MINERAL RESOURCES OF ALASKA, 1925

MINERAL INDUSTRY OF ALASKA IN 1925

By FRED H. MOFFIT

INTRODUCTION

This volume is the twenty-second of a series of annual bulletins[1] summarizing the results achieved during the year in the investigation of the mineral resources of Alaska, describing the mineral deposits, and presenting statistics of mineral production.[2] It has for its chief purpose the prompt publication of notes on the more important mining developments of the year and of the principal results of the field work carried on by members of the Geological Survey who are engaged in the investigation of Alaska's mineral resources, especially any facts or conclusions coming from these investigations which may be of immediate use to the mining public. The papers included in this volume are for the most part preliminary statements or summaries of the results of work which are expected to be published in greater detail at a later time, as the study of the field collections in the office is not yet completed and the final maps are not prepared. The omission in this volume of engraved maps and the illustrative material which ordinarily accompanies a more detailed report on the geology and mineral resources of a district makes possible its publication with much greater promptness than otherwise could be attained. It is evident that the later conclusions of the final reports may differ in some measure from the statements of this volume, yet it is believed that any changes of this kind which may be found necessary will not modify radically the conclusions here set forth. Those who desire more detailed information regarding a particular district or particular problem in Alaska, especially those who require the geologic and topographic maps of areas that are being surveyed, are urged to obtain copies of the final reports when they become available. Although as a rule it is not possible to state even approximately the date of publication of a paper in

[1] The preceding volumes in this series are U. S. Geol. Survey Bulls. 259, 284, 314, 345, 379, 442, 480, 520, 542, 592, 622, 642, 662, 692, 712, 714, 722, 739, 755, 773, and 783.

[2] The statistics in this report have been compiled principally by Miss Erma C. Nichols.

course of preparation, requests for such reports are filed, and the reports are mailed to those requesting them as soon as they come from the press.

The information for the general survey of the mining industry of Alaska in 1925 here presented comes from a number of sources, chiefly the schedules of lode mines and gold placers which are furnished by the owners or operators of mining properties at the request of the Geological Survey; the reports furnished by banks, the Bureau of the Mint, the Bureau of Mines, the Customs Service, and others with special knowledge of mining developments or production; and the data gathered in the field by the Geological Survey. Some items of interest and notes on important events are obtained from the Alaskan newspapers and the technical press. The information from the operators themselves is the most valuable, for it brings the Geological Survey into close touch with the mining men of Alaska, makes possible a more accurate knowledge of the conditions under which the miner is working and of his needs, and increases the value of the statistical records of production by increasing their accuracy. All operators who receive each year the schedules asking for statistics of mineral production are therefore urged to fill out and return them promptly, in order that the figures for production may be as nearly accurate as is possible and compiled without delay in the Geological Survey. In order to make the records accurate and complete it is necessary to have returns not only from operators of mines of large production, but also from those that produce little or none at all. All the schedules are regarded as confidential and are used for no other purpose than compiling the tables of mineral production of Alaska which are published each year in this series of volumes. In preparing these tables care is taken to combine the figures in such a way as not to reveal the production of individual operators or companies, except such companies as themselves publish the figures of their production in the annual reports to their stockholders. It is for this reason that the grouping of minerals produced and of creeks or properties in some of the tables is not entirely natural or not always logical. It is gratifying that so large a number of Alaskan mining men are willing to assist in the work of collecting the statistics by placing at the command of the Geological Survey the figures of their individual production.

Many persons have contributed information or rendered other aid toward the compilation of the statistics and descriptive material in this report. The list is too long to be included here, although such recognition of appreciation would gladly be given. A number, however, have given special assistance and should be mentioned.

Special acknowledgment is due to the directors and other officers of the Bureau of Mines and Bureau of the Mint; the collector and

other officers of the Alaska customs service; the officers of the Alaska Railroad; N. L. Wimmler, formerly of the Bureau of Mines, now a member of the Geological Survey, for information about gold placers; Volney Richmond, of the Northern Commercial Co.; John C. McBride and the Alaska Juneau Gold Mining Co., of Juneau; E. H. Bartholf, of Hyder; J. H. Cann, Hirst-Chichagof Mining Co., and Chichagoff Development Co., of Chichagof; Kennecott Copper Corporation, of Kennecott; Thomas Larson, of Kotsina; M. J. Knowles, of Valdez; S. W. Jansen and H. W. Nagley, of Talkeetna; Alex Liska and Sumner Smith, of Anchorage; N. E. Bolshanin, of Unalaska; Arthur Moose Johnson, of Chulitna; J. H. Lander, of Wasilla; L. A. Levensaler, of the Nicolai Placer Mines, Dan Creek; Charles Zielke, of Nenana; Carl F. Whitham, of Chisana; J. J. Hillard, of Eagle; James P. Collins, Henry Cook, the First National Bank, George Hutchinson, and G. E. Jennings, of Fairbanks; Charles E. M. Cole, of Jack Wade; the Miners & Merchants Bank, of Iditarod; E. J. Stier, of Flat; William Schneirla and Frank Speljack, of Ophir; B. Cascaden, of Livengood; Alex Mitchell, of Kantishna; W. D. English and Frank H. Smith, of Bettles; H. S. Wanamaker, of Wiseman; Tom Plunkett, of Fortuna Ledge; William Yanert, of Purgatory; A. J. Griffin, of Richardson; B. J. Bower, of Long; George Jesse, of Poorman; Lynn Smith, of Ruby; J. R. Murphy, of the Kuskokwim Dredging Co., McGrath; E. M. Whelan, of Medfra; John Haroldsen and A. Stecker, of Kwinak; the Miners & Merchants Bank, G. R. Jackson, S. M. Gaylord, R. W. J. Reed, and K. L. Gravem, of the Coffee Creek Mining Co., of Nome; E. M. Marx, of Teller; A. V. Cordovado, of Deering; A. S. Tucker, of Bluff; James C. Cross, Lewis Lloyd, Fred Johnson, Michael Tuohy, and F. R. Ferguson, of Shungnak; and Arthur W. Johnson, of Haycock.

MINERAL PRODUCTION

The mineral industry of Alaska was until a few years ago the principal source of wealth in the Territory, but the growth of other industries, notably the fisheries, together with the decrease in mineral production resulting from increased cost of mining and supplies and decreased output from bonanza gold placers, has displaced it from its leading position, notwithstanding the fact that the loss in gold production has been partly made up by increased production in other metals and mineral substances. This change in relative rank of the mining industry is evidence of the growing importance of Alaska and the certainty of its commercial future, for a diversity of commercial interests argues for growth and stability of population. The tables that follow show, however, that mineral production still holds an honorable place among the sources of wealth in Alaska and that the present scale of production is likely to be maintained if not raised.

Alaska has produced more than $553,000,000 in gold, copper, silver, lead, and other mineral substances since the year 1880, which may be regarded as marking the beginning of its mining industry. From 1880 to 1897 there was a slow but steady increase which brought the annual production up to about $2,500,000. Beginning with 1898 a rapid increase in production took place as a result of the discovery of rich gold-bearing gravel in many parts of Alaska. The output of other metals besides gold, such as copper and silver, also increased, and the curve of gold production was no longer coincident with the curve of total mineral production. From 1898 to 1906 the total mineral production increased from less than $2,500,000 to over $20,000,000. Since 1906 Alaska's mineral production has varied a little above or a little below the $20,000,000 mark, except during the extraordinary years of the war (1916–1918), when the high price of copper and resulting stimulus to production carried the value of the minerals produced to nearly $50,000,000 in 1916. The year 1906 marks the peak of Alaska's yearly gold output. Since then the amount of gold produced from the placers has slowly diminished as the bonanza gravel deposits were exhausted, till now the proportion of placer gold in the annual output is not greatly different from that of lode gold. There is much reason to believe that, although the high record of the bonanza placer days is not likely to be repeated, the present rate of gold production will probably be maintained and may reasonably be expected to increase.

The total mineral production of Alaska is given in the following table and shown graphically by the curves of Figure 1, on which are included also the production of copper, the total production of gold, and the production of gold from placers. This diagram brings out clearly the effect of the war on the production and price of copper and the increasing proportion of other minerals to gold in the total mineral production.

Previous volumes of this series, except that for 1924, contain tables giving the values of the principal metals by years as far back as the records go, but in order to save space and the cost of printing, the tables were condensed in the report for 1924 by combining the earlier years into one item and giving the total annual production by years only from 1891 and the production of individual metals from 1916. Those who are interested in obtaining the full record should consult Bulletin 773 in connection with the present volume.

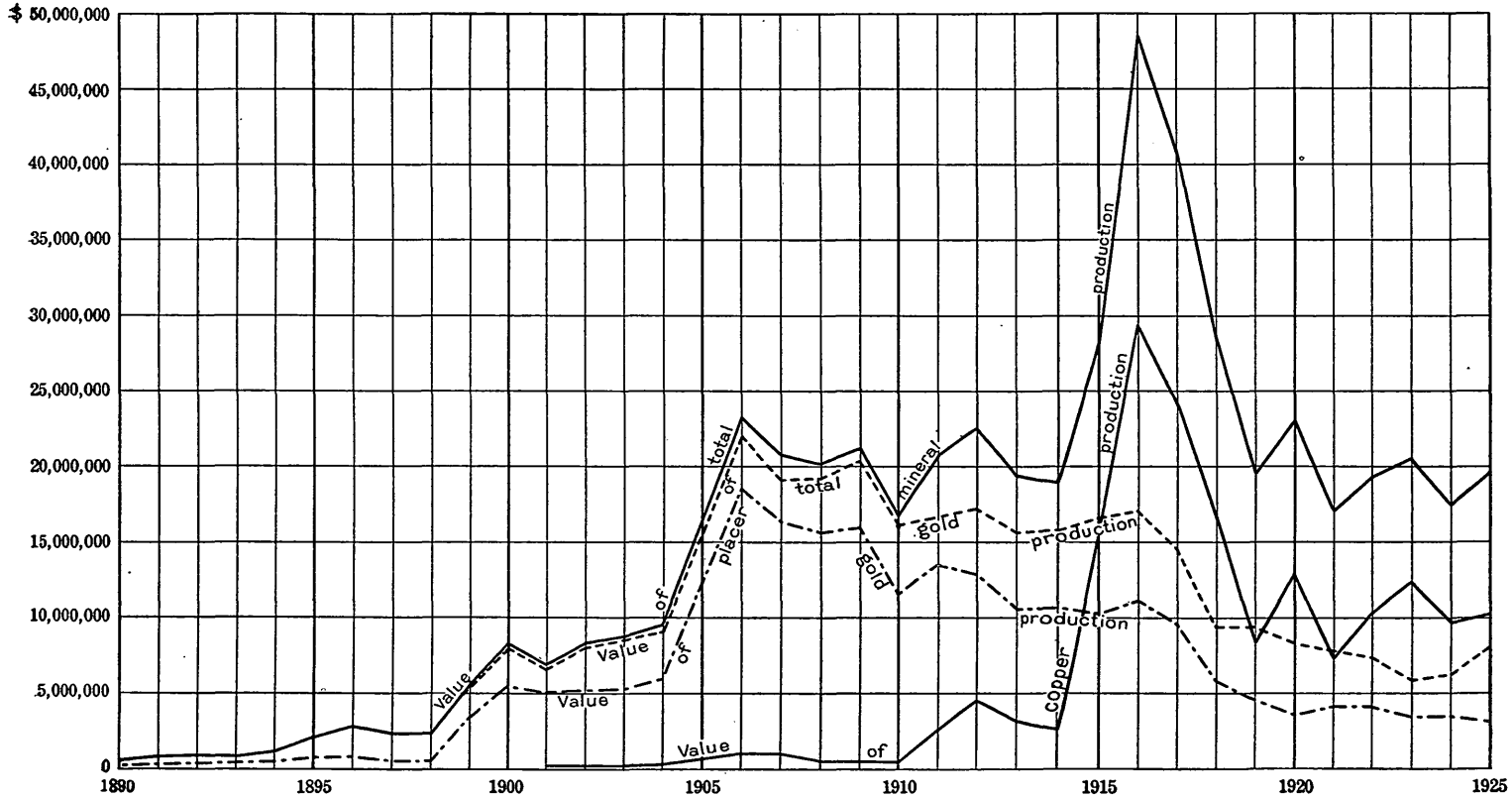

FIGURE 1.—Value of mineral production of Alaska, 1890–1925

Value of total mineral production of Alaska, 1880–1925

By years				By substances	
1880–1890	$4,193,919	1909	$21,140,810	Gold	$353,601,079
1891	1,014,211	1910	16,875,226	Copper	178,174,215
1892	1,019,493	1911	20,720,480	Silver	10,433,088
1893	1,104,982	1912	22,581,943	Coal	4,545,097
1894	1,339,332	1913	19,547,292	Tin	962,207
1895	2,588,832	1914	19,109,731	Lead	1,070,884
1896	2,885,029	1915	32,790,344	Platinum (placer)	112,978
1897	2,539,294	1916	48,386,508	Antimony	237,500
1898	2,329,016	1917	40,694,804	Marble and other products (including lode platinum metals)	4,167,920
1899	5,425,262	1918	28,218,935		553,304,968
1900	7,995,209	1919	19,626,824		
1901	7,306,381	1920	23,330,586		
1902	8,475,813	1921	16,994,302		
1903	9,088,564	1922	19,420,121		
1904	9,627,495	1923	20,330,643		
1905	16,490,720	1924	17,457,333		
1906	23,501,770	1925	18,220,692		
1907	20,840,571				
1908	20,092,501		553,304,968		

From this table, which gives the total mineral production of Alaska during 45 years of mining, it is seen that the production of 1924 was the smallest since 1905, except that of 1910 and 1921, and that the production of 1925 exceeded that of 1924 by $763,359. A comparison of the quantities and values of the principal mineral products of Alaska for the years 1924 and 1925 is made in the following table, which gives a view of the present condition of the mining industry not obtainable from the table of total production.

