

PRELIMINARY REPORT ON THE RABBIT CREEK GRAPHITE DEPOSIT,

PLATTE COUNTY, WYOMING \*

Location

The area covered in this report is located in T. 26 N., R. 60 W., on the eastern flank of the Laramie Range, Platte County, Wyoming. The deposit is 21.5 miles west of Wheatland, Platte County, Wyoming, on County Road 133; and 19.6 miles southwest of Dwyer, Platte County, Wyoming, on County Road 230. Both roads are graded, and travel is difficult during the rainy seasons. The mineral claims on this land have been held by Sidney S. Bartlett (deceased) and Fred W. Kroger of San Francisco, California. The administrator of the S.S. Bartlett estate is Albert S. Bartlett of Wheatland. Henry Phelps also of Wheatland now controls a third interest in the claim.

Field Methods

A total of 9 square miles <sup>were</sup> ~~was~~ mapped. Traverses were run at half-mile intervals normal to the regional strike. Field mapping was completed on aerial photographs, scale 1/50,000. Also a detailed planetable map of the immediate area surrounding the deposit was prepared on a scale of 1" = 100 feet. A copy of the Jetson Quadrangle, scale 2" = 1 mile, was used for horizontal control. Both the quadrangle and the aerial photographs were obtained from the United States Forest Service.

\* Condensed from Master's thesis, by Kenneth D. Patterson, University of Wyoming, 1950.

### Topography

The area is located in the foothills of the Laramie Range. Pre-Cambrian rocks predominate in the area, with tertiary-White River sediments to the southeast, and Quaternary (?) alluvium to the northwest. The topography in the north and west portions of the area are characterized by high prominent ridges of gneisses, and the southeastern portion consists of low-lying hornblende schist.

The graphite body lies in the western portion of the mapped area, and is located in a gneissic host rock. Exposures are excellent, and accessibility is good. Spring water is available towards the central and northern portions of the graphitic schist body.

### General Geology

The Rabbit Creek area is located in a region of pre-Cambrian schists and granitic rocks. Graphitic schist occurs in a major shear zone that trends northwest-southeast in the western half of the area. The shear zone is along the axial plane of a non-plunging fold. Hornblende, biotite and magnetite schist, along with gneisses, are also found in the mapped area. Other rocks are: clinozoisite rock, hornblende diabase, and quartz veins.

### Graphitic Schist

Graphitic schist occurs as an elongated body in sections 15, 22, and 27, T. 26 N., R. 60 W., in the Rabbit Creek area, Platte County, Wyoming. The body has a N. 22° W. strike, vertical dip, and can be traced for 4720 feet along the surface, with only one major break near Rabbit Creek. The

schist varies from a few inches to 30 feet in width. Exposures on the hilltops seldom reach a thickness of four feet, yet will attain their maximum width further down the side of the hills, and lense-out completely before reaching the valley floors.

The graphitic schist is dark-gray, amorphous graphite, containing microscopically granitic and quartz material. The unweathered graphitic schist is compact, highly fractured, and contains many drag folds and slickensided surfaces. Distinction between weathered and unweathered schist is based upon the conditions of the samples taken, although the elevation of the working has much to do with such a division. The upper portion of the body is highly weathered; whereas the lower portion is darker, more dense, and has a higher specific gravity.

TABLE I

Comparison of Mineral Composition in Weathered and Unweathered Graphitic Schist

| Mineral                  | Unweathered Schist | Weathered Schist |
|--------------------------|--------------------|------------------|
| Graphite                 | 20-40 %            | 10-25 %          |
| Quartz                   | 15-25 %            | 5-60 %           |
| Potash Feldspars         | 10-30 %            | 15-40 %          |
| Plagioclase (Oligoclase) | 0-10 %             | 0-5 %            |
| Cordierite               | 0-10 %             | 0-2 %            |
| Muscovite                | 0-2 %              | 0-5 %            |
| Garnet (Almandine)       | 0-trace            | 0-trace          |
| Magnetite                | 0-trace            | 0-trace          |
| Tremolite                | none-found         | 8 % in one slide |

The amorphous graphite has the following physical properties: opaque;; black with a metallic luster in reflected light; tabular crystals up to 0.5 mm. in length, thin flakes, and disseminated dust, the average length being less than 0.1 mm.

