MINING HISTORY OF PIERCE COUNTY, WASHINGTON

COAL FIELDS, 1860-1962

By Joseph Daniels[1/]

Washington Division of Geology and Earth Resources

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Editor's note:

This report has not been edited or retyped to conform to our publishing standards. There are many footnotes in the text—each footnote number indicates a reference that may be found in a numerical list, beginning on page 149. Following this, on page 154, the footnotes have been listed in alphabetically order. A list of references is also included, starting on page 159.

PREFACE

~~FOREWORD~~

This story was begun several years ago as an effort to bring together facts dealing with the beginnings of coal mining in the Puyallup River Coal Field near Tacoma, Washington, now known as the Pierce County coal area. The town of Wilkeson was named for Samuel Wilkeson, secretary of the Northern Pacific Railroad, who had visited Puget Sound in 1859 and had written a very interesting account of the area he had visited. Wilkeson became the first center of coal-mining activities, which later extended into other nearby localities until the term Wilkeson-Carbonado-Fairfax area was applied to the field, and the term Puyallup River Coal Field fell into disuse. Discrepancies and contradictions were found in some of the earlier accounts, and a decision was made to write a historical account that would be reasonably accurate and that would be based on a search through available records. As the search through dependable sources progressed, it was found that geological and mining ~~aspects~~ had failed to give proper importance to men and events involved in the pioneering adventures of a new area of the Pacific Northwest. The pioneers proved to be an interesting study, and their associations with the search for coal in the area east of Tacoma and Seattle played an important part in the development and growth of the Puget Sound Region. Moreover, ~~the story of~~ the surveys and construction of the Northern Pacific Railroad, together with the earlier migration of the Red River colonist group from Manitoba, Canada, to Washington Territory, ~~both~~ had exerted a profound influence on the building of the State.

The ~~story~~ has been divided into two parts, the first dealing with events and personages as they have been revealed in ~~the~~ newspapers and the writings of journalists and historians of the period prior to 1860. This

portion does not give the reader any information about the structural conditions of the coal field and its problems, nor the methods of mining, preparation, or coking, economics, and the engineering and technical factors involved in production. Consequently, a second part was deemed necessary. This required additional research, but it was done to give future investigators a more complete history and a broader understanding of the mineral industry.

Many facts about the early mining developments and production of mineral products, particularly in the years preceding 1888, had not been assembled by competent authorities. The Federal Government did not begin to collect systematic data about the coal industry until after the year 1888. First, the United States Geological Survey, in its volumes on the Mineral Industry, and, later, the Bureau of Mines were given the responsibility and authority of assembling data of production from the active mines of the country as a whole. It is from these two sources that individual operations as well as over-all figures may be obtained. In some instances, the figures and data given in state publications cannot be checked against federal reports; in these cases, the national agencies have been given preference.

To the many, many, persons and organizations who freely made available their time and gave information, sincere thanks and acknowledgments are made. The story of Wilkeson and Pierce County could not have been brought together without this generous assistance.

INTRODUCTION

Lying east of the city of Tacoma, Washington, is a large coal field that extends southerly from South Prairie across the foothills of Mt, Rainier to Ashford. In the early years the accessible portion was designated the Puyallup River Coal Field; later it was known as the Wilkeson-Carbonado-Fairfax coal field of Pierce County. An investigation of the geology, coal resources, mines, and mining methods made during 1911 to 1913, was published in 1914 by the Washington Geological Survey, (Daniels, 1914). Later, a review of the coking industry was included in a bulletin of the University of Washington Engineering Experiment Station, (Daniels, 1920).

This area has long been of great economic value, because it contained the largest known resources of coking coal ~~among~~ in the Pacific Coast States, had produced beehive coke for many years, and ~~was~~ is believed to have great potential value and significance for future chemical and metallurgical developments in the Pacific Northwest and tributary regions. In addition, the story of its discovery, exploration, and development has an intriguing appeal because of its relationship to the construction of the Northern Pacific Railroad into Tacoma and Seattle and ~~to~~ of the association of many important personages in the pioneer days from 1870 onwards.

Pete Arsanto,[3] former resident of Wilkeson, wrote a term paper in a ~~class~~ at the University of Washington dealing with the history of the town of his birth. ~~It is a very interesting study.~~ He made an exhaustive and painstaking study of the literature dealing with Washington coal, particularly the Pierce County area, and carried on extended correspondence with persons who were able to furnish information about the early days. The paper is available in the Northwest Collection, University of Washington Library, Seattle.

F. E. Melder,[4] a former graduate student at the University of Washington, has also contributed to the story of Wilkeson, in two papers. Both were written from the viewpoint of a student of economics, with special reference to the industrial relations problem. They contain many bibliographic references, and add much to a knowledge of the coal mining industry of Washington.

EXPLORATION AND EXPEDITIONS TO NORTH PACIFIC COAST PRIOR TO 1870

It seems appropriate at this point to look back and review the work done by explorers and investigators in the North Pacific area from 1845 to 1869 leading to the development of coal mining in Washington, and specifically to the beginnings of the industry about 1860. With the coming of the Northern Pacific Railroad a new era was to begin in the Pacific Northwest in which coal was to be a most significant factor.

Prior expeditions to the North Pacific coast revealed the existence of coal deposits, but the Pierce County area was virtually unknown until about 1860. A brief chronological outline is here presented as an introduction to the general history of coal resources of Washington and adjacent territory.

The Expedition led by ~~Commander~~ Lieutenant Charles Wilkes included a number of scientists and naturalists, among whom were James D. Dana, Mineralogist, who was on the expedition during the years 1838 to 1842; William Rich, Botanist; J. D. Brackenridge, Assistant Botanist. A letter to the Scientific Corps instructed them to study botany, geology, mineralogy, and natural resources.

A notation about the coal on Cowlitz River was given by Wilkes which reported that coal of a good quality existed, that examination of the places indicated only lignite, the largest quantity lies above the East Fork, several specimens of it were obtained. Later, in August 1853, Lt. W. P. Trowbridge, U.S. Engineers, reported that coal of medium quality obtained from the banks of the Cowlitz was mined to some extent by parties from San Francisco. Professor Dana reports that it contains considerable pyrites,

burns with much smoke, caking completely. An analysis by B. Silliman, Jr., yielded carbon 45.56, volatile ingredients 52.08, and ash 2.36 percent.

