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FIRST ANNUAL REPORT

OF THE

MINING BUREAU

OF THE

STATE OF WASHINGTON.

FROM APRIL 1, 1891, TO APRIL 1, 1892.

OLYMPIA, WASH.:

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REPORT OF MINING BUREAU.

Hon. Elisha P. Ferry, Governor:

SIR—In accordance with the provisions of an act entitled “An act to create a Mining Bureau and to define its powers and duties, and declaring an emergency,” approved February 25, 1890, the Mining Bureau has the honor to transmit herewith a report of its operations from April 1, 1891, to April 1, 1892.

While the act in question contemplates that such reports should be transmitted on or before the 15th day of January of each year, yet it has been thought best to delay a report of the operations of this Bureau until this date, as circumstances have arisen which render the further active operations of the Mining Bureau useless, and the efforts of its officers in promoting the interests for which it was created valueless.

By an act entitled “An act making appropriations for sundry civil expenses of the state government for the fiscal term beginning April 1, 1891, and ending March 31, 1893, and for other purposes,” approved March 7, 1891, the sum of \$3,000 was appropriated by the legislature “for traveling and incidental expenses” of this Bureau, which amount has been dispensed as follows:

Voucher.	Name.	For what.	Amount.
5967...	B. M. Denton.....	Seven months' clerical services.....	\$525 00
6056...	Wm. Sternberg.....	Carpenter work.....	18 25
6135...	F. S. Harmon.....	Desk, chairs, etc.....	155 25
6136...	Arthur Ellis.....	Stool.....	3 50
6235...	E. Ricksecker.....	Expenses, tents, stationery.....	127 30
6374...	H. E. Parrish.....	Salary, expenses, etc.....	70 10
6775...	E. Ricksecker.....	Expenses, etc.....	261 95

WASHINGTON MINING BUREAU.

Voucher.	Name.	For what.	Amount.
6376...	H. E. Parrish.....	Supplies.....	\$102 20
6383...	B. M. Denton.....	Clerical services, April.....	75 00
6435...	Chas. A. Sayre.....	Drafting board.....	10 00
6438...	E. Ricksecker.....	Salaries and expenses.....	246 13
6442...	I. M. Larsen.....	Tent.....	28 00
6513...	B. M. Denton.....	Clerical services, etc., May.....	80 25
70-6...	B. M. Denton.....	Clerical services, etc., June.....	76 25
7654...	C. E. Laughton.....	Expenses from Conconully, attending session.....	291 55
7655...	A. A. Lindsley.....	Freight and telegrams.....	16 85
7656...	Paul Riecker.....	Services.....	200 00
7657...	B. M. Denton.....	Clerical services, July, August.....	150 00
7676...	A. A. Lindsley, assignee.....	Services Parrish.....	150 00
7815...	C. E. Laughton, assignee.....	Services Ricksecker, etc.....	201 25
8035...	Val. A. Milroy.....	Postage.....	10 00
8703...	A. A. Lindsley.....	Freight, etc.....	6 75
9725...	N. E. Neary.....	Blankets, etc.....	48 00
9726...	C. E. Laughton.....	Freight paid.....	2 15
9729...	Delprat & Ball.....	Insurance cabinet.....	6 40
9730...	Oscar Nuhn.....	Stationery.....	2 85
9731...	R. L. Polk & Co.....	Tacoma Directory.....	5 00
.....	B. F. Dennison.....	Services.....	100 00
	Total.....		\$2,969 98

This sum was intended by the legislature to be expended by the Mining Bureau for the divers incidental expenses which would necessarily be incurred, but owing to the decision of the supreme court (to be referred to later), which rendered unavailable the appropriation made for a geological and mineralogical survey of the state, \$920.68, properly chargeable to the appropriation for said survey, was diverted and charged by the auditor to the incidental expenses of the Mining Bureau. It is almost needless to say that this action upon the part of the auditor materially crippled the usefulness and investigations of the bureau.

In the general appropriation act of 1891, heretofore referred to, the following appropriation appears:

“Mining Bureau and state geologist: For salary of state geologist, at twelve hundred dollars (\$1,200) per year, two thousand four hundred dollars (\$2,400); for chemicals, at two hundred and fifty dollars per year (\$250), five hundred dollars (\$500); for contingent and traveling expenses, at one thousand dollars per year (\$1,000), two thousand dollars (\$2,000); for rent of offices, at six hundred dollars per year (\$600), twelve hundred dollars (\$1,200);

for rent of cabinet room for Mining Bureau, five hundred dollars (\$500); for traveling and incidental expenses, three thousand dollars (\$3,000); for making geological and mineralogical survey of state, and making and publishing maps and reports of the same, fifty thousand dollars (\$50,000)."

It was the intent of the legislature, without question, that the sum of \$50,000, above referred to, should be expended by the Mining Bureau for a geological and mineralogical survey of the State of Washington. In order, therefore, to carry out the purposes for which this appropriation was made, the Mining Bureau met April 9, 1891, and proceeded to consider the systematic organization of such a survey. At this meeting several applications for the position of engineers in charge of the projected survey were received. After carefully considering the qualifications and fitness of the various applicants, it was decided to place three surveying parties in the field immediately, and Messrs. Eugene Ricksecker, Paul F. Riecker and H. E. Parrish were selected as engineers in charge, to be known as assistant state geologists. These gentlemen presented credentials of the highest character, the two former having occupied similar positions in the corps of engineers of the United States army, and the latter having had many years' experience in the coal measures of Pennsylvania as assistant state geologist, as well as a varied experience in the coal fields of other states.

These three surveying parties were allotted stations as follows: Mr. Ricksecker was instructed to proceed with his work in Oganogan county, from a point to be selected by him as the most advantageous for the prosecution of the work in the mineral belt of that county. Mr. Riecker was instructed to make his base of operations from a point in the vicinity of Colville, Stevens county, and Mr. Parrish was instructed to begin his work on the coal measures of the State of Washington at a point on the Carbon river, near Carbonado, it being the policy

of the Mining Bureau to begin its geological and mineralogical surveys in those sections of the mineral belts which had been most actively prospected and developed; proceeding thence, as the work progressed, to make a thorough and comprehensive survey of the mineral belts of the entire state. The assistant geologists in charge were instructed to make weekly reports to the Mining Bureau, of the progress of their work and, also, reports at the end of each month or upon the completion of the work in any one mineral district; to transmit maps to the Bureau, showing the work done during the month or in that district. They were instructed to make thorough topographical, geographical, geological and mineralogical surveys; to note carefully the character of the country, as to its timber, water, water ways and fords, quality of soil, number and names of rivers and streams, its adaptability for settlement and for agricultural purposes; to collect specimens, securing samples of the ores produced by the various mines in the respective districts; to secure specimens of fossils, petrefactions, etc.; and, generally, specimens of interest of whatever nature, and forward same fully classified to the Mining Bureau for the state cabinet.

Letters were addressed to the Northern Pacific Railroad Company, to the Northern Pacific Express Company and to the Union Pacific Railroad Company, stating the object of the establishment of the Mining Bureau, and requesting special rates of transportation upon all minerals, specimens, etc., shipped over their respective lines and consigned to the Mining Bureau. It affords us pleasure to report that prompt and most gratifying responses to these requests were received, both companies very generously consenting to ship same free of cost.

As soon as the instructions of the Mining Bureau were received by the assistant geologists in charge, they proceeded to the several districts to which they were assigned. Messrs.

Riecker and Parrish were able to begin active field and topographical work immediately, but Mr. Ricksecker was obliged to devote more than a month's time in the establishment of his base lines, from which to commence operations, as no government surveys had been had in that portion of Okanogan county in which he was located.

His reports, showing what he accomplished from the date of the establishment of his camp until he was instructed to cease work, are respectfully submitted herewith. No maps accompany this work for the reason that his survey of the Salmon River mining district was not completed at the time the party was dismissed. Mr. Ricksecker, however, is in possession of his field notes, which can be utilized in the making of a map should the legislature, as it doubtless will, reenact the appropriation for a geological and mineralogical survey.

REPORTS OF EUGENE RICKSECKER, ASSISTANT
STATE GEOLOGIST IN CHARGE.

REPORT FOR THE MONTH OF APRIL, 1891.

WORK IN OKANOGAN COUNTY.

CONCONULLY, WASH., May 1, 1891.

Having been commissioned by you as assistant state geologist in charge on the 10th day of April, 1891, my time was occupied in collecting material for camp and field outfit from that date until April 23d, when, under your instructions, I proceeded to my field of operations in Okanogan county, Washington, taking two assistants, H. S. Heitzeberg and George H. Ricketson, with me from Seattle.

