

Please do not destroy or throw away this publication. If you have no further use for it write to the Geological Survey at Washington and ask for a frank to return it

UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary
GEOLOGICAL SURVEY
W. C. Mendenhall, Director

Bulletin 857—E

CORE DRILLING FOR COAL IN THE
MOOSE CREEK AREA, ALASKA

BY
GERALD A. WARING

Mineral resources of Alaska, 1932
(Pages 155-166)



metadc304242

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1934

CONTENTS

	Page
Abstract.....	155
Introduction.....	156
Geology.....	158
Stratigraphy.....	158
Structure.....	160
Correlation of drill holes.....	160
Coal.....	162
Developments.....	162
Quality.....	163
Core drilling.....	164
Conclusions.....	166

ILLUSTRATIONS

	Page
PLATE 6. Map of the Moose Creek area, showing geology, coal mines, and drill holes.....	160
7. Logs of diamond-drill holes in the Moose Creek area.....	160
8. Logs of diamond-drill holes in the Moose Creek area correlated on conglomerate beds and with the coal seams of the Premier mine.....	160
9. Progress of core drilling in the Moose Creek area.....	160
FIGURE 6. Map of part of Alaska showing location of the Moose Creek area.....	157

CORE DRILLING FOR COAL IN THE MOOSE CREEK AREA

By **GERALD A. WARING**

ABSTRACT

The Moose Creek area is in the western part of the Matanuska Valley, in south-central Alaska, about 165 miles by railroad north of the coast at Seward.

Coal deposits in the valley have been known since the early 1890's, and there have been producing mines since 1916, but the annual production is only about 40,000 tons, or less than one-third of the total amount consumed in the Territory. Early in 1931 Congress authorized the investigation of mineral resources in areas tributary to the Alaska Railroad, which is Government owned and operated, for the purpose of stimulating development and hence increasing the traffic and revenue of the railroad. The technical work of carrying on these studies was entrusted by Col. O. F. Ohlson, general manager of the railroad, to the United States Geological Survey.

One of the investigations undertaken was that of the Moose Creek area, where small coal mines are in operation. Difficulties have been encountered in these mines, owing to the faulted character of the formation, which causes unproductive work in mining and also produces a large percentage of fine coal, which is unsuitable for sale in distant markets.

Field examination indicated that more favorable mining conditions might be found somewhat farther west. Core drilling was therefore done in 1932, in order to learn if workable beds of coal were present that might be mined at less cost and produce a better product than the present mines for competitive sale in markets of the Pacific coast.

A total of 3,700 feet was drilled, in five locations. This drilling demonstrated that although the coal-bearing formation extends for some distance westward from Moose Creek, it becomes thinner in that direction. The fact that no coal seams were encountered in the five places tested shows that the coal beds are not continuous. A few thin seams were penetrated, of practically the same rank of coal as that of the developed mines; and there appears to be no hope of finding coals of higher rank in the area.

It is not unlikely that somewhere in the area there are workable coal beds at no great depth; but their discovery would require systematic drilling over a considerable area. The chance of finding a coal of good shipping quality which could successfully compete in distant markets is so slight, however, that there is at present no economic justification for further prospecting in the Moose Creek area for such coal.

INTRODUCTION

The Moose Creek area is in the western part of the Matanuska Valley in south-central Alaska. It is accessible by the Alaska Railroad from Seward, the nearest steamer port, northward 150 miles to Matanuska station, and thence about 15 miles by branch lines up the valleys of the Matanuska River and Moose Creek. (See fig. 6.)

The coal deposits of the Matanuska Valley have been known to white men since the early 1890's, but producing mines were not opened until 1916, when the railroad, a Government owned and operated line, was extended into the valley, primarily to obtain fuel for its own needs. This line was completed in 1923 from Seward northward to Fairbanks, a distance of 470 miles, with branch lines of nearly 50 miles to the coal fields. The coal deposits are on Government land, and leases to prospect and mine coal are granted to private enterprises on the basis of small royalty payments.

The annual consumption of coal by the entire Territory is at present only about 150,000 tons. Somewhat less than one-third of this total is produced in the Matanuska Valley, chiefly from two mines, and is used principally by the railroad. About 60,000 tons is subbituminous coal from the Healy River mine, 150 miles to the north. This is used largely at Fairbanks for power development in connection with gold dredging and for the heating and lighting needs of the town. Although these two coal fields supply the local markets and are capable of producing several times the present demand, neither coal is suitable for shipment to distant markets. The Healy River coal is of low heating value and also breaks down too easily to withstand long hauling. The Matanuska Valley product is of higher rank, but it contains a large proportion of fine coal and is not suitable for shipment and sale in competition with other coals in markets of the Pacific coast. The remainder of the coal consumed in the Territory is used chiefly in the coastal towns and is supplied from Seattle and British Columbia.

In 1930 a special committee of the United States Senate, composed of Senators Howell, Kendrick, and Thomas, visited Alaska in order to study the problem of increasing the revenues of the railroad. Through their recommendations, Congress early in 1931 authorized the investigation of mineral resources in areas tributary to the railroad for the purpose of stimulating development and hence increasing the traffic and revenue of the railroad. The technical work of carrying on these studies was entrusted by Col. O. F. Ohlson, general manager of the railroad, to the United States Geological Survey.

Among the projects undertaken was the investigation of the extent of coal deposits of the Moose Creek area. One obstacle to the

development of coal mines in the area (see pl. 6) is the faulted condition of the beds. This has in some places caused the displacement of the coal seams and requires crosscutting and other dead work to find the coal again. In other places the coal seams have been pinched

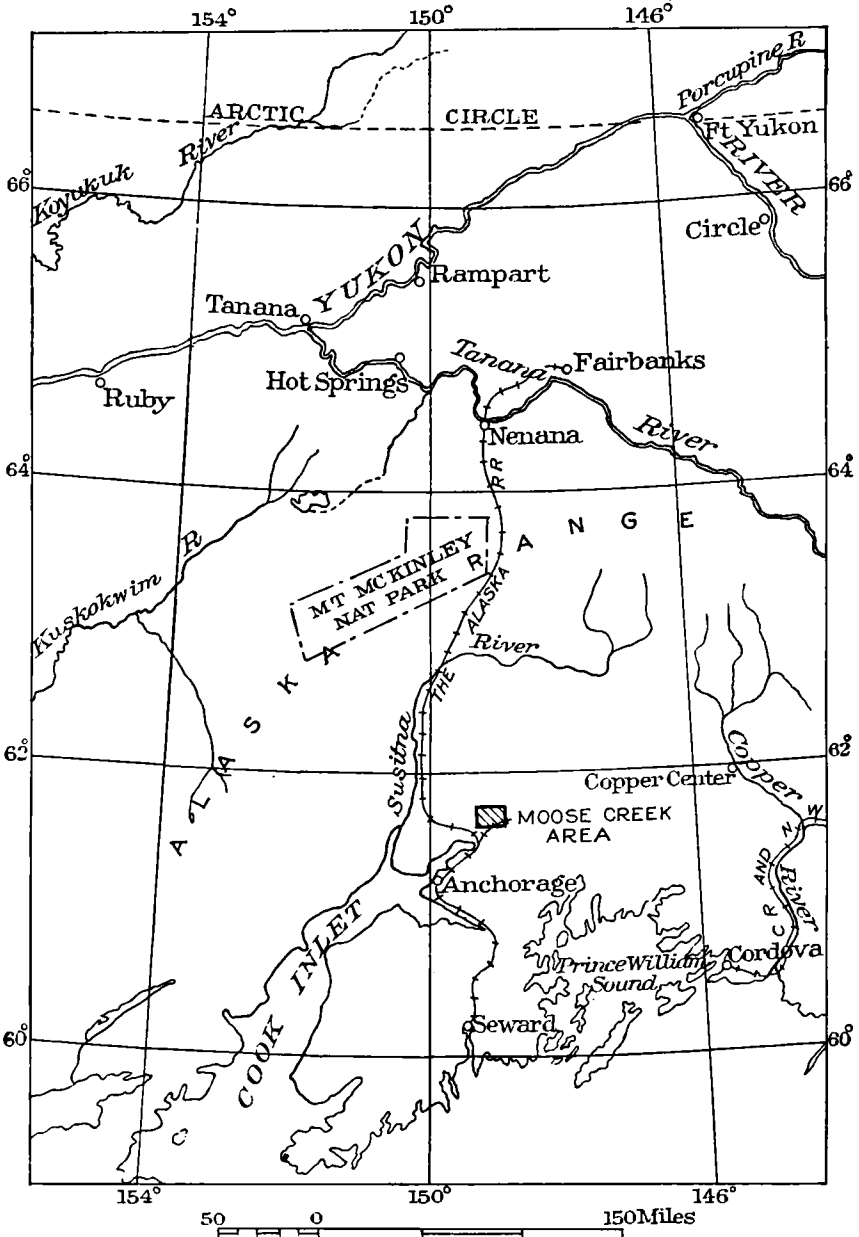


FIGURE 6.—Map of part of Alaska showing location of the Moose Creek area.

out by the faulting. The faulting and steep tilting of the beds have also caused the coal to be crushed.

Field examination indicated that the coal-bearing formation extends for some distance west of Moose Creek and that the beds in the western area are flat-lying and presumably less broken by faults. It was therefore decided to prospect the most promising portion of this area with diamond core drill, to learn if workable beds of coal were present which might be mined at less cost and produce a better product than the present mines for competitive sale in markets of the Pacific coast. The core drilling was done during June to December 1932, a total of 3,700 feet being drilled at five locations, and the principal results are recorded in the following pages.

General supervision of the Government's interests in the core drilling was in charge of G. A. Waring, geologist, who was assisted by P. A. Davison, junior geologist, in the collection and recording of the core as drilling progressed. Much assistance during the course of the work was also rendered by J. J. Corey, mining engineer, of the Geological Survey, stationed at Anchorage. Transportation and the obtaining of supplies were facilitated by Col. O. F. Ohlson and members of his staff.