### Magnetite Schist

A lenticular body of magnetite is located in the eastern part of section 22. The body is 200 feet long, and 10 feet in maximum width; and strikes N. 50° E., dipping 30° S.E. The depth is unknown due to poor exposures. The foliation of the schist is parallel to the foliation of the surrounding hornblende schist.

Magnetite is present as distinct euhedral crystals, irregular grains, and in masses. The size of the opaque magnetite crystals varies from 0.1 to 3.0 mm. The schist is highly magnetic, but does not possess polarity.

Quartz veins and inclusions are common in the schist, and vary from 0.1 to 8 mm. in width, some of which may be traced for 20 to 50 feet through the magnetite schist.

### History and Development of the Rabbit Creek Graphite Mine

The Rabbit Creek graphite deposit was discovered by Billy Beaman, a German miner, who worked the deposit spasmodically until 1911. In the seven years he worked the claim, he is reported to have shipped only one wagonload of the higher grade ore to Denver, Colorado, by team and wagon. Because of poor roads about half of the original shipment arrived at the destination. This is the only known shipment to have been made from the mine.

In the spring of 1949 the mine consisted of 1 shaft, 5 tunnels, 10 prospect pits. Tram cars, tracks, etc., have deteriorated, or have been removed. Most of the workings are now overgrown with brush, and have been long abandoned. Work has been kept at the minimum for the legal retention of the lease. Locations of various workings are numbered 1 to 16 on Plate



III for the convenience of reference. Data compiled on the individual workings, have been recorded in Table III.

TABLE II

Mineral Composition of the Graphitic and Magnetite Schists

| <u>ROCK</u>             | <u>Minimum %</u> | <u>Maximum %</u> | <u>Average %</u> |
|-------------------------|------------------|------------------|------------------|
| <u>Graphitic Schist</u> |                  |                  |                  |
| Quartz                  | 5                | 60               | 35               |
| Graphite                | 10               | 55               | 30               |
| K-Feldspars             | 10               | 40               | 30               |
| Cordierite              | 0                | 10               | 0                |
| Tremolite               | 0                | 10               | 0                |
| Plagioclase             | 0                | 5                | 0                |
| Muscovite               | 0                | 5                | 0                |
| Almandine               | 0                | 5                | 0                |
| Magnetite               | 0                | trace            | 0                |
|                         |                  |                  | <u>95 %</u>      |
| <u>Magnetite Schist</u> |                  |                  |                  |
| Quartz                  | 30               | 60               | 50               |
| Magnetite               | 25               | 30               | 25               |
| Hornblende              | 10               | 25               | 15               |
| K-Feldspars             | 0                | 20               | 10               |
| Sphene                  | 0                | trace            | trace            |
| Graphite (?)            | 0                | trace            | 0                |
|                         |                  |                  | <u>100 %</u>     |

Reserves and Future of the Rabbit Creek Graphite Mine

The graphitic schist body, at the Rabbit Creek area, is 4720 feet long, 4 feet wide (average), and 70 feet maximum vertical thickness; or an estimated 1,321,600 cubic feet of schist. Thin section studies indicate an overall average of 21 % amorphous graphite, with flake size varying from

submicroscopic to 0.5 mm. in length. The reserves of the mine are computed in terms of pure amorphous graphite at 277,500 cubic feet, with no known valuable gangue minerals present.

The better grade ore could be hauled 20 miles to Dwyer, Wyoming; and be shipped via Colorado and Southern Railroad to market, should market conditions become such that mining could be carried out profitably.