The growing interest in the possibility of building a railroad to the Pacific Ocean led to a most important step--that of surveying the resources of the coast region. The War Department was authorized to make surveys of various routes, and all its personnel was organized into various units needed for such an undertaking. The results of the expeditions were later incorporated into a series of reports.[6]

~~General~~ Isaac I. Stevens was appointed governor of the newly created Washington Territory by President Franklin Pierce in 1853; about the same time he was ~~designated~~ to direct the northern exploration route of the Pacific Railroad ~~on the route of~~ the 47th parallel. The exploring party moved from St. Paul to Puget Sound across wild, mostly unmapped country. Letters from Stevens to James Doty gave instructions about the land to be crossed and to other matters pertaining to the explorations and survey. A book of instructions embracing the period from March 21 to June 1853 covered only the beginning of the survey, the initial planning, and the physical arrangements necessary to get it under way. The scope was indicated in a communication addressed ~~on~~ March 21, 1853 to Secretary of War Jefferson Davis in which ~~he~~ wrote that the final report would probably include geology, botany, mineralogy, and agricultural interests of the route. Examination of approaches and passes of the Cascade Mountains was assigned to Capt. George B. McClellan of the Corps of Engineers, this party to organize at Puget Sound and operate in the Cascade Range.

Various members of the expedition, civilian and military, made studies of the coal resources tributary to the proposed route; memoranda or reports

were prepared that were included in the many volumes that constituted the final reports. Some of this material is summarized here to give a picture or prelude to the later work carried on; only the more significant data can be presented.

George Gibb wrote of the coal beds on the D'wamish River and Bellingham Bay in a report on a "Reconnaissance of the Country Lying upon Shoalwater Bay and Puget Sound," issued from Office of Northern Pacific Railroad Exploration and Survey, Olympia, W. T. December 30, 1855.

W. P. Trowbridge, U.S. Engineers, contributed data on Bellingham Bay in a report dated August 1853.

J. S. Newberry, M.D., Geologist and Botanist of the Expedition, wrote a Report upon the Geology of the Route, Part II, Geological Report, Washington, D.C., 1856. He refers to coal on the Oregon Coast near Coos Bay, to coal from Cape Flattery, Washington Territory, to coal from Santa Clara, California; describes the coal of Bellingham, Washington Territory, and refers to a geological report by W. P. Blake contained in Vol. V, U.S. Pacific Railroad Reports.[7]

Some of these contributions are to be found in the volumes of the Reports published after the original five volumes and atlas of the 1855 publication. ~~General~~ Stevens made his final report in 1859 but there is very little mention of coal in it.[8] (Stevens, 1859)

The surveys made by the federal government were followed by examinations conducted by the promoters of the Northern Pacific Railroad Company and the publication of more reports and articles dealing with the resources of the Pacific Coast. Californians interested in promoting enterprises were looking for coal and timber; some coal in King County, Washington, was

being exploited. Little was known about the Pierce County areas because they were away from the normal routes of investigation, and it was 1860 before discoveries became known.

Reports of surveys executed in 1867 by General Ira Spaulding, Chief Engineer of the Minnesota Division, and General James Tilton, Chief Engineer of the Washington Division, dated October 21, 1867, were available in 1869 to Edwin F. Johnson. It appears that Robert Brown's work (1870) was known to him for there are many references to coal in the North Pacific Coast Coal Fields. ~~The author of this communication,~~ while engaged in other duties, made many notes between the years 1863 and 1866 on the geology and physical characteristics of the coals. He also reports on the Coal Trade of San Francisco and the North Pacific in tables and explanations, 1861, and January 1 to August 26, 1868, together with Analyses of Native and Imported Coals of the North Pacific. No mention is specifically made of the King and the Pierce County coals.

~~Another~~ publication by James Macfarlane[10] (1873) written a few years later also contains references to coals of the area.

Macfarlane, under the main heading of Cretaceous Coal, writes about the coals of the Pacific Coast as they were known in 1873. The want of coal had been deeply felt by the inhabitants of California, and attention had been directed toward the other deposits along the Pacific Coast. The principal localities where coal had been produced were the Mount Diablo region near San Francisco, California; Coos Bay in southwest corner of Oregon; Seattle on Puget Sound; Bellingham Bay in the northwest corner of Washington Territory; and Vancouver's Island. He describes each of these areas and the mines from which the coal is taken, together with facts about the coal trade.

The Seattle area is only briefly described, but more detail is given about the Bellingham Bay operations.

A map of the Pacific Coast from San Francisco to the Straits of Juan de Fuca and a table of coal imports into San Francisco for 1860 to 1872 by sources are included. His discussion of the coal trade at San Francisco is very enlightening. Most of the data of the chapter appear to have been drawn from the reports of the explorers and writers of his day.

EARLY PROSPECTING OF PUYALLUP RIVER COAL AREA

The records of early voyages and expeditions to the Pacific Coast had noted the occurrence of coal in California, Oregon, and Washington; similarly, transcontinental expeditions added information about inland occurrences away from the coast. A considerable body of material is available to the investigator who wishes to get a general picture from the observations made up to 1860, and many references can be found in the bibliographies of the subject of coal on the Pacific Coast. In this study little attempt will be made to discuss all references dealing with Washington Territory except those relating in some direct way to Pierce County east of Tacoma and Commencement Bay, particularly to the Puyallup River and its tributaries, designated in the earlier literature as the "Puyallup River Coal Field."

The presence of coal apparently was known as early as 1862 or 1863, presumably the beds along the Carbon River whose steep canyon strikingly reveals outcrops of thick seams of coal on high dips. The rugged topography here was not favorable to exploration, but other occurrences along South Prairie Creek and the tributaries of the Puyallup were more readily accessible and active prospecting was begun early in the seventies in these localities. ~~Search and~~ prospecting for coal ~~were~~ was carried on during the period 1874-1883 as reported in the ~~columns~~ of newspapers of those years.[1] The accounts are glowing and optimistic, not very specific about locations, but they indicate ~~an~~ interest and hope that a rich deposit might be found.