GEOLOGY

STRATIGRAPHY

The following discussion of the geology has been largely compiled from earlier publications of the Geological Survey.¹

The Moose Creek area is bordered on the north by the Talkeetna Mountains, which are composed chiefly of granitic and gneissic rocks. From their relation to other rocks farther north and east, these crystalline rocks were assigned by Paige and Knopf to a period of intrusion during the Middle Jurassic.

Along the south side of the Matanuska River and also in bluffs on the north side both above and below the mouth of Moose Creek, dark indurated shale and sandstone are exposed. These beds in places contain fossils which show them to be of marine deposition and Upper Cretaceous age. They have for several years been known as the "Matanuska formation."

On the flank of the Talkeetna Mountains, resting directly on the granitic rocks, there is a series of highly indurated arkose, con-

¹ Paige, Sidney, and Knopf, Adolph, *Geologic reconnaissance in the Matanuska and Talkeetna Basins, Alaska*: U.S. Geol. Survey Bull. 327, pp. 19-52, 1907. Martin, G. C., and Katz, F. J., *Geology and coal fields of the lower Matanuska Valley, Alaska*: U.S. Geol. Survey Bull. 500, pp. 19-54, 67-75, 1912. Chapin, Theodore, *Mining developments in the Matanuska coal field*: U.S. Geol. Survey Bull. 712, pp. 131-167, 1920.

glomerate, and shale. In Arkose Ridge, north of Moose Creek, these beds are more than 1,500 feet thick, but they have not been found south of the base of the mountains. Poorly preserved plant remains found at a few places show that the beds are of Tertiary age, probably Eocene.

Much of the Moose Creek area is covered by a series of unaltered shale, sandstone, and conglomerate. This has for many years been known as the "Chickaloon formation", from prominent exposures along the Chickaloon River, farther east in the Matanuska Valley. In the western area the sandy and coarse-grained materials predominate and for the most part are poorly consolidated, though there are some beds of hard sandstone. Within the formation there are coal beds; and most of the shales are black and carbonaceous and carry veinlets of coal. The carbonaceous beds also contain plant remains which show that the deposits are of fresh-water origin and Eocene age. Additional fossil-bearing material which was collected at several horizons from the drill holes, was examined by Roland W. Brown, of the United States Geological Survey, who identified plant remains of the following genera:

32AW2. Diamond-drill core from Moose Creek area, Alaska:

Ferns.	Fagus.
Equisetum.	Juglans.
Sequoia, twigs and cones.	Ulmus, seeds.
Populus.	Carpites.
Corylus.	

The different materials have been deposited irregularly, so that there is much variation in the thickness and extent of individual beds; but broad zones in the formation may be traced fairly well over considerable distances. The character of the beds is well shown by the logs of the drill holes, given in plate 7.

Although the arkose and associated beds along the flank of the mountains are in general much more indurated than the typical Chickaloon beds, they may represent the lower portion of the Chickaloon formation in the northern part of the Moose Creek area.

At Wishbone Hill, between Moose and Eska Creeks, the Chickaloon beds are overlain by a series of thick beds of coarse conglomerate, separated by minor beds of coarse sandstone and sandy shale. This formation is known as the "Eska conglomerate," and although it lies without noticeable unconformity on the Chickaloon formation, it has been considered to be a later formation, questionably of Miocene age. It contains no coal beds and very little fossil material. About 20 miles east of Eska fully 3,000 feet of the conglomerate is exposed in the cliffs of Castle Mountain. The formation is more than 1,000 feet thick in the eastern part of Wishbone Hill, but thence

westward it either thins rapidly or the upper portion has been removed by erosion. Along the valley of Moose Creek a thickness of only 200 or 300 feet of the conglomerate is exposed, and a mile farther west the core drill penetrated beds of the Chickaloon formation immediately beneath the surface layer of gravel.

Along the north side of the Matanuska River and the southern part of the valley of Moose Creek there are thick deposits of gravel containing a few boulders a foot or more in diameter. Nearly all of this gravel was probably brought down by a great glacier that formerly occupied the Matanuska Valley. On the upper lands the gravel forms areas of knolls, undrained depressions, and winding ridges, typically of glacial moraine character; but along the valley of lower Moose Creek the gravel has been reworked by water, and the surface has been smoothed into terraces which rise above the rock bluffs that border the creek. Along the north side of the Matanuska River, for about 3 miles below the mouth of Moose Creek, there are also gravel bluffs, which rise 200 to 400 feet above the river.

STRUCTURE

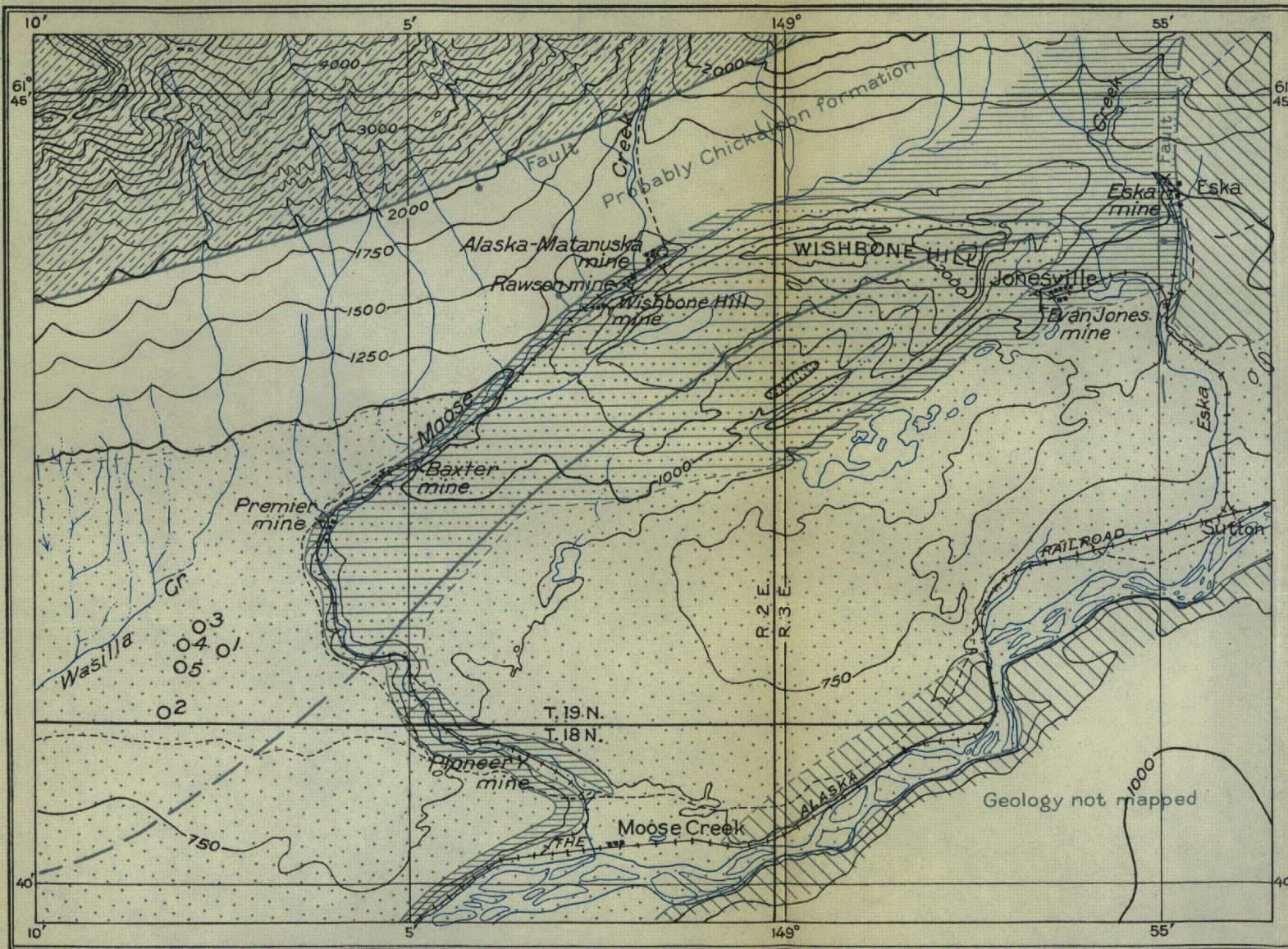
In the western part of the Matanuska Valley the rocks have been greatly folded and faulted. On the north side of the valley there is a great fault, which has been described and mapped by Martin.²

The dominant structure of the Moose Creek area is a broad, shallow syncline, of which Wishbone Hill is the most prominent portion. A mile east of the hill the syncline is exposed along Eska Creek, where it is broken by minor cross faults. The eastern part of Wishbone Hill seems to be unbroken by large faults; but along its northwest base the beds of the hill have been uplifted. In some places the beds there dip northward and indicate tilted fault blocks of considerable size. The axis of the syncline plunges southwestward, approximately with the slope of the hill, and the dips of its limbs flatten so that the area included between the limbs widens in that direction. Along the southern course of Moose Creek the dip flattens to only 2° or 3° near the synclinal axis, but steepens again to 20° to 40° on the south limb of the fold, near the mouth of the creek. On the south side, as well as on the north side, the syncline is broken by faults, but these have not been mapped in detail.

CORRELATION OF DRILL HOLES

The rock cores obtained from all the drill holes showed that the beds lie nearly horizontal, so no correction to obtain their true

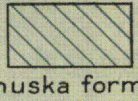
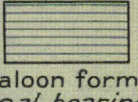
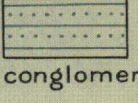
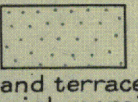
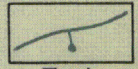
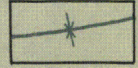
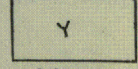
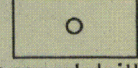
² Martin, G. C., *op. cit.*, p. 39, pl. 5.