Arriving at Conconully by special stage on the evening of the 26th, I spent several days in climbing the hills to gain a better idea of the topography of the country while waiting the arrival of my camp equipage by freight team, most of which was purchased in Spokane. Here I made the further addition to my party in the person of C. S. Baldwin.

I was enabled to pitch camp on the 28th, my goods coming through from Coulee City in the short time of three days.

The many details of opening and organizing camp for a protracted field season were attended to as speedily as possible.

On the 30th the location for a base line was chosen. The site selected will allow the unobstructed measurement of a line more than a mile in length. It is admirably situated on the bench land between the town of Conconully and the summit of Mineral Hill, and will allow large angles and good figures in the development of the triangulation for this district.

Respectfully submitted.

EUGENE RICKSECKER,
Assistant Geologist in Charge.

REPORT FOR THE MONTH OF MAY, 1891.

CONCONULLY MINING DISTRICT.

CONCONULLY, WASH., JUNE 1, 1891.

A considerable amount of work has been accomplished during the month of May, though most of it, to other than the professional eye, is necessarily invisible. I refer to the triangulation of the district. I am engaged in mapping the Salmon River, or, properly speaking, the Conconully district.

A base line has been measured, remeasured and checked a third time, the mean result differing by a few hundredths of a foot from the actual measurements.

The final reduction of the base gives a length of 6,339.597 feet. To this a series of well selected points has been so attached as to form a system of triangles, from which the location of most of the points has been determined and the distance between same computed. This system is the basis, the network, for the map of this district.

The work of filling in between these points, the taking of the topography, locating mines and mining claims, houses, roads, trails, etc., was commenced on the 18th and prosecuted with no delay except that due to rainy days. Such days were utilized in arranging and elaborating information already collected.

The area finished is covered with timber, half of which, aided by moderately thick brush, makes progress slow, while the other half is composed of beautiful glades opening out into natural parks, presenting long vistas carpeted with luxuriant green grass and bright hued flowers.

I append a tabulated statement of the work done during the month:

Number of primary triangulation stations occupied.....	10
Number of primary triangulation stations selected and located.....	15
Number of topographic stations occupied.....	107
Number of points located.....	749
Number of elevations determined.....	866
Number of square miles mapped.....	1.9

Barometric observations were taken hourly two successive days conjointly at a Northern Pacific Railway bench mark, on the Columbia river, and at Conconully camp, giving the mean difference of elevation of 1609.5 feet, or 2438 feet as the elevation of my

camp above sea level. On this depends the vertical element of my work here.

I can speak to-day only of the superficial surface, but in all my travels I have yet to see a section of country that is as beautiful and gives as much promise of wealth to the masses—capitalist, prospector, farmer or cattleman—as this, my acquaintance of yesterday.

Respectfully submitted.

EUGENE RICKSECKER.

CONCONULLY, WASH., JUNE 7, 1891.

Hon. A. A. Lindsley, Olympia, Wash.:

DEAR SIR—My vouchers for May have been turned over to Governor Laughton, who has forwarded them, I believe. My report for May has been delayed on account of press of work. It will follow shortly. Work is moving smoothly now, and progressing as rapidly as accuracy will admit.

This being the largest district, there is an immense amount of work to be done here, and I am anxious to place another party near me to hasten its completion.

Yours sincerely,

EUGENE RICKSECKER.

CONCONULLY, WASH., July 1, 1891.

Hon. A. A. Lindsley, Secretary Mining Bureau, Olympia, Wash.:

DEAR SIR—I have been told that the month of June is Okanogan county's rainy season. Whether it is or is not, is yet an unsettled question in my mind. The past month has, however, been all that the farmer could desire.

Observations taken during the month show that there have been six days of almost incessant rain, and five days when light rains fell. The mean temperature for the month was 54 degrees Fahr. The highest observed, 70 degrees, on the 15th, and the lowest observed, 40½ degrees, on the 23d.

The amount of work accomplished by my party during the month is shown in the following statement:

Number of secondary triangulation stations occupied.....	13
Number of topographic stations occupied.....	114
Number of points located.....	1,227
Number of elevations determined.....	1,354
Number of square miles mapped.....	6.1

The above includes the southeastern, the southern and the southwestern slopes of Mineral Hill and western slope of Peacock. The work on Cowboy mountain, along Scotch creek through the Arlington townsite, along Conconully Lake and the southwestern slope of Homestake Mountain, is in an advanced state and will be completed the first part of July. The north face of Mineral Hill is heavily timbered, but I will be able to complete that, also, during the next month. This will leave Ruby Hill and vicinity, with a portion of Peacock, yet to be completed.

The mining claim stakes, as a rule, other than those surveyed for patent, have either disappeared or are rendered unintelligible by the elements. Most of the stakes have been set lightly into the ground and held in position by a small pile of rocks. These make excellent rubbing posts for the horse or cow and fall ready victims to their propensities. There have been located, however, 188 of these stakes.

Respectfully submitted.

EUGENE RICKSECKER,
Assistant State Geologist in Charge.

CONCONULLY, WASH., July 7, 1891.

Hon. A. A. Lindsley, Olympia, Wash.:

DEAR SIR—Yesterday I wired you: "Instructions received; can't move without an attachment being served on personal and state property." To-day I wire you: "Attachment served on me to-day; hearing set for 13th."

The sheriff interviewed me this morning at 6 o'clock and seized five horses to cover an indebtedness of \$66. I intended riding out with the freight team. None of my men have money, nor have I, for that matter. No state property has been seized as yet, although threatened. Hardenbergh brought suit in company with Dickson.

Am at a loss what policy to pursue here. The horses will be taken by the original owners if I do not appear at the hearing, and I do not see how I can stop them by appearing. This is the most outrageous thing I ever got into, and I sincerely trust that you will be successful in the efforts I hear you are making to cancel our indebtedness without delay.

Yours, &c.,

EUGENE RICKSECKER.

REPORTS OF PAUL RIECKER, ASSISTANT STATE
GEOLOGIST IN CHARGE.

Mr. Riecker performed most efficient work in Stevens county, as his reports which are appended hereto will show.

MAY 10, 1891.

DAILY ACCOUNT OF PROCEEDINGS AND WORK ACCOMPLISHED BY PARTY
IN CHARGE OF PAUL RIECKER, ASSISTANT STATE GEOLOGIST, IN
GEOLOGICAL SURVEY OF STEVENS COUNTY.

May 4, Monday—Weather fair:

Left Spokane at 7 o'clock A. M., via Spokane & Northern Railroad, for Colville; party consisting of Mr. Riecker, in charge, five men and cook, and carrying principal portion of outfit of instruments, tents, materials, etc. Arrived at Colville, which is the northernmost outlet of mining district of Stevens county, at 11 o'clock A. M. Pitched first camp just north of town. Collected material and provisions to complete necessary outfit.

REMARKS ON COLVILLE VALLEY.

Has smelter at Colville. Land, rich agricultural; first alluvial. Product, chiefly hay.

May 5, Tuesday—Weather cloudy, and rain:

Ran a reconnoissance line for section corners, in valley, and instruction of corps in general methods to be pursued during survey. Decided to make Dominion Hill, seven miles east of Colville, the starting point of survey. Broke camp at 3 P. M., and started with outfit in wagon for Dominion Hill. Ascended as high as Old Dominion mine, located on south side of mountain about one-half down from summit. Arrived at mine at 7 P. M.

REMARKS ON OLD DOMINION MINE.

Has been opened for about five years and worked for about two years; has yielded from 100 to 1,000 ounces silver and small percentage lead to ton; average 125 ounces silver in car lots.

Present condition: A force of twelve men are working several shafts and tunnels prospecting for further pockets. Little pay yield at present. Ore has to be packed down mountain and shipped from Colville. Land adjacent to Old Dominion mine all under claim. Total development, shafts and tunnels, at present, about 3,000 feet; deepest shaft, 105 feet. A tunnel 985 feet long, and now nearly completed, will cut a vein 500 feet below surface. Underground survey not yet made, will be included in future report.

May 6, Wednesday—Weather cloudy, and rains:

Ran line with stadias and aneroid barometer from quarter section corner, found in place, between sections 4 and 9, township 35 north, range 40 east, up Dominion Hill to section corner between sections 3, 4, 9 and 10; thence to quarter corner between sections 3 and 4; thence diagonally across quarter section to starting point.

May 7, Thursday—Weather fair, and rain; snow on summits:

One party ran along west side of Dominion Hill from quarter section corner between sections 8 and 9 to quarter section corner between sections 4 and 33. Thick brush and timber. Other party ran line to section corner between sections 3, 4, 33, 34, and continued along summit, across Mill Creek Gulch to east side, and returning in a horseshoe shape to section corner between sections 4 and 9, thus making a tour of summits of Dominion Hill, which is indented on west side by the Mill Creek gorge, 1,000 feet deep. The line followed shows several abandoned location shafts. South slope of Mill Creek gulch shows quartz croppings and slides.