Mineral output of Alaska, 1924 and 1925

	1924		1925		Decrease or increase in 1925	
	Quantity	Value	Quantity	Value	Quantity	Value
Gold—fine ounces	304,072	$6,285,724	307,679	$6,360,281	+3,607	+$74,557
Copper—pounds	74,074,207	9,703,721	73,855,298	10,361,336	−218,909	+657,615
Silver—fine ounces	669,641	448,659	698,259	482,495	+28,618	+33,836
Coal—short tons	99,663	559,980	82,868	404,617	−16,795	−155,363
Tin, metallic—do	7	7,028	13.8	15,980	+6.8	+8,952
Lead—do	631	100,899	789	140,571	+158	+39,672
Placer platinum metals—fine ounces	21.98	2,594	10.21	1,205	−11.77	−1,389
Miscellaneous mineral products, including petroleum, marble, gypsum, quicksilver, and lode platinum metals		348,728		454,207		+105,479
		17,457,333		18,220,692		+763,359

The values given for copper, silver, and lead differ somewhat from the values published by the Bureau of Mines, but this is an apparent rather than a real discrepancy. Where the prices actually received for the metals are known and apply to the principal part of the production from Alaska, the average of those prices for each metal is used to multiply the known quantity produced, rather than the average yearly market price for the whole country, which is commonly used in computing such statistics. Only where the selling

price is not known is the average yearly price used in compiling the tables. For this reason the tables show a somewhat greater value for the mineral products of Alaska in 1925 than would be assigned if the average price of the several metals for the year had been used, indicating that the price received for some of the Alaskan metals was slightly above the average for the year. The average market prices of copper, silver, and lead as computed by the Bureau of Mines for 1925 were as follows: Copper, 14.2 cents a pound; silver, 69.4 cents an ounce; lead, 8.7 cents a pound.

The table of mineral output for 1925 compared with that for 1924 shows a decrease in production of coal and an increase in gold, copper, silver, and lead. The reasons for some of the changes are considered in the discussion of the individual minerals, but it may be said here that the decrease in coal is due in part to special temporary causes and that an increase may be expected in the future. An increase in silver production follows naturally from an increase in that of copper, as a considerable proportion of the silver is obtained from copper ores. Lead is obtained from gold ores and from silver ores in southeastern Alaska, where the production of ores of both types was greater than in the preceding year.

Tables giving the annual production of gold, silver, copper, coal, tin, lead, and placer platinum metals are presented in their proper places in succeeding pages, but the figures for certain other minerals, including petroleum, marble, and lode platinum minerals, either have not been compiled or are included in the item of miscellaneous mineral products in the following table:

Value of output of miscellaneous mineral products of Alaska, including petroleum, gypsum, marble, and other products, 1901–1925

Year	Value	Year	Value	Year	Value
1901	$500	1910	$96,408	1919	$214,040
1902	255	1911	145,739	1920	372,599
1903	389	1912	165,342	1921	235,438
1904	2,710	1913	286,277	1922	266,296
1905	710	1914	199,767	1923	229,486
1906	19,965	1915	205,061	1924	348,728
1907	54,512	1916	326,737	1925	454,207
1908	81,305	1917	203,971		
1909	86,027	1918	171,452		4,167,920

GOLD

TOTAL PRODUCTION

As is seen from the curves of Figure 1, gold made up practically the whole of Alaska's mineral output from 1880 to 1900 and was never less than 92.3 per cent of the total prior to 1910. In 1925, however, gold formed only 34.9 per cent of the total. In spite of the large increase in the proportionate value of other minerals to gold

produced in Alaska, gold still leads in value. The gold produced from Alaskan lode and placer mines from 1880 to 1925 amounted to $353,601,079, or 63.9 per cent of the value of all mineral products for the same years. The following table shows that from 1880 to 1925 more than two-thirds of the total output has come from the placers, although now the gold from placers is only a little more than that from lode mines.

Gold and silver produced in Alaska, 1880–1925

Year	Gold		Silver		Value of gold by sources	
	Fine ounces	Value	Fine ounces	Commercial value	Placer mines	Lode mines
1880-1915	12, 592, 121	$260, 302, 243	4, 923, 198	$2, 821, 911	185, 200, 444	$75, 101, 799
1916	834, 068	17, 241, 713	1, 379, 171	907, 495	11, 140, 000	6, 101, 713
1917	709, 049	14, 657, 353	1, 239, 150	1, 021, 060	9, 810, 000	4, 847, 353
1918	458, 641	9, 480, 952	847, 789	847, 789	5, 900, 000	3, 580, 952
1919	455, 984	9, 426, 032	629, 708	705, 273	4, 970, 000	4, 456, 032
1920	404, 683	8, 365, 560	953, 546	1, 039, 364	3, 873, 000	4, 492, 560
1921	390, 558	8, 073, 540	761, 085	761, 085	4, 226, 000	3, 847, 540
1922	359, 057	7, 422, 367	729, 945	729, 945	4, 395, 000	3, 027, 367
1923	289, 539	5, 985, 314	814, 649	668, 012	3, 608, 500	2, 376, 814
1924	304, 072	6, 285, 724	669, 641	448, 659	3, 564, 000	2, 721, 724
1925	307, 679	6, 360, 281	698, 259	482, 495	3, 223, 000	3, 137, 281
	17, 105, 451	353, 601, 079	13, 646, 141	10, 433, 088	239, 909, 944	113, 691, 135

Gold and silver produced in Alaska, 1925, by sources

Source	Gold		Silver	
	Fine ounces	Value	Fine ounces	Value
Gold ores (3,573,540 tons)	150, 045. 46	$3, 101, 715	67, 186	$46, 445
Copper and lead ores (860,270 tons)	1, 720. 53	35, 566	606, 929	419, 294
Placers	155, 912. 62	3, 223, 000	24, 144	16, 756
	307, 678. 61	6, 360, 281	698, 259	482, 495

GOLD LODES

In 1925 the gold produced from lodes in Alaska amounted to 151,765.99 ounces, valued at $3,137,281, or $415,557 more than in 1924. These figures represent the output of 20 established gold mines, a number of small prospects, and a few mines whose principal product is copper or some other metal. All of these contribute to the total and help swell the final figures, although the amount contributed by a given property may be insignificant. It is for this reason especially that returns from all those engaged in mining in Alaska are desired. The production in 1924 was derived from 19 mines. A lode property reporting an output of less than $1,000 is arbitrarily considered to be a prospect rather than a mine. The next table gives the production of gold and silver in Alaska in 1925, by districts.

Gold and silver produced from gold-lode mines in Alaska in 1925, by districts

District	Number of mines	Ore mined (short tons)	Gold		Silver	
			Fine ounces	Value	Fine ounces	Value
Southeastern Alaska	7	3,552,789	121,945.29	$2,520,833	63,486	$43,877
Willow Creek	5	15,834	21,990.37	454,581	1,728	1,199
Fairbanks district	4	3,663	4,064.00	84,010	919	638
Other districts	4	1,254	2,045.80	42,291	1,053	731
	20	3,573,540	150,045.46	3,101,715	67,186	46,445

It is evident from this table that by far the larger part of the lode gold comes from southeastern Alaska, and the next table shows that much the larger part of the output from southeastern Alaska comes from the mines of the Alaska Juneau Gold Mining Co., at Juneau. This company publishes the record of its operations each year, and the table which follows is compiled from these reports.[3]

Production of Alaska Juneau mine, 1893–1825 [a]

Year	Ore (tons)			Metals recovered			
	Total	Fine milled	Coarse tailings rejected	Gold	Silver (ounces)	Lead (pounds)	Total value
1893–1913	507,254	330,278	176,976	$707,730	Lost in tailings		$707,730
1914–1915	242,328	239,918	2,410	251,655	6,192	117,031	261,326
1916	180,113	180,113	----------	115,022	2,844	61,068	121,379
1917	677,410	677,410	----------	429,262	12,248	296,179	460,666
1918	592,218	574,285	17,933	430,124	11,828	273,297	459,445
1919	692,895	616,302	76,593	499,002	16,431	359,762	542,714
1920	942,870	637,321	305,549	732,870	23,348	487,574	791,390
1921	1,613,600	904,323	709,277	969,703	40,619	550,913	1,035,251
1922	2,310,550	1,108,559	1,201,991	1,296,157	49,404	687,315	1,388,679
1923	2,476,240	1,134,759	1,341,481	1,427,199	41,876	755,423	1,514,774
1924	3,068,190	1,367,528	1,700,662	1,907,374	63,191	1,256,857	2,055,782
1925	3,481,780	1,537,884	1,943,896	2,030,067	55,971	1,288,974	2,184,384
	16,785,448	9,308,680	7,476,768	10,796,165	323,952	6,134,393	11,523,520

[a] Compiled from published reports of mining company.

The outstanding feature in the Alaska Juneau's operations in 1925 is the great amount of ore mined, which during some months exceeded 10,000 tons a day; the average for the year was 9,618 tons, as compared with 8,476 tons in 1924. Work on additions to the general plant and mill, which treats the ore from the mines of this company, proceeded throughout the year in accordance with the plan eventually to increase the capacity of 10,500 tons a day, which was reached in 1925, to 14,000 tons. A contract has been made whereby the company is to mine ore from the adjoining Ebner property, and in addition to the improvement and enlargement of its own mill the company did considerable work in preparing the Ebner mine for the production of 1,000 tons of ore a day in accordance with the contract.

[3] Alaska Juneau Gold Mining Co. Eleventh Ann. Rept., for 1925, Mar. 1, 1926.

Some gold was produced by the Alaska Treadwell Gold Mining Co. in the course of cleaning up the old property.

A mill was erected on the Peerless property, on Windham Bay, at the south end of Stephens Passage between Juneau and Petersburg, and a mill test of the ore was started but was not completed at the end of the season.

Development work was continued on gold-bearing quartz veins on Hawk Inlet and Funter Bay, on the north end of Admiralty Island. These two localities are only a few miles apart and are similar in geologic character. A large number of gold-bearing quartz veins have been discovered, and considerable work has been done, but none of the properties were productive in 1925.

Aside from the output of the Alaska-Juneau mine, the largest quantity of lode gold in southeastern Alaska in 1925 came from Chichagof Island. Work was continued on the properties of the Chichagoff Development Co., the Hirst-Chichagof Mining Co., and the Apex-El Nido Mining Co. and resulted in a considerable production by the first two companies. These properties are all in the northwestern part of Chichagof Island.

The lode-gold production of the Ketchikan district was small. Some gold is obtained with the platinum minerals of the Saltchuck or Palladium mine, on Kasaan Bay, but gold does not constitute the principal product. The mine of the Kasaan Gold Co., near Hollis, sometimes known as the Julia or Dunton mine, was not in operation in 1925.

Gold is contained in some of the ores of the Hyder district, but as silver and lead are the most valuable metals of this district the output will be considered elsewhere.

The Prince William Sound district contributes only a little to the gold production of Alaska. Mining for gold has been carried on during the last three years at a property on the east side of Valdez Glacier, commonly known as the Ramsey-Rutherford mine, and a small production has resulted. These operations require only a few men and are conducted in an economical way, apparently with profit. It is reported that the scale of operation will be increased in the near future.

Although little further gold production is reported from the vicinity of Port Valdez, prospecting and development work were done on claims on Mineral Creek and in the vicinity of Columbia Glacier. At the Little Giant group, on Mineral Creek, development work was done, but there was no production. This property is equipped with a 2-stamp mill, which was not in operation. A few ounces of gold was produced from the Tuscarora claim, near Shoup Glacier. A small shipment of gold ore was made from the Culross mine, on the north end of Culross Island, in the early part of 1925, but with this exception

no mining other than assessment work was done in the vicinity of Port Wells. The Culross mine is about a quarter of a mile from the beach and 200 feet above it. The ore body is a gold-bearing quartz vein in greenstone near slate. Mining has been carried on intermittently here for some years.

The Herman-Eaton prospect, on the west side of Port Wells, in Bettles Bay, contains a promising gold-bearing quartz vein, cutting slate adjacent to a light-colored granitic dike, on which considerable development work was done a few years ago. In 1925 a tunnel 550 feet long was opened to tap at about the 200-foot level a well-defined vein that is exposed in a creek bed 400 feet above the beach and has been explored by an incline and a drift 165 feet long. No raise has yet been made to connect the tunnel with the drift, and the extent of the vein below the drift is not known.

A substantial production of lode gold is reported from the Paystreak mine, in Nuka Bay, on the south coast of Kenai Peninsula, but none from the Moose Pass district, north of Seward, although prospecting and assessment work was done in that district. Mining was in progress at the Lucky Strike mine, near Hope, and a little gold was produced. Mining operations were interrupted, however, by a snowslide that destroyed bunk houses and part of the mill and assay office and entailed the loss of considerable time while repairs were made, so that only a small amount of underground development work was accomplished. The Lucky Strike mine is equipped with a 5-stamp mill.