John Flett had taken a homestead at the present site of South Prairie in 1869 within a relatively short distance of many exposures of coal, and by 1874 his sons and John Gale had opened a drift in Section 34, ~~T/9N, R-6E.~~

Others had found coal, but little public information was given about these prospects. Search through the files of newspapers of this period give an occasional item, but nothing of great significance or value to the historian. A few articles, however, are enlightening.

Reverend G. F. Whitworth, in an article on Coal Mines of Western Washington written in 1881 refers to the first coal claim taken by the Fletts and Gale, then states, "Existence of coal had been known for several years, certainly as early as 1862 or 1863, if not a little earlier. Mr. Van Ogle, now a resident of Elhi, Pierce County, was one of the first, if not the very first, to discover it. Prospecting along the Puyallup River, he came across some of the coal veins which had been cut and bared by the stream . . . . The upper valley of the Puyallup being all this time a terra incognita. The reference to the coal beds exposed along the Puyallup River and noted by Van Ogle may have been to the striking outcrops visible along the canyon of its tributary, Carbon River. But as soon as Flett brothers had demonstrated existence of coal, numerous explorers during the fall of 1874 and summer of 1875 went in. Numerous claims were taken in the spring of 1875 under coal land law."*

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* Coal Mines of Western Washington. Data and Detail Regarding This Vast Source of Wealth. Resources of Oregon and Washington, issue of December 1881, Volume IV, No. 2, page 91. David and W. G. Steel, publishers. Office No. 6, Washington Street, Portland, Oregon.

NORTHERN PACIFIC RAILROAD COMPANY SURVEYS, 1869

The occurrences of coal in Washington, as pointed out earlier, were broadly known at an early date, but when preliminary surveys were being considered by railroad and shipping interests more detailed attention was given to economic resources along the coastal area. The planners of the Northern Pacific Railroad had given much attention to the coal resources long before railroad construction had been decided upon. The history of the Northern Pacific Railroad is intimately connected with the explorations and development of coal resources of Washington, particularly those tributary to the Puget Sound region. The literature is voluminous, but only a portion of it can be included in this narrative.

Pearl Russell[12], gives an excellent introduction.

> "The reports known familiarly as the Pacific Railroad Reports are a storehouse of information. The reports fill 13 quarto volumes . . . . The accounts were the result of the western surveys made shortly after the discovery of gold and the acquisition of the Mexican accession turned the attention of all classes of people to the Pacific Region."

Eugene V. Smalley gives a summary of the situation preceding the surveys made by the Northern Pacific Railroad.[13] During the period of 20 years prior to 1850 there was more or less agitation to arouse interest in the building of a railroad to the Pacific. At that time the only route spoken of was that followed by Lewis and Clark. In 1853 a survey of the northern route was placed in charge of Isaac I. Stevens. The final report was submitted by Stevens to Secretary of War Floyd in February 1859.

The Northern Pacific Railroad Surveys that deal specifically with the coal resources of the Pacific Northwest are listed in the following pages to give the reader a more systematic review of the specific investigations made by the railroad officials.

Edwin F. Johnson, a civil engineer of Middletown, Connecticut, published a report in 1854 dealing with the proposed railroad to the Pacific.[14]

The author had not, so far as can be learned, made any personal examination of the proposed routes, but he was familiar with the plans and he discussed the merits of the different routes. He says little about the fuel resources, but concerned himself mainly with civil engineering details. The commissioners of the Northern Pacific Railroad held ~~its~~ their first meeting in Boston on the first day of September 1864, and selected the northern route for its proposed line. They noted that there was good coal in inexhaustible quantities on Puget Sound, and traces of good coal had been found in the interior near the line of the proposed route. The services of Johnson were secured, and he was appointed Engineer-in-Chief to the road by the board of directors in 1865. A report, dated May 18, 1866, by him to the Board of Directors, November, was printed at Hartford by Case Lockwood and Company, printers, 1867. This appears to have been a new edition of the 1853 report referred to above. In it he mentions that coal is mined in large quantities at Bellingham Bay, loaded into vessels, and shipped to California.

Thomas H. Canfield made a recommendation to the directors, urging that more specific facts should be known to them before they took action in the matter of commencing operations on the western portion of the line. As a result, two investigations were made in which specific attention was drawn to the coal areas of Pierce County, one by W. Milnor Roberts, the other by Thomas H. Canfield, General Agent of the Northern Pacific Railroad, who was delegated to go to the Pacific Coast to escort representatives of Jay Cooke and Company who were being sent to secure independent data for the Philadelphia firm of bankers who were financing the railroad.

William
/Milnor Roberts, U.S. Civil Engineer of New York City (father of Dean Milnor Roberts of the College of Mines of the University of Washington), in a letter dated June 1, 1869, signed by Jay Cooke and Company, was requested to proceed to the Pacific Coast, and after a thorough examination of Puget Sound and Columbia River, the two proposed terminii of the railroad, to proceed eastward via the Columbia River or the Snoqualmie Pass to the Rocky Mountains. Roberts replied on September 25, 1869. Through the courtesy of Capt. J. H. Ainsworth, President of Oregon Steam Navigation Company, he was provided transportation that enabled him to visit Olympia, Tacoma, and Seattle. In his report (1869) he draws attention to coal on the east side of Lake Washington, also at Sehome and Whatcom, and mentions the fact that he was in possession of the reports of Mr. Johnson, Chief Engineer of the Northern Pacific Railroad, of the surveys made in 1867 of the different passes of the Cascade Range, and that at Walla Walla he fitted out a horseback expedition for the journey across to the Rockies.

