

REPORT
ON THE "OLD IRONSIDES" GROUP OF LODE MINING CLAIMS, LOCATED IN LAWRENCE
COUNTY, SOUTH DAKOTA.
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INTRODUCTION.

The property which is the object of this report is located in the Black Hills of South Dakota, on Squaw Creek, a tributary of Spearfish Creek, at altitudes varying from 4,600 to 5,600 feet above sea-level.

The Black Hills of South Dakota form a mountainous group in the great plains of Dakota and Wyoming; they are well covered with forests and well watered. The summers are dry and hot; there is considerable rainfall late in the spring; the winters are cold and the snowfall is moderate; the precipitation is extremely variable from year to year.

The main U. S. Highway from Colorado to Montana, No. 85, running north and south and locally connecting Newcastle in Wyoming with Deadwood in South Dakota, meets at the entrance into the Black Hills, at Cheyenne Crossing, a South Dakota State highway. This State highway follows Spearfish Canyon to the town of Spearfish. Eight miles before reaching Spearfish is a place called Maurice, at the mouth of Squaw Creek. The properties of the Old Ironsides group of lode mining claims are located about a mile and half up Squaw Creek from its junction with Spearfish Creek in Spearfish Canyon and also on both sides of its tributary Redpath Creek; they cover the ridge between Squaw Creek and Redpath Creek, and the western slopes of Redpath valley.

The little mining settlement of Carbonate is located about a mile to the northeast of the "Old Ironsides" property and it can be reached from Spearfish by automobile. Only foot trails connect the "Old Ironsides" property with Maurice and Carbonate, but an automobile road, following the valley of Squaw Creek could be made from Maurice to the main tunnel on the "Old Ironside" property easily and cheaply, a distance of a mile and half.

HISTORY OF THE DISTRICT.

The military reconnaissance of General Custer in the summer of 1874, which was the first to penetrate into the Black Hills, was accompanied by several miners and prospectors who discovered some placer gold. Another party, also with a military escort, was sent by the Government in 1875. The Homestake deposit was discovered in 1876 and in 1877 some of the claims covering part of it were acquired by a group of prominent mine operators and capitalists, the best known among them being George Hearst.

The Homestake ~~deposit~~ ore deposit has proven since then to be ~~one of~~ the largest gold mines of the United States and one of the largest gold ore body of the whole world. Its mining operations have overshadowed all others in the Black Hills. Nevertheless, a number of good mining properties have been exploited in this region, some in the pre-Cambrian rocks, which are the ones in which the Homestake deposit occurs, some in the sedimentary formations of Paleozoic Age, and some in the Tertiary eruptive rocks which have penetrated them.

The ore found in the "Old Ironsides" property belong to this last type. It was found as prospecting of the areas surrounding the Homestake deposit was carried on from time to time. Most of the claims forming the "Old Ironsides" group were located, or perhaps re-located between January 1, 1894 and March 24 1897.

GENERAL GEOLOGY.

The Black Hills are formed by an irregular dome-shaped anticline which upturned a nearly complete sequence of sedimentary formations, ranging in age from the Upper Cambrian to the latest Cretaceous, all dipping away from the central core.

The formations found in the basin of Squaw Creek and its close proximity are; from top to bottom:

CARBONIFEROUS.MISSISSIPIAN Pahasapa Limestone. Fine grained and massive bedded; light gray to dove color and white; it has a thickness of 600 feet in Spearfish Canyon. Englewood Limestone. It forms slopes at the foot of the Pahasapa Limestone cliffs; it is slabby; it is buff or pale pinkish in color; it is 40 feet thick.

ORDOVICIAN.UPPER ORDOVICIAN. Whitewood Limestone. It is from 60 to 80 feet thick; it occurs in hard massive beds, mostly buff or pinkish in color.

CAMBRIAN.UPPER CAMBRIAN. Deadwood Formation. It is a hard, brown or dusky buff sandstone, with a widespread conglomerate at the base, It is 200 feet thick in Squaw Creek basin. Where the Deadwood Formation is ore bearing, it is at two horizons, one a little above the base and the other a short distance below the top of the formation.

ALGONKIAN. It is the same as the pre-Cambrian formation, which is very wide spread in the Rocky Mountains region. It presents a considerable variety of igneous and sedimentary rocks in different stages of metamorphism, with granites and pegmatites. The amphibolites found in it are derived from diorites; they are in varieties from schistose to massive.

TERTIARY IGNEOUS ROCKS. The Algonkian and the sedimentary rocks of younger age have been intruded by laccoliths, masses, sills and dikes of eruptive rocks during Tertiary Time. Although these igneous rocks show considerable diversity in texture, they are all chemically related, a fact which indicates that they were intruded at about the same time geologically and that they came from a common magma. The chief varieties found in the area which is the object of this report are: Phonolite. A porphyritic rock containing no quartz; it has orthoclase and albite, aegirine and augite and feldspathoids. Quartz-monzonite and Rhyolite Porphyries. These are rocks from medium to fine grained in texture, containing both biotite and hornblende. Monzonite-porphyry. A fine grained rock gray to greenish in color and showing abundant prisms of hornblende.

