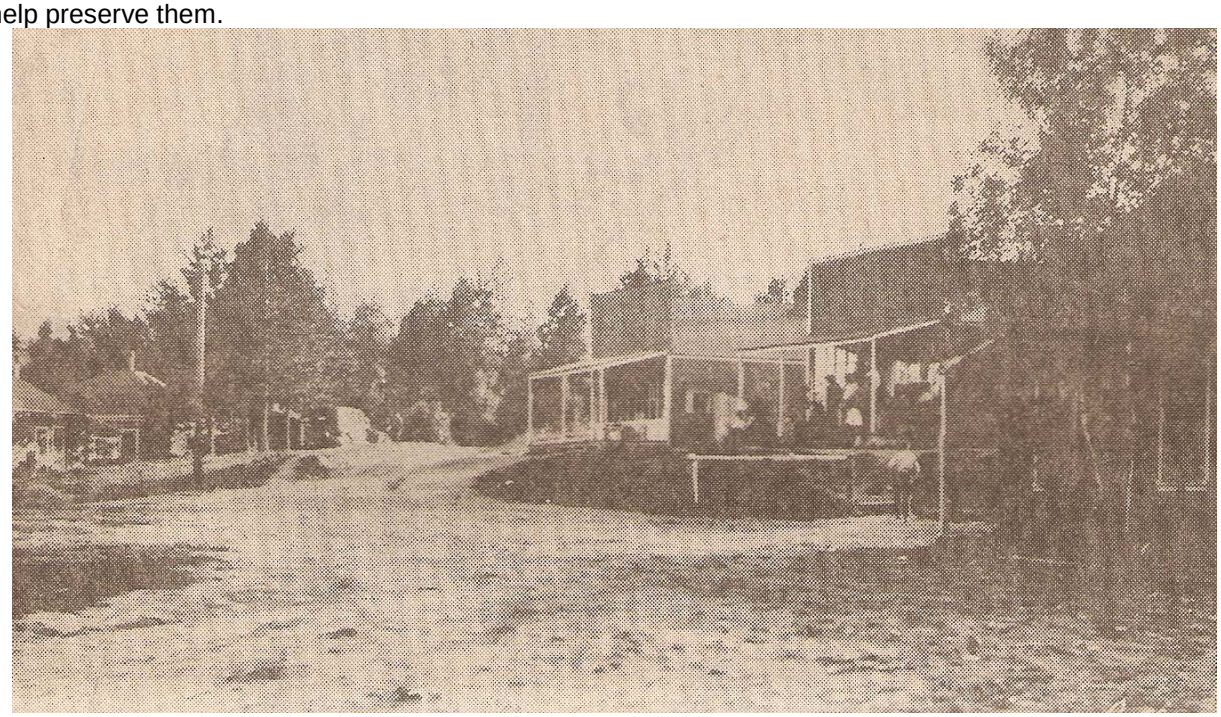
Tinton became a company town, and in the 1940's the mill was re-purposed to process feldspar and spodumene.



(Everton photo)

The Tinton feldspar/spodumene mill in the 1950's. It burned down shortly after this photo was taken.

In the 1950's the town boasted a school, a company store and office, a post office and a newspaper. Cabins and houses lined several 'streets' in the town, and each one was covered with red tarpaper to help preserve them.



(photo – Rapid City Journal – July 1978)

Main Street Tinton in the 1920's



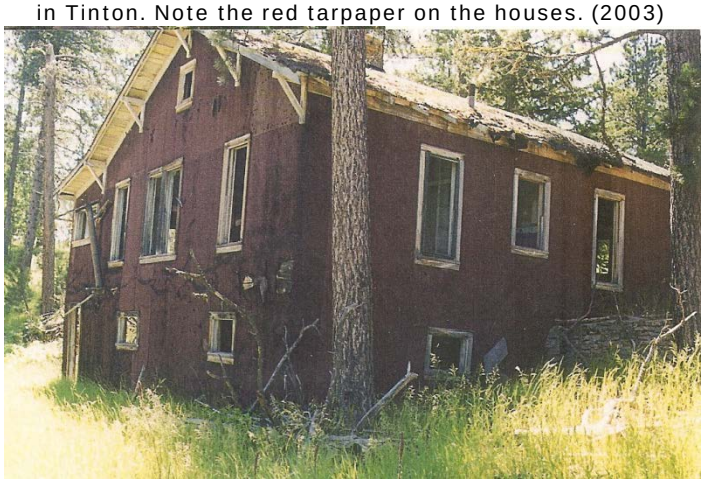
(Everton photo)

The remains of Tinton's Main Street in 1965



(Everton photos)

The top photo is the company manager's house and the bottom photo is one of the only two-story houses in Tinton. Note the red tarpaper on the houses. (2003)



The mining camp of Tinton is one of the few places in the Black Hills where the remains of the town and partial remains of the mill are still visible, although the cabins and houses are falling into disrepair. The town site is on private land and not accessible to the public.

Deadwood Gulch

In the Black Hills, most of the prospectors moved from the south to the north. As the prospectors moved to the northern edge of the Black Hills mining district, they discovered a relatively inaccessible area (because of the fallen dead timber), in a steep gulch with a creek running through it. On July 6, 1876, a major gold discovery was made in this gulch. This discovery was in Deadwood Gulch (named after the fallen dead timber), along Whitewood Creek, which runs through part of the gulch. This discovery was one of the most extensive and prosperous that had yet been found in the Black Hills.



(photo-Deadwood historic archives)

First discovery of gold on Whitewood Creek in Deadwood Gulch. Caption on top of photo reads "Bryant party 1875 1st gold discovered in 'creek gravels'(?)"



(Everton photo)

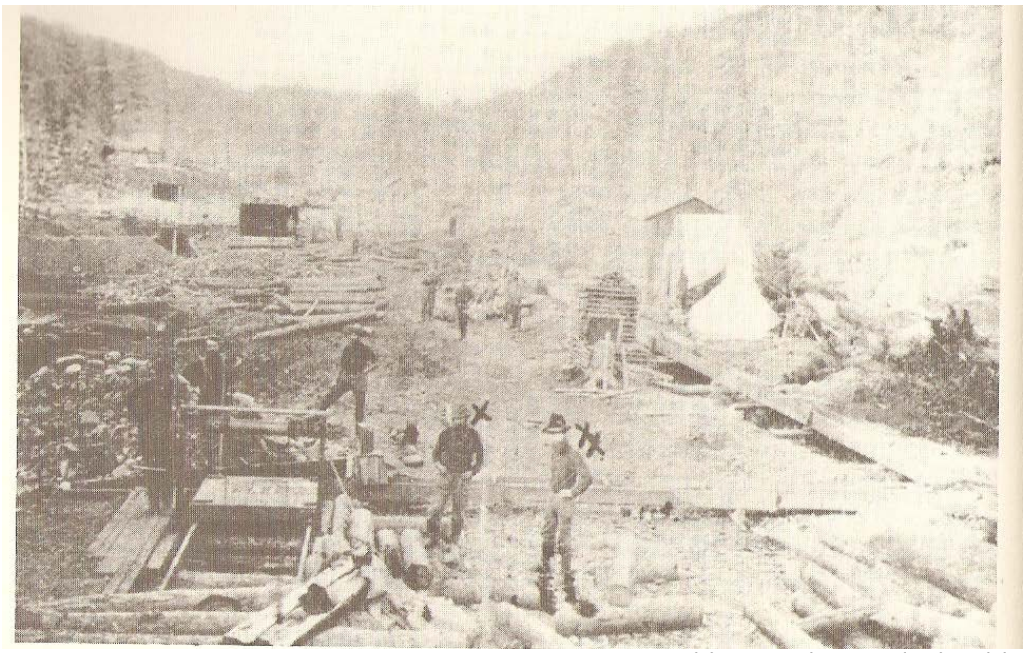
A 2016 view of the lower end of Deadwood and Whitewood Creek with first discovery of gold in the area of the yellow willow trees in the center of the photo

Gold was discovered in the Deadwood area along both Whitewood Creek and Deadwood Creek (Gulch). These photos show the various types of placer mining along these creeks.



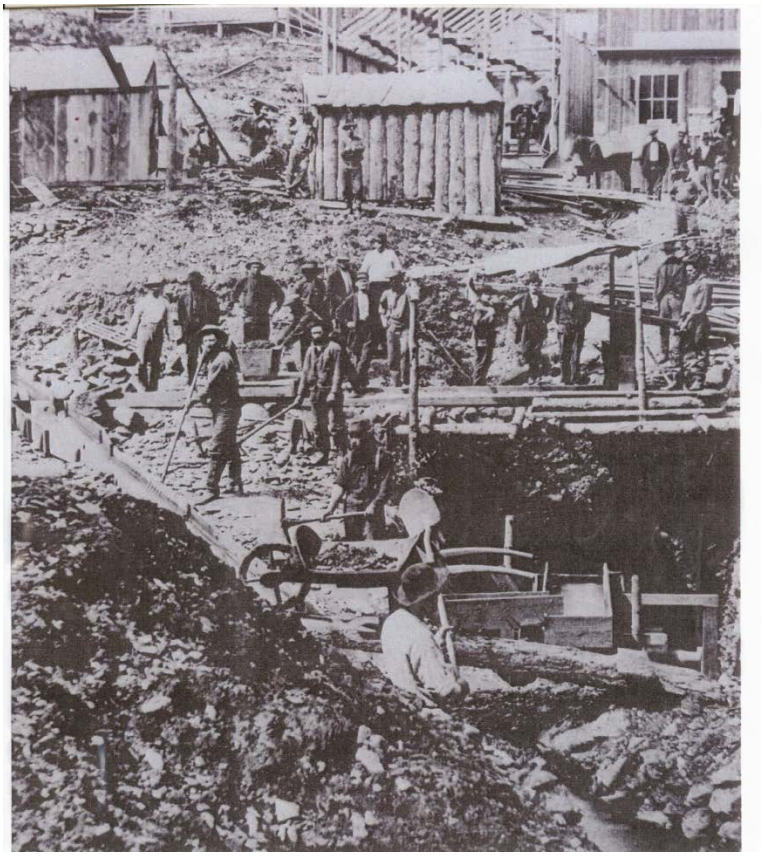
SLUICING IN DEADWOOD, 1876
Just below "Discovery" claim

(photo – Richard B. Hughes)



(photo – Joel K. Waterland – original unknown)

Discovery #2 Placer Mine just below discovery #1 in the Deadwood area. The windlass on the left was for prospecting deep gravel. Note the flume/sluice box on the right, made from long toms laid end to end.



(photo - Saga of the Hills by S. (Samuel) Goodale Price)

Photo in Deadwood Gulch taken just below #1 discovery. According to Goodale-Price this was one of the first photos taken in the Gulch in 1876.

There was a lot of placer mining in the Deadwood area, but not everyone was fortunate enough to 'strike it rich'. This information from 'Staff Correspondence' was in the June 16, 1877 ***Engineering and Mining Journal:***

> Deadwood, Whitewood and Spring Gulches are being worked with some success, about 23 miles of the bed of these creeks having been taken up. The first named has so far been the most productive, but all are sported. Bed rock has been reached only in a few places. The depth of the gravel is from 12 to 25 feet, and in rare instances deeper. No new strikes are yet reported, though hundreds of men, who find there is no ground left to take up and have no money to purchase, are scattering over the adjoining districts and giving them very thorough examination. There will doubtless be some new discoveries this year.
>
> Latest From the Black Hills
>
> Information from the Black Hills is generally discouraging. The New Eldorado is thronged with thousands of penniless men, who are wholly unable to secure ground to work, and equally unable to pay their living expenses. So far, the spring has been very backward, deep snows have fallen along the routes from Bismark, Yankton and Cheyenne, and cold, raw weather has prevailed. There is much suffering among the new arrivals.

And this was in the June 30, 1877 ***Engineering and Mining Journal:***

AFFAIRS IN THE BLACK HILLS.

Staff Correspondence of the Engineering and Mining Journal.

The rush of miners to the Black Hills this summer is unprecedented in the history of the West since the opening of California in 1849. The arrivals amount to fully 100 per day, the vast majority of whom reach Deadwood with almost nothing left with which to support themselves. It is estimated that there are now fully 10,000 men in the Hills, and many judge as high as 15,000. Of course there is not enough day work for these, and so far no new gulches capable of supplying ground for as many men as Deadwood has have been found.

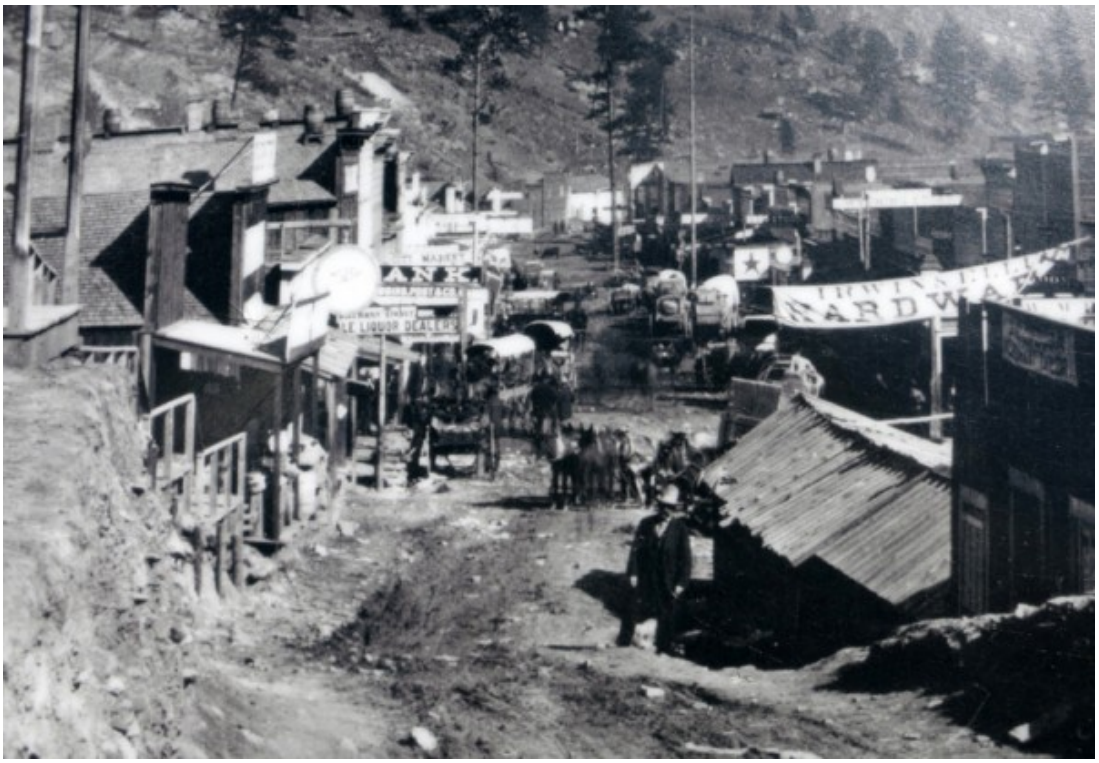
Prospecting parties are already starting off to Big Horn, Wind River, the Yellowstone, and Tongue River. The gulches and ranges of these localities are thought to be auriferous, and before the 1st of July, judging by the number of men already starting off, there will be five thousand miners scattered through the gorges of Northern Wyoming. The country to be explored lies to the southeast of the Montana placer districts. In 1861, 1862, and 1863, repeated attempts were made by prospectors from that Territory to explore these ranges, but in every case the venturesome miners were either driven back by the fierce Sioux and Crows or massacred. This year the results will be different. The season's work, even if it should result in no important gold discoveries, which is highly improbable, will doubtless inaugurate another excitement over the wonders of the Yellowstone Valley, and, by calling attention to it, indirectly aid in opening a new route from Cheyenne or some point on the Union Pacific in Wyoming to Montana.

In Deadwood good work is being done. A majority of the claims are yielding finely, and the production of dust is footing up better than was expected. A great deal of attention is being given to lode mining. At the head of the gulch a number of very large veins have been found which are easily worked and are quite rich. About 60 stamps are now running, and fully 200 more are on the road or in process of erection. The charges for crushing are down to $5 per ton, and will probably go lower when the new mills are up. There is an abundance of water for all purposes.

These two photographs show just how extensive the mining was in Deadwood Gulch. These photos show the bustling mining camp of Deadwood, with placer mining being conducted right in the middle of Main Street (the tent/cabin on the right).



(source(?) - Deadwood historic archives)



This information on mining titles within the limits of a town was in the May 11, 1878 ***Mining and Engineering Journal:***

Mining Titles in the Hills.—The following letter from the Department of the Interior at Washington, settles a question which has troubled many of the residents of the gulch relative to the difference between them and the rights of surface and bed rock claimants:

DEPARTMENT OF THE INTERIOR,
General Land Office, Washington, April 23d, 1878.

Register and Receiver, Deadwood, Dakota:

GENTLEMEN—With your letter of the 23d of November last, you transmitted the papers in the case of the association of Frank Norton *et al.*, for patent from the premises described in mineral entry No. 1, lot 28, Whitewood placer mining district, Lawrence County, Dakota:

Against this application for patent a protest was filed by James McPherson and John A Nye, who alleged that there are upon the surface of said premises valuable dwellings and improvements, owned and occupied by the citizens as a town site. In all cases where mining claims are situated within town sites, the patents for such mining claims contain a clause as follows, viz.:

"Excepting and excluding, however, from their presents, all town property rights upon the surface, and these are hereby expressly excepted and excluded from the same—all houses, buildings, structures, lots, blocks, streets, alleys, or other municipal improvements upon the surface of the above described premises, not belonging to the grantee herein, and all rights necessary or proper to the occupation, population and enjoyment of the same."

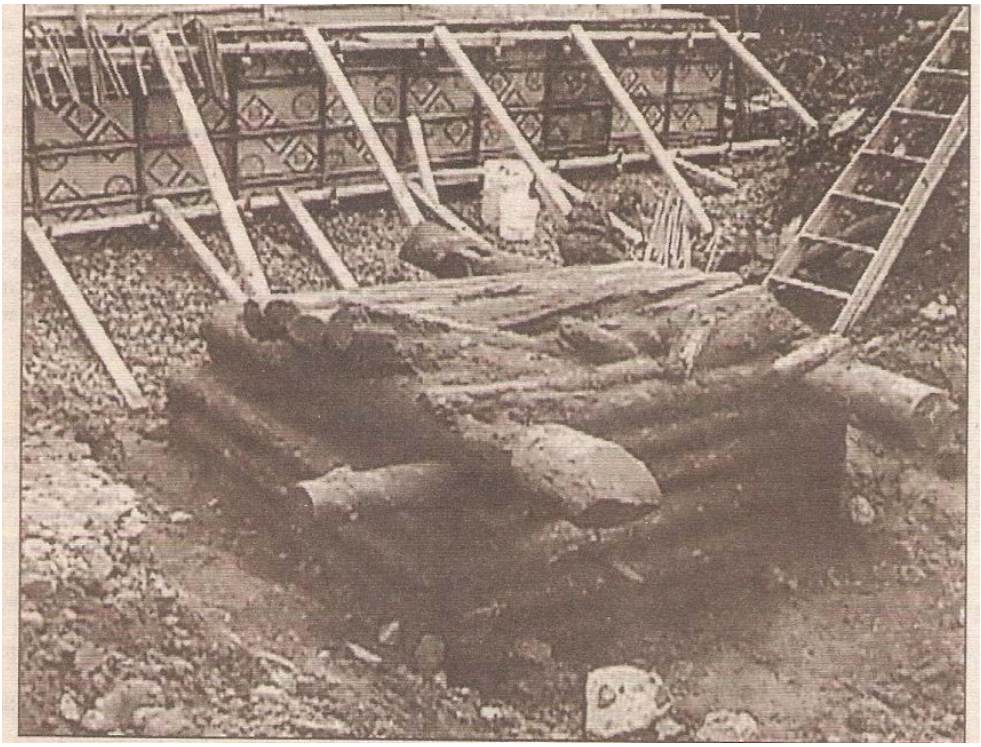
Patents issued for town sites in mining regions contain a claim in accordance with the terms of the law; providing "that no title shall be acquired under this patent to any mine of gold, silver, cinnabar or copper, or to any valid mining claim or possession, held under existing laws; and provided further, that the grant hereby made is held and declared to be subject to all the conditions, limitations and restrictions contained in section two thousand three hundred and eighty-six of the Revised Statutes of the United States, so far as the same are applicable thereto."

As the proofs submitted in this case are satisfactory, patent will issue for said mining claim, in accordance with the terms of this letter.

You will inform all parties in interest, and acknowledge the receipt hereof.

Very respectfully, your obedient servant,

J. A. WILLIAMSON, Commissioner.



This old placer mine shaft was excavated during the construction of the Deadwood Broadway parking lot. This photo was in the Black Hills Pioneer on April 4, 1998.

Hard Rock Mining in the Black Hills

As the placer mining along Deadwood and Whitewood Creeks and in other areas played out, the propsectors moved into the hills and ridges above the streams and creeks, looking for the sources of the gold they found in the placer deposits, and hard-rock mining began in earnest in the Black Hills.

Information on Black Hills Mining from the June 16 and June 30, 1877 ***Engineering and Mining Journal***

LATEST FROM THE BLACK-HILLS.

Staff Correspondence of the Engineering and Mining Journal.

Information from the Black-Hills is generally discouraging. The New Eldorado is thronged with thousands of penniless men, who are wholly unable to secure ground to work, and equally unable to pay their living expenses. So far, the spring has been very backward, deep snows have fallen along the routes from Bismarck, Yankton, and Cheyenne, and cold, raw weather has prevailed. There is much suffering among the new arrivals.

Deadwood, Whitewood, and Spring gulches are being worked with some success, about 23 miles of the bed of these creeks having been taken up. The first named has so far been the most productive, but all are sported. Bed rock has been reached only in a few places. The depth of the gravel is from 12 to 25 feet, and in rare instances deeper. No new strikes are yet reported, though hundreds of men, who find there is no ground left to take up and have no money to purchase, are scattering over the adjoining districts and giving them very thorough examination. There will doubtless be some new discoveries this year.

Six stamp-mills and one arastra are in operation on quartz taken from the lodes around Lead City, Gayville, and Golden City. Three or four other mills are on the way or being set up. There is also a Hendric pulverizer in operation.

It is said that three hundred and fifty-nine ounces of gold was the result of a nine days' run of a ten-stamp mill at Central City, Dakota, recently.

Discoveries of silver ore are being made at Bear Buttes. It is thought by many that the resources of the Hills in this metal are already showing better than for gold. Several large sales are reported.

The Union Pacific Railroad Company has ordered 7,000 tons steel rails for the Black Hills branch of its road.

AFFAIRS IN THE BLACK HILLS.

Staff Correspondence of the Engineering and Mining Journal.

The rush of miners to the Black Hills this summer is unprecedented in the history of the West since the opening of California in 1849. The arrivals amount to fully 100 per day, the vast majority of whom reach Deadwood with almost nothing left with which to support themselves. It is estimated that there are now fully 10,000 men in the Hills, and many judge as high as 15,000. Of course there is not enough day work for these, and so far no new gulches capable of supplying ground for as many men as Deadwood has have been found.

Fred Reynolds, son of Joseph Reynolds, well-known Black Hills prospector and rancher, remembers this from his childhood: “There were many prospectors all through the country and it was not that unusual for someone to go into a prospectors’ cabin if it looked too quiet and find that the fellow had died.”.

(Fred Reynolds memoirs from Loren Harrison)

Prospecting parties are already starting off to Big Horn, Wind River, the Yellowstone, and Tongue River. The gulches and ranges of these localities are thought to be auriferous, and before the 1st of July, judging by the number of men already starting off, there will be five thousand miners scattered through the gorges of Northern Wyoming. The country to be explored lies to the southeast of the Montana placer districts. In 1861, 1862, and 1863, repeated attempts were made by prospectors from that Territory to explore these ranges, but in every case the venturesome miners were either driven back by the fierce Sioux and Crows or massacred. This year the results will be different. The season's work, even if it should result in no important gold discoveries, which is highly improbable, will doubtless inaugurate another excitement over the wonders of the Yellowstone Valley, and, by calling attention to it, indirectly aid in opening a new route from Cheyenne or some point on the Union Pacific in Wyoming to Montana.

In Deadwood good work is being done. A majority of the claims are yielding finely, and the production of dust is footing up better than was expected. A great deal of attention is being given to lode mining. At the head of the gulch a number of very large veins have been found which are easily worked and are quite rich. About 60 stamps are now running, and fully 200 more are on the road or in process of erection. The charges for crushing are down to $5 per ton, and will probably go lower when the new mills are up. There is an abundance of water for all purposes.

No new discoveries of silver mines have been made. In fact, the silver excitement has died out. In all probability there will be some valuable discoveries of ores of this metal outside of the Black Hills before long in that part of the Nasatch Range which extends through Northern Utah and Idaho. A revival of interest in the Sweetwater mines would also not be a surprising outcome of the present rush to Wyoming.

This information on Black Hills Mining was in the October 20, 1877 ***Engineering and Mining Journal***:

MINERAL RESOURCES OF THE BLACK HILLS.—I.

To the reader, whose patience has not already been exhausted by the numerous and often conflicting articles which have appeared in the secular press about the Black Hills, the following account may be of some interest: The story of to-day is not that of yesterday. The development of a country where gold exists in paying quantities advances with long and rapid strides. Hardly three years ago the elk and deer held almost undisputed possession of these wooded hills. The Indian cut his tepee poles in the foot hills, and was prevented only by his superstitions, engendered probably by the terrible display of the meteoric forces, from inhabiting the interior. To-day the miners and ranch man's cabin meet us at every turn. Cattle feed in the beautiful flower-bedecked parks. The gulches are torn up, and the hills pitted and tunneled by the gold-seeker. Deadwood Gulch, then an almost impassable waste of dead and fallen timber, is to-day one long succession of flourishing villages; while the steam whistle and the roar of stamps have broken the profound silence for which this country was so remarkable.

Though gold is found everywhere in the gulches and the veins, where the primary formations crop out, two years of exploration have developed only one flourishing and important gold district on Whitewood Creek and its tributaries, besides a silver district on Bare Butte Creek, not so well prospected, but giving promise of considerable richness. Rich placer diggings were discovered on Deadwood Creek, in December, 1875, and the city of Deadwood soon after sprang up at the junction of this creek with Whitewood Creek. These diggings, though rich, and yielding large fortunes, were not extensive, and people soon began to search for the fountain head, the source of all this wealth. What may be called the *immediate* source of the gold was soon discovered in a belt of conglomerate crossing Deadwood Gulch, two miles above the city. This belt consists of beds of quartz, pebble cemented by iron oxide, overlying the primary slates and schists, and in many places covered by later sedimentary beds, and by what has every appearance of an intrusive, eruptive porphyry. Beds of this cement are found everywhere in the hills, but only in the belt have they proved rich in gold. It possesses many curious geological features. The beds generally first dip into the hills, afterwards slowly ascend with their slope The cement varies in its physical properties. In places it is loose, and made of well rounded pebbles, while in others it is extremely firm and hard, having the appearance of homogeneous rock. When firm, it is often jointed, so that it may be quarried out in huge cubical blocks. Neither is the gold uniformly distributed, there being spots or channels of extreme richness, the best pay being on and near the slate bedrock. A great many assays have proved the quartz to be almost invariably barren, the gold being in the cementing material.

The Oldest Mine in the Black Hills

In April 1878, a party of hard-rock miners 'found a series of mining shafts and a timbered tunnel some fifteen miles from Deadwood, dug and built in 1852. Old mountaineers here say that it is the work of a party of whites under the lead of an old trapper named Carey who went into the hills in 1852, struck big diggings, and were afterward all massacred by Indians.' ***The Engineering and Mining Journal*** had this write-up on the 'oldest mine in the Black Hills' on April 13, 1878:

THE OLDEST MINE IN THE BLACK HILLS.

There is a mine in the Black Hills said to have been worked in 1852. On examining the place a correspondent reports that he found the allegations correct. Hundreds of excavations have been made on the side of a steep mountain seven miles from Deadwood. Three tunnels have been driven in fromtwenty to sixty feet. There is one dump of 200 tons. Directly in the mouth of one of the tunnels is a large cottonwood tree growing. The whole mountain prospects rich in gold. A mine struck in one of the old shafts has now been bonded for $40,000.

The Homestake Mineral Belt

In February 1877 ***The Engineering and Mining Journal*** had this to say about the gold district in Deadwood Gulch and along Whitewood Creek:

> Principal gold districts in the northern Black Hills include Deadwood, Whitewood, Bear Butte and Sand Gulches, which go to form the boundary lines of the large area where auriferous beds abound. There are about 3,000 lodes or quartz mines staked off, and are now ready for sale at prices varying from $125 to $1,000,000. Some of the property has shafts sunk to the depth of two or three feet, and somewhat deeper. The Wheeler Brothers, who left the Hills recently with an armed guard of twenty men, carried out over $200,000 as the product of their season's work. The Wheeler Brothers, who worked Claim No. 2, Deadwood Gulch, thought they had got about all there was in in the mine, and sold it for $3,000. The first twenty-four hours worked by their successors cleaned up $3,240.

This information on 'Black Hills Resources' was reported in March 1878:

DAKOTA.

BLACK HILLS RESOURCES—ITEMS FROM A REPORT OF THE COMMITTEE ON NEW TERRITORY.—We take the following from the Denver *Tribune* of the 10th inst.:

"The gold yield of the Black Hills for the past year was $4,000,000.—Improvements in machinery and mills completed and in process of construction for the Father De Smet Company, $225,000.—The price paid for the Homestake Mine was nearly $100,000, and an eighty-stamp mill nearly completed for the same company, $100,000.—The price paid for the Golden Terry was $160,000.—The Giant brought $42,500.—The owners of the Reno Mine have refused $100,000 for that property.—One-half of the Rhoderick Dhu sold for $40,000.—The Hidden Treasure has netted its owners to date $100,000; pays for labor $6,000 per month, and has at present half a million tons of ore in sight, and could not to-day be purchased for less than $300,000.—The Fairview, Aurora, Keets, Old Abe, Gustin, Woolley, Alpha, Lincoln and Homestake No. 2 are mines equally rich, and have yielded their owners flattering returns.—There are 650 stamps at present in operation in the Hills. One hundred and fifty are nearly ready to begin work.—The Recorder's books show a record of 4,073 quartz locations in this district.

These mines were all located within and around the Homnestake Mineral Belt. The most important of these mines included the Homestake, the Old Abe and Caledonia in the mining camp of Terraville, and the Father DeSmet in the mining camp of Central City/Golden Gate.

The Great Homestake Mine

The 'Great' Homestake Mine was the most important and the longest working mine within the Black Hills Mining District. The Wheeler Brothers were the original discoverers of the Homestake Mine, and it was eventually sold to George Hearst of California. The Hearst family owned the mine for a number of years, making numerous improvements to the mine, and also building a hospital and recreation hall in the City of Lead for the miners and their families.

This information on the Homestake Mine was reported in the September 1878 ***Engineering and Mining Journal:***

THE HOMESTAKE MINE.

"About 200 tons of ore are daily crushed at this mine; a recent run of about two weeks gave 2822 oz. of gold, valued at over $40,000, so that the average of the ore is somewhere in the neighborhood of $14 per ton. This property is one that was purchased less than a year ago for $70,000, incorporated in San Francisco with 100,000 shares, and a capital of $10,000,000. The shares sold first for less than four dollars each, but have since touched ten, near which they now stand. Two assessments were levied to build the 80-stamp mill. The body of ore now exposed is practically inexhaustible for an 80-stamp mill, but more will soon be erected. A long list of dividends is probable in the future."

…and this description of the Homestake Mine was reported in the December 1878 ***Engineering and Mining Journal:***

THE HOMESTAKE MINE.

The Homestake was among the first Black Hill properties bought in the interest of California capitalists, having been purchased by George Hearst, in conjunction with J. W. Gashwiler and Henry Janin, early in the month of April last. The mine, which embraces a number of valuable claims, covers an area 1500 feet long by 450 feet wide. The many tunnel and shaft openings in every part of it give evidence that the Homestake is one great, continuous body of paying ore. The most systematic and thorough developments have been made to test the real value of the property, and the result has been the erection of an 80-stamp mill and the preparation to work the mine by all appliances that will procure a steady yield of bullion. Other mills will soon be erected, and the day is not far distant when the operations of the Homestake Company will rival the largest schemes of the Comstock. The average yield of the ore per ton will not fall short of $15. The mill capacity is fully 175 tons per

day. Here, then, we have nearly a million dollars as the result of one mill for a single year. Samuel McMasters, a most capable and reliable man, has been appointed superintendent of the mine. The mill, which sits directly on the mine, has been built of the finest seasoned pine lumber, and has dimensions of 100 feet front, 120 feet deep, and 56 feet from floor to floor. Every part of the construction has been conducted by expert mechanics, and the mill is a model of mill architecture. Two immense oré-bins, having a capacity of 2000 tons, have been erected, and into these the ore is dumped by the cars from a tramway running from

the mine into the upper portion of the building. From these the ore passes over screens, the fine particles going into bins, and the coarse to the two Blake ore-breakers and then into the bins, where it is fed to the batteries by the Hendy self-feeder. Over 100,000 feet of lumber were used in the construction of the main building.

THE MACHINERY

consists of two boilers 54×16, having 200 horse-power, accompanied by a splendidly-built and finished engine 20×42. The battery consists of 80 stamps, weighing 750 pounds each ; two Blake rock-breakers, 9×15 each, and the Hendy self-feeder mentioned above. The entire weight of machinery is 496,000 pounds, the freight upon which alone cost the snug sum of $38,000. The mill cost fully $100,000. The batteries will have a capacity of from 175 to 200 tons per twenty-four hours, or more than two tons of average quartz per stamp.

THE HOISTING MACHINERY

consists of two 12×24 engines of 75 horse-power, which are capable of raising two tons 400 feet per minute ; two reels for hoisting, supplied with a steel-wire cable which will sink to a depth of 1000 feet. This cable is a most powerful and costly one, being two and three fourths inches in diameter, weighing one pound and a quarter to the foot. Added to this is a six-inch drawing and lift pump with five-foot stroke, having a capacity of 5000 gallons per hour. The entire enterprise is one of immense proportions and one that will be a profitable monument to the nerve and money of San Francisco capitalists. Mr. Hearst has taken the lead in the Black Hills quartz reduction, and the coming years of steady Homestake bullion shipments will record the wisdom of his extensive, systematic, and fearless operations. This immense and splendidly-appointed structure is now in operation, turning out gold bullion at the rate of about $90,000 per month, a production that can probably be kept up for many consecutive years, and may easily be increased with additional milling facilities.—*Pacific Coast Mining Review.*

This information is from the January 1879 ***Engineering and Mining Journal:***

THE HOMESTAKE.

"This mine continues to look well at all points. The compressor and drills, so long expected, have arrived and are now being set in place over the incline shaft. These drills will develop the mine very expeditiously. The freight for the 120-stamp mill is arriving daily, and it is expected that all the machinery will be on the ground within thirty days, and the mill running by the 1st of June. The mortars are now being replaced, and the mill, when complete, will be the largest in the United States.

"The 80-stamp mill is running very smoothly, crushing ore day and night."

The February 1880 ***Black Hills Times*** reported" 'The bullion production of our bonanza mines is a regular thing. Between $125,000 and $150,000 in gold is cleaned up from the Homestake Mills as regularly as the first and fifteenth of each month comes around.'

This was also reported in the February 1880 ***Engineering and Mining Journal:***

The year 1879 was one of unprecedented prosperity in the Black Hills. Deadwood has been rebuilt since the great fire which destroyed over $2,000,000 of its property and in a far more substantial manner than before. Nearly three hundred new stamps were added on the mineral belt during the past year, making a present total of about twelve hundred, most of which are in profitable operation. It is expected that fifteen hundred stamps will be dropping by the 1st of July. The bullion shipments amounted to over three million dollars. The average yield of ore is about eight dollars per ton.

The gold-bearing rock being generally in very large bodies of low-grade ore, work on an extensive scale is required for profit. The permanent prosperity of any mining territory is, as a rule, dependent less upon exceptionally rich mineral than upon the quantity of medium and low-grade ore that can be remuneratively treated. Under this view, Dakota may be regarded as one of the most substantial bullion-producing sections of the country.

July 1880

THE BLACK HILLS MINES, DAKOTA.

Special Correspondence of the Engineering and Mining Journal.

recently in the papers here. The great water suit between the Homestake and Father de Smet companies for the Whitewood water has been decided in favor of the former. The Homestake Company is declared to be entitled to 500 inches of water, which it need not return, and as much more as it wishes, if, after using it, it returns it to the Boul ler ditch.

The Homestake Company won its victory substantially through its ownership of an old arrastra title, which was considered a title to water for milling purposes. Without considering the equity of the decision, it is an indisputable fact that any limitation which is put upon the water-supply of the Homestake Company is a serious detriment to the interests of the Black Hills. It is not difficult to realize that there would have been an immense difference to-day, in the standing and condition of the mines here, had any company with less energy and money undertaken their development. One can not pay tribute too often to the pluck and business sagacity which have characterized the Homestake management. If some of your Eastern companies could send their officers here to take a few lessons in the business management of mines, there would be fewer disappointed stockholders than at present are found lamenting the mishaps of *bona-fide* mining enterprises. When mine-owners learn that mining requires as much business knowledge and system as any other enterprise, their balance-sheets in the aggregate will rapidly improve.

October 1880

BLACK HILLS MINING NEWS.

Special Correspondence of the Engineering and Mining Journal.

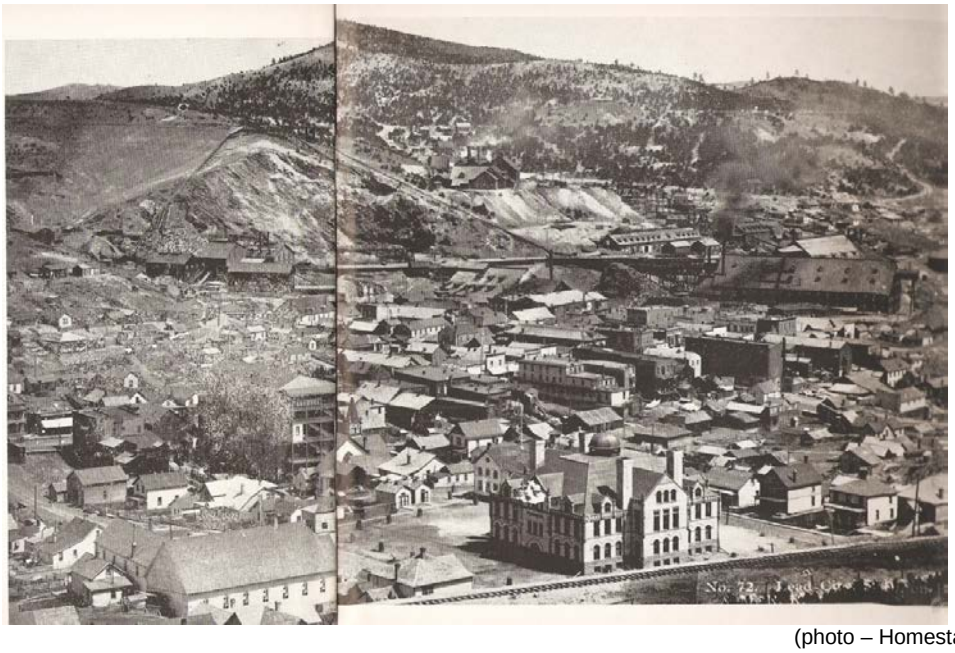
Since my last letter, Mr. McMaster has returned and resumed the management of the Homestake Company's mines. His return has been the signal for renewed activity upon the Belt, if that were possible, and several important improvements have been inaugurated. The water supply has become exceedingly low, and it is only by the most careful management, and the use of the water pumped from the mine, that they are able to keep all the stamps going. The forty additional stamps which will soon be ready to run in the Deadwood & Terra mills will need still more water; and this, with the possible increased consumption in the future in a new mill for the Giant & Old Abe mine, indicates that the question of water supply has already become a very important one. To meet this, temporarily at least, the Homestake Company has ordered a pump with a capacity of seventy-five inches of water, to pump water from its settling reservoirs back to the mills. The large increase of bullion product in the Homestake, since the proportion of ore taken from the lower level has increased, is the

best possible guarantee of long life to the mine, as the sulphurets carry but little more gold than the quartz, which admits saving a high percentage of the assay value of the ore. The favorable indications for the future have determined the management upon new improvements of the most substantial character. Hoisting-works for the Highland will probably be in working order this winter, although they seem to have ore enough above the open-cut level to run for several years. A large part of the ore for the Highland mill is now taken from this open cut, which is simply a continuation of the big Homestake cut. It has also been decided to erect hoisting and pumping works for the Deadwood & Golden Terra, and to sink a large shaft for the joint use of both mines, they having recently been consolidated. When the fact is considered that only in the Homestake have the developments gone below the open-cut level, and that above this level in the Terra is one of the finest bodies of ore in the hills already blocked out, the future of the new company may be foreshadowed. The ore-body in the Homestake lower level (100 feet below the surface) is 325 feet wide. The shaft has been sunk another hundred feet, and the contracts let for cross-cutting. The three mills at Lead City are all supplied by one locomotive, which hauls nearly one thousand tons a day. The Savage Tunnel, which was expected to cut the extension of the Belt, has stopped work.

August 27, 1881

DAKOTA.

HOMESTAKE.—The Black Hills *Pioneer* of the 13th inst. gives the following details of the working of this mine: Fully 80 men are employed on each shift, making 160 in all on the lower level. Four hundred cars of ore are hoisted at the vertical shaft every twelve hours, but 70 cars an hour can be raised, if necessary. The distance from the lower level to the track leading to the ore-bins is 200 feet, and from the floor to the vertical hoisting-works to the lower level is 253 feet. But few hands are at work on the first level, the bulk of ore coming from the 200-foot level. There remains about forty to fifty feet of ore between the top floors of the lower level and the old Golden Star stope. When this has been taken out, another level will be opened 100 feet below the 200-foot station. The color of the ore changes as the work goes down. The tailings now are of a yellowish color, the old-time "red" having been nearly displaced.



(photo – Homestake Sharp Bits)

Homestake Mine and Lead – 1902

The Homestake Mine continued to be the most prosperous mine in the Black Hills,absorbing the properties in the mineral belt along Blacktail, Central City and Terraville, and working tunnels and stopes under the City of Lead and along the belt. In April–July 1907, ***The Engineering and Mining Journal*** reported on a fire in the Homestake Mine:

South Dakota

LAWRENCE COUNTY

Homestake—The fire which broke out on the 500-ft. level three weeks ago is still spreading and apparently extending its area. An upraise is now being made from the 500 level, and it is hoped to reach it this way. Tunneling and other methods have been employed in vain. No men, except the fire-fighters, are at work in the mine, all the ore now milled being taken from the open cuts and upper level tunnels. The 400 stamps in the Star and Homestake mills are still hung up. There is no improvement in conditions.

South Dakota

LAWRENCE COUNTY

Homestake—It has been found necessary to flood the Homestake mine to put out the fire which has burning for four weeks. Water has been turned in through two shafts and the open cut, and flumes are now being built, so that it may also be run in through the old Savage tunnel. All mills with the exception of the cyanide annexes, which have not made their clean-ups, are closed down for the first time in the history of the mine. There are in the workings 68,000,000 cu.ft., which it will be necessary to fill with water.

South Dakota

LAWRENCE COUNTY

Homestake—The water is flowing into the mine at the rate of 1500 cu.ft. a minute. It is estimated that it will take 48 days to flood the mine, which will complete the work about June 10. The water has now reached the 800-ft. level, one of the largest in the mine, and is rising rapidly with but little loss from seepage. All the works continue idle. Additional filter-presses are being put in at the slime plant, so that its capacity will be increased by the time the mills are running again.

South Dakota

LAWRENCE COUNTY

Homestake—A circular to stockholders, signed by J. B. Haggin, president, and Fred. Clark, secretary, has been issued. It says in part: "The management regrets to announce that for the first time in over 28 years it is deemed advisable to discontinue temporarily the payment of the monthly dividend. The advisability of this action becomes apparent when it is known that there is a fire in the mine which prevents operations underground on account of the gases, and that the mills are hung up in order to allow the water ordinarily used in them to go into the mine to extinguish the fire, all other known methods of subduing it having failed, notwithstanding the heroic efforts, long continued, of all the employees on the ground. It is expected that the fire will be submerged on or about the first of June, when the water now going into the mine will be available for milling purposes again, and as many stamps (probably 500 to 600) will be started as can be furnished with ore from the surface openings. Nothing serious occurring to prevent, the mine will be unwatered to the 500 level about the middle of July, when underground operations to that depth will be resumed, and the remainder of the 1000 stamps started. Operations below the 500 will follow as each level is relieved of its water contents. When the fire was discovered the mine was in excellent physical condition. No material impairment of that condition is looked for from water contact. The unwatering will not be expensive. The treasury will take care of that. We have 20 years' ore in sight and owe nothing. Our slime plant is practically finished, and the property generally in good order and condition."