It must be remembered that Roberts was mainly concerned with the engineering side of the construction aspects of the proposed route. In a memorandum, signed by him on September 25, 1867, he had stated, "There is no doubt that coal exists over an extensive area of the country east of Puget Sound; and as the demand on the coast is steadily increasing, it will be developed to meet the needs of commerce." In a publication issued by Jay Cooke and Company about March 10, 1870, entitled The Northern Pacific Railroad's Land Grant and the Future Business of the Road, there was an endorsement by Roberts, dated May 5, 1870.

Canfield and some associates toured the Puget Sound region and made a report of his observations.[16] His party arrived at Olympia, July 8, 1869,

and were extended traveling facilities by Capt. Ainsworth. Samuel Wilkeson, Secretary of the Railroad, accompanied this party and wrote a very glowing account of the country traversed, dealing with harbors, timber, climate, soil and production, fish, and "glittering generalities."[17] He was most enthusiastic about the resources and possibilities, and although he did not contribute any information about the coal resources, he was given the honor of having the railroad station in the Puyallup field named Wilkeson when the branch reached its terminus at the coal mine.

Canfield says "I was sent to escort the representatives of Messrs. Jay Cooke and Company . . . to ascertain the prospective resources and capacity of the country to support a railroad successfully and profitably when built . . . This information embraces many facts, statements, and statistics as to soil . . . coal . . . minerals. I present a brief report for the use of the Directors . . . compiled chiefly from the various documents which I have received from different persons and relating mostly to Puget Sound." His report does not mention coal in Pierce County, but he does give some information about the deposit east of D'wamish Lake, the Stillaguamish and Bellingham Bay.

In 1869 Johnson refers to a statement in the Portland Oregonian about the coal resources in the vicinity of the Straits of De Fuca, on Vancouver Island, and Puget Sound. He comments on its value in view of the immense steam marine . . . which will be traversing the waters of the Pacific from the Straits of De Fuca, an adequate idea can now scarcely be formed. Its existence . . . will be of greater importance than mines of gold and silver . . . . It gives to the territory the means of creating and maintaining a commercial and military marine not possessed by any other section of equal extent within our limits on the coast of the Pacific.

It is clear that with the favorable reports made, the decision to build the railroad on the proposed northern route was made.

In 1878, the Reverend G. H. Atkinson, D.D., of Portland, wrote articles relating to the resources tributary to the proposed railroad. The prime purpose was to give aid to needed congressional legislation in favor of the N.P.R.R., Atkinson refers to coal, and particularly to Puyallup Valley coal, in a number of places in the pamphlet, and quotes Reverend G. F. Whitworth. The Puyallup coal had been tested by A. Campbell, esq., of Seattle and several blacksmiths of Portland, and by others in Washington Territory. President Whitworth of the Washington Territory University has examined the field, and the coal was tested at Portland Gas Works. Transportation is available from safe harbor at Tacoma. Tacoma mines have begun to furnish fine grades of grate coal, also steam, gas, and blacksmith, and of furnace coals. The S.S. Alaska tested 40 tons on last trip.* The new railroad survey of N.P.R.R. via Cowlitz Pass reveals veins of true anthracite.

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* Engineer's Condensed Report of Steaming Properties of Puyallup Coal on Pacific Mail S.S. Co., Alaska, October 21-24, 1878, is reported.

MORTON MATHEW McCARVER, 1868

Morton Mathew McCarver, generally known as General McCarver, one of the founders of Tacoma, an enterprising, enthusiastic individual, was one of the citizens who was extremely interested in the Puyallup Coal Field as early as 1868. He drove the last spike in the completed railroad line from Kalama to Tacoma at 3 o'clock December 16, 1873. Much of the information we have about his efforts will be found in the writings of Thomas W. Prosch, an early-day journalist of Olympia and Tacoma, particularly in his book "McCarver and Tacoma."~~19~~ The biographical data are presented in the excerpts and quotations given below. Under the heading "McCarver the Coal Discoverer: Trips to Puget Sound Toward the Mountains in 1868 and Later, a quotation is given from a letter written to Starr and Steel* on September 8, ~~1968~~ 1868:

> "I have made a trip to the coal region which is about twenty or twenty-five miles east of this city up the Puyallup River . . . . This hill extends to the coal; five or six miles distant in the forks of the river. The coal is just above river bed--six feet in thickness and fifteen feet in length. Burns freely, can be lit with a candle, makes no clinkers, and leaves an ash as white as that of wood . . . We have not divulged the secret here, or the woods would be alive with the men looking for the mines in a few days. Carr and Canfield went on foot until they found the coal mine the second day after leaving me. They brought back only a pocket handkerchief full. We will make headquarters at the South Prairie on the north fork, which is about four miles from the point where we have found the coal, the latter being on the main or middle fork."

A subsequent reference (1868) reports, "With Captain Clendenin Caulfield, Hood and Howard and Anthony Carr, McCarver made a trip up the Puyallup Valley and elsewhere looking for coal . . . and reported that Howard Carr and

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* Starr and Steel refer to Lewis M. Starr, President, and James Steel, cashier, of the First National Bank of Portland, associates of McCarver in some of his business ventures.

D. Caulfield, who had gone some distance into the hills, had returned with fine samples of coal. They had discovered a coal field which since has yielded millions of tons. It was the first bituminous find on the coast, and it had a great deal to do with the future of the village, as well as the entire western coast."

An item in the Olympia Tribune of July 17, 1871, is one of the first newspaper accounts relating to the coal deposits on the Puyallup River. "Puyallup Coal - On Saturday last, we were shown several specimens of coal from the Puyallup Valley in the hands of M. M. McCarver. The General was on his way to Portland to obtain a chemical analysis of the coal, which bore the appearance of possessing excellent qualities. He informed us that it exists in immense quantities, cropping on the top and sides of high bluffs on the margin of the Puyallup River, which offers the best facilities for transporting it cheaply to a shipping point. If it should prove as valuable as it is accessible, it will soon become a mine of immense wealth for the fortunate possessors."