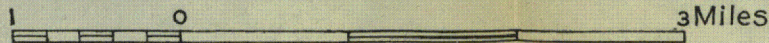


GEOLOGIC MAP OF THE MOOSE CREEK AREA, ALASKA

Geology by
G. C. Martin

EXPLANATION

- | | | | |
|-----------------------------|---|---|-------------------|
| <p>Upper
Cretaceous</p> |  | <p>Matanuska formation</p> | <p>CRETACEOUS</p> |
| <p>Eocene?</p> |  | <p>Chickaloon formation
(Coal bearing)</p> | <p>TERTIARY</p> |
| <p>Eocene</p> |  | <p>Eska conglomerate</p> | <p>TERTIARY</p> |
| <p>Quaternary</p> |  | <p>Stream and terrace gravel
and glacial moraines</p> | <p>QUATERNARY</p> |
-
- | | |
|---|------------------------------------|
|  | <p>Fault
Showing downthrow</p> |
|  | <p>Synclinal axis</p> |
|  | <p>Mine</p> |
|  | <p>Diamond-drill hole</p> |



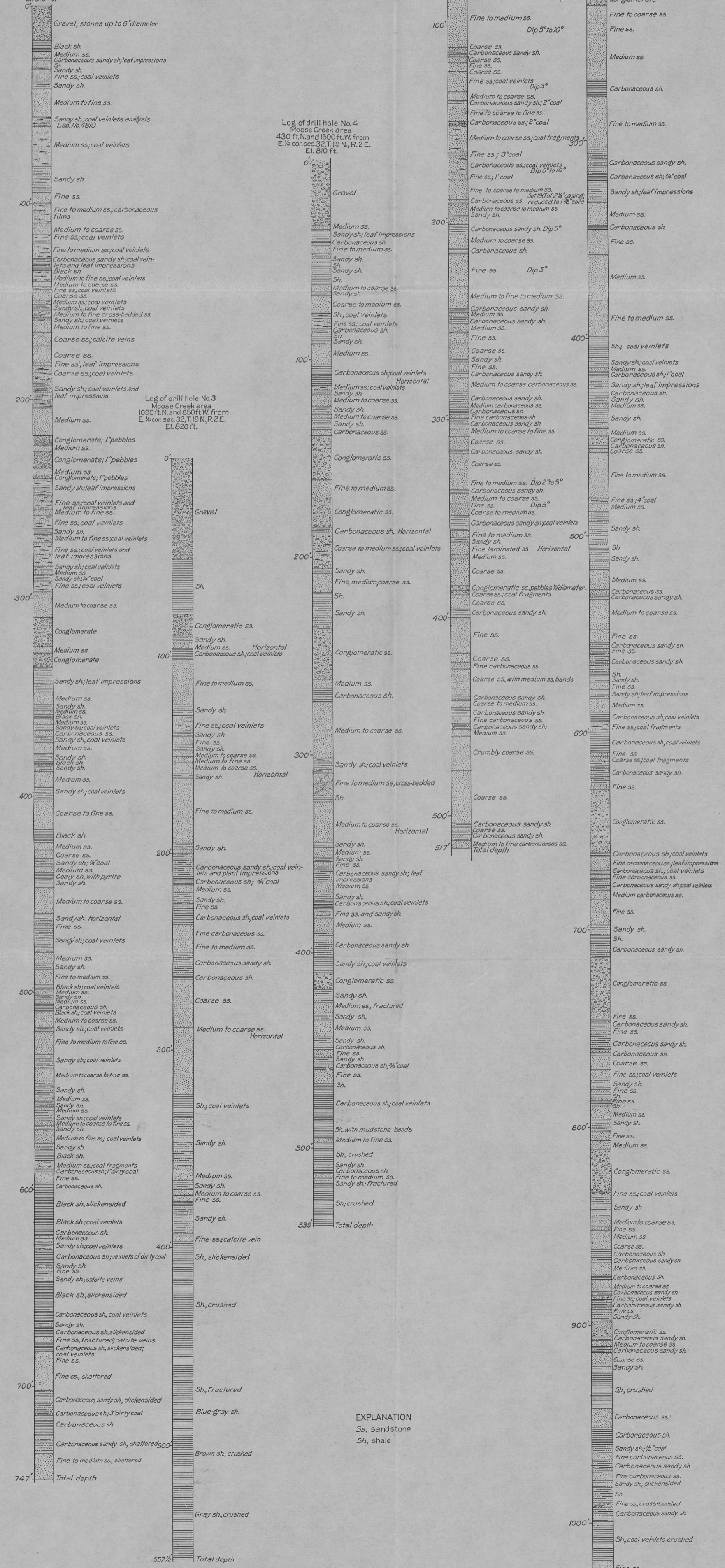
Log of drill hole No.2
Moose Creek area
490 ft. N and 210 ft. E from
S 1/4 cor. sec. 32, T.19N., R.2 E.
El. 840 ft.

Log of drill hole No.5
Moose Creek area
460 ft. S and 190 ft. W from
E 1/4 cor. sec. 32, T.19N., R.2 E.
El. 810 ft.

Log of drill hole No.4
Moose Creek area
430 ft. N and 150 ft. W from
E 1/4 cor. sec. 32, T.19N., R.2 E.
El. 810 ft.

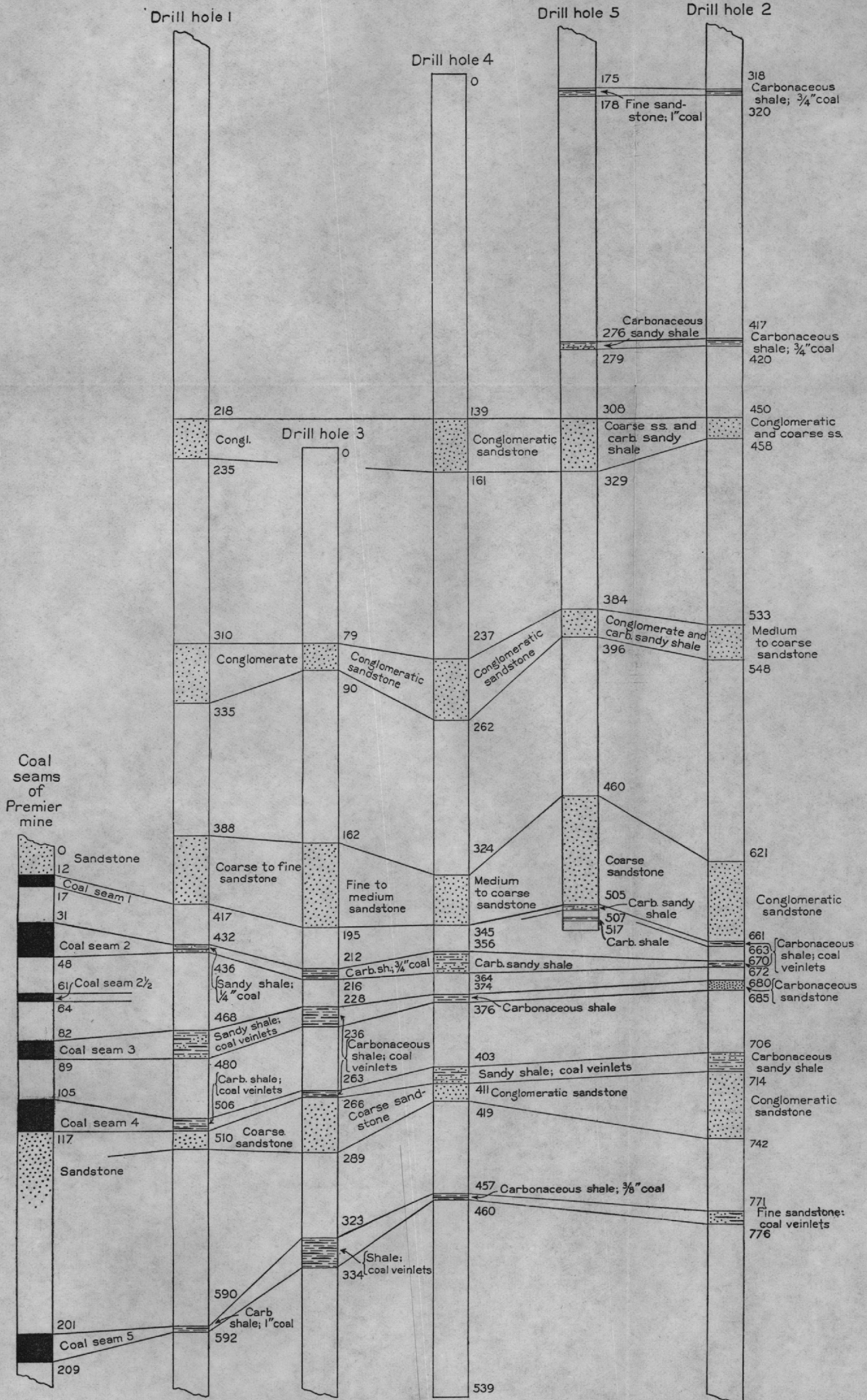
Log of drill hole No.1
Moose Creek area
320 ft. N and 40 ft. W from
E 1/4 cor. sec. 32, T.19N., R.2 E.
El. 810 ft.

Log of drill hole No.3
Moose Creek area
1090 ft. N and 850 ft. W from
E 1/4 cor. sec. 32, T.19N., R.2 E.
El. 820 ft.