Homestake—Flooding of the mine was completed by May 22 and some of the mills will resume operations soon. The 600 stamps in the Desmet, Deadwood-Terra, Caledonia, and Highland will be dropping for the present, while the work ing is confined to surface and upper level ores. Explorations show that the upper workings are practically free from the gas which has been forced up by the great volume of water and has found its way out by the Savage and North End tunnels. The task of unwatering will commence at once, water being hoisted from the Old Abe and Ellison shafts by means of skips.

Homestake—The fire in this mine has been extinguished and the unwatering has been begun. The stamp mills have been put in operation again, 600 out of the 1000 stamps being now in use. These are at work on surface ore; but as soon as the water has been lowered to the 400-ft. level ore will be taken from that point, where there are large accumulations already broken in the stopes, which is of better grade than the surface ore that is now being worked. After that the work of unwatering will proceed slowly, inasmuch as a large part of the hoisting capacity will be employed in supplying the mills, but it is expected that the mine will be entirely unwatered in the course of three or four months.

Homestake—This week the Homestake mill with 200 stamps was started, which gives full capacity, 1000 stamps in operation. The water in the mine has been lowered below the 600-ft. level. Little damage on account of the flooding of the mine has resulted in the lower workings. The company has installed the air lift system in the Ellison shaft throwing water from the 1100- to the 300-ft. level, where it is discharged through the Savage tunnel. There are two 8-in. pipes with a 2-in. air pipe in the center and a 6-in. pipe with a 1-in. air pipe in the center. A head of 800 to 1000 lb. of air is used. The inflow of the mine is estimated at 1000 gal. per minute.

At the end of 1907, the Homestake and the entire Black Hills Mining district experienced the effects of attempts to organize a miners union, and in 1908 and 1909, a full feldge miner's strike was in progress. This information from Special Correspondence was in the ***Engineering and Mining Journal*** on Jamuary 4, 1908:

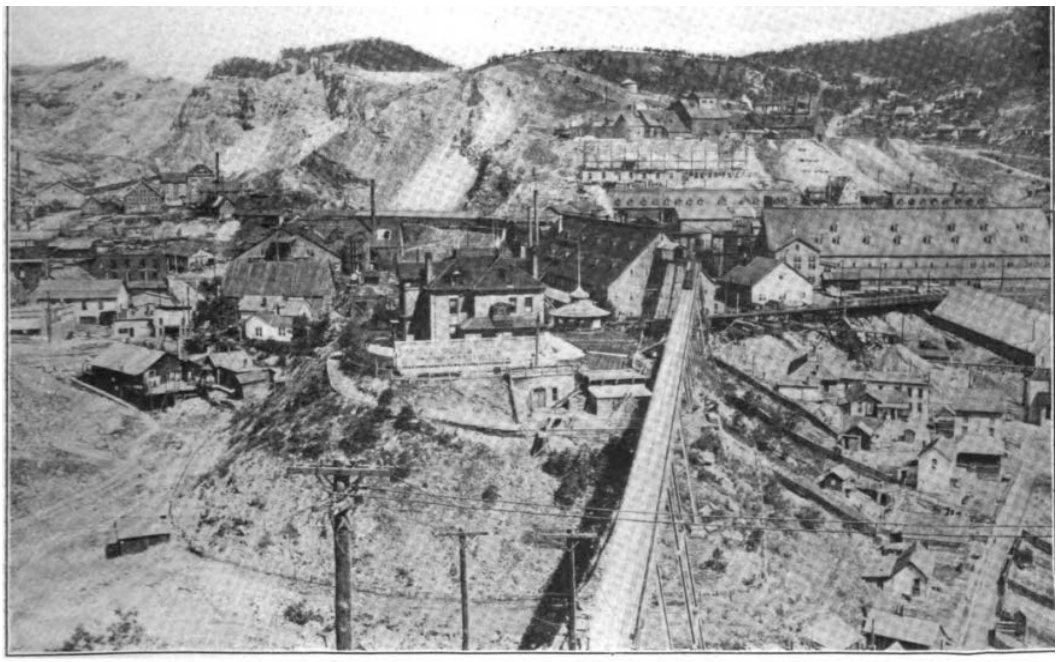
With a strike of the mine and millmen that lasted four months, and a fire in the Homestake mine that caused an entire cessation of operations in the mills for over a month, and a partial suspension for six weeks longer, the Black Hills feared a big decrease in the annual output figures for 1907. The report of the State mine inspector, Nicholas Treweek, of Lead, and estimates gathered from mining men, show that this reduction will be about $2,500,000, making the 1907 figures approximately $4,100,000 for the whole Hills, the Homestake having out of this about four-fifths, which shows a heavy falling off from 1906. Mr. Treweek fails to state in his report the exact figures of each mining company for the year, presumably because the managers of the companies themselves deemed it a wiser policy not to publish the smaller production total. Several of the companies, affected by the demand for eight hours, which were compelled to shut down on Jan. 1 last, remained closed for seven and eight months, and two of them are still closed, the Gilt-Edge Maid and the Golden Crest, so that the figures would be decidedly small. From other sources it is learned that the total amount of bullion produced by the mines other than the Homestake in the Black Hills this year will approximate $1,250,000. The heaviest producers outside of the Homestake will be the Imperial, Mogul and Golden Reward.

The monthly shipment east of the Homestake is now about $600,000 worth of bullion while the unofficial figure from the other companies combined is about $130,000 in bullion.

And at the end of 1909, the Homestake was forced to shut down because of the miner's strike:

South Dakota

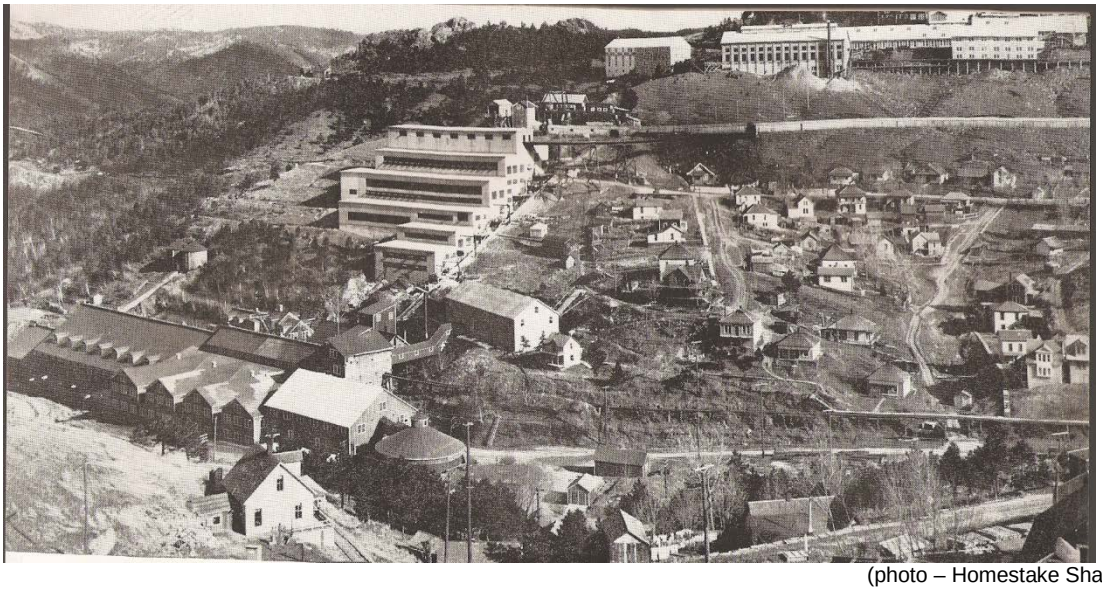
Homestake—Owing to trouble with the Western Federation of Miners the mine has closed. Superintendent T. J. Grier recently posted a notice as follows: "Notice is hereby given that the Homestake Mining Company will employ only non-union men after Jan. 1, 1910. The present scale of wages and the eight-hour shift will be maintained. All employees who desire to remain in the company's service must register at the general offices of the company on or before December 15, 1909." Anticipating a strike the management decided to close for an indefinite period. The wage scale was $3.50 per day for eight hours. The union has been recognized at the mine for 30 years although some nonunion men have been employed. About 2500 men were on the roll.



THE MILL AND SOME OF THE MINES, BELONGING TO HOMESTAKE MINING COMPANY, AT LEAD, SOUTH DAKOTA

(photo – the Engineering and Mining Journal)

1908



(photo – Homestake Sharp Bits)

1920's

This information on Homestake was in the January 1910 ***Engineering and Mining Journal:***

South Dakota

BY J. V. N. DORR *

The year 1909 was not a very prosperous one for the mining industry in South Dakota and its end is overshadowed by the shutdown of the Homestake mines and mills to avoid a strike. Those familiar with the Black Hills, however, do not feel discouraged, as the possibilities of the country have by no means been exhausted, and the mines now down will undoubtedly be started again.

The Homestake Trouble

The matter in everyone's mind at the time this is written is the shutdown of the Homestake, which has thrown 2500 men directly out of employment. While the time for resumption of work cannot be anticipated, the ultimate outcome will undoubtedly be the operation of the property on a non-union basis. The history of the trouble is of general interest. The Homestake company has always maintained the best relations with its employees and has had the unique record of operating 31 years without a strike. Good wages were always paid and the management maintained cordial personal relations with the men that were unusual with such a large company. During the whole time the property has been open shop and the only attempt to make it closed shop, made about the time of the organization of the Western Federation of Miners, was met by a notice from the management that no discrimination would be shown between union and non-union men.

The origin of the present movement may be traced back to the autumn of 1906, when the men asked for eight hours work with the same daily pay they were receiving for 10 to 12 hours. The company refused the request at first, but finally granted it without a strike, under conditions which enabled them to exact nearly the same amount of work as before in a shift, so that the operating costs were not materially increased. It was apparent, however, that the men considered that they had won an easy victory and there was more or less agitation for an increase of pay, which was stopped by the mine fire of 1907. An increase of the dividend to 75c. a share for one month only in November, 1908, renewed the discussion, and it was generally thought that it would be brought up actively when the million-dollar waterpower system, which the company then began, was completed.

The union started an active campaign last summer to increase its membership, importing organizers and speakers, and sending committees to persuade recalcitrant workmen to join. The first overt act in the present trouble was the adoption of a resolution by the unions concerned on Oct. 10, demanding that all eligible men join at once, and stating that any man who neglected to join would be dealt with as the union might determine. This was followed by a resolution, passed Oct. 24, that all men failing to join by Nov. 25 would be declared "unfair," and no members of the union would work with them after that date.

The company took no action until Nov. 10, when it filed suit in the United States court against the union for $10,000 damages alleged to have been sustained on account of the intimidation of the men, whose working value had been thereby diminished. Finally on Nov. 17 the district was greatly surprised when notices were posted and published that after Jan. 1, 1910, no union men would be employed on the property and that all employees desiring to work after that time must register before Dec. 15. The leaders of the union were astounded by this movement, for they had apparently taken the liberality and kindness of the management as a sign of weakness and had anticipated as easy a victory as in the eight-hour movement.

On Nov. 23, the company, finding that the union had decided to call out its men on Nov. 25, shut the property down with the exception of work on the waterpower plant. A number of the employees, as well as men from the outside, have been employed as watchmen and there has been no violence of any sort attempted. The company has not given out the number of men who have applied for work, but it is understood that applications are coming in rapidly and it is probable there will be enough men available to operate part of the property at any rate early in the year. It is not expected that any violence will occur, as the company is amply prepared for any emergency and the leaders of the union are strongly against any disturbance.

Much discontent was caused among the men when they found that instead of getting strike benefits from the start, they were expected to use up all their own funds before applying for aid.

To an outsider it appears as if the management, while friendly to unions in general, realized that, with unlimited power the federation would surely aim to live up to the avowed principles of the order, and believing, as they assert, that "labor produces all wealth" (evidently recognizing physical labor only), and "wealth belongs to the producers thereof," they would endeavor to gather it in. The remark of a member of the executive board to a committee of mine operators, during the strike over the eight-hour question two years ago, throws further light on their attitude. He said, "Boys, you might as well give the men eight hours and get as much of that as you can, for we will be coming up here again asking for a six-hour day some time." While the legal right of all men to get all they can for as little work as possible is recognized by everyone, it seems that, from the employees' standpoint, poor judgment was used, and the federation will have only its managers to blame if it loses a large membership in the Black Hills.

Improvements at the Homestake

The Homestake company finished the addition to the slime plant during the year and commenced the construction of a hydraulic power plant in Spearfish cañon. The installation includes several miles of tunnels and is expected to furnish from 3000 to 4000 engine horsepower at the mills at a cost of at least $1,000,000 for the plant. The saving in operation will more than pay interest on the money expended, and it is expected that the plant will be running by the end of 1910.

*Metallurgical engineer, Pluma, S. D.



(photo - Homestake Sharp Bits)

Homestake Slime Plant in Deadwood, South Dakota

On February 12, 1910, ***The Engineering and Mining Journal*** reported: 'The (Homestake) Company is receiving about 30 to 40 men per day to work on the property. They are coming largely from Joplin, Missouri, Wisconsin, and Colorado, and seem to be a good class of men, with few foreigners. It appears probable that the management will refuse to employ the Slavonians who are the only ones of their old employees still maintaining the strike. They make good workers, but the leaders of the federation found it easy to deceive them as to the chances of winning the strike. The Homestake has two mills running with ample ore supply and will start the third as soon as mechanics can get it in shape. It appears probable that the mine will be running ar full capacity in a short time.'

The Homestake continued operations, developing the underground workings, constructing new hoists and service buildings on the surface, and improving conditions for the miners both in the mine and in the town of Lead, with little or no problems until October 1919 when another fire broke out at the mine. ***The Engineering and Mining Journal*** reported this on the fire:

Fire Breaks Out in Homestake Mine at Lead, S. D.

Company Preparing to Flood Workings—No Men Laid Off—Mine Rescue

Fire broke out in a timbered stope between the 700 and 800 levels of the Homestake Mine at Lead, S. D., on September 25. Miners driving a drift for water lines on the 700 level ran into burning timbers on October 2. Efforts are being put forth to confine the fire to this area. Preparations have been made for flooding the mine, and during the interval the mills will be idle. All employees will be used on the surface until the fire is extinguished. In all probability the mine will be flooded to the 600 level within a month. During the fire of 1907 the workings were flooded to the 300 level in forty-seven days. The United States Bureau of Mines rescue car is on the ground from Livingston, Mont.

Homestake Fire Still Burning

The fire in the Homestake mine, at Lead, S. D., which started on Sept. 25, as reported in the last issue, broke out when miners blasted down a timbered raise on the 800 level. Water was turned in from the 600 and 700 levels and for a week the blaze was confined to the stope where it began. Openings were driven on the upper levels for water lines. The fire could not be reached from the 800 level and all openings leading from the burning stope were bratticed off to confine the gas. On Oct. 2 the fire reached the 700 level and on Oct. 4 it was decided to flood the workings to the 600 level. All machinery from lower levels was hoisted and all mine work suspended. All mills were also shut down owing to the need of all available water. Flooding to the 600 level will probably take about five weeks. Suitable work will be found by the company for all employees during the temporary shut down of mine and mills. The fire continues to burn between the 700 and 600 levels.

During the fire in the same mine in April, 1907, it required 47 days to fill from the 1,550 level to the 200 level, and took 622,257,232 gals. of water. Today the mine is over 2,000 ft. deep, but the lower levels have not been opened to any great extent. If the fire can be held below the 600 level it should not take as long to fill the mine as it did in 1907. The 600 level and those above are larger than those below. Another advantage of keeping the fire below the 600 is that work can be resumed immediately after the fire is extinguished.

SOUTH DAKOTA

At the Homestake mine at Lead, S. D., the fire which broke out on Sept. 25 is still burning on the 700 level with continued efforts being made to extinguish it. The water used in flooding the workings has reached the 1,250 level, and it will be some time before it reaches the fire. Two deaths have resulted to date as a result of the fire. On Oct. 13, two men employed in removing forms from concrete bulkheads on the 700 level were overcome and died. The company announced on Oct. 16 that declarations of dividends would be suspended for the present.

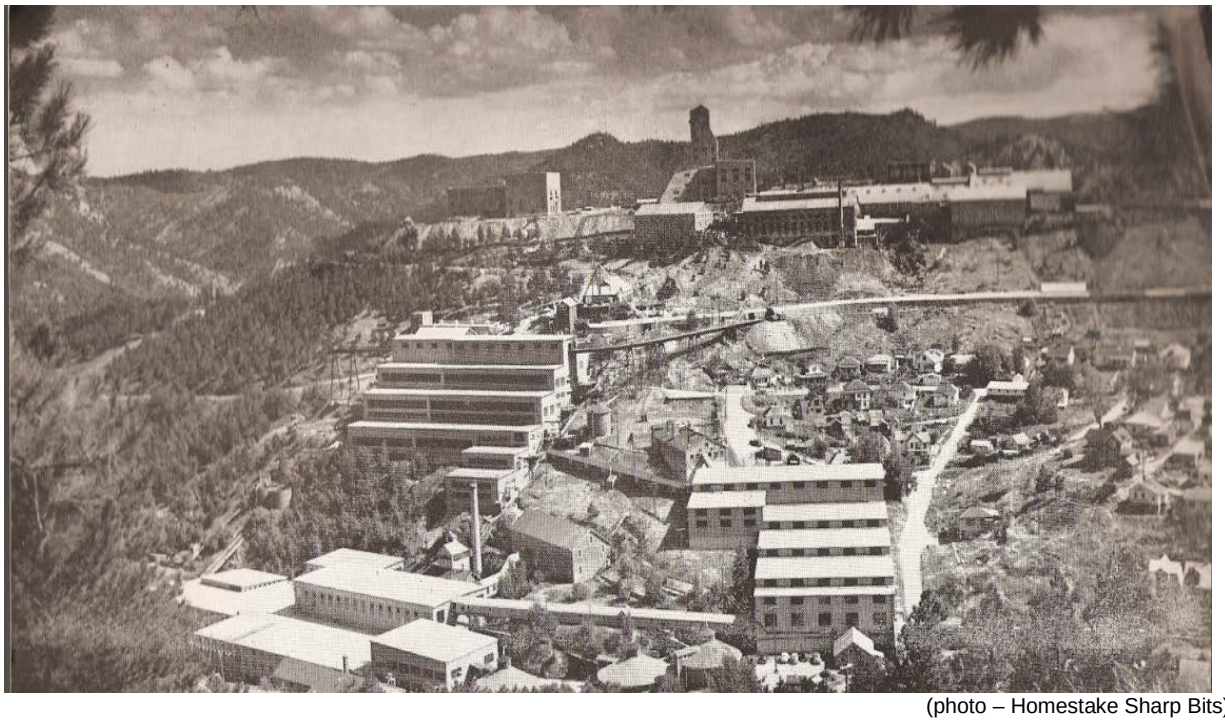
Homestake Fire Submerged

The fire which started on Sept. 25 in the Homestake Mine at Lead, S. D., when miners blasted down a timbered raise on the 800 level, has finally been extinguished by flooding the property. The water is now between the 500 and 600 levels and preparations are being made to unwater the workings. Water was run in from the surface through the open cut, all mills being shut down to make available a maximum supply of water. In all probability stamps will be dropping again before the first of the year. Further details regarding this fire have been given in previous issues.

One of the main features of the Homestake Mine was the open cut. Initially this is how the gold was mined by the Homestake Company. When the surface gold started to trend underground, the open cut was abandonded and the Homestake became an underground mining operation. As the mine continued to expand underground, the open cut also began to expand. Because mining operations of the day did not backfill abandonded mining tunnels and stopes, eventually the open cut began to subside into the underground mine, and in 1918-1919 parts of Lead City began to collapse into the open cut. By 1939 all of the buildings in the open cut area of Lead had been moved.

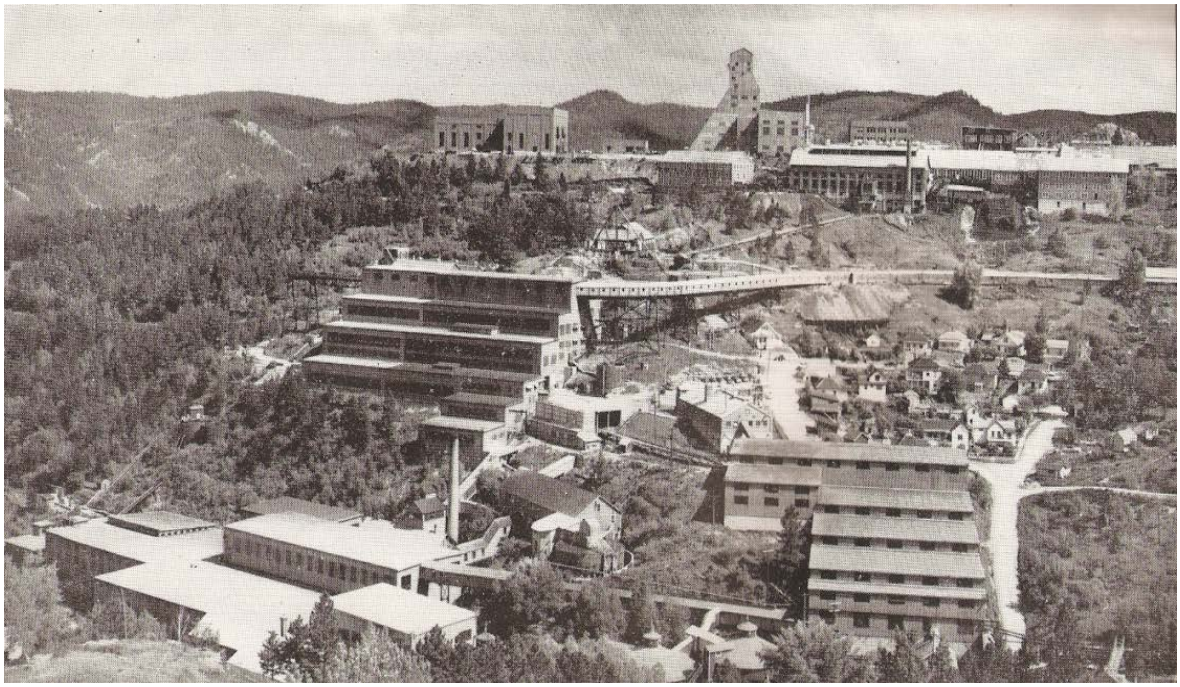
In the 1990's the open cut was re-mined and expanded to include the Terraville area. The Homestake open cut is now a substantial hole in the ground in Lead.

The Homestake Mine continued operations until the early 2000's. The mine was sold to Barrick Goldstrike Mining Company of Canada in the 1990's. Then in early 2000, because of the drop in gold prices and the fact that the mine was becoming too deep to be profitable, Homestake Mine was closed. In 2002-2003 most of the mine buildings were torn down. The area where Homestake Mine was located in Lead City is now a park and 'outdoor museum'.



(photo – Homestake Sharp Bits)

Homestake in 1949



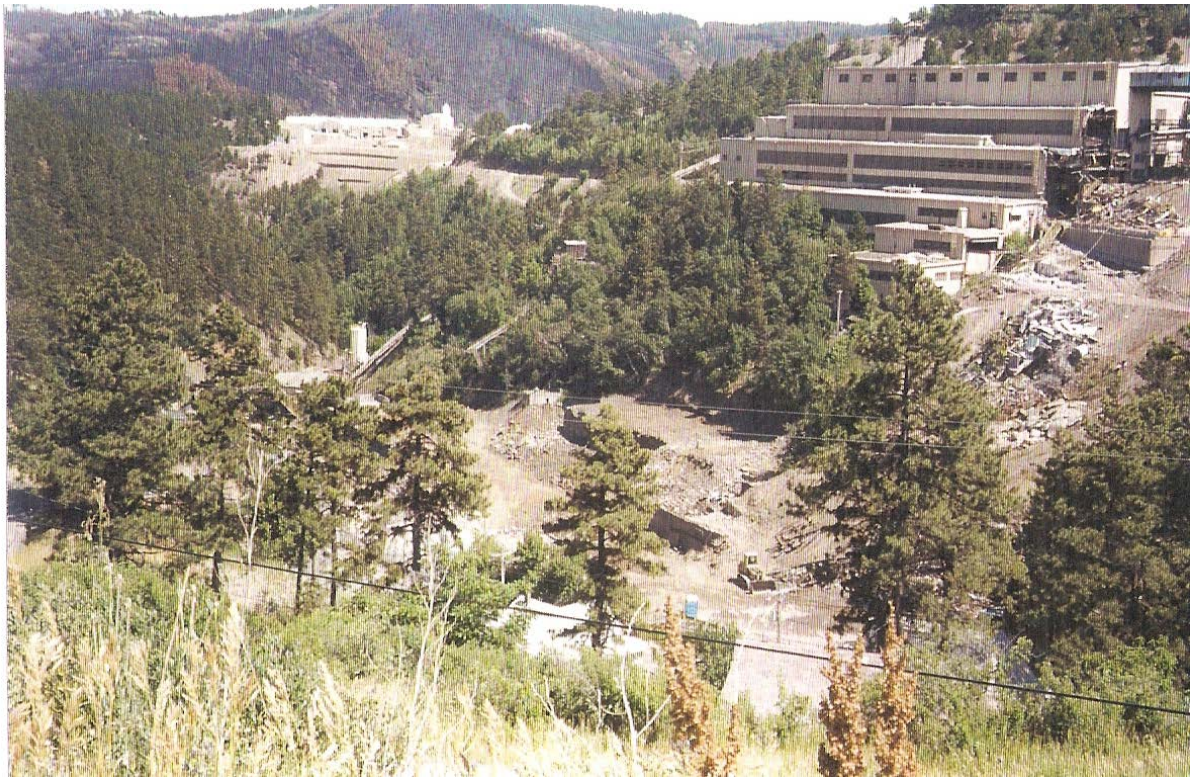
(photo – Homestake Sharp Bits)

Homestake in 1959

These photographs (all Everton) of the Homestake and demolition of the Homestake structures were taken in early 2002, through mid-2003.



Before demolition



Demolition begins



During demolition





Almost all gone



Homestake structures in Gold Run Gulch



Demolition in Gold Run Gulch

Homestake demolition

6/6/02



Tim Velder/Journal staff

Cleveland Wrecking Co. crews on Wednesday start tearing down structures at the now-defunct Homestake Mine in Lead. The mill and gold-processing facilities will be demolished by August. Some material will be buried in a lined pit in the former Open Cut mine. Some scrap also will be salvaged for recycling. Here, the former thickener tanks at Enos and Short streets along U.S. Highway 85 are being dismantled. The tanks prepared finely crushed rock for treatment by sodium cyanide and granular carbon to extract gold. Homestake, the nation's oldest gold mine, stopped mining last year after 125 years of operations. Demolition will continue into 2003.

The photo is from the Rapid City Journal. It shows demolition of one of the cyanide settling tanks in Gold Run Gulch.

The area where the Homestake mill and builldings were located is now a walking/interpretive trail and park with historic information about the Homestake Mine.

Terraville, and the Caledonia, the Old Abe and the Golden/Deadwood Terra

Another major area of the 'mineral belt' was located in the mining camp of Terraville. The mines in this area included the Caledonia, the Old Abe and Golden or Deadwood Terra. This information on these three mines was reported in the April 1879 ***Engineering and Mining Journal:***

THE OLD ABE.

"This company is working its usual force of men. The main vertical shaft is down 115 feet. It is admirably arranged in three compartments—one 5 × 5 in the clear will be used for a pump, the other two 4½ × 5. When 200 feet in depth is attained, a drift will be run south to connect with the old level, where twelve men are stoping ore which the 20-stamp Burns mill is crushing, giving a return of $10 per ton.

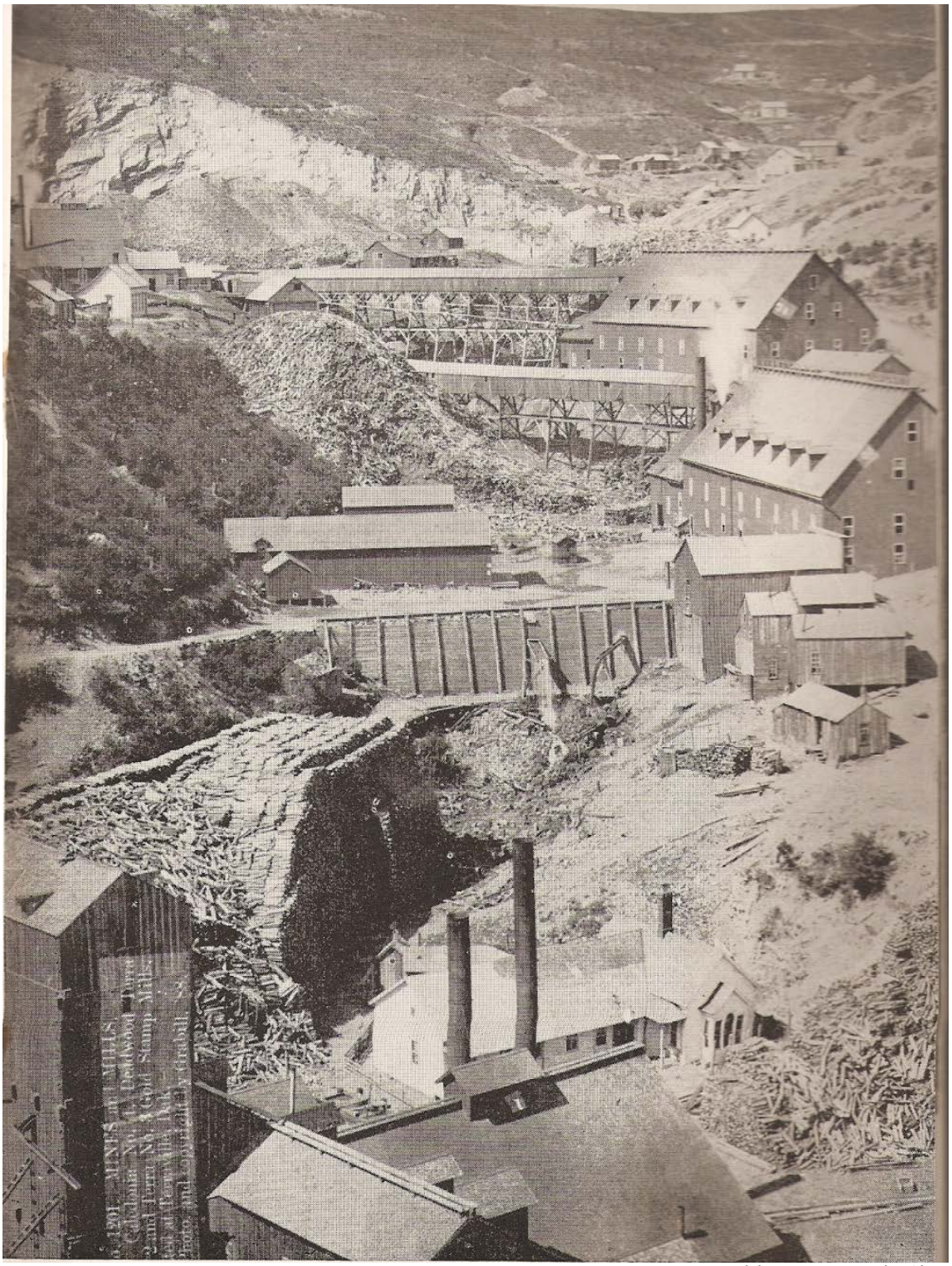
THE CALEDONIA.

"The old tunnel in this mine, which is timbered in first-class style, runs into the hill nearly at right angles with the ledge, which is reached at a distance of 300 feet. At this point an immense chamber of ore has been excavated. connection with the surface being here made by a shaft eighty feet deep. The main tunnel is being now driven in along the foot-wall. It is in 575 feet, and at the north end a drift 42 feet from the foot-wall, to cross-cut the vein, shows the face and side in solid ore, and for the 575 feet of this tunnel the top, bottom, and side show a continuous body of ore, the extent of which can be determined only by cross-cuts. One hundred feet below and farther down the hill, another tunnel has been started for the purpose of tapping the vein immediately under the large chamber, where connections will be made by means of a winze 10 × 12, now being sunk. The lower tunnel is now in 475 feet, and yesterday they struck the discovery ledge, a rich vein 10 to 12 feet wide; a platform was built to save the ore, which shows specimens of free gold. The company's 20-stamp mill is crushing forty tons per day, which averages $9.50 per ton. Twenty-seven men are worked in the mine.

"An assessment was lately levied (which is now delinquent) for the purpose of erecting an 80-stamp mill, which will probably be built this summer. The Clara Consolidated, lately listed on the S. F. Stock Board, is parallel with Caledonia. A tunnel, now in 60 feet, is being pushed forward as rapidly as possible.

THE GOLDEN TERRA.

"This mine is probably the best developed property in the Hills. Over 1200 feet of tunnels and cross-cuts demonstrate the enormous amount of over five million dollars' worth of ore estimated in sight. The main south drift has a number of cross-cuts; one, 110 feet in length, is in ore the entire length. A lateral drift runs 400 feet parallel with this main drift, showing the same character of pay quartz. The main lower tunnel, started below the 30-stamp mill, is in 360 feet, and will be run parallel with the upper tunnel, being connected at convenient distances by winzes. Four veins have been cut in running the lower drift, one showing 40 feet of ore, which is considerably impregnated with white iron, same as that in the lower level of the Father De Smet, which assays $17 per ton. At the surface the dirt from the grass-roots down is being milled. A large breast of ore, 200 feet wide, is exposed, which will be quarried down, and, by means of a chute into the tunnel, transported by cars to the mill. One blast yesterday morning (the hole being drilled 12 feet deep and charged with over half a keg of powder) threw down about 1000 tons of ore. No ore has been milled that did not yield from $10 to $12 per ton. The machinery for the 60-stamp mill will probably be here very soon, and it will be complete and running within forty days. The 30-stamp mill is running; also 20 stamps of Elliott's mill at Central. Fifty-three men are worked in the mine. The stock is now quoted at about $9 per share."



(photo – Homestake Sharp Bits)

This 1888 photo shows the Caledonia and the Deadwood/Golden Terra mills in Terraville

This information was reported in May 1880:

DAKOTA.

CALEDONIA (B. H.).—The Black Hills *News* of the 25th ult. has the following regarding this mine:

"About 100 men are employed by the Caledonia in the mine and mills. The principal work is now being done on the smaller ledge. This is tapped at right angles by the main working or lower tunnel at a depth of 500 feet from the mouth of the tunnel. This is the first station at which point a main drift is started in on the strike of the ledge. This is now in 350 feet from the first station, and is used as the sill floor, the timbers being solidly put in and wedged between the hanging and foot walls. Above the sill floor are three others started, which will also follow the sill floor, and as every particle of the average width of 35 feet is milled, and the depth of the ledge is about an angle of 45 degrees, the timbering will be a nice feature of the work, as it will soon have to be braced as the stoping is extended upward.

"The main tunnel, after leaving the first station, cuts the formation a distance of eighty feet, and then cross-cuts the big ledge until it comes to the hanging-wall, 180 feet distant. A drift is started in on the foot-wall, and at the south-east face of the drift some good rock is coming in.

"One hundred and fifty feet above these workings there is another tunnel driven in till it cuts both ledges. At the intersection of the large ledge an immense chamber has been excavated, and a drift is carried in for several hundred feet along the foot-wall.

"A tunnel is also being driven in on the Clara No. 1, and a small shaft is being sunk from the surface on the Caledonia. Two hundred car-loads of ore per day are run out for the sixty and twenty stamp mills, mostly from the lower workings, which is emptied into an intermediate bin, where it is loaded on cars from the chutes, and run into the top of the mill. The twenty-stamp mill at Central, nearly one mile distant, can, of course, be run with profit, but the transportation by teams is expensive, and, when its machinery has done all that it can, it will be discontinued. But the better plan would be for the company to sell it."

This information on the Golden Terra was reported by ***The Black Hills News*** in September 1880:

GOLDEN TERRA.—The Black Hill *News* says: In the Terra mine, there has been more development. There is also a large open cut from which a large amount of ore has been taken, and from which ore is taken in good weather, but the principal working has been carried on under ground. Tunnels have been run in over 1000 feet, and some of the finest ore-bodies we have ever seen are in this mine. The system of timbering, as practiced here, is as perfect as possible, and involves a large amount of timber and labor. It is all sawed timber 12 × 12 inches, and framed together, and put in squares; as fast as the ore is removed, one of these takes its place, and, although seeming to be a very expensive luxury, it costs but twenty cents a ton to timber the mine. The workings in this mine have been more with a view of developing it, and preparing for the taking out of immense quantities in the future, than to simply furnish their two mills with ore. The mine shows an admirable state of development; two large main lateral drifts have cross-cuts, showing the immense width of the lode; 100 feet below these tunnels, and running in almost at right angles for over 300 feet, is a tunnel which cuts three veins or leaders from the main vein. These small veins are very rich, and are from 16 to 40 feet in width; but where the end of the tunnel taps the main lode, which is over 200 feet wide, another drift is run in on the strike of the ore, which shows the ore to be much richer, averaging in many places from $15 to $20 per ton.

This information was reported in February 1881:

DAKOTA.

The Black Hills *Herald*, in reviewing the mines and mills around Central City, says:

While earlier developments were prosecuted, the prominent mines on the "belt" were coolly gobbled by Californians, Haggin & Tevis taking the Golden Terra and Deadwood, and the Borland party the Father de Smet, Justice, Belcher, and Golden Gate, at round figures. Permanent mills and other buildings were now projected, while extensive developments were pushed underground. The Father de Smet's 80 stamps were dropping and Deadwood and Golden Terra in turn erected 60 stamp-mills, which have since been increased to 80 each. The Caledonia came into line soon after with 60 stamps, and at the present time the Esmeralda Company is erecting 60 stamps in Blacktail Gulch. The anticipated milling facilities for the near future are one or more large mills of perhaps 200 stamps each for the De Smet and Deadwood mines; additional stamps for the Consolidated Terra-Deadwood mines, and one or more mills of good capacity for the Gopher. The whole number of stamps placed in position to date, in this vicinity, which includes Blacktail, Poorman, and Bobtail gulches, and the 60 now in the course of erection by the Esmeralda Company, is 885. The estimated cost in the early days was $1000 per stamp; some of the first mills cost much more than this figure. At low rates for freight, they can be erected now for less; but the total cost of mills alone, including other small buildings in connection, has not been below one million dollars.

CALEDONIA.—The mill started up its sixty stamps on the 18th ult., water being supplied by the Homestake C mpany which, since the accident and shutting down of the Golden Terra, has an abundant supply. The Terra will be idle for fifteen or twenty days, at the end of which time the Caledonia settlers will be finished and water secured for both mills.

This information was reported in the August 1881 ***Engineering and Mining Journal***:

CALEDONIA, B. H.—The superintendent of the Caledonia Gold Mining Company, B. H., under date of July 24th, reports an accident to the mine on the 20th ult., which will cause the shutting down of the mill for four days. The hanging-wall of the open cut had a slip in it extending across the slate formation between the Caledonia and the Queen of the Hills veins, and a heavy shower caused the slide. This slip could not be seen until after the accident. The damage to the mine will not be great, being of a local character only.

This information was reported in the September 1882 ***Engineering and Mining Journal***:

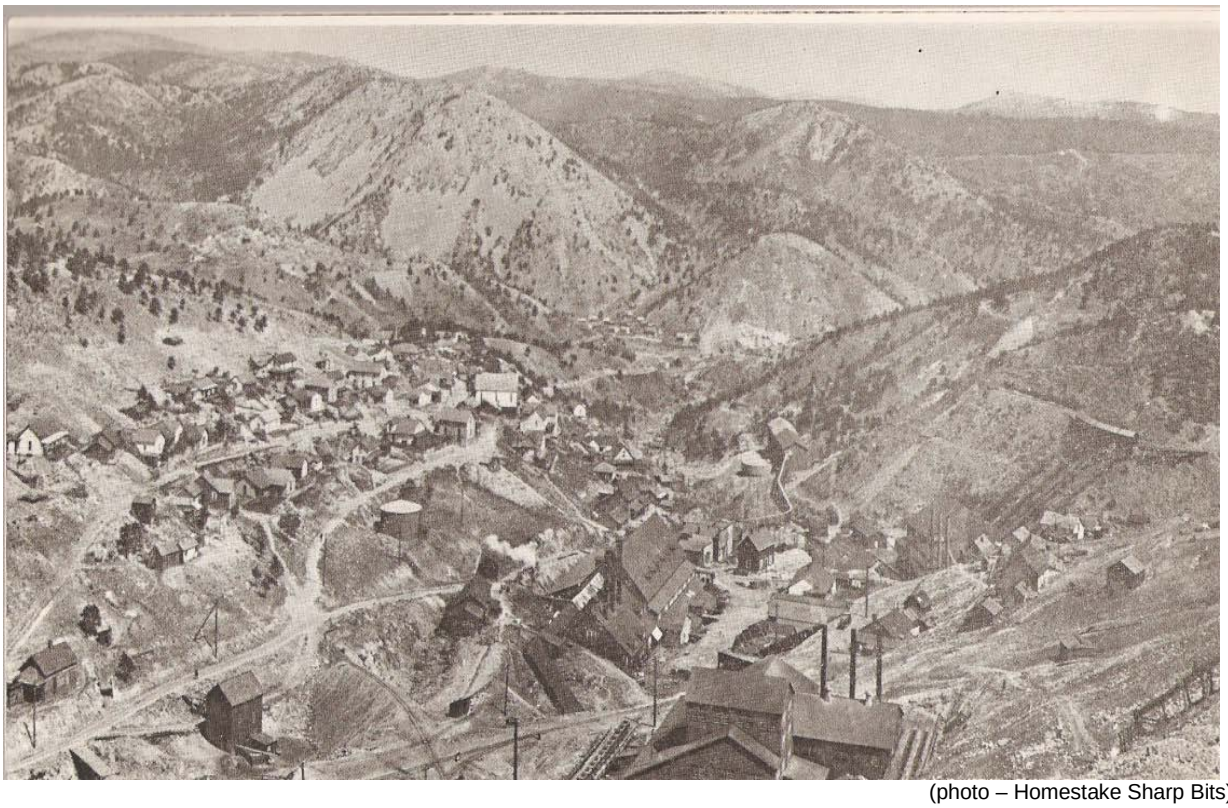
CALEDONIA.—It is expected to start the mill running day after to-morrow. A great deal of development work has been done since the mill shut down, and the mine is looking better than ever before. Under date of the 12th of August, the secretary writes: I have to inform you that assessment No. 18, of 15 cents per share, has just been levied. This assessment has been forced upon the directors on account of the unforeseen delay in opening up the new level, and the consequent delay in starting up the mill. The level is now in ore of fair quality, as you have doubtless seen by the superintendent's report. The directors expect the mill will again be producing bullion before this assessment is exhausted. I may add that the mine is out of debt.

This information was reported in the 1888 ***Engineering and Mining Journal***:

DAKOTA.

Dispatches to the New York *Tribune* state that the principal mining operations in the Black Hills are confined to "the belt," a strip of land about four miles long and two miles wide, in the immediate vicinity of the Homestake, Deadwood-Terra, and other noted mines.

The mines in the Terraville area continued to be worked profitably for the respective mining companies until 1902 when the Old Abe (Brig), Caledonia and Terra mines were consolidated into the Homestake Mining Company. The Terraville mills continued to be used by Homestake until the 19-teens. Terraville continued to be a small mining community through the 1990's. A few hardy residents continued to reside in the town, and the Methodist Church continued to be used for worship. In 1990, the Homestake open cut was expanded, and Terraville was obliterated.



(photo – Homestake Sharp Bits)

Terraville in 1906. Homestake was operating the mills in Terraville at this time. Note the white Methodist Church on the hill in the center of the photo.



(photo – Homestake Sharp Bits)

Terraville in 1964. A few hardy souls still resided in the town. The Methodist Church was still in use.



(photo – Homestake Sharp Bits)

The Old Brig (Abe) mill in Terraville in the early 1900's. Note the chutes in the right/center of the photo.



(Everton photo)

The author sitting on one of the chutes in the above photo in 1980.

The Father DeSmet Mine

Another early mine located on the 'mineral belt' was the Father DeSmet Mine, located in the Central City (Golden Gate) area in Deadwood Gulch.

This information on the Father De Smet Mill was in the July 1878 ***Engineering and Mining Journal:***

THE FATHER DE SMET MILL.