Prosch states that these letters stamp McCarver as one of the original discoverers of coal. An interim period that followed the early investigations indicates that nothing definite was done about the prospects, but by 1874 there was considerable talk of the coal there, then sometimes termed the Gale coal, after one of the later explorers and discoverers, and a little of it sold at $20.00 a ton. ~~McCarver still retained his interest, and in the spring of 1875 McCarver re-examined the region.~~ His old friends, J. C. Ainsworth, R. R. Thompson, and S. G. Reed, organized the Puyallup Valley Coal Company, their purpose being to build a railroad to the mines, get out the coal, and transport it to Tacoma. In January 1875, Senator

Mitchell introduced a bill in Congress to give their company the necessary right-of-way, but the Northern Pacific concluded it wanted this trade for itself and it interposed such obstacles that Portland men dropped the undertaking. McCarver thoroughly re-examined the property on the upper Puyallup on the spring trip of 1875. The trip was made on horses and was very hard on the General, who had become more feeble, and when he went to bed on his return it was for the last time. He passed away April 17, 1875, at the age of 68 years, 3 months, and 3 days.

During the period in which McCarver was interested, many other prospectors must have been attracted to the area; perusal of the files of early newspapers reveals local items relating in very general terms to this or that person who had been searching for coal. Much of this was hearsay and not sufficiently accurate to include as history. However, a few specific items may be noted for the record.

The Puget Sound Express, published at Steilacoom, on May 1, 1873, reports: "Coal Mine on Puyallup.- We are informed that some time ago several gentlemen went on a prospecting tour through the Puyallup Valley and struck a rich ledge of coal, sample of which was brought to this city for inspection. The coal was taken up by the same parties, and they now propose at their earliest convenience or as soon as they have secured the needed capital, to sink shaft, etc., and vigorously prosecute the work of getting out coal."

The May 29, 1873 issue states: "Coal Mine.- The much-talked-of coal mine on the Puyallup River is in T. 19 N., R. 5E., in SE¼ Section 36,*/ said section being a school section in District 9. The veins of coal are 6 feet

*/ The location stated is apparently inaccurate or in error.

thick." On June 5, 1873, a statement: "Coal mine located by the Chapman Brothers and Frank Hawk is on the Puyallup River, Sec. 30, T. 19N., R. 6E.* A road to the mine was located on Tuesday and specimens of the coal brought here for inspection. Judges pronounce it the very best of its class. Specimens can be seen at this office. With backbone and capital, fortunes can be made from that mine."

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* This location is probably one along the lower reaches of the Carbon River in the productive Carbonado area.

JOHN FLETT AND SONS,
DAVID JAMES AND WILLIAM HARVEY, 1874

John Flett is one of the romantic pioneer figures connected with the history of Pierce County and the coal discoveries in the Puyallup River Coal Field. He was born near Winnipeg, Canada, August 5, 1815, was a member of the Red River group that left Manitoba under the leadership of James Sinclair on June 15, 1841 for the Puget Sound country to become colonists with the Hudson's Bay Company, and arrived at Nisqually on November 8, 1841. A recent book [20] describes the journey made under the charge of James Sinclair of the Hudson's Bay Company. The expected employment did not materialize; Flett went to Vancouver for iron to make plows and spent Christmas Day there, remained in Pierce County for a period, then left with his brothers in June 1842 to settle at Forest Grove, Oregon.

He appears to have successfully operated a farm until 1859 when he sold out, moved to South Prairie in Pierce County, and took up a homestead embracing land on which the town now stands. During his residence in Oregon, 1854-1858, he served as an interpreter in negotiations with the Indian tribes in Oregon and Washington under General Joel Palmer, Superintendent of Indian Affairs of Oregon. For several years he successfully conducted a stock ranch, and in addition began service at the Puyallup Indian Reservation in 1862. From 1862 to 1878 he was employed as a farmer and blacksmith and also served as interpreter at the reservation.*/** (Bonney, 1927; Evans, 1889).

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* W. P. Bonney, History of Pierce County, Washington. Pioneer Historical Pub. Co., Chicago, 1927. Vol. I, pages 31, 32-37.

** Elwood Evans. History of the Pacific Northwest: Oregon and Washington. Portland North Pacific History Co., 1889. Vol. 2, pages 326-328.

Flett was married to Charlotte Bird, born in 1817, before leaving Fort Garry; she died at Tualatin Plains, Oregon, on July 6, 1851, age 34. Seven children graced this union. In 1856 at Forest Grove, Oregon, he married Ellen Munroe; they were the parents of five children, all of whom, excepting Ellen, are reported to be deceased.

The children of the first marriage appear to have survived and to have joined the father in Washington Territory, but their exact history has not been obtainable. It is known that Elizabeth, an older daughter, born in Canada on April 5, 1841; married John Gale; David James was born June 22, 1848; and William Harvey, July 13, 1850, both in Oregon.

About 1876 John Flett purchased 320 acres of land near Lakeview, which became the site of his permanent home; he died at his home near Fort Steilacoom on December 13, 1892 at the age of 77 years.

In the newspaper articles written at the time of his death it is generally stated that his son was the first to discover coal at Carbonado and that Flett, Sr., made the first test of it in his blacksmith shop at Puyallup. A son brought the sample of coal down the valley on his shoulders, which son is not actually named, but presumably it was William Harvey, the younger of the two brothers. Mrs. Madeline Curry, daughter of John Gale, informed me in October 1958 that "Uncle Willie and John Gale (Madeline's father) found coal on the Carbon River, but they did open the mine." It would seem from the various accounts of the early years, that both David James and William Harvey Flett must have shared in the prospecting done for coal, and it would appear that the Fletts were familiar with the coal occurrences on Carbon River as well as those on South Prairie Creek and its tributary, Flett Creek.

The complete story of John Flett is too long to be told here except as a part of the legend about the coal finds. His story of the journey of the Red River colonists was originally printed in the Tacoma Ledger. For details of his life in Oregon and Washington, the various newspaper accounts written after his death give much information.*

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* Steilacoom - Dec. 13, 1892
Tacoma Ledger, Dec. 18, 1892
Washington Standard, Dec. 23, 1892
Spokesman Review, Dec. 26, 1892

JOHN P. GALE, 1874

The name John Gale is reported in the first accounts of mining near Wilkeson. He was associated with the Flett brothers in acquiring patent to coal land, in working the property, and in selling the coal at Tacoma. The principal information about him has been obtained from the writings of William F. Prosser,[21] who refers to him as John P. Gale. A photograph accompanying the biographical notice, page 94, also gives Gale's signature as John P. Gale.

