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GREAT NORTHERN RY

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1.

The reports which follow will be embodied at a later date in proper <sup>and</sup> better form, in a final report on the work, embracing all available data, which can be personally verified, <sup>and</sup> giving to each factor its value with relation to possible manufacture of iron <sup>and</sup> steel in Montana.

Recommendations as to work are final and not subject to any material modification at later date.

## Iron and Copper Claims in the Sweet Grass Hills Montana -

2.

Geographical  
and  
Topographical.

Two complete and able reports have been made on these properties, the first by A. R. Sedoux, Oct 23. 1890 and the second by D. H. Bacon Nov. 10. 1890. In the interval very little has been done to change any of the conclusions therein expressed, as to future possibilities, or then existent facts.

Geography, topography and geology are amply and accurately described in the main in these reports. Page 34 of a book of notes and reports shows a theoretical sketch of the formation.

Geological

Briefly stated, the east buttes are formed by an intrusive mass of porphyry which is present in many varieties, and which has apparently forced its way up through Cretaceous layers. Smaller intrusions have later pierced both porphyry and Cretaceous layers in continuous dykes.

The commercial and economic feature is the presence of a contact belt between lime on the north and porphyry to the south which is traceable from the saddle between Mt. Browne and Mt. Royal around the north and northeast sides of Mt. Morris.

Acting on the theory that the "collar of limestone" surrounded Mt. Morris, the claims

have followed this trend regardless of the fact that the surface plainly shows this contact to continue eastward. It hence results that while the

Malvina claim in part  
M and M claim  
Mountain Chief claim  
Caturus claim in north corner

follow the contact, the  
Caturus claim in its length  
Helena claim  
Helena #1 claim  
Tradwell #1 claim

are all located on porphyry barren of any reasonable mineral indications, and the Tradwell claim encounters and follows another similar lime porphyry contact on the South side of Mt. Morris on which nothing of value is shown.

Details of  
Examination.

Beginning at a point on the Malvina claim the lime porphyry contact shows iron on surface. Several pits and cuts disclose from 1 to 4 feet of siliceous magnetite carrying pyrrhotite. General sample

|         |            |        |            |
|---------|------------|--------|------------|
| Gold    | none       | Iron   | 34.00 p.c. |
| Silver  | trace      | Silica | 29.20 p.c. |
| Copper  | .13 p.c.   |        |            |
| Nickel  | none       |        |            |
| Sulphur | 28.00 p.c. |        |            |

4.

at various points on the Malvina claim, bunches of copper ore have been encountered in the porphyry, and near various later intrusive dykes gold can be panned. These bunches of ore have been extracted and further work done in an absolutely aimless way, if designed to find ore. In one case a shaft is sunk on a small stringer which now shows

|        |        |
|--------|--------|
| Gold   | .10 oz |
| Silver | .20 oz |

at small depth all sign of vein or crack disappeared but not only was work continued but a tunnel begun and pushed in 80 feet in hard porphyry to reach a point beneath this shaft. Mr. Pegtmeier is now turning this tunnel east to strike the lime porphyry contact which may show something worth following. The various cuts, shafts and pits on the Malvina claim have been prospecting work which has thus far disclosed nothing of value.

There are no indications of iron ore bodies of any size or value on the claim as now shown. Personally I should spend no money on this claim.

5.

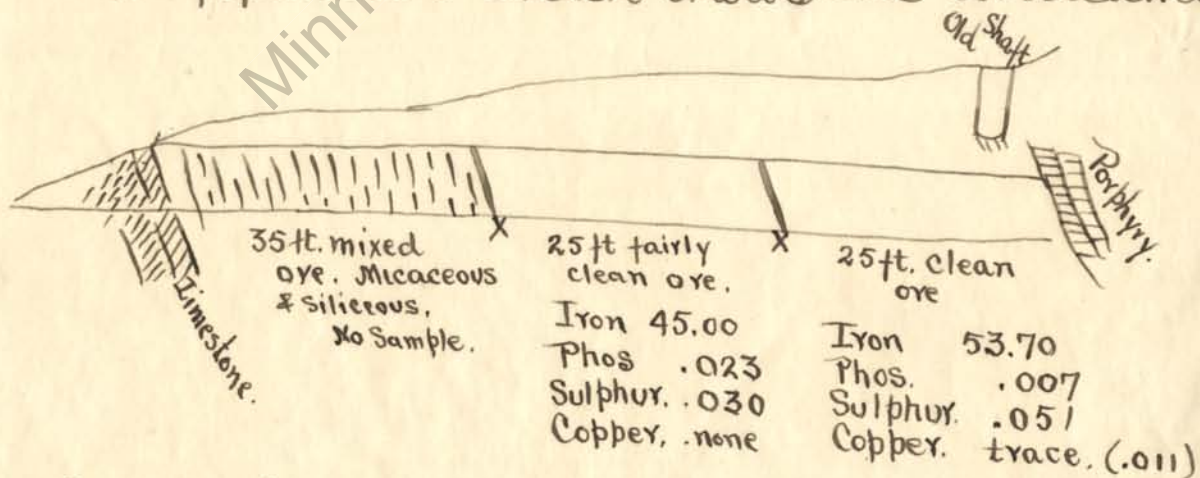
M & M.  
Claim.

lying next to the eastward is the M & M claim which apparently follows the contact for its entire length. The west end of the claim shows iron outcrop at some points. The east end is entirely covered with slide rock. Boulders in this slide rock point to the continuity of the iron ore deposit.