This mill, when completed, will consist of 120 stamps, with its mammoth machinery of the latest improved pattern, together with special appliances for handling and breaking the ore as it leaves the giant tramway for the batteries below.

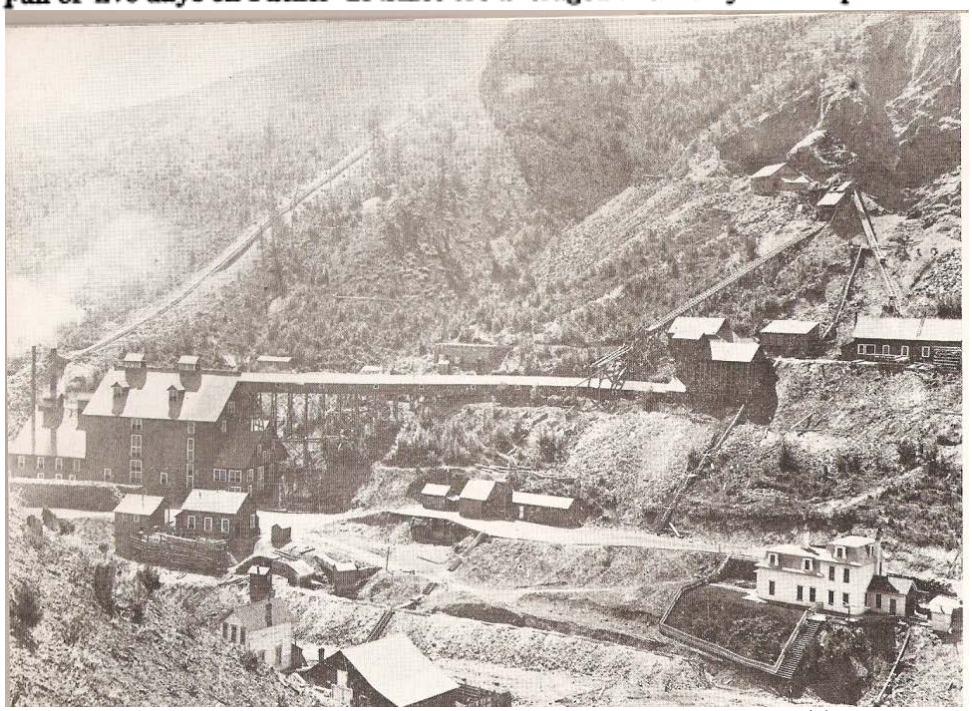
To give the reader an idea of this huge thumper—which is by far the largest of its kind ever manufactured—we will state that four large freight trains on the Union Pacific Railroad have been engaged to transport the machinery to Cheyenne, where special trucks and heavy wagons will take the segments to their final resting place at Golden Gate.

It will be inclosed in a building 120 ft. long, 100 ft. wide, and 50 ft. high. Three miles of huge pipe have been ordered at Chicago to supply water, and it will take twenty cars to transport this side issue. When completed, this immense affair will scarcely attract attention, located as it will be at the base of the De Smet mountain of gold.

Several expert machinists who assisted in constructing the machinery have been engaged to put it together. The company have advertised for bids to supply the lumber for the building, and soon a new source of life for this end of the gulch will be in motion, and hundreds of men will henceforth receive constant employment, until in after years the mighty body of ore shall show indications of the destructive power of man. A good idea of the coming mill can be formed by visiting the 80-stamp mill of the Homestake at Lead City, now nearly finished. This massive machinery is the most perfect in the country, and will be in running order in two weeks. Then look out for a clean-up that will surprise the natives, and cause the stock speculators of the Pacific Coast to pounce on anything with the name of Black Hills attached.

The result of a twenty-six day run with 60 stamps, on ore from this mine, was clean-up of something over $50,000.

Of this mine a recent number of the Bismarck *Tribune* says: "Contemplate for a moment the two-hundred-foot vein of gold-bearing rock now exposed to view for a depth of sixty feet in the Father de Smet, the ore on the surface yielding about eleven dollars per ton, while the cost of mining and reducing does not exceed five dollars per ton, including wear and tear of machinery and interest on money invested. Indeed, a clean-up, partially made in our presence, from a run of five days on Father de Smet ore averaged over forty dollars per ton."



(photo – Homestake Sharp Bits)

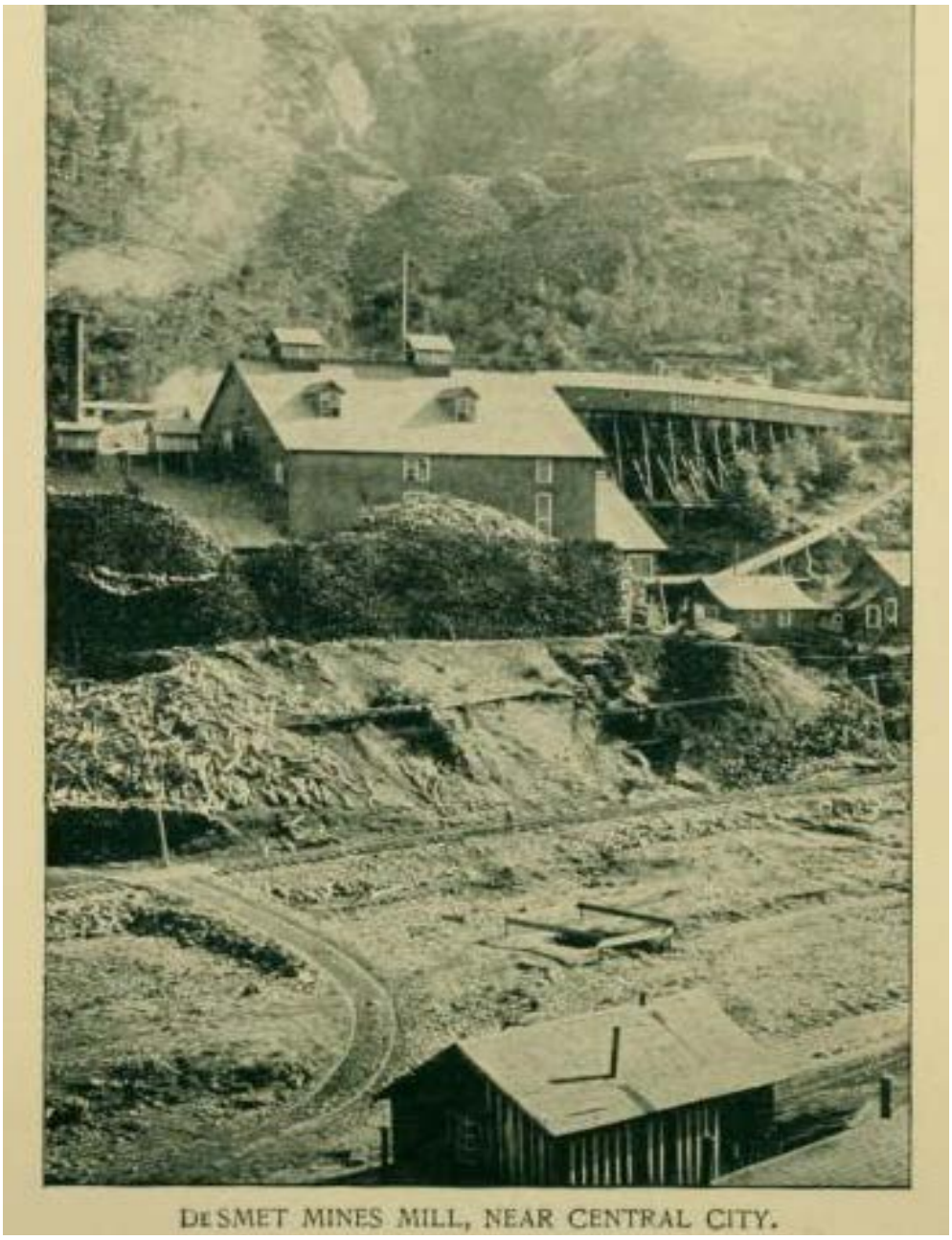
The Father DeSmet Mining Company

This information was reported in the September 1878 ***Engineering and Mining Journal:***

THE FATHER DE SMET.

A very important development has been made in this property by the prosecution of work on the Golden Gate tunnel, the present header of which taps the main vein at a distance of 207 feet below the present workings of the mine. It was no less than the encountering of raw ore (showing no decomposition) which assays over $100 per ton. It is also most incontrovertible evidence of the permanency and true-fissure character of Black Hills quartz, and as such goes abroad to our benefit.

Under the care of Captain I. M. West, the 80-stamp mill of this company is being rapidly built. At the present time one hundred and thirty-five stamps are crushing ore from this mine. Over twenty-five thousand dollars are required to meet the monthly pay-roll of the company.



DESMET MINES MILL, NEAR CENTRAL CITY.

Picture postcard of Father DeSmet Mine and Mill

This information was reported in the October 1880 ***Engineering and Mining Journal:***

dollars. The papers have also stated that the De Smet has passed into the hands of the Homestake management. It would certainly be a change for the better, but as yet, there is no authority for such a statement. That a proposition has been made to the Homestake, and that they have made an exceedingly thorough examination of the property, is beyond a doubt. That they have made a return proposition, is probable, but nothing further can be affirmed regarding the matter. The talk that the Homestake is playing a freeze-out game in respect to water is simply bosh, as the De Smet gets its water for milling from a different source from the Homestake. The custom mills are nearly all shut down for want of water. Re-

This information was reported in the December 1880 ***Engineering and Mining Journal:***

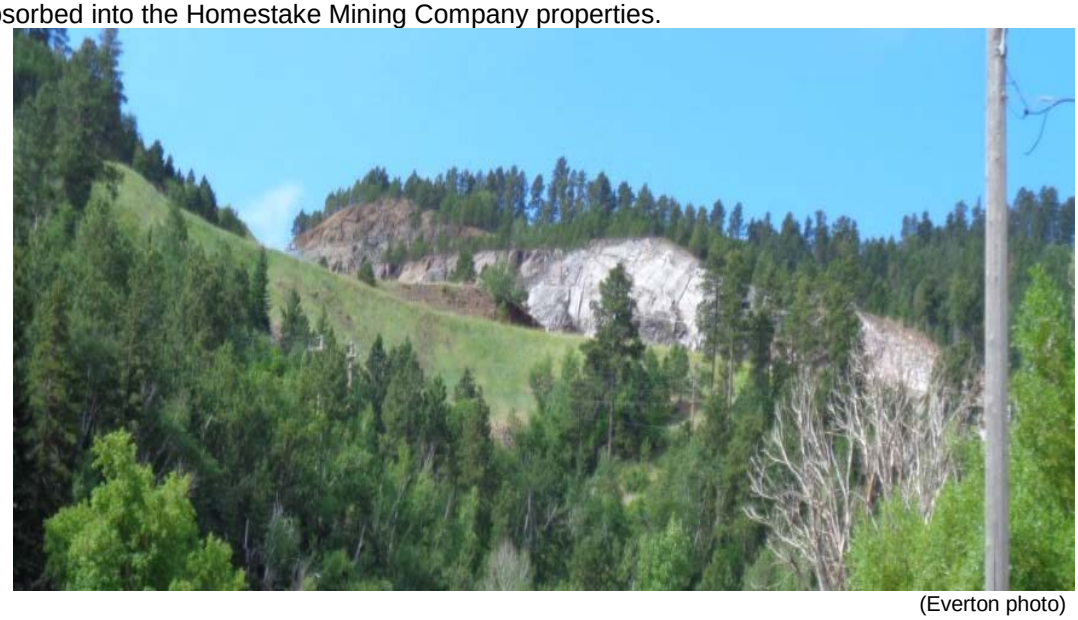
DAKOTA.

The Father de Smet Company is about to try contract work in its mines It advertises for bids for supplying the Father de Smet mill with ore, to be taken from such portions of the company's mines as the superintendent may direct, and asks that bidders will state how much they will break the ore for per ton, and deliver it in the mill, and be willing to bind themselves to furnish such quantity of ore as may be required to keep the mill supplied, which will probably be three hundred tons, more or less, per twenty-four hours.

This information was reported in the November 1881 ***Engineering and Mining Journal:***

FATHER DE SMET.—The superintendent of the Father de Smet mine writes, under date of November 5th, as follows: I send herewith express company's receipt for 1800 ounces gold bullion, the result of last 15 days' run in October, making 3751 38 ounces for the month, this being the largest amount of bullion produced by the mine in any one month. The mill is running steadily, and we are now receiving the benefit of the extensive repairs made during the summer. At the mine every thing is running with its accustomed regularity and smoothness. We have started a drift south on second level, Golden Gate vein, which shows very well. We are also putting in sill sets on third level, preparatory to working the large body of ore lying between second and third levels. If the winter is open, this body of ore will not be required for use until one year from now. The north-end tunnel is progressing about 2 feet each 24 hours, and on 1st inst. was in 257 feet. For the week ending November 8th, the superintendent reports that 1200 tons of ore were extracted from first level, 1000 tons from second level, and 105 tons from third level. This week, 2805 tons of ore were milled. The north-end tunnel is in 267 feet. A tunnel is driving in a southerly direction on the second level, beginning at the rise at the end of the east cross cut, Golden Gate vein, to be known as South Header, Golden Gate.

The Father DeSmet Mine was worked extensively as an independent entity until 1886, when it was absorbed into the Homestake Mining Company properties.



(Everton photo)

The open cut from the Father DeSmet Mine in 2016

Trojan and the Bald Mountain Area

In the late 1870's a western extension of the Homestake mineral belt was found in the Bald Mountain area. The mining camp of Portland (later Trojan) and the Portland Mine, the Bald Mountain Mine, the Two Johns Mine, the Reliance (Annie Creek) Mine and several other smaller mines were all located in this area. This information on the Bald Mountain area was reported in the June 1880 ***Engineering and Mining Journal:***

DAKOTA.

BALD MOUNTAIN.—The Black Hills *News* says that work in this camp is pushed in all the mines with unusual vigor. The Portland Mining Company has started its saw-mill, and is busy sawing out the timber and lumber for its mill pending the arrival of the machinery, which will be here in a few days; in the mean time, work is pushed in developing the mine. The Snowstorm mill is shut down awaiting the arrival of the roasters for treating the ore by fire process. This company has recently developed some very rich ore in its mine, assays showing as high as $800 per ton. A large force of men is also at work on the Silver Plume mine. This property is owned by a Canadian corporation, and work on the mine is pushed vigorously. It is the intention of this company to immediately erect a twenty-stamp mill, with all the modern improvements, for the reduction its ores.

… and this was reported in the November 1889 ***Engineering and Mining Journal:***

DAKOTA.

LAWRENCE COUNTY.

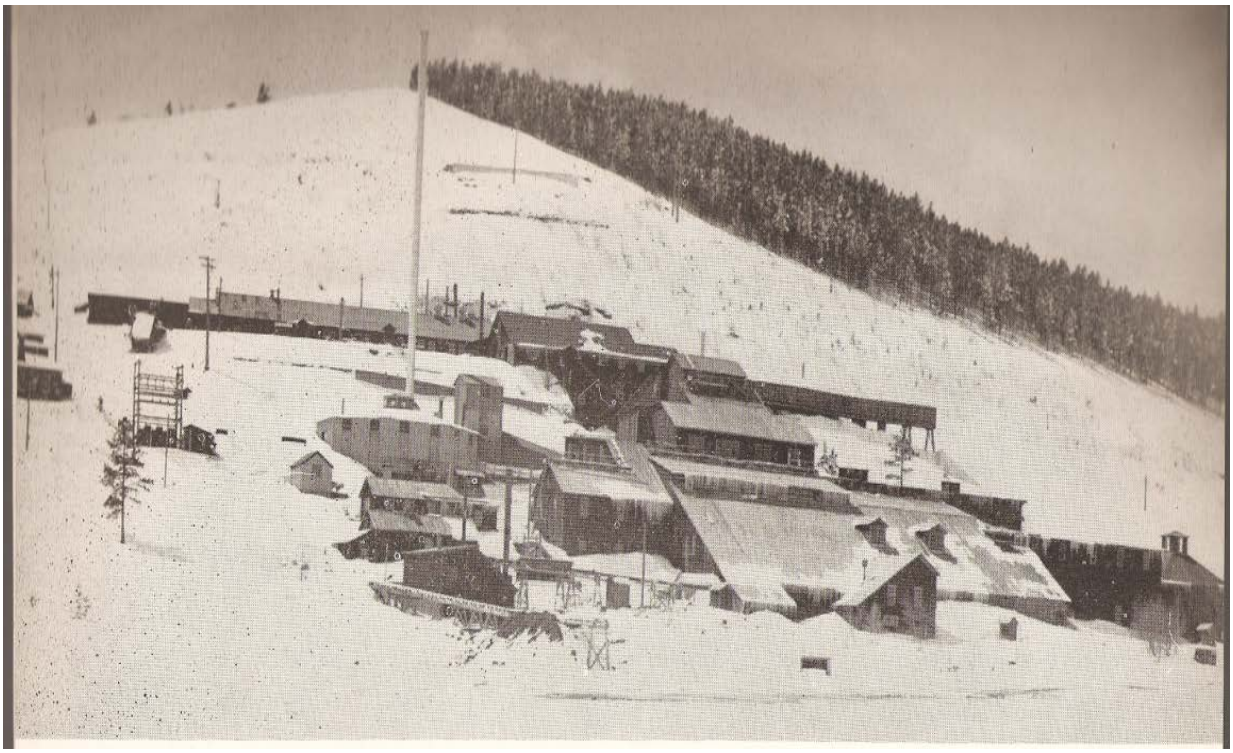
It is stated that more ore has been shipped from Bald Mountain this summer than in any other season in the history of the district. Half a dozen mines, it is said, are forwarding ore to Omaha or Kansas City. Prospectors are encouraged and are now opening several new and promising locations.

Bald Mountain was the second most productive mining area within the Black Hills Mining District. There was a real problem in this area with the processing the ores that were found in the mines. A small percentage of the ore was what was known as brown ore, with the gold either visible or easily processed and recovered. The problem ores in the Bald Mountain district were called blue ores, and it was extremely difficult to extract the gold from these ores. Many different processes were tested, with various degrees of success. It was finally determined that the ore needed to be roasted and then processed, and this returned a fairly successful amount of gold. Once this process was invented, the area was mined successfully into the 1930's, and again for a short time in the 1940's and the 1950's. There was a large processing plant at Bald Mountain, and this plant was visible for many years after the mines and mill were closed. Parts of the buildings were salvaged, and the rest was allowed to fall into disrepair. The area was open-pit mined by Wharf Mining Company in early 2000, and the buildings are now gone.



(photo – The Engineering and Mining Journal)

The Bald Mountain processing plant in 1919



(photo – Homestake Sharp Bits)

The Bald Mountain Mill in 1965. The roaster is the octagon building with the tall smake stack.



(Everton photo)

The remains of the Bald Mountain mill in the 1990's. The roaster is in the center of the photo.

Terry and the Ruby Basin Mines

On the other side of Nevada Gulch to the south of Bald Mountain was the Ruby Basin Mining District, and the mining camp of Terry.



(photo – Ed Johnson – Terry SD resident)

This 1905 photo shows the mining camp of Terry, SD.



(Everton photo)

This overview photo taken in 2016 shows the area of the mining camp of Terry. Visible in the distance on the side of Terry Peak is the Horseshoe Mine, which Wharf Mining Company is strip mining.

The mines associated with the Terry and Ruby Basin area included the Horseshoe, the Lundberg, Dorr, Wilson, the Bonanza, the Tornado and the Golden Reward or Aztec.



Horseshoe Company's 120-Stamp Mill.

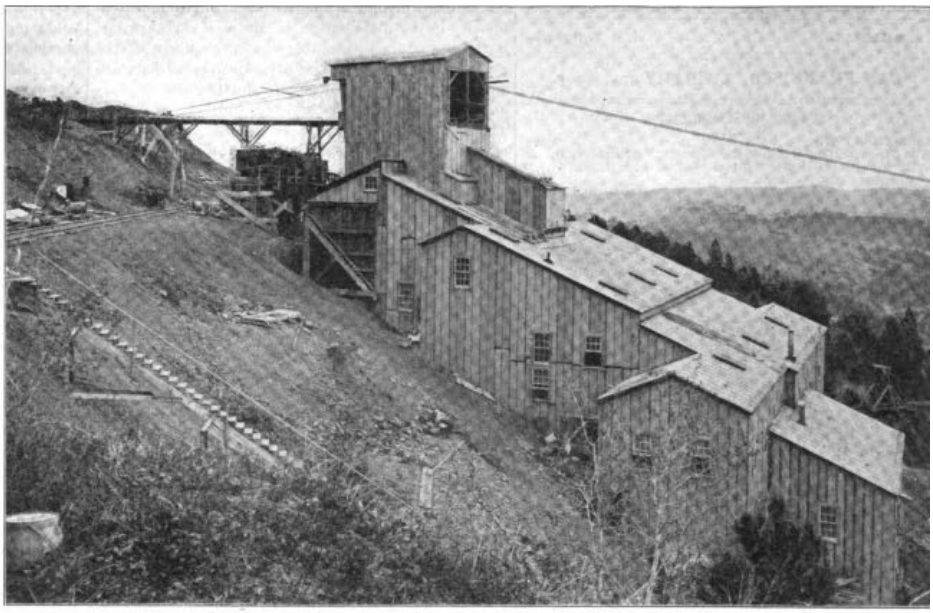
(photo – Black Hills Views)

The 500-ton cyanide plant at the Horseshoe Mine and Mill



(Everton photo)

The Horseshoe Mine and Mill site in 2016

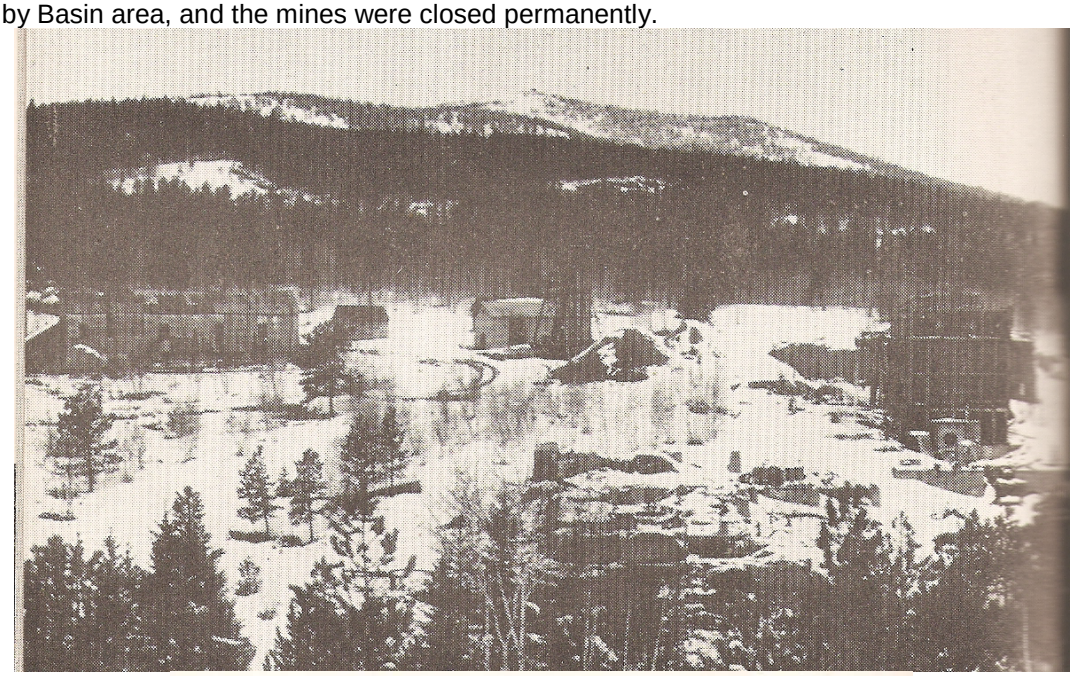


The Lundberg, Dorr & Wilson Cyanide Mill, Near Lead, S. D.

(photo – The Mining & Scientific Press)

This area was also plauged with blue ores that were difficult to process, and the Lundberg, Dorr and Wilson company was one of the most innovative mills in the Black Hills built to process these ores.

The mines and mills in the Terry area were worked throughout the early 1900's. In the 19-teens, the war stopped production of all gold in the Black Hills. When to war ended, gold prices remained low, and most of the Black Hills properties could not afford to resume operations. This happened in the Terry and Ruby Basin area, and the mines were closed permanently.



HOW A PART OF THE SECOND LARGEST GOLD PRODUCER in the Black Hills looked in 1953—35 years after shutdown. This view of the Golden Reward Gold Mining Company can easily be seen today (with headframe missing) from U. S. Highway 85 on Aztec Hill, southwest of Lead. Upon closing operations in mining, milling and smelting (in Deadwood) in 1918 because of high costs, the company's total gold production exceeded an estimated $21,000,000. They had stated in 1916 that 2,000,000 tons of mineable ore were in reserve.

(photo – Homestake Sharp Bits)

In the 1930's there was a renewed interest in gold and a few Black Hills mines were either re-opened for a short time, or were examined for profitability. Several of the mines in the Terry area were examined, but none were re-opened for large-scale mining.

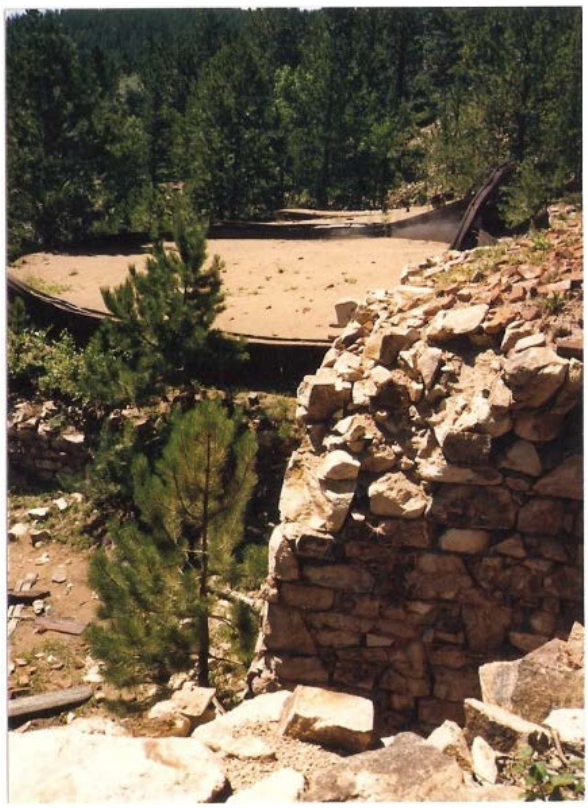
In the 1970's and 1980's the northern Black Hills were re-opened for strip mining, and several mining companies came into the Hills and set up operations. In the Terry area, the Golden Reward Mining Company stripped mined the area in and around Terry and in parts of Ruby Basin. Currently, the Wharf Mining Company has been strip mining the area around Terry Peak where the Horseshoe, Tornado and Welcome mines were located. There are no structures left in the town of Terry, and only a few depressions and some vestiges of the railroad grade left from the mining days. At the Horseshoe Mine there were foundation remains from the mill and also the sand tailings pile left from processing the gold. (As of 2017-2018 Wharf Mining Company has strip mined this area and these features are now gone).



(Everton photos)

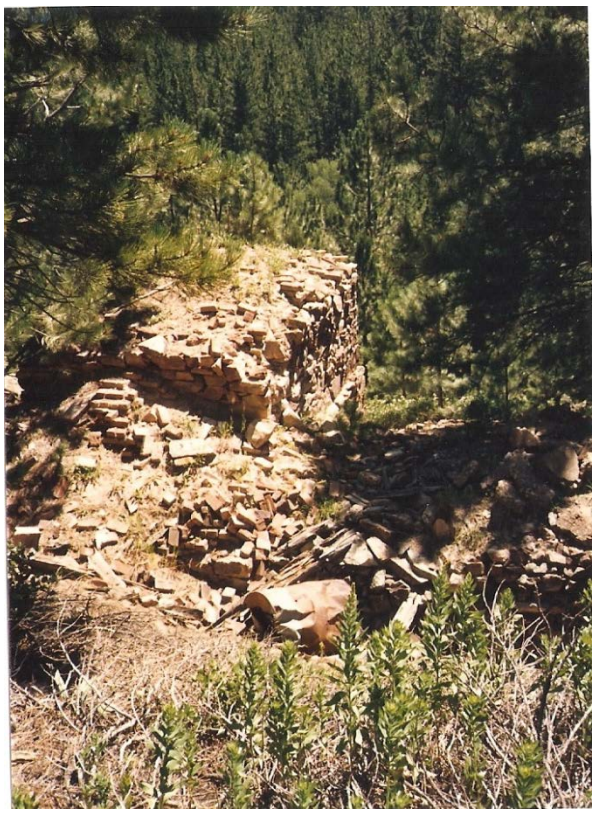
Remains of the Horseshoe mill in 1988 showing the crusher cone and part of the foundation.





(Everton photos)

Horseshoe cyanide settling tanks filled with sand from processing



Foundation remains of the Horseshoe mill looking toward Ruby Basin

Carbonate Camp, and the Iron Hill Mine and Seabury-Calkins Mine

Another area of extensive mining in the northern Hills included the mines in an area to the east of Spearfish Canyon and north of Bald Mountain known as Richmond Hill. Mines and mining camps in this area included Carbonate and the mostly silver or carbonate mines the Iron Hill and the Seabury-Calkins, and the mines associated with the Cleopatra Mining Company (gold).

In April 1881 a dispatch from Deadwood reported in ***The Engineering and Mining Journal***:

> There is great excitement over the discovery of rich carbonates nine miles west of this city. Ore was brought in to-day alive with native silver, and assayed $2600 a ton. (This was the first discovery of silver in the Carbonate area, and was the first report of silver and gold ores in and around Squaw Creek, Rubicon Gulch and the Preston/Balmoral area). These areas are all located to the east of Spearfish Canyon.



(photo – BH Mining Museum)

Main Street Carbonate Camp 1881



(Photo – Homestake Mining Company)

Main Street Carbonate Camp in 1890.



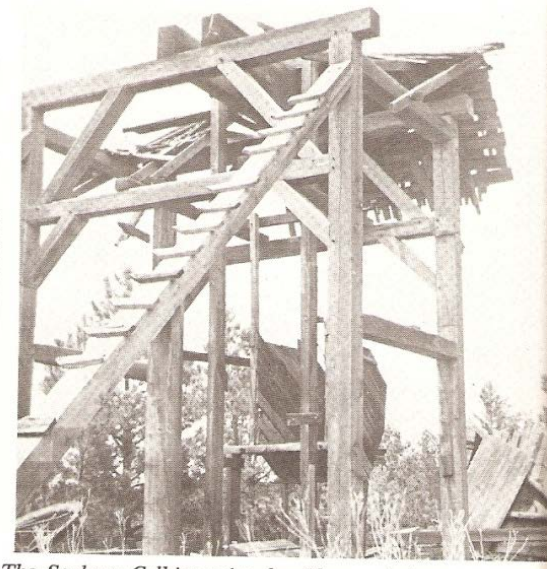
(Everton photo)

Part of Main Street Carbonate Camp in 1988

This mining camp only lasted for a few years, and the mines in the area were only worked sporadically.



The Seabury-Calkins crusher building was nothing but a skeleton of rotted wood in 1964. Photo by Fielder, 1964.



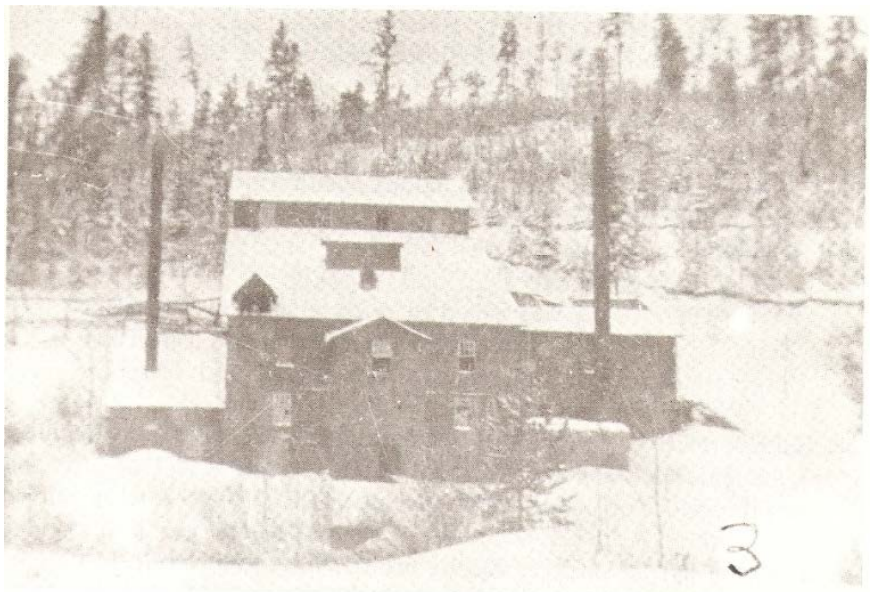
The Seabury-Calkins mine headframe skeleton was still standing in 1955, but by 1968 was torn down and nothing left over the empty shaft. Photo by Fielder, 1955.

Photos by Mildred Fielder of the Seabury-Calkins headframe and crusher. These photos are from Fielder's book *A Guide to Black Hills Ghost Mines.*



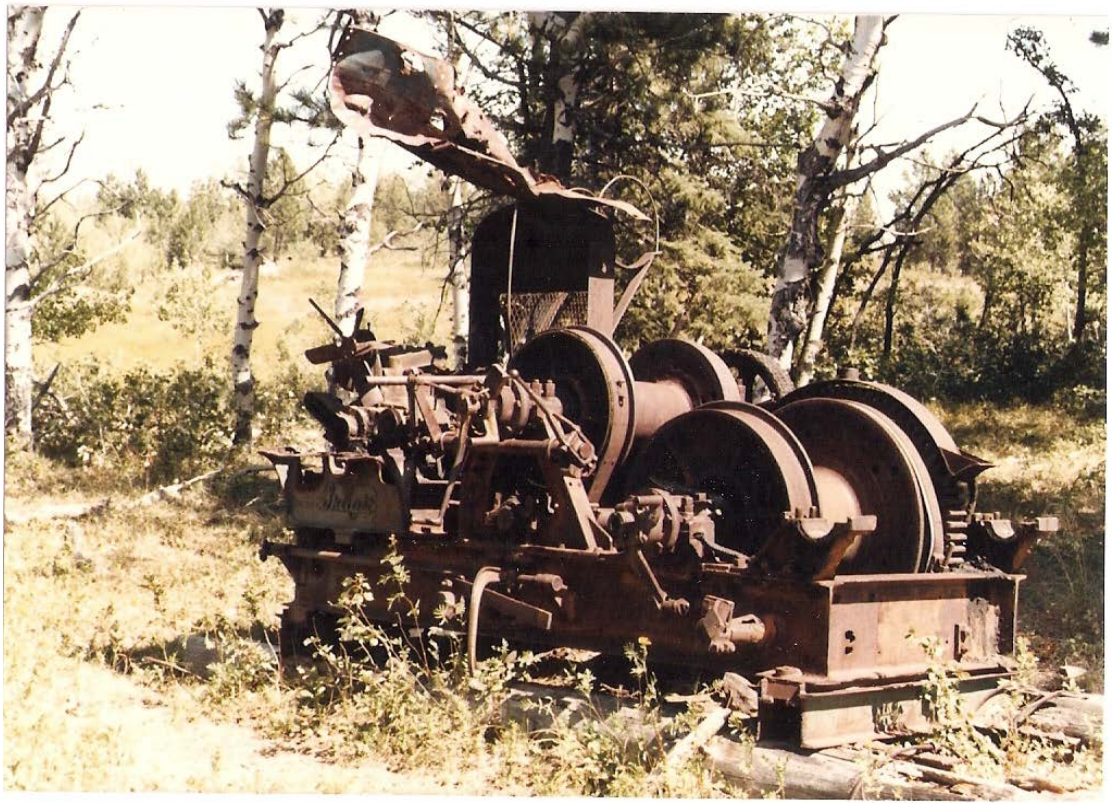
(Everton photo)

Remains of the Seabury-Calkins crusher building in 1988



The Iron Hill smelter in Rubicon Gulch below Carbonate Camp, 1890. This mill was installed in 1883.—Photo by courtesy of Mrs. Mary Bryant Walton.

This photo of the Iron Hill Smelter is from Mildred Fielder's book *Silver is the Fortune.*

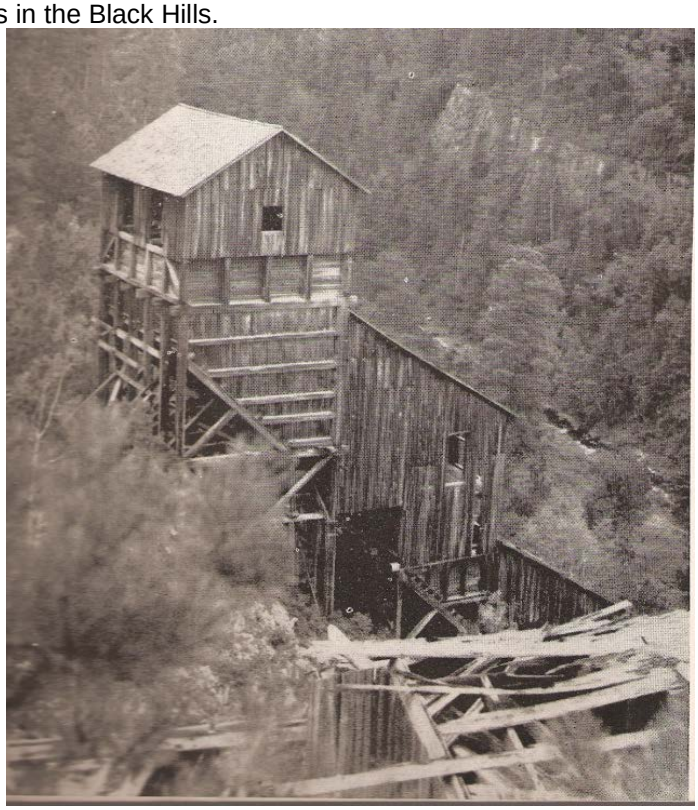


(Everton photo)

Remains of machinery from the Iron Hill Smelter - 1988

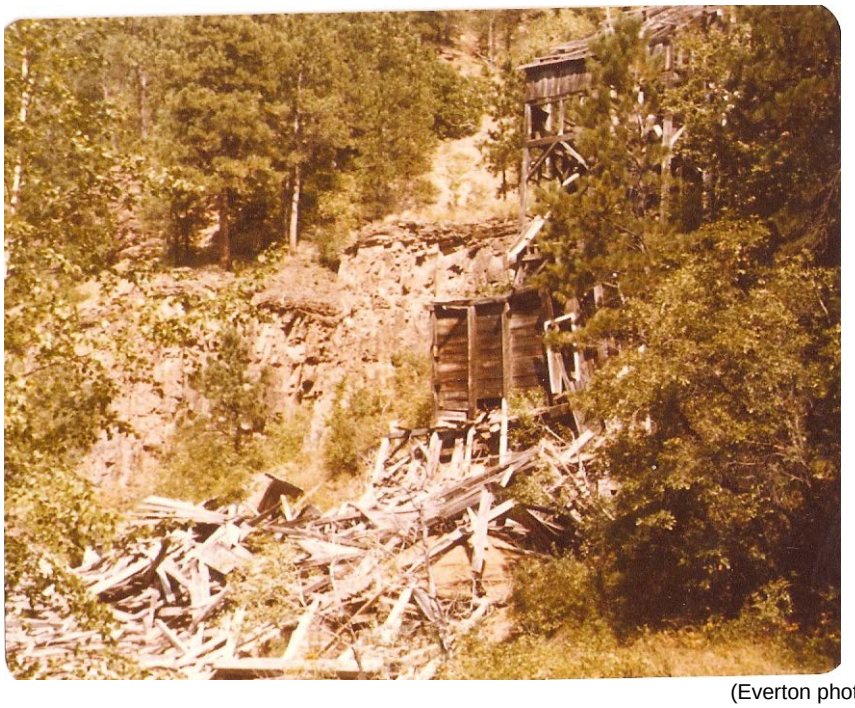
The Cleopatra Mining Company

The Cleopatra Mining Company was located on the east rim of Spearfish Canyon on Squaw Creek. Although not a heavy producer, this Company did build an impressive processing mill in one of the most inaccessible areas in the Black Hills.



(photo – Homestake Sharp Bits)

The Cleopatra Mill on Squaw Creek. This mill processed gold ore for the Cleopatra Mining Company.

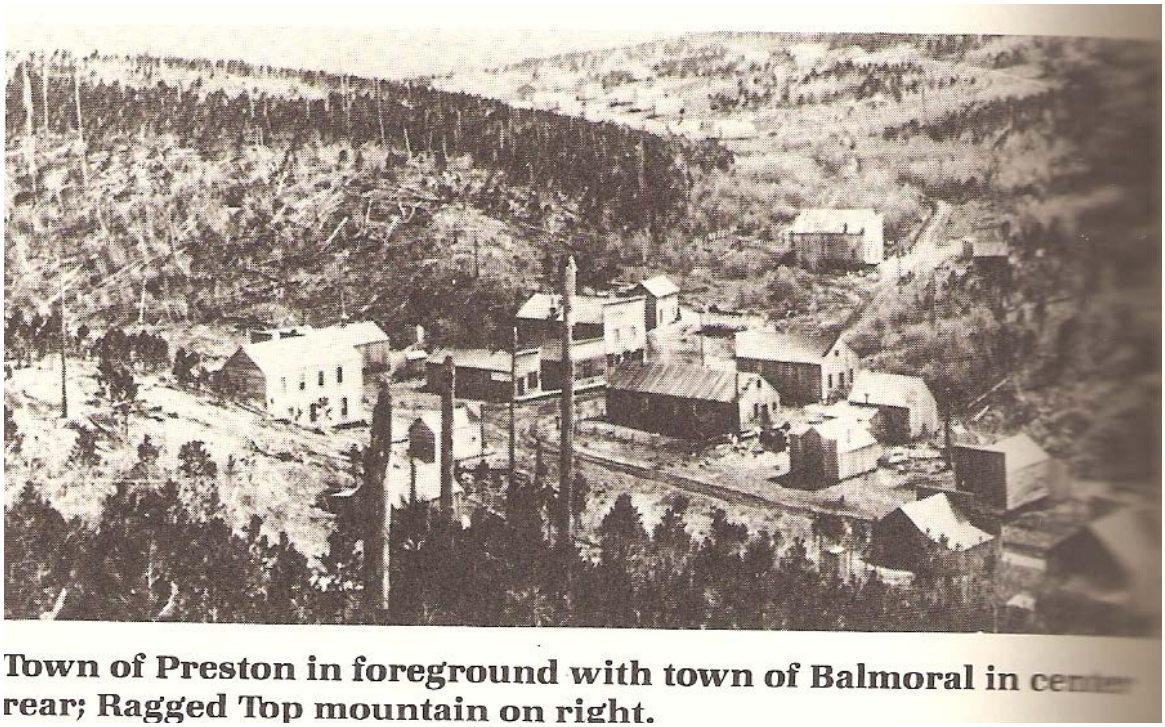


(Everton photo)

The remains of the Cleopatra Mill in the 1970's

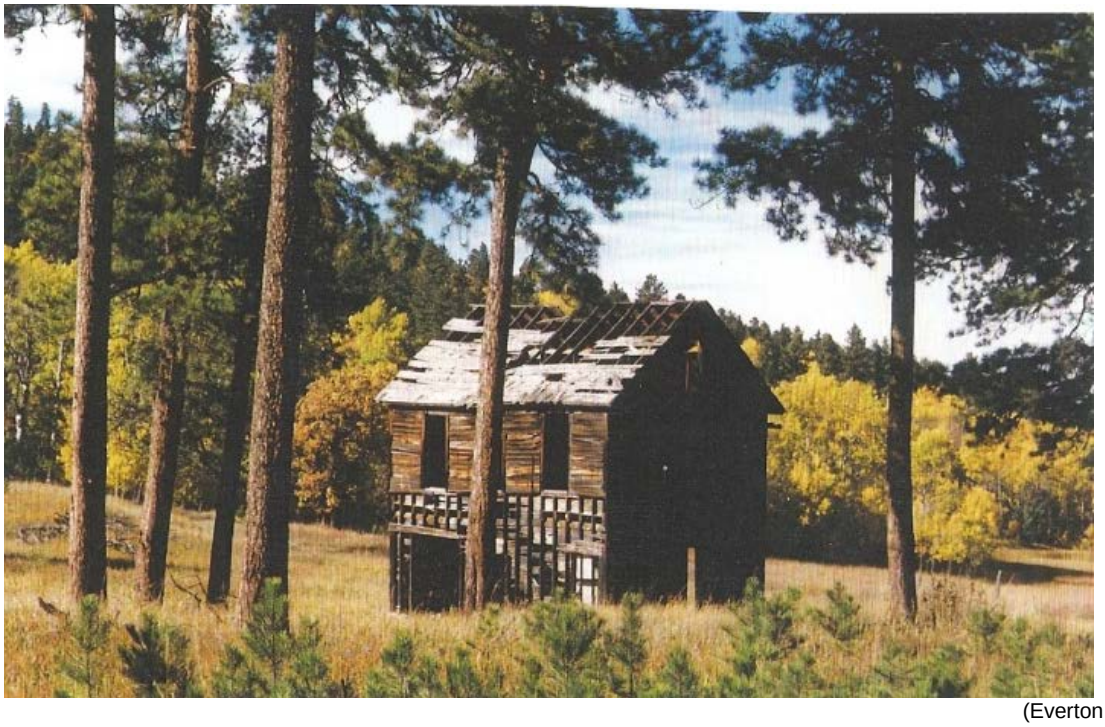
Preston and Balmoral, and the Spearfish Gold Mining and Reduction Company and Deadwood Standard Gold Mining and Milling Company

Another area of mining on the east side of Spearfish Canyon was the Ragged Top District. The area included the Mining Camps of Preston and Balmoral, the Spearfish Gold Mining and Reduction Company and the Deadwood Standard Gold Mining Company.