The Willow Creek district, after the Alaska Juneau mine and Chichagof Island, made the largest production of lode gold in Alaska in 1925. Much the larger part of its output came from the Lucky Shot mine, on Craigie Creek, which was worked intensively. The War Baby, which in 1924 was the chief gold producer, was much below both the Lucky Shot and the Fern in 1925. The Fern Gold Mining Co.'s property, near the head of Archangel Creek, made a substantial production. This company recently acquired the adjoining Talkeetna mine. The Mabel mine, on the ridge west of lower Archangel Creek; the Gold Bullion, on the ridge south of Craigie Creek; and the property of Elder & Thorpe, on Grubstake Creek, each had a small production. The Elder & Thorpe property is of special interest in that it lies in an area of mica schist rather than in intrusive quartz diorite, like all the other gold mines of this vicinity.

There was a considerable falling off in the production of lode gold in the Fairbanks district in 1925, as compared with 1924. The largest output came from the Mohawk lode, sometimes called the Henderson mine, near the head of St. Patrick Creek, 10 miles west of Fairbanks. The ore body is a granular quartz vein from 1 to 5 feet thick, carrying a number of metallic sulphides including stibnite, arsenopyrite, galena,

and sphalerite. The gold is mostly free, but a small proportion is contained in the sulphides and is lost in milling. The narrow parts of the vein are the richest, and the quartz near the stibnite pockets is of high grade, although the stibnite is not auriferous. Some of the assays show silver. The property is equipped with a Lane Chilean mill of 20-ton capacity with amalgamation under the rolls. It is fed from a jaw crusher.

A number of auriferous veins are known on the ridge west of St. Patrick Creek, and several of them are being prospected. A shaft 40 feet deep and a short drift on the First Chance claim expose a vein from 2 to 3 feet thick, of the same general character as the Mohawk, from which 43 tons of ore was taken for a mill test in 1925. A shaft 30 feet deep on the Blue Bird claim exposes a horse of mineralized schist 2 feet thick, with quartz veins 12 to 15 inches thick on the footwall side and 2 to 10 inches thick on the hanging wall. No assays or mill tests of this material have been made, but specimens of visible free gold indicate some high-grade ore. The Gem claim has several open cuts and a shaft 30 feet deep exposing a vein a few inches thick with considerable gangue along the footwall.

The Hi Yu group, of Crites & Feldman, on Moose Creek, tributary to Fairbanks Creek, continued to produce gold in 1925. Four adits with an aggregate length of over 4,200 feet have been driven, and a number of productive veins have been found. As the ground is extensively faulted, some trouble is experienced in keeping on the ore bodies. Four men are engaged in mining, and under favorable conditions about 300 tons of ore a month is put through the mill.

The old Rhoads-Hall mine, on Bedrock Creek, at the head of Cleary Creek, is being reopened by Gustafson Bros., under the name of the Cleary Hill mine. The workings of the old mine include an adit 840 feet long and two levels below, driven from a winze at the 70 and 120 foot levels. The mine is flooded, and a new adit 400 feet long at the 70-foot level is being driven. The Cleary Hill vein is an east-west (magnetic) vein dipping steeply south. Seven men are employed in mining and operating a 5-stamp mill.

About a quarter of a mile south of the Cleary Hill vein is the Wyoming vein, or Wackwitz property. The vein varies in thickness but reaches a maximum of 2 feet and is much crushed and faulted. It contains kidneys of stibnite, around which the gold mineralization is said to be good, and much scheelite, particularly at the margins of the vein and in the adjacent mineralized country rock. A new ball mill was installed in 1925 and was in operation for one month.

The Tolovana mine, on Willow Creek, the next tributary of Cleary Creek west of Bedrock Creek, was operated in a small way in 1925, principally by assessment work and prospecting.

The Kuskokwim Basin, in spite of its great extent, produced lode gold from only one locality—the Whelan mine, on the Nixon Fork, in the upper part of the basin. This property was formerly operated by the Alaska Treadwell Gold Mining Co. and since the withdrawal of that company has been operated by the original owners. The lode deposits are evidently connected with the intrusion of a mass of granitic rock and have given rise to the placer-gold deposits of this vicinity. A substantial production of lode gold is reported from the Whelan mine in 1925.

GOLD PLACERS

GENERAL FEATURES

Alaska's gold placers were probably the most important of its resources in first arousing a wide public interest in the Territory and attracting settlers to it. Placer mining is peculiarly the kind of mining that is most open to the man who has little or no capital aside from his own strength and the simple equipment required. For this reason the widely distributed gold-bearing gravels of Alaska attracted a horde of prospectors, who penetrated the remotest parts of the Territory and left few places of promise unvisited. Many widely separated localities have contributed and still contribute to the great sum of gold produced since the days of the Klondike rush. It is probable that the bonanza days, when every prospector held himself ready to take his place in the stampede to some newly discovered placer-gold field, are over. The steady decline in the production of placer gold since 1906 is due largely to the exhaustion of the richer, more easily mined gravels and the failure to find new fields of similar richness and extent. The pick and shovel are now in great measure replaced by machinery requiring the expenditure of large sums of money and the control of sufficient proved ground to attract capital by the possibility of a reward commensurate with the risk. Better transportation, more economical operation, improved methods of thawing frozen ground, and many other advances tend to stabilize the industry and give it the promise of long life through the possibility of mining gravel of lower gold content than could be handled in the past.

More than two-thirds of the total gold production of Alaska has come from the placers. The total production from this source to the end of 1925 was $239,909,944, of which $29,859,474 came from the dredges. The proportion of the total placer gold produced by dredges is thus about 12.5 per cent, though the present rate of production by the dredges is about 48 per cent of the annual placer gold recovered.

Statistics of placer mining in Alaska in 1924 and 1925

Region	Number of mines		Value of gold produced		
	1924	1925	1924	1925	Decrease or increase, 1925
Southeastern Alaska	4	5	$7,000	$5,000	−$2,000
Copper River region	9	15	130,000	144,200	+14,200
Cook Inlet and Susitna region	39	33	168,800	214,400	+45,600
Yukon Basin	374	348	1,740,500	1,564,600	−175,900
Kuskokwim region	25	21	268,700	191,400	−77,300
Seward Peninsula	84	78	1,245,000	1,088,500	−156,500
Kobuk region	5	8	4,000	14,900	+10,900
	540	508	3,564,000	3,223,000	−341,000

Silver, platinum, and tin ore (cassiterite) are also obtained from the gold placers and are noted in the tables of production of these metals.

The table of placer-gold production shows a considerable falling off from the output of the two preceding years, the production for 1925 being about 90 per cent of that in 1924. Among the regions of larger production, the Cook Inlet-Susitna River region shows an increase of 27 per cent over 1924, but Yukon River and Seward Peninsula show decreases of about 10 and 12 per cent, respectively. These decreases are less in proportion to total output than those in some other districts, but they result in a noticeable reduction in the total output of Alaska, as the districts are large producers. Some of the decrease in total output is due to dry weather in the early part of the season and to floods in the fall. The decrease in the Nome and Fairbanks districts, however, was not due wholly to weather conditions but to the fact that the companies which have recently acquired large holdings of placer ground through the consolidation of many smaller interests were making preparation for future operations and were not mining at full capacity. This was especially true at Fairbanks, where the Fairbanks Exploration Co. spent most of the season in stripping a large part of the valley of Goldstream Creek, drilling test holes to determine the gold content of the gravel, and building ditches.

Two of the large dredges in the Nome district were tied up while extensive experiments were being made to determine the most efficient method of thawing frozen ground in advance of dredging. Such operations are necessary but are only preliminary to the production of gold.

SOUTHEASTERN ALASKA

The output of placer gold from southeastern Alaska is small. Most of the gold comes from the creek gravel of Silver Bow Basin at Juneau and the beach gravel at Yakataga. These gravels have

been mined for many years. In 1925 a small amount was taken out in the Porcupine district in the course of assessment work and the dead work preliminary to more extensive mining operations. A little gold is also mined on Shuk River, in the Windham Bay district, between Juneau and Petersburg, where, it is reported, drilling operations were to be carried on to test the gravel with a view to install a dredge. There was no placer mining on Lituya Bay in 1925.

COPPER RIVER REGION

Most of the placer gold mined in the Copper River Basin in 1925 was produced from the gravels of Dan and Chititu Creeks, in the Nizina district. The gold deposits of these two streams have been mined for more than 20 years and have yielded regularly, although the amount has varied considerably from year to year. On each stream the principal part of the production is due to the operations of a single mining company, but in addition to the output of these two companies a few thousand dollars in gold is produced by smaller operators on independent claims. The production of Chititu Creek for 1925 was much above the average, but that of Dan Creek was somewhat less, so that the district produced about the same amount of gold as for several years past.

The Chisna district was the second largest producer of the Copper River Basin. Full production by all claims in this district has never been maintained in recent years, owing to the lack of water or of dumping ground that could be used without covering the unmined gravel of other owners. In 1925, as in previous years, some claims were idle.

A few thousand dollars from the Nelchina district and a few hundred from deposits near Tiekel, on the Richardson Highway, make up the remaining placer-gold production of the Copper River Basin.

COOK INLET-SUSITNA BASIN

The Cook Inlet-Susitna Basin includes a number of placer-gold districts, one of which, the Yentna, is a large producer. Kenai Peninsula, Valdez Creek, and Willow Creek are the remaining districts, as the gold-bearing streams around Fairview Mountain are regarded as part of the Yentna district. In the Yentna district there was an abundance of water, and the weather allowed placer operations to continue later than usual. The dredge on Cache Creek had a highly successful season, and the smaller operators on other creeks helped to bring the total production of the district to about $195,000, a considerable increase over the production of 1924. Unusual interest was shown in the possibilities of the Fairview streams. The

Valdez Creek district made a small production and experienced a period of excitement over the discovery of gold outside the area of recent mining. The importance of the discovery has not yet been determined. The work of the Bureau of Public Roads in the Kenai district is of much benefit to the miners on Canyon and Sixmile Creeks. An interesting project of this district is the construction of a high dam on Canyon Creek to divert water from the creek for mining gravel in an old channel and to allow the gravel of the creek itself to be mined. Placer mining was done on Resurrection Creek near Hope and on Crow Creek north of Turnagain Arm.

YUKON BASIN

The Yukon Basin includes at least 16 widely separated placer-mining districts besides a number of lesser districts whose production is here included with that of larger districts in order that the output of individual operators may not be disclosed. The total production of placer gold from the basin for 1925 amounted to over $1,500,000 but was $175,900 less than the production of 1924. The collection of statistics for several of the largest producing areas of the region has proved particularly difficult, through failure to get returns of production from a large number of operators. This is especially true of the Fairbanks district, where the consolidation of individual properties has complicated the mailing lists and made it difficult to ascertain which of the former producers were mining independently and which had disposed of their interests.

The following table gives the production by districts for 1924 and 1925. For districts from which only incomplete individual reports were obtained it was necessary to make estimates based on whatever other information was available. There are undoubtedly errors in the figures given for some districts, but it is believed that to a certain degree these errors compensate one another, so that the figures for total production are fairly accurate.

Placer gold produced in Yukon Basin, 1924 and 1925, by districts

District	Value of gold		Number of mines	
	1924	1925	1924	1925
Fairbanks and Richardson	$680,400	$520,800	74	58
Iditarod	207,100	223,100	21	17
Tolovana	189,500	194,100	20	19
Innoko (including Tolstoi district)	161,200	167,500	19	16
Circle	90,200	149,600	26	35
Ruby	84,600	39,900	32	24
Hot Springs	83,400	73,200	22	19
Fortymile	31,800	39,800	51	58
Chandalar	17,900	8,000	6	4
Koyukuk (including Indian River district)	54,000	49,800	27	30
Chisana	23,400	24,000	8	6
Eagle	49,800	35,000	19	12
Rampart (including Gold Hill district)	16,000	8,000	8	7
Bonnifield	12,500	10,000	13	14
Kantishna	18,800	11,900	18	17
Marshall	19,900	9,900	10	12
	1,740,500	1,564,600	374	348

The table shows a reduction in the output of several of the larger districts, including the Fairbanks, Ruby, and Hot Springs and an increase from the Iditarod, Innoko, and Circle districts. Practically all the other districts show some decrease.

The Fairbanks district, which includes Cleary, Goldstream, Ester, Fairbanks, Dome, Vault, and other gold-producing creeks in the vicinity of the town of Fairbanks, continues to be the most productive district within the Alaska part of the Yukon drainage basin. The outstanding development in connection with placer-mining operations in this district is the progress made by the Fairbanks Exploration Co. in preparing its holdings of gold-bearing gravel for mining. This work involves the construction of dredges and an extensive system of ditch lines to provide water for sluicing and will require several years for its completion. In 1925 a large amount of drilling to determine the extent and value of placer gravel on different streams, especially Ester, Cleary, Fairbanks, and Goldstream Creeks, was done, buildings were erected at Fairbanks and Chatanika, and some ditch line was dug on Chatanika River and Cleary and Goldstream Creeks. A resurvey of the Davidson ditch was made. This ditch, which is one of the most important projects connected with the enterprise, is nearly 80 miles long and brings water from Chatanika River near its head to Cleary, Goldstream, and other creeks. One result of the work of the Fairbanks Exploration Co. is to close a considerable number of small mining plants and thus reduce the number of mining operators in the district. About 19 summer drift mines were in operation, principally on Little Eldorado and Fairbanks Creeks. When these preparations are completed much of the gold-placer ground of the Fairbanks district will be ready to be mined under the most efficient methods that abundant capital and years of experience in

the handling of frozen gold-bearing gravel in an Arctic country can provide. It is evident that the success of these operations means the addition of many years to the productive life of the Fairbanks placers.