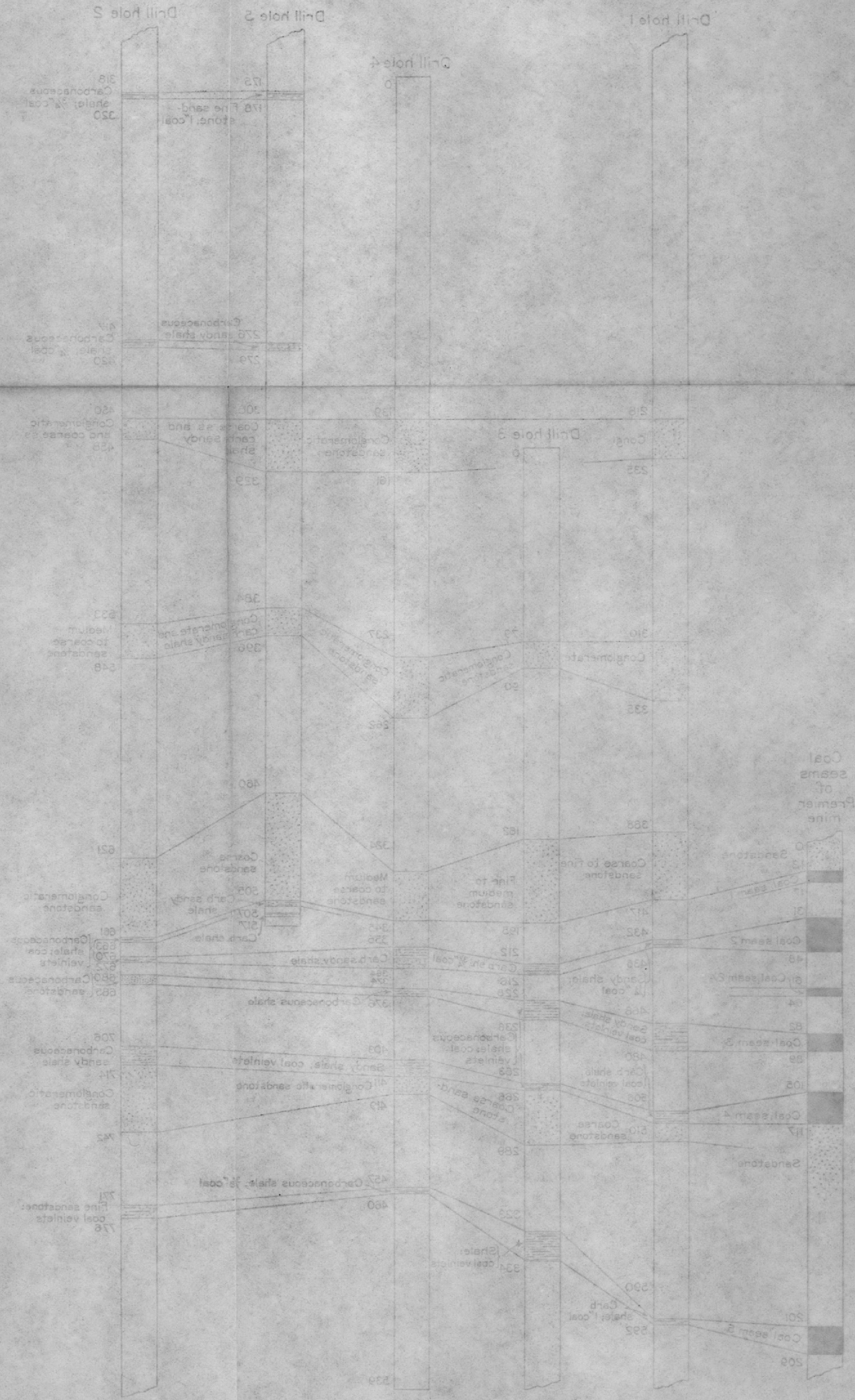
EXPLANATION
Ss, sandstone
Sh, shale

LOGS OF DIAMOND-DRILL HOLES IN THE MOOSE CREEK AREA.



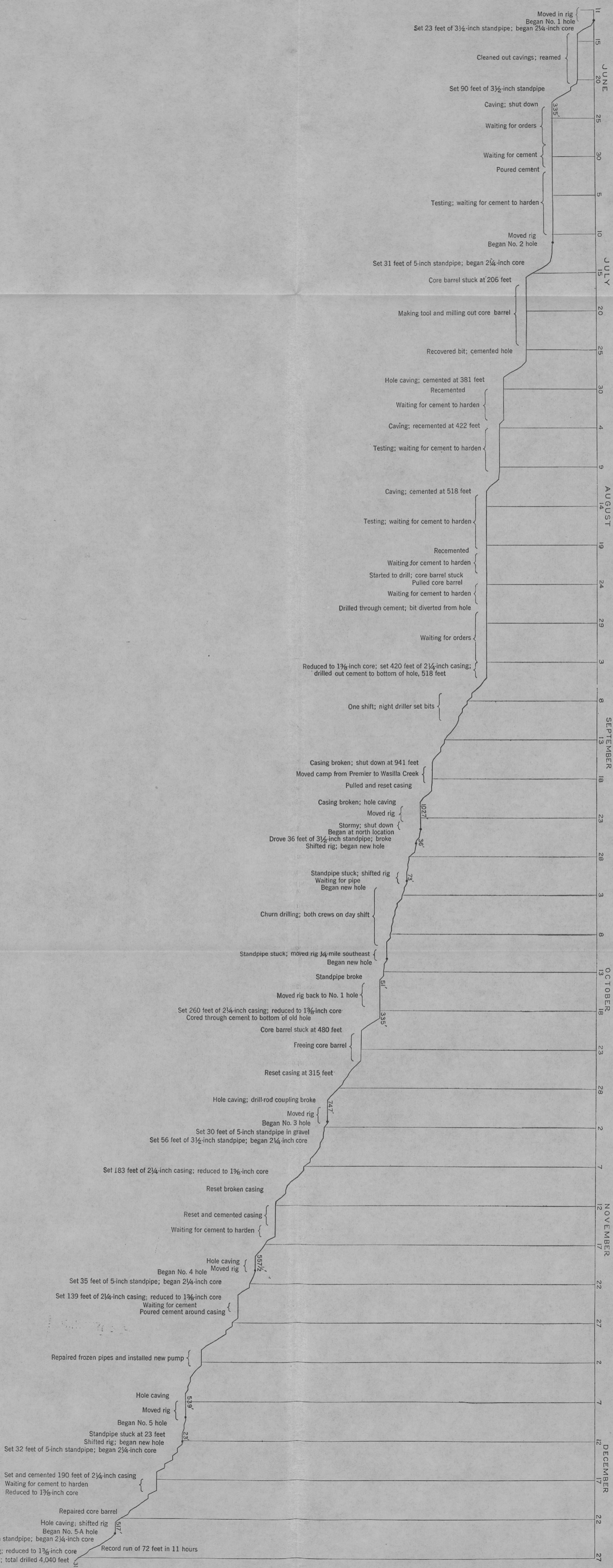
LOGS OF DIAMOND-DRILL HOLES IN THE MOOSE CREEK AREA.

Correlated on conglomerate beds and with the coal seams of the Premier mine as measured by J. J. Corey.



LOGS OF DIAMOND-DRILL HOLES IN THE MOOSE CREEK AREA.

Compiled on conglomerate beds and with the coal seams of the Premier mine as measured by J. J. Corey.



PROGRESS OF CORE DRILLING IN THE MOOSE CREEK AREA.

thickness was necessary in the measurements recorded during the drilling. A few dips of 5° or 10° were noted, but these dips persisted for only a few feet in depth and evidently represented cross-bedding within narrow zones.

In the several drill-hole logs four principal zones of conglomerate and coarse sandstone can be traced. The logs have been correlated in plate 8, with the top of the highest conglomerate bed as a datum. This is apparently at about the surface at drill hole 3, in which the first conglomerate that was penetrated seems to be the second conglomerate of the other drill holes. When so correlated, four thin zones of carbonaceous beds can also be traced through the lower portion of drill holes 1, 2, 3, and 4. Drill hole 5 reached only the uppermost of these zones. This correlation of the logs is in accord with the structure of the beds exposed along Moose Creek 1 mile to the east and shows that all the drill holes are on the gentle north limb of the syncline that extends southwestward from Wishbone Hill. There is a fairly uniform dip of about 440 feet from drill hole 3 southward to drill hole 2. The correlation of the logs also indicates that the strike of the beds is south of west, as beds encountered in drill hole 1 are found at shallower depths in hole 4 and greater depths in hole 5.

The projection southwestward of the structure observed at the Premier mine, with due allowance for the flattening of dip toward the synclinal axis, indicates that the horizons of the coal seams of the Premier mine should be at depths between about 400 and 600 feet in drill hole 1. Between these depths there are carbonaceous beds in the drill hole, and these beds therefore appear to be equivalent to the coal seams. In plate 8 the top of the sandstone beneath coal seam 4 of the Premier mine has been correlated with the top of the lowest zone of coarse sandstone in drill hole 1, and the approximate correlation of the several coal seams is indicated in all the drill-hole logs. The distance between the highest and lowest carbonaceous beds in the drill holes is somewhat less than the distance between the highest and lowest coal seams at Premier. This condition shows that there is some westward thinning of the coal-bearing zone.

The logs show that four of the drill holes penetrated some distance below the coal zones of the Premier mine and found only carbonaceous shale with veinlets and stringers of coal an inch or less in thickness. The core drilling is therefore believed to have demonstrated that, in the area tested, the coal beds have pinched out and there are no commercial coals within the depths penetrated. Drill holes 2, 3, and 4 in their lowest portions penetrated crushed shales, which indicate that there is some faulting in this area of flat-lying beds.

COAL

DEVELOPMENTS

Along the valley of Moose Creek and also in some places farther east coal beds are exposed interbedded with the sandy materials of the Chickaloon formation. In 1916-17 the railroad was extended to and beyond Moose Creek, primarily in order to reach these coal fields as a source of fuel for the railroad, and the opening of mines was stimulated. The Doherty or Pioneer mine (see pl. 6) was opened on the west side of Moose Creek, three-quarters of a mile above its mouth, on a 3-foot bed, and the coal was hauled by tramway to bunkers beside a spur of the railroad. The coal was used chiefly by the railroad, some also being sold in Anchorage, but it was dirty, and the mine was shut down after a few months' operation. Early in 1917 the Eska Creek Coal Co. began development work, and in June of that year its property was purchased by the Alaska Engineering Commission and operated as a Government mine, in order to assure a fuel supply for the railroad. It was closed late in 1921, after the Evan Jones mine, $1\frac{1}{4}$ miles to the southwest, had been opened by private enterprise; but it has since been kept in condition to produce on short notice, in case of failure of the coal supply from the privately operated mines. The Baxter mine, $4\frac{1}{2}$ miles above the mouth of Moose Creek, produced coal during the winter of 1917-18, from an 11-foot bed exposed on the east bank of the creek. Later development work showed the coal to be faulted, and lack of capital caused the mine to be closed for a time. It was reopened in 1921 and produced small amounts of coal during the next few years, but its operation ceased in 1925. Coal showings at several other places along Moose Creek were prospected during 1917-20, but successful development was hindered by the faulted condition of the beds. At the Rawson mine, 2 miles above the Baxter mine, and at the mine of the Alaska-Matanuska Coal Co., a quarter of a mile farther upstream, tunnels were driven and considerable other development work was done. Some coal was produced from the Rawson mine until late in 1926 and from the other property until late in 1929. In 1925 the Premier mine of the Alaska-Matanuska Coal Co. (later the Alaska Premier Coal Corporation) was opened 4 miles above the mouth of Moose Creek, and this mine has been the chief producer in the Moose Creek area. In the summer of 1932 the Wishbone Hill Coal Co. started operations on the old Rawson property and produced some coal.