TABLE III

Features of the Individual Workings of the Rabbit Creek Graphite Mine

| Working no.<br>(on Plate III)                   | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Width of<br>Graphite schist                     | 5'  | 4½' | 12' | 6'  | 4½' | 4'  | 11' | 5'  |
| Thickness of<br>interlayered<br>Gneiss          | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| Shaft, tunnel,<br>adit, or<br>prospect pit.     | P   | P   | P   | A   | A   | P   | A   | P   |
| On strike, or<br>across strike                  | AS  | OS  | AS  | OS  | AS  | AS  | AS  | AS  |
| Length of<br>working                            | 10' | 3'  | 12' | 16' | 21' | 5'  | 10' | 10' |
| Width of<br>working                             | 6'  | 4'  | 3'  | 6'  | 5'  | 5'  | 4'  | 5'  |
| Average height<br>of working                    | 3'  | 2'  | 4'  | 5'  | 5'  | 1'  | 4'  | 2'  |
| Maximum percent<br>of graphite                  | 30% | ?   | ?   | 30% | 20% | ?   | 15% | 25% |
| Maximum length<br>of graphite in<br>millimeters | 0.1 | ?   | ?   | 0.1 | 0.2 | ?   | 0.1 | 0.5 |
| Working in<br>weathered zone ?                  | yes | yes | yes | yes | yes | yes | no  | yes |

SYMBOLS: S - shaft, T - tunnel, A - adit, P - prospect pit.  
OS - on strike, AS - across strike.

TABLE III

Features of the Individual Workings of the Rabbit Creek Graphite Mine

| Working no.<br>(on Plate III)                   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Width of<br>Graphite schist                     | 4'  | 5'  | 24' | 26' | 4'  | 12' | 6'  | 8'  |
| Thickness of<br>interlayered<br>Gneiss          | 0   | 0   | 6'  | 9'  | 0   | 0   | 0   | 0   |
| Shaft, tunnel,<br>adit, or<br>prospect pit      | P   | S   | T   | T   | P   | P   | P   | P   |
| On strike, or<br>across strike                  | AS  | OS  | OS  | OS  | OS  | OS  | OS  | OS  |
| Length of<br>working                            | 10' | 60' | 23' | 60' | 12' | 16' | 12' | 8'  |
| Width of<br>working                             | 3'  | 6'  | 4'  | 4'  | 10' | 10' | 2'  | 10' |
| Average height<br>of working                    | 2'  | 6'  | 6'  | 6'  | 4'  | 4'  | 2'  | 2'  |
| Maximum percent<br>of graphite                  | 25% | 50% | 50% | 45% | 25% | 25% | 20% | 10% |
| Maximum length<br>of graphite in<br>millimeters | 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 0.1 | 0.1 | 0.1 |
| Working in<br>weathered zone ?                  | yes | no  | no  | no  | yes | yes | yes | yes |

SYMBOLS: S - shaft, T - tunnel, A - adit, P - prospect pit.  
OS - on strike, AS - across strike.



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES

GEOLOGICAL SURVEY OF WYOMING  
*MR 50-1*

Oil-Shale Demonstration Plant

Box 792, Rifle, Colorado

November 8, 1949

Mr. John R. McDermott  
P. O. Box 576  
Rock Springs, Wyoming

Dear Mr. McDermott:

Enclosed are two copies of a letter just received from the Laramie Station of the Bureau of Mines. You will note that Mr. Thorne does not want this data published as he feels the work is of a too preliminary nature to permit publication.

Mr. S. R. Zimmerley, Superintendent of the Intermountain Experiment Station of the Bureau of Mines, 1600 East First South Street, Salt Lake City, 1, Utah, has requested "several" gallons of the trona liquid for a preliminary laboratory investigation. If it is inconvenient for you to send these samples to Mr. Zimmerley at this time, please advise us and we will have Mr. Bolser pick up a five-gallon sample from each of your wells on or about November 19.