Mining operations in the Fairbanks district are being facilitated by the activities of the Alaska Road Commission in the construction of highways and the lessening of transportation costs. It is expected that eventually Fairbanks will be connected by an automobile road with Circle, on the Yukon.

In the Bonnifield district the Alaska Road Commission constructed about 11 miles of road between Ferry and Eva Creek. There was little placer-mining activity in this district.

Shortage of water resulted in a reduced output of gold in the Hot Springs district. Some of the placers of this district produce stream tin as a by-product of the mining of gold.

Placer mining in the Chandalar district was carried on about as in other recent years. The miners in this district work under the disadvantage of especially high costs for labor and supplies, so that it is said the ground must contain not less than $2 in gold to the square foot of bedrock for profitable mining.

The Circle district had a long favorable season with a resulting large increase in gold production. The Berry dredge on Mastodon Creek did not shut down till October 24. There was abundant water for mining in the Eagle district, especially in the later part of the season. The remarkably high water in the Yukon in the spring did little damage at Eagle.

The Fortymile district increased its gold output considerably above that of 1924. The Ingle Creek Gold Co., operating on and near Mosquito Fork, carried on an extensive drilling campaign preliminary to expanded future operations. This company is also operating the Dome property in the Eagle district. The Walker Fork Gold Corporation completed the installation of a new hydraulic plant, including over 2 miles of ditches and flumes and nearly a mile of hydraulic steel pipe. Extensive damage was done on lower Fortymile River by the high water of spring.

Shortage of water interfered greatly with some of the placer-mining operations in the Iditarod district. Transportation of freight on the river was delayed, water was lacking for sluicing, and some operators had to lay off men. Two dredges were operated in the Otter Creek section. About 11 miles of ditch line was constructed to bring water from upper Bonanza Creek to Willow Creek.

The Innoko district had a long season of fine weather but a shortage of water from the middle of June till early August. A new dredge built by the Flume Dredge Co. on Little Creek was put into operation and did not close down till late in October. Excellent progress

was made by the Alaska Road Commission in constructing a road from Takotna to Ophir. About 15 miles of this road is now completed for automobile traffic.

The Kantishna district made a small production of placer gold. Considerable interest was aroused in the later part of the year by the discovery of coarse gold on a tributary of the Kantishna.

A dry season resulted in decreased production in the Koyukuk district. This is an old camp, and little in the way of new development took place in 1925, although it is reported that an English company took over a large number of claims on Hammond River and intended to begin developing them in 1926. Prospects were found on a new creek near Wild River Lake during the summer of 1925, which were encouraging enough to justify further work during the following winter.

The Marshall district showed a considerable falling off in production in 1925, although the weather was favorable all the season.

There was an acute shortage of water in the Rampart district and a reduction in output. The lack of water was such that some miners were unable to clean bedrock and were obliged to let the ground lie over till the next season.

The production of the Ruby district was much reduced, and there was less mining activity than usual.

Operators in the Tolovana district were seriously handicapped by lack of water at times, yet the season's work was fairly satisfactory. Hydraulic mining was conducted on Olive, Lillian, and Ruth Creeks and Livengood bench, where three drift mines also were in operation.

KUSKOKWIM REGION

The production of placer gold in the Kuskokwim Basin, including streams tributary to Kuskokwim Bay, in 1925 amounted to $191,400. This sum includes the dredge gold and was produced in four widely separated districts, distributed from the head of the river to its mouth. Two of these districts, the Mount McKinley and Georgetown, are on the north side of the Kuskokwim, adjacent to the Innoko and Iditarod districts of the Yukon Basin, and except for the accidents of drainage development might be included with them. Of the remaining two, the Tuluksak-Aniak district is southeast of the lower river, and the Goodnews Bay district lies still farther south, on the east side of Kuskokwim Bay. The nearness of these districts to the deep navigable waters of Kuskokwim Bay and River makes them relatively easy to reach during the open season, although travel within the districts is often difficult. On the other hand, the great area drained by the eastern tributaries of the Kuskokwim is difficult of access and has probably been less prospected than any other equal area of Alaska south of the Brooks Range. Except

along the coast where missions or canneries have been established and at the few places where mining is in progress, the whole of this region is practically without white inhabitants.

Much the larger part of the placer gold from Kuskokwim Valley was mined by the dredge on Candle Creek near McGrath. After that the largest production came from the creeks of the so-called Nixon Fork district, which includes streams in the vicinity of the Whelan mine, north of Berry's landing on Kuskokwim River. The Georgetown district had a small production. In the Tuluksak-Aniak district there was a shortage of water and a general falling off in mining. Cripple Creek and Marvel Creek were both idle. Construction of a dredge on Bear Creek was begun by the New York-Alaska Gold Dredging Co. This dredge was not completed in 1925 but was expected to be ready for operation in June, 1926. The ground for dredging had been thoroughly tested by drilling, and the success of the project was believed to be assured. Placer mining in the Goodnews Bay district was retarded by a shortage of water and labor, and only a few claims were worked. Butte Creek was reported to be idle, and little prospecting was going on.

SEWARD PENINSULA

Seward Peninsula is remarkable for the wide distribution of gold in its gravel deposits. There is scarcely a stream from which colors have not been obtained, and although the gold was not always found in sufficient amount to afford profitable mining, the number of streams that have yielded gold in commercial quantities is large. Furthermore, the gold-bearing beach gravels, including those of the present wave-washed beaches and the numerous ancient beaches deeply buried beneath more recent deposits, afforded some of the most notable gold placers ever discovered and still contribute to the output of the peninsula. The Nome district, although not the first gold-placer district known in Alaska, was the first of the greater and more famous placer districts to be discovered.

The first mining at Nome was done with simple equipment. This, however, was soon replaced by more efficient and economical machinery, and early in the history of the district the dredge was introduced to dig and wash gravel. The early dredges were small, crude, and inadequate and have long since been replaced by others of more powerful and costly types, capable of withstanding the great strains to which they are subjected and able to handle great quantities of gravel at low cost. The use of dredges increased as the richer gravel was mined out, so that now several times as much gold is obtained with the dredges as with other methods of mining. Each year sees the construction of new dredges or preparations for install-

ing them, so that a description of placer mining in this district has become largely an account of dredging operations.

The early placer miners of the Yukon Valley and of Seward Peninsula found in the frozen gravel of the Arctic and sub-Arctic regions a problem which was new even to the most experienced miners from the Western States. Various methods, from exposure to the sun and direct contact with fire to steam applied through pipes driven into the ground, were used to thaw the ice and loosen the sand and gravel so that they could be washed through the sluice boxes to free and collect the gold. Recently experiments have been conducted to test the value of water at normal atmospheric temperature for thawing frozen ground. Such experiments were carried on at Nome by the United States Smelting, Refining & Mining Co. in 1925. Details of the operations are not at hand, but it appears that for deep ground the most successful method is to drill to bedrock and insert a pipe down which cold water is forced under pressure, rather than to drive the pipe as is usually done in steam thawing. The process is slow, but it is reported that gravel from 40 to 70 feet thick has been successfully thawed in this manner.

The work of the Alaska Road Commission is highly commended in some of the schedules returned by placer miners, and as instances of the things accomplished are cited the reconstruction of the tramway from Nome to Shelton, the maintenance of roads in the vicinity of Nome, grading of the aviation field, and construction work in Nome Harbor.

The last regular passenger boat for the season left Nome for Seattle on October 25. The fall was an open one, with no snow and little frost. Plenty of water during the summer season is reported.

The placer-gold production of Seward Peninsula showed a decided falling off in 1925. The output was $1,088,000, as compared with $1,245,000 in 1924, a decrease of $156,500, or over 12½ per cent. This reduction was due in large part to the fact that a number of dredges did not begin operations till late in the season and some that operated in 1924 were not working in 1925.

Most of the gold from Seward Peninsula is obtained from the vicinity of Nome, but many other localities contribute to the total, and in most of them, as at Nome, a dredge either has been installed or is contemplated as a means of reducing the cost of mining.

It was reported that a large tract of placer ground on American Creek, in the Casadepaga district, was under option and would be drilled with a view to installing a dredge.

In the Council district the property of the Wild Goose Mining & Trading Co. was idle. The dredge and hydraulic plant were sold to other operators and will be active again in 1926.

Little change is noted in the Solomon district. It is reported that a mining engineer was engaged during the summer in testing the gravel on upper Big Hurrah Creek, and as a result of his examination a dredge for handling the gravel is under consideration.

The Koyuk district, at the head of Norton Bay, although one of the smaller gold producers of the peninsula, is of special interest as it is the chief producer of placer platinum in Alaska. Three mines were in operation in winter and nine in summer in this district.

The Fairhaven district includes Inmachuk River and Candle Creek together with their tributaries and some other streams. This district experienced a dry season with little rain until September. The two dredges on Candle Creek, operated by the Fairhaven Gold Dredging Co., were working part of the season. Water is provided by a ditch line 37 miles long and is used to strip away the overburden before dredging begins. An interesting project of the Inmachuk River locality is the search for gold-bearing gravel beneath the geologically recent lava flows that were poured out over the gravel deposits and later partly removed by erosion. Remnants of these flows are conspicuous in the Fairhaven district. Shafts have been sunk through the lava beds on the Inmachuk to depths of 130 to 200 feet, disclosing gravel deposits from 6 to 16 feet thick. Drifting from these shafts has not yet disclosed a pay streak, but colors are reported. A small output of gold was made from Kugruk River and also from Koopuk Creek, tributary to Buckland River. The Koopuk district has small and uncertain rainfall. Prospecting has been done on Buckland River for many years, but thus far with only indifferent success. The miners of the Fairhaven district are interested in the contemplated extension of the Nome-Shelton tramway to Candle Creek, which is proposed to improve the transportation of coal from the Chicago Creek mine and help reduce the cost of fuel. The Chicago Creek coal is a lignite and is less efficient than higher-grade coals shipped from the outside, but as it costs less it has been used to some extent in place of the better coal.

The placer gold produced in the Kougarok district is obtained partly by dredges and partly by other methods of mining. Only one dredge, however, was in operation in 1925, that of the Behring Dredging Corporation on Kougarok River. The Kelliher dredge did not operate, as the company was undergoing reorganization. On Dick Creek a mechanical tailings stacker driven by a gasoline engine was installed and is reported to be giving satisfaction. The use of gasoline for power releases a part of the water for piping, which is an advantage where water is scarce. A ditch line was built on Henry Creek to furnish water for use on Merritt Gulch in 1926. The miners of the Kougarok district are also interested in the extension of the

tramway from Nome as a means of reducing mining costs, which in some localities are reported to be so high as to prohibit mining.

Port Clarence is one of the minor districts of Seward Peninsula and had a small production in 1925. Considerable prospecting was done on Coyote Creek, and a ditch line 1½ miles long was built preparatory to mining in 1926.

Preparations were made to install two dredges on Bluestone River in 1926. Both of the dredges are old, one reconstructed and one moved from another locality.

KOBUK REGION

The placer gold of the Kobuk region comes from two districts—the vicinity of Shungnak, on the middle course of Kobuk River, and the valley of Squirrel River, a tributary of the lower Kobuk. Shungnak is nearly 150 miles in an air line from Kotzebue Sound, but the distance is much greater along the winding river. Kiana, at the mouth of Squirrel River, is about 50 miles from the sound. The production in both these districts is small. Prospecting was done in the Kobuk region before the discovery of gold at Nome, but the region is difficult of access, and the cost of mining there is high. It seems probable that the possibilities of this region have not yet been fully realized.

Most of the gold from the Shungnak district comes from California and Dahl Creeks, although Lynx Creek and Shungnak River contribute some. Hydraulic plants have been installed on California and Dahl Creeks, replacing the pick and shovel. The gravel in many places is not frozen, and there is difficulty with seepage water. Moreover, the overburden is chiefly gravel with little muck, so that machinery capable of handling large yardage is required rather than hand methods of mining. The equipment of the Ferguson property, on California Creek, includes 2 miles of ditch, a long pipe line, three giants, and an elevator. The plant on Dahl Creek encountered some poor ground in 1925 and was delayed by dead work, so that only a small production was made. Two floods during the summer did much damage to the placer mines of the Shungnak district, causing delay and adding to the expense of mining.

Klery Creek is the principal producer of the Squirrel River district. Only a few men are employed, and the gold production is less than that of the Shungnak district. A nugget valued at nearly $100 was taken from Klery Creek during the summer. Coarse gold is characteristic of both the Squirrel River and Shungnak districts.