The mountain region that extends from Bear Butte Creek to Spearfish Creek is formed by a secondary dome, that rises on the north end of the general uplift. At many places, the strata on the slopes of this dome are traversed by several local anticlines; these are due mostly to the intrusion of igneous masses into the strata of the northern Black Hills in early Tertiary. Intrusions of this nature are found in the basin of Squaw Creek, and in the area covered by the claims of the "Old Ironsides" group.

ECONOMIC GEOLOGY.

Among the metalliferous deposits of the Black Hills, the gold ores can be classified as follows:

Deposits in Algonkian Rocks; Homestake ore body. Quartz veins. Mineralized shear zones. Mineralized replacement lodes. Deposits in Paleozoic rocks. (A) Refractory siliceous replacements; Deposits in dolomites of Deadwood Formation. Deposits in Pahasapa Limestone. (B) Fossils placers. Deposits in Tertiary Porphyry.

I leave out any description of a number of these different types of deposits and confine myself to the description of the deposits in the Deadwood Formation and in Tertiary Porphyry.

The refractory siliceous gold ores found in the Cambrian rocks occur in an area extending from Yellow Creek to Squaw Creek.

In the Deadwood Formation, ore has been found mostly at two horizons; one known as the "Lower Contact" lies immediately above the basal quartzite, from 15 to 25 feet above the Algonkian. The other known as the "Upper Contact" lies 18 to 30 feet below the top of the member of the Deadwood Formation.

The Deposits in the Tertiary Porphyry have been found at several localities and one in Strawberry Gulch and the other near the mouth of Squaw Creek -- the "Old Ironsides" -- have yielded considerable ore. Much of the ore, some of it rich, occurs in thin sheets of auriferous limonite filling small fractures or it impregnates a decomposed portion of a large intrusive porphyry body. In the "Old Ironsides" mine, the ore, apparently sylvanite, occurs in connection with vertical fractures in a 40 foot sill of mica diorite porphyry in Deadwood strata. Silicification has occurred along these fractures and the ore has been introduced into the adjacent igneous rock and to a less extent into the Deadwood strata.

LEGEND OF FORMATIONS

TERTIARY

Oligocene; White River Group; Brule Clay and Chaudron Formation

Thickness 200 feet; peculiar clay of pale flesh color, passing into sandy members at the base.

CRETACEOUS

Graneros Shale.

Thickness 1,000 feet; of Benton age. (Missing; from top to bottom Pierre Shale, Niobrara Formation, Carlisle Shale and Greenhorn Limestone.) At the base 225 to 250 feet of dark Mowry shales; in some localities above it a bed of buff to gray massive sandstone, 12 to 25 feet thick.

Dakota Sandstone.

Usually less than 50 feet thick; gray to buff sandstone, which weathers brown.

Fuson Shale.

Usually less than 100 feet thick; forms a depression between a low crest of Dakota sandstone and a long slope of Lakota sandstone. Mixture of fine sand and clay; much of it is fire-clay.

Lakota Sandstone;

Forms most of the prominent hogback around the Black Hills; 150 feet thick in the northern part;

Morrison Shale.

(Placed here into the Cretaceous and not the Jurassic) 100 to 150 feet thick; massive shale, gray, greenish, maroon, calcareous.

JURASSIC.

Sundance.

Sandstones and shales, unconformable on the Triassic.

TRIASSIC.

Spearfish Formation.

It is the Red Beds and consists of 600 to 700 feet of red sandstone and shale.

CARBONIFEROUS. PERMIAN.

Minnekahta Limestone. Averages less than 40 feet in thickness, but is very hard and forms ridges. Color, light gray, pinkish or purplish.

Opeche Formation.

About 100 feet of red shale and sandstone.

CARBONIFEROUS. PENNSYLVANIAN.

Minnelusa Sandstone.

White and reddish sandstone, about 400 feet thick, with some limestone members, in the center and lower members.

CARBONIFEROUS. MISSISSIPPIAN.

Pahasapa Limestone.

Fine grained and massive bedded; light gray to dove color and white; 600 feet thick in Spearfish Canyon.

Englewood Limestone.

It forms slopes at the foot of the Pahasapa Limestone cliffs; is slabby; buff or pale pinkish in color; 40 feet thick.

ORDOVICIAN. UPPER ORDOVICIAN.

Whitewood Limestone.

Is 60 to 80 feet thick; occurs in hard massive beds, mostly buff or pinkish.

CAMBRIAN. UPPER CAMBRIAN.

Deadwood Formation.

Hard, brown or dusky buff sandstone, with a widespread conglomerate at the base; 200 feet thick in Squaw Creek.

ALGONKIAN.

Presents a considerable variety of igneous and sedimentary rocks in different stages of metamorphism, with granites and pegmatites. The amphibolites are derived from diorites; they are schistose to massive.

ERUPTIVE ROCKS. TERTIARY.

Phonolite.

Porphyritic rock; contains no quartz; has orthoclase and albite, aegirine, augite and feldspathoids.

Quartz-monzonite and Rhyolite Porphyries.

Medium grained to fine grained rocks with both biotite and hornblende.

Monzonite-porphyry.

Fine grained; gray to greenish; shows abundant prisms of hornblende