The production of all the mines in the area has been relatively small, as 40,000 or 50,000 tons annually has supplied the needs of the railroad and the several towns in which the coal has been marketed.

QUALITY

All the coal of the Moose Creek area and also of the Evan Jones and Eska mines, farther east, is of bituminous rank. The following analyses show the chemical character of the coal from the two principal mines and of three samples obtained from the diamond-drill holes.

Analyses of coal from Jonesville and Moose Creek areas

[By Maurice L. Sharp, chemist, U.S. Bureau of Mines]

Laboratory no.	Source	Air-drying loss	Form of analysis ^a	Moisture	Volatile matter	Fixed carbon		Ash	Sulphur	Heating value		Fuel ratio
										Calories	British thermal units	
4570	Premier mine.....	3.8	A	5.5	38.2	46.7	9.6	0.2	6,686	12,035	1.22	
			B	1.8	39.7	48.5	10.0	.2	6,950	12,510	-----	
			C	-----	40.4	49.4	10.2	.2	7,074	12,735	-----	
			D	-----	45.0	55.0	-----	.2	7,876	14,175	-----	
4571	Evan Jones mine.....	5.0	A	7.0	36.8	45.8	10.4	.2	6,517	11,730	1.24	
			B	2.1	38.7	48.2	11.0	.2	6,860	12,350	-----	
			C	-----	39.6	49.2	11.2	.2	7,006	12,610	-----	
			D	-----	44.5	55.5	-----	.2	7,892	14,205	-----	
4810	Drill hole 1 (depth 57 feet; veinlets of coal).	-----	A	3.2	33.0	48.3	15.5	.3	6,373	11,470	1.46	
			C	-----	34.1	49.9	16.0	.3	6,583	11,850	-----	
			D	-----	40.6	59.4	-----	.4	7,839	14,110	-----	
4811	Drill hole 2 (depth 320 feet; ¾ inch of coal).	-----	A	3.1	33.7	57.7	5.5	.2	7,160	12,800	1.71	
			C	-----	35.8	58.5	5.7	.2	7,381	13,285	-----	
			D	-----	36.9	63.1	-----	.2	7,833	14,100	-----	
4812	Drill hole 2 (depth 1,010 feet; 1 inch of coal).	-----	A	1.7	38.0	43.3	17.0	.4	6,641	11,955	1.14	
			C	-----	38.7	44.0	17.3	.4	6,754	12,160	-----	
			D	-----	46.6	53.4	-----	.5	8,202	14,765	-----	

^a A, as received; B, air-dried; C, moisture free; D, moisture and ash free.

The samples from the Premier and Evan Jones mines were monthly composites of shipments of coal to the Alaska Railroad during November 1931.

The mined coals are noncoking, burn freely, are moderately low in ash, and have fairly high heating value. They are good coals for steam making. In a few places along upper Moose Creek the coals have at some time naturally burned, which is an indication of their rather high content of volatile matter.

The small samples from the drill holes show that the rank of the thin stringers of coal encountered is about the same as that of the Premier coal, two of the samples having a little higher fuel ratio and the other a little lower fuel ratio than the Premier coal. The low content of ash in sample 4811 is not significant in such selected sample. None of the analyses indicate that the coal differs appreciably from the beds exposed along Moose Creek.

CORE DRILLING

As considerable difficulty was experienced in the core drilling, chiefly because of the poorly consolidated character of the materials penetrated, a short account of the work is given here as being of interest in connection with the project.

The contract for the core drilling was awarded on May 19, 1932, to the Pennsylvania Drilling Co., of Pittsburgh, Pa. The terms were \$5.50 a foot for core drilling in bed rock, with \$1.50 additional for each foot of core recovered. For drilling through the overburden of gravel, \$5 a foot was paid. All expenses of moving in equipment and setting up the drill at the first four locations were borne by the contractor. Additional set-ups were paid for at \$350 each.

The equipment consisted of a Sullivan type CN drill with hydraulic feed and 20-horsepower steam engine and a vertical 20-horsepower boiler. Coal from the Premier mine was used for fuel. Pumps capable of delivering water to the bit at a pressure of 250 pounds to the square inch were used, and double-tube core barrels were employed to protect the core from erosion by the wash water. An A-shaped derrick was employed, the 30-foot timbers for its construction being obtained from local spruce trees. The drill rods were handled in 20-foot sections (two rods at a time). During most of the time two shifts were employed, each consisting of a driller and a helper, who also served as fireman.

On June 6 the drilling machinery and camp equipment were unloaded from the train at Premier, under the supervision of J. A. Christopherson, drill foreman. Camp was established at Premier, and during the next few days a road was built to the first location, beside a marsh $1\frac{1}{2}$ miles southwest of Premier. The progress of the work is shown graphically on plate 9, which also gives notations on the principal features of the drilling, which began on June 13. Only 17 feet of gravel was encountered, and after setting standpipe 6 feet deeper, in soft black shale, core drilling began with a 3-inch diamond bit, cutting $2\frac{1}{4}$ -inch core. Poorly consolidated sandstone, which caved badly, was soon encountered, and it was necessary to ream the hole and set 90 feet of $3\frac{1}{2}$ -inch casing. The hole was continued to 335 feet, where caving became so bad that an attempt was made to hold back the loose material by cementing. A quick-setting portland cement was tried but failed to set hard; and after experimenting with this for several days, the drill was moved about three-quarters of a mile, to the south location, to see if the materials were better consolidated there.

Water for drilling hole 2 was obtained from a pond 2,000 feet to the north, where a steam pump was installed, a 1-inch pipe line being laid to the drill. The bottom of the gravel was reached at

31 feet, where the standpipe was set and core drilling commenced. The formation was sandy, and drilling proceeded rapidly until at 206 feet the core barrel became stuck, owing to caving of the hole. On attempting to free the tools by pulling, the inner tube of the core barrel was pulled out, leaving the bit and outer tube in the hole. It was necessary to mill this down within a few inches of the bit before the bit could be recovered by means of a tapered tap. The hole was cemented, but the cement was only partly successful in holding back the cavings, and at 381 feet caving again became serious. The hole was recemented, using warm water in the mixing and hot water to warm the hole before pouring in the cement; but it did not harden much better than before. At 422 feet caving again required cementing; and drilling was continued to 518 feet, where caving again endangered the tools. This time calcium chloride was mixed with the cement, but the mixture did not harden much better than the cement alone; so it was drilled out, the hole recemented, and several days allowed for the mixture to harden. On attempting to drill through this, the core barrel became stuck and required a day's work to recover. On redrilling, the bit became diverted from the hole about 100 feet off bottom, and the new hole began to cave badly. After a few days' delay it was decided to try drilling with a smaller bit; so casing was run and drilling resumed with a 2-inch bit, cutting 1½-inch core. This drilled with less caving, though core recovery was not so good as with the larger bit; and the vibrating rods broke the casing some distance above its bottom. At 1,027 feet the hole began to cave badly, the casing was broken again, and as no favorable showings of coal had been found, the hole was abandoned.

For the next test the rig was moved a mile, to the north location. This was close to the north quarter corner of sec. 32, T. 19 N., R. 2 E., beside Wasilla Creek, to which camp had for convenience been moved from Premier. Three attempts were made to set standpipe through the gravel, the last hole being carried to 157 feet without reaching bedrock. The rig was then moved a quarter of a mile southeast, and another attempt was made to penetrate the thick layer of glacial gravel and boulders but was abandoned at 51 feet. The rig was then moved back to drill hole 1 for an attempt at deepening it with smaller bit, as this method had been successful in drill hole 2. The cement, which was still soft, was drilled out to 260 feet, where casing was set and drilling proceeded with a 2-inch bit. This worked fairly well, although the core barrel once became stuck and the casing was once broken by the vibrating drill rods and had to be pulled and reset. At 747 feet a drill-rod coupling broke, and after recovering the rods the hole was found to be caving so badly that it was abandoned. Only thin stringers and veinlets of coal had been penetrated.

The drill was moved about a quarter of a mile northwest, for drill hole 3, and standpipe was landed on bedrock at 56 feet. Core drilling proceeded easily to 183 feet, where the sandy material caved badly; so casing was set and the size of the hole reduced. The vibration of the drill rods soon broke the casing, and on the second recurrence of this trouble the casing was set and strengthened by cement poured between it and the wall of the hole. At about 400 feet crushed shale was encountered which caved badly, and after penetrating this material to 557½ feet the hole was abandoned. No coal other than veinlets and small stringers had been penetrated. Drill hole 4 was located about 900 feet to the southwest, where water was available for drilling. Much the same conditions were encountered as in the third hole, a depth of 539 feet being reached before caving shale caused the hole to be abandoned.

The next move was about 900 feet south, where on the second attempt standpipe for drill hole 5 was set on bedrock at 32 feet. The materials here penetrated were chiefly sandy; and caving necessitated the setting of casing at 190 feet and reduction to 1¾-inch core. Serious caving caused the hole to be abandoned at 517 feet. Drill hole 5A was started 4 feet south of hole 5 but was carried to only 313 feet, where caving caused the cessation of drilling. As no favorable showings of coal had been penetrated in either hole at this location, and as the footage contracted for had been drilled, the work was discontinued.