Town of Preston in foreground with town of Balmoral in cen
rear; Ragged Top mountain on right.

(photo – Joel K. Waterland



(Everton photo)

Preston in the 1990's



(Everton photo)

Preston in 2016

In the Ragged Top area, the mining was conducted in shallow trenches and tunnels as well as shafts and drifts.



(Everton photo)

A shallow trench in the Ragged Top area



(Everton photo)

A collapsed tunnel/trench in the Ragged Top area



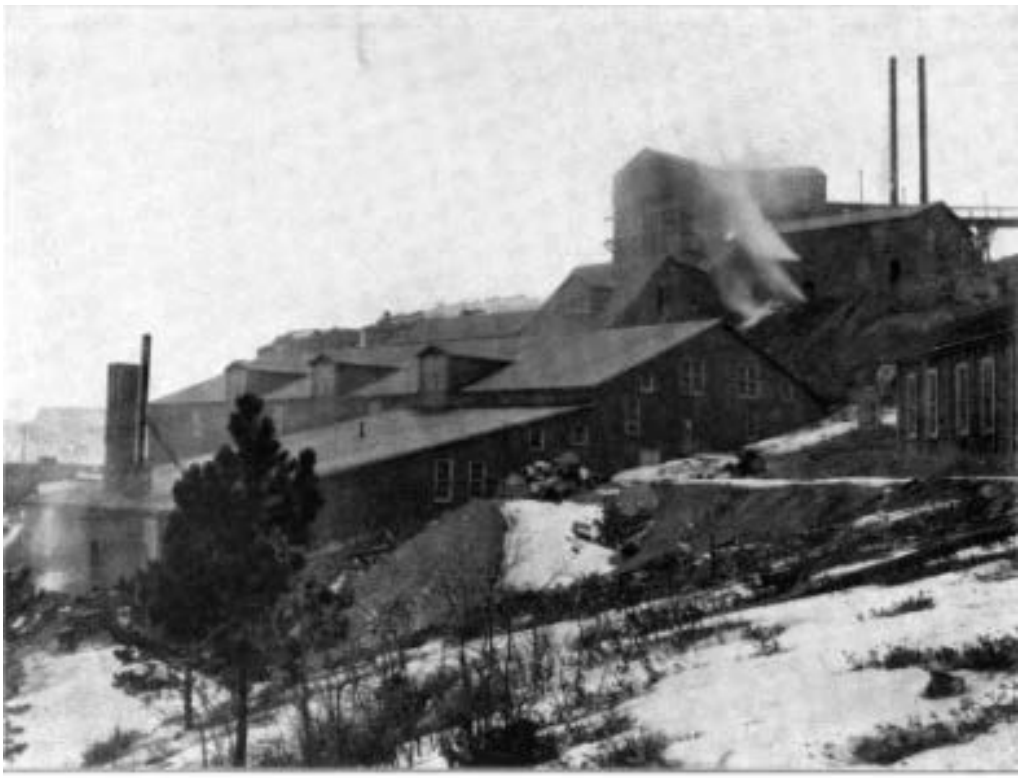
(Everton photo)

Another collapsed tunnel in the Ragged Top area



(Everton photo)

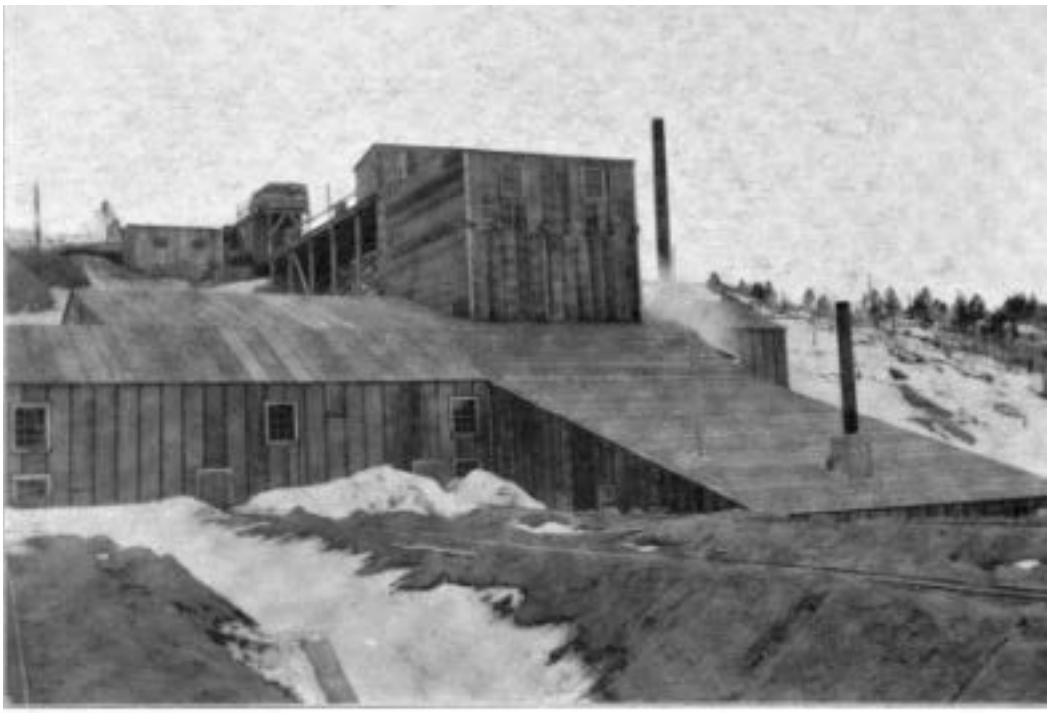
A deep shaft in the Ragged Top area



Spearfish Gold Mining and Reduction Company.

(photo – Black Hills Views)

Both the Spearfih Gold Mining and Reduction Company and the Deadwood Standard Gold Mining and Milling Company built expansive (and expensive) mills in the Ragged Top area, however, gold deposits were not very extensive in the area, and these mill never did process very much ore.



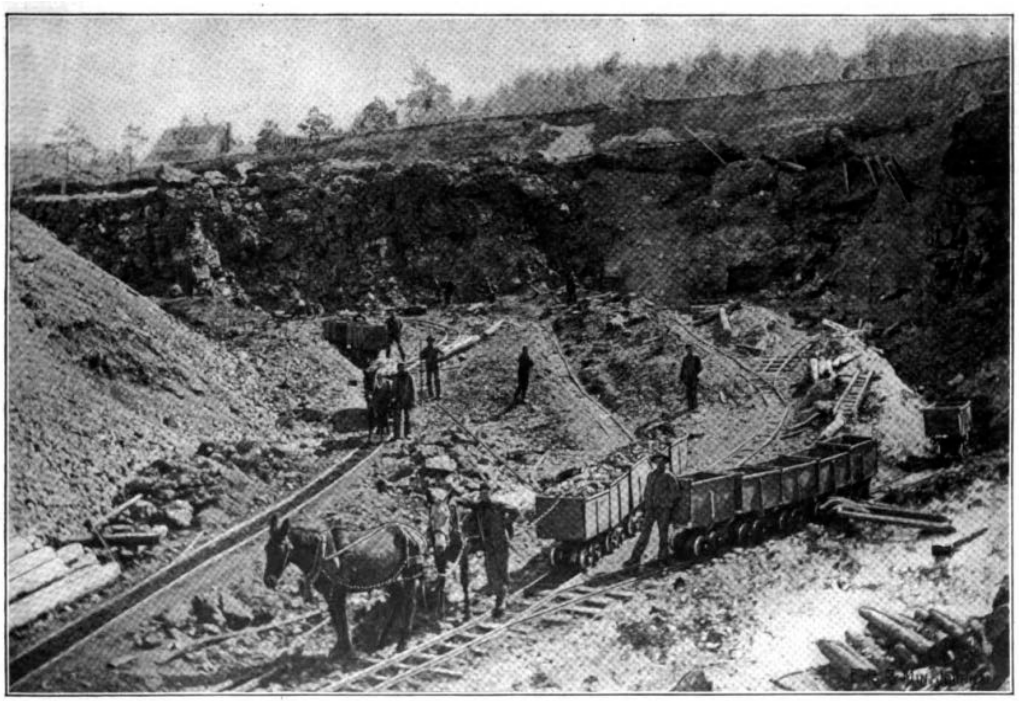
Deadwood Standard Gold Mining and Milling Company.

(photo – Black Hills Views)

Yellow Creek and the Wasp No. 2 Mine and Mill

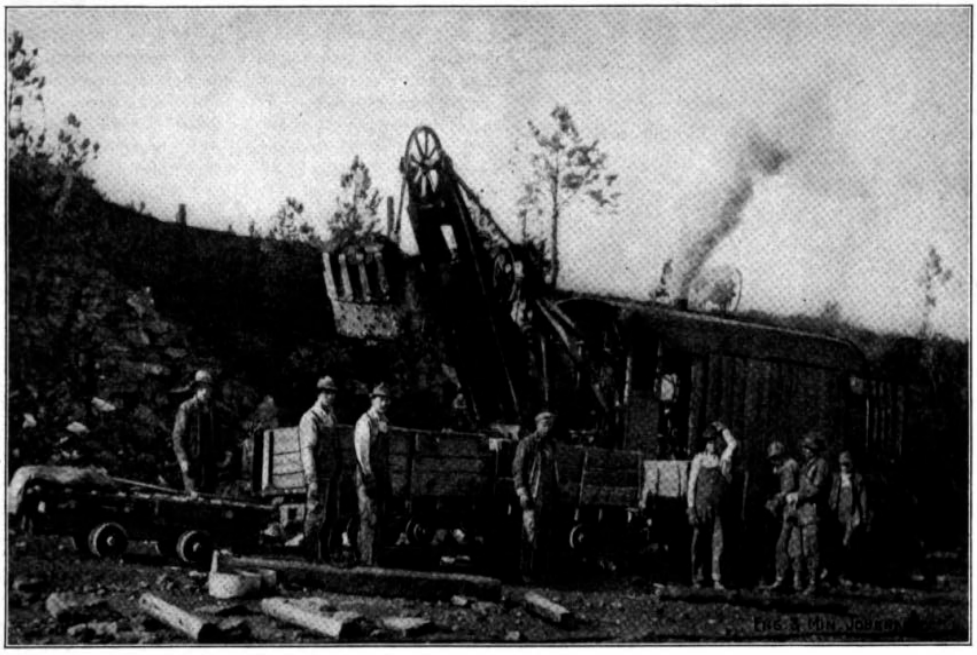
In 1881 the McShane Brothers were prospecting along Yellow Creek south of Lead. They found a substantial area of gold above the creek, and started an open-pit mining operation. This mine, named the Wasp No. 2, became one of the most profitable mines within the Black Hills Mining District.

This area was unique for two reasons; the first was this was the only mine in the Black Hills that was mined entirely with the open-pit method; the second was that this company was the only one in the Black Hills that employed a steam shovel to remove the overburden rock.



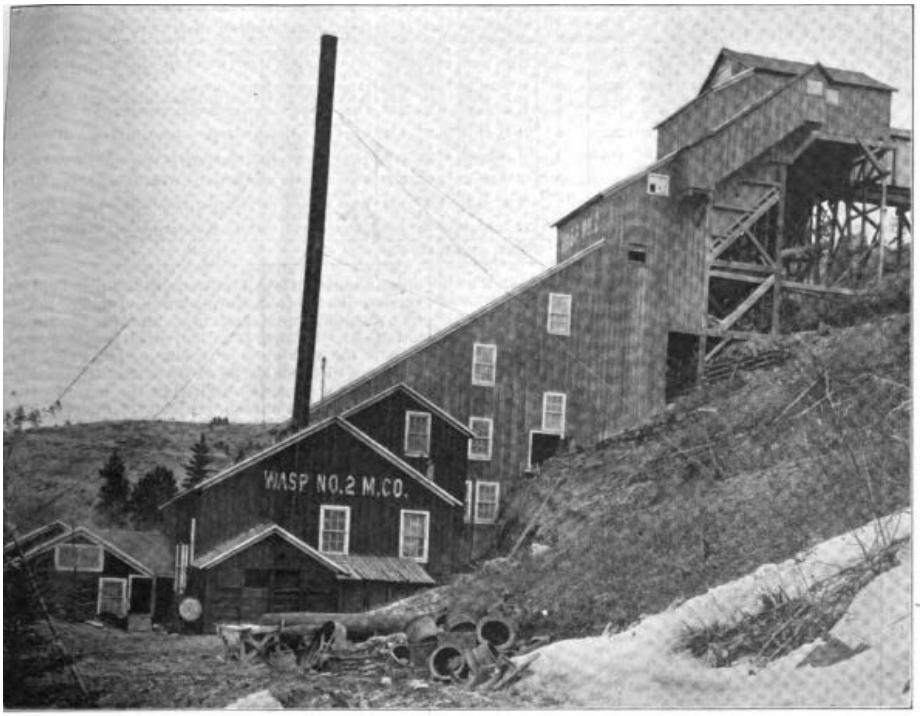
TRAMMING ORE FROM THE SOUTH SIDE OF THE WASP OPENCUT

(both photos – The Engineering and Mining Journal)



STEAM SHOVEL USED IN STRIPPING THE OVERBURDEN AT THE WASP NO. 2

The Wasp No. 2 was mined for gold in the beginning, and was one of the first and only companies in the Hills to find and implement a successful method of cyanide extraction of gold from low-grade ore. This was the first mill or processing plant on the Wasp No. 2 property.

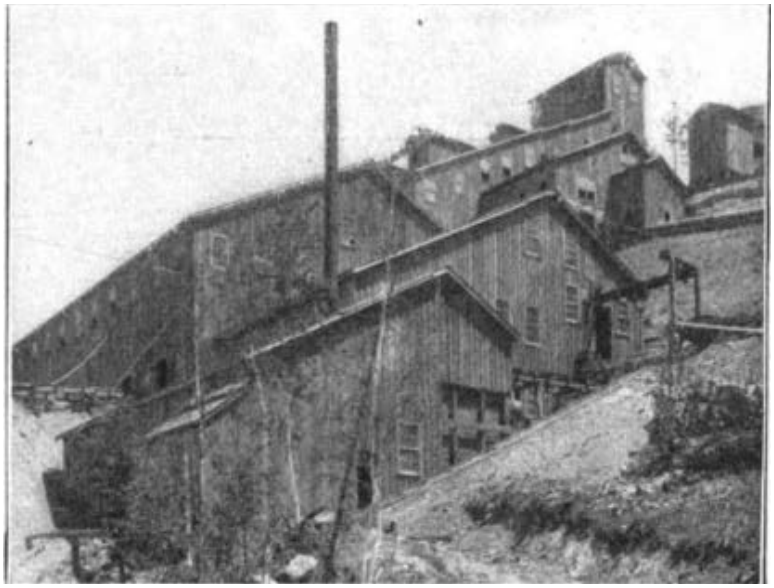


Mill of the Wasp No. 2 Co., Near Kirk, South Dakota.

(photo – Mining and Scientific Press)

Wasp No. 2 cyanide processing mill in 1905

This mill burned in 1910, and a second processing plant was built on the property. This second mill was updated in 1914-1915 to process the wolframite (tungsten) that was found on the property. The discovery of tungsten allowed the Wasp No. 2 to run for several more years as the gold ore deposits were pretty much exhausted.



(photo – The Engineering and Mining Journal)

The second processing plant at Wasp No. 2



(Everton photo)

The remains of the Wasp No. 2 mill in 2017

The Wasp No. 2 was permanently closed in 1917, and the area became the property of Homestake Mining Company. The large and extensive open-cut area was used for a number of years by the City of Lead as a refuse dump, and the open pit area has been filled in and reclaimed.

A small mining camp known as Flatiron was located to the south of the open pit mine, and a few foundations, depressions and some lumber piles are still visible in this area.

A second mining company, first known as the Little Blue Fraction, then as the Bismark Consolidated, was also located in the Yellow Creek area, just north of the Wasp No. 2.



BISMARK MILL, WITH WASP NO. 2 IN BACKGROUND

(photo – The Engineering and Mining Journal)

Galena

Another area of extensive mining in the northern Black Hills was located along Bear Butte Creek, Upper or Little Strawberry Creek, and in Butcher Gulch. This area was known as the Bear (Bare) Butte Mining District, and the mining camp of Galena was the major processing area for the silver (galena) ores that were mined here. Mines in this area included the Gilt Edge Maid, the Sitting Bull, the Branch Mint and the Florence. Mines in the Bear Butte Creek and Butcher Gulch area where gold was found included the Golden Crest, the Hoodoo, and the Anchor Mountain.



Silver was found in the Bear (Bare) Butte Creek area in 1877, however, the area was not extensively prospected until the next year.

In February 1880 ***The Engineering and Mining Journal*** reported this on the Florence Mine in Galena:

We condense as below from the Black Hills *Pioneer*:

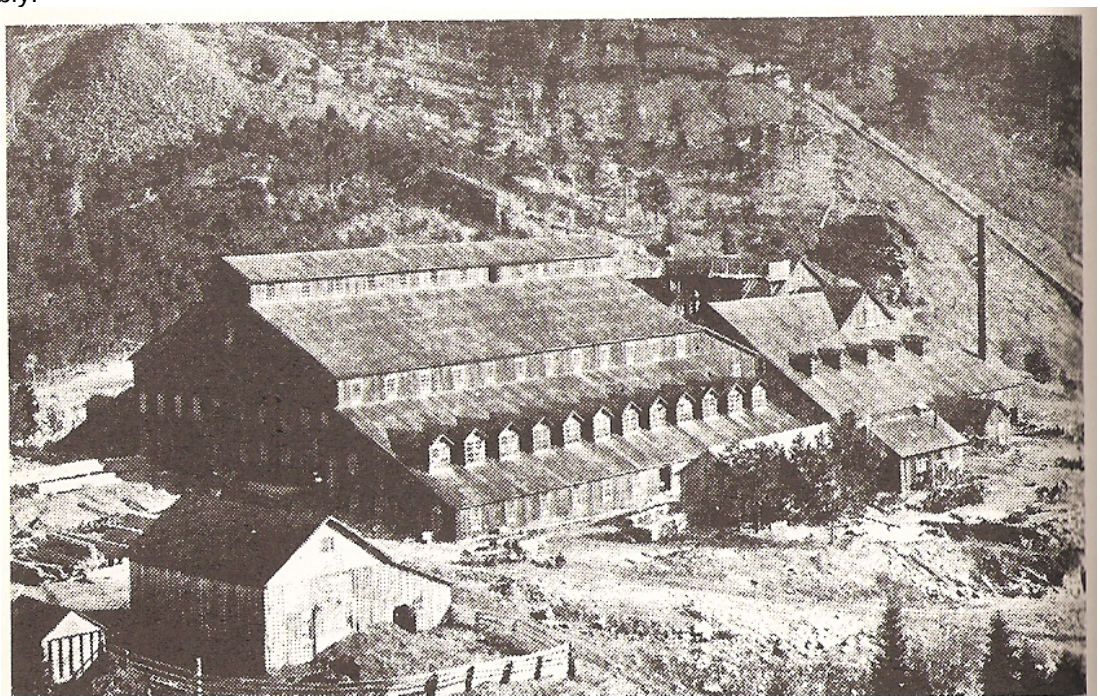
BEAR BUTTE DISTRICT.

FLORENCE MINING COMPANY.—The plant of this company is kept at work exclusively upon the ore of its own mine. At the Florence mill, each alternate day, a brick is made that weighs from 1000 to 1300 ounces of fine silver. Ten stamps are now at work, with ten more about to be hung. The developments on the Florence lode consist of a tunnel running into the mountain 800 feet horizontally, a shaft 98 feet deep at 450 feet from the mouth of the tunnel, and a number of cross-cuts and drifts, most of which have been continuously through pay-ore. The company also owns five placer claims on Bear Butte Creek. Water is brought to the stamp-mill through a covered sluice-way over half a mile in length. The engine is of 200 horse-power. The capital stock of the company has recently been increased from $150,000 to $300,000 for the purpose of more rapidly developing the mine and adding to the capacity of the mills.

And in July 1880 this was reported in the ***EM&J:***

Galena was at one time supposed to be the bonanza camp of the Hills. People left Deadwood to secure town lots there; now it is literally dead and half deserted.

Several mines were opened up, worked for a short time, and then closed or idled in the Galena area. Several large mills were built and operated, again for a short time and sometimes not very profitably.



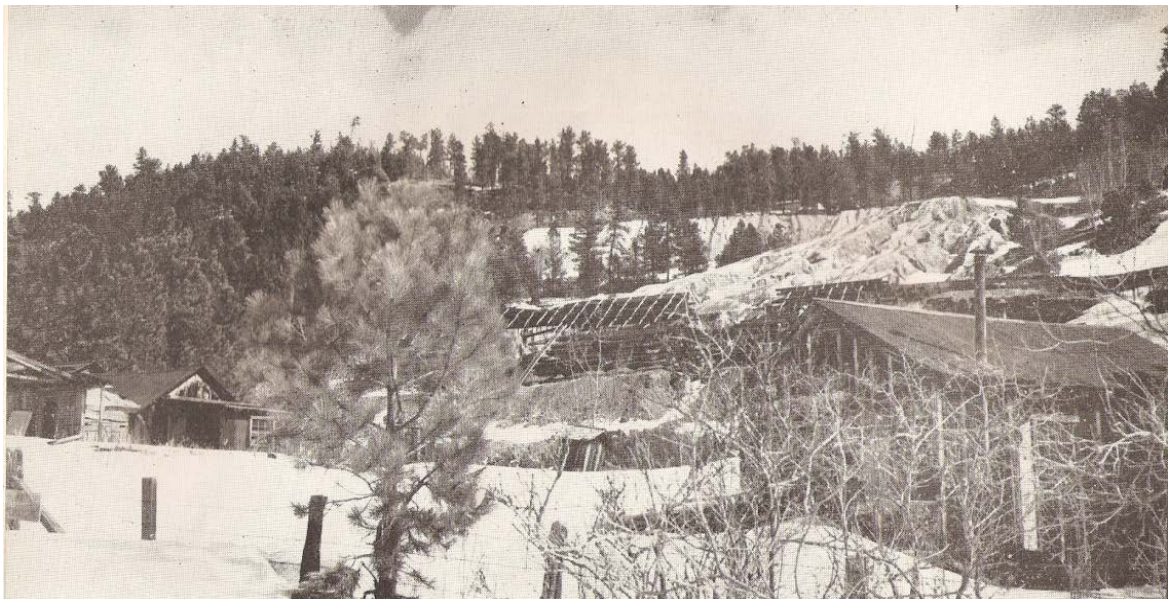
(photo – Jesse Simmons)

The Branch Mint Mill in Galena



(photo – SDSM&T Black Hills Views)

The Gilt Edge Maid Mill in 1906



(photo – Homestake Sharp Bits)

The Gilt Edge Maid Mill remains in the early 1960's

None of the mines and mills in the Galena area were ever really profitable, although there was a miner (Walsh) who discovered and sold the Anchor Mountain Mine, took the money he had made from this transaction, and went to Colorado and became a millionaire.



This Everton photo shows the arrastra that is still standing at the Anchor Mountain Mine. This is the only arrastra known to be still intact in the Black Hills. Note the grinding stone with the hole in it in the center of the arrastra. An arrastra was one of the first methods used to process ores in the Black Hills. This arrastra would have been filled with water and gold ore, and with the grindstones laying flat on the bottom there would have been some method used (horse, steam etc.) to drag the stones in a circle around the arrastra to break up the gold ore. When sufficently ground, the water would have been drained out (note the pipes at the top of the photo) and the grinding stones removed to get to the gold at the bottom of the arrastra.

The profitibility of mines in the Black Hills and fraudulent mining schemes

Profitability was the biggest problem with Black Hills Mining; unless you owned or were invested in the Homestake, the Wasp No. 2, or the Trojan Mining Companies, you did not get rich mining in the Black Hills, mainly because the mineralization in all but a few select areas was not extensive enough to make anyone but a lucky few wealthy.

However, the fact that the Black Hills did have a number of areas of mineralization made this area one of the most 'productive' mining areas in North American for swindlers and scammers. During the late 1800;s and early 1900's there were numerous investors with 'money to burn' living on especially the east coast. A prospector could locate a promising mine, develop it enough to make it interesting for an investor, take some ore (not necessarily from that particular mine) back east to show the people with money, and sell the mine (sometimes for a pretty good profit). Most of the time the investors never saw the mine, and relied on the prospector or a local person to manage and handle the day to day operations of the mine. Most of the time this 'manager' was either a swindler himself, or had little or no knowledge of mining operations, and the company would be bankrupt or would have to shut down in only a short time.

In his book ***Golden Days in the Black Hills*** Carl Leedy (the "Old Timer") states: 'Fraudulent stock-selling schemes hurt the mining business in the Black Hills. There were many good, reputable mining men here, but, for every legitimate mining operation, there were two who would sell thousands of dollars in mining stock, not intending to do anything but keep the money. Bob Flormann was probably the most notorious swindler in this business. He was always at it. One of his big projects was the Greenwood Mine near Nemo. By exchanging sample ore bags, he was able to send rich samples back east to be assayed and, on the strength of these false samples sold more than a half a million dollars' worth of stock. His principal benefactor was an ex-postmaster in Chicago (Laflin). They had a celebration when the mine opened, but in two months they were through – and Bob Flormann started on a new (mining scheme).' It was rumored that Flormann had investments in Galena, although none can be substantiated. It would stand to reason that he did, however, as he had 'investments' all over the Hills.

Another Black Hills mining profiteer was James Hardin. He and his brother started in the mining business in the Two Bit Creek area of the Black Hills, and sold the mine to Eastern Investors. James Hardin decided that he could make more money promoting and raising investment money for other mining companies instead of digging in the ground for it, and he assembled a 'syndicate' of investors from Chicago, Omaha and Milwaukee and used the money to invest in numerous mines in the Black Hills, including the Branch Mint in Galena. In somewhat of a mining scheme, he spent $500,000 on the construction of the Branch Mint and other features at the mill, and was supposed to sell treasury stock to pay for the construction. Instead, he sold his own stock (the investors money), and loaned the proceeds to the company. When the company shut down, he filed a lien against the company for his money, but the company never recovered and neither did Hardin. This was the start of the downfall of the mining camp of Galena.

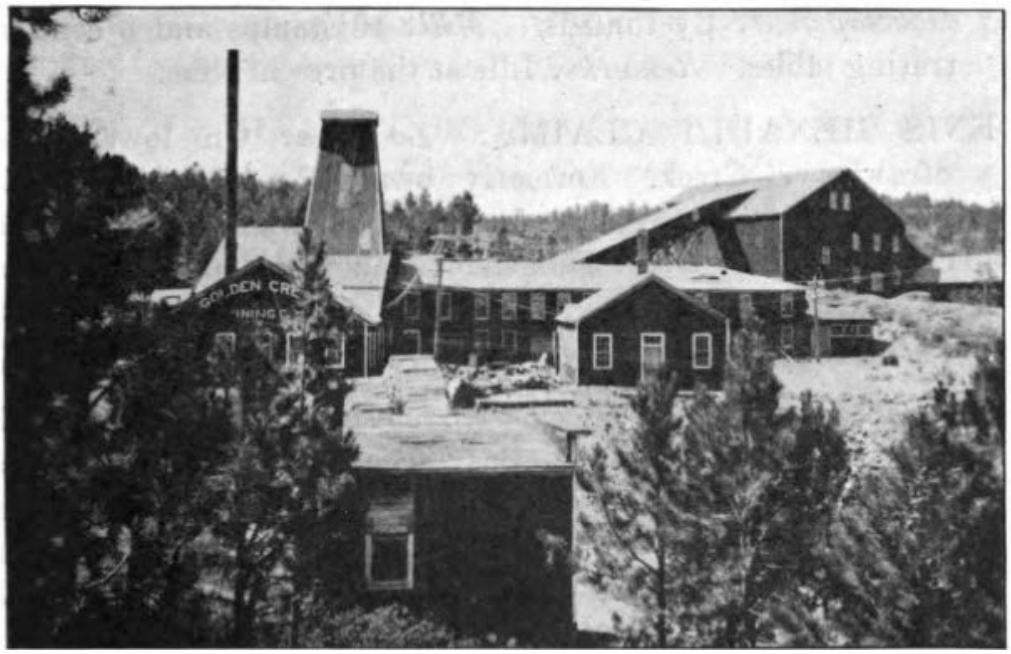
The Galena area was prospected sporadically until the 19-teens. The war also shut down the mining in the this area, and again, because of low gold and silver prices, it was not profitable to re-open any of the mines.

In the late 1930's and early 1940's during the re-newed period of interest in gold and gold mining in the Black Hills, the Golden Crest or Deadwood Gold Incorporated Mine was re-opened for a short time. Ken Stewart, historian and archivist for the South Dakota State Historical Society, lived on this property for a time. In the 1970's a fire destroyed the mill, and vandals destroyed most of the other structures.

Information from the 1937 SDSM&T Bulletin No. 17: *The Mining Industry of South Dakota*

DEADWOOD GOLD, INCORPORATED: Formerly the Golden Crest Consolidated Mining Co. ***Location:*** **8 miles southeast of Deadwood, in the Whitewood Mining District.** ***Officers:*** **R. Kenneth Lee, President; George W. Pitts, Gen. Motors Bldg., Detroit, Mich., Secretary and Treasurer.** ***Capi-***

tal Stock: 100,000 shares of $10 par value, all issued. *Property:* 6 patented claims and 9 unpatented claims. *Type of Deposit:* Porphyry ore and replacement in Cambrian sediments. *Ore:* Gold and some Silver. *Mine Plant:* Electric hoist, compressor, drills, pump, track and cars. *Buildings:* Fully equipped assay office, mine office, blacksmith shop, bunk house and boarding house. *Mill:* 300-ton cyanide plant. *Power:* Electric from Consolidated Line. *Development:* 330′ shaft and approximately 4,500′ of drifting and crosscutting. *Remarks:* Exploration and sampling at present time.

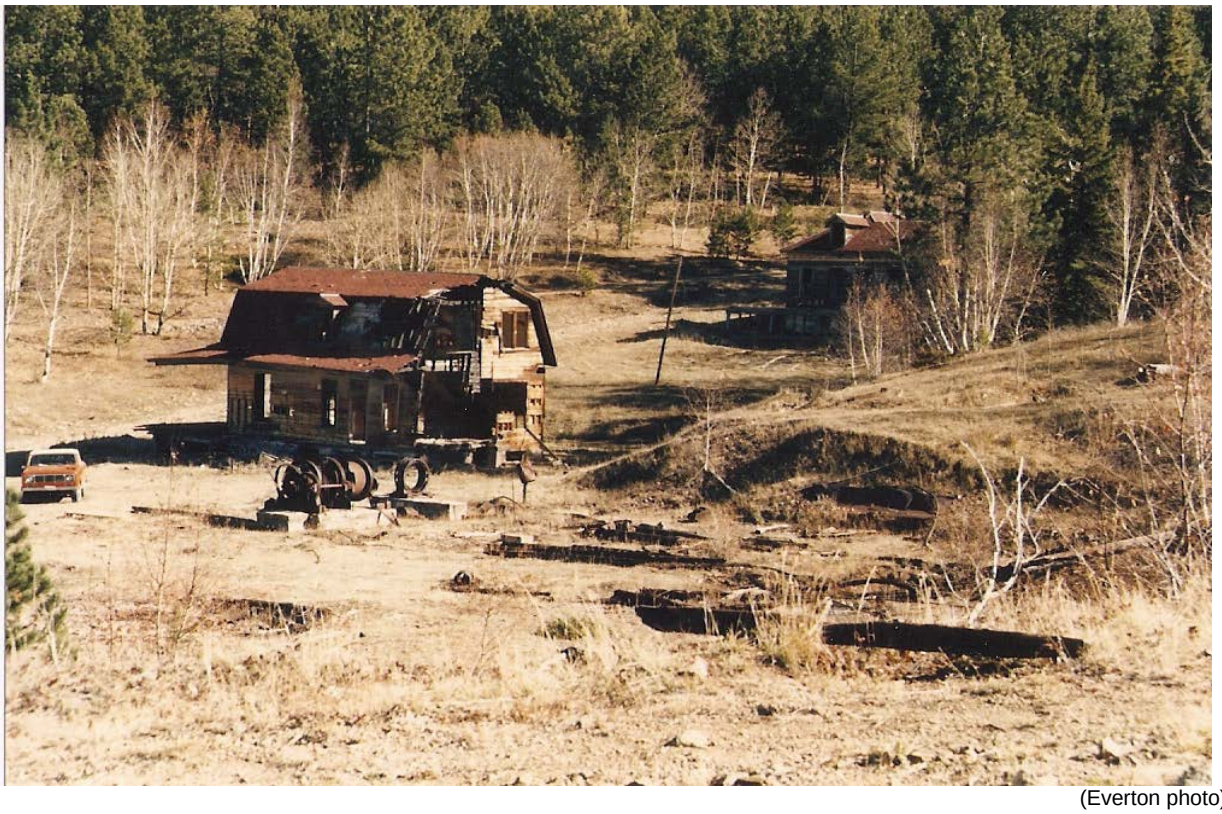


The Deadwood Gold, Incorporated (Golden Crest) property in 1937



(photo – Homestake Sharp Bits)

The Commonwealth Gold Company (Deadwood Gold, Inc./Golden Crest) property in the 1960's



(Everton photo)

The Golden Crest/Commonwealth property in 1988



(Everton photo)

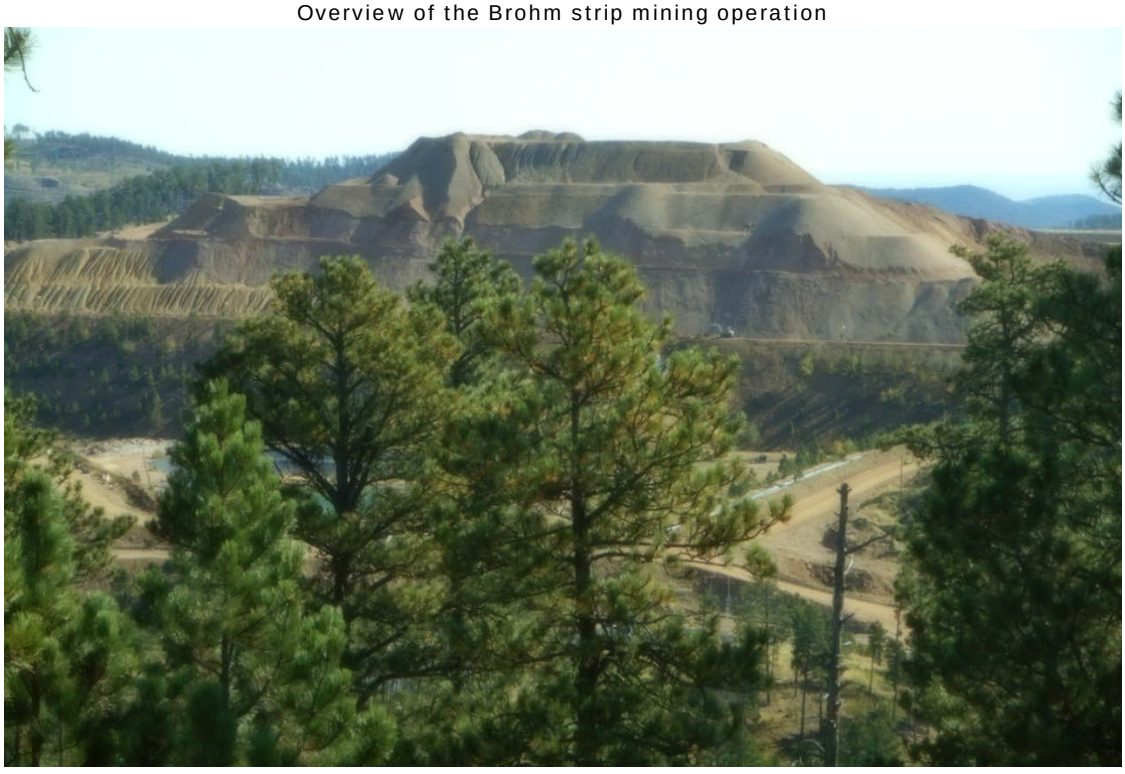
The mill at the Golden Crest/Commonwealth burned in the 1970's. These are the stamp banks.

In the 1980's the Brohm Mining Company strip mined in the Gilt Edge area.



(Everton photos)

Overview of the Brohm strip mining operation



The town of Galena still boasts several residents (mostly in the summer), and one or two of the mines are still being ‘hobby prospected’ in the area.

(all Everton photos - 1995)



Galena’s ‘Main Street’



Two of Galenas oldest structures



The first structure erected in Galena

Other Northern Hills Areas

The northern Black Hills was where the majority of Black Hills mining occurred. There were several areas in the northern Hills where mining was conducted on either a limited scale or very sporadically. One of these areas was in the Maitland/Garden City area. Another was in the Two Bit and Spruce Gulch areas.

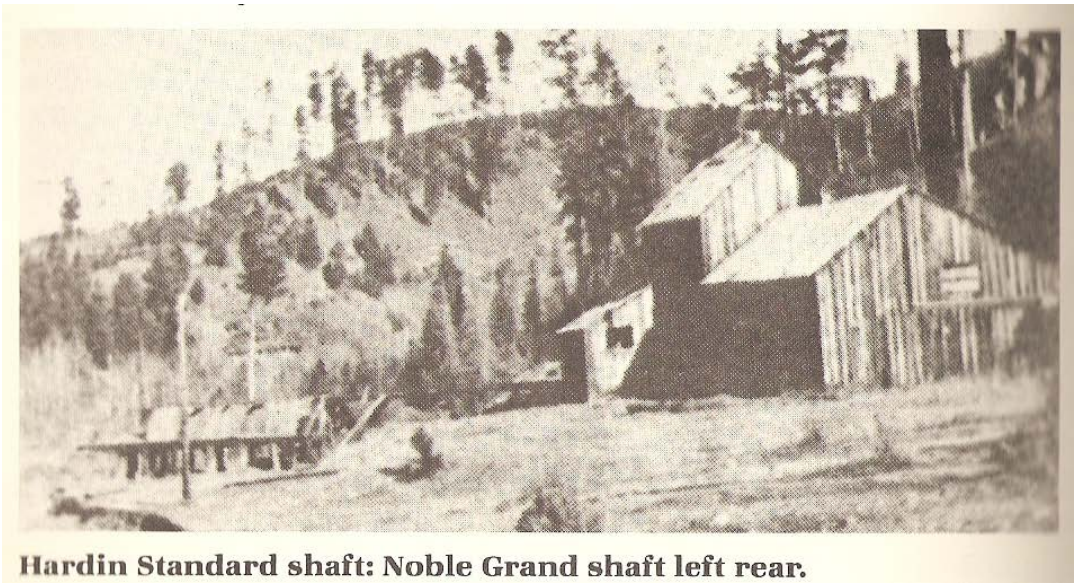
Maitland



BEFORE A RECENT FIRE, this was how Canyon Corporation's property at Maitland looked (in 1953). This corporation operated the gold-silver producer from 1934 until War Production Board order L-208 suspended all U. S. gold mining operations in 1942. They never reopened. This property was first known in 1902 as the Penobscot Gold Mining Company, from 1904 to 1906 as the Alexander Maitland Company, and as the North Homestake Company from 1907 to 1911. From 1912 to 1915 other interests sank a shaft 600 feet into a different rock formation (than previously mined) and did extensive but unsuccessful exploration work.

(photo – Homestake Sharp Bits)

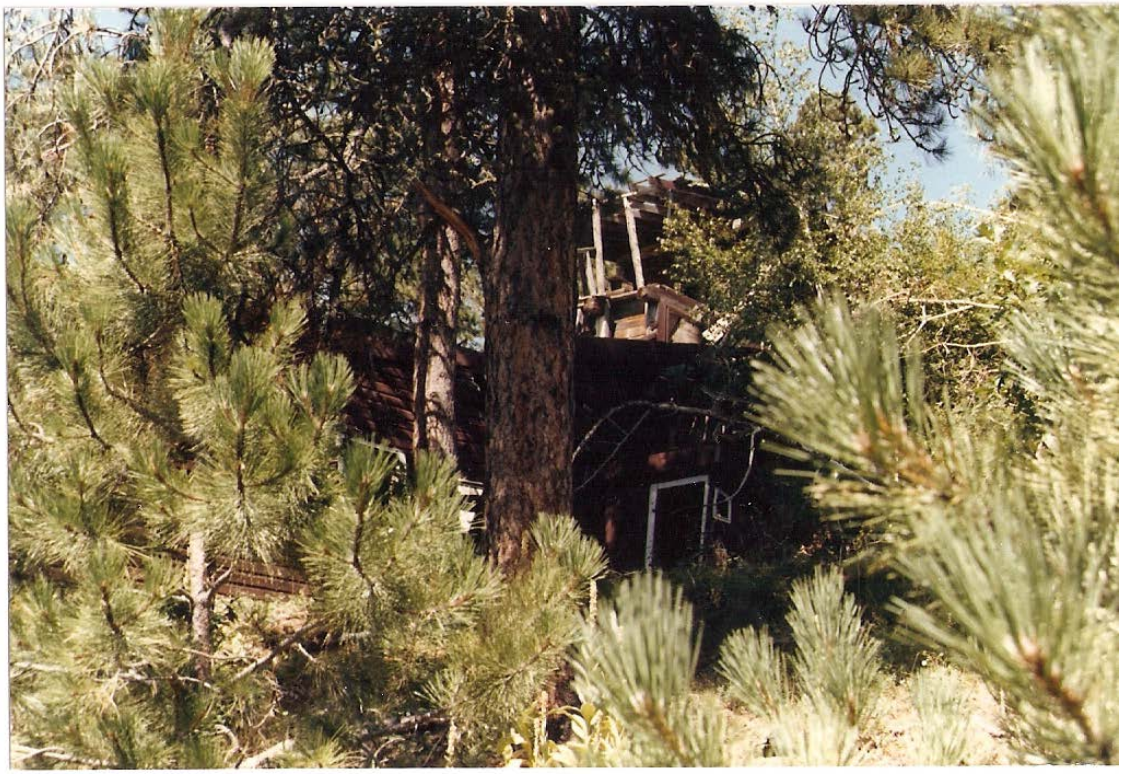
Two Bit Gulch - Hardin



Hardin Standard shaft: Noble Grand shaft left rear.

(photo - Joel K. Waterland)

The James and Charles Hardin gold mining property in Spruce Gulch.