REMARKS ON DOMINION HILL.

Well wooded with red pine and tamarac at foot; thinly at summit, which becomes rocky (volcanic) with snow at top.

May 8, Friday—Weather fine:

One party starts out to make detour of Dominion Hill by best possible line for topographical purposes. Expected to be out about three days. Other party ran line from quarter section corner between 4 and 9 westerly to section corner between 4, 5, 8 and 9, then made detour of southeast quarter of section 5, tying up to all section posts satisfactorily.

May 9, Saturday—Weather fine:

Party still making detour of Dominion Hill. One man returns to camp a 5 p. m. with pack horse and provisions. Reports re-

mainder of party six miles away and country too rough to take horse and any materials any farther. Other party makes detour of portion of southeast quarter of section 9.

May 10, Sunday—Weather very fine:

Man starts with provisions on his back for party making detour of hill. Field map completed to date, showing topography and all shafts and objects of interest. Samples of rock and earth are preserved and numbered, and correspondingly shown on map. These samples will be forwarded as soon as ore sacks are obtained.

Total miles of lines run, twenty; total area land surveyed, about twenty-eight quarter sections. Thermometer ranges from 75 degrees at noon to 40 degrees at night.

GENERAL REMARKS.

Several of the mines adjacent to Old Dominion have been worked, but were not very productive. Principal ones are the Ella, Portland, Paris Belle and Rustler, all touching Old Dominion claim. Many other adjacent claims merely awaiting future of Old Dominion.

Very respectfully submitted.

PAUL RIECKER,
Assistant in Charge.

DOMINION HILL CAMP, WASH., MAY, 1891.

WEEKLY ACCOUNT OF PROCEEDINGS AND WORK ACCOMPLISHED BY
PARTY IN CHARGE OF PAUL RIECKER, ASSISTANT STATE GEOLOGIST,
IN GEOLOGICAL SURVEY OF STEVENS COUNTY.

May 11, Monday—Weather fine:

One party ran line from corner between sections 4, 9, 10 and 3, southeast across section 10 diagonally. Party making detour of Dominion Hill returned at 7:30 P. M. Five pack horses arrived this day.

May 12, Tuesday—Weather fine:

Party returned from detour of mountain report as follows: Country generally heavily timbered and brush; deep gulches and small, swift mountain streams. Snow in places from two to four feet deep. Saw crater at southwest corner of southeast quarter section 34. Heavy local attraction encountered at northeast corner section 28, township 36 north, range 40 east, indicating probable

iron deposits. At southeast corner northeast quarter section 27 found big deposits of quartz.

Go to Colville with pack horse for provisions. Commence to plat line around mountain. Make reconnoissance tour to lake about four miles southeasterly.

May 13, Wednesday—Weather fine:

One party makes underground survey of Old Dominion mines to locate all shafts, tunnels, levels, etc. Other party runs line diagonally across section 3, and return by east and south boundary lines.

May 14, Thursday—Weather fine:

One party runs line through section 35, township 36, range 40 east; thence south along east boundary of section 35, and diagonally across section 2. Commence platting mine survey.

May 15, Friday—Weather fine:

One party runs east, west and south boundaries of section 10.

With exception of section 10, there were no mining claim posts found in field work of this week. Country generally very hilly. Fine mountain streams. Very dense timber and brush, with game in plenty, characterize the country traversed during this week.

May 16, Saturday—Weather, rain:

Mr. Riecker makes examination of Old Dominion mine with superintendent. Remainder of party engaged in mapping of work done. It is decided to complete all maps of work done to date and get in shape to move camp next week to Clugston Creek district.

REMARKS ON OLD DOMINION MINE.

Was located in 1885. In 1886 a sale was arranged for \$150,000 to St. Louis parties, who failed to respond in time, and owners refused to negotiate further.

The mine has produced about \$300,000, and in no place has the ore been exploited to a depth exceeding about 100 feet. The developments from the surface have been confined exclusively to the ore beds, no prospecting having been done on the various ore feeders or veins whenever the same have pinched so as to render them unprofitable to work. As a consequence, at the time of my examination, while I find a large number of ore bearing veins which in their present condition show but little ore in sight, there is no question but that a small amount of money, judiciously expended in

their exploitation and extension, would soon put the mine into profitably productive condition, and I have every reason to believe that such expenditure would open ore bodies of greater magnitude than any heretofore worked.

The ores of the mine are of exceedingly high grade, carrying lead, silver and gold, and varying in value from 40 ounces to 800 ounces silver to the ton in car load lots. As a rule the percentage of lead is insufficient to characterize it as a smelting ore, though galena often occurs in spots and casings on the walls which enclose the richer ores.

The owners of the mine, being unfamiliar with mines in limestone formations, were until quite recently led to believe that the surface ores found encased in the lime were the result of a contact vein lying between a granite formation and a silicate of lime, in which the ores actually exist. In pursuance of this theory, a deep adit or tunnel was driven on the line of said contact a distance of nearly 1,000 feet, the inner terminus cutting 500 feet below the surface. This tunnel, although it has not developed any ore bodies, will prove a valuable adjunct to the property as a means of drainage, and also affording opportunities for accessibility to ore veins lying parallel with the tunnel, giving valuable opportunities for the stopping of ores above this level.

The silicate of lime, in which these ore veins exist, is very heavily mineralized, showing in every seam and crease asbestos, manganese and the various characters of precious metals. The general character of the richer silver ores in the mine, and in the greatest quantity, is sulphide of silver; the other forms being in the minority. Asbestos and talc occur in peculiar combination, showing most beautiful specimens, extremely rich. Water can be brought a distance of one and a half miles to the mine at a small cost.

The indications are, from examination and information obtained in regard to the manner of working the mine in the past, that it has been handled very injudiciously, and a large amount of work done which was productive of comparatively poor results, and that under proper handling the mine could be made one of the best paying in this state. The present handling of the mine appears to be under a most competent superintendent and good management. The form of organization is a stock company.

It might be mentioned that there are in the vicinity, good

mountain streams which could be counted a factor for purposes of power for a smelter and for use in process of reduction.

There will be completed and forwarded by end of this week field maps of work done thus far. Great difficulty is experienced in obtaining names of mining locations. Will attempt to find the interested parties and obtain the desired information, and as soon as possible will add same to and forward the maps.

Very respectfully,

PAUL RIECKER,
Assistant Geologist in Charge.

DOMINION HILL, WASH., MAY 22, 1891.

Secretary of the Mining Bureau, State of Washington, Olympia:

DEAR SIR—I have the honor to transmit herewith by express, tracings of maps of Dominion Hill mining district, as surveyed under my direction, showing topography, mineral locations, geological and mineralogical features, together with a perspective view taken from a position near Colville and facing westerly slope of hill, with geological section of the country.

The exact position of some of the mines has not yet been fully ascertained, on account of the difficulty encountered in finding the corners; but, as I have a progress map, will continue to correct and fill in any additional information I may be able to obtain; also names of locations which have not yet been identified.

Will forward, also, in a few days, a box of ore samples collected in this district.

Respectfully yours,

PAUL RIECKER,
Assistant Geologist in Charge.

CLUGSTON CREEK CAMP, WASH., May 30, 1891.

REPORT OF PROCEEDINGS AND WORK ACCOMPLISHED BY PARTY IN CHARGE OF PAUL RIECKER, ASSISTANT STATE GEOLOGIST, IN SURVEY OF STEVENS COUNTY, WASHINGTON, INCLUDING TWO WEEKS ENDING MAY 30.

During week ending May 23d, party were engaged in collecting final data for and completing the maps, etc., of work done in Dominion Hill district, which were forwarded as per letter of transmittal on above date.

On Sunday, May 24th, moved camp and outfit in wagon about twenty miles to Clugston Creek mining district, starting at 7 A. M. and arriving at 7 P. M. at a point centrally located for survey of mines, and took possession of two mining cabins found in gulch near south branch of creek.

During week have had two and sometimes three parties in the field, when weather would permit, making usual topographical survey of surrounding country, locating all mining posts and claims possible, and examining and making underground survey of all mines which have been developed to any extent. The principal ones appear to be the following: The Dead Medicine, the Tenderfoot, the Daisy, the Silver Wave, the Galena and the Devil's Dream, all silver bearing; the Galena, silver and iron; also the Dandy, iron bearing.

Future report on this camp will give details regarding these mines and any others of importance which may be found.

The country traversed during past week has been very rough, wild and mountainous; thickly timbered with yellow pine and tamarac; brush in places, almost impenetrable; also high, bald mountains, overgrown with good grass. Several good mountain streams. Game abundant.