DREDGING

Reference to the dredges has been made in the foregoing comments on placer-mining districts, but the importance which they have attained in the production of placer gold in Alaska and their probable

future still greater importance makes a special discussion of them desirable. Alaska possesses large amounts of gold-bearing gravel which does not contain sufficient gold to make mining by the older, simpler, and more costly methods of mining profitable. Where the general conditions, such as location, character, depth of gravel, and water supply, are favorable and where tracts of auriferous gravel of sufficient extent to justify the large initial cost of installation can be controlled, dredging has proved to be one of the most economical and effective methods of placer mining. One of the obstacles to dredging in Alaska has already been pointed out. The frozen condition of much of the gravel adds an item of expense which is not met in regions of warmer climate. Steam and hot water have been used to thaw the frozen gravel before dredging, but within the last few years increasing attention has been paid to the use of cold water for this purpose, and favorable results have been obtained. Although somewhat slower, the cold-water method does away with the need for fuel to heat water and thereby reduces the operating cost. It now seems certain that as more and more of the higher-grade gravel becomes exhausted the use of this method of mining will be much extended, especially as improvements in transportation and methods of application continue to be made.

Reports of dredging operations for 1925 were furnished by owners or operators of 20 dredges, and information concerning others was obtained from different sources. Apparently 27 dredges were active, although several of them had short seasons due to delay in starting or interruptions from various causes. Of this number 16 were on Seward Peninsula, 3 in the Fairbanks district, 3 in the Innoko district, 2 in the Iditarod district, and 1 each in the Yentna, Circle, and Mount McKinley districts. A list of the operating dredges follows:

Seward Peninsula:	
Casadepaga district—	
Peck	Casadepaga River.
Council district—	
Northern Light Mining Co	Ophir Creek.
Mebes & Hansen	Albion Creek.
Fairhaven district—	
Fairhaven Gold Dredging Co. (2)	Candle Creek.
Kougarok district—	
Behring Dredging Corporation	Kougarok River.
Koyuk district—	
Dime Creek Dredging Co	Dime Creek.
Nome district—	
Dexter Creek Dredging Co	Dexter Creek.
Dry Creek Dredging Co	Dry Creek.
Hammon Consolidated Gold Fields	Wonder Creek.
Hammon Consolidated Gold Fields (3)	On or near Little Creek.

Seward Peninsula—Continued.
Solomon district—
Iversen & Johnson ..... Big Hurrah Creek.
Lomen Reindeer & Trading Corporation ..... Solomon River.
Shovel Creek Dredge Co. ..... Shovel Creek.
Yukon Basin:
Circle district—
C. J. Berry Dredging Co. ..... Mastodon Creek.
Fairbanks district—
Chatham Gold Dredging Co. ..... Cleary Creek.
Fairbanks Gold Dredging Co. (2) ..... Fairbanks Creek.
Iditarod district—
North American Dredge Co. ..... Otter Creek.
J. E. Riley Investment Co. ..... Otter Creek.
Innoko district—
Flume Dredge Co. ..... Yankee Creek.
Flume Dredge Co. ..... Little Creek.
Guinan & Ames Dredging Corporation ..... Ganes Creek.
Kuskokwim region:
Mount McKinley district—
Kuskokwim Dredging Co. ..... Candle Creek.
Cook Inlet and Susitna region:
Yentna district—
Cache Creek Dredging Co. ..... Cache Creek.

One new dredge appears on this list, that of the Flume Dredge Co., on Little Creek, in the Innoko district, but several that appeared in the lists of former years are absent. Most of the changes are on Seward Pensinsula.

The dredges of Alaska produced $1,572,312 in 1925, or more than 48 per cent of the total output of placer gold from the Territory. The production is a slight increase over that of 1924, which was $1,563,361. The following table gives statistics for the period since dredging began in 1903:

Gold produced by dredge mining in Alaska, 1903–1925

Year	Number of dredges operated	Value of gold output	Gravel handled (cubic yards)	Value of gold recovered per cubic yard
1903–1915		$12,431,000		
1916	34	2,679,000	3,900,000	$0.69
1917	36	2,500,000	3,700,000	.68
1918	28	1,425,000	2,490,000	.57
1919	28	1,360,000	1,760,000	.77
1920	22	1,129,932	1,633,861	.69
1921	24	1,582,520	2,799,519	.57
1922	23	1,767,753	3,186,343	.55
1923	25	1,848,596	4,645,053	.40
1924	27	1,563,361	[a] 4,342,667	[a] .36
1925	27	1,572,312	[a] 3,144,624	[a] .50
		29,859,474		

[a] See text (p. 26) for basis of estimate.

The maximum number of dredges in operation in any one year was 36, in 1917. A decided falling off in both total production and number of dredges operating took place in 1918 and continued to 1920, but since then the trend of each item has been upward.

The average length of operating season in 1925 for those dredges which furnished the data was 96 days, but this figure does not represent the length of season in which dredging was possible, as a number of dredges had short seasons due to causes other than weather conditions. The greatest number of operating days reported by any single dredge was 163 days, for the North American dredge on Otter Creek, in the Iditarod district. The J. C. Riley Investment Co.'s dredge and the Cache Creek dredge, in the Cook Inlet-Susitna region, were each operated 153 days. The earliest date on which any dredge worked was in May on Cache Creek, and the latest date November 17 on the Iditarod.

In the foregoing table are given data on the number of cubic yards of gravel handled by the dredges each year and the value of the gold recovered per cubic yard. This table is valuable in the consideration of Alaska's gold resources but is incomplete and of lessened value in so far as operators fail to make returns covering the item of yardage. The information furnished to the Geological Survey by owners or operators of dredges in 1925 includes figures relating to this item of operation for 15 dredges. These 15 dredges, which represent nearly all the districts where dredging is carried on, handled 2,141,165 cubic yards of gravel in 1925 and recovered an average of 50 cents in gold to the cubic yard. On the assumption that 50 cents represents the average gold content of the gravel handled by all Alaskan dredges, the total yardage may be estimated as 3,144,624 cubic yards. This method of estimating was employed in preparing the corresponding table for 1924,[4] and, as explained there, it may involve the use of a figure for value per cubic yard which is a little too small and result in an estimate of total yardage which is correspondingly too high.

Two new dredges were installed in 1925. The Flume Dredge Co. built and put into operation a dredge on Little Creek, in the Innoko district. The Tanana Valley Gold Dredging Co. (Ltd.) launched a dredge on Fish Creek, in the Fairbanks district, but did not complete the installation of the machinery in time to produce gold in 1925. In the Kuskokwim Valley the New York-Alaska Gold Dredging Co. began the construction of a dredge on Bear Creek, in the Tuluksak-Aniak district. This dredge was expected to begin operation in 1926. In addition to these new dredges a number of old dredges were being reconstructed or moved to new dredging ground, and several other dredges were planned for building in 1926. It is reported that in nearly every locality where a new dredge is planned

[4] U. S. Geol. Survey Bull. 783, p. 19, 1925.

the ground has been thoroughly prospected by drilling or otherwise to determine the gold content of the gravel before construction of the dredge has been begun. Such a procedure, although it has sometimes been neglected, represents the exercise of good business sense and will do much to prevent failure and establish confidence among those who are asked to invest their money in dredging enterprises.

COPPER

Copper in quantities sufficient to be of economic value is not so widely distributed in Alaska as gold, but deposits of copper-bearing minerals are known in many places, and some of those which now attract little or no attention will probably become important when transportation is better or the price of copper is sufficiently high. Meantime only those deposits that are especially rich or are most favorably situated with reference to transportation facilities can be exploited with profit. Notwithstanding this fact, Alaska has a considerable copper production.

The total Alaskan production of copper for 1925 was 73,855,298 pounds, valued at $10,361,336. This includes copper from mines that are operated primarily for copper and that from mines where some other metal constitutes the chief product of value. Most of this copper came from the mines of the Kennecott Copper Corporation, including the Mother Lode mine, at Kennecott, in the Chitina Valley, and at Latouche, on Latouche Island, in Prince William Sound. The next largest producer of copper is the Saltchuck mine of the Alaska Palladium Co., near Ketchikan, in southeastern Alaska, and after that the Green Butte mine, on McCarthy Creek near Kennecott. In addition, copper is produced from ores whose principal content is lead and is recovered from the gold placers of Dan and Chititu Creeks, in the Nizina district of Chitina Valley. A small amount was obtained also from gold lodes in the Juneau, Ketchikan, and Sitka districts.

Copper, silver, and gold produced at Alaska copper mines, 1900–1925

Year	Mines operated [a]	Ore mined (tons)	Copper [b]		Silver		Gold	Total value of metals
			Pounds	Value	Fine ounces	Value		
1900–1915	-------	1,232,396	220,773,969	$35,031,225	2,351,726	$1,297,756	$1,059,357	$37,388,338
1916	18	617,264	119,654,839	29,484,291	1,207,121	794,286	188,977	30,467,554
1917	17	659,957	88,793,400	24,240,598	1,041,153	857,911	265,900	25,364,409
1918	17	722,047	69,224,951	17,098,563	719,391	719,391	107,635	17,925,589
1919	8	492,644	47,220,771	8,783,063	488,034	546,598	63,795	9,393,456
1920	8	766,095	70,435,363	12,960,106	682,033	743,416	18,868	13,722,390
1921	6	477,121	57,011,597	7,354,496	544,311	544,311	11,689	7,910,496
1922	5	581,384	77,967,819	10,525,655	623,518	623,518	15,069	11,164,242
1923	6	731,168	85,920,645	12,630,335	715,040	586,333	33,633	13,250,301
1924	5	761,779	74,074,207	9,703,721	572,078	383,292	13,341	10,100,354
1925	5	860,023	73,855,298	10,361,336	596,607	412,131	32,778	10,506,245
	-------	7,901,878	984,932,859	178,173,389	9,541,012	7,508,943	1,811,042	187,493,374

[a] Properties producing less than $1,000 are not counted as mines but are considered prospects.
[b] Includes also slight amount from other sources.

The table shows a decrease of 218,909 pounds of copper for 1925, compared with the production of 1924, but an increase in value amounting to $657,615, due entirely to the higher price received for copper in 1925. The figures given for the value are based almost wholly on the actual selling price of the Alaska copper and not on the average price of copper (14.2 cents) throughout the United States for the year. A cargo of copper ore from Latouche which was salvaged from the motor boat *Kennecott* in 1925 is not included in the table, as that production was included in a previous report.

The ore shipped from Kennecott to the smelter is taken from four contiguous mines—the Bonanza, Jumbo, Erie, and Mother Lode, which are all operated under one management, although the Mother Lode is organized as a separate company. As shown by the annual statements [5] made to the stockholders, the Mother Lode mine produced somewhat more ore in 1925 than any one of the other associated mines. From the same source it is learned that the ore mined from the Mother Lode amounted to 156,309 tons, averaging 10.38 per cent of copper and 1.68 ounces of silver to the ton. The ore from Kennecott is largely high-grade copper sulphide and carbonate containing silver but practically no gold.

The mine of the Kennecott Copper Corporation at Latouche produces low-grade copper-iron sulphide ore of a character wholly different from that at Kennecott. A caving system of mining is used, and a steady output at low cost has been maintained for a number of years. No high-grade ore is obtained.

Mining operations at the Green Butte mine, on McCarthy Creek, a few miles east of Kennecott, are regarded as prospecting or development work, but a large force of men are employed, and regular shipments of high-grade ore are made to the smelter. The ore resembles that at Kennecott and occurs in similar relation to the limestone and underlying greenstone. Mining was discontinued during part of the winter of 1924–25 but was resumed in May. The incline has now reached the 700-foot level, and it was reported that development work would be discontinued in the winter of 1925–26, while more powerful machinery was being installed.

Copper is obtained from the Saltchuck mine, on Kasaan Bay, Prince of Wales Island, as an associate of the platinum group of metals, particularly palladium, which makes up the chief product of the mine. Originally this deposit was opened for its copper, but it was later found that the copper is subordinate in value to the palladium, although copper is an abundant constituent of the ore and makes up a considerable part of its value.

The copper obtained from lead ores is relatively small in quantity and comes chiefly from the Hyder district, in southeastern Alaska.

[5] Kennecott Copper Corporation Eleventh Ann. Rept., for 1925; Mother Lode Coalition Mines Co. Seventh Ann. Rept., for 1925.

A little copper is also obtained from the sluice boxes of placer mines on Dan and Chititu Creeks. Formerly it was thrown away, and only in recent years, after the construction of the Copper River & Northwestern Railway made transportation easier, has it been saved. A little copper is obtained from gold lodes in southeastern Alaska, and a further small quantity is reported by the smelters as scrap and salvage.

Prospecting for copper has not been encouraged by the price of the metal during the last few years. Many copper prospects in southeastern Alaska, the Copper River Valley, and Prince William Sound have been patented or have had no work done on them other than the assessment work necessary to hold them, and there seems to be no reason to expect any large addition to the copper production in the near future.