John Gale was born in England, about 1829 or 1830, while his parents were on a visit from the United States to their native land. After returning to the United States the young man learned the trades of shipsmith and blacksmithing, which proved of great value to him in after years when he was thrown on his own resources. He left the east coast and arrived in San Francisco in November 1849 at the height of the gold fever, made his way to the north fork of the American River and was soon busy in placer mining. He is reported to have done well and to have laid up some capital. Then he went to Calaveras County, opened a shop on Mokelumne Hill, made miners' picks, shoes for mine mules, and had other odd jobs connected with blacksmithing. After an unfortunate experience with a dishonest partner, he returned to San Francisco as a journeyman until 1852, then resumed his trade at Portland, Oregon. At a later period he established a shop at Wapato Lake in Yamhill County. He was with General Palmer when the treaty was made with the Indians, afterwards worked as blacksmith in the valley of Grand Ronde, then located at Tillamook where he was engaged in farming and blacksmithing until 1859, when he appeared at Dominec Prairie, Pierce County. After three years, in 1862, he returned to Wapato Lake and remained until 1867, when he

made his appearance at what is now Tacoma, Washington Territory, and took a homestead which he improved.

In the 1870 directory of Tacoma, a J. Gale is listed as a blacksmith.[22]

Presumably Gale was successful in his ventures, for in 1874 he became associated with his brothers-in-law, David James and William Harvey Flett; and applied for 320 acres of coal land near the present site of Wilkeson, opened a mine in Section 34, T. 19 N., R. 6E. and trucked some of the coal via South Prairie to Tacoma. There is no doubt that his background of experience in smithing and in mining was valuable in this venture. An item in the Tacoma Weekly Pacific Tribune of January 1, 1875, reported that "Gale had been bringing down a quantity of coal from his mine in the Tacoma valley; that it had been tested by blacksmiths here and in Olympia, and pronounced equal to Cumberland coal; it sold on the railroad wharf at $21.00 per ton." The article added that "his lands adjoin those of Messrs. Ainsworth, Reed and Thomas, who organized the Puyallup Coal Company for the purpose of mining their coal and placing it on the market."

An attempt was made to learn (by search of records on file at the Commonwealth Title Insurance Company of Tacoma) what had become of the Gale-Flett property in Section 34, T. 19 N., R. 6E., after mine operations had been shut down. The record is incomplete and fragmentary but indicates that E. S. Smith had an agreement and understanding to pay $7,000 for the claims within 30 days after August 10, 1876, and receive a good and sufficient deed for the property; Apparently, this was not consummated. and a similar offer was made to Richard O. Rice and filed on September 11, 1876; This, too, was not executed.

A mortgage deed for 213-1/3 acres of the tract had been granted by John Gale to the Flett brothers in July 1875. This appears to have been satisfied in September 1876.

At some later date the Northern Pacific Railroad Company acquired title to this tract and to the land owned by Frank Clark, and leases were given to the Wilkeson Coal and Coke Company after it was organized.

Now for some interesting details about John Gale's affiliations with the Flett family: Prosser relates: "It is pleasing to record that the domestic life of Mr. Gale has been of happy character. During his Oregonian days he became acquainted with Miss Elizabeth Flett, an attractive Canadian lady, to whom he was happily wedded in 1856." They probably became acquainted in Oregon during the residence there of Gale and the Flett family. Elizabeth Flett was the daughter of John Flett and his first wife Charlotte Bird, born April 5, 1841 in Canada, about the time of the departure of the Red River colonist group. She was the older sister of David James and William Harvey Flett, later to be known as the Flett brothers who opened the first coal mine in Pierce County. She is ~~reported~~ said to have passed away at Steilacoom in 1872; According to the marker on her grave she died January 15, 1873.

John Gale died in April 1907, was buried in the family plot at Tacoma Cemetery, April 25, 1907, age 78 years, 3 months, 20 days.

The Gales had five children. According to Prosser they were: Georgia, the oldest daughter who died in her third year; Tillie or Celia, born in Oregon, 1859 (married to Henry Russell); George W., born 1862, in Washington Territory; Madeline,* born 1864 in Oregon; Guy C., born 1866 in Oregon.

* Mrs. Madeline Curry, and who was living in Bellingham in 1958, age 94.

T. A. BLAKE, 1875

W. A. Goodyear, mining engineer of San Francisco, in 1877 published a book dealing with the coal mines of California, Oregon, and Washington Territory in which several items of interest dealing with the coal reserves of Washington were reported. Theodore A. Blake, a friend and former partner of Goodyear, made examinations of Washington mines. In the spring and summer of 1868, Blake studied the mines near Seattle for private parties. Blake at some time was a mining engineer in the employ of the Black Diamond Coal Company, which operated coal mines near Mount Diablo, California, and was interested in learning something about future sources of supply for the San Francisco market. His report was written in April 1868; later in May, he again went to Washington Territory to extend his investigations. The Puyallup River occurrence was visited in April 1875 and a detailed report was prepared. It must be remembered that considerable activity was being shown in this area near Wilkeson and that the Gale Mine was being operated at this time.

A summary of the reference in Bancroft to the Puyallup coking coal is given on page 128 and is here reported, "But along the Puyallup River and its branches, in townships 18 and 19, north, range 6 east, Willamette Meridian, there is a considerable field of coking coal, some of which at least is of most excellent quality. This field was visited in April, 1875, by Mr. T. A. Blake, who, on his return, brought with him about a ton of the coal to San Francisco. This coal was tested for blacksmithing purposes and at the San Francisco Gas Works for gas. It proved to be a most excellent blacksmith coal, and Mr. Blake furnishes me with the following result of

the test at the Gas Works." Then follows a statement about the test, a description of the coal bed, an opinion on the commercial value of the coal field, and a comment that the Northern Pacific Railroad Company are courageously engaged in building a branch railroad to reach the coal.