Very truly yours,

EMERY M. SIPPENELLE  
Mining Engineer

Enclosure

cc: Laramie (2) (w/o encl)  
S. R. Zimmerley (w/ encl)

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF MINES

Petroleum and Oil-Shale  
Experiment Station, Box 621

Laramie, Wyoming

October 31, 1949

Through: H. P. Rue  
Boyd Guthrie

Mr. Emery H. Sippelle

Rifle Station

Dear Emery:

This letter is in regard to two samples of brine which were left here by Carl Belser for examination. Sample SBR49-2376, which was delivered on September 14, was from McDermott No. 1 well, SW 1/4, NW 1/4, Sec. 5, T. 23 N., R. 106 W. of the 6th P. M. in Sweetwater County, Wyoming. Sample SBR49-2397, delivered on October 20, was mentioned in your letter to me dated October 25. The sample was from Shallenberger No. 2 well, SE corner, Sec. 6, T. 23 N., R. 106 W. of the 6th P. M., Sweetwater County, Wyoming.

We were not able to spend a great deal of time on these samples; however, we believe you will be interested in our findings which are given below.

The quantitative results on the samples are as follows:

|                             | Composition based upon original<br>brine sample. P. D. M. |                   |
|-----------------------------|-----------------------------------------------------------|-------------------|
|                             | Sample                                                    | Sample            |
|                             | <u>SBR49-2376</u>                                         | <u>SBR49-2397</u> |
| Total solids by evaporation | 58,710                                                    | 257,400           |
| Ash                         | 49,180                                                    | 52,890            |

Copy to: Rifle  
Carl Belser (Rifle)  
K. E. Stanfield

Copy to: J. R. McDermott (2)  
S. R. Zimmerley  
E. H. Sippelle  
A. S. Houghton  
Rifle Files



| Composition based upon original<br>brine sample. P. P. S. |                   |                   |
|-----------------------------------------------------------|-------------------|-------------------|
|                                                           | Sample            | Sample            |
|                                                           | <u>SBR49-2376</u> | <u>SBR49-2397</u> |
| Difference (mostly organic material)                      | 9,530             | 204,510           |
| Analyses made on ash but calculated to brine basis:       |                   |                   |
| Na <sub>2</sub> O                                         | 27,710            |                   |
| CO <sub>2</sub>                                           | 19,460            |                   |
| SiO <sub>2</sub>                                          | 32                |                   |
| B <sub>2</sub> O <sub>3</sub>                             | 196               |                   |
| K                                                         | 100               |                   |
| Ca                                                        | trace             |                   |
| Mg                                                        | trace             |                   |

These results are expressed in parts per million of original brine. Sample SBR49-2376 had a pH of 9 to 10; Sample SBR49-2397 had a pH of 7.5 to 8.0.

Both samples contained soluble salts of strong organic acids (soluble in 5 percent NaHCO<sub>3</sub>). As sample SBR49-2397 contained a greater amount of organic material, this organic material was examined in greater detail. Less than one-third of the organic material in the sample was soluble in water. The water-insoluble organic acids were recovered by precipitation from the brine with dilute sulfuric acid. The resulting acids were soluble in ethyl alcohol but only very slightly soluble in benzene, carbon tetrachloride and carbon bi-sulfide.

The water-insoluble fraction showed molecular unsaturation and a high ratio of acidic groups to hydrocarbon residue. The material had a low vapor pressure and only a small amount of distillate was obtained by distillation at 11mm., mercury, pressure. The distillate from 120°-220° C. resembled crude oil. Alkaline permanganate cleavage yielded isomeric butyric acids among other products suggesting the presence of humic acid-type structures. Based upon this limited study, it appears the mixture contains unsaturated aliphatic and naphthenic polycarboxylic acids, and aliphatic acids within the soap forming range are indicated. The acids appear to be largely humic acid-type structures.