(Everton photo)

The Hardn property in Two Bit Gulch in the 1980's

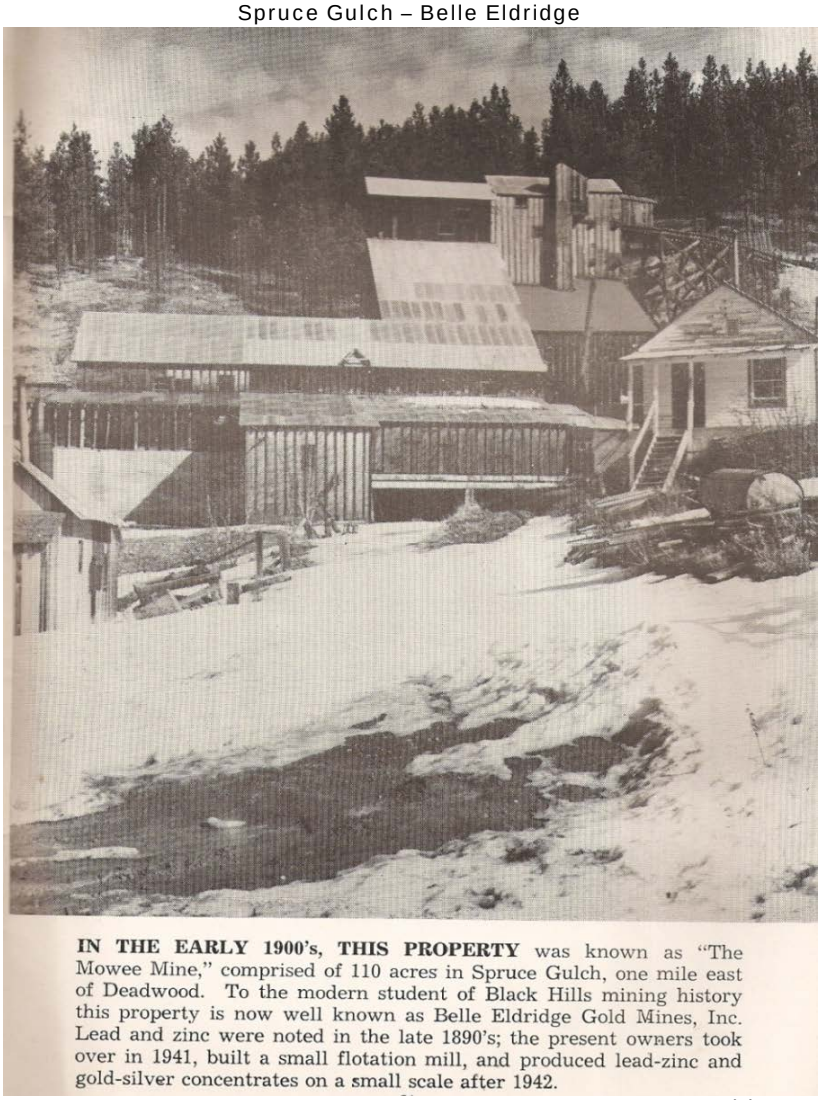
Spruce Gulch – Lexington Hill



(photo – Mining & Scientific Press)

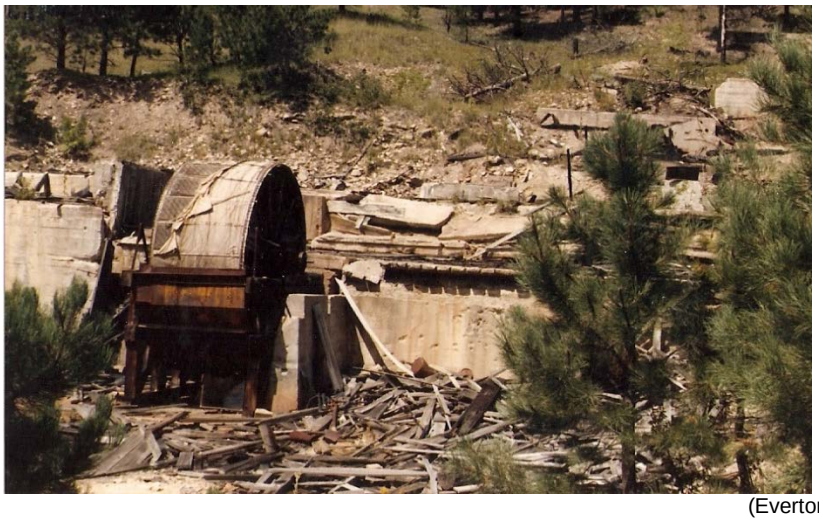
The Lexington Hill Mill in Spruce Gulch. This was one of the first mills in Spruce Gulch

Spruce Gulch – Belle Eldridge



IN THE EARLY 1900's, THIS PROPERTY was known as "The Mowee Mine," comprised of 110 acres in Spruce Gulch, one mile east of Deadwood. To the modern student of Black Hills mining history this property is now well known as Belle Eldridge Gold Mines, Inc. Lead and zinc were noted in the late 1890's; the present owners took over in 1941, built a small flotation mill, and produced lead-zinc and gold-silver concentrates on a small scale after 1942.

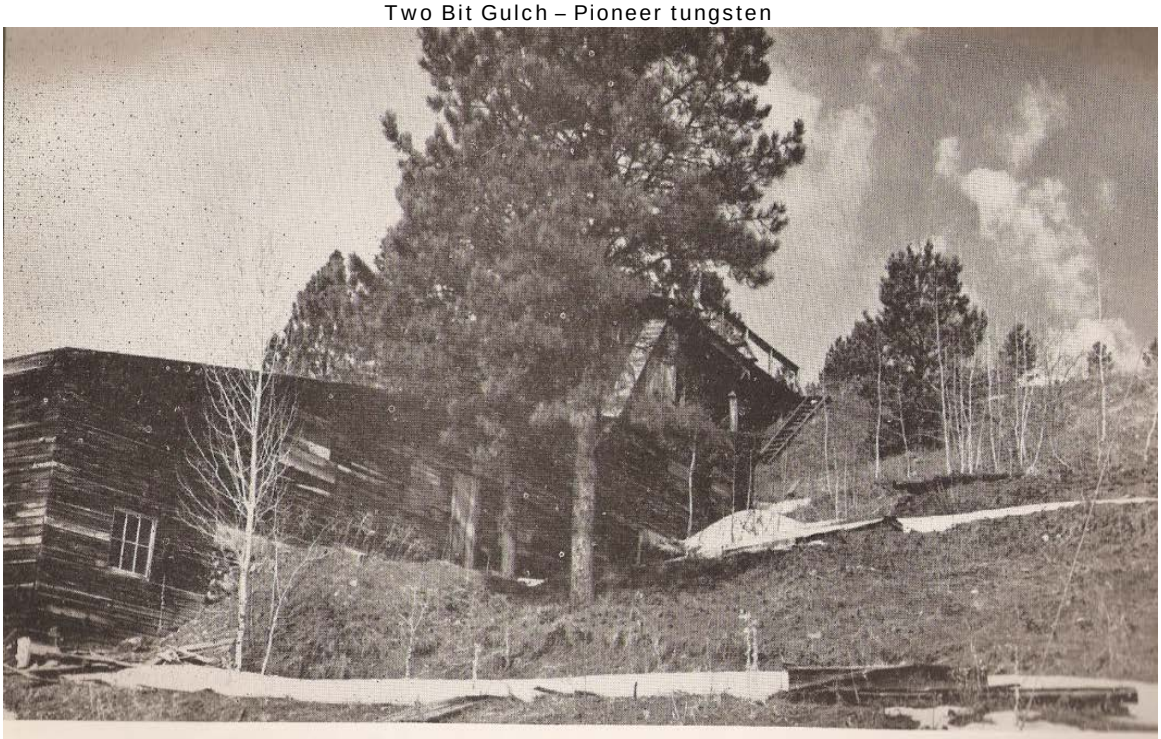
(photo – Homestake Sharp Bits)



(Everton photo)

Remains of the Belle Eldridge flotation mill in the 1980's

Two Bit Gulch – Pioneer tungsten



A TUNGSTEN PROPERTY near the top of Strawberry Hill, on Two Bit Creek, consisted of several claims. This group of claims was taken over in 1941 or 1942 by Pioneer Tungsten Mines, Inc., and a 30-ton mill was built on the Mary claim. This photo was taken in March 1960.

(photo – Homestake Sharp Bits)



(Everton photo)

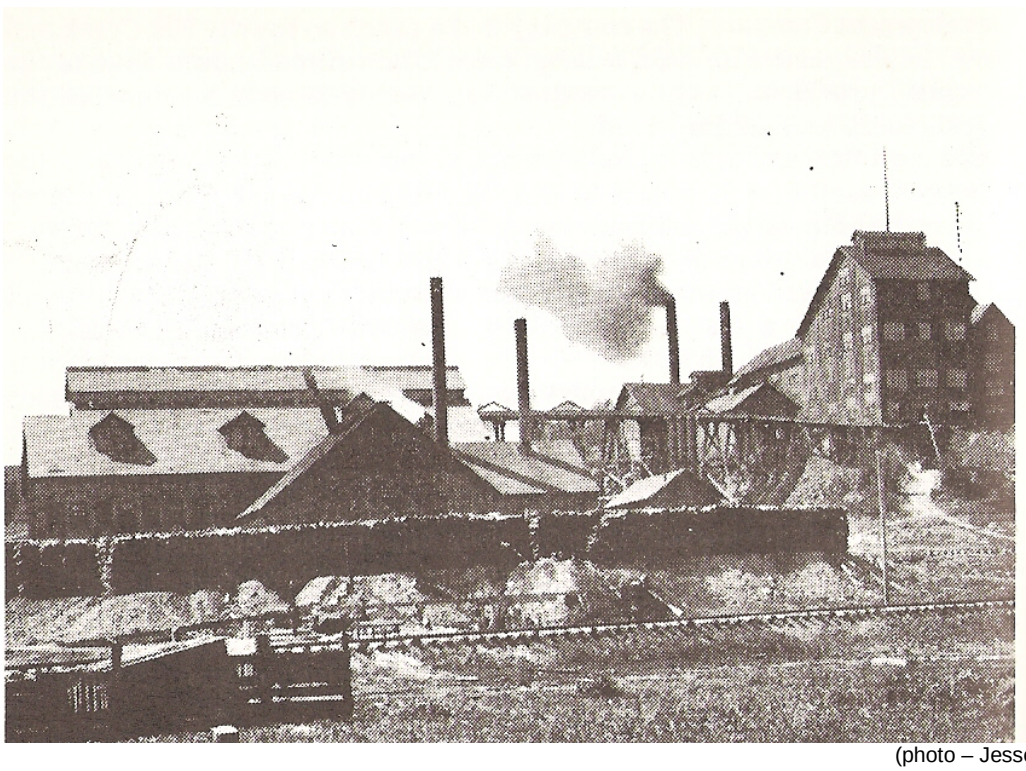
Pioneer Tungsten mill in 1991

A third area was the **Uncle Sam/Clover Leaf/Anaconda Mine** located on Box Elder Creek in the mining camp of Roubaix.



Roubaix, South Dakota, 1903, showing the Uncle Sam Mine (the Clover Leaf Mine) at upper right. The center row of buildings shows the bunkhouse (a two-story building in the shape of a cross); the hospital (the square white house); and the large dark two-story house which was the Richards' boarding house. Photo by courtesy of Mrs. Wayne Waddell.

The Uncle Sam/Clover Leaf Mine and the Mining Camp of Roubaix in 1903



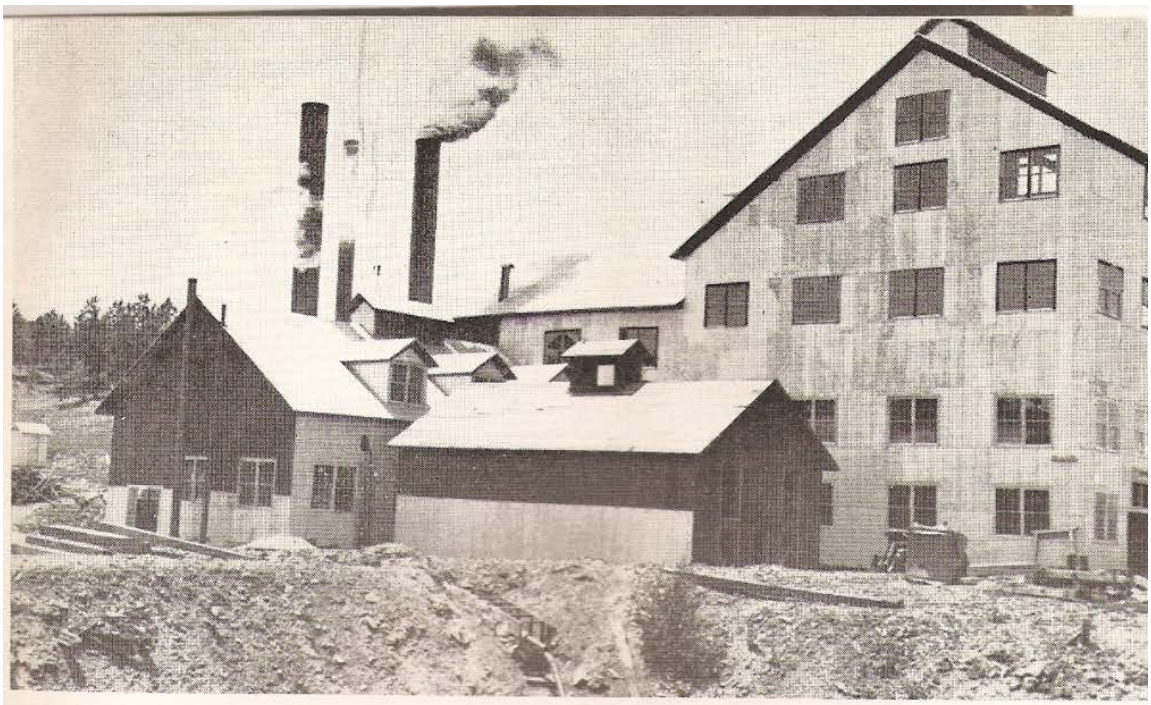
(photo – Jesse Simmons)

The Clover Leaf Mill in 1905 before it closed. Approximately $300,000 was processed through the mill.

In the late 1930's the Anaconda Gold Mining and Milling Company re-opened the mine and refurbished the mill. This information is from the 1937 SDSM&T Bulletin No. 17: *The Mining Industry of South Dakota*

ANACONDA GOLD MINING AND MILLING COMPANY: Formerly the Clover Leaf Mine and Uncle Sam Mine. *Location:* In the Bear Butte Mining District, 12 miles south of Deadwood. *Ownership:* Under lease to Anaconda Gold Mining and Milling Co. *Local Representative:* Martin H. Brede, Lead, S. Dak., President. *Other Officers:* D. M. Patterson, Chamber of Commerce Bldg., Denver, Colo., Secretary. *Incorporated:* South Dakota, Feb. 27, 1928. *Capital Stock:* 2,000,000 shares. *Par Value:* $1.00. *Stock Issued:* 876,000 shares. *Property:* 600 acres unpatented and 1,600 acres patented, including lease and purchase option on Clover Leaf Mine. *Type of Deposit:* Quartz lenses in schist. *Ore:* Gold and some Silver. *Development:* 700′ vertical shaft, 560′ shaft, 6,340′ of drifting and some crosscutting. *Mine Plant:* One first motion 2-drum hoist, 1000′ capacity; one steam winch with 1,500′ of 1″ cable, two Pomona unwatering pumps—1,800 G.P.M. at 200′ and 800 G.P.M. at 350′. *Power:* 500 HP in 2 Diesel units 330 KVA., 650 HP boiler plant with 5 boilers. Daily consumption 200 HP. Source of water is Elk Creek. *Remarks:* Worked 1889-1905 continuously. Development work being done on Clover Leaf Mine at present and ten stamps operating.





THE UNCLE SAM PROPERTY IN 1936 was under lease to the Anaconda Gold Mining and Milling Company. The closeup above shows smoke pouring from the steam boilers at the hoisting plant. The 60-stamp mill was reconditioned more than once throughout the mine's lengthy history. The hoisting plant had Bullock-Corliss engines. Machine and blacksmith shops were on the property, and for a period of time the company operated its own logging and sawmilling department.

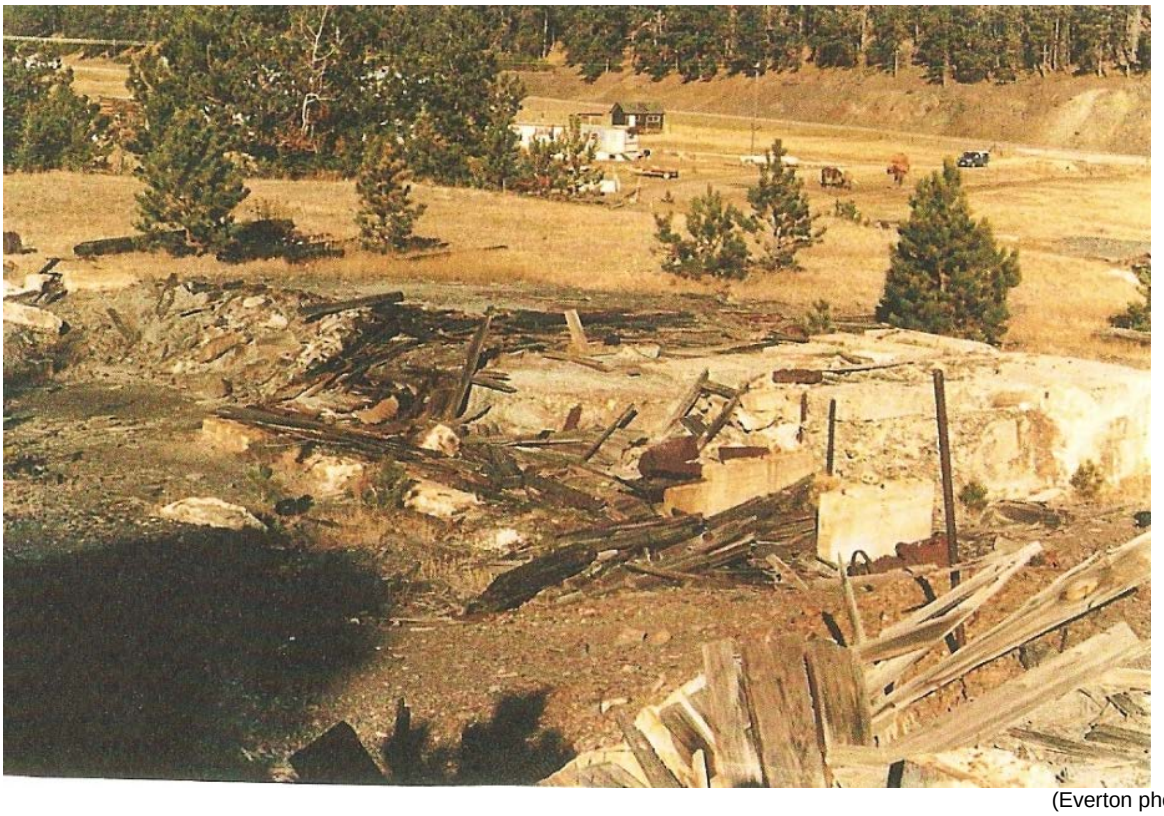


(photo - Homestake Sharp Bits)

The Aaconda property in 1988



(Everton photo)



(Everton photo)

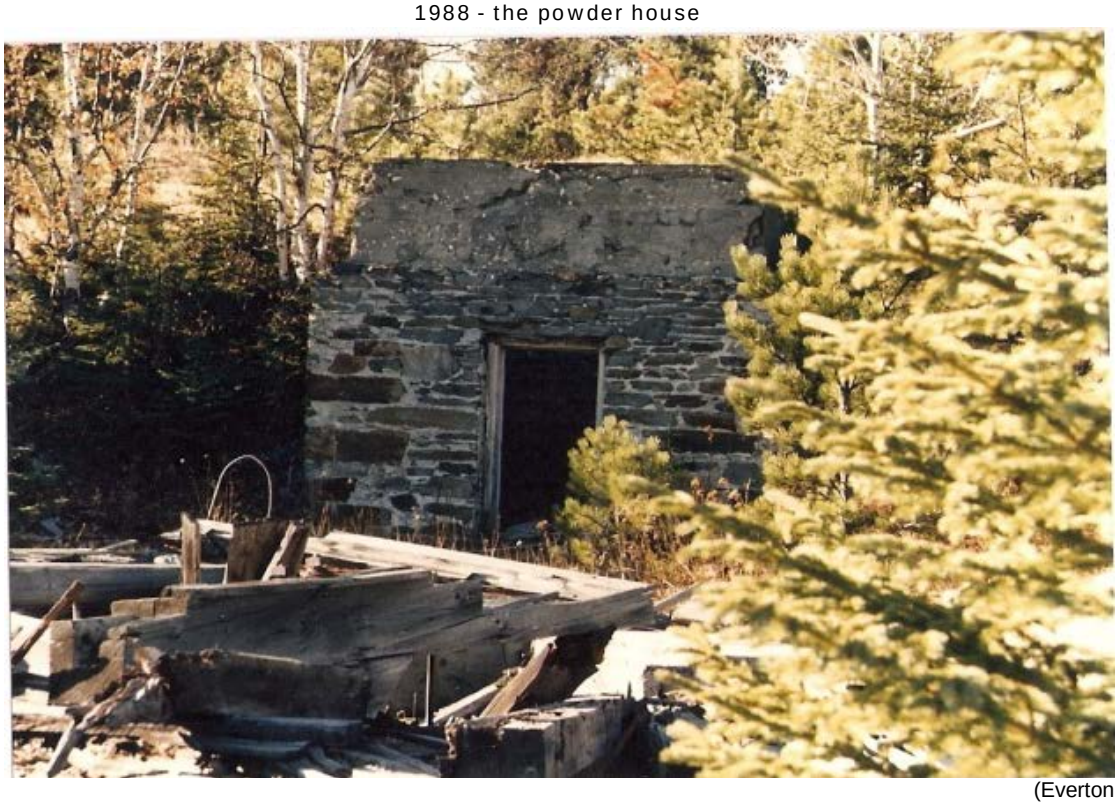


(Everton photo)



(Everton photo)

1988 - the powder house



(Everton photo)



(Everton photo)

2017 overview of the Anaconda property and the mining camp of Roubaix

The Central Black Hills

Mining in the Central Black Hills was not as extensive or profitable as it was in the northern Hills. Areas in the Central Hills where mining was conducted included the Rochford District, Keystone and the Keystone District, Spokane, and the Hill City District. The Central Black Hills was most noted for the Harney Tin mining scandal.

The Rochford District

The Rochford District, which is located about 12 miles south of Lead on (Little) Rapid Creek, was at one time thought to be as rich, or richer, than the Homestake area. As time went on and mines were discovered, worked, and then idled or closed, it became very apparent that the geology of the area was not like anywhere else in the Hills. The formations in the Rochford area and to the west and south of Rochford were folded over themselves, sometimes several times, making it almost impossible to follow any type of vein for any distance. Mines such as the Montana, the Alta Lodi, the King of the West, the Golden West, the Yellow Bird and especially the Standby were all discovered, prospected, and worked sporadically, sometimes for a number of years, however, most of these mines were never big money-makers for their owners, and most never produced enough gold (and in some areas copper) to pay investors or show much of a profit.

The Standby Mine and especially the mill was one of the best-known in the Black Hills. The reason for this is because the remains of the Standby mill stood for many years along Rapid Creek just east of Rochford along Rochford Road, and was one of the most photographed mining structures in the Black Hills. These descriptions of the Standby Mine were reported in the June 1880 ***Engineering and Mining Journal:***

DAKOTA.

STANDBY.—From a full description of this mine and mill, appearing in the *Rapid City Journal* of the 5th inst., we glean the following: The discovery-shaft of the mine goes down from near the summit of a lofty mountain on the south side of the Little Rapid, and about half a mile below the town of Rochford, the trend of the mine being northeasterly and southwesterly. The discovery-shaft is entered by a tunnel, the initial point of which is 100 feet south of the discovery. This tunnel starts in good millable ore, and is run through good millable ore, throughout its extent of 100 feet, and no wall has yet been reached by it. Through this tunnel the ore is run out for delivery at the mill. From this tunnel, where it enters the discovery-shaft, a drift was started which circles around to the southerly wall, and it runs 120 feet through continuous bodies of good millable ore. The mine is tapped by another tunnel, the initial point of which is 400 feet northwest of discovery-shaft, and 130 feet below the croppings of the mine. Rich ore-bodies were encountered 100 feet in, and the tunnel has continued 120 feet through rich ore, and is still in rich ore—the west wall not having been reached. Still another tunnel is being excavated to intersect the vein 200 feet below the surface, or 114 feet below the present lowest development. It is now in 200 feet, and it is believed the vein will be reached in about 130 feet farther tunneling. Night and day forces are engaged in this tunnel; but they are now working in a very obstinate, close-grained rock, and slow progress is being made. Running a lighted candle along the walls of this tunnel showed that the "mother-rock" is talcose and micaceous slate, with dikes of quartzite intervening. The Standby ores run from four to ten dollars to the ton; in other words, they yield a net profit of from three to nine dollars per ton. It is now in contemplation to put 60 additional stamps in operation, which would double this rate. The water-power owned and controlled by the company is equal to running 200 stamps.

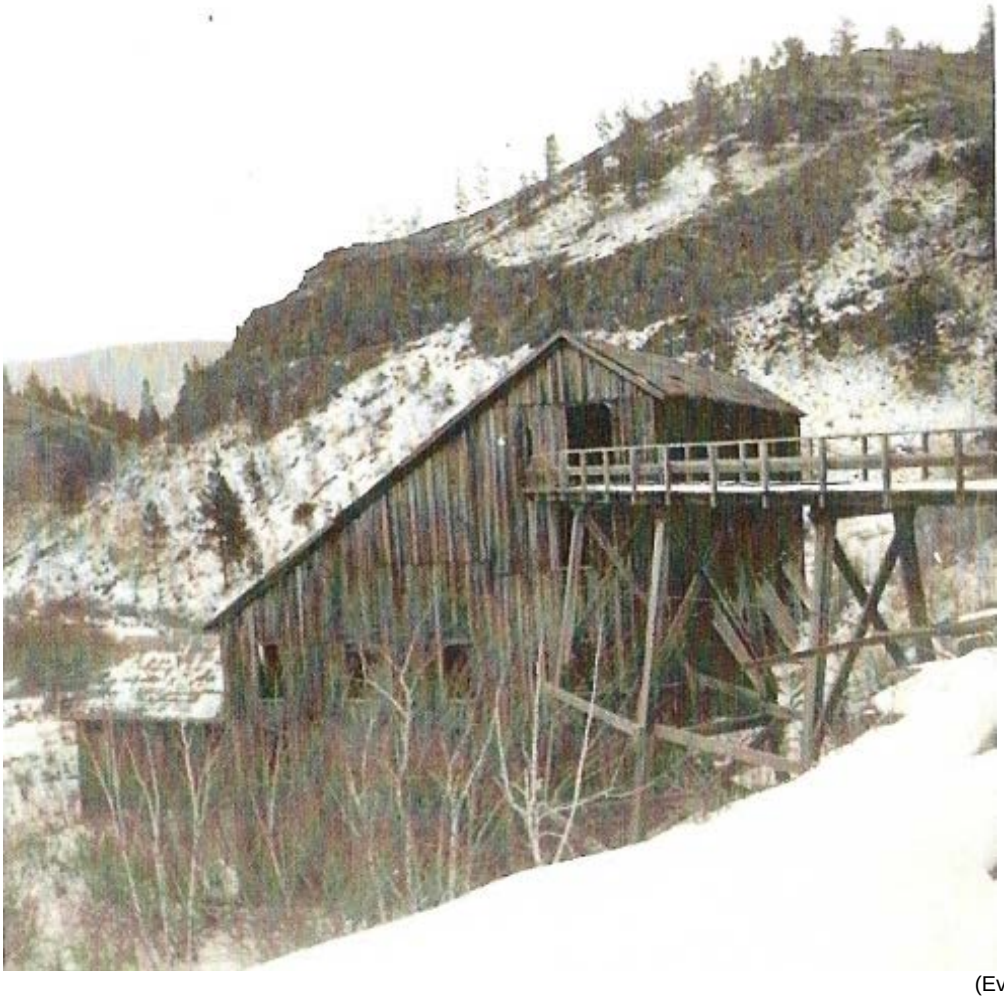
…and in the September 1880 ***Engineering and Mining Journal:***

DAKOTA.

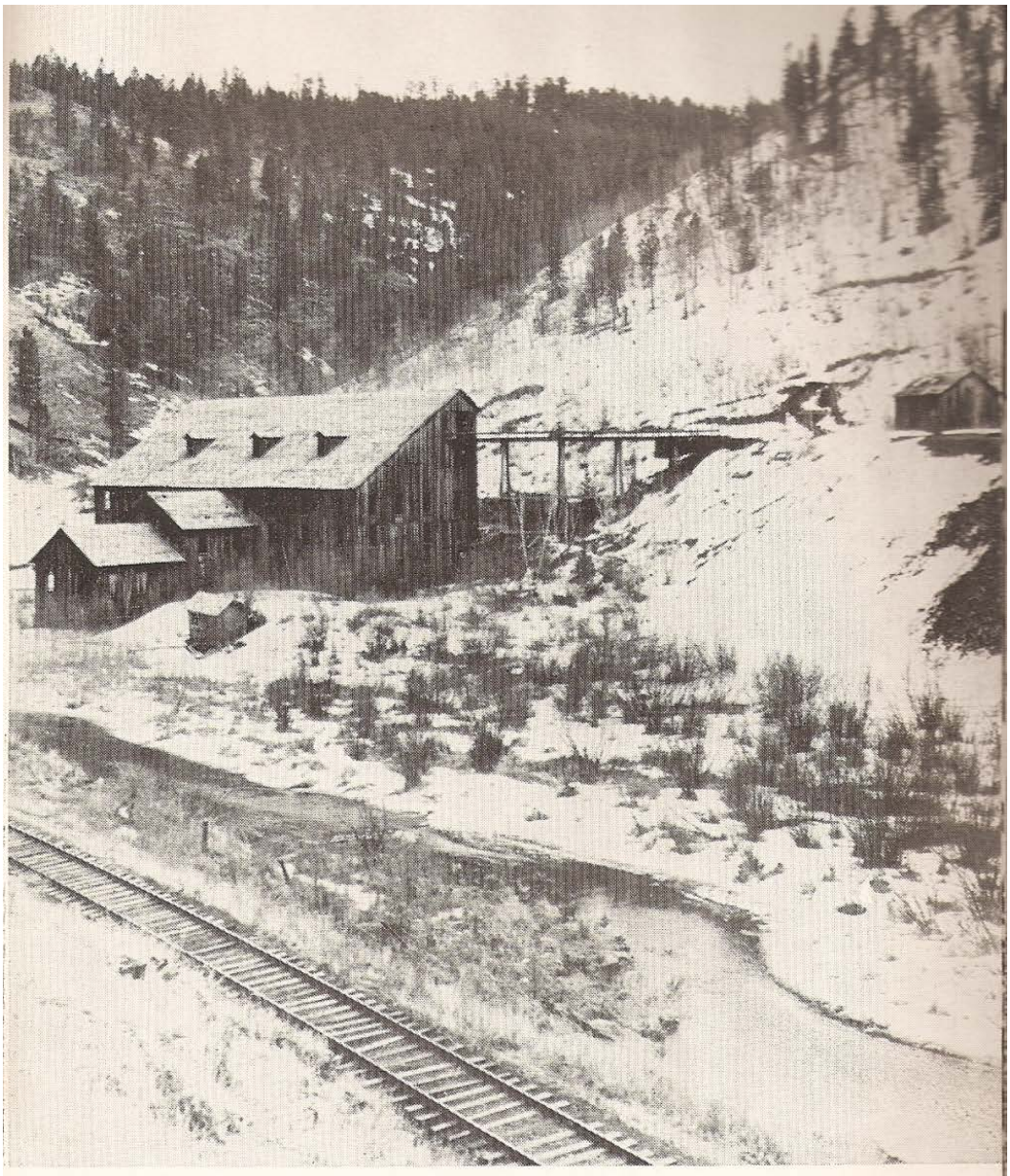
STANDBY.—In a letter to the editor of the Black Hills *Pioneer*, the following description of the Standby mine and mill appears: First we were shown a large open cut on the Continental vein, which lies parallel to and only 100 feet from the Standby ledge. This vein is 60 feet in width, and is incased in well-defined micaceous slate walls. From the grass-roots the ore carries gold, but of very low grade, probably not more than an average of two dollars to the ton. This is owing to the brecciated condition of the vein near the surface. The entire mass of quartz is broken up, and through it is diffused and intermingled considerable slate that is nearly barren of gold. To this fact may be attributed the leanness of the ore in the upper part of the lode. Considerable ore is milled from this vein; the Standby lode, however, supplies the greater part. The latter vein is 104 feet in width, and is opened from the surface by a large open cut. The same brecciated condition prevails as in the Continental, and the surface ore is of similar low grade. An encouraging feature in the Standby

is the demonstration of a better grade of ore at greater depth. A tunnel entry is made into the vein at a depth of 80 feet, which shows that the ore-body is less brecciated, less intermixed with slate, and richer, the particles of gold being coarser and heavier. From the bottom of the 80-foot level, a winze shaft is sunk to a depth of 40 feet. This shaft encounters a still better quality of ore than any found above, and the vein-matter is more solid and firm, indicating that the disturbed and chaotic conditions that prevail on the surface have changed to a well-defined and concentrated vein of uniformly better grade and quality than the top portion of the ledge. A level is running from the side of the mountain, which will tap the lode at a depth of 225 feet from the surface. This tunnel is large and roomy, and is designed as a working level for the mine. It is completed to within 150 feet of the vein, and is being diligently prosecuted with day and night shifts of miners. When the vein is reached by this tunnel, the Standby will be fairly opened and its real value and merit established.

Concerning the mill, the correspondent says: In a few minutes we wended our way to the great 60-stamp mill at the base of Standby Mountain. We found all its ponderous stamps pounding away on ore, and crushing from 160 to 200 tons every 24 hours, as shown by the daily register of car-loads transferred from the mine to the mill by the most perfect system of tramway I ever saw. The mill is a marvel of strength and simplicity. But four men are occupied during each shift in the entire establishment. The great machinery is propelled by water-power, a small Leffel's turbine wheel only 15 inches in diameter performing the office of locomotion under a 104-foot pressure of 300 inches of water, which is only about one third of the capacity of the ditch and flume that convey the waters of Little Rapid Creek a distance of three miles to the Standby property. An examination of the plates showed them to be in good condition, handsomely coated with amalgam.

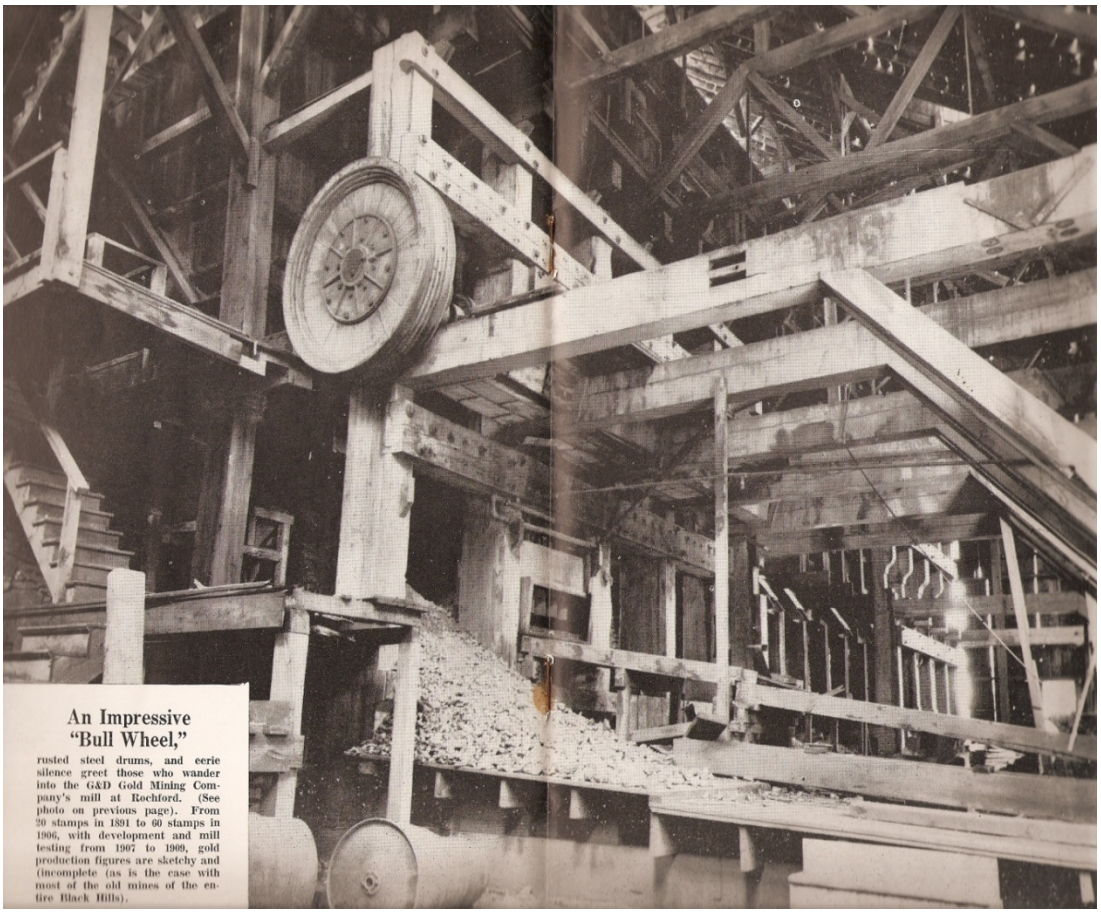


(Everton photo)



ONLY ONE-HALF MILE EAST of Rochford stands this old gold ore mill of the Standby Mine. In 1936 this mill became the property of the G&D Gold Mining Company. Considerable renovation to both mill and mine was undertaken. History of this mill is incomplete, but in 1891 oxidized ore was being treated in a 20-stamp amalgamation mill. For an inside view today, and more information, turn the page to the center-spread photo.

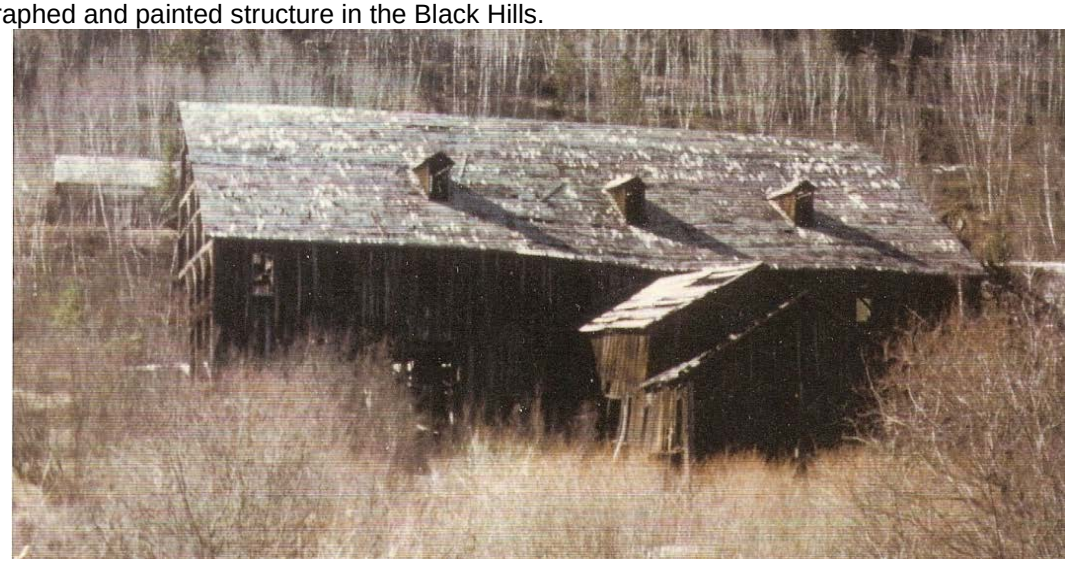
(photo – Homestake Sharp Bits)



(photo – Homestake Sharp Bits)

Caption reads: An Impressive "Bull Wheel," rusted steel drums, and eerie silence greet those who wander into the G&D Gold Mining Company's mill at Rochford. From 20 stamps in 1891 to 60 stamps in 1906, with development and mill testing from 1907 to 1909, gold production figures are sketchy and incomplete.

The Standby, along with several other mines and mills in the Black Hills, was re-opened in the late 1930's and early 1940's. The Standby mill was re-conditioned, but very little gold was found and the mine was again shut down. The mill building was left to deteriorate, and became (possibly) the most photographed and painted structure in the Black Hills.



(Everton photo)



(Everton photo)



(Everton photo)

In 2017-2018 Mineral Mt. Resources started drilling in the Rochford area, once again looking for a promising vein of gold ore. Problems have plauged the Company including water rights and permit problems.

The Keystone District

The Keystone District, located on Battle Creek approximately 12 miles southwest of Rapid City was most noted for the Holy Terror Mine. Other mines in the area included the Etta Mine, the Keystone Mine, and the Bismark/Ida Florence.

The Holy Terror

The Holy Terror Mine was one of the richest in the Black Hills. The mine was discovered in 1883 by W.M. (Bill) Franklin, Jacob F. Reed and Thomas Blair, and according to Carl Leedy, was named after Franklin's wife. In the first year a ten-stamp mill was built on the property, and the following year more than $100,000 was paid to the stockholders. This information on the Holy Terror was reported in the January 1895 ***Engineering and Mining Journal:***

Holy Terror.—Suit has been begun by the heirs of Jacob F. Reed, one of the original locators of this mine, to recover a part ownership in the mine. The mine was originally located by Jacob F. Reed, W. M. Franklin and Thomas B. Blair. After Reed's death the claim was allowed to lapse because assessment work was not done, but recently the mine was relocated by Blair and Franklin, and active development work carried on. The Reed heirs now claim a share.

…this was reported in the March 1895 ***Engineering and Mining Journal:***

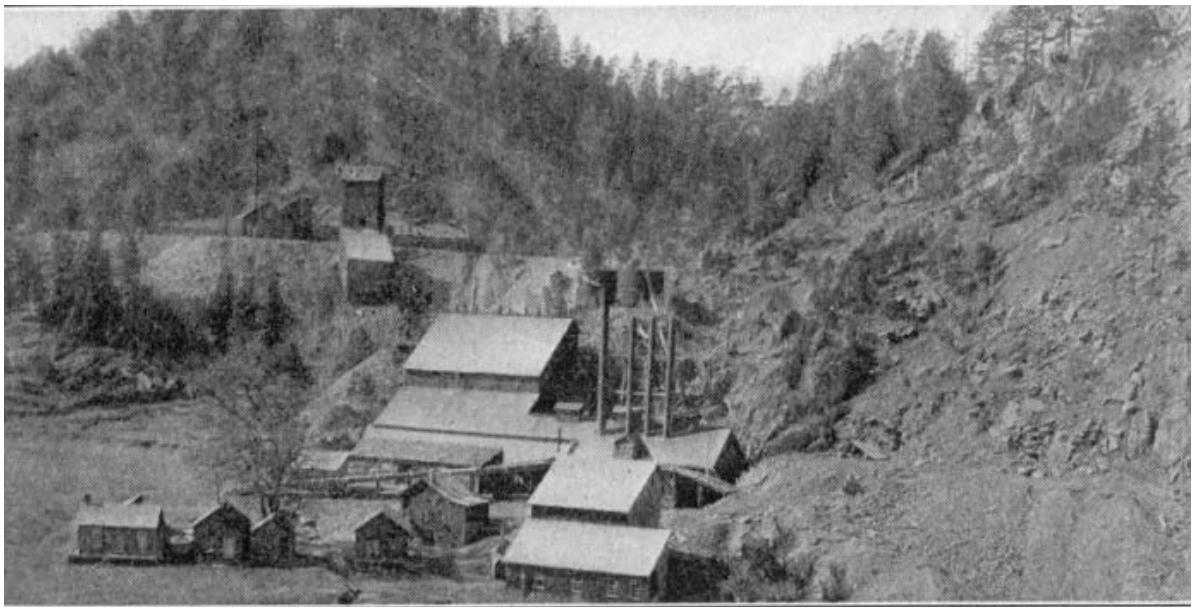
Pennington County.

Holy Terror.—Although but a five-stamp mill is being run on this property the average weekly output is about $10,000, says the Rapid "Journal." A new hoist and other new machinery is now on the road. The work until that arrives will be drifting and stoping, which will furnish the mill all the ore it can crush. Development work continues to disclose a wider vein, but without any diminishing in the value of the ore. After going down 100 ft. deeper the owners intend to increase the working capacity of the mill by putting on additional stamps.

…and this was reported in the April 1895 ***Engineering and Mining Journal:***

Pennington County.

Holy Terror.—In speaking of this mine, near Hill City, the Deadwood "Pioneer" says: The shaft is down about 90 ft., with crosscuts north and south for about 40 ft. The vein is nearly vertical, inclining slightly to the east with clearly defined foot and hanging walls. It varies in width from 14 in. to 2 ft. going down, and the vein matter is almost entirely goldbearing quartz. In going down all the quartz has been taken out and the mine is well worked and timbered throughout.



(photo – The Engineering and Mining Journal)

The Holy Terror Mine and Mill in Keystone

The Holy Terror Mine was operated sporadically for many years, mostly for gold, but the mine was constantly plagued by water problems. There were numerous attempts to re-open the mine as it is rumored that the remaining gold vein is extensive and very rich, however, any attempt that was made was met with an influx of water that no pump could conquer. During the 1950's through the 1970's the Holy Terror mill was used to process feldspar and spodumene that was mined in pegmatites in the Keystone area.