W. S. SHEAFFER, 1876

The Northern Pacific Railroad in 1876 engaged Walter S. Sheaffer, Engineer of Mines, Pottsville, Pennsylvania, to make a geologic reconnaissance of the Puyallup River Coal Field to supplement and check prospecting work done locally by them. He spent the field season of 1876 examining some of the known prospects and openings uncovered along Gale Creek in Sections 27 and 34, Township 19 North, Range 6 East; visited Sections 2 and 3 in Township 18 North; went into Section 13, all east of the main Burnett-Wilkeson anticline. He also carried on some field work in the Carbon River basin in Section 4, Township 18 North, Range 6 East. His report, dated Pottsville, Pennsylvania, June 12, 1876, is addressed to the President and Directors of the Northern Pacific Railroad Company,[24] A map accompanied the report, but I have been unable to secure a copy. The railroad branch from Tacoma had not yet reached Wilkeson. Sheaffer included a brief reference to the Gale mine: "A five and three quarters feet bed, dipping 60° east, known as the Gale vein, and opened by a drift near the creek level. Top bench 2' of coal, slate 9", bony coal 3'. The Gale is an underlying bed of this series."

The report contains a great deal of detailed information together with recommendations and conclusions. On page 6 the following statement is made: "My own impression is that the coals can all be opened in Sections 34, 27, and 28 of Township 19, and that there is no immediate necessity to search as far east as Section 13 of Township 18. I think Section 34 of Township 19 is an important one the company should own in case they determine to fully open and develop this important, as it may prove, and interesting coal field."

Sheaffer's conclusions and recommendations undoubtedly played an important part in the decisions made to open and develop the Railroad mine in Section 27. In passing, it is interesting to note that parts of the area in the upper reaches of Gale Creek examined by Sheaffer were prospected in 1923 and 1924 by E. F. Lawson and M. C. Butler for the Pacific Coast Steel Co.

This organization, investigating the possibility of establishing an iron and steel plant, was looking for a tract of coking coal land. Lawson's general report was made to officers of the Pacific Coast Steel Company in November 1923; Butler's data covering the exploration and sampling of surface outcrops and openings and drilling, including a structure map, completed in 1924, were incorporated into a report to the Pacific Coke and Coal Company, which continued the investigation begun by the steel company officials. Specifically, the area included in this examination lies in Sections 2, 10, 11, 15, the west half of 14, the east half of 16, and the north half of 22, in Township 18 North, Range 6 East.

Plans were made for driving a long crosscut tunnel from a site near the railroad branch from Carbonado to Fairfax to tap the area prospected. Samples of coal were collected and later tested for washability and for coking properties. Results of this phase of the investigation and a summary description of the coal property and the beds are available in two publications.[25,26]

BENJAMIN FALLOWS, 1877

Benjamin Fallows was the engineer selected by the Northern Pacific Railroad to operate its first new mine in Section 27, Township 19 North, Range 6 East, near Wilkeson. He was born in England, educated there, had served his apprenticeship as a mining engineer, and had some experience in English mines. At the time of his appointment he was unmarried, about 32 years old, and had been in this country for ~~nine~~ 9 years, engaged in mining enterprises near Pittsburgh, Pennsylvania. His recommendations were very favorable for the position of mining engineer and colliery manager, and he was highly rated as a gentleman and a business man.

He was appointed to the position of Mining Engineer of the Northern Pacific Railroad Co. for ~~one~~ 1 year, his engagement to begin on May 1, 1877. General George Stark, Vice President, signed the letter of appointment, dated April 12, 1877, and in a second note / gave his instructions as follows:

> Your acceptance of the appointment of Mining Engineer of the N.P.R.R. Company having been placed on file in this office, I now have to request that you will start from Pittsburgh as soon as your convenience will allow, and proceed without unnecessary delay via San Francisco to Kalama or Tacoma in Washington Territory, and report yourself to General J. W. Sprague, the Representative and General Superintendent of this Company on that coast, who will have instructions to facilitate your further movements.
>
> After full consultation with General Sprague and such of his assistants as have been employed in exploring the coal lands of this company, you will proceed to locate yourself at the easterly terminus of the Puyallup Branch, now under construction, and devise a judicious plan for the development and working of the company's coal veins near such terminus and put the same in operation so as, if possible, to have coal in readiness to transport as soon as the Branch is ready for traffic.
>
> The working of the mines will be under your immediate control . . . . While it is intended that you will have full charge of, and be responsible for, the operation of the mines, it must be understood the General Superintendent of the Company on that coast will outrank you, and should be consulted on all matters of general importance, and such reports should be made to him as he may from time to time desire. Reports should be made to this office, also, at least monthly and you are always at liberty to correspond freely with these Headquarters."

General John W. Sprague, an officer of the Northern Pacific Railroad Company, had been appointed to the position of General Superintendent of Operations on the Pacific Coast in 1876. He had been brevetted major general in March 1864; on leaving the service he took charge of the Winona & St. Peter Railroad in Minnesota, and from there went to the Kaloma. Washington Territory headquarters of N.P.R. He was top man in authority there. Colonel Samuel A. Colonel Samuel A. Black had accepted the temporary position of Superintendent of the Northern Pacific Railway, Pacific Division in May 1872 (or 1873), with offices at Kaloma. Later he was transfered to Tacoma.

The Secretary of the Railroad reports that a Book of Reference, compiled by F. V. Smolley in (1883), p. 944, states that Black was appointed Superintendent of road business on the Pacific Coast on September 25, 1877.

unknown, but these alone would afford all the coal that could be mined for several years without going below water level or beyond the lands now owned by the company.

The results of many other explorations made under the direction of the officials are probably in the railroad files, but they were not made public and were not available to me during the course of my searches. All the evidence points to the fact that these investigations were favorable, and led to the decision to appoint Fallows to open the mine at Wilkeson. Sprague interested himself in many activities other than railroad affairs and played an important part in civic and other affairs in Tacoma. He appears to have been interested in Reverend George Whitworth's activities; one report indicates that Whitworth actually worked for him. It is certain that Whitworth and Sprague worked together in the matter of leasing the coal operations of the cooperative group at Wilkeson in 1880-1881.