On page 2938 of Chemical and Engineering News for October 10, 1949, an item mentioned analyses of brine samples similar to the above, and stated that, "Representatives of the U. S. Bureau of Mines, Salt Lake City Branch, were present in the field, took samples, made analyses and are following the investigation." The analytical data given above do not represent an extensive examination of the brine and are certainly not for publication. If the data are forwarded to the companies involved as an accommodation, it should be pointed out that the data are of a preliminary nature and are not publication.

Very truly yours,  
/s/  
H. M. THORNE

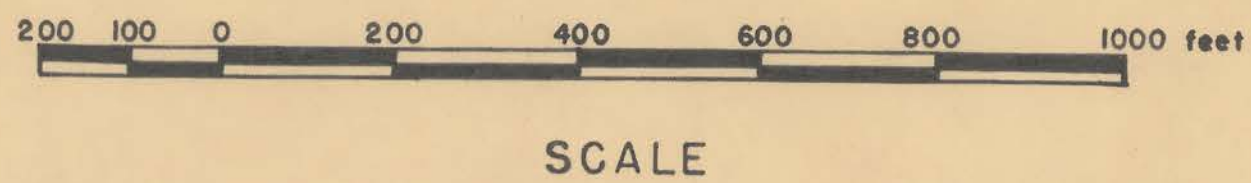
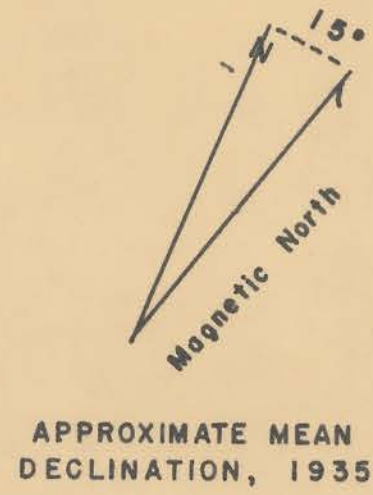


# GEOLOGIC MAP AND CROSS SECTIONS OF AREA ADJACENT TO THE RABBIT CREEK GRAPHITE MINE

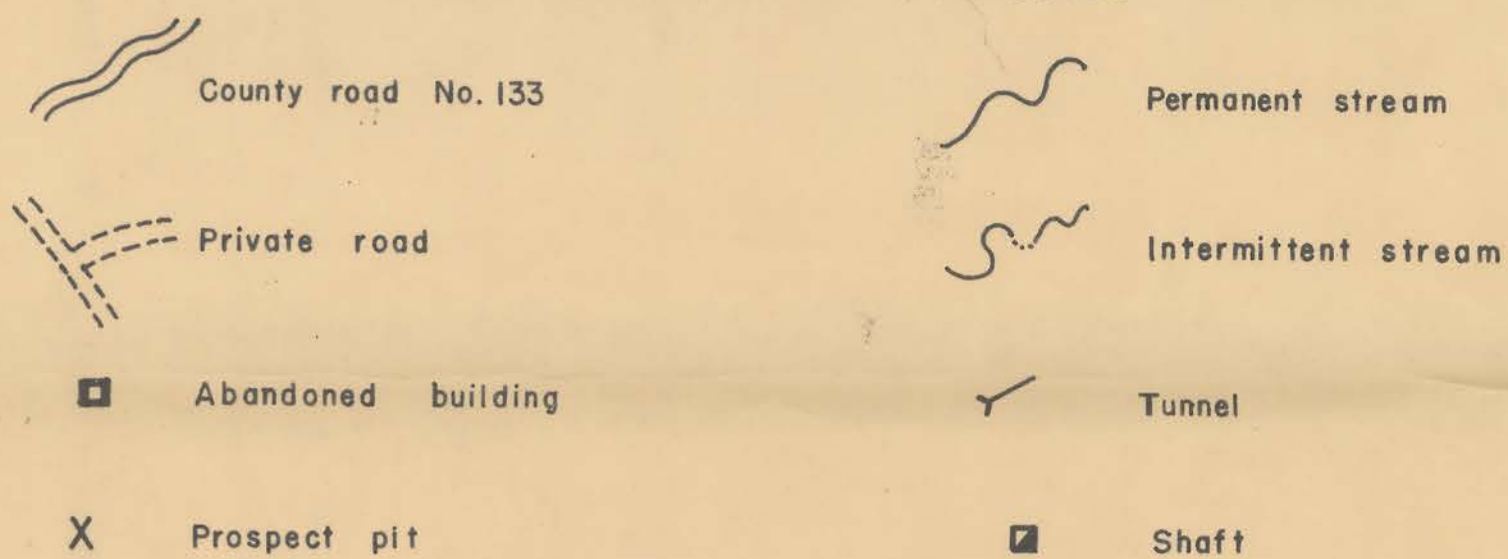
SECS. 15, 22, and 27, T. 26N., R. 70 W.