(Everton photo)

The remains of the Holy Terror feldspar mill, and the remains of the shaft house from the original Holy Terror mill (on the hillside on the left in both photos).



(Everton photo)

Another view of the feldspar mill remains and the original shaft house (top-center of photo)

Information on the Holy Terror Mine and underground illustration of the mine from the Paul T. Allsman book: ***Reconnaissance of Gold-Mining Districts in the Black Hills, S. Dak.***

HOLY TERROR

The Holy Terror group of claims (see fig. 23) is adjacent to the town of Keystone, S. Dak. It has the best production record of any lode gold mine in the southern Black Hills. The mine, in addition to producing high-grade ore, received wide attention because of the many gold-quartz specimens taken from the vein. As the property has been under water since about 1903 it has been necessary to rely on old records, engineers' reports, and published articles for information.

GEOLOGY

The ore deposit differs from others in the district in that it is a well-defined quartz fissure vein. The strike of the vein is about N. 35° W. and the dip 70° to 80° NE. At the surface the vein was mined for only about 80 feet along the strike; at the second or 150-foot level, ore shoots were opened for 700 feet; at the fifth level, 500 feet below the collar, ore shoots were opened for 1,200 feet along the vein. The vein widens and pinches along the strike, often being only a narrow seam between lenses. It ranges in width from a few inches to 18 in the upper workings and from 3 to 6 feet on the lower level.

The gangue material is massive white quartz, and the ore mineral is coarse flaky gold. Very little arsenopyrite, pyrite, and other sulfide minerals are reported. From the record of production the grade appears to be higher in the upper and narrower parts of the vein than in the lower and wider parts.

The mine is opened to a depth of about 1,200 feet. According to old maps the distance mined along the vein diminished from about 1,200 feet on the 500-foot level to 100 to 300 feet on lower levels. Whether the length of the ore shoot actually decreased with depth or had not been developed and mined is not known. It is questionable whether any quantity of ore remains above the 1,200-foot level. The lower workings have been under water since about 1903 and cannot be examined easily.

HISTORY AND PRODUCTION

The Holy Terror group of claims was relocated and the Holy Terror vein discovered in 1894 by William Franklin and Tom Blair. Several years before the claims had been located and prospected, but as the ground was believed to be worthless the assessment work had been allowed to lapse. The owners immediately began to develop the vein. J. J. Fayel and Albert Amsbury were given a large interest in the property in consideration of capital furnished to develop and equip the mine. A five-stamp mill and a steam hoist were installed, and a shaft was sunk to a depth of 60 feet. The first 77 tons run through the mill yielded $26 a ton.

About this time the interests of Blair, Franklin, and Amsbury were sold to John S. George, and the Holy Terror Mining Co. was formed under the management of Fayel. The adjacent Keystone mine and mill were purchased in 1898 just before Fayel's death, and both mines were operated under the name of the Keystone-Holy Terror Co.

By 1903 a three-compartment shaft had reached the 1,000-foot level, and a winze had been sunk to the 1,200-foot level. Figure 24 is a longitudinal section of the Holy Terror mine compiled from old maps by A. I. Johnson of Keystone. After the consolidation most of the ore was milled in the Keystone mill, but both mills were operated part time.

Records indicate that little ore was mined from the Holy Terror after 1903. The mine is said to have been forced to close because of the inability of the operators to pump out the water, the flow of which had increased steadily with depth, and because of litigation. Several men were killed and others injured in the mine before it closed, and a $75,000 judgment bankrupted the organization. Failure to recognize early claims to the property also resulted in expensive litigation and contributed to the shut-down.

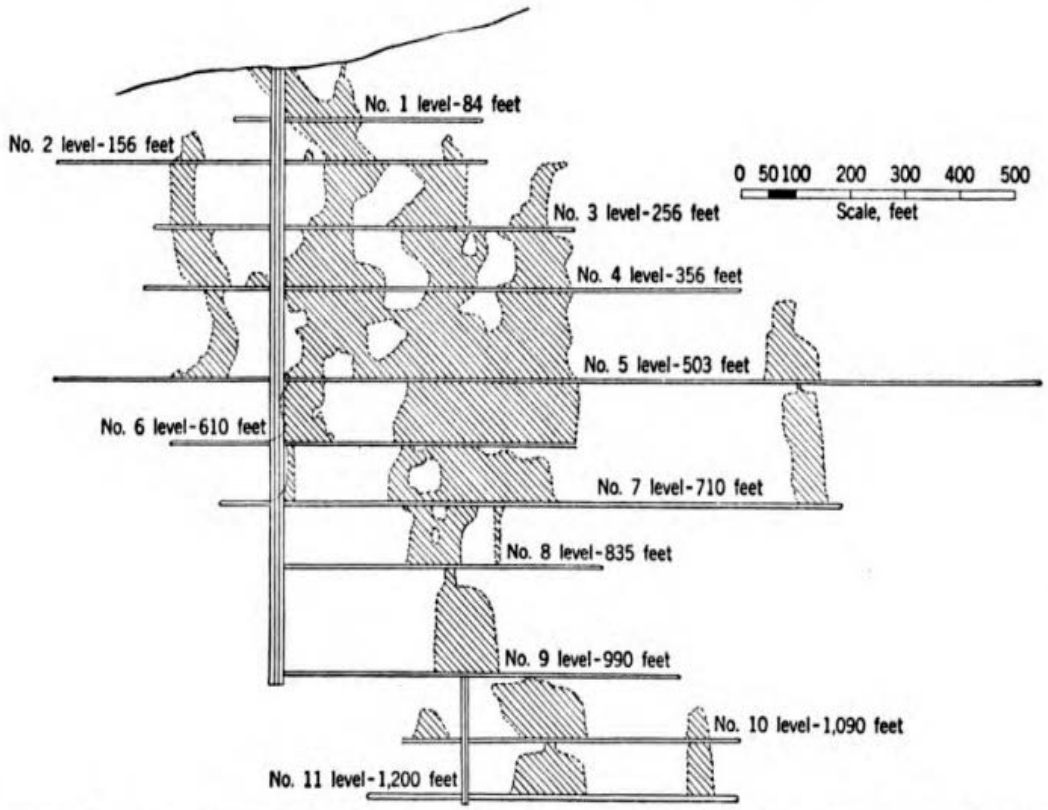


FIGURE 24.—Longitudinal projection of Holy Terror mine facing southwest, Keystone, S. Dak., showing stoped areas. (After Johnson, August 1935.)

The following table giving ore milled, bullion recovered, and recovered value per ton was compiled by A. I. Johnson from original records of the company. Although a few records never were found the total is thought to be fairly accurate.

Ore milled and bullion recovered from Holy Terror mine, 1894 to 1903

Year	Ore milled (tons)	Bullion receipts	Concentrate receipts	Total receipts	Recovered value per ton of ore [1]
1894–95	[2] 2,016			$32,000.00	$15.87
1896	24,915	$58,523.03	$252.74	58,775.77	
1897		164,336.68	10,094.70	174,451.38	9.36
1898	18,897	259,409.31	9,098.22	268,507.53	11.40
1899	31,121	282,319.29	19,244.07	301,563.36	9.11
1900	22,545	111,487.10	15,320.65	126,807.75	5.62
1901	20,310	128,162.90	12,359.31	140,522.21	6.92
1902	20,420	115,832.22	6,278.28	122,060.50	6.38
1903	[2] 11,000			69,300.00	6.30
Total	151,224			1,293,988.50	8.56

Information on two other mines in the Keystone area, the Keystone Mine and the Bismark Ida Florence are in the Paul T. Allsman book: ***Reconnaissance of Gold-Mining Districts in the Black Hills, S. Dak.***

KEYSTONE

HISTORY AND PRODUCTION

The workings on the Keystone group of lode claims are about 450 feet northeast of the Holy Terror. (See fig. 23.) The property was located by Blair, Franklin, and Reed in 1892. A mill was erected the following year, was burned about 2 years later, and was rebuilt in 1895. Operations continued on the Keystone as a separate property until 1898, when it was consolidated with the Holy Terror as the Keystone-Holy Terror Co.

At the time of the consolidation the Keystone shaft was 200 feet deep, and by October 1901 the 500-foot level had been opened from the Holy Terror. Before operation was stopped in 1903 crosscuts had been driven from the Holy Terror to the Keystone vein on the 700- and 1,000-foot levels. Some drifting and stoping were done on each of the levels along the Keystone vein.

Most of the ore mined from the Keystone vein by the original company and later by the Keystone-Holy Terror Co. came from an open-cut and stope above the 200-foot level. The South Dakota mine inspector's report showe that $65,000 in gold was taken from 18,736 tons of or milled in 1893 and $74,952 from 21,160 tons milled in 1894. The recovered value per ton would be $3.46 and $3.54, respectively. As the recovery is said to have been about 70 percent the grade of the mill feed was $4.95 and $5.05 per ton, respectively (gold at $20.67 an ounce). From old records it is estimated that $273,140 in bullion was recovered from ore mined on the Keystone vein to 1903.[61] A small tonnage was mined from surface and shallow openings of the Keystone-Holy Terror claims in 1906–8 and 1911. A total of 659 tons of ore yielded 195.06 ounces of gold and 90 ounces of silver.[62]

The following results of mill tests were obtained by the Keystone-Holy Terror Co. in 1900 on ore from the 500-foot level of the Keystone vein:

Mill-test results, Keystone-Holy Terror Co.

	Test No.		
	1	2	3
Ore milled.....tons	85	131	167
Recovery per ton:[1]			
Plates	$2.72	$3.46	$1.13
Battery sands	1.60	1.57	2.18
Concentrate	1.83		
Value per ton recovered	[2] 6.15	5.03	3.31
Tailings loss	2.80	1.76	1.76
Value per ton milled	8.95	6.79	5.05

[1] Based on a gold price of $20.67 an ounce.
[2] Percent recovered, 68.7.

As the Keystone mine has not been accessible for many years, little information is available on the relation of ore to walls, faulting, or diorite intrusion. The strike and dip presumably are about the same as those of adjacent shear zones that strike N. 35° W. and dip 70° to 80° NE.

Figure 25 shows a plan and longitudinal section of the Keystone mine compiled from old maps. The mine appears to have been entered through an upper and lower adit. There is a 200-foot vertical shaft with drifting on the 100- and 200-foot levels and drifts connected by crosscuts from the 500-, 700-, and 1,000-foot levels of the Holy Terror. Ore was stoped from three ore shoots north of the shaft. The largest stope was situated nearest the shaft; it is said to have been 10 to 40 feet wide and as much as 300 feet long and to have been mined continuously to a depth of more than 300 feet to the 200-foot level. Apparently the large ore shoot is continuous to the 500-foot level as that level was partly mined out on the sill floor and the ore tested in the mill.

[61] Johnson, A. I., Professional report, Keystone, S. Dak.
[62] Statistics furnished by Chas. W. Henderson, Mineral Production and Economics Division, Bureau of Mines.

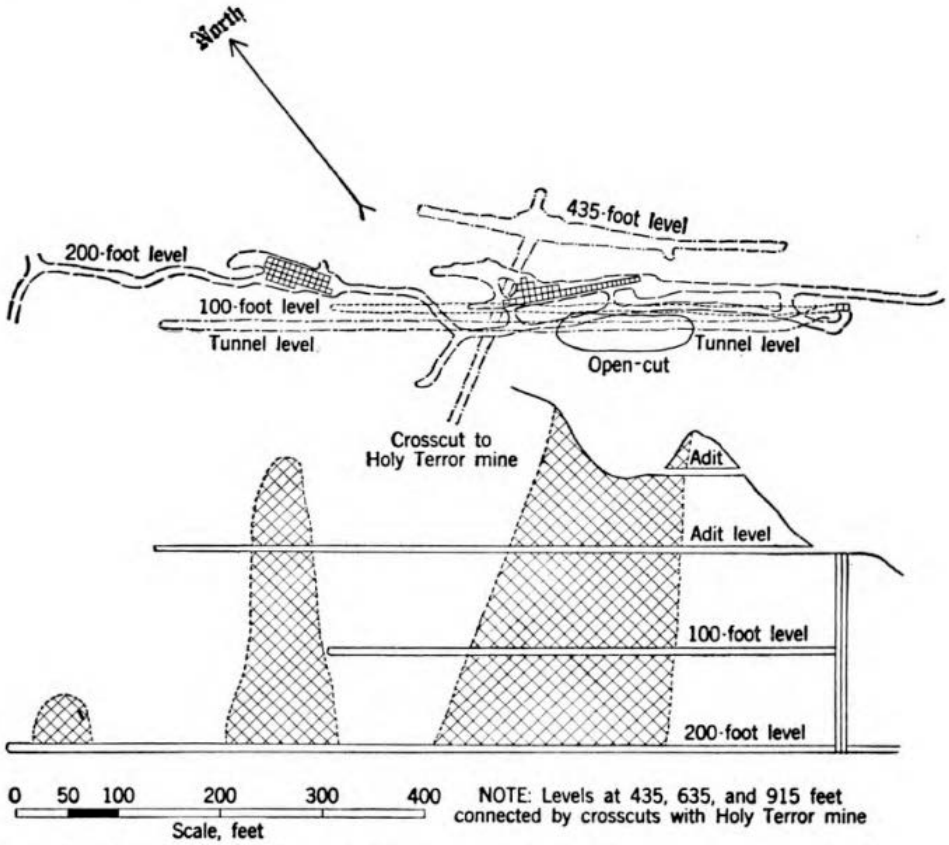


FIGURE 25.—Horizontal projection and longitudinal section, facing northeast, of Keystone mine, Keystone, S. Dak., showing approximate stoped areas.

ORE RESERVES

From old records of production, mill tests, and sampling by early operators, one engineer has estimated that about 980,000 tons of ore is available with a grade of $10.20 in gold per ton (gold at $35 an ounce). About one-third of the available ore is exposed on two sides and the remainder on one side. The maximum distance between exposures is about 300 feet. Ore in one block was projected about 200 feet below its upper exposure.

The Bismark Ida Florence

Information on the Bismark Ida Florence from ***The Engineering and Mining Journal:***

Ida Florence.—Last week the bonds on this mine were taken up and the property changed hands from its original owners, B. Mitchell, Wm. B. Franklin, Captain Pope, Jas. Halley, H. J. Smith and A. Madill. to David Sisk, of Chicago. The property was bonded to M. J. Scanlan April 1st, for 90 days at $40,000, the conditions being that development work should be kept up during the time or until a well-defined ledge should be found. During the last week of the bond a ledge of ore was discovered reported to be 18 ft. thick, encased between well-defined walls of hornblende and porphyry. The ore is said to be free milling and in grade and character very much like the Bismarck. The vein being at the end of a 215-ft. prospect tunnel, considerably more work will be done before the new owners will commence milling the ore.

From Paul Allsman:

BISMARK-IDA FLORENCE GROUP

The Bismark and Ida Florence groups are about three-fourths mile northwest of Keystone on a continuation of the Keystone gold belt. (See fig. 23, p. 90.) The property, comprising eight patented claims, is held under lease and option by the Mines Finance & Development Shares, Inc.; Charles H. Reed, of Rapid City, is the local representative. The Bismark previously was known successively as the Golconda, Mainstay, and Carolina. Information on the properties has been taken from a report by A. I. Johnson in 1936.

HISTORY AND PRODUCTION

The Bismark was one of the early operations in the district. Records show that in 1893 mill tests were run on the ore. No records are available for the next 10 years, but from 1904 to 1907 the property was controlled by the Mainstay Mining & Milling Co. and from 1907 to July 1936 by the Carolina Mining & Milling Co.

During the operating period a 30-stamp mill was on the property. Ore was treated by amalgamation, table concentration, and cyanidation. According to reports, lack of water and inability to obtain a satisfactory recovery contributed to the shut-down. Arsenopyrite, assaying 12 to 22 percent arsenic, was the chief obstacle to satisfactory treatment.

In July 1936 the present company was organized, and 10 men were employed to unwater and retimber the 435-foot shaft. Former

metallurgical difficulties were overcome. A steam hoisting plant and other equipment were installed on the property, but lack of funds prevented completion of the development program. The mine was idle in 1938.

The early production record of the mines is not available, but a report dated December 31, 1894, shows that 212 tons of ore, presumably from the surface, was milled in the Keystone mill in 1893. Recovery was $4.60 a ton. The following table shows the production of the Bismark mine from 1904 to 1912.

Gold and silver recovered from the Bismark mine, 1904–12 [1]

Year	Ore (tons)	Gold recovered (ounces)	Silver recovered (ounces)
1904	100	36.43	----------
1905	1,125	750.00	----------
1906	1,654	194.95	82
1911	1,600	93.68	25
1912	----------	4.67	12
Total	4,479	1,079.73	119

[1] Statistics furnished by Chas. W. Henderson, Bureau of Mines, Mineral Production and Economics Division, Denver, Colo.

GEOLOGY

The geology and mineralogy of the shear-zone ore bodies of the Bismark and Ida Florence are similar to those of the Bullion ore bodies. The Ida Florence vein is dense and black, contains abundant hornblende and quartz, and resembles the "east vein" of the Bullion mine.

According to Johnson's report the 100-foot level of the Bismark mine is mineralized along a diorite dike in the hanging wall of the shear zone. Indications are that the mineralized ore zone is split into two sections by the diorite, which evidently has been closely folded at this point. Mineralization has taken place on both sides of the diorite in much the same manner as in the Bullion mine. A complete and satisfactory study of the structural relations has not been made owing to the inaccessibility of most of the Ida Florence property and part of the Bismark.

DEVELOPMENT AND ORE RESERVES

Figure 27 shows an oblique projection of the Bismark mine. A shaft has been sunk to a depth of 450 feet, and about 15,000 feet of tunnels, drifts, and crosscuts has been driven on the 100-, 200-, 300-, and 400-foot levels. According to reports considerable broken ore remains in shrinkage stopes.

Early reports indicate that three stopes on the 100-foot level were mined by shrinkage prior to 1907. The total length of the stopes is 280 feet and the average width 20 to 25 feet. The stopes are supposed to contain 20,000 tons of ore. It is said that a stope 110 feet long and an average of 40 feet wide on the 200-foot level contains 8,000 tons of broken ore. Maps show another stope 100 feet long and 20 feet wide on the 200-foot level that is accessible. Apparently no stoping was done on the 300- or 400-foot levels.

Development on the Ida Florence consists of a 300-foot shaft. It is stated that about 2,000 feet of lateral work has been done on the 45-, 85-, 115-, 200-, and 300-foot levels. The 200-foot level is developed most extensively.

An early report states that an ore shoot 100 feet long was exposed on the 200-foot level. It is said to have assayed $6 to $7 in gold per ton (gold at $20.67 an ounce) and 15 to 17 percent probable As_2O_3. Dump ore, supposedly from the 200-foot level, has been sampled and assayed. The assays ranged from $5 to $10.53 in gold per ton and

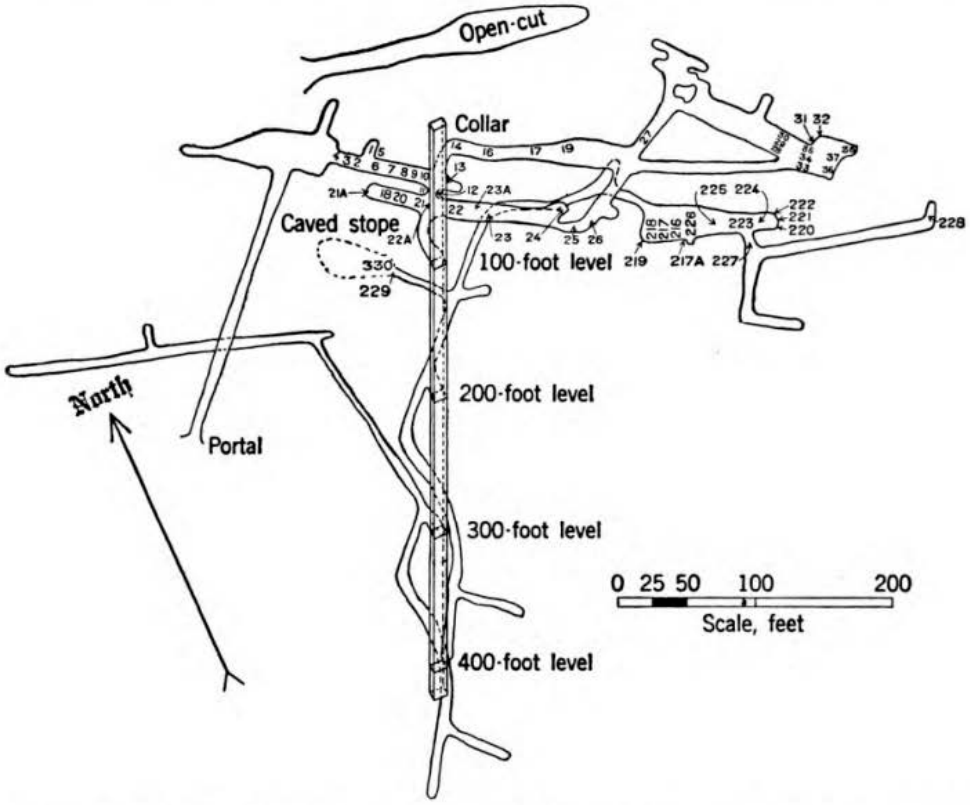


FIGURE 27.—Oblique projection of Bismark mine, Keystone, S. Dak., showing source of samples.

averaged $7.96 per ton (gold probably at $35 an ounce). The average assay for As_2O_3 was 15.9 percent. A partial analysis of the Ida Florence dump ore was as follows:

	Percent		Percent
SiO_2	39.5	CaO	2.38
Fe	34.18	Sb	Nil
As	9.5	Bi	Nil
S	12.85	Cd	Nil
Al_2O_3	6.72	Pb	Nil

A. I. Johnson sampled the 200-foot level of the Bismark in August 1936 and the 300-foot level in December 1936. The following table gives the results. The grade is based upon a gold value of $35 an ounce, and the sample numbers are shown in figure 27.

Results of sampling, 100-foot level, Bismark mine

[Compiled by A. I. Johnson]

Sample No.	Description	Width (feet)	Gold per ton
1	West of fault	5.00	$1.40
2	Mineralized schist with quartz	2.33	5.60
3	Mineralized schist and 10 inches gouge	2.20	2.80
4	Quartz stringers and gouge	1.66	4.20
5	South wall of crosscut	12.20	2.80
6	Roof of drift opposite crosscut	4.25	4.90
7	Quartz stringers 10 feet south of crosscut	4.33	1.40
8	10 feet south of No. 7	3.75	2.10
9	22 inches mineralized diorite and 14 inches gouge	2.50	14.70
10	Schist contact zone	1.90	1.40
11	33 inches west of No. 10	3.90	5.60
12	West side of drift	3.83	1.40
13	14 inches east of No. 12	2.00	1.40
14	2 feet west of east wall	1.42	.70
15	Begins 20 feet west of diorite	3.10	0
16	Begins 35 feet south of crosscut	3.00	1.40
17	20 feet north of beginning of stope	5.00	2.80
18	7½ feet south of face; 8 inches quartz, 8 inches gouge	5.41	3.50
19	North end No. 2 stope	7.00	8.40
20	26 feet south of face	6.60	9.80
21	5 feet north of crosscut to shaft	5.00	8.40
22	20 feet south of center of crosscut to shaft	6.50	7.00
22a	10 feet south of No. 21	9.17	5.60
23	20 feet south of No. 22	2.71	9.80
23a	22 feet south of crosscut to shaft	6.30	6.30
24	Across face	3.00	9.80
25	Quartz and contact schist	3.00	2.10
26	Schist, slightly mineralized	5.66	2.80
27	Schist, considerable sulphates	8.50	0
28	South end No. 4 stope, 6 inches quartz, west roof	7.16	5.60
29	South end No. 4 stope, east of No. 28, roof	5.16	0
30	South end No. 4 stope, east contact, roof	7.83	2.80
31	South end No. 4 stope, 19 feet south of No. 30, wall	5.00	4.20
32	South end No. 4 stope, south of No. 31, wall	5.00	10.85
33	South end No. 4 stope, 20 feet south of No. 28, roof	7.33	4.20
34	South end No. 4 stope, east of No. 33	3.33	2.10
35	South end No. 4 stope, contains 2½ feet quartz	7.41	10.50
36	South end No. 4 stope, southwest corner of stope	12.16	4.55
37	South end No. 4 stope, stratified schist	6.83	1.40
38	South end No. 4 stope, face of drift	5.50	2.80
216	10 feet northwest of timbered stope	19.0	2.80
217	15½ feet northwest of No. 216	15.5	3.50
217a	West side of sample No. 217	6.0	4.90
218	15 feet northwest of No. 217	15.3	1.40
219	North face of north stope	5.0	4.20
220	South side of south face	6.7	26.60
221	Center of south face	3.0	1.40
222	North side of south face	3.5	2.45
223	20 feet northwest of No. 220, south stope	18.0	6.30
224	Grab sample from pile in stope		4.20
225	20 feet northwest of No. 223	4.4	2.80
226	East side of manway to stope	7.0	4.20
227	East side of crosscut from stope	13.0	2.80
228	West side of last crosscut	12.0	2.80
229	West side of north stope	2.5	3.50
230	Grab sample from pile		8.40

It has been estimated that 128,230 tons of ore can be developed to the 300-foot level of the Bismark by extension of the present workings, particularly on the 300-foot level. Of this total, 24,420 tons would average $6.05 in gold per ton, 13,020 tons $5.33, and 21,270 tons $5.50. The grade of the ramaining 69,520 tons cannot be estimated, as it represents ore in and below old shrinkage stopes now inaccessible. An early record shows that the average grade of ore milled from these stopes was $8.94 in gold per ton (gold at $35 an ounce).

METALLURGICAL TESTS

Early operations and tests on unoxidized ores from the Bismark and Ida Florence properties failed to yield satisfactory recoveries.

The presence of arsenopyrite and inability to grind the ore fine enough to liberate the gold are said to have been the chief obstacles.

In 1936 cyanidation tests were made on Bismark ore by Dr. Bancroft Gore of the South Dakota School of Mines. A 50-pound sample taken from a dump near the shaft collar represented ore from the 200-foot level. The chief sulfide mineral in the ore was about 10 percent of auriferous arsenopyrite. The gangue minerals were dolomitic siderite, magnesite, calcite, and ankerite, together with schist containing quartz stringers. The ore contained 0.3 ounce of gold per ton and no silver.

Numerous cyanidation tests on the ore showed that 83 percent of the gold could be recovered in a 36-hour contact period by grinding to 93 percent minus 200-mesh compared with only 87 percent in 72 hours. By grinding to 97 percent minus 200-mesh 90 percent could be recovered in 36 hours, and further contact failed to improve recovery. Grinding through 200-mesh only increased the recovery to 93 percent in 72 hours. The tests indicate that the best results consistent with economy were made by grinding to 97 percent minus 200-mesh and using a contact period of 36 hours. They also indicated a cyanide consumption of approximately 2 pounds per ton of ore and a lime consumption of 12 pounds per ton. As the ore had been exposed to the atmosphere for several years the lime consumption was thought to be considerably higher than it would be with freshly mined ore.

The Etta Mine

Another important mine in the Keystone District is the Etta Mine. The Etta started out as a gold producer in the early 1880's. The Etta was in the early development stages when this was reported in the August 1883 ***Engineering and Mining Journal:***

ETTA.—San Francisco parties have purchased this mine for about $50,000. The work of development continues for the present; and as soon as the company has secured control of the property, the mining and reduction of the ore on a large scale will be commenced.

This was reported in the December 1883 ***Engineering and Mining Journal:***

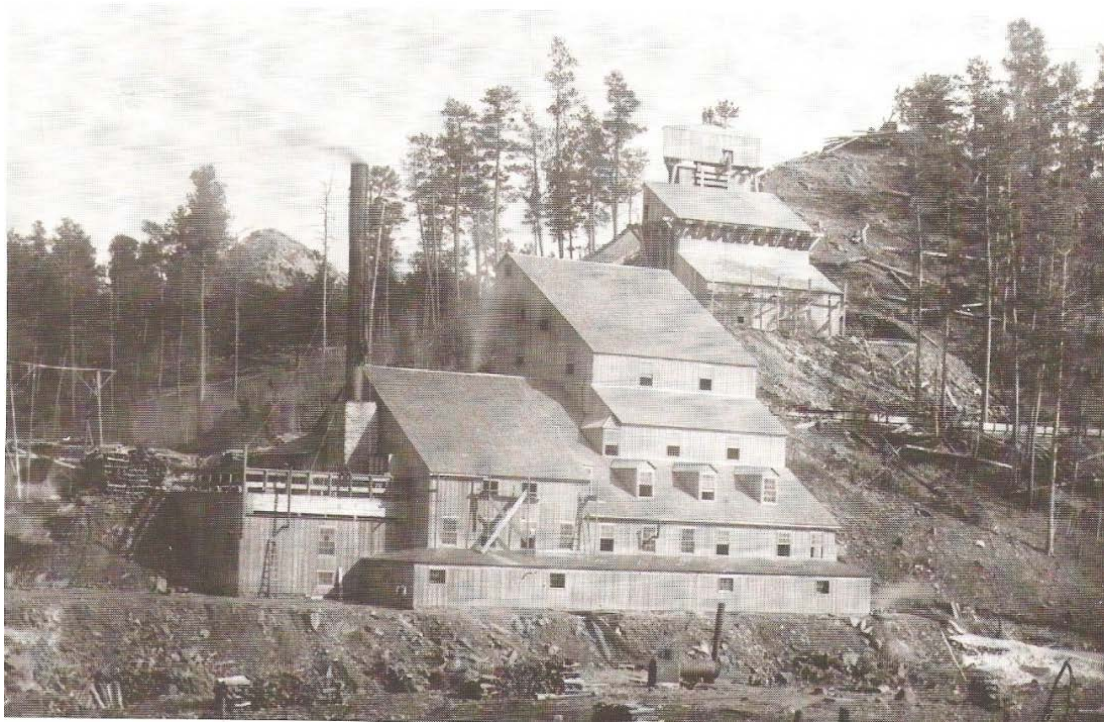
ETTA.—According to the *Index*, A. J. Simmons contracts with the other owners, for one half of their several interests in the property, to place machinery on it consisting of ten stamps, Blake crusher, concentrators, tramway from mine to Grizzly Gulch, and to open the mine. Work has been begun. With the machinery proposed, it is expected to produce two and a half tons of clean oxide a day, which will be shipped out for smelting until the mine pays for erecting the necessary smelter, which it is thought may be advisable to place in Rapid City.



(photo – SD School of Mines & Technology)

The Etta Mine

In the mid-1880's cassiterite (tin) ore was found in the Etta, in addition to numerous other mines in the Central Black Hills. This started the tin boom in the Black Hills, and at the Etta Mine a 100-ton concentration mill was constructed by the Harney Peak Tin Mining, Milling and Manufacturing Company to process the ores.



(photo – South Dakota State Historical Society)

The Harney Tin MM&M Co. 100-ton concentration mill at the Etta Mine



(Everton photo)

Remains of the Etta mill in 1995

After the tin boom collapsed in the early 1900's, spodumene was found at the Etta Mine. This was a lithium based ore and was mined for the war in the 19-teens. The largest spodumene crystal ever found was mined from the walls of the Etta Mine.



(photo – The Engineering and Mining Journal)

Spodumene crystal at the Etta Mine

The Etta was mined for a number of years for spodumene and feldspar. The mine was a pegmatite, which is a plug of mineralized rock that can be just a few feet wide, or can be many feet wide and deep. The Etta was the latter, and there is a large hole where the mineralized rock was taken out; almost like an open cut or glory hole.



(Everton photo)

Looking down into the Etta Mine in 1995. The mine is partially filled with water.



(Everton photo)

Machinery left in the Etta mine – note the height of the walls.

The Etta mine was noted as the most mineralized mine in the Black Hills – in other words this mine was one of the only areas in the Black Hills where you could go and find samples of a number of different minerals, and students from the SD School of Mines & Technology used the mine to collect samples for study purposes for many years. The mine is now under private ownership, and there is no longer access to it.

The Harney Tin Mining Scandal

In the Central Black Hills, during the summer of 1883, it was found that tin existed in some of the mines that had been prospected for gold. This information is from the November 1883 ***Engineering and Mining Journal:***

HARNEY PEAK TIN MINING COMPANY.—This company has recently been organized at Rapid City. The property consists of twenty tin-bearing quartz locations near the summit of Harney's Peak, and a large scope of stream-tin ground lying along the branches of Palmer's Gulch, together with various water-rights, mill-sites, etc. Mr. G. F. Randall, an English engineer and representative of English capitalists, has reported favorably on the property, and before his departure made the following proposition to the company: He to organize an English company with a capital of $500,000; such company to furnish $250,000 for developing the mines and purchasing machinery within a certain specified time; the local company to turn over the property upon receipt of $250,000 or one half the capital stock (non-assessable). An agreement which binds the company to give a bond upon the property on payment of $10,000 has been executed, and as soon as part of the money has been paid, work will be commenced. Unless the Black Hills *Journal* has horribly garbled the "Professor's" report, it furnishes ample testimony for the conclusion that he does not know what he is writing about, not to speak of how he writes. For the edification of our readers, we quote:

The first tin ore is found about half a mile from the base of the mountain, at which point a ridge of greisen quartz rock some 300 feet in width and from 100 to 500 feet in hight, above the surface, is found. This ridge extends for over one mile, and capes the two branches of Palmer Creek, producing suitable sites for mills, and adequate water-power for concentrating-works. The rock is composed of mica, silica, and porphyry, carrying a large percentage of black tin crystals, which yield under assay from 50 to 75 per cent of pure metallic tin and from 8 to 10 per cent of nickel. Large veins are found in this ridge which will yield 75 per cent of black tin crystals, and vary in width from three to eight inches. No rock could be easier or better situated for mining purposes. I was able with an ordinary hammer to break it at any point; and in some hundreds of samples which I examined, was unable to discover any except what contained a high percentage of tin crystals. At a distance of a quarter of a mile, running parallel with this, the erect ridge is continued. This is of still larger dimensions, and extends from the head of the east branch of Palmer's Gulch to nearly the summit of the mountain, and in some cases 600 to 800 feet in hight ABOVE THE SURFACE. The tin crystals in this mass are almost incredible, in many cases where they occur being 50 per cent of the quartz-rock—the black crystals in contrast to the white spar and shining mica, presenting a most beautiful appearance, exceeding in size two and a half inches in diameter, yielding under analysis from 70 to 75 per cent pure tin, and from 8 to 15 per cent of nickel. From this to the top of the mountain, a distance of about 1000 feet perpendicularly, the same formation extends, containing ore in perfectly inexhaustible quantities. This rock needs no mining whatever. It is simply throwing down the greisen rock into chutes and ore-bins and carrying the same to the mill for crushing and concentrating. To form any estimate of the extent of this formation is impossible, the magnitude is so great, and it is no exaggeration to state that it requires a fortnight even to survey this mass of rock. These mines will certainly rule the tin markets of the world. The ore can without doubt be mined and concentrated for from five to ten per cent per ton, with suitable appliances, and the quantity is so enormous that for years to come none but the richest portions need be touched.

The mining community of the Black Hills should raise a subscription to pay the expenses of the "Professor's" trip back to England on condition that he will never come back. He is hurting the prospects of their country as a future tin-producing district. Turn him out!

Investors started to pour money into these mines and a tin boom ensued. In the late 1880's a London-based corporation invested fifteen million dollars into the tin mines, and the Harney Peak Consolidated Tin Company, Ltd., was created. The Company invested money into purchasing mines and constructing mills for processing.

Over the next 12 years, information on the Harney Peak Tin Mining, Milling and Manufacturing Company was reported in ***The Engineering and Mining Journal.*** Some of the reports were positive and reported of mines being purchased and developed and machinery being delivered, and others questioned the validity of the Company, the reports on the tin deposits and the prosperity of the mines. The following are excerpts from the ***EMJ*** from 1889 to 1893:

April 20, 1889

PENNINGTON COUNTY.

HARNEY PEAK TIN MINING, MILLING AND MANUFACTURING COMPANY.—As the representative of American mining interests and in view of the position taken by the ENGINEERING AND MINING JOURNAL on this subject, it is eminently proper that the JOURNAL should be the first American publication to print definite and authentic information concerning the final consummation of the much talked about Harney Peak Tin deal. A reporter for the ENGINEERING AND MINING JOURNAL this week found Mr. Chas. D. Deshler, the secretary of the Harney Peak Tin Mining, Milling and Manufacturing Company, at the newly opened offices of the company, No. 280 Broadway, New York City. Mr. Deshler in substance said: "Our capital stock is now $15,000,000, divided into 150,000 shares. There are no preference shares of any kind. The company has offices at No. 5 Lothbury, London, E. C., and in this city. The board of directors is composed as follows:

"D. S. Appleton, Wm. Remsen, Louis May, Samuel Untermeyer, George Ehret and Henry Clausen, Jr., the brewers, Jas. Flannagan, Jas Wilson and the following English capitalists: Lord Thurlow, Wm. Garnett, H. Seton-Karr, Edw. S. Baring-Gould, and John Taylor. The officers are Samuel Untermeyer, President; Henry Clausen, Jr., Vice-President; Lewis May, Treasurer, and Chas. D. Deshler, Secretary. The property of the company is in Pennington and Custer counties, Dakota. It comprises over 300 lodes, which are included in a circle, having a circumference of thirty miles and distant from the center about seven or eight miles. This center is the famous Harney Peak, a granite mass, which rises to a height of 7,800 feet above sea level, and slopes gradually for a distance of about seven miles, finally disappearing in the foothills.

"It is an interesting fact that the tin deposits occur not in the native country rock, which is slate, nor in the granitic upshoot forming Harney Peak, but are invariably found at the point of contact of these rocks. Beginning at the extreme eastern point of the circle, we find the Etta group, the development of which has already been fully described in Prof. W. P. Blake's report, published in the ENGINEERING AND MINING JOURNAL, September 8th and 15th, 1883; August 2d, October 25th and November 29th, 1884, etc. Here we have a 200-ton mill. In this vicinity is also the Sarah group, which has been extensively developed and into which we will run a tunnel 300 feet. We have now a tramway between the Etta mine and mill which we propose to connect with the Sarah group, thus enabling both groups to send their ore direct to the mill. Continuing in a northwesterly direction and around the circle, there are the following groups of lodes: Bob Ingersoll, Legal Tender, Volunteer, Addie, February, Excelsior and Logan. The last four groups comprise a total of 70 lodes. The Addie and Excelsior have been well developed. We now come to the bulk of our richest property at Hill City and vicinity, which includes the following groups: Le Grand, Edna, Telegraph, No Name, Cassiterite, Mohawk, Campaign, Gertie, Delia, Cowboy and Coates. On the two last work is being vigorously prosecuted. At the Cowboy the shaft has reached a depth of 100 feet, and at 75 feet drifts have been run east and west. At the Coates there is a shaft of the same depth, with east and west drifts at sixty feet. In the Cowboy an eighteen to twenty inch vein has been encountered. At Hill City we propose to build immediately a 500-ton mill in four sections. The machinery for this mill has already been ordered from Fraser & Chalmers, of Chicago, and will cost over $57,000. Should the production warrant it we will increase the capacity to 2000 tons. South of the Hill City deposits, and within six miles from Custer City are the following groups: Tin King, Little Whale, Tenderfoot, Darwin and Czar. If Professor Vincent so decides we will also build a mill here; otherwise the ore will be sent by tramway to the Hill City mill. This completes the circle. Water power is abundant and in the fertile valleys on the slopes of Harney Peak we have land in plenty for the thousands of men that may be required to thoroughly develop this extensive territory. Transportation facilities can be easily provided for. Already, we have entertained a proposition to build a narrow-gauge railway around the circle of our mines. In a year, we expect to spend not less than $500,000 upon the property. We are now employing 200 men and this number will be almost immediately increased. As to the quality of the ore, there can be no better testimony than the assays made in England, which were sufficient to secure English capital to the amount of $1,500,000.

"These assays were made on November 14th by Johnson & Matthey, Mr. Claudet, Assayer to the Bank of England, and Capt Davies, of the Dolcoath mine, and resulted in an average yield equivalent to 92 pounds of black tin, or 64 pounds of metallic tin per ton, taking 70 per cent as yield of metal. On December 6th, Thos. Bolitho & Sons also assayed a quantity of over eight tons from which was obtained over 7 cwt. of black tin (tin ore) equivalent to 94·6 pounds of

April 20, 1889 - (cont.)

black tin per ton. This ore yielded 66 per cent of metal of refined quality, so that the out-turn of metal was 62·67 pounds per ton. This was not ore selected for its richness. Representatives of the English investors went to Dakota themselves, and selected any ore they chose. They sent to England 40 tons, and 10 tons of this was again selected by them for the final assay, as representing the average."

We sincerely hope that the expectations of Mr. Deshler may be realized. The ENGINEERING AND MINING JOURNAL has never disputed the existence of tin in Dakota, but has demanded some proof that tin in paying quantity existed there as a preliminary to the enormous capitalization. This proof is yet lacking, and since the ore sent to England was notoriously selected as the best to be gathered in Dakota, its yield is no measure of what will be found in regular working. In view of the $15,000,000 capital of the present enterprise, it must be said that former strictures are still applicable.

Mr. Deshler says that it makes little difference to the stockholder whether the capital is five or ten millions, so long as his proportion remains the same. Mr. Deshler says that the English capitalists paid over 50 per cent per share for their stock, which would make the cash valuation of the property over $7,500,000, a perfectly absurd figure for a lot of prospects. Of the new stock which has gone into American hands, Mr. Deshler says that it was paid for, but does not care to state at what figure it was purchased.

We see no reason in any of this official information to change the opinion we have already frequently expressed, that the property is as yet almost wholly undeveloped, and thus far no paying mine has been opened on it. As it stands, the capitalization and price at which the stock was sold are inflated far beyond any present or prospective value. As we have frequently observed, it is possible that paying deposits may be found, and we sincerely trust this may be the case, though, shou'd it occur, it would in no way justify the selling of a property at from fifty to one hundred times its value.

A proof of the above was submitted to Mr. Deshler. The statement that the 40 tons sent to England "was notoriously selected as the best to be gathered in Dakota," he strenuously objects to.

June 22, 1889

DAKOTA.

HARNEY PEAK TIN MINING AND MANUFACTURING COMPANY.—The company has now about 150 men at work sinking shafts, and more men are being added as fast as there is room to place them. Much machinery is now being shipped, and a sampling mill is to be erected immediately. In this mill the ore from different mines will be treated, and when the best method of treatment is established for each class of ore, mills will be built in the line which this experience will teach is best. The company, it is stated, will undertake only the production of block tin.

October 12, 1889

THE WANING PROBABILITIES OF FINDING PAYING TIN MINES IN DAKOTA.

The promoters of the malodorous Harney Peak Tin-mining Company are pushing their schemes into print again, and evidently a stock boom is being worked up. This seems to have been started in London by securing the pages of the London edition of the New York *Herald*, and not only the *Herald* and the *Sun*, but other lesser luminaries here, have commenced to devote much, more or less valuable, space to "booming" the scheme.

The company which, with English capital, bought the numerous Harney Peak "prospects" at the prices of bonanza mines has done some exploration, and has sunk a number of shafts to very moderate depths. The best showing yet made, as we are informed by reliable experts who have recently visited the district, is in a mine where a vein varying from 18 inches to 48 inches of ore, estimated to run 2 per cent. of tin stone, is opened in the shaft, which was, at the date of examination, less than 90 feet deep. This, of course, is not a paying deposit, and from the information in our possession it would seem, much to our regret, that not a single paying deposit of tin has yet been opened in any part of Dakota.

October 12, 1889 – (cont.)

After years of prospecting all over the Territory, and after some shaft sinking and underground development, the result has not yet justified the high expectations we and others had held of the probability of finding a paying deposit of tin ; in fact, the failure to do so after so many years of work has greatly lessened the chances of such a deposit ever being found. We confess the results thus far are exceedingly disappointing to us as well as discouraging to investors, but they cannot be denied, and the present efforts to make a stock boom seem to us to be an indication that even the sanguine insiders are giving up hope.

It is said, on very good authority, that the entire tin output of Dakota for two years was recently made into a tin gavel, weighing about two pounds, and was presented to the chairman of the late Republican State Convention as coming "from the future base of the world's tin supply near Rapid City, Dakota."