SILVER AND LEAD

Most of the silver produced in Alaska has been associated either with gold in gold lodes and placers or with copper in copper mines and was, in fact, a by-product. Most of the lead was derived from lodes that were mined primarily for the gold they contained. This condition was changed somewhat in 1925, for an increasing amount of silver and lead now comes from mines in which these two metals are the most valuable product. The following table shows the quantity and value of silver and lead recovered from mining operations classified according to the most valuable metal produced:

Silver and lead produced in Alaska in 1925

Source	Silver		Lead	
	Ounces	Value	Pounds	Value
Gold lodes	67,186	$46,445	1,298,256	$116,243
Gold placers:				
Dredges	11,728	8,139		
Others	12,416	8,617		
Silver-lead lodes	10,322	7,163	279,645	24,328
Copper lodes	596,607	412,131		
	698,259	482,495	1,577,901	140,571

In this table for the first time are listed silver and lead from silver-lead lodes. The silver from gold lodes was produced by 20 mines and a few prospects, that from gold placers by about 506 mines, and that from copper lodes by 5 mines. Lead from lodes other than lead-silver lodes was produced by 5 mines. Silver and lead were produced from 5 mines where they are the chief valuable metals. Much the greater part of the silver produced in Alaska comes from copper mines. Most of the lead is taken from the gold mines of the Alaska

Juneau Gold Mining Co. at Juneau, which, as will be seen from the table on page 9, compiled from the annual report of the company to its stockholders, yielded 1,288,974 pounds in 1925.

Lead produced in Alaska, 1892–1925

Year	Tons	Value	Year	Tons	Value	Year	Tons	Value
1892	30	$2,400	1904	30	$2,580	1916	820	$113,160
1893	40	3,040	1905	30	2,620	1917	852	146,584
1894	35	2,310	1906	30	3,420	1918	564	80,088
1895	20	1,320	1907	30	3,180	1919	687	72,822
1896	30	1,800	1908	40	3,360	1920	875	140,000
1897	30	2,160	1909	69	5,934	1921	759	68,279
1898	30	2,240	1910	75	6,600	1922	377	41,477
1899	35	3,150	1911	51	4,590	1923	410	57,400
1900	40	3,440	1912	45	4,050	1924	631	100,899
1901	40	3,440	1913	6	528	1925	789	140,571
1902	30	2,460	1914	28	1,344			
1903	30	2,520	1915	437	41,118		8,025	1,070,884

Silver-lead ores are attracting attention in several parts of Alaska. The most prominent district is that around Hyder, at the head of Portland Canal, in southeastern Alaska. Other districts include mines or prospects at Chomly, near Ketchikan; the Lake claims, near Wrangell; a new silver-lead prospect near Skagway; and the Alpha mine, in the Kantishna district.

In the Hyder district the new mill at the Riverside mine began production early in the year and made a run of about two months, producing a galena concentrate carrying silver and gold. The property then lay idle for several months pending arrangements for its operation by a new company, but a small additional production was made in the later part of the year. In the Texas Creek area a test shipment of 10 tons of lead ore, with some silver and gold, was made by Carlson & Hewitt from the Homestake prospect to the smelter at Selby. A test shipment of 1 ton of complex silver-lead-zinc-copper ore was made by Hummel, Blasher & Moss from a newly discovered deposit on the south branch of Chickamin Glacier. McDonald & Cronholm shipped a test lot of 20 tons of high-grade lead ore carrying gold and silver from another newly discovered deposit, on the Cantu group, near the foot of Salmon Glacier.

Native gold is associated with the lead ore in several veins in the district, and some exceedingly rich specimens of free gold were found in connection with narrow quartz stringers in a rock cut for the new portion of the Salmon River road near Sixmile. It is probable that with more extensive development native gold will be found in other veins already discovered. Exploration was continued on the Daly Alaska property, and a little native silver was found. Development work is being vigorously prosecuted on the Mountain View property under the direction of Arthur Moe. A small shoot with a considerable percentage of the tungsten mineral scheelite,

identified by A. F. Buddington, was discovered in a vein on this property. Grains of scheelite were later noted in other veins. Assessment work was kept up on practically all the other properties in the district, and several new prospects were located in the Texas Creek area. A prospecting tunnel is being driven across a sparsely metallized band in a limestone and schist belt within the coast range batholith on the Commonwealth group of claims, about 13 miles down Portland Canal from Hyder.

A recent geologic survey of the Hyder district by Buddington [6] has shown that there are present near Hyder two batholiths that differ in age and in significance with respect to ore deposits. Metalliferous veins have been found in the rock of the older batholith, but as yet no mineral deposits of commercial importance have been found in the younger batholith. The older batholith consists of granodiorite and is widely exposed on Texas Creek. The rock of the younger batholith along the southern border of the older batholith and in the vicinity of Hyder is quartz monzonite and in the vicinity of Munro Glacier is granodiorite. The older granodiorite has a dull gray color and a slightly banded structure, thus contrasting with the pink or mottled white, more massive rock of the quartz monzonite and the granodiorite near Munro Glacier. Dikes of granodiorite porphyry connected with the quartz monzonite and the granodiorite of Munro Glacier cut both the older granodiorite and the ore veins connected with it. The southern portion of the older granodiorite near the contact with the quartz monzonite is mashed and rendered schistose through the thrust exerted upon it by the intrusion of the younger batholith. The southern boundary of the older granodiorite lies at an elevation of about 4,800 feet on the southern slope of Mount Dolly and extends in general a little north of true west, crossing Salmon River just below the mouth of Fish Creek and thence passing through the head of Thumb Creek and the head of the West Fork of Texas Creek. On the West Fork of Texas Creek, west of Casey Glacier and Ibex Creek, the older granodiorite plunges under a roof of tuffaceous graywacke and slate, disappearing beneath the surface at the head of the West Fork, with the exception of several upward bulges that are exposed where the Texas Glacier joins the Chickamin Glacier and both north and west of the locality where the Chickamin Glacier makes a turn from north to west. Quartz veins with shoots of lead ore, carrying moderate quantities of silver and low to moderate quantities of gold, are found within the batholith and also in the adjoining or overlying country rock, but commonly near the contact between the two. Veins also occur, however, within the older granodiorite at considerable distance from

[6] Buddington, A. F., Geology of the Salmon River area, Hyder district, Alaska (in preparation).

the contact with the sediments. Nearly 50 veins of the type described have been discovered in the older granodiorite and are being prospected.

TIN

Stream tin or cassiterite has been found in the concentrates from the sluice boxes of gold placers in several parts of Alaska. Tin has been mined from its original bedrock source in the Port Clarence district of Seward Peninsula and is recovered from placer deposits in that district and also from placer deposits near Tofty, in the Hot Springs district of Tanana Valley. These two districts are at present the source of all the tin reported from Alaska. Placer mining has been carried on primarily for tin in the Port Clarence district, but in the Hot Springs district the mining is done primarily for gold and tin is a by-product.

The production of tin ore for 1925 was 22.2 tons, which contained 13.8 tons of metallic tin, valued at $15,980. This production is an increase over that of 1924, which in turn was an increase over that of 1923, but it is considerably less than the production for the years 1912 to 1917, when the output of metallic tin reached 139 tons in 1916 and fell below 100 tons only in 1913.

Tin produced in Alaska, 1902–1925

Year	Ore (tons)	Metal (tons)	Value	Year	Ore (tons)	Metal (tons)	Value
1902	25	15	$8,000	1915	167	102	$78,846
1903	41	25	14,000	1916	232	139	121,000
1904	23	14	8,000	1917	171	100	123,300
1905	10	6	4,000	1918	104.5	68	118,000
1906	57	34	38,640	1919	86	56	73,400
1907	37.5	22	16,752	1920	26	16	16,112
1908	42.5	25	15,180	1921	7	4	2,400
1909	19	11	7,638	1922	2.3	1.4	912
1910	16.5	10	8,335	1923	3	1.9	1,623
1911	92.5	61	52,798	1924	11	7	7,028
1912	194	130	119,600	1925	22.2	13.8	15,980
1913	98	50	44,103				
1914	157.5	104	66,560		1,645.5	1,016.1	962,207

The tin credited to the Port Clarence district in 1925 is reported as having been shipped in that year. It seems probable that some of this tin was mined in 1924 and held over till 1925 for shipment, as there is reason for believing that less tin was mined than was shipped.

PLATINUM METALS

Platinum and palladium belong to a group of six metals of which platinum is the most important and consequently gives its name to the group. These metals commonly occur together, so that where one member of the group is found one or more of the others may be expected. Most of the platinum of Alaska is obtained from one lode mine and from several widely separated placer mines where it

is associated in subordinate amount with gold. Platinum was long practically unknown and almost unsuspected in Alaska, but the experience of recent years has shown it to be widely distributed, although for the most part in small amount.

The principal producer of platinum metals in Alaska is the Saltchuck mine of the Alaska Palladium Co., on Kasaan Peninsula near Ketchikan. Ore from this mine yields palladium, platinum, copper, gold, and silver, but the value of the ore lies chiefly in the platinum metals, especially palladium. The output of palladium and platinum from the Saltchuck mine made up so large a proportion of the total output of platinum metals from Alaska in 1925 that the amount can not be stated without disclosing confidential information. Therefore in this as in the last bulletin of this series the palladium output of the Saltchuck mine is included in the table "Miscellaneous minerals" on page 6 and the copper, gold, and silver are included in the tables on pages 8, 27, and 29.

In 1924 a total of 28 ounces of platinum, valued at $2,594, was recovered from the gravel of placer mines on Dime Creek, on Seward Peninsula near the head of Norton Bay; Slate Creek, in the Chistochina district, Copper River Basin; Granite Creek, in the Ruby district; and Metal Creek, on Kenai Peninsula. Platinum has also been produced in small amount from the Marshall district, on the lower Yukon; from Boob Creek, in the Tolstoi district; from the Cache Creek district, of Susitna Valley; and from beach gravel on Kodiak Island. The quantity of platinum reported by placer-mine operators in 1925 was less than half that reported in 1924, but, inasmuch as platinum was probably produced, as in previous years, in some districts from which no reports were received, it is probable that the amount reported is less than the actual production; nevertheless a decrease in production is evident.

QUICKSILVER

Quicksilver was produced at two localities in Alaska in 1925, and the value is included in the table of "Miscellaneous minerals" on page 6. A large increase in output for 1925 as compared with 1924 is reported.

The largest production was made in the Iditarod district, 22 miles from the Kuskokwim, between the river and Flat. The ore is cinnabar and occurs at a contact of sandstone and an intrusive igneous rock. That mined in 1925 came from the outcrop, but an adit was started to cut the ore body at depth. Quicksilver was also obtained at Napamute, lower on the Kuskokwim, and 10 tons of ore, which had not been retorted when the report was made, was mined from a new deposit on the south side of the river.

Both the localities mentioned have been known for their cinnabar deposits for many years. Attempts have been made to put different deposits on a producing basis, and a somewhat irregular production of mercury has resulted. At this time the interest in quicksilver has increased, and steps are being taken to reopen properties that have been lying idle.

COAL

Alaska produced 82,868 tons of coal in 1925, nearly 17 per cent less than the production of 1924, which was 99,663 tons. The value of the coal produced in 1925 may be stated as approximately $404,600. This value can not be determined with accuracy, for it is based mainly on the contract prices of large lots, but considerable coal was sold in small lots in local markets at prices of which no record is available.

Most of the coal was mined in the Matanuska and Healy River fields, both of which are reached by the Alaska Railroad and are thus provided with the transportation facilities necessary to place the coal in a market. A little subbituminous coal is mined by the Eskimos on the shores of Wainwright Inlet, on the Arctic coast southwest of Point Barrow. Some coal is obtained from lignite deposits on Chicago Creek, tributary to Kugruk River in the northeastern part of Seward Peninsula, and is used locally by the placer miners, principally those of Candle Creek. A little coal is also mined at Bluff Point, on Kenai Peninsula, for use of the local canneries in Cook Inlet. The coal from these localities, however, is only a fraction of 1 per cent of the production of the Matanuska and Healy fields. Most of the coal mined on Healy and Matanuska Rivers is consumed by the Alaska Railroad, but a part is used locally, and some is shipped to Alaskan coast towns. The Healy River coal is a lower-grade coal and is produced in smaller quantity than the higher-grade bituminous coal of the Matanuska field.

The valuation given for coal produced in Alaska in 1925 is based in part on the prices paid by the Alaska Railroad for coal furnished under contract from the Matanuska and Healy River fields. In the fiscal year 1925 the railroad bought 57,284 tons of coal of all grades from all fields at an average price of $5.279. The contract prices for Matanuska coal during the later part of the fiscal year 1926 were, run of mine, $4.44; steam, $3.95; for Healy River coal, lump, $4.25; nut, $4; chestnut, $2.68; pea, $1; run of mine, $3.50.

Alaskan coal has to compete with the coal of outside mines whose market is already established, and although the Territory is capable of supplying from its own resources the coal needed for its own use it has not yet been able to close its market to the outside producers. In 1925 nearly 53 per cent of the coal used in Alaska came from out-

side sources. The showing for Alaska coal is even less favorable than in 1924, for the domestic production was reduced while the quantity of coal imported increased.

Coal produced and consumed in Alaska, 1880–1925

Year	Produced in Alaska, chiefly subbituminous and lignite.		Imported from States, chiefly bituminous coal from Washington [a] (short tons)	Imported from foreign countries, chiefly bituminous coal from British Columbia [a] (short tons)	Total coal consumed (short tons)
	Short tons	Value			
1880–1915	71,633	$456,993	679,844	1,079,735	1,814,047
1916	12,676	57,412	44,934	53,672	111,282
1917	54,275	268,438	58,116	56,589	168,980
1918	75,816	413,870	51,520	37,986	165,322
1919	60,894	345,617	57,166	48,708	166,768
1920	61,111	355,668	38,128	45,264	144,503
1921	76,817	496,394	24,278	33,776	134,871
1922	79,275	430,639	28,457	34,251	141,983
1923	119,826	755,469	34,082	43,205	197,113
1924	99,663	559,980	40,161	41,980	181,804
1925	82,868	404,617	37,324	57,230	177,422
	794,854	4,545,097	1,094,010	1,532,396	3,404,095

[a] Compiled from Monthly Summary of Foreign Commerce of the United States, 1905–1925, Bureau of Foreign and Domestic Commerce. No figures on imports before 1899 are available.