Many mining claims found, but few developments of any extent. Quality of ore produced good, but developments not as a rule of sufficient extent to judge of value of mines. Ore apparently occurs as a rule in pockets and bunches and not in ledges or veins which could be followed. Heavy rains have fallen during the week, precluding all field work for over two days.

Very respectfully,

PAUL RIECKER.

CLUGSTON CREEK CAMP, WASH., June 13, 1891.

To the Secretary of the Mining Bureau, State of Washington, Olympia:

DEAR SIR—I transmit herewith my report (final) on Clugston and Bruce Creek mining districts, and also forward this day by express the following: (1) Perspective view and geological section of the above mentioned districts. (2) Topographical maps in parts one and two of same districts.

Respectfully yours,

PAUL RIECKER,

Assistant State Geologist in Charge.

CLUGSTON CREEK CAMP, WASH., June 13, 1891.

REPORT OF WORK ACCOMPLISHED BY PARTY IN CHARGE OF PAUL RIECKER, ASSISTANT STATE GEOLOGIST, IN GEOLOGICAL SURVEY OF STEVENS COUNTY.—FINAL ON CLUGSTON CREEK DISTRICT.

Since last report the entire party has been engaged in collecting necessary information regarding mines, locations, etc., and data relative to geological and mineralogical features of this region, and completing topographical maps of same; all of which are transmitted herewith. Will move camp to Bonanza Mine district, seven miles northwest of this camp, and commence labors in that field on Monday, June 15th.

The weather since last report has been, with exception of several heavy rains, fair, and thermometer ranging from thirty-two degrees to seventy degrees.

Detail report on principal mines in this vicinity is as follows:

THE GALENA—LOWER MINE.

This mine presents a very peculiar formation. The ore body, and in fact the entire front of the hill on which it is found, appears to be an overflow, much faulted and heavily mineralized, and containing in its surface croppings titaniferous iron ore, which probably was deposited by chalybeate fountains existing in the higher levels, and subsequently the precipitous mountain having become washed, they must have been separated from the main body and slid down.

The ore at a few feet depth develops into a silver bearing galena, carrying about twenty per cent. lead. The formation is a silicious limestone, as is also the entire mountain in which this group of mines, comprised of this and the three following, are found, and underlaid at its base by granite.

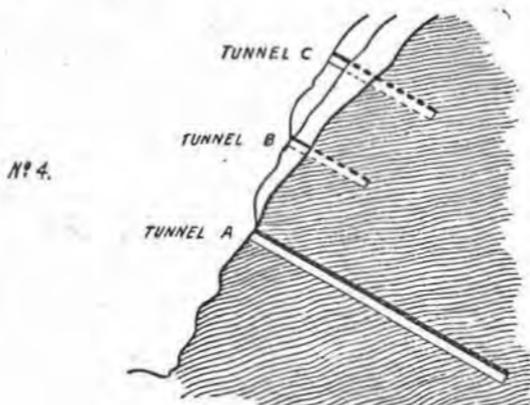
The development of this mine, which is located near the foot of the mountain, consists of three tunnels cut into the abrupt face of the mountain, and cross-cutting the ledge at points as shown in sketch herewith. (See next page.) Tunnel "A" is sixty feet long, and "B" and "C" twenty-five feet each. The direction of the vein is north and south, and its dip about twenty degrees westerly.

THE GALENA—UPPER MINE.

This mine is doubtless in the mother vein in this mountain range, which vein can be traced for two miles north and an equal

distance south from the mine. It is located near the summit of the mountain, and the ore body is found in the bold and precipitous croppings of silicious limestone which cap the summit of the range and rise above the general level to a height of over 200 feet, the mineral bearing veins and feeders occurring throughout.

At the time of my examination, I find developed a breast of galena ore about five feet thick, yielding twenty ounces silver and eighty per cent. lead to the ton, and to all appearances promising to be a mine of considerable extent and value. There is, to my mind, no doubt that the ore body continues in pockets and feeders



to a depth of about 500 feet, at which depth it encounters granite, then to cease entirely or continue in a true fissure vein.

A plan of working of this mine can be readily conceived by which every dollar's expenditure could bring a corresponding return, inasmuch as all drifting and cross-cutting could be carried on so as to run close to the ore bodies, and but little work of a prospective nature entirely would be necessary.

This mine strikes north and south and dips easterly into the mountain.

I am surprised at so little development of a mine which, at present appearances, promises so favorably.

THE SILVERTON.

Last, but not least, of this group of mines, is the Silverton. During the progress of the survey at this camp, this mine, which, on my arrival, was nothing more than a prospect, and so poorly

understood by the owners that the claim was located east and west instead of northerly and southerly, I called the attention of the owners, who happened to be doing some assessment work at the time of my examination, to the fact that the vein had a north and south strike and was dipping easterly, and should have been located accordingly. Acting on my advice, they cross-cut the vein at the proper place, with the result of opening up an immense ore body, the hanging wall of which is not reached at the time of this writing. It will be about fifty feet across, all in the best quality of iron ore, which has been shipped to Tacoma for fluxing purposes.

I pronounce it one of the best mines in this region. It appears to be in a slate and limestone contact, and will no doubt, as greater depth is reached, develop into silver ore, as otherwise the formation possesses the same characteristics as the Galena, of which it appears to be an extension.

If this mine, upon further developments, continues as it has commenced, \$500,000 would be a small valuation, especially if silver is encountered, which, in my estimation, is almost beyond doubt.

I only regret that on account of departing to-morrow for another camp, I shall be unable to watch the progress of its development.

GENERAL REMARKS ON THE RANGE IN WHICH THIS GROUP OF MINES OCCURS.

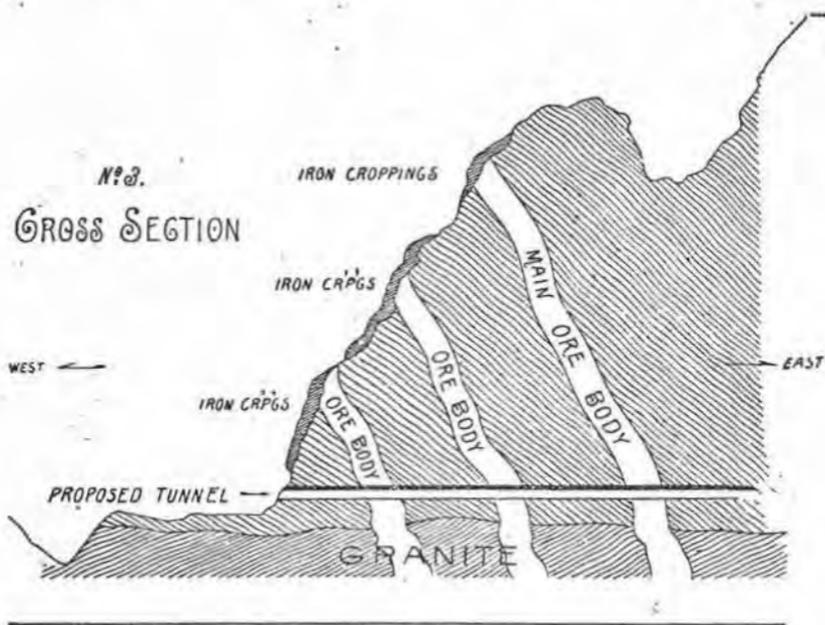
As shown on topographical map and geological section accompanying this report, there are numerous locations along this mountain range, extending north and south, located in the main ore body, and others lying adjacent to it. The whole mountain, in fact, appears to be heavily mineralized, and small ledges and feeders are encountered throughout, extending in the directions mentioned a distance of at least four or five miles.

From all signs it would appear that at about the level of 3,000 feet the mountain is underlaid with a granite formation, while the higher levels are of silicious limestone with occasional showing of slate, the entire southern portion being nearly all of this latter formation.

I have every reason to believe in a continuation of the ore bodies after the granite is encountered, and that they may develop into true fissure veins. The workings, however, are at present of too small an extent to determine this accurately. Most of the prospects show a very small amount of work done, but too limited to be of much value to the mine.

The great drawback and cause of this condition of the mining industry in this region is the lack of capital among mine owners, and what is still more surprising, the fact that up to date the country has produced no leading spirit, who, possessing a knowledge of mining and business push, would attract the attention of capitalists to this section, which presents great possibilities for improvement and an opportunity for some one.