At a point about 500 feet from the west end line a shaft had been sunk which penetrated magnetic iron ore. Following this with good judgment Mr. Tegtmeyer has run a cross cut which shows magnetic iron formation, 80 feet wide between walls.

The ore is too near surface to be clean, but regard the showing as excellent as an indication. The vein apparently dips 70 degrees south <sup>Aug</sup> into the mountain.

The appended sketch shows the conditions



This constitutes all the work on this claim.

Mountain Chief.  
Claim.

On this claim has been done the main work and here is the chief showing of iron ore.

at about the center of the claim, has been sunk a shaft 45 feet in depth and from the bottom a crosscut run south 50 feet to the porphyry hanging wall. Both shaft and drift are in clean magnetic iron ore. A sample taken foot by foot in shaft and crosscut analyses as follows

|         |       |   |
|---------|-------|---|
| Iron    | 65.70 | % |
| Silica  | 3.47  | % |
| Phos    | .028  | % |
| Sulphur | .021  | % |
| Copper  | .113  | % |

The difficulty of pursuing development work with out machinery in ore of this character, will render the positive proof of tonnage difficult and expensive if work be devoted to shafts drifts and crosscuts, nor would the delivery be at a point desirable for delivery to railway.

The natural approach is by way of the Creek immediately below this shaft. As nearly as barometer's reading and pacing can determine, a tunnel 900 feet in length should cut the vein at a depth of 400 feet.

The work would be in lime which is the easiest to break of all the local rocks.

If any further work is to be pursued I strongly recommend this as the only work calculated to determine the value of the

7.

property for iron, copper or other mineral of value. Unless the iron is continuous to 400 feet depth, sufficient tonnage is not assumed to warrant exploitation as a source of iron ore supply. If copper does not appear at this depth on reasonable drifting, there is little hope of commercial copper deposits. The work will settle all points in a satisfactory manner.

Tonnage.

As this work comprises all of value for iron purposes, the cutting of the iron at 400 feet depth would give fair assurance of a body of ore 2000 feet long 50 feet wide and 400 feet deep or certainly 4,000,000 tons less proper deductions for low grade ores, which cannot be assumed without further development.

General conclusion.

After examining other reported iron ore deposits in Montana, tributary to possible operation at Great Falls, this deposit is among the largest in point of possible tonnage and as such important as calculated to furnish a considerable part of raw material needed.

As regards copper content I do not think this will seriously effect ores above 400 feet depth or water level. Below this

8.

point I am inclined to fear local increase of sulphur to a prohibitive point. Despite this the possible tonnage free from sulphur <sup>and large</sup> seems sufficiently probable to warrant the work recommended.

Other  
claims.

Passing to the east and south following the lines of location, very little work has been done. None of it discloses anything of value. Details are as follows:-

Caturus Little of this claim covers the contact, which is traceable east and off the claim. A tunnel about 60 feet long follows a narrow intermittent streak of iron ore in porphyry. Work in a cule north exposes the contact, barren of any commercial amount of iron ore.

Helena Open cut in slide rock. No rock in place. Shaft in barren porphyry. Cut east of latter shows decomposed bunches of pyrites in porphyry.

Helena #1 Shaft 500 feet from north end center in barren porphyry. Claim of no apparent value.

Treadwell #1 all in porphyry. No work on the claim.

9.

Inadwell. This claim partially covers the "south contact" previously mentioned. a tunnel 45 feet in length follows a streak of decomposed iron which pans a small amount of gold. There is no amount of float along this southern contact to indicate anywhere the presence of iron deposits of any commercial importance.

### Copper Claims

To the west of the iron claims on a southwest spur of Mt. Royal is a group of claims of which the "Brown Eyed Queen" is of sole interest. Local evidence of intrusive dykes of trap and banded porphyry are apparent. Near one of the latter occur bunches of copper glance.

Samples and specimens can be picked but there is absolutely no evidence of any continuous vein carrying copper ore. The ores if they can be so called consist of occasional bunches in the porphyry and there seems no promise in present work of the discovery of commercial ore bodies at any reasonable cost.

R. N. Vickman

Sept 1, 1901