CONCLUSIONS

The core drilling demonstrated that although the coal-bearing formation extends for some distance westward from Moose Creek, it becomes thinner in that direction; and the fact that no coal seams of workable thickness were encountered in the five localities tested shows that the coals are intermittent in character. The thin seams penetrated were of practically the same rank of coal as that of the Premier and the Evan Jones mines, and there appears to be no hope of finding coals of higher rank in the western part of the area. The crushed character of the materials in three of the drill holes indicates that the area is faulted.

It is not unlikely that somewhere in the area there are coal seams of workable thickness at no great depth below the surface, but their discovery would doubtless require systematic drilling over a considerable area. The chance of finding a coal of good shipping quality which could be sold competitively in Pacific coast markets is so slight, however, that there is at present no economic justification for further prospecting for such coal in the Moose Creek area.

INDEX

A	Page		Page
Abstracts of papers-----	99-100, 141, 155	Apex-El Nido mine, work at-----	15
Acknowledgments for aid----	2-4, 142, 158	Archangel Creek, gold mining on--	17
Adak Island, observations on----	149-150	Arolic River, gold placers on-----	42
Admiralty Alaska Gold Mining Co.,		Atka Island, observations on-----	149
operations by-----	15	Attu Island, observations on-----	151
Admiralty Island, gold mining on--	15	B	
Aggie Creek, gold placers on-----	45	Babcock & Downey, operations by--	20
Aglapuk River, prospecting on-----	47	Banded Mountain, claims on-----	16
Akun Island, sulphur mine on-----	76	Baranof Island, claims on-----	15
Alaska-Chichagoff Mining Co., op-		Baxter mine, work at-----	162
erations by-----	15	Bear Creek (Fairhaven district),	
Alaska-Independence Mining Co., op-		gold placers on-----	44
erations by-----	15	Bear Creek (Kenai Peninsula), gold	
Alaska Juneau Gold Mining Co., op-		placers on-----	28
erations by-----	12-14, 58	Bear Creek (Toluksak-Aniak dis-	
Alaska-Matanuska Coal Co. <i>See</i>		trict), gold placers on-----	41
Alaska Premier Coal		Bear Gulch (Ruby district), gold	
Corporation.		placers on-----	34
Alaska Mercury Corporation, de-		Beaver Creek, gold placers on-----	34
velopment work by---	74-75	Bedrock Creek, mining on-----	17
Alaska Middle Fork Mining Co., op-		Benson Gulch, gold placers in-----	45
erations by-----	27	Bez property, work on-----	15
Alaska Palladium Co., production by--	63-64	Big Chena River, gold placers on--	31
Alaska Peninsula, geography of--	142-143	Big Creek, gold placers on-----	37
map showing-----	pl. 5	Big Delta Creek, prospecting on--	31
rocks of-----	143-146, 152	Big Hurrah Creek, gold placers on--	45
Alaska Premier Coal Corporation,		Big Hurrah quartz mine, possible re-	
operations by-----	66-67, 162	opening of-----	22
Alaska Railroad, coal for-----	66-67, 156	Big Minook Creek, gold placers on--	39
cooperation with-----	103	Birch Creek, gold placers on-----	35
examination of districts adja-		Bird Creek, gold placers on-----	27
cent to-----	21-22, 156	Bismuth, deposits containing-----	76
Albert Creek, gold placers on-----	27	Blackhawk district, claims in-----	15
Albrecht & Hanson, operations by--	33	Bluff district, gold lodes in-----	22
Aleutian Islands, geography of--	142-143	gold placers in-----	46
map showing-----	pl. 5	gold produced from-----	96
rocks of-----	143-146, 147-151	quicksilver in-----	74-75
American Creek (Eagle district),		Bock & Co., operations by-----	33
gold placers on-----	38	Boedeker claims, development on--	138-139
American Creek (Hot Springs dis-		Bonanza district, prospecting in---	47
trict), gold placers on-----	33	Bonnifield district, bismuthinite in--	76
American Creek (Iron Creek area),		gold lodes in-----	19
gold placers on-----	46	gold placers in-----	38-39
American Creek Dredging Co., op-		gold produced from-----	96
erations by-----	33	Boob Creek, platinum on-----	63
American River, gold placers on--	47	Boulder Creek, gold placers on-----	33
Amy Creek, gold placers on-----	34	Bremner district, prospecting in---	21
Anderson, Pontella, Utilla & Lar-		C	
son, operations by-----	32	Cache Creek district. <i>See</i> Yentna-	
Aniak district. <i>See</i> Tuluksak-Aniak		Cache Creek district.	
district.		California Creek (Hot Springs dis-	
Anthracite Ridge coal field, test		trict), gold placers on-----	33
drilling in-----	68-69		
Antimony, deposits of-----	75-76		
Anvil Mountain, prospecting on----	22		

	Page		Page
California Creek (Shungnak area), gold placers on	48	Copper River region, copper in	53-57
Candle Creek (Kuskokwim region), gold placers on	40-41	gold lodes in	21
Candle Creek (Seward Peninsula), gold placers on	43	gold placers in	26-27
Canyon Creek, gold placers on	28	gold produced from	25, 96
Capps, Stephen R., Notes on the geology of the Alaska Peninsula and Aleutian Islands	141-153, pl. 5	platinum in	63
Carl Whitham mine. See Nabesna Mining Corporation.		Cordovado, A. V., operations by	44
Carlson, John E., operations by	28	Council district, gold placers in	45
Carlson Creek, prospecting on	15	gold produced from	96
Casadepaga River, gold placers on	45	Coyote Creek, gold placers on	47
Cement, production of limestone for	74	Craigie Creek, gold lodes on	16-17
Chandalar district, gold placers in	36-37	Cripple Creek, gold placers on	33
gold produced from	96	Crooked Creek (Council district), gold placers on	45
Chatanika River, gold placers on	31	Crooked Creek (Eagle district), gold placers on	38
Chichagof Island, gold mining on	14-15	Crow Creek, gold placers on	29
Chichagoff Mining Co., operations by	14	lode prospecting on	20
Chicken Creek (Fortymile district), gold placers on	37	Curry district, climate of	107-108
Chicken Creek (Iditarod district), gold placers on	32	coal in	123-125, 139-140
Chicken Creek Mining Co., operations by	32	drainage in	103-106
Chilkat Oil Co., operations by	70	field work in	103
Chisana district, gold placers in	39	game in	111-112
gold produced from	30, 96	geology of, principal features of	113-114, pl. 1
Chistochina district, gold placers in	26	glacial features in	126-127, 132-135, pls. 1-4
gold produced from	96	gold prospects in	136-139, 140
platinum in	63	igneous rocks in	127-131
Chititu Creek, gold placers on	26	location and area of	100
Chrome ore deposits, work on	75	map of	pl. 1
Chulitna River, geomorphic develop- ment of	104	mineral resources of	135-140
Circle district, gold placers in	35	previous investigations in	100-102
gold produced from	30, 96	routes and trails in	108-109
Clara Creek, platinum from	62	sedimentary rocks in	114-127
Clark claims, prospecting on	15	settlements and industries in	112-113
Cleary Creek, gold lodes on	17	topography of	106-107, pls. 1-4
gold placers on	30-31	influence of rock type on	131-132, pl. 3
Cleary Hill Mines, production by	17	vegetation in	109-111
Coal, analyses of	140, 163		
consumption of	65	D	
core drilling for, in Matanuska Valley	68-69, 155-166	Dahl & Wilson, operations by	41
records of	pls. 7-9	Dahl Creek, gold placers on	45, 48
markets for	69-70	Dan Creek, gold placers on	26
production of	7, 9, 65-70	Daniels Creek, gold placers on	46
Coffee Creek Mining Co., operations by	45	Davis Creek, gold placers on	37
Cold Bay, features of area near	152	Deadwood Creek, gold placers on	35
Continental Gold Mining Co., opera- tions by	46	Dick Creek, gold placers on	46
Cook Inlet-Susitna region, gold placers in	27-29	Dime Creek, gold placers on	46
gold produced from	25, 27, 96	platinum from	63
Copper, price fluctuations of	56	Dolgoi Island, observations on	152
production of	7, 9, 53-57	Dollar Creek, gold placers on	27
Copper River Basin, changes in drainage of	104	Dome Creek, gold lodes on	18
		gold placers on	30
		Donlin Creek, gold placers on	41
		Dredges, length of working season of	50-51
		list of	51
		placer gold mined by	49-50, 98
		preparations for operation of	52-53
		Dry Creek, platinum from	62
		Dry Creek Dredging Co., operations by	43