My proposition regarding the working of these mines would be



as follows: That this group of mines located, as it is, favorably for comparatively easy development, should be bonded by a company of men for a certain sum, and a tunnel to cost about \$40,000 cut into the side of the mountain from a point marked "camp" on maps herewith, and near the 3,000 foot level. The tunnel to be about 1,500 to 2,000 feet in length, intended to cross-cut every vein. As ore bodies are being encountered, drifting could be resorted to along the ore veins and the tunnel could be used subsequently for stoping the ore. The tunnel being close to the granite underlay, a few shafts would determine whether the ore extends into the granite.

Forty thousand dollars judiciously expended thus might result in laying the foundation for an output of millions. The opportunity certainly exists.

The above proposition is illustrated in sketch on preceding page.

THE DEAD MEDICINE.

This mine is situated about three miles north of present camp, and this and the Silver Wave are the two leading mines in the north end of this district. The ore body of the first mentioned mine with its surface croppings (in conglomerate), about thirty feet wide, is a well defined and continuous ledge, striking north and south and dipping easterly, and yielding, as it does, fifty ounces silver and twenty per cent. lead, in average assays, is richer in silver than any others in this vicinity. In formation the foot wall is shell slate, the hanging wall porphyry with traces of zinc and white iron.

Present state of development of the Dead Medicine consists of an incline shaft seventy feet deep, all in ore, a tunnel forty feet deep and another incline fifteen feet deep, as illustrated, together with the following mine, on the following page.

THE SILVER WAVE

Is adjacent to the Dead Medicine and appears to be a continuation of this mine, as the developments to date show similar characteristics. Fossil wood appears in the slate.

Present state of development: Incline shaft 100 feet deep. In other respects this mine is exactly similar to the Dead Medicine; in fact, is a north extension.

THE MYRTLE

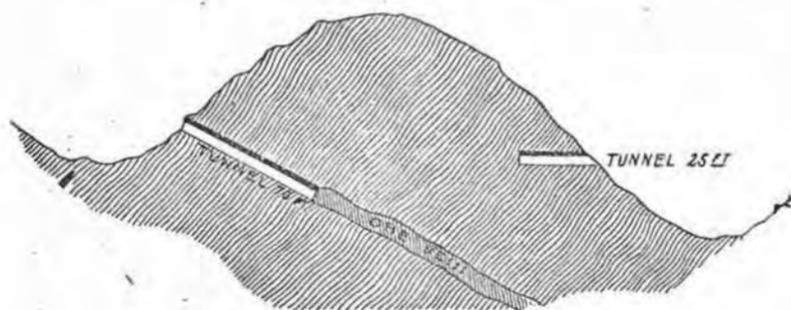
Is another adjoining location, which has not been developed to any great extent. Shows considerable iron croppings of ferruginous hematite; hanging wall of lime, foot wall porphyry. The iron showing at surface develops at a depth of twenty feet into a silver bearing ore, which appears often to be the case in this vicinity.

To the east and west of this group of mines, and at some distance from them, occur outcroppings of granite, bearing out the theory of a granite underlay of this region.

THE STAGHORN

Is a promising prospect, situated easterly of the Dead Medicine, and about one mile farther on. Formation—contact vein in lime

and granite; yields galena ore, and slate contact yields galena ore; ore breast shows about one and one-half feet in thickness.



№ 1.
CROSS SECTION.—DEAD
MEDICINE.



№ 2.
LONGITUDINAL SECTION. DEAD MEDICINE
AND SILVER WAVE.

THE ALABAMA, DOCK AND SAN, AND THE J. I. C.,

Are chief among a group of mines located on the north fork of Clugston creek, about three miles southeast of this camp. Yield—silver and lead. Formation—limestone.

Developments indicate quite extensive ore bodies, some of which are six feet in thickness. all heavily mineralized throughout, the mineralization occurring in stringers, but no well defined ledges. Outcroppings are quite extensive, showing thirty feet across.

Many other minor locations have been found and located on maps, but none of sufficient importance or development to call for special description.

Very respectfully,

PAUL RIECKER,
Assistant Geologist.

STEVENS COUNTY.

BONANZA MINE CAMP, WASH., June 27, 1891.

REPORT OF PAUL F. RIECKER, ASSISTANT STATE GEOLOGIST IN CHARGE,
FOR TWO WEEKS ENDING JUNE 27, 1891.

On account of heavy and continuous rains daily during entire week ending June 20th, no report was forwarded covering that time. Arrived at this camp from Clugston Creek vicinity Saturday, June 13th, and pitched camp one-half mile north of Bonanza mine, which is located six miles north of Columbia river.

The usual survey of this vicinity has been completed and party is now engaged in preparing maps, etc., of same. This day one party of five men, with provisions and pack horses, proceeds to the Silver Crown mine, a distance of twenty-five miles northeast of here, to make survey and examination of that mine and vicinity, afterwards returning to this camp.

Maps and detail report regarding the country covered during this encampment will be completed and forwarded within about one week from this date.

Since moving to this point, which was accomplished in a heavy rain, have had showers and very heavy rains daily, generally continuing the entire day, rendering our work more difficult.

Very respectfully,

PAUL RIECKER,
Assistant State Geologist.

BONANZA MINE CAMP, WASH., July 4, 1891.

REPORT OF PAUL F. RIECKER, ASSISTANT STATE GEOLOGIST IN CHARGE.
FINAL ON BONANZA MINE CAMP.

I give below detail information and findings regarding principal mines and country in general in this vicinity.

THE BONANZA MINE

Is situated twenty-two miles easterly from the Columbia river and the Spokane & Northern railroad, which runs near its east bank, and about five miles northeasterly from East Marcus, the nearest railroad station, being therefore readily accessible for supplies and transportation of output.

The mine was discovered in 1885, near a locality which has been known for over sixty years, being only eight miles from what was once the principal distributing point in the Northwest of the old Hudson Bay Company, which was located in 1826 further down the Columbia river, near what is now the enterprising town of Kettle Falls.

The discovery of the mine was made in a most accidental manner by a farmer crossing the field in search of horses, and who noticed at the point where the mine is now located, the ledge, slightly uncovered by recent heavy rains. On further prospecting he at once exposed to view indications of an immense ore body of silver bearing galena, which proved to yield an average of 40 per cent. lead and 10 ounces silver, which is about the average yield at the present time. The mine is certainly an instance of how little prospecting has been done in this locality, for there exists nothing to lead one to suspect the presence of a mineral bearing vein in the center of a field of finest alluvial soil, which, to all appearances, was only fit for agricultural purposes. Under the circumstances it is not surprising that no developments were attempted until February, 1890, since which time there has been taken out and sold to various smelters, ore to the value of \$110,000. So far the mine has only been worked for immediate profits and has been stoped as fast as it was convenient. The development at present consists of a main shaft, forty-five feet deep, and two air shafts, required for ventilation on account of the atmosphere being heavily charged with sulphur from the first level, which is thirty-one feet deep. The greatest depth obtained is 182 feet in ore. The ore bodies are en-

countered in lime and slate shales. Its general trend is northwest and southeasterly, dipping easterly.

The company has commenced in earnest to open the mine in a business like manner, and the superintendent instructed to sink a working shaft 300 feet deep. The ore body is not yet even sufficiently developed to warrant an attempt at a statement regarding its dimensions, but there are certainly thirty-five feet of ore between the foot and hanging walls, and, if the developments continue as favorable as present indications point, there is no doubt but that this is a mine of a series in this vicinity which is destined to attract much attention in the near future.

THE SOUTH BONANZA

Has been exploited to a depth of 118 feet, and about forty feet of drifting has been done. So far, no ore bodies of any magnitude have been encountered, but what little has been found shows this to be of the same character as the Bonanza mine. The ore occurs in slate shale, the trend and dip of which are similar to the Bonanza. There is no work being done upon the mine at present.

THE "A. Y." MINE

Is located about 1,000 feet south of the Bonanza, and shows a vein of iron ore averaging seven feet in thickness in blue slate formation, with traces of lead, silver and gold. A vein of black sulphide of iron, narrowing from six inches in thickness to a mere seam, is a feature which may be traced along the entire extent of the vein, and lying close to the foot wall, and upon the blue slate in many places there are bunches of quartz colated with iron. A working shaft and two air shafts of twenty-four feet and twenty feet, respectively, in depth, encounter the ore bodies, and drifting 100 feet in length has been resorted to, following the vein in the expectation that it may lead to the same ore body as encountered in the Bonanza mine. The ore, so far, has been of too low a grade to be profitably worked. If, however, they are successful in discovering the extension of the Bonanza mine it will decide the status of both of these properties, and place them in the front rank of ore producers in this district.

THE YOUNG AMERICA

Is situated three miles northwest from the Bonanza, within one-half mile of the Columbia river and at an altitude of 400 feet above

the water level. The Spokane & Northern Railroad runs near the base of the hill on which the mine lies, and will be of great importance in its development. Mr. Frank Moore, of Spokane, is its owner, and he has determined to resume operations towards its development at once.