All the good tin stone available was sent to London to help the deal, and probably a fresh lot of specimens will now be collected and sent to France to help the new scheme which we understand Mr. James Wilson is getting ready for the Paris market. The Dakota School of Mines is to be used, through Professor Bailey, to give the scheme a better appearance with the credulous Frenchmen. From what we consider entirely reliable information, we believe the whole scheme is worthless, a mere "bubble," which has no real value behind it; but Wilson and his associates make money whenever any one buys, and they have secured the assistance of nearly every one, from ministers down, in the so-called "tin districts" to help "boom" the bubble.

The English investors who disregarded our advice will have an opportunity to regret their course. We now warn others, whether English, French, or Americans, who may be disposed to invest in these schemes, to investigate the properties through disinterested and responsible experts before parting with their money. In New York they can learn many facts, and if they look and judge for themselves when in Dakota, they can easily ascertain the baselessness of the "boom" reports which are now being circulated.

April, 1890

PENNINGTON COUNTY.

HARNEY PEAK MINING COMPANY.—The cut in wages from $3 to $2.50 per day, which this company ordered to take effect on the 3d inst., was followed by a strike of the miners. This is the first strike of consequence by miners in the Hills.

January 3, 1891

TIN IN 1890.

The production in this country has made little progress. The oft mentioned Harney Peak mines have not commenced producing, though they are being opened with encouraging prospects. No further work has been done in Virginia or North Carolina, but some promising claims in Lower California have gone into the hands of an English company, and these are perhaps the first from which American tin may be expected.

February 6, 1892

HARNEY PEAK CONSOLIDATED TIN COMPANY.

This company, it is said, has executed a mortgage on all its property in the Black Hills for $5,000,000. The money will be used in the development of the works and in the erection of mills.

July 16, 1892

SOUTH DAKOTA.

Lawrence County.

Harney Peak Tin Mining Company.—The Black Hills "Daily Times" reports the following interview with Capt. Thomas, the English metallurgist, who came with Lord Thurlow's party to examine the property of this company. When asked to express himself regarding the property he said: "The mines, as far as developed, in my opinion are fully equal to those of Cornwall, if not better, as regards the quantity and quality of the productions." When asked if he thought the deposits would prove to be mere pockets that would play out after a time, he said he thought from the formation that they would prove inexhaustible, and when asked when the tin mill would be blown in he stated that it would probably be two or three months before the event would take place, as it would require that time to complete the railroad spurs from the several mines to the mill.

July 30, 1892

OUR TIN MINES.

The tin mining industry of this country is not in a flourishing condition; in fact, it is very unsatisfactory.

The Harney Peak Mining, Milling and Manufacturing Company's mines in South Dakota have been opened to a considerable depth at a great number of places, and a very large amount of money has been expended in this development work, and more recently in building a fine mill (which is illustrated in this issue of the ENGINEERING AND MINING JOURNAL), yet we hear of paying results, and, according to our private information, the supply of ore does not justify the starting of the mill. Moreover, the local papers are outspoken in denouncing the expenditures for property, claiming, with much corroborative evidence, that there has been gross dishonesty in this department of the company's business.

The ENGINEERING AND MINING JOURNAL was fiercely denounced some years ago when it warned English investors against this enterprise which was then being floated in the London market at $15,000,000. The outcome thus far, and the present prospects, have fully justified the advice we then gave. It seems pretty well established that at the present time no paying tin mines have been opened in South Dakota, though magnificent specimens and "promising" veins have been found in many places. Unfortunately the mines, like the companies, are better at "promising" than "performing."

In California the Temescal mines of the San Jacinto estate, also an English corporation, have greatly disappointed the investors and the experts who made such glowing reports on the property a few years ago. There the company injudiciously expended a very large amount of money in a worthless dam and in a mill, without ascertaining that the mine could supply it with paying ore—a blunder against which the ENGINEERING AND MINING JOURNAL warned the company at the very outset of its career. At present there are practically no reserves of paying ore in the mine. The output of tin which, up to a few months ago, had amounted to 120,000 lbs., will probably not exceed 300,000 lbs. this year. The ore in the reserves, it is said, runs only 3 to 3½ per cent. of black oxide, instead of the 12 to 20 per cent. so confidently set forth in the prospectus of the company two years ago.

It is yet perhaps too early to say that this property does not contain paying veins, but it is certain that there is nothing yet in sight which would pay, the quantity being wholly insufficient to supply an economical plant, and too poor to work on a small scale.

The company owns a large estate and has many chances yet for redeeming the past, but if our advices are to be relied on, a pretty thorough change in the administration will take place before dividends come in sight.

In Virginia, the Boston Tin Mining Company, operating the Cash Mine, in Rockbridge County, have built a large ($75,000) plant and have developed the property to the depth of 60 ft., and a length of some 200 ft., exposing a vein about 7 ft. wide of ore that is said to average 3 per cent. of tin. Unfortunately, the title to this property is so defective that it is at present impossible to say when or how it can be perfected. The vein is here said by experts to be extremely "promising," and the reserves already large for the amount of work done. Until the title is made clear, it is, however, unlikely that this mine will become a producer of any importance.

From all of this it is evident that our tin mines have thus far been disappointing. We do not, however, abandon hope that this industry will some day become important. Except in South Dakota the amount of development work done has been too little to condemn the properties, and even there it is possible that permanent deposits of ore of paying quality may be proved, as we sincerely hope they will be. Had the work of development preceded the sale to the English company, and had the whole enterprise not been floated with so many and gross misstatements its failure up to the present time to have become self-sustaining would not have attracted so much attention or criticism.

The manufacture of tin plates in this country has also been disappointing, though there is no reason whatever why this industry should not grow to very important proportions, even though the tin mines should defer for years the fulfillment of their promise.

August 6, 1892

Harney Peak Tin Mining and Milling Company.—The company has issued a mortgage to Henry Clausen, Jr., of New York; Frank Crisp, of London, and Samuel Untermeyer, of New York, as trustees, to secure the bonds issued by the company to the amount of $4,880,000. The mortgage includes all tin, both placer and quartz, and all other property owned by the company.

September 17, 1892

HARNEY PEAK TIN MINING, MILLING AND MANUFACTURING COMPANY.

Some time ago we mentioned the fact that Lord Thurlow and party, which included Capt. Josiah Thomas, of the Dolcoath tin mine, Cornwall, were in this city en route to the Black Hills, South Dakota, for the purpose of examining the properties of the Harney Peak Tin Co. Lord Thurlow's report, which bears date of July 25, has now been made public and from it we take the following:

The company owns 1,100 mineral claims of 10 acres each. The principal groups of mines on which the greatest development work has been done are the Addie, the Tenderfoot or Japanzy, the Gertie, the Coats and the Cowboy. From the particulars given we learn that the Addie has a shaft 600 ft. deep; that the drifts, aggregate 1,600 ft. in length, with an upraise of 545 ft. and 280 ft. of crosscuts. This mine is considered one of much importance on account of the strong body of ore on which it is sinking. The levels vary in richness, but the well defined lode goes down between clearly defined continuous walls. The shaft of this mine being divided into compartments, admits of sinking for attaining greater depth, and of stoping and hoisting ore simultaneously. It is decided to sink this mine 1,000 ft. or more as an experimental test of the depth of the ore deposit of the Black Hills.

The Tenderfoot is the next mine dealt with, and it is regarded as the representative mine of a very powerful group contiguous to the line of railway, and embracing the Darwin, Czar and several other important lodes. The main lode, strongly marked, can be traced for a considerable length, and has been tapped from below by the Japanzy tunnel of about 1,000 ft. in country rock. From the point of contact there extend drifts on the vein for 972 ft., with an upraise of 145 ft. It has also a 95-ft. shaft and other development works of about 500 lin. ft. This important group produces rich ore, and is expected to prove a large and valuable source of supply.

The Gertie is stated to be the richest mine yet opened in the district. The Cowboy, it is explained, is a comparatively narrow quartz vein, yielding magnificent stones of tin of exceptionally fine color. The engine is of 130 H.P., and is just now fully employed pumping from the bottom of the 315-ft. shaft. There are 938 ft. of drifts on the vein. In the case of the Coats mine, the shaft is 425 ft. deep, with 900 ft. of drifts, and an upraise of 120 ft. in ore. Taking the Gertie, Cowboy and Coats together, Lord Thurlow is of opinion that a "large amount of very high grade ore could be daily put into the mill, raising the average milled to a high percentage."

The supply of ore to the new mill is next dealt with. It is explained that it is from the five mines just referred to that it is intended to supply the new mill with 250 tons a day, there being sufficient ore available to do so for one year without further development. The boiler power in this mill is sufficient to work up to 500 tons a day, and additional milling plant will be added as soon as practical experience proves the class of machinery selected. According to the proportion of ore taken from each of the above mines, the average return of black tin will vary from 3 to 5 per cent.

Speaking generally on the subject of the tin ore-bearing zone, the report continues: "I have no doubt that the above five mines will prove fair samples of the great majority of the whole. They embrace quartz and mica lodes, and afford examples of the rich but narrow veins of ore, say from 1 to 4 ft. in width, as well as of the stronger lodes of lower grade ore varying from 4 to 12 ft. in width. The selection of these mines for first development is due to their being among the first discovered, and to their proximity and accessibility."

It is further announced that the company has executed a mortgage to New York and London capitalists to secure the $4,800,000 of bonds issued by the company. This mortgage includes all tin claims, both

September 17, 1892 – (cont.)

placer and quartz, and all other property owned by the company. The company, with the money thus obtained, will develop their property.

As usual, a great part of the report is made up of "estimates of hypothetical quantities of ore and of profits, it is hoped will be realized on the hypothetical ore." The time during which the patient stockholders are still to continue the exercise of their admirable faith, and when they are actually to receive some tangible "evidence of the things hoped for" are not stated in this report, nor does Captain Josiah Thomas tell us his opinion of the mines or his estimates of their profits, nor whether he is anxious to sell out his Dolcoath stock and invest in Harney Peak.

There are many other things curious people would like to know, but if the Harney Peak stockholders are satisfied others probably should be.

November 19, 1892

Pennington County.

Harney Peak Tin Mining, Milling and Manufacturing Company.—An exhaustive report on the tin deposits in the Black Hills owned by the Harney Peak Mining Company, made by Capt. Josiah Thomas, Superintendent of the famous Dolcoath tin mine in Cornwall, has just been made public. Capt. Thomas' report fully confirms the opinion expressed by the ENGINEERING AND MINING JOURNAL, that nothwithstanding the great show of tin ore in various parts of the Black Hills region, there are grave doubts as to whether any considerable body of ore exists or whether any of the mines can be worked at a profit. In view of the extravagant claims concerning American tin mines which have filled the daily papers, as well as many technical journals, during the past few years, this result from the careful examination of acknowledged experts is decidedly interesting. We shall publish the report next week. The value not only to this country, but to the world at large of the discovery of new and rich deposits of tin ore would be very great, for the increase in production of the metal has no more than kept pace with the increase in demand, as is shown, says *Engineering News*, by the following table, giving average prices of tin in the London market since the beginning of the century:

Year.	1800-'20	'21-40	'41-'60	'61	'71	'80	'88	'91
Cts. per lb.	16.6	15.3	23.3	26.6	26.7	19.8	25.5	19.8

Especially within the past few years has the consumption of tin shown an enormous growth and this is likely to continue for a long time to come unless the growth in demand should cause a marked increase in price. Tin and gold are about the only two metals which have not fallen heavily in "exchangeable value" in the last five decades in the face of enormous increase of demand, owing to enlargement of supply and improved metallurgical processes. For these reasons at least everyone will welcome the discovery and exploitation of really valuable deposits of tin ore in this country; but the stockjobbing and chicanery which has accompanied the prospecting of the Black Hills tin deposits has been of itself sufficient to make their actual value very doubtful.

December 17, 1892

Pennington County.

Harney Peak Tin Mining Company.—As was expected, considerable difficulty is being experienced in the concentration of tin by the Harney Peak mill during the first run. Operations upon Gertie ore have been suspended, owing to the fact that tin crystals were too fine to be saved by the jigs in use. The mill is now running on ore from the Cowboy mine, which contains the coarsest crystals of tin found in the Harney Peak region. The company is as yet undetermined as to what method and machinery will be required to separate the finer tin crystals in Gertie ore. The new plant of the Harney Peak company, in the main, however, is accomplishing all that has been expected, and the results thus far are promising and satisfactory. The company will separately test ore from each of the five properties more largely developed—the Gertie, Cowboy, Coats, Tenderfoot or Japanzy group and Addie—and thus expects to gain a knowledge of the average value of the tin rock of the entire district, before commencing operations on the ore unassorted. Increase of hoisting capacity at the Gertie mine, and the introduction of new machinery at the Tenderfoot group, where diamond drills have been used in prospecting, will shortly be necessary, and it is understood that the company is making preparations to secure this new machinery. Superintendent Childs was interviewed by a reporter of the "Black Hills Times," and said they will commence shipping concentrates east for refining about January 1. The company has no smelting plant. It has not yet been decided whether the concentrates will be shipped to Omaha, Aurora, Ill., or Jersey City.



GENERAL VIEW OF THE HARNEY PEAK COMPANY'S TIN MILL.

(photo – The Engineering and Mining Journal)

February 11, 1893

SOUTH DAKOTA.

Harney Peak Tin Mining and Milling Company.—Concerning the closing down of this company on February 2d the Deadwood "Daily Pioneer" says: "The number of men thrown out of employment is said to be upward of 400. This sudden change in the policy of the Harney Peak people is all the more confounding on account of recent reported rich strikes in the Tenderfoot and other mines of the company, and of the late heavy expenditure in mill improvements and approval and acceptance of such additions to their property. Some insinuate that the company has got tired spending money on barren property, but there are many who believe there is plenty of tin ore in the Harney Peak mines, and that the shutdown is attributable to internal differences in the corporation. A mine operator gave as his opinion that the English stockholders had got tired putting up money for the New York stockholders to spend. It is a well known fact that there has been a strong difference of opinion between the English and American stockholders concerning the operation of the property. The former desired to place the operations under experienced Cornwall tin miners, but to this the New York stockholders objected, and it is not improbable this difference may have led up to the present suspension." A more sensible view is that the company closed down, as we long ago predicted, because there was not enough tin to the ton of ore.

Despite the 'glowing reviews' that were sometimes reported in the investment journals of the time, and the amount of money put into development and construction, most of the mines never produced a single ounce of tin ore. The Harney Tin Company was questioned, and then a lawsuit and finally receivership was filed against the Company.

This information on the Harney Peak Tin Company was reported in the November 17, 1894 ***Engineering and Mining Journal:***

THE HARNEY PEAK TIN MINES.

Specially Written for the Engineering and Mining Journal by Arthur J. Morse.

The attempt to produce tin in the Black Hills of South Dakota, an enterprise of great national interest, began in about 1883 with the opening of the Etta mine near Hill City. A mill was built on this property, several companies were formed at various times and finally consolidated into the Harney Peak Tin Mining, Milling and Manufacturing Company with English and American stockholders. This company and its operations have been fully described in the Engineering and Mining Journal from time to time, with illustrations of its mill and property.

This company began operations on a very extensive scale—too extensive, as the results have shown. At least $3,000,000 has been invested by the English stockholders, besides what the Americans have furnished—an unknown amount it seems. In attempting to obtain control of the entire tin-bearing district something over 1,000 claims have been taken up or purchased, embracing a tract of country estimated to measure 9 × 15 miles. The two most distant points on the company's property are 24 miles apart.

Besides the Etta mill the company has erected at a cost of $235,000 a modern mill of 200 tons capacity, equipped with all the necessary machinery of the most modern type. It is lighted by electricity.

The company owns in all about thirty buildings of importance, including a hotel, office building, superintendent's house, machine shop, storehouses, hoisting works, etc. Besides these there are a number of smaller buildings. Among the seven shafthouses or hoisting works the one at the Addie mine is the finest, containing $30,000 worth of hoisting machinery, ore compressors, etc. There are five railroad spurs, comprising about 8 miles of road built at a cost of $200,000.

In the illustration shown the white, tin bearing "vein," or stratum, of greisen is pinched out entirely; the slates folding around it, but again widening out it continues in a straight line, dipping about 45°. A great number of these strata outcrop in this district.

What is considered one of the most promising tin claims at present is he Mohawk. The tin bearing vein on this property is not greisen but quartz, and not only prospects well at surface, but seems to rather improve with depth. It is thought that this ledge may be a true fissure, though it shows the same lenticular character so common throughout the Black Hills. The Cowboy and Coats ledges are also quartz, and show a similar character. It is doubtful if there are any true fissure veins in the Black Hills, though there are mineralized ledges of enormous extent. Dr. Ledoux may recommend sinking on the Mohawk.

About 5,000 tons of ore was run through the new mill, operating for about two months and giving employment to 300 men. It is difficult to tell what the results really were. Ore was takenfrom a good many mines and all run through together. What any one mine might show in a mill run is unknown. At the end of the above period the English stockholders became dissatisfied and refused to furnish further funds. The mill was closed down, and pending an investigation and settlement of difficulties,

Some of the mining claims have been opened up to a depth of 700 and 800 ft., others are "prospect holes," on which the assessment work has not been completed. Besides the mining property the company also owns much of the best farming land in the district.

Surface prospects everywhere in the Harney Peak district are excellent, but do not seem to improve with depth: rather the opposite. The theory of the formations as advanced by eminent geologists, is that the strata, originally flat, have been folded, until they now appear nearly vertical. The tops of the multiple folds having been eroded, the greisen, being harder than the surrounding rock, has been left standing out like dikes. This greisen, a white micaceous rock, is the tin-bearing material. Where the tin comes from is the chief question. If from below, it is possible a true fissure vein rich in mineral might be encountered at considerable depth. If gathered from surface waters no improvement over the present prospects can be looked for.

The peculiar formations of this district are illustrated as follows: Suppose the slates, etc., to be the layers in a jelly cake, and the greisen, in a pasty condition, to be the jelly. When the strata were folded and distorted, the greisen was pinched down in places by the "bucking" of the tougher slates, and again swelled out where the pressure was less severe. In this way it forms lens-shaped bodies more or less elongated and regular. One of these formations is beautifully shown in the mouth of the Gertie shaft, and similar occurrences are often noticed throughout the district.

In the illustration shown the white, tin bearing "vein," or stratum, of greisen is pinched out entirely; the slates folding around it, but again widening out it continues in a straight line, dipping about 45°. A great number of these strata outcrop in this district.

What is considered one of the most promising tin claims at present is he Mohawk. The tin bearing vein on this property is not greisen but the property has been placed in the hands of Dr. Albert R. Ledoux as temporary receiver.

Dr. Ledoux has not yet made a thorough examination of the property, but says he will recommend doing what assessment work is necessary for holding the claims, and if, on examination, any of the developed properties seems to justify it, will recommend starting the mill.

Dec 15, 1894 - Engineering and Mining Journal

Pennington County.

Harney Peak Tin Mining Company.—In the United States Circuit Court, New York, December 10th, a formal answer was filed in the pending suit against this company. The answer is long, but contains very little that is new, consisting substantially of a denial of all allegations of fraud in the issue or transfer of stock or issue of bonds by the defendants, May, Untermeyer, and others, and asserting that the consent of the stockholders to the execution of a mortgage was fairly and honestly obtained. The answer also claims that despite the failure of the company to operate mines in the Black Hills the property there is of great value and contains rich deposits of tin ore, and that this can be proved by disinterested parties. The defendants claim to be able to establish all this by proof when the case is tried.

April 27, 1895 - Engineering and Mining Journal

SOUTH DAKOTA.

Harney Peak Tin Mining, Milling and Manufacturing Company.—Dr. A. R. Ledoux, the receiver of this company, is in receipt of advices that some promising gold prospects are being discovered upon some of the property of the Harney Peak Company. This company has several hundred claims in the southern Black Hills, many of which have never been prospected for tin or any other mineral. Our readers have been kept advised of the developments of gold in the southern hills, where it looks as if two mines had become steady producers with considerable reserves. These mines are not over two miles from the Etta group, belonging to the Harney Peak Company, and advices received by the receiver this week state that upon the Legal Tender group, patented by this company, some rich quartz has been found, assaying very high. The Samelias and Philadelphia locations have also been prospected, with encouraging results. It is possible that the Harney Peak Company may become a paying business enterprise, without considering the question of tin.

May 23, 1896 - Engineering and Mining Journal

Harney Peak.

It is about two years since we recorded the appointment of a receiver for the Harney Peak Tin Mining, Milling and Manufacturing Company, and commented upon the unusual sagacity of the courts in naming for this position a man familiar with tin and other mines and their products. We think it was the general expectation that the parties most interested would, by taking receiver's certificates or otherwise, place the receiver in funds with which he could demonstrate by intelligent sampling and development what is the average assay in tin of the principal prospects which are the property of this unfortunate company. It is well known that under the original management vast sums were expended in the purchase of claims, numbering over 300, in the erection of costly mills, the laying out of the town sites, etc., etc., while comparatively little was expended in development work, so little, in fact, that on most of the properties the assessment work had not yet been sufficient to enable the company to acquire a patent.

Two years have dragged along, and for some reason the problem is no nearer a solution. The lawsuit, as in all similar cases, is dragging its slow length, and has proceeded no further than the examination of one witness in New York and some three or four in South Dakota. Considering the number of high-priced lawyers involved on both sides of the case in this country, to say nothing of the London solicitors, at least $100,000 must have been expended in legal warfare, when probably one-half of this amount carefully expended by Dr. Ledoux, the Receiver, would have determined the question whether there was tin in any of the properties likely to be worked remuneratively. The pity is the greater since the discovery of gold in the southern hills has surrounded the Harney Peak property with little prospects and a few real mines which show gold to an extent rendering it likely that profitable mines may be established in the district.

The Harney Peak Tin Mining boom became known as the biggest scandal in the Black Hills. Millions were invested in mines that in some cases never produced a an ounce of tin ore, and numerous investors were left with nothing but empty promises (and pockets) to show for their investments.

The Southern Black Hills

Only two areas of extensive mining occurred in the southern Black Hills, the St. Elmo and Clara Belle Mines, and the Spokane Mine. The St. Elmo and Clara Belle Mines were fairly prosperous, and several different types of minerals (along with gold) were found and mined for a number of years in the area. The Spokane Mine was the only property in the southern Hills where silver was found in marketable quantities.

The St. Elmo and the Clara Belle Mine

The St. Elmo and the Clara Belle Mines are located in the Southern Black Hills on the south side of St. Elmo Peak near the mining camp of Oreville. This dispatch from Deadwood reported in the June 1883 ***Engineering and Mining Journal*** describes the discovery of the St. Elmo Mine:

> The second discovery was made in the St. Elmo, a gold mine six miles from Custer, near the Sidney stage-road. Work began on the mine two weeks ago, and was continued in good ore from the start. The ledge was cut to a width of 50 feet, and recently a streak of exceedingly rich ore was encountered. Pieces of rock pulverized, making less than a pan, yielded fully $40 gold. The ledge can be traced on the surface a long distance. Miners are flocking to the locality from every direction.

The St. Elmo was purchased by Captain Marsh in 1897. As was typical of most Black Hills Mines, the St. Elmo was worked sporatically for a number of years.

To the south and east of the St. Elmo Mine was another area where prospectors found some gold in surface deposits. This area became known as the Clara Belle Mine. In early 1900 a well-known engineer and miner named Frank Hebert purchased the Clara Belle. For a few years he placer mined the surface gold deposits located in several areas on the property.



(Everton photo)

One of the placer mining areas on Clara Belle property

After a few years, Hebert started developing the property, and soon he had the shaft down 125 feet in the Clara Belle mine. The ore on the property was mostly free-milling, and relatively easy to process. As time went on the tunnels from the Clara Belle and the St. Elmo began to merge underground, as the two mines were relatively close together. Eventually Hebert ended up owning both properties.

Because the ore was mostly free-milling, Hebert brought in machinery to process on the property. One of the items he set up on the property was a small two-stamp Tremain mill. Hebert used this small stamp mill throughout his ownership of the property. In 1991 when the author visited the property, the Tremain mill was still standing.

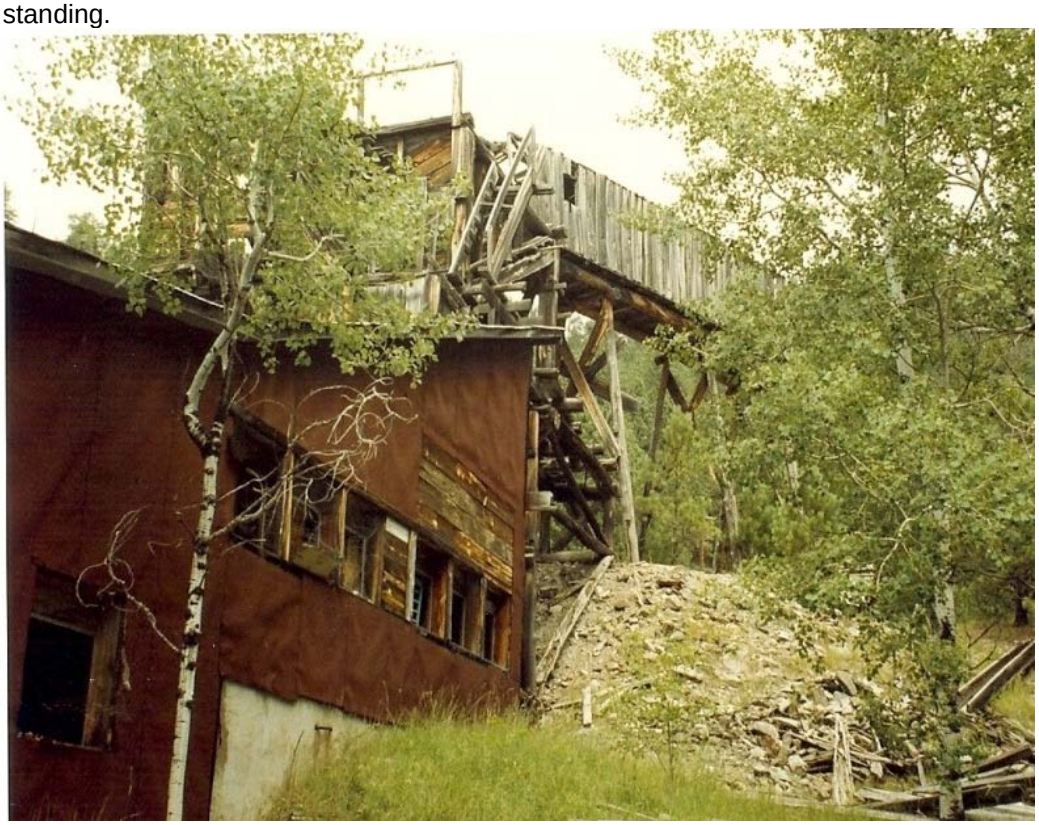


The two-stamp Tremain mill on the Clara Belle property



The two stamps

A processing plant was also constructed on the property In 1991 when the author visited the area, this processing plant and the overhead tram from the mine shaft to the processing plant was still (partially) standing.



The processing plant and the overhead tram



The overhead tram, processing plant, boiler and machine shed on the Clara Belle property

The Clara Belle property was worked until 1911. The property was idled and the mine and structures were left to deteriorate. Because the mine structures were located on private land, in a remote area of the Hills, they were left relatively undisturbed.

In 2012-2013 the author once again visited the area. The property had been purchased by a couple who were interested in the history of the mine, and the author was allowed to enter the property and photograph the structures.



The same view as above in 2013. Unfortunately the overhead tram has collapsed.



Collapsed overhead tram. The shaft is to the left. The tram brought the ore from the shaft to the top of the processing mill



The processing plant in 2013



Unfortunately the two-stamp Tremain mill had also collapsed

The Clara Belle property is the only place in the Black Hills where the processing plant and the majority of mining features remains (mostly) intact. The reason for this is that the property is on private land, and is somewhat protected. Although the structures are starting to seriously deteriorate, the owners of the property are interested in history, and will hopefully save or rebuild all or some of them.

Spokane

The other area of mining in the southern Black Hills is Spokane, located approximately 6 miles southeast of Keystone on what is now known as Spokane Creek. This information on Spokane was reported in the June 6, 1891 ***Engineering and Mining Journal:***

PENNINGTON COUNTY.

SPOKANE.—This mine at Squaw Creek is said to make a handsome showing at a depth of 40 feet, the ore being very rich and the full width of the vein 5 feet. The ore that has been tested averages about $70 in silver and lead, and consists of a mixture of galena and carbonate. Other good prospects are being located and quite a camp has sprung up in the last two months. The Custer people are building a new road nearly the entire distance, about 15 miles to the northeast. When completed this will make the mines easily accessible from Custer, and ore will probably be shipped from that point.

The Spokane mine was worked then idled for many years, all the way through the 1940's when tungsten and other minerals that were needed for the war and beyond were found in the ore bodies.

In 1917 a 50-ton concentration mill was built on the property. This structure, along with the shaft house, the manager's house, and several structures in the nearby mining camp of Spokane were left to deteriorate when the mine and property were permanently closed in the 1940's.

In 1987 the mill, shaft house and power house were burned in a fire.

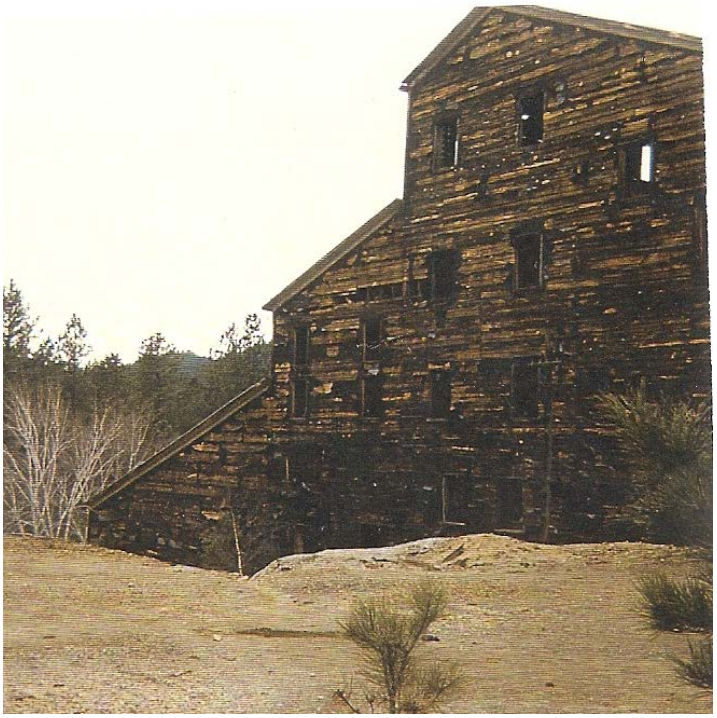


(all Everton photos)

The Spokane hoist, part of the power house and part of processing plant in 1886 (before the fire)



Spokane hoist and processing plant – 1986 (before the fire)



Spokane processing plant

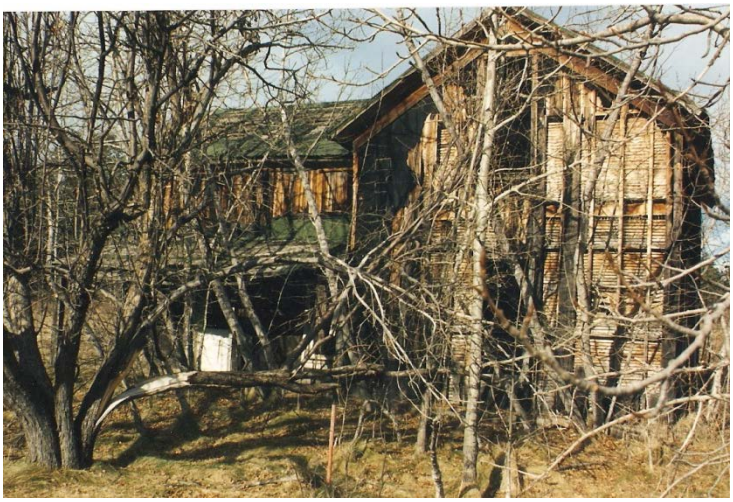
Although the mill features are gone, several structures still remain in the mining camp of Spokane. The caretaker's house and the school remain (partially) standing in the town itself, and the managers house remains (partially) standing near where the mine buildings were located. A grave is also located in the Spokane area; the grave is for a Spokane miner who was killed by another miner over a claim dispute.



Spokane school



Manager's house

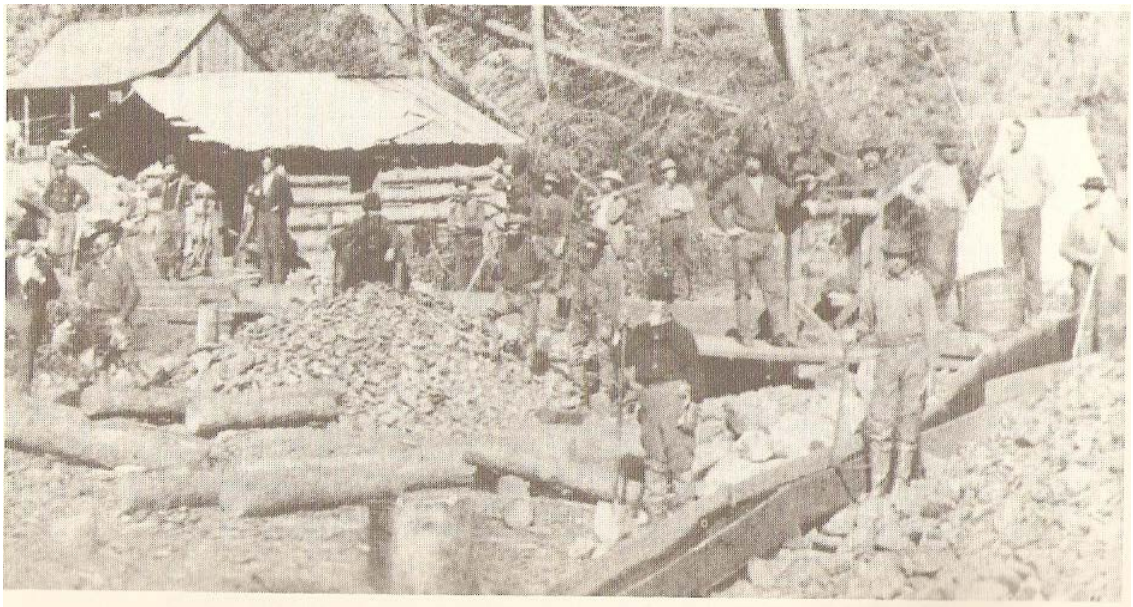


Caretaker's house

Types of Mining in the Black Hills



Miner's sluice box at Blacktail, South Dakota, around 1893.—Photo by courtesy of Mrs. John Finola.



Placer mine in Deadwood Gulch showing living quarters—location unknown.

(photo – Joel K. Waterland)

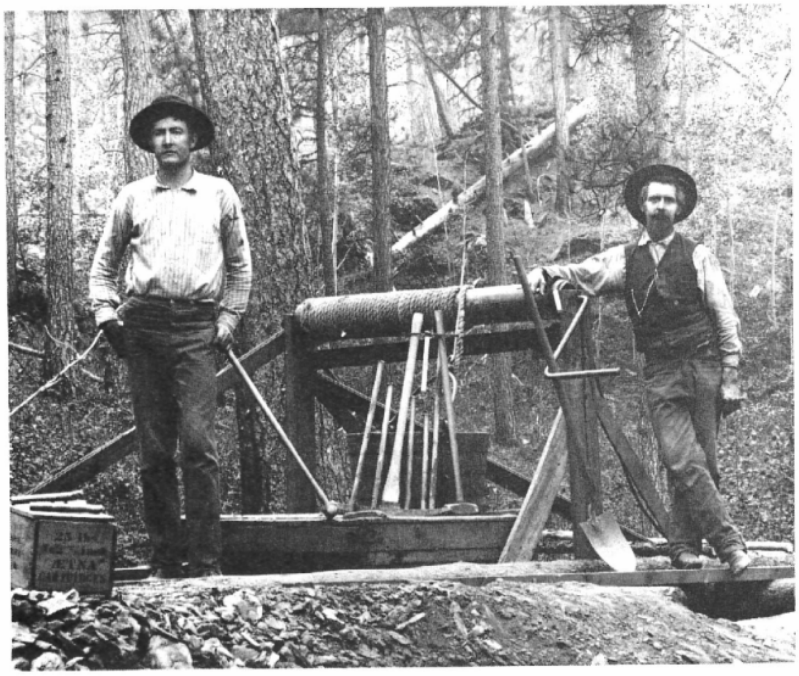


A prospector digging with his pick in his prospect hole, early days in the Black Hills.—Photo by W. J. Collins, by courtesy of Larry Carper.



Getting Ready for the Mining Engineer.

(photo – The Pahasapa Quarterly)



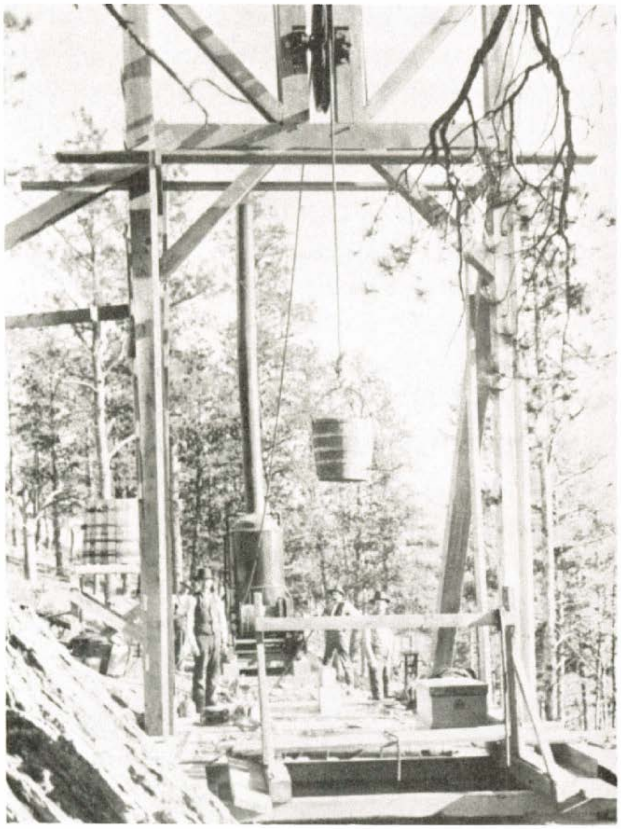
Early Black-Hillers could sink shallow mine shafts with the aid of hand-windlasses. Note the collection of hand tools on platform.

Courtesy Carper-Tscharner Photo Collection



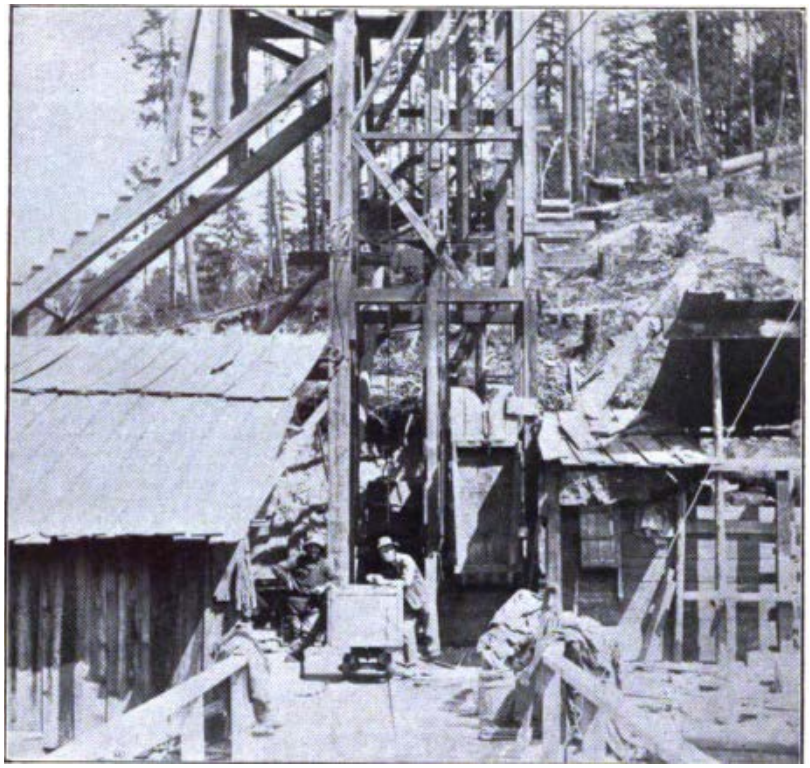
Ore was brought out of mines on cars which ran on wooden rails covered with strap-iron strips. Note platform box (left foreground) used to sort ore.

Courtesy Carper-Tscharner Photo Collection



Sinking shaft with donkey engine on Uncle Sam property—1899.

(photo – Joel K. Waterland)



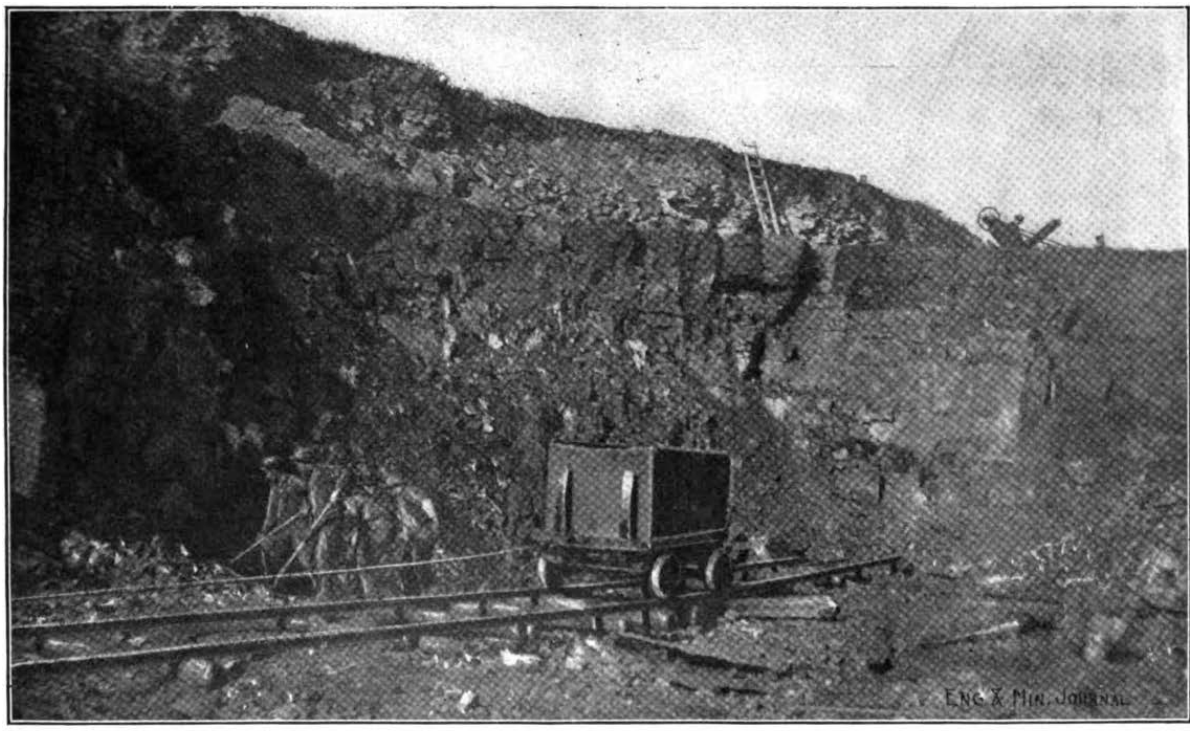
This photo from an April 1907 issue of Ores and Metals shows a double compartment shaft



Figure 9. Mouth of Golden Reward mine, Ruby Basin, ca. 1895. The Golden Reward Mining Company operated mines in both the Bald Mountain and Ruby Basin areas. Peter Rosen, *Pa-ha-sa-pah* (St. Louis: Nixon-Jones Printing Co., 1895)

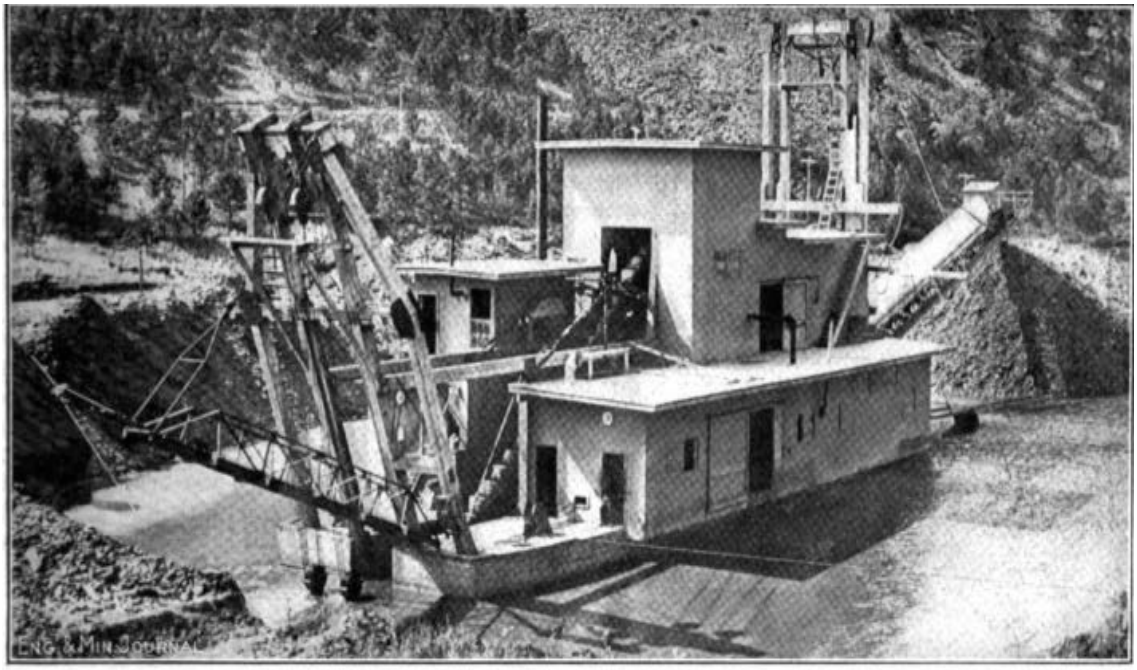


STEAM SHOVEL REMOVING OVERBURDEN AT A SOUTH DAKOTA GOLD MINE



LOADING ORE DIRECTLY INTO SKIPS AT THE NORTH SIDE OF WASP NO. 2 OPENCUT; THE OVERBURDEN IS REMOVED BY STEAM SHOVEL

(photos – The Engineering and Mining Journal)



GOLD DREDGE AT MYSTIC IN THE BLACK HILLS OF SOUTH DAKOTA

This dredge was built in 1911 and was operated until the latter part of 1913.