E		Page	Page	
Eagle Creek (Circle district), gold placers on-----		35	Gertrude Creek, gold placers on---	34
Eagle Creek (Fortymile district), gold placers on-----		37	Girdwood district, gold lodes in----	20-21
Eagle district, gold placers in----		38	gold placers in-----	28-29
gold produced from-----	30, 96		Glaciation, in Alaska Peninsula--	146-147
Eldridge, G. H., quoted-----	124		in Aleutian Islands-----	146-147
Engineers' Exploration Syndicate, holdings of-----	37		in Curry district--	132-135, pls. 1, 3, 4
Eska, Government-owned coal mine at-----	67, 162		Glen Creek (Bonnielield district), gold placers on-----	39
Ester Creek, gold placers on-----	30		Glen Creek (Hot Springs district), gold placers on-----	33
Ester Dome area, prospecting in----	18		Glen Gulch (Tolovana district), gold placers in-----	34
Eureka Creek (Bonnielield district), gold placers on-----	39		Golconda Creek, prospecting on----	21, 26
Eureka Creek (Hot Springs district), gold placers on-----	33		Gold, production of, by dredging--	49-53, 98
Eva Creek Mining Co., operations by-----	19		production of, from lodes-----	12-22
Eva Quartz Mining Co., bismuth in ore mined by-----	76		from placers-----	22-53, 93-98
Evan Jones Coal Co., operations by-----	66		total-----	9-12, 96
Evan Jones mine, analysis of coal from-----	163		trend of-----	8, 11, 96-97
F			Gold Cord mine, work at-----	17
Fairbanks Creek, gold placers on--	30		Gold Hill district, gold placers in--	39
Fairbanks district, gold lodes in--	17-18		gold produced from-----	96
gold placers in-----	30-31		Gold King Creek, gold placers on---	38
gold produced from-----	11, 12, 30, 96		Gold lodes, production from, by districts-----	12-22
Fairbanks Exploration Co., operations by-----	30-31		production from, summaries of--	10-12
Fairbanks Gold Dredging Co., operations by-----	30		Gold placers, dredge mining of--	49-53, 98
Fairhaven district, gold placers in--	43-44		general conditions of mining of--	22-24
gold produced from-----	96		length of working season at--	50-51
Fairview district, prospecting in----	28		production from, by districts--	24-53, 93-97
Falls Creek, gold placers on-----	27		summaries of--	10, 11, 25, 30, 96
Farmer & Jones, operations by-----	33		Gold Run (Fairhaven district), gold placers on-----	44
Ferguson & Son, operations by-----	48		Gold Run (Port Clarence district), gold placers on-----	47
Flat Creek (Iditarod district), gold placers on-----	32		Gold Standard, work on-----	16
Flat Creek (Ruby district), gold placers on-----	34		Gold Top Syndicate, operations by--	16-17
Fern mine, work at-----	17		Goldsmith Dredging Co., operations by-----	45
Fishhook Creek, gold mining on----	17		Goldstream Creek, gold placers on--	30-31
Forno & Coyle, operations by-----	34		Goodnews Bay district, gold placers in-----	41-42
Forsgren & Vollmer Dredging Co., operations by-----	44		gold produced from-----	96
Fortymile district, gold placers in--	37-38		platinum in-----	62-63
gold produced from-----	30, 96		Granite Creek, platinum on-----	63
Fourth of July Creek, gold placers on-----	38		Granitic rocks, age of, in relation to volcanic rocks-----	144-145
Fox Gulch, platinum from-----	62		Greenstone Creek, gold placers on--	34
Frank, J. R., & Co., operations by--	33		H	
Franklin Gulch, gold placers in----	37		Hallum-Dora claims, testing on----	14
Fritsch, Wm., operations by-----	38		Hammon Consolidated Gold Fields, operations by-----	43
Froelich, Kummer, Ott & Scheele, operations by-----	38		Hammond River, gold placers on----	36
G			Happy Gulch, gold placers on-----	32
Galvin, J. G., and associates, operations by-----	22		Hawkins, C. M., operations by-----	18
Georgetown district, gold placers in--	40, 41		Head & Strand property, work on--	22
gold produced from-----	96		Healy River Coal Corporation, operations by-----	67, 156
			Henry Creek Gold Dredging Co., operations by-----	45
			Hidden River, gold lodes on-----	138-139
			Higgins, Archie, operations by-----	32
			High Grade mine, work at-----	17
			Hirshey, John, operations by-----	20

	Page		Page
Hirst-Chichagof Mining Co., operations by-----	14-15	Kennecott Copper Corporation, operations by-----	56-57
Holdem Creek, gold placers on-----	35	Ketchikan district, gold lodes in-----	16
Holitna River, quicksilver mined on-----	74	prospecting in-----	75-76
Holmgren & Erickson, operations by-----	29	Ketchum Creek, gold placers on-----	35
Hoosier Creek, gold placers on-----	39	Kiana, gold placers near-----	47-48
Hope-Sunrise district, gold lodes in-----	20	Kiska Island, observations on-----	150-151
gold placers in-----	28	Klery Creek, gold placers on-----	47-48
Hot Springs district, gold placers in-----	33	Klokerblok Creek, prospecting on-----	46
gold produced from-----	30, 96	Kobuk Alaska Mines, operations by-----	48
quicksilver in-----	75	Kobuk River, gold placers on-----	47-49
tin in-----	64	Kodiak Island, platinum in beach placers of-----	63
Humboldt Creek, gold placers on-----	44	Kotsina district, claims held in-----	21
Hunter Creek, gold placers on-----	39	Kougarok district, gold placers in-----	45-46
Hyder district, gold lodes in-----	16	gold produced from-----	96
silver in-----	59-60	Koyuk district, gold placers in-----	46
I			
Idaho-Alaska Corporation, holdings of-----	37	gold produced from-----	96
Idaho Bar, prospecting on-----	39	platinum in-----	63
Iditarod district, gold placers in-----	32	Koyukuk district, gold placers in-----	36
gold produced from-----	11, 30, 96	gold produced from-----	30, 96
Independence Creek, gold placers on-----	35	Kugruk River, coal mining on-----	67
Indian River district, gold produced from-----	96	Kuskokwim region, gold lodes in-----	19
Inmachuk River, gold placers on-----	44	gold placers in-----	40-42
Innoko district, gold placers in-----	32	gold produced from-----	25, 96
gold produced from-----	11, 30, 96	quicksilver in-----	74
platinum in-----	63	L	
Inspiration Point Mining Co., operations by-----	60	La Chance & Thibault, operations by-----	32
Iron Creek, gold placers on-----	46	Lake Creek (Fairview district), prospecting on-----	28
J			
Jack Wade Creek, gold placers on-----	37	Lake Creek (Koyukuk district), gold placers on-----	36
Jannsen Camp, work at-----	22	Lass & Whitney, property of, chrome ore from-----	75
Jarvis Creek, gold placers on-----	31	Lead, production of-----	7, 9, 60-61
Jensen and Associates, operations by-----	34	Lenard Harbor, features of area near-----	152
Jerome Creek, gold placers on-----	45	Lignite. <i>See</i> Coal.	
Johnson, Axel, operations of-----	38	Lillian Creek, gold placers on-----	34
Johnson & Toftaker, operations by-----	33	Limestone, production of-----	74
Julian Creek, gold placers on-----	41	Little Creek, gold placers on-----	32-33
July Creek Placer Co., operations of-----	38	Little Eldorado Creek, gold placers on-----	39
Jump Creek, gold placers on-----	43	Little Minook Creek, gold placers on-----	39
Juneau district, gold lodes in-----	12-14	Little Moose Creek, gold placers on-----	39
gold produced from-----	12-13, 96	Little Squaw Creek, gold placers on-----	37
lead from-----	13, 61	Little Susitna Valley, gold mining in-----	17
silver from-----	13, 58	Lituya-Yakataga region, beach placers of-----	26
K			
Kahiltna River, gold placers on-----	28	Livengood Creek, gold placers on-----	34
platinum from-----	63	Long Creek, gold placers on-----	34
Kantishna district, gold placers in-----	39	Loper Creek, gold placers on-----	35
gold produced from-----	96	Lucky Gulch, gold placers in-----	34
silver-lead ores from-----	59	Lucky Shot Mine, work at-----	16
Katalla oil field, production from-----	70	Lucky Strike Mine, work at-----	20
Keewalik Mining Co., operations by-----	43	Lynx Creek (Kenai Peninsula), gold placers on-----	28
Kempf claims, development on-----	16-17	Lynx Creek (Kobuk River Valley), gold placers on-----	48
Kenai Peninsula, chrome ore deposits on-----	75	M	
gold lodes on-----	19-20	Macklin Creek, gold placers on-----	45
gold placers on-----	27, 28	Marble, production of-----	73-74
gold produced from-----	96		
platinum on-----	63		

	Page		Page
Marguerite Creek, gold placers on	38	Mount McKinley, area southeast of	99-
Marlon Twin mine, conditions at	17	140, pls. 1-4	
Marshall district, gold placers in	38	Mount McKinley district, gold	
gold produced from	30, 96	placers in	40-41
platinum in	63	Murray & Harper, operations by	27
Marty claims, prospecting on	15		
Marvel Creek, gold placers on	41	N	
Mason Creek, prospecting on	39	Nabesna district, gold-lode mining	
Mastodon Creek, gold placers on	35	in	18-19
Matanuska Valley, coal in	66-67, 68-69, 162-166	Nabesna Mining Corporation, opera-	
petroleum in, test drilling for	72	tions by	18-19
Mauneluk River, prospecting on	49	Napoleon Creek, gold placers on	37
McCarthy & Panos, operations by	43	Navy Department, cooperation by	141-142
McDougall claims, prospecting on	14	Nelchina district, gold placers in	26-27
McKallick Chichagoff Gold Mines, Inc., operations by	15	gold produced from	96
McKinley district, gold produced from	96	Nenana coal field, mining in	67
McKinley Lakes district, claims held in	21	New York Alaska Dredging Co., op-	
Meketchum Creek, gold placers on	34	erations by	41
Mespelt, Charles, and associates, op-		Newton Gulch, gold placers in	43
erations by	19	Nicolai Placer Mines, operations by	26
Metal Creek, platinum on	63	Nixon Fork district, gold lodes in	19
Miller Creek (Circle district), gold placers on	35	Nizina district, gold placers in	26
Miller Gulch (Chistochina district), gold placers in	27	gold produced from	96
Mineral industry, assembling of sta-		Noatak Valley, prospecting in	49
tistics of	1-3, 24, 93-95	Nolan Creek, gold placers on	36
relative importance of	1	Nome Creek (Tolovana district), mining on	34
reports on	1, 77-91	Nome district, gold placers in	42-43
Mineral production, summaries of	6-9, 93-98	gold produced from	11, 96
trends of	8, 96-97	North American Dredge Co., opera-	
Miscovich, Peter, operations by	32	tions by	32
Molybdenum, prospecting for	75	Northern Star Dredging Co., opera-	
Monaghan, Stevens & Lohr, opera-		tions by	45
tions by	34	Northwestern Alaska, gold placers in	47-49
Monahan Creek, prospecting on	26	gold produced from	25, 96
Montezuma Creek, gold placers on	38	Nugget Creek, gold placers on	27
Monument Creek Mining Co., op-		Nuka Bay district, gold lodes in	19-20
erations by	43		
Moore Creek, gold placers on	40	O	
Moose Creek (Bonnifield district), gold placers on	38	Odergaard & Ross, operations by	34
Moose Creek (Ruby district), gold placers on	34	Offield Creek, gold placers on	47
Moose Creek area (Matanuska Val-		Olive Creek, gold placers on	34
ley), coal in, core drill-		Omega Creek, gold placers on	33
ing for	68-69, 158, 164- 166, pls. 7-9	Ophir Creek (Council district), gold placers on	45
coal in, mining of	66-68, 162	Ophir Creek (Innoko district), gold placers on	33
quality of	163, 166	Ophir Gold Dredging Co., operations by	45
total production of	162	Otter Creek, gold placers on	32
fossils found in	159		
maps showing	157, pl. 6	P	
stratigraphy in	158-160, 160-161, pls. 7, 8	Pacific Coast Cement Co., quarry of	74
structure in	160	Pacific Sulphur Corporation, prop-	
Moran Gulch, gold placers in	45	erty of	76
Mother Lode Coalition Mines Co., operations by	57	Palladium, production of	62, 64
Mount Distin, operations near	22	Palmer Creek, gold mining on	20
		Parks, E. W., property of, quick- silver mined on	74
		Patterson Creek, gold placers on	43
		Pavlof Bay, features of area near	153
		Pearson & Strand mine, production from	19
		Pedro Creek, gold placers on	30