The mine was located in 1885, and has produced \$125,000. There are about 1,000 tons of ore now on the dump, claimed to assay \$65 in silver and twenty per cent. in lead to the ton, in car load lots.

The formation is in limestone, dipping northerly and easterly, and it is in many respects similar to the Old Dominion mine. The stratum in which the pay ore appears is about thirty feet thick, and has varied from two to five feet in thickness. I noticed here the black sulphides of silver, similar to the showing in the Old Dominion, and traced them in many places in casings on the walls. The ore is certainly very rich. The mine is finely located for the work of development, as a tunnel could be easily run into the mountain to cross-cut the ledge and the vein followed by an incline shaft, both of which could be utilized in stoping the ore bodies.

OTHER LOCATIONS.

There are many in this vicinity, but none of sufficient importance or development to demand special notice.

THE SURROUNDING COUNTRY

Shows considerable agricultural land of first quality, and its hills and valleys would afford good opportunities for the raising and maintenance of large herds of stock of all kinds. There still remain large tracts of unoccupied public lands which would make splendid farms, the value of which the recent completion of the Spokane & Northern Railroad greatly enhances, affording, as it does, a ready and convenient means of transportation for all products. Wheat, barley, rye and hay can be raised in abundance, while vegetables of all kinds, such as potatoes, tomatoes, cabbage, onions, melons, etc., grow prolificly. There are a few orchards which produce apples, pears, plums, etc., as fine as I have anywhere seen, while strawberries grow wild and are, when cultivated, of exceedingly fine flavor, and would constitute a fair source of revenue if their cultivation were extensively undertaken.

It is predicted that next spring will bring a large influx of immi-

grants, on account of the opening of a portion of the Colville Indian reservation, which lies on the other side of the Columbia, and consists largely of farming, grazing and fruit lands.

Kettle Falls is the most important town near this vicinity, and the enterprise displayed by its inhabitants, and the encouragement offered to new comers, is sufficient to predict for it a rapid growth. The falls themselves, being one and one-half miles above the town, afford an immense water power, which could be utilized in the operation of saw, flour and quartz mills, electric railroads and light plants, and all other uses to which natural forces of this character can be applied. As the establishment of the Hudson Bay Company's post shows, the importance of this district was recognized as early as 1826, when this was for many years the principal distributing point for the fur trade. In the hills and valleys there are many small lakes, and the country is well watered, sufficient rain falling, especially during the critical season, to insure a certainty of crops without irrigation. Game of all kinds and varieties is found in abundance, the woods teeming with deer, bear and beaver, grouse, prairie chickens, etc., and the lakes, rivers and creeks are alive with trout, salmon and other fish, so thus are furnished the main articles of food for new comers, who are compelled to utilize the gifts of nature while struggling with the self denials and hardships of pioneer life.

The more extensive settlement of this vicinity only began two years ago, and my observations satisfy me that the raising of horses, cattle, sheep and hogs, chickens, geese and turkeys, would prove a profitable adjunct to enterprises in this vicinity, where the hillsides afford an abundance of nutritious natural grasses, and the mountain streams and lakes, easy facilities for watering. As to the winters, I am informed that they are comparatively mild, and that only during a period of about six to eight weeks, the grass would be rendered difficult of access to the stock on account of snow, and the cattle, etc., have to be fed and cared for under cover. One who would be willing to accept these conditions, could look confidently forward to reaping, in a few short years, the benefits of his labors.

The timber is of but few varieties, principally tamarac and yellow pine, the latter often of good quality.

There are, in Colville valley, two sawmills of primitive construction and small capacity, also a smelter at the town.

REGARDING FUTURE OPERATIONS PROPOSED.

My attention has been repeatedly called to the Chewelah and neighboring mining districts, but I have been unable to determine, without further investigation, whether it would be toward the attainment of the best results to continue moving our camp in a northeasterly direction along the Columbia river and vicinity to the Deep Creek and Metaline country, or to move south to the Chewelah district. To settle this question, I proceeded to Chewelah on June 19, returning to this camp on June 22, with the result that I decided to make that district my next field of operation, after making a survey and examination of the Silver Crown mine, situated about twenty-three miles northeast from Bonanza camp, on the east side of Columbia river and about one and one-half miles from the terminus of the Spokane & Northern Railroad and its junction with steamboat connection for Canadian Pacific Railroad. Proceeding, accordingly, with a party of four men to the last named mine, I commenced field work for usual topographical survey, perspective and geological section, and for gathering of data for general report on this vicinity, which, if finished, would have been artistic and interesting, and would have compared favorably with the best results obtained to date. On our return yesterday, the 2d instant, however, we find ourselves recalled, and the work to be abandoned.

IN CONCLUSION

I will say that at the time the survey is discontinued, the whole party has become thoroughly familiar with the work, and the gratifying results which were obtained, of an artistic nature, are entirely due to Mr. Wm. H. Bull, the special artist of the expedition, and I cannot express in too strong terms my keen appreciation of his valuable services so cheerfully rendered. Owing to an inadvertence in the formation of the party, the salary of Mr. Bull was placed at \$40 per month. As the services rendered by him at once proved of such a valuable nature, I promised him that compensation at the rate of \$100 per month would be arranged for from the start as soon as the unsettled condition of affairs regarding the appropriation was decided. I hereby strongly recommend, therefore, that in justice to Mr. Bull, his salary be placed at above mentioned rate per month since the time of his engagement.

The work of Mr. Soderburg and Mr. Stixrud, the two topogra-

phers of the expedition, has been entirely satisfactory and the work will speak for itself.

I feel satisfied that in the short period which we have been allowed in the prosecution of this work I have attained results which, had they been allowed publication and dissemination during the World's Fair, would have attracted unusual attention and would have formed the first intelligent step in the systematic effort toward bringing our immense mineral and other resources to the attention of the world.

As far as I am personally concerned I had commenced to take a genuine interest in the survey, and had resolved to make this the effort of my life, and I regret very much, not for myself but for the certain benefits which the state would have reaped, that the work had to be abandoned at this stage, for even a casual observer will note, in examining the reports and drawings, how the work was improving as it progressed, and it is safe to say that the final results, had the work continued, would have been equal if not superior to any work of a similar nature done in the United States. The entirely new feature which I have added, showing perspective and geological sections of the more important groups of mines, has never, anywhere else, been attempted, and would have aided much in enhancing the value of the survey by its attractive and lucid form.

TRANSMISSION OF RECORDS, ETC.

The following maps, etc., of survey of Bonanza mine vicinity are now completed, and are transmitted herewith: Topographical map (tracing) No. 1; section and plan of Bonanza mine; perspective and geological section.

THE CAMP EQUIPMENT

Will be forwarded by express to care of Mining Bureau, Olympia, as per instructions, on Monday, July 6, on which date we expect to be in readiness to proceed on our way to Olympia.

Very respectfully,
PAUL RIECKER,
Assistant Geologist in charge.

REPORTS OF H. E. PARRISH, ASSISTANT STATE GEOLOGIST IN CHARGE.

Mr. Parrish, the assistant state geologist in charge of the party detailed to survey the coal measures, met with almost insurmountable difficulties from the outset of his work. Heavy rains occurred at frequent intervals during the first month, and the country was so heavily clothed with underbrush and fallen trees that progress was necessarily slow. We believe that the work accomplished, however, was as satisfactory as could be expected under these adverse circumstances. Owing to Mr. Parrish's absence after the work of his party was closed, his final report was not received. Appended herewith are the reports and maps so far as received by the Mining Bureau.

CARBONADO, WASH., May 1, 1891.

Mr. Chas. E. Laughton, President Mining Bureau, Olympia, Wash.:

DEAR SIR—I arrived here Monday evening last (April 27). Found accommodations for my men, such as they are, but will do very well. Could not get a room for drafting, so had to get a tent, also had to get a better room for myself than furnished the men, where I could work nights. Have only had one pleasant day so far, but have been in the field every day. Do not think the Mining Bureau has an idea of the roughness of this country; it is, without exception, the worst I have ever seen, so thick with underbrush at places that one cannot see over ten or fifteen feet ahead.

Have scouted as far south as section 21, township 18, range 6 east, and east and west to adjoining townships. The only reliable corner to be found is the southeast of section 8, so have taken the east and west line through this corner as my base. My idea is to work south from this to section 21, about the bottom of the coal

measures, west to adjoining township, east to Carbon river, and north to Carbonado. After finishing this I will go east of Carbon river, working east as far as of interest and north to Wilkeson.