In spite of the fact that less coal was mined in Alaska in 1925 than in 1924, an increased use of local coal is anticipated, and steps have been taken in both the Matanuska and the Healy River fields to meet the increased demand. In the Matanuska field the two largest producers are the Evan Jones Coal Co. on Eska Creek and the Premier Coal Mining Co. on Moose Creek. The Evan Jones Co. did a large amount of development work. A long tunnel was driven from the south limb of the anticline, on which mining has been done heretofore, to the north limb, where bad air made it necessary to extend an air course over 1,000 feet long to the surface. Mining was interrupted during May, June, and July. The Premier Coal Mining Co. was in operation almost throughout the year but was closed temporarily as a result of legal difficulties. During the year a branch of the Alaska Railroad was extended up Moose Creek to the property of the Alaska Matanuska Coal Co., which has been equipped with new machinery and put on a producing basis. The Rawson property had no production, and the Alaska Bituminous Coal Co. ceased operations in May. Ross Heckey produced a small quantity of semibituminous coal for the railroad and for blacksmith use. Permits for prospecting the anthracite of the upper Matanuska were issued, but little work was done.

The Healy River Coal Corporation, at Suntrana, was able to operate continuously in 1925, owing to the construction of a new steel railroad bridge across Nenana River. The company has now

equipped its mine with the most modern apparatus for producing coal. Electric underground haulage was installed, making this the first coal mine in Alaska to be thus equipped. A modern tipple with facilities for screening and sizing coal was built. Improvements were made in the power plant and camp facilities, and a schoolhouse and recreation hall were constructed. In the mine a crosscut entry was driven to the last or sixth bed, where mining has since been carried on. The Suntrana mine is the chief coal producer of this field, although R. F. Roth did some tunneling on beds 9 miles above the mouth of Healy River which are thought to be the same beds as those met in the Suntrana mine. A few loads of coal from this place were brought down Healy River on the ice.

No coal was produced in the Bering River field except possibly a little that may have been taken out for local use. Interest in this field is not lacking, however. It is reported that the Alaska Anthracite Railroad has been taken over by a new company and will be equipped for handling coal. The part of this road already built is stated to be in fair condition, although some of the bridges are out, and it has not been in recent use. It will be necessary to build coal bunkers on Controller Bay and an extension of the landward end of the road to reach the mines which it is proposed to open.

PETROLEUM

The petroleum production of Alaska is small and comes entirely from the Katalla field, on the south coast a short distance east of the mouth of Copper River, where it is obtained from 16 shallow wells on patented claims belonging to the Chilkat Oil Co. This company operates a refinery at Katalla and disposes of its gasoline and distillate in the local market, principally at Cordova, where a selling station is maintained. Extensive improvements for increasing the yield and quality of products and decreasing the cost of production were made to the plant in 1924 and resulted in increased output in 1925. According to the annual statement of the company to its stockholders[7] the production for 1925 was 7,963 barrels. The prices received in Cordova were 17 cents a gallon for gasoline and 13 cents for distillate. Two wells were drilled in 1925. One reached a depth of 1,160 feet and had an initial production of 3½ barrels a day from three oil-bearing strata. The other was drilled to 1,760 feet but yielded only half a barrel a day. The gasoline-extraction plant was operated approximately 200 days but was closed most of the time in January, February, and March because of extremely cold weather.

Large quantities of petroleum products, such as gasoline, distillate, fuel oil, and lubricating oil, are used in Alaska by the fishing boats and other water craft along the coast, the canneries, the mines of the

[7] Chilkat Oil Co. Eighth Ann. Rept.

Kennecott Corporation, the Copper River & Northwestern Railway, and other consumers. Most of this oil must be imported from outside sources, as the domestic production is wholly insufficient to meet the demand.

Petroleum products shipped to Alaska from other parts of the United States, 1905–1925, in gallons [a]

Year	Heavy oils, including crude oil, gas oil, residuum, etc.	Gasoline, including all lighter products of distillation	Illuminating oil	Lubricating oil
1905	2,715,974	713,496	627,391	83,319
1906	2,688,940	580,978	568,033	83,992
1907	9,104,300	636,881	510,145	100,145
1908	11,891,375	939,424	566,598	94,542
1909	14,119,102	746,930	531,727	85,687
1910	19,143,091	788,154	620,972	104,512
1911	20,878,843	1,238,865	423,750	100,141
1912	15,523,555	2,736,739	672,176	154,565
1913	15,682,412	1,735,658	661,656	150,918
1914	18,601,384	2,878,723	731,146	191,876
1915	16,910,012	2,413,962	513,075	271,981
1916	23,555,811	2,844,801	732,369	373,046
1917	23,971,114	3,256,870	750,238	465,693
1918	24,379,566	1,086,852	382,186	362,413
1919	18,784,013	1,007,073	3,515,746	977,703
1920	21,981,569	1,764,302	887,942	412,107
1921	9,209,102	1,403,683	2,021,033	232,784
1922	15,441,542	1,436,050	2,095,675	345,400
1923	12,285,808	4,882,015	473,826	454,090
1924	14,412,120	5,554,859	566,431	506,364
1925	16,270,746	6,993,500	562,844	580,321
	327,550,379	45,639,815	18,414,959	6,131,599

[a] Compiled from Monthly Summary of Foreign Commerce of the United States, 1905 to 1925, Bureau of Foreign and Domestic Commerce.

The efforts that are being made to establish new productive oil fields in Alaska did not meet with success in 1925. No new oil pools were tapped, and no new prospects of promise were reported. Drilling operations on the Pearl Creek dome, near Kanatak, on Alaska Peninsula, have so far met with disappointment. The Standard Oil Co. drilled three holes. Two of these are shallow, but the third reached a depth of 5,400 feet without striking oil in sufficient quantity to be of value. The deep hole caved near the bottom, drilling was stopped, and the hole was abandoned. Since then the machinery has been removed and hauled to Kanatak, but not before the holes had been stopped in a manner to comply with the leasing laws. The Associated Oil Co. drilled intermittently on the Finnigan claims of the same field without success.

In the Yakataga field no drilling has been done, but preparations for drilling were made. During the summer of 1925 the General Petroleum Co. landed machinery and a drilling rig at Yakutat, from which it was taken on scows to Icy Bay and unloaded on the beach. Tractors were provided to haul this equipment from the beach to the drilling site, but before they had delivered their freight at its destination the storms and bad weather of early winter put an end

to the work until sometime in 1926, when the drill rig is to be installed.

A drill rig was landed at Chickaloon, Matanuska Valley, on the Lars Netland coal-lease area, but was not set up in 1925.

No development was undertaken in the Iniskin Bay field, on the west side of Cook Inlet, but geologic surveys were made by oil geologists representing companies interested in that field, and surveys for land subdivision were carried on by the General Land Office.

The search for oil in naval petroleum reserve No. 4, in northern Alaska, was continued in 1925 by members of the Geological Survey. A party of four men, including one topographer and one geologist, made the winter trip by dog sled from Nenana to that part of the Arctic slope including the headwaters of Colville River and carried on topographic and geologic surveys. One of the chief results of the work, aside from the mapping of new territory, is the delimiting of the area in which petroleum may be expected to be present. A short account of the work is given in another part of this report.

STRUCTURAL MATERIALS

Marble and gypsum are the principal structural materials that have been shipped out of Alaska. Both these materials are present in southeastern Alaska, and because of their convenient situation with reference to water transportation may readily be placed on the Pacific coast market.

Most of the marble is produced from the quarries of the Vermont Marble Co. at Tokeen, on Marble Island, at the north end of Prince of Wales Island. This company was active in 1925 and employed a force of men which is said to have been larger than has been employed before. Such a force would indicate an increasing demand for Alaska marble. Since 1904 the output of marble has steadily grown, but the number of companies producing marble has always been small. The value of the marble produced in Alaska since 1901 is $2,629,214.

Gypsum has been produced on the east coast of Chichagof Island each year since 1906. The mine was closed in December, 1923, and was not reopened till August, 1924, when it was taken over by the Standard Gypsum Co. This company made plans for a mill and for developing the mine, but being unable to make satisfactory arrangements regarding royalties with the owners, it finally gave up the mine and removed its equipment. In consequence no production of gypsum in 1925 is reported.

OTHER MINERALS

In some years a number of minerals other than those already mentioned have been produced and marketed from Alaskan sources. This was especially true during the war, when an unusual demand for many of the less common metals arose and the market price was so high as to encourage the production of such metals, even in remote regions of high mining costs. These metals include antimony, chromium, molybdenum, and tungsten. None of them were shipped from Alaska in 1925, although some may have been produced.

ADMINISTRATIVE REPORT

By FRED H. MOFFIT

This administrative report relates to the fiscal year 1925–26 and therefore involves the field work of more than one calendar year.

Since April 1, 1925, the work of the Alaskan branch has been in charge of Philip S. Smith, chief Alaskan geologist, who at the time of this writing (July, 1926) has been in Alaska since February, continuing the investigation of naval petroleum reserve No. 4 which was begun in 1923. During his absence from Washington S. R. Capps acted as chief Alaskan geologist until May 21, when he also left the Washington office for field work in Alaska and Fred H. Moffit assumed temporarily the duties of the position.

The work of the Alaskan branch was expanded at the beginning of the fiscal year 1926 by the transfer to it of certain functions which had been previously exercised by the Bureau of Mines but which, when that bureau was transferred to the Department of Commerce, were turned over to the Geological Survey. The new duties devolving on the Alaskan branch include the supervision of the production of coal and oil on public lands under the mineral leasing acts. The supervision of leased mineral lands under this new arrangement is administered in cooperation with the conservation branch of the Geological Survey, which performs the necessary Washington office functions and advises the Alaskan branch with respect to the general conduct of work in the field. The following persons connected with the work of the Bureau of Mines in Alaska and resident in the Territory were transferred to the Alaskan branch on July 1, 1925: B. D. Stewart, supervising mining engineer; J. J. Corey, coal-mining assistant; J. G. Shepard, metal-mining assistant; H. H. Townsend, associate mining engineer; Ilona M. Grover, junior clerk.

The local office at Anchorage, Alaska, formerly maintained by the Bureau of Mines was taken over by the Geological Survey.

Systematic investigation of the mineral resources and geology of Alaska and the mapping of its topographic features by the Geological Survey began in 1898 and have continued uninterruptedly to the present time. A number of special investigations, however, were made by men from the Geological Survey before that time. Their work was not conducted by the division of Alaskan mineral resources

and in part was directed by organizations wholly outside the Geological Survey. Such work, as well as the work of other Government organizations now active in Alaska, is not included in the following summary of surveys so far made.

Areas surveyed by Geological Survey in Alaska, 1898–1926, in square miles

Fiscal year	Areas covered by geologic surveys			Areas covered by topographic surveys		
	Exploratory (scale 1:500,000, 1:625,000, or 1:1,000,000)	Reconnaissance (scale 1:250,000)	Detailed (scale 1:62,500)	Exploratory (scale 1:500,000, 1:625,000, or 1:1,000,000)	Reconnaissance (scale 1:250,000, 200-foot contours)	Detailed (scale 1:62,500, 25, 50, or 100 foot contours)
1898–1925	75,500	140,720	5,847	55,980	180,650	4,066
1926		13,785	130		9,500	
	75,500	154,505	5,977	55,980	190,150	4,066
Percentage of total area of Alaska		40.2			42.6	

Some explanation of this table is required. In the course of work that began when Alaska was an almost unknown country and that has extended over a period of 28 years some parts of the Territory were covered first by exploratory surveys in which only the most prominent features of the country could be noted. Later more careful reconnaissance surveys of large areas were made, and finally in some small areas where the mining industry required it, detailed maps of still larger scale were made. Where such surveys overlap and an area has been mapped on two or more scales only the most recent and largest-scale maps are included in the table, so that there is no duplication of areas on different scales. It results, therefore, that the area surveyed from 1898 to 1925, as given in the table, is not identical with the area reported in the corresponding table of the report for the fiscal year 1925, as the totals given in that table are here corrected by amounts corresponding to the areas resurveyed in the field season of 1925. As the areas where surveys are made are determined largely by the needs of the mining industry, it results that the areas mapped geologically and those mapped topographically are in large measure the same.

The table shows that at this time a little more than two-fifths of Alaska, or more than 235,000 square miles out of a total of 586,400 square miles, is mapped both topographically and geologically in an exploratory, reconnaissance, or detailed way. The area thus surveyed on the reconnaissance scale (1:250,000) is nearly twice as great as that of the other two scales combined, and the area surveyed in detail is only 2.5 per cent of the total area surveyed both topographically and geologically. In considering these figures it must be borne in mind that however necessary and valuable the exploratory and other

less exact surveys were at the time they were made, the resulting maps must eventually be replaced by better maps of at least the standard of accuracy of the present-day reconnaissance surveys, and in important districts, if the needs of Alaska are to be met, some surveys of the still more detailed kind will be required, both for the mining industry and for the development of water power and other resources.