RABBIT CREEK AREA,  
PLATTE COUNTY, WYOMING

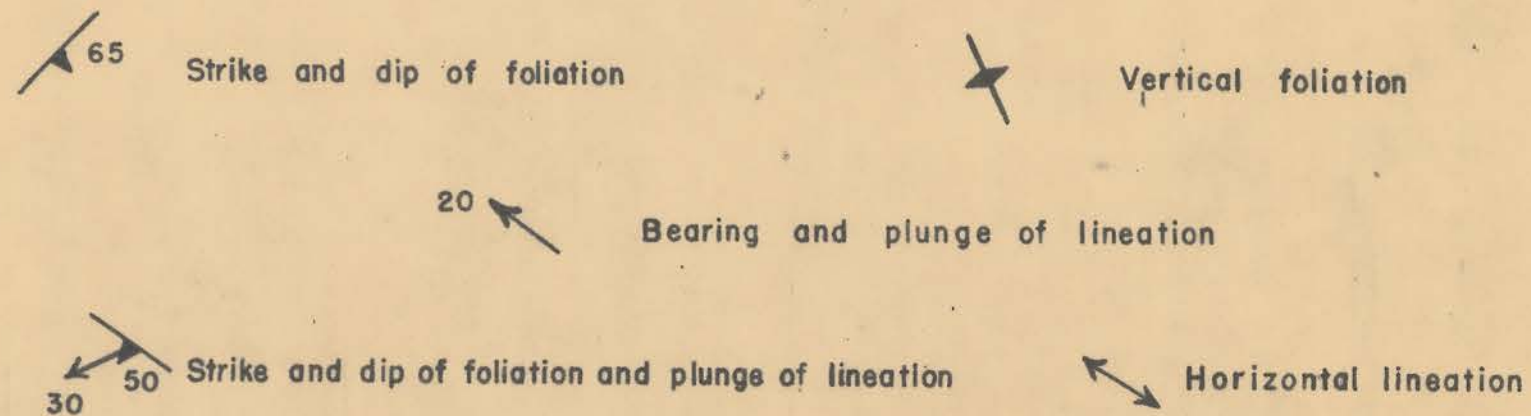
GEOLOGY BY KENNETH D. PATTERSON  
1949



## CONVENTIONAL SYMBOLS



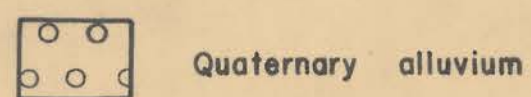
## STRUCTURE SYMBOLS



## MINERALOGIC SYMBOLS



## SEDIMENTARY ROCKS



## IGNEOUS & METAMORPHIC ROCKS



## CROSS SECTIONS

SCALE OF SECTIONS EQUALS SCALE OF MAP