The cross section up Carbon river canyon will be the finest I have ever seen. It cuts about all the strata in this section, the exposures rising at places from five to six hundred feet above the river bed. I was compelled to run a line of levels from Wilkeson over here in order to secure a reliable tide. My map work will not be very extensive the first month on account of the nature of the country, but the second and so on will show well. My men are in the field at 6:30 every morning. I want to show as nearly as possible as much work as the other parties, realizing that in order to do so we will be compelled to work early and late, my territory being so much more difficult than theirs.

Yours respectfully,

H. E. PARRISH,

Assistant Geologist.

CARBONADO, WASH., May 3, 1891.

Mr. A. A. Lindsley, Secretary Mining Bureau, Olympia, Wash.:

DEAR SIR—Enclosed find my vouchers up to May 1. I have not sent vouchers for the men, as they had only three days last month, but if you want their month to begin on the 1st, will make them out. I am more than pleased with my men so far; all are willing and seem anxious to make a good showing, and are ready to take the field in all kinds of weather. Have had only two days without rain, but this has not interfered with the work. I shall be able to get a map of this region that will be filled with important information. Hoping to hear from you, I am, yours respectfully,

H. E. PARRISH,

Assistant Geologist.

CARBONADO, WASH., May 6, 1891.

Mr. A. A. Lindsley, Secretary Mining Bureau, Olympia, Wash.:

DEAR SIR—Yesterday and to-day we have been unable to go in the field. Monday we were out all day in the rain and yesterday was still worse, besides three of the men were laid up with severe colds,

and one nursing bruises received from a large stone rolling down the canon, striking him on the back. He had a very narrow escape from being knocked over a precipice. All were in fair condition for work to-day, but it rains hard and fog is so dense we could not see any distance in the woods. Am sorry to lose two days, but it cannot be helped. The work here is so hard and at the same time so dangerous that I do not think the men are paid sufficiently well, especially the chainmen who have to keep the line and climb over everything. I want to ask permission to revise the salaries to a point that, in the aggregate, will amount to the same as adopted by the Bureau. For example, my first assistant, \$90; the second, \$65; one chainman \$60, the other \$50; the chief axeman, who is an excellent man, \$50; the others from \$25 to \$35 per month. This will make the sum total about the same as the other plan and puts the men on a more equal footing. After we get in a more even country, free from underbrush, etc., I can then again revise them to the other basis.

Hoping you will bring this before the Mining Bureau at your earliest convenience, I remain, yours respectfully,

H. E. PARRISH,
Assistant Geologist.

CARBONADO, WASH., May 8, 1891.

Mr. Chas. E. Laughton, President Mining Bureau, Olympia, Wash.:

DEAR SIR—I have very little to report since my last, except progress. We were compelled to lose two days this week on account of abominable weather. Yesterday morning the sun came out clear and bright and we looked for a clear day and a good day's work, but it snowed and rained the entire day, though we accomplished a great deal considering the day. To-day was fine and I only hope we have seen the last of bad weather. We will work on Sundays to make up for lost time, though we would be compelled to do so to locate the Carbon Hill Coal Co.'s openings and tunnels, as they are at work all the week. We shall have to take tunnel sections at night for the same reason. I continued my base from southeast corner section No. 8 east to Carbon river, and meandered the river south about one and one-half miles, where I had to abandon it until things have dried out some. The continual rain has made the rocks

so slippery that it is an impossibility to get a safe foothold. I shall continue this as soon as I can do so with less danger, as it is the most important work.

Here I get all the exposures and their courses, and am now locating the trails for my topographical work. I have covered a great deal of ground ready for mapping. Mr. Davis, superintendent of the Carbon Hill Coal Co., and Mr. Lewis, surveyor, are very kind, and willing to give me all the information in their possession. I have access to their mine maps and will, when I am ready, take tracings and transfer to mine. This will save a great deal of time and money.

Yours respectfully,

H. E. PARRISH,
Assistant Geologist.

CARBONADO, WASH., May 17, 1891.

Mr. Chas. E. Laughton, President Mining Bureau, Olympia, Wash.:

DEAR SIR—Herewith I submit my weekly report. I am glad to say we have had over a week of pleasant weather, and the work accomplished is to my entire satisfaction. The first tracing sent you from my working map will show very well considering the unfavorable weather of the first two weeks. We will have finished the territory west of the Carbon river from sections 4 to 21 in about ten days, when we will go east. When I begin on this I had better go into camp, as there are trails over which to get supplies, besides I can locate more in the center of the work and thus save time. In taking my base I did not rely on the government lines, but tied to the corner of section 8 as one end, and from this ran and measured my own base. I have now taken an observation and connected on the base adopted by the Carbon Hill Coal Co. This I will use for their mine workings. I wish you would send me copies of the government plats for this section, as they would benefit me greatly for reference and aid in my connections. I have small county maps but find them of little use. The method of preparing coal by the Carbon Hill Coal Co. and the machinery used is so modern and does the work so well that I think it a good idea for me to take a sketch of the plant and insert it in the reports. Mr. Davis has taken advantage of water power and the topography of the country to such

an extent that his cost is no doubt less than any coal plant in the state, at least any that I have seen. If you wish it I will take the sketch.

Yours respectfully,

H. E. PARRISH,

Assistant Geologist.

CARBONADO, WASH., June 15, 1891.

Hon. Chas. E. Laughton, President Mining Bureau, Olympia, Wash.:

DEAR SIR—I sent you, by express from Tacoma, tracing of topography of west side of Carbon river, also plan of bunkers and machinery of Carbon Hill Coal Co. The tracing does not show the amount of work done, as on account of interruptions I was unable to map all the field work. There are a great many details as to exposures, located openings, etc., to go on. On my next I hope to show all these, as well as the developments of the Carbon Hill Coal Co., which are quite extensive; also cross sections, three in number, east to west through township 18, range 6 east. The plan of the bunkers I made to show the mode of preparing coal and handling cars at this the most complete plant I know of in the state. I think it will be of interest in the future development of the state (coal interests). With the sanction of the Bureau I will sketch the best points of all plants visited, and from these future operators can construct plants from the best features of those already in operation. You will notice that the Carbon Hill Coal Co. have taken advantage of water power and gravity to place the outside cost at a minimum. I mail you to-day tracing of bunkers finished, and wish you would kindly send me the original plan, as I wish to finish it. I am now working on a perspective of the bunkers showing frame work and machinery in position. Mr. Davis requested tracings of all these plans to send to San Francisco, shall I grant the request?

I am not entirely satisfied with the month's work, but still think I have done fairly well, taking into consideration the unfavorableness of the weather the first two weeks, the necessity of becoming acquainted with the country in which I am located, the amount of underbrush encountered, etc. The Carbon Hill Coal Co. are working five different beds from four to seven feet in thickness, all above water level. They employ 700 men and have a maximum

output of 1,200 tons per day. The general strike of the beds is north and south, rising to the south, dipping east and west from thirty to seventy degrees. The plan used in mining is the "Partial Long Wall System," the plans and sections of which will be shown in my next. I have a number of samples and only await sample bags.

My party is now in camp in the most favorable location for the work, and as we have finished the worst part—*i. e.*, the canon—I hope to cover a great deal of ground the next month.

Submitting to you this, my first monthly report, I remain, yours respectfully,

H. E. PARRISH,
Assistant Geologist.

CARBONADO, WASH., June 29, 1891.

Mr. A. A. Lindsley, Secretary Mining Bureau, Olympia, Wash.:

DEAR SIR—After due consideration of your favor received this date, I find it would not be justice to myself or the state to stop the work immediately. If I did so a large portion would have to be gone over again. The axe and chain party are about four miles ahead of the transit. I will have the axe party finish to-morrow the connection they are working on, and then can let them off. Will then finish all lines with the transit and place monuments so the work can be continued at any time. I would much rather run chances of the state paying us than leave the work partially finished.

I will get my maps up to date and detailed report as soon as possible, then ship everything to Olympia.

Hoping this meets with favor, I am, yours respectfully,

H. E. PARRISH,
Assistant Geologist.

CARBONADO, WASH., July 7, 1891.

Mr. A. A. Lindsley, Secretary Mining Bureau, Olympia, Wash.:

DEAR SIR—Enclosed you will find vouchers up to date. I shall have detailed report and maps ready to forward in a few days. It is absolutely necessary that I should receive money for my men at

once, also for the cook. The men cannot go into town, as they have not a cent, and would be arrested for indecent exposure if they did. They are indeed in bad shape and must have assistance.

Kindly let me hear from you at once, and oblige yours respectfully,

H. E. PARRISH,
Assistant Geologist.

In making public the reports of the assistant state geologists, we submit them as an earnest only of the work which we expected to accomplish for the State of Washington. It could hardly be expected that surveying parties whose work required such constant attention to detail, should render efficient service until they were thoroughly and systematically organized and each one acquainted with the work that was expected of him. We desire to commend the professional services rendered the state by the assistant geologists in charge.