	Page		Page
Pennsylvania Drilling Co., core drilling by-----	164-166	Seward Peninsula, gold lodes in----	22
Peters Creek Placer Co., operations by-----	27	gold placers in-----	42-47
Peterson Oil Association, drilling by-----	72	gold produced from-----	25, 96
Petroleum, production of-----	70-72	platinum in-----	63
prospecting for-----	71-72	quicksilver in-----	74-75
Petroleum products, shipments of, to Alaska-----	71	tin in-----	64
Pinnell River, gold placers on-----	44	Sharp, Maurice L., analyses by-----	163
Pioneer Creek, gold placers on-----	33	Shropshire, Gragan & Pedretti, operations by-----	34
Pioneer mine, coal from-----	162	Shungnak, gold placers near-----	47-48
Platinum, production of-----	62-64	Shushanna district. <i>See</i> Chisana district.	
Platinum Creek, platinum from-----	62	Silva & Co., operations by-----	34
Platte Creek, gold placers on-----	38	Silver, production of-----	7, 9, 55, 58-60
Poker Creek, gold placers on-----	37	Skookum Gulch, gold placers in-----	33
Poorman Creek, gold placers on-----	34	Slate Creek, gold placers on-----	39
Porcupine Creek, gold placers on-----	35	Slate Creek Mining Co., operations by-----	26-27
Porcupine district, gold placers in-----	25-26	Smith, Philip S., Mineral industry of Alaska in 1932-----	1-76
gold produced from-----	96	<i>Past</i> placer-gold production from Alaska-----	93-98
Port Clarence district, gold placers in-----	47	Smith Creek, gold placers on-----	37
gold produced from-----	96	Solomon district, gold placers in-----	44-45
Premier Gold Mining Co., operations by-----	15	gold produced from-----	96
Premier mine, analysis of coal from-----	163	gold quartz mine in-----	22
conditions at-----	66-67	Sonny Fox mine, production from-----	20
Publications issued or in preparation-----	77-91	Sourdough Creek, gold placers on-----	30
		Southeastern Alaska, gold lodes in-----	12-16
Q		gold placers in-----	25-26
Quartz Creek, gold placers on-----	44	gold produced from-----	12, 25, 96
platinum from-----	63	lead from-----	13, 61
Quicksilver deposits, work on-----	74-75	limestone and marble in-----	73-74
		platinum in-----	63
		silver from-----	13, 58-60
R		Spaulding claims, work on-----	18
Ramer Bros.' property, work on-----	21	Spruce Creek, gold placers on-----	33
Rampart district, gold placers in-----	39	Spruce Creek Dredging Co., operations by-----	44
gold produced from-----	30, 96	Squaw Creek, gold placers on-----	37
Rawson mine, work at-----	162	Squirrel River, gold placers on-----	47-48
Resurrection River, gold placers on-----	28	Strandberg, David, operations by-----	32
Rex Creek, gold placers on-----	26	Stuyahok River, gold placers on-----	38
Rhoads-Hall mine. <i>See</i> Cleary Hill Mines.		Sullivan Creek, gold placers on-----	33
Richardson district, gold produced from-----	96	Sulphur deposits, work on-----	76
Riley, J. E., Investment Co., operations by-----	32	Suntrana mine, operations at-----	67
Riverside mine, possible reopening of-----	16	Superior Portland Cement, Inc., operations by-----	74
Rock Creek, gold placers on-----	45	Susitna region. <i>See</i> Cook Inlet-Susitna region.	
Ruby Creek (Nixon Fork district), gold mining on-----	19	Swede Creek, gold placers on-----	46
Ruby district, gold placers in-----	33-34	quicksilver deposits at mouth of-----	74-75
gold produced from-----	30, 96	Sweepstake Creek, gold placers on-----	46
platinum in-----	63	Switch Creek, gold placers on-----	35
Ruth Creek, gold placers on-----	34		
		T	
S		Taku River Valley, prospecting in-----	14
Salcha River, gold placers on-----	31	Tenderfoot camp, mining at-----	31
Salmon Creek, platinum on-----	62	Texas Creek, West Fork of, development work on-----	16
San Antonio Metals Co., operations by-----	75	Thanksgiving Creek, gold placers on-----	33
Sea Level mine, gold from-----	16	Thunder Creek, gold placers on-----	27
Seventymile River, gold placers on-----	38	Tiekel district, prospecting in-----	21
		Tilleson & L'Heureux, operations by-----	33
		Timber Creek, gold placers on-----	34

	Page
Tin, production of-----	7, 9, 64-65
Tokichitna River, gold placers on--	27-28
Tolovana district, gold placers in--	34-35
gold produced from-----	96
Topkok Chief Mines Co., operations by-----	46
Tuck, Ralph, The Curry district--	99-140,
pls. 1-4	
Tulsequah River, prospecting on----	14
Tuluksak-Aniak district, gold placers in-----	40, 41
gold produced from-----	96

U

Unalaska Island, observations on--	147-149
------------------------------------	---------

V

Valdez Creek district, gold placers in-----	27, 28
gold produced from-----	96
Valdez district, gold lodes in-----	21
Vault Creek, gold placers on-----	30
Vermont Marble Co., operations by--	73
Victor Gulch, gold placers in-----	33
Volcanism in Alaska Peninsula and Aleutian Islands--	142-146

W

Waring, Gerald A., Core drilling for coal in the Moose Creek area-----	155-166,
pls. 6-9	
Wattamuse Creek, gold placers on--	42
West Creek, gold placers on-----	45

	Page
Whelan mine, prospecting at-----	19
White Creek, gold placers on-----	28
White Water claims, prospecting on--	14
Whitham, Carl, mine. <i>See</i> Nabesna Mining Corporation.	
Wilbur Creek, gold placers on-----	34
Wild River, gold placers on-----	36
Willow Creek (Iditarod district), gold placers on-----	32
Willow Creek district, gold lodes in--	16-17
gold placers in-----	27
gold produced from-----	12, 96
Willow Creek Mines, Inc., opera- tions by-----	16
Wishbone Hill Coal Co., operations by-----	67, 162
Woodchopper Creek, gold placers on--	33

Y

Yakataga district, gold produced from-----	96
Yakobl Island, gold mining on-----	15
Yankee Creek, gold placers on-----	32-33
Yellow Creek, gold placers on-----	39
Yentna-Cache Creek district, gold placers in-----	27
gold produced from-----	96
platinum in-----	63
York district, tin in-----	64
Yost & Nash, operations by-----	32
Yukon region, dredge-mining in-----	50-51
gold lodes in-----	17-18
gold placers in-----	29-39
gold produced from--	11-12, 25, 30, 96
platinum in-----	63
tin in-----	64

UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary
GEOLOGICAL SURVEY
W. C. Mendenhall, Director

Bulletin 857

MINERAL RESOURCES OF ALASKA

REPORT ON PROGRESS OF
INVESTIGATIONS IN

1932

BY

PHILIP S. SMITH AND OTHERS



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1934

CONTENTS

	Page
Mineral industry of Alaska in 1932, by P. S. Smith.....	1
Selected list of Geological Survey publications on Alaska.....	77
Past placer-gold production from Alaska, by P. S. Smith.....	93
The Curry district, by Ralph Tuck.....	99
Notes on the geology of the Alaska Peninsula and Aleutian Islands, by S. R. Capps.....	141
Core drilling for coal in the Moose Creek area, by G. A. Waring.....	155
Index.....	167

ILLUSTRATIONS

	Page
PLATE 1. Geologic reconnaissance map of the Curry district, Alaska.....	112
2. <i>A</i> , Eocene coal-bearing rocks and vegetation-covered moraine of Ruth Glacier; <i>B</i> , Rugged granitic mountains on the east side of Mount McKinley.....	112
3. Rugged topography along Eldridge Glacier.....	112
4. Buckskin Glacier with Mount McKinley in the background....	112
5. Map of the Alaska Peninsula and Aleutian Islands.....	146
6. Map of the Moose Creek area, showing geology, coal mines, and drill holes.....	160
7. Logs of diamond-drill holes in the Moose Creek area.....	160
8. Logs of diamond-drill holes in the Moose Creek area correlated on conglomerate beds and with the coal seams of the Premier mine.....	160
9. Progress of core drilling in the Moose Creek area.....	160
FIGURE 1. Trends of mineral production of Alaska, 1890-1932.....	8
2. Trend of value of gold production of Alaska, 1880-1932.....	11
3. Copper produced from Alaska mines, 1900-1932, and fluctu- ations in the price of copper during that period.....	56
4. Index map showing the location of the Curry district.....	101
5. Sketch map showing the distribution of timber in the Curry district.....	111
6. Map of part of Alaska showing location of the Moose Creek area.....	157