The work of the Geological Survey in Alaska, however, does not consist solely in making geologic and topographic maps. It includes the collection of mineral statistics and the making of special investigations relating to supplies of coal, petroleum, platinum, chromium, and other mineral resources, as well as of such metals as gold, silver, and copper. For several years the Geological Survey conducted an investigation of the water resources of Alaska to determine the supply of water available for placer mining and for the development of power, but these investigations were discontinued because of lack of funds. More recently certain work formerly carried on by the Bureau of Mines has been transferred to the Geological Survey, as noted above.

The publications of the fiscal year consist of a report on the progress of investigations in Alaska in 1923 (Bulletin 773), the administrative report and a report on the mineral industry of Alaska in 1924 (Bulletin 783–A), and "Mesozoic stratigraphy of Alaska," by G. C. Martin (Bulletin 776).

The funds available and used in part for the conduct of the work of the Survey in Alaska in the fiscal year 1926 include proceeds of an appropriation of $72,000 for 1925–26 carried in the Interior Department act and made available March 3, 1925, and of an appropriation of $50,000 for 1926–27 contained in the Interior Department act, available May 10, 1926. In addition to these sums, appropriated directly for expenditure by the Geological Survey, $22,000 was transferred to the Geological Survey from the appropriation of $33,000 for the work of the Bureau of Mines in Alaska, contained in the Interior Department act for the fiscal year 1926, at the time of the transfer of certain activities formerly conducted by the Bureau of Mines when it was a part of the Interior Department, and $12,300 remained from funds amounting to $75,000 made available to the Survey by the Department of the Navy for investigation of naval petroleum reserve No. 4, in northern Alaska, and expended in part in the fiscal years 1924 and 1925. All these funds except the appropriation for 1926–27 were available for use at the beginning of the fiscal year 1926. Their use has been accounted for in accordance with the law and the regulations of the Treasury Department, but some analysis of the expenditures from other viewpoints may be of interest.

The following statements give in round numbers the amounts that were expended for the principal uses to which the funds were applied

in the fiscal year 1926. Without taking into consideration the work for the Navy Department and that transferred from the Bureau of Mines, the amount expended in starting parties into the field in the spring of 1925, before the beginning of the fiscal year 1926, is offset by the amount used to start the parties at the end of the fiscal year 1926, so that the funds used for the fiscal year 1926 were $72,000, the amount of the appropriation for that year. The funds expended in supervising the leasing of mineral lands and for the work in naval petroleum reserve No. 4 will be analyzed separately.

Expenditures from funds directly appropriated for the Geological Survey's work in Alaska, fiscal year 1926

Branch administration	$5,500
Other technical salaries	21,450
Branch clerical and drafting salaries	5,900
Service rendered by other Survey units, including editing, duplicating-machine service, accounting, and other services	5,800
Office expenses, stationery, telegrams, photography, and other expenses	2,300
Field expenses	31,050
	72,000

The sums contained in the items "Other technical salaries" and "Field expenses," plus $1,500 of the item for "Branch clerical and drafting salaries," were expended for surveys and investigations in progress in the fiscal year 1926 as follows:

General investigations	$1,875
Geologic surveys	33,800
Topographic surveys	16,425
Statistics of mineral production	1,900
	54,000

In this table it is impossible to show accurately the distribution of expenses between geologic and topographic surveys. Four of the field parties contributing to these two items in the table were combined topographic and geologic parties, for which the larger part of the cost might properly be charged to the topographic work. It has seemed best, however, to conform with the practice of former years and divide the cost of these four parties equally, or approximately so, between the two kinds of surveys.

The geographic distribution of the work reported in the last table, together with the approximate amount devoted to each district, is as follows:

Approximate cost and distribution of work by geographic divisions for the fiscal year 1926

General investigations	$1,875
Southeastern Alaska	6,950
Prince William Sound	6,600
Matanuska region	1,675
Southwestern Alaska	6,525
Skwentna-Kuskokwim region	5,675
McKinley region	4,100
Upper Yukon and Sheenjek regions	10,525
Northern Alaska	8,175
Statistics of mineral production (including $1,500 for clerical salaries)	1,900
	54,000

In the season of 1925, which included the later part of the fiscal year 1925 and the beginning of the fiscal year 1926, eight parties were engaged in geologic or topographic investigations or both in Alaska. This number includes all those connected with the Alaskan branch exclusive of those resident in Alaska, except two persons who are engaged in clerical duties in the Washington office and one whose time throughout the year is given to the preparation of maps. On the average nearly one-half the time of those engaged in field work is spent in investigations away from Washington, and the remainder of the year, including the winter season, when field work is impracticable or impossible, is devoted to the preparation for publication of information collected in the field, to conferences, committee work, and the answering of correspondence—things which would be done unsatisfactorily and at a great disadvantage if attempted away from the facilities of the Washington office.

A brief account of the field work of each member of the branch is given below for the season 1925, together with the assignment of field parties for 1926 and a statement of the activities of those whose time is all given to the work of the Washington office. Field parties in Alaska are usually out of touch with mail and telegraph communication for weeks or months at a time. It is therefore often impossible to learn the progress of the work till the return of the men in the fall, and consequently until that time it is also impossible to make any accurate statement of what was accomplished during the fiscal year.

Philip S. Smith, chief Alaskan geologist, was detained in Washington by administrative duties connected with the Alaskan work until July 12, when he left for Alaska. He spent about a week in visiting the field party in charge of A. F. Buddington at Hyder, in southeastern Alaska, and an equal time with the party under Fred H. Moffit on Prince William Sound. Most of his field season, however, was spent in Juneau, Anchorage, and Fairbanks, and in the Matanuska and Nenana coal fields in consultation with Messrs.

Stewart and Corey concerning plans for carrying on the work transferred from the Bureau of Mines and in studying the coal-mining situation. After returning from Alaska Mr. Smith was engaged in the Washington office until February 8, 1926, when he left to continue the investigation of naval petroleum reserve No. 4.

In the Washington office Miss Lucy M. Graves acted as chief clerk throughout the period covered by this report. Miss Erma C. Nichols devoted a considerable part of her time to the collection and coordination of mineral statistics. Mrs. Marion E. Maclean was engaged in general clerical work from the time of her connection with the branch (October 5, 1925) until June 16, 1926, when she was transferred to the topographic branch. John B. Torbert was engaged throughout the year in the preparation and drafting of Alaskan maps.

Two parties were at work in southeastern Alaska. A. F. Buddington made a reconnaissance of the west coast of Dall Island and spent the later part of the season of 1925 in detailed geologic surveys in the Hyder district, at the head of Portland Canal, adjacent to one of the active Canadian silver-lead camps. The results of this work are now being prepared for publication. R. K. Lynt was detailed to accompany a party of surveyors from the General Land Office who were carrying on subdivisional surveys in the vicinity of Wrangell Narrows, where he made a detailed topographic map. On February 8, 1926, Mr. Lynt was transferred from the Alaskan branch to the topographic branch.

Fred H. Moffit continued the investigation of the copper and other metalliferous deposits of Prince William Sound, one of the important copper-producing districts of Alaska, which has also produced considerable gold and gives promise of more. About 450 square miles of territory on the west side of the sound was mapped geologically. At the end of the season Mr. Moffit visited the Chitina Valley to collect data on mining.

K. K. Landes made a reconnaissance geologic survey of an area of about 335 square miles between Matanuska River and Knik River. A separate paper in this volume gives the more important results of the work.

R. H. Sargent, topographer, and R. S. Knappen, geologist, made topographic and geologic surveys of 3,000 square miles on the Alaska Peninsula. The surveys extended the full width of the peninsula from Aniakchak Crater to a point 25 miles west of the Chignik Lakes, where another crater of great size was found. The primary object of the surveys was to assist in developing the oil resources of the region, and the work of 1925 completed a series of surveys planned to cover the prospective oil-bearing portion of the peninsula. Mr.

Knappen has in preparation a report on the geology of the district for future publication.

Mr. Sargent was detailed as special representative of the Geological Survey to accompany a party organized by the Bureau of Aeronautics of the Department of the Navy to carry on aerial photographic surveys in southeastern Alaska and left Washington to join the party at Ketchikan in May, 1926. This cooperative work, undertaken at the request of the Survey, is the first attempt to make use of the aero-photographic method of mapping in Alaska. Field work began in the vicinity of Ketchikan and was to be extended northward as rapidly as weather conditions would permit, with the intent to cover as much of southeastern Alaska as possible during the season.

S. R. Capps in 1925 carried on a reconnaissance geologic survey on the northwest side of the Alaska Range in the Toklat-Tonzona district of the Mount McKinley region, covering an area of 2,000 square miles. This work was in part a resurvey on a larger scale of exploratory surveys made by A. H. Brooks and D. L. Reaburn in 1902. A report giving the results of the work is printed elsewhere in this bulletin. Mr. Capps, with K. W. Trimble, topographer, left Washington in May, 1926, to conduct geologic and topographic surveys in a hitherto unmapped district that includes the headwaters of Skwentna River and the South Fork of Kuskokwim River.

J. B. Mertie, jr., made a geologic survey along the Yukon between the international boundary and Circle and at the end of the field season of 1925 spent a week in the vicinity of Fairbanks collecting statistics on mineral production. The survey on the Yukon covered 1,500 square miles and was in part a resurvey on a larger scale of a district covered by earlier exploratory surveys. This expedition had for its object the correlation of field observations and material already in hand. A report on this district has been submitted for publication as a separate bulletin. In May, 1926, Mr. Mertie, with J. O. Kilmartin, topographer, left Washington to conduct geologic and topographic surveys in the valley of Sheenjek River, which heads in the Brooks Range north of Yukon River and joins Porcupine River about 20 miles above Fort Yukon. This area had not previously been mapped.

Gerald FitzGerald, topographer, and W. R. Smith, geologist, left Washington in February, 1925, to extend the surveys already made in naval petroleum reserve No. 4, northern Alaska. They went by dog team from Nenana down the Yukon to Norton Sound and thence north to Kotzebue, where they obtained supplies for the summer. They then completed their winter trip up the Noatak and across the divide, arriving on the Arctic slope before the spring break-up. Their field work began late in April and resulted in exploratory and reconnaissance surveys covering 6,500 square miles of territory, principally

in the headwater region of Colville River and some of the northern tributaries of the Noatak.

In February, 1926, Philip S. Smith, chief Alaskan geologist, and Gerald FitzGerald left Washington to continue geologic and topographic surveys in the region between the headwaters of the Colville and the Arctic coast on the northwest. They traveled in the same manner and over the same route as the expedition of 1925 to Kotzebue and thence up the coast to Kivalina, where surveys of the unsurveyed area to the north were begun. After the later part of March the party was out of mail and telegraph communication with the Washington office during the remainder of the fiscal year.

W. R. Smith resigned in February, 1926, to take employment with an oil company in Mexico.

The sum available for use in the fiscal year 1926 from the funds transferred to the Geological Survey by the Department of the Navy was expended as is shown in the following table:

Allocation of funds for surveys in naval petroleum reserve No. 4, northern Alaska

Administration	$1,375
Technical salaries	5,750
Clerical and drafting salaries	1,700
Field expenses	3,475
	12,300

The members of the Alaskan branch who were transferred from the Bureau of Mines to the Geological Survey at the beginning of the fiscal year are stationed at Anchorage and Juneau. Their time is occupied with matters relating to the leasing of public lands and the issuing of permits for prospecting under the leasing acts and to the general development of the Alaskan mining industry. Their work involves frequent journeys by the field men to the mining districts throughout the Territory.

The funds for this work were transferred to the Geological Survey from the appropriation for the Bureau of Mines and amounted to $22,000 for the fiscal year 1926. The use of this fund is explained in the following table:

Expenditures from funds transferred to the Geological Survey from the appropriation for the work of the Bureau of Mines in Alaska

Administration (including services rendered by other Geological Survey units, accounting, etc.)	$540
Technical salaries	13,425
Clerical salaries	1,500
Field expenses	6,095
Budget reserve	440
	22,000

In the preceding table the item "Administration" covers the charges against the appropriation for work done in the Washington office by different units of the Geological Survey and not the salaries of administrative officers in Alaska. The work of supervising the leasing of mineral lands in Alaska, under the general direction of the chief Alaskan geologist, is in charge of B. D. Stewart, supervising mining engineer, who resides in the Territory. The work done during the year included the following activities:

B. D. Stewart spent the major part of his time in the routine supervisory and administrative work of the office, in conferences with officials of the Federal Government and of the Territory, and in the preparation of official reports.

John J. Corey, coal-mining assistant, inspected coal mines in different parts of Alaska, particularly in the Bering River, Matanuska, and Nenana River districts, and consulted with operators concerning methods and plans for mining and marketing Alaskan coal.

John J. Shepard, metal-mining assistant, inspected metal mines in southern and southeastern Alaska and made reports on prospects and properties.

Harry H. Townsend, associate mining engineer, was employed from the beginning of the fiscal year to January 15, 1926. His time was given to the examination of metal prospects and mines and the preparation of reports on them.

Mrs. Ilona M. Grover handled the clerical work of the Anchorage office and gave special attention to supplying the requests for publications of the Geological Survey in Alaska.

N. L. Wimmler, mining engineer, and F. W. Holzheimer, associate mining engineer, were not assigned to field work till late in June, 1926, near the end of the fiscal year.