On or about June 1st, during the absence of the president of the Mining Bureau, the state auditor informed the secretary of the Bureau that objections had been urged and a protest made against the payment of any further indebtedness incurred by reason of the prosecution of the geological and mineralogical survey of the state. We were not advised as to whether the objections were personal, political or legal, but they were of sufficient consequence to induce the auditor to decline to issue any further warrants in payment of such claims. The president of the Mining Bureau was immediately advised of this decision, and upon his return to Olympia it was decided to determine the question of the legality of this action, upon the part of the state auditor, by submitting the matter to the supreme court; and to this end a voucher was prepared and submitted to the auditor, accompanied by a request in writing that he issue his warrant in

payment of the same. Upon receipt of his answer declining to pay same, the Mining Bureau, through its attorneys, began an action in the supreme court by applying for an alternate writ of mandate against the state auditor. This application was denied by a majority of the supreme court, Judge Stiles alone dissenting. A petition for re-hearing met with the same fate. We do not desire in this report to enter into an argument as to the merits of the question involved, and so summarily dismissed by the supreme court; but, for the best interests of those engaged in mining, whose number is being augmented daily, and for the development of an industry which we believe will be the most potent factor in the progress and prosperity of the state, we regret that the so evident intent of the legislature should have been ignored and that the statute was construed according to the strict letter and not the spirit of the law.

Upon the filing of the judgment of the supreme court, the Mining Bureau notified the assistant geologists of its purport and instructed them to cease work, to ship all state property to Olympia, and to render to the Mining Bureau their final accounts and reports. These instructions were complied with, and Messrs. Ricksecker, Riecker and Parrish reported to the Mining Bureau in Olympia. At this juncture the Mining Bureau found itself in a most embarrassing position. The men in the field had been without money for nearly two months; creditors who had furnished supplies and subsistence were importunate, and in some cases the men employed were entirely destitute, without money, clothing or food; they were far removed from lines of railway travel and populous centers; they could neither obtain employment nor reach places where employment might be found. The integrity of the state and of the individuals composing the Mining Bureau was assailed and criticised. The president and secretary of the Mining Bureau

personally advanced a sufficient sum of money to meet the immediate requirements of those employes most in need of help, and the question of liquidation of the indebtedness incurred demanded immediate consideration.

Out of the \$3,000 appropriated by the legislature for incidental expenses of the Mining Bureau, but \$702 had at this time been expended, and it was decided to use the remainder of this amount in part payment of the claims that had accrued. Prior to the first of June, claims had been paid and warrants therefor issued by the state auditor amounting to \$920.68, incurred on account of the geological and mineralogical survey of the state, which the Mining Bureau had "examined, audited and allowed" to be paid from the fund appropriated for said survey, but upon receipt of the auditor's decision to issue no further warrants we found, much to our surprise, that these warrants, which were in settlement of claims in no wise connected with the incidental fund of the Mining Bureau, had been charged to this fund by the auditor, and our measure of usefulness was still further circumscribed by this action. We have used nearly all of the balance of the appropriation for incidental expenses in part payment of claims incurred by reason of the survey. Certificates have been issued by the Mining Bureau to individual creditors for the obligations incurred by our order, amounting in the aggregate to \$6,142.22. For this indebtedness there is no relief except by legislation authorizing its payment. We therefore respectfully request you to call the attention of the legislature, when next in session, to this matter, to the end that immediate and favorable action may be taken and the credit of the state and its officers, while honestly engaged in duties prescribed by law, be maintained.

The following is a detailed statement, showing the number of

certificates issued, to whom issued, for what, and the amount of same:

Cert. No.	Name.	For what.	Amount.
1.....	H. S. Heitzeberg (2).....	Services.....	\$223 55
2.....	Chas. Herrman.....	Supplies, sundries.....	6 00
3.....	H. A. Harris.....	Blacksmith work.....	20 25
4.....	F. M. Wrye.....	Merchandise.....	8 75
5.....	Wm. H. Hinton (2).....	Services.....	119 35
6.....	C. S. Baldwin (2).....	Services.....	81 21
7.....	Moore, Ish & Co. (4).....	Sundries, merchandise.....	70 40
8.....	G. W. Hardenburgh (2).....	For use of teams.....	80 00
9.....	Raymond Laughton (2).....	Services.....	83 88
10.....	F. J. Stafford (2).....	Services.....	107 42
11.....	Geo. H. Ricketson (2).....	Services.....	211 15
12.....	Thos. Dickson (2).....	Use of horses.....	70 50
13.....	Lovman & Hanford.....	Stationery.....	9 60
14.....	Leopold Linder.....	Use of team.....	5 75
15.....	Loss Feger (3).....	For services.....	105 00
16.....	J. A. MacMartin (3).....	For services.....	98 37
17.....	M. Gross (2).....	For services.....	27 96
18.....	Henry Hanson.....	For services.....	50 64
19.....	W. H. Bull (3).....	For services.....	178 31
20.....	P. Stixrud (3).....	For services.....	210 03
21.....	Geo. Planner.....	For services.....	50 00
22.....	E. E. Frisbee (2).....	For services.....	73 51
23.....	John Macready & Co.....	Merchandise.....	7 75
24.....	I. M. Larsen.....	Tents.....	49 50
25.....	F. M. Phillips (2).....	Services.....	83 99
26.....	W. T. Phillips (2).....	Services.....	189 03
27.....	W. N. Burckes (2).....	Services.....	73 51
28.....	D. L. Fell (3).....	Services.....	94 19
29.....	H. M. Sarvent (2).....	Services.....	88 99
30.....	C. Stewart Barnes (3).....	Services.....	82 56
31.....	Goldberg & Fitzhenry (2).....	Merchandise.....	10 00
32.....	J. Lowther (2).....	Meat.....	63 12
33.....	Monty & Gunn (3).....	Merchandise.....	164 86
34.....	S. F. Hullard (3).....	Services.....	240 00
35.....	Don. Mackenzie (3).....	Services.....	133 20
36.....	Carbon Hill Coal Co. (10).....	Supplies, merchandise.....	287 54
37.....	Lawrence Bros. (2).....	Merchandise.....	85 85
38.....	H. E. Parrish.....	Services, etc.....	311 65
39.....	Paul F. Kiecker.....	Services, etc.....	1,294 98
40.....	Eugene Ricksecker.....	Services, etc.....	881 85
41.....	Felitz Bros.....	Canvas covers.....	8 00
	Total.....		\$6,142 22

CONCLUSION.

We are living in an age of progressive thought and of practical scientific research. Blind groping in darkness without the guiding light of intelligent information will accomplish but little in the development of the manifold resources with which our state is abundantly endowed. The arguments in favor of the continuation of the work of the Mining Bureau are legion. Investors and settlers—particularly foreign capitalists, prior to investment, desire a knowledge of the constituent elements of the soil and its geological formation, for upon this knowledge they base opinions as to the existence of the precious and other metals as well as the cultivation of fruits, vegetables, cereals and all other agricultural commodities. The direct object sought to be attained by the Mining Bureau is to place the mining interests upon a scientific basis which will enable prospectors to form intelligent opinions as to the existence of and where to search for the precious metals; to so guide the intending settler, by careful analysis of soils, that our immense unoccupied areas of arable land may be dotted with happy homes; and it emphatically and above all should be the advertising bureau of the magnificently rich natural resources of Washington. These purposes fully attained would invite an unprecedented immigration of a most desirable class of citizens, and our almost exhaustless deposits of coal, iron, lead, silver and gold would attract the investment of such amounts of capital that the return to the state by reason of the increase of tax-

able values would equal the amounts appropriated, and to be appropriated by the legislature.

The investigations of the Mining Bureau, hampered as it has been by adverse and senseless criticism, and by a lack of cooperation upon the part of some who should have given its workings their attentive interest, has, notwithstanding, developed the existence within our state of an empire of mineral wealth, with which the world was little acquainted until by the wisdom of our legislature the Mining Bureau was established.

The discovery of anthracite coal, asbestos, cement—equal in value to the Portland—fire and ~~putters'~~ clay, marble, both white and variegated, as well as immense deposits of clay containing a large percentage of aluminium, are only a part of the results already attained.

The proper presentation to the public of these riches, which can only be accomplished by scientific examination and investigation, remains an unfinished work of the Mining Bureau. But we have such a profound respect for the intelligence of the people's representatives that we confidently submit the matter to the members of the next legislature, feeling assured that they will so wisely legislate upon this important question that Washington will take rank, as is her place, among the first of the rich sisterhood of states.

CHAS. E. LAUGHTON, *President,*

A. A. LINDSLEY, *Secretary,*

Mining Bureau, State of Washington.