(photo – Engineering and Mining Journal)



DIAMOND DRILLING ON MAIN STREET—That's right! This crew was drilling on Main and Gold Streets on October 20, 1924. That's the Campbell House on the left, and the Black Hills Candy Kitchen on the right.

(photo – Homestake Sharp Bits)



Figure 79. Open cut, Lead, ca. 1909. The chasm carved by the Homestake Mining Company's open-pit mines dwarfs the company's mills and the town of Lead, situated at the top of this photograph. State Archives Collection, South Dakota State Historical Society



Figure 31. Water-powered arrastra, 1876. Enclosed in a rough log structure is an arrastra powered by a water wheel. The denuded hillside gives mute testimony to the heavy demand for lumber in the Black Hills.
Stanley J. Morrow photograph, State Archives Collection, South Dakota State Historical Society

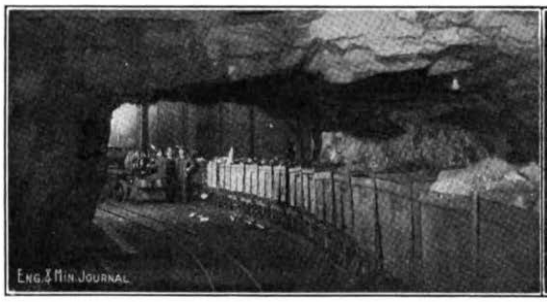


TRAMMING ON 100-FT. LEVEL OF HOMESTAKE MINE

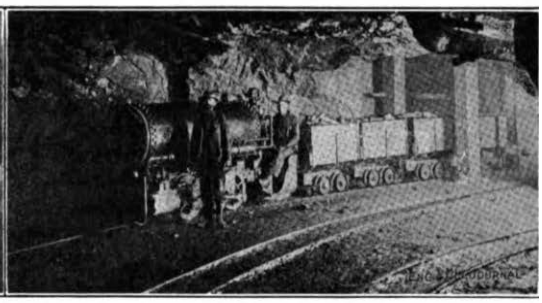


ON THE 400-FT. LEVEL OF THE HOMESTAKE MINE

(Copyright by W. B. Perkins)

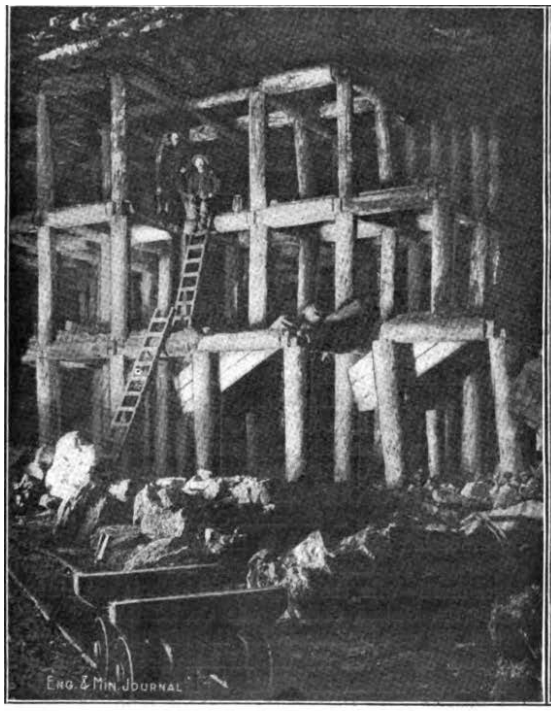


COMPRESSED-AIR LOCOMOTIVES HAULING TRAINS OF 16 CARS AT THE HOMESTAKE

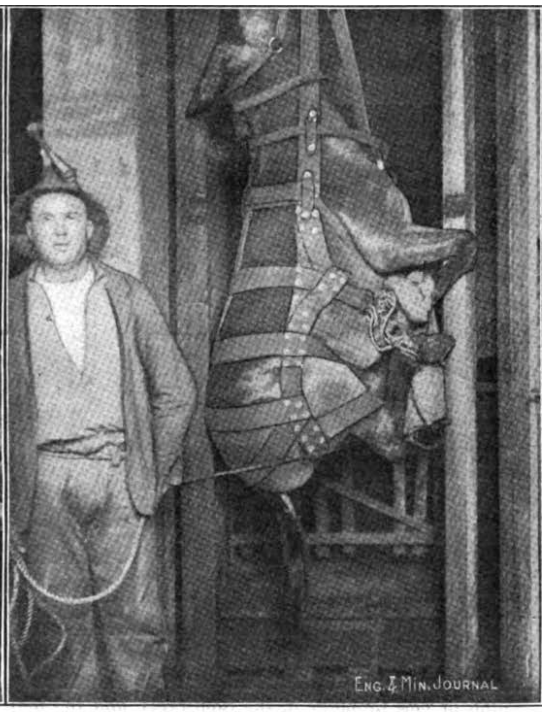


TRANSPORTATION METHODS AT THE HOMESTAKE MINE LEAD, S. D.

(Copyright by W. B. Perkins)



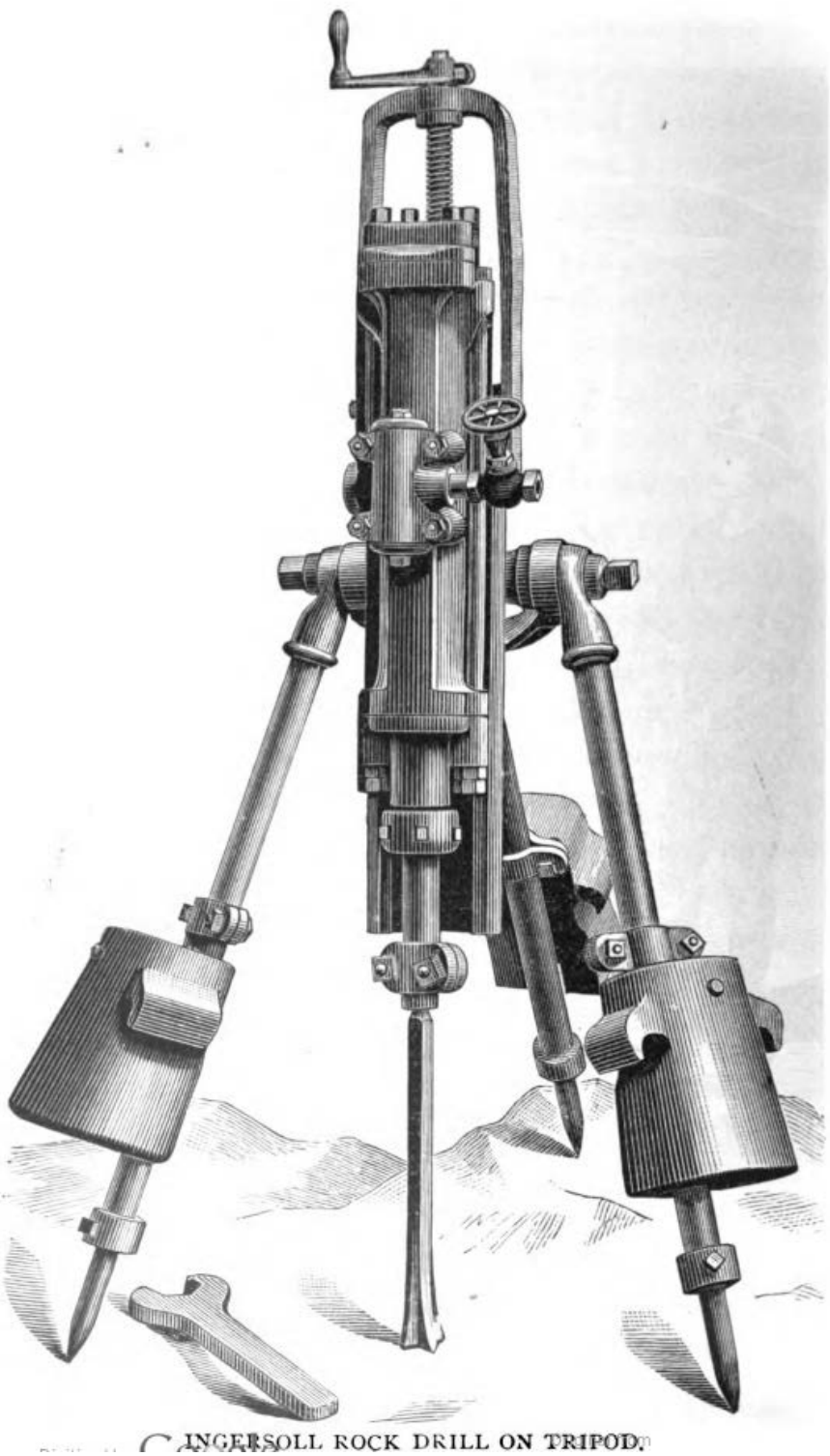
TIMBERED STOPE ON THE 200-FT. LEVEL OF THE HOMESTAKE MINE



HOISTING A MULE AT THE HOMESTAKE MINE, SOUTH DAKOTA

(Copyright by W. B. Perkins)

Mining Machinery Used in the Black Hills



INGERSOLL ROCK DRILL ON TRIPOD.

(Engineering and Mining Journal)

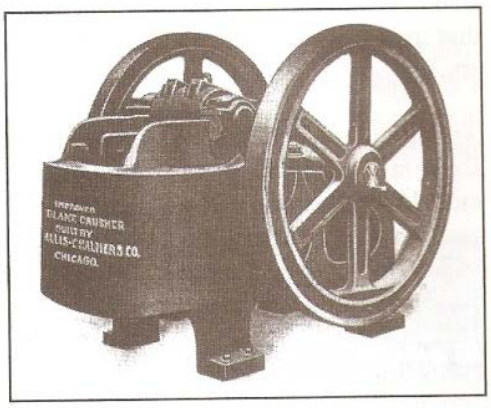


Figure 19 Blake Jaw Crusher
Source: Allis-Chalmers, 1903

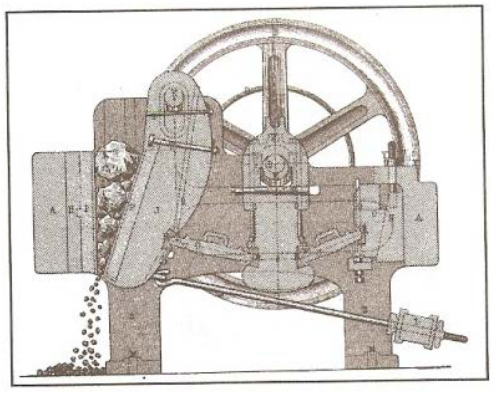


Figure 20 Blake Jaw Crusher
Courtesy USGS

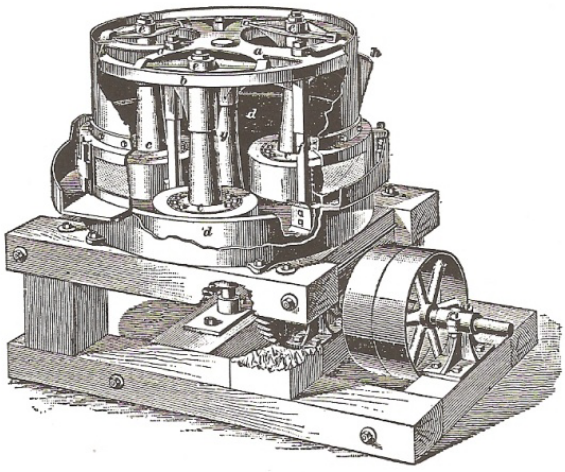


Figure 41. Huntington mill. As the central vertical shaft turned, the arms from which the cylindrical rollers were suspended also turned. The Huntington mill was used to crush ore that had already been broken into walnut-sized particles. *A Treatise on Metal Mining,* Vol. 4 (Scranton, Pa.: Colliery Engineer, 1899)

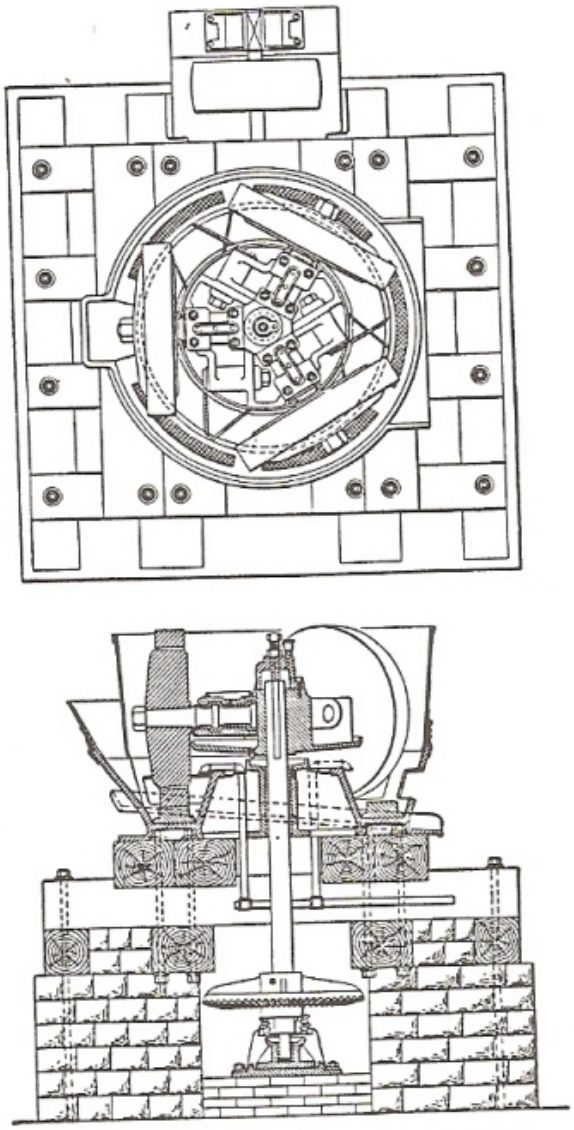
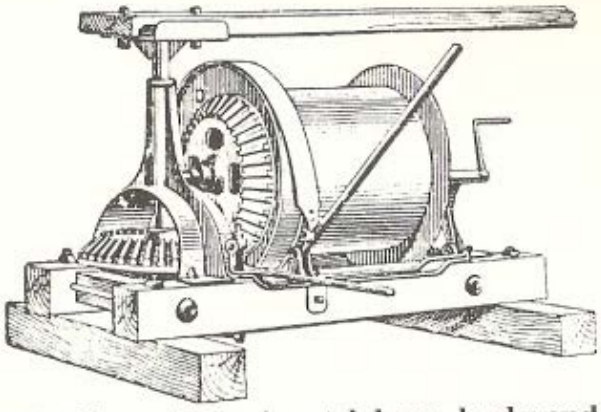
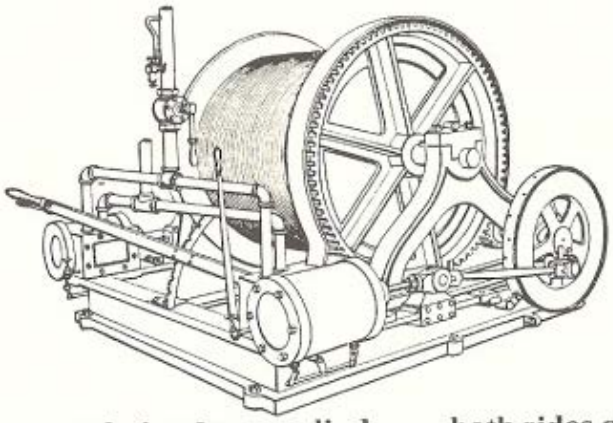


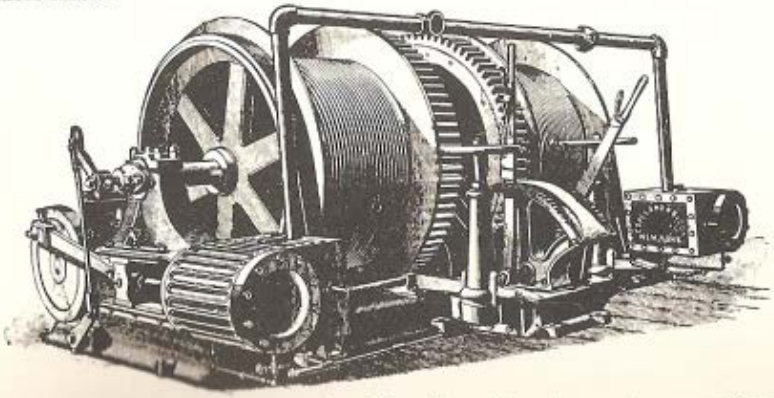
Figure 42. Chilean mill, plan (top) and section (bottom). Like the Huntington mill, the Chilean mill was a relatively inexpensive and portable fine-crushing machine, making it ideal for use in smaller plants. *A Treatise on Metal Mining*, Vol. 4 (Scranton, Pa.: Colliery Engineer, 1899)



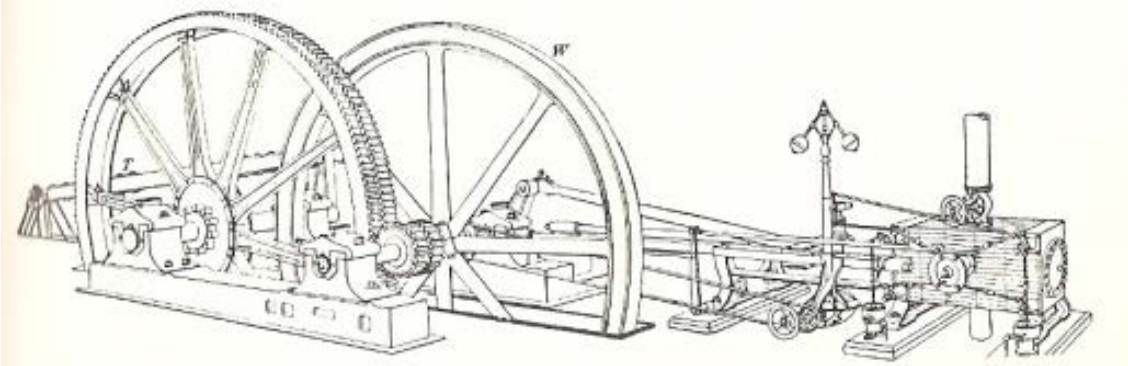
Horse-powered whim with horizontal drum, brake and clutch. Horse was attached to wooden shaft above drum.



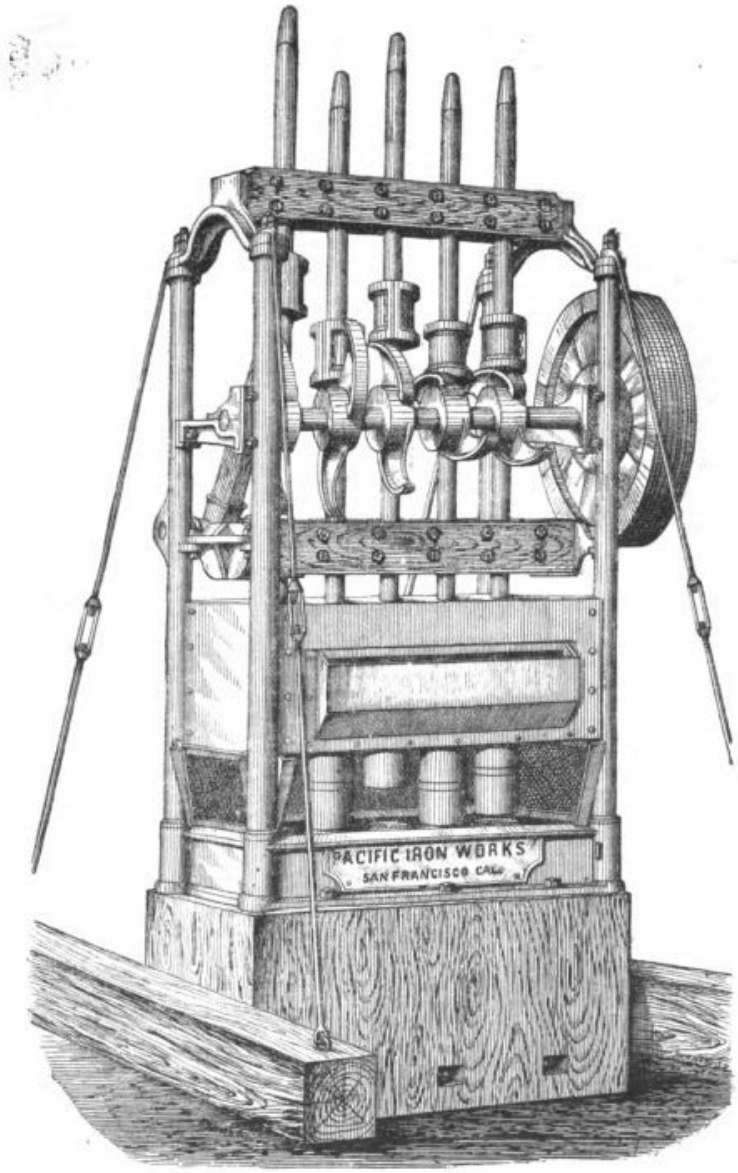
Single drum steam hoist: Steam cylinder on both sides of drum provided power. Brake and reversing levers in front, throttle valve on steam line.



Double drum steam hoist: Wheel brake adjustment, reversing lever and throttle lever in front.



Sketch of Corliss steam engine.



THE RELIANCE IRON FRAME PORTABLE STAMP BATTERY.

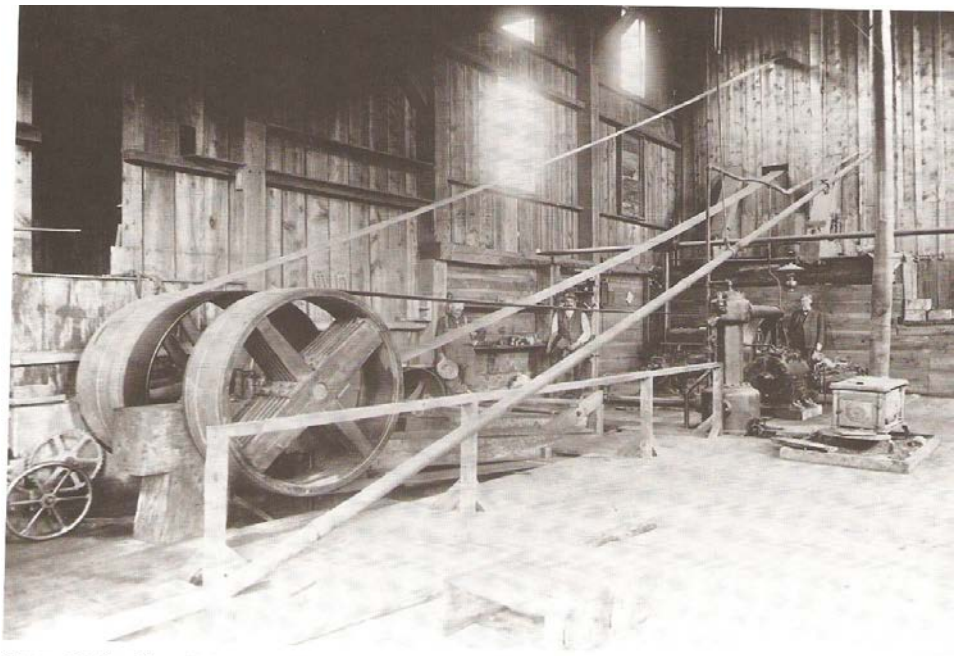


Figure 28. Standby mill, Rochford, ca. 1905. This mill was powered by a Pelton water wheel (not visible), which turned the pulley on the left to drive the stamps. The pulley on the right was connected to a compressor. State Historic Preservation Office Collection, South Dakota State Historical Society

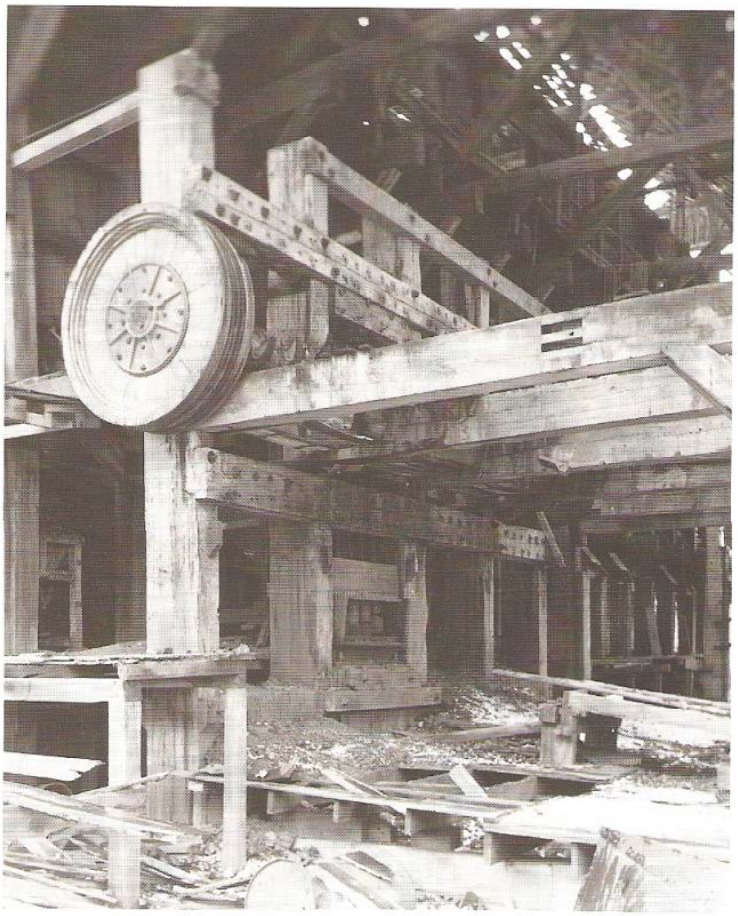


Figure 34. (*left*) Standby mill, Rochford, 1980. The wheel at left center in this photograph was attached to the pulley shown on the left in Figure 28. The wheel here is mounted at the base of the mill's camshaft floor. State Historic Preservation Office Collection, South Dakota State Historical Society



Figure 33. Stamp battery, Standby Mill, Rochford, 1980. The sixty-stamp Standby mill originally contained twelve of these five-stamp batteries for pulverizing ore. Massive timbers were needed to support the heavy equipment and dampen vibrations in the structure. State Historic Preservation Office Collection, South Dakota State Historical Society

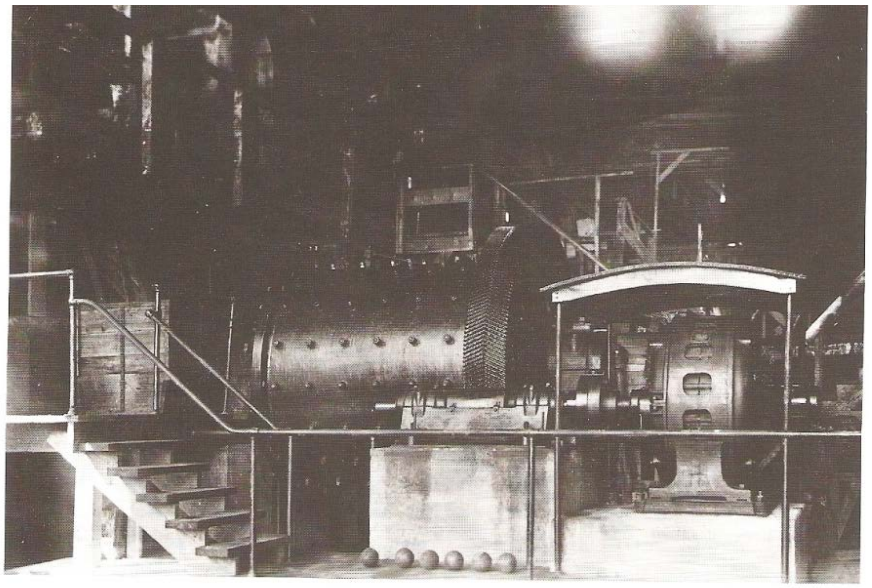


Figure 39. Ball mill, Bald Mountain mill, Trojan, 1919. Similar in concept to rod mills, the ball mill used forged-steel balls, which are lined up on the floor in this photograph. The electric motor that powered the ball mill is mounted beneath the curved canopy to the right of the mill. State Archives Collection, South Dakota State Historical Society

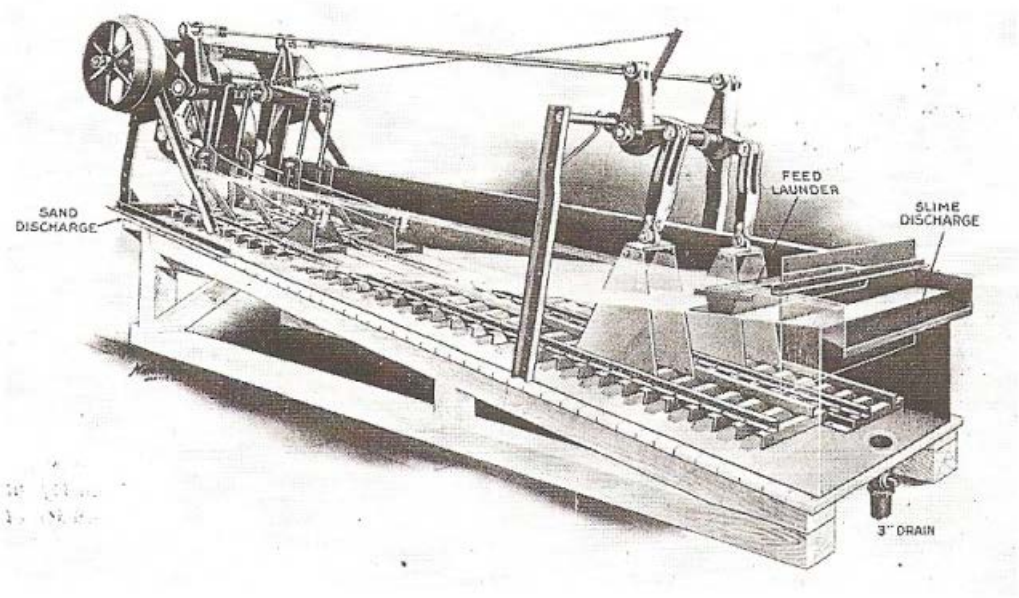


Figure 74. Dorr classifier. Dorr's invention to separate sands and slimes eventually attained worldwide distribution. *The Dorr Classifier, the Dorr Continuous Thickener, and the Dorr Agitator*, Catalog No. 5 (Denver, Colo.: Dorr Cyanide Machinery Co., Jan. 1914)

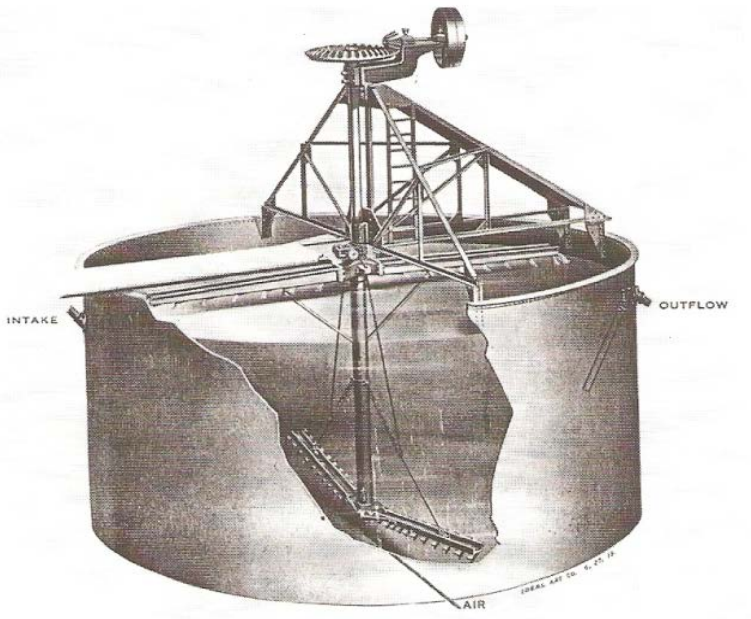
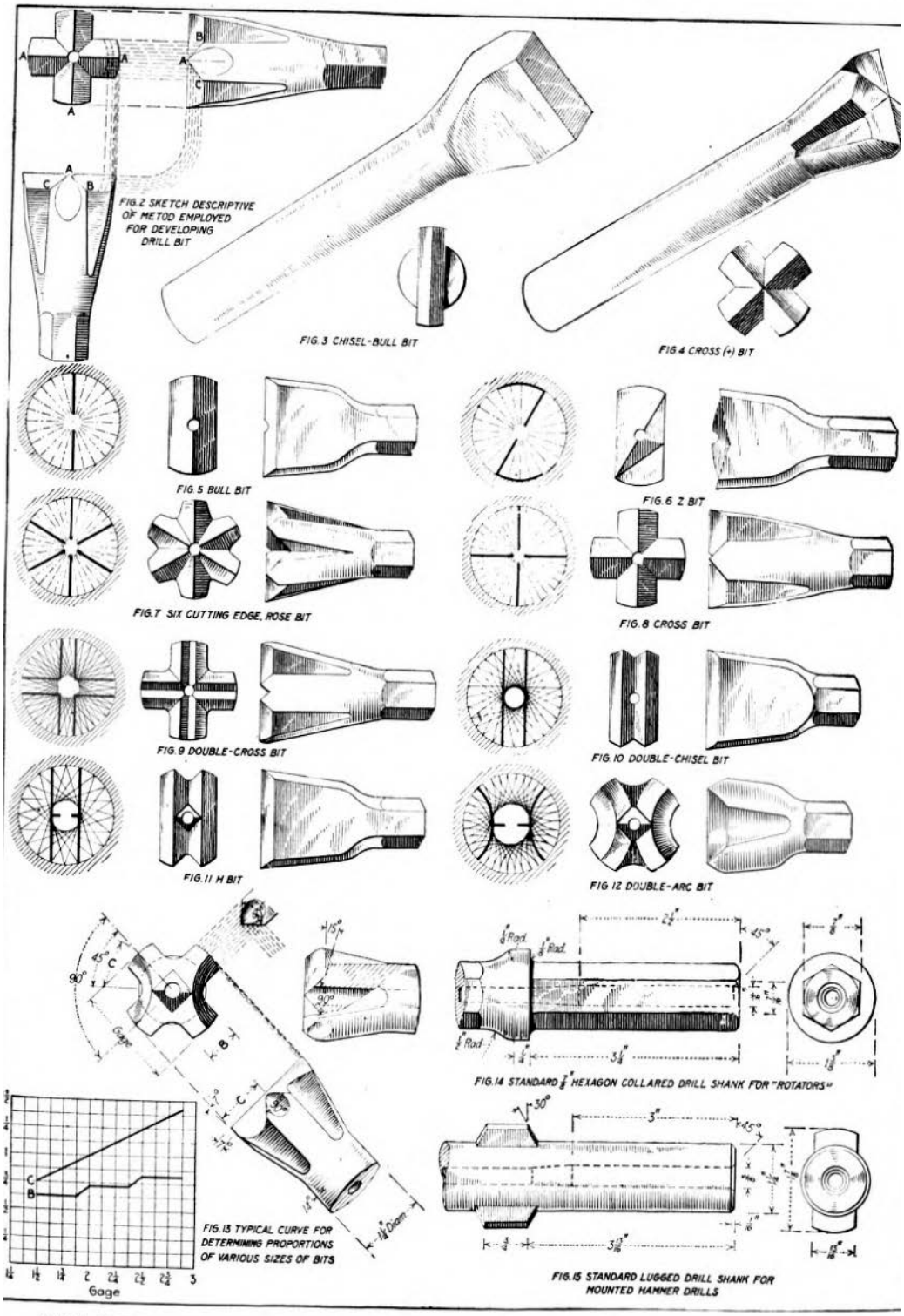
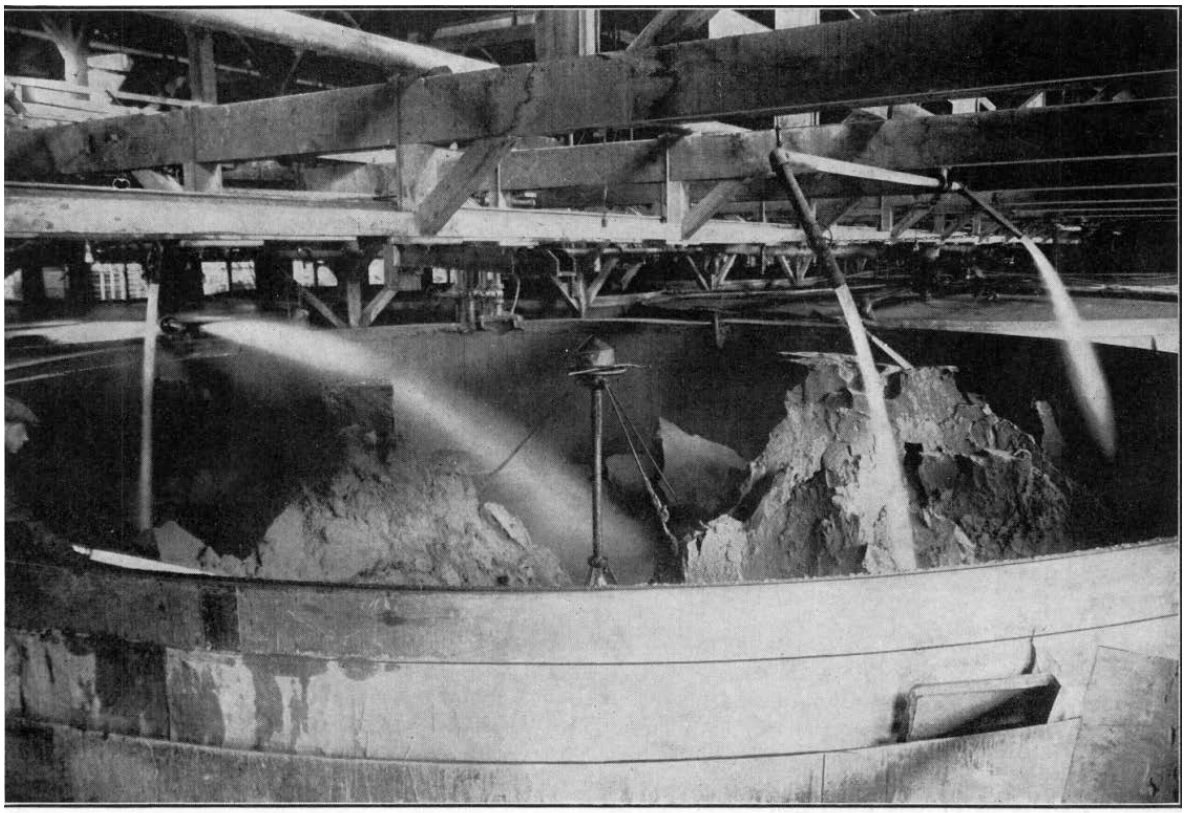


Figure 76. Dorr agitator. This modification of the Dorr thickener incorporated an air intake at the bottom to improve the efficiency of the thickening process. *The Dorr Classifier, the Dorr Continuous Thickener, and the Dorr Agitator*, Catalog No. 5 (Denver, Colo.: Dorr Cyanide Machinery Co., Jan. 1914)



TYPES OF BITS AND SHANKS, WITH TYPICAL CURVE DIAGRAM FOR DETERMINING PROPORTIONS OF VARIOUS SIZE BITS

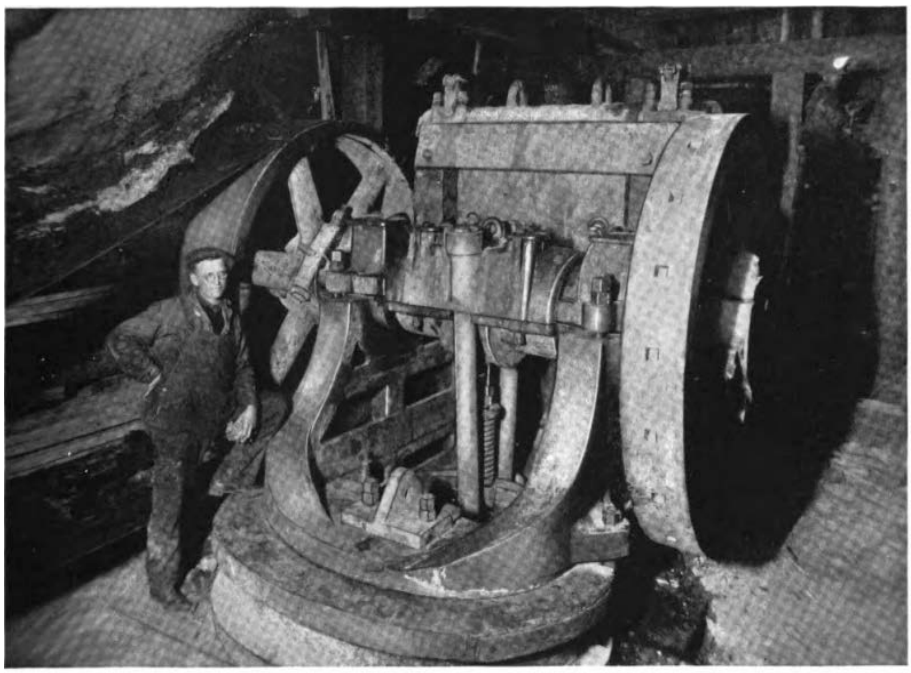


DISCHARGING A SAND TANK BY SLUICING AT THE HOMESTAKE MILL, LEAD, S. D.



Compressed-air locomotive for special haulage on the surface

(photo – Engineering and Mining Journal)



Jaw crusher used at 800 level

(photo – Engineering and Mining Journal)

Homestake

Conclusion

Mining in the Black Hills was conducted from 1876 through 2000. The majority of mining occurred between the years of 1876 and 1917. All types of mining occurred within the Black Hills Mining District, including placer and hydraulic mining, prospecting, hard rock mining including tunneling, drifting, shafts, and stopes, open pit mining, and shallow trench mining. Minerals and ores taken out of the Black Hills mines included (mostly) gold and silver, and also copper, tin, tungsten, spodumene, feldspar, mica, and a small amount of rare and other minerals. In the beginning many hundreds of thousands of dollars were invested into the mines in the Black Hills, and in the beginning a number of mines (especially along the Homestake mineral belt, the western extension at Bald Mountain, and the Wasp No. 2 Mine at Yellow Creek) paid their investors handsomely, but in the end only one mine in the Black Hills was prosperous enough to continue to pay investors. The Great Homestake Mine was at one time the second largest gold mine in North America, and was the only mine in the Black Hills that was profitably worked (almost) continually from 1877 through 2000. Although the Black Hills was one of the smallest mineralized areas in North America where mining was conducted, a good deal of ore was profitably taken out of the area, and the Homestake Mine was a legacy that made the Black Hills Mining District one of the best known in the world.

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