N.Y. April 12, 1877

Benjamin Fallows, Esq.
Mining Engineer

Dear Sir:

Your acceptance of the appointment of Mining Engineer of the N.P.R.R. Company having been placed on file in this office, I now have to request that you will start from Pittsburgh as soon as your convenience will allow, and proceed without unnecessary delay via S.F. to Kalama or Tacoma, and report yourself to General J. W. Sprague, the Representative and General Superintendent of this Company on that coast . . . .

After full consultation with General Sprague and such of his assistants as have been employed in exploring the coal lands of this Company, you will proceed to locate yourself at the easterly terminus of the Puyallup Branch, now under construction, and devise a judicious plan for the development and working of the Company's coal veins . . . The working of the mines will be under your immediate control . . . It must be understood the General Superintendent of the Company on that coast will outrank you . . . Reports should be made to this office, also, at least monthly, and you are always at liberty to correspond freely with these headquarters.

Respectfully yours,
George Stark, Vice President

It is an interesting coincidence that a few days later Stark wrote Philip G. Eastwick that he had appointed Fallows. Eastwick's part in the history of Wilkeson will be indicated in a subsequent portion of this narrative.

N.Y. April 17, 1877

Philip G. Eastwick, Esq.
Seattle, W.T.

Your letter of Feb. 6 applying for appointment of Engineer to develop the coal mines of this Co. on the Puyallup, came duly to hand. It has laid among other applications under consideration until the past week, when a decision was made, appointing to the position Mr. Fallows of Pittsburgh, Pa., who will start for your coast about the first of March.

Respectfully yours,
George Stark
Vice President

New York
April 13, 1877
General J. W. Sprague
General Superintendent

Dear Sir:

Letter announces engagement of B. Fallows as Mining Engineer for the Pacific Coast.

References to his experiences, education, or letters of recommend.

George Stark

I do not know the date of Fallows' arrival at Wilkeson; the first available reports he made is dated June 20, 1877, from Wilkeson, Washington Territory, to Colonel Samuel A. Black, General Superintendent, Tacoma, and describes the work being done at Flett's Creek. Later, reports were made by Fallows directly to General George Stark, Vice President, 23 Fifth Avenue, New York City. A series of letters and reports covering a period to January 15, 1879, written by Fallows and Black, describing the progress of developments in the coal beds at Wilkeson, was made available to me in 1958 by Robert S. MacFarlane, president of the railroad company. The original reports, written in longhand, have been photostated and the set deposited in the Manuscript Library of the University of Seattle. From this material it is possible to reconstruct a detailed story of progress in developing the first important Wilkeson mine, then sometimes designated as Tacoma Colliery.

Fallows' reports as superintendent of the mine are very interesting in revealing the problems and the difficulties encountered in opening and working the bed of coal then known as the General Vein. The field is extremely complex in structure; irregularities in the bed, geologic faulting, interruption of continuity because of the presence of sand, gravel, and water all combined to make mine operation very trying and difficult in this

pioneering effort. Even in later years, as more knowledge became available, mining officials were plagued and frustrated in their attempts to win the coal from this area. To give some continuity to the picture, the Fallows' reports have been condensed and extracts are given without attempting too much detail.

It appears that the first prospect openings made along Gale Creek were on the eastern dip of the measures; these were later abandoned in favor of operations on the western dip of the structure in Section 27, Township 19 North, Range 6 East. No maps of the first operations have been available to me to give an exact record of the stages in the development; consequently an accurate presentation cannot be made.

Fallows' report of June 20, 1877, indicates that active mining operations were conducted in the so-called General vein or bed named after General Stark on the west dip; prospecting nearby disclosed the presence of other beds designated as the 7-ft. 6-in., the Gale vein, and an 8-ft. seam. The General bed on the advance work showed evidence of "throws" or faulting, also the existence of sand and gravel above the gangway instead of coal, indicating the presence of former water courses and of erosion. These unfavorable conditions led to consideration of developing the 8-ft. 4-in. seam as a source of coal for shipment; finally in November, instructions were issued to begin work on this bed, sometimes designated as No. 3 vein. The names "Stark" and "Black" had been suggested for the 8-ft. 6-in. and the 8-ft. 4-in. beds respectively, but this idea was not carried out. A sketch map dated October 30, 1877, shows the face of the gangway of the General at 602 feet from the portal.

An item of interest is a memorandum from Mr. Black, dated November 3, 1877; "We are within 3½ miles of Wilkeson with our track." On November 24,

1877, Fallows notes, "The track being up to the mines, we find the ready communication with Tacoma a luxury. I have not, however, been down since the middle of June."

In a report dated December 27, 1877, Fallows acknowledges dispatches ordering abandonment of the General gangway which had reached a distance of 873 feet but was still in bad coal and in gravel and water. He refers to the idea of sinking a slope 350 feet deep in the General vein near its mouth, then driving a gangway from which counter gangways and breasts could be opened to ~~supply~~ an adequate supply of this coal for market. In addition, by cutting a tunnel across the measures to the ~~8'-4"~~ 8-ft. 4-in. and the ~~8'-6"~~ 8-ft. 6-in. veins, coal could be mined simultaneously with the General. All the coal from the three veins could be hoisted from the General slope.

Apparently no decision was reached until later, but on March 7, 1878, Fallows gives considerable attention to alternate plans for securing coal from beds in sections 27 and 34, and states that surface preparations are being made for sinking the slope. He also points out that from the slope bottom a tunnel across the measures ~~of~~ about 200 yards in length driven will reach the 8-ft. vein, crossing the ~~8'-4"~~ 8-ft. 4-in., ~~8'-6"~~ 8-ft. 6-in., and Gale veins, giving certainty of a good dip on five workable seams. On June 1, 1878, the slope is reported to be driven 130 feet, at which point a fault was encountered, and another, totally distinct, vein appeared at the face. This vein had few characteristics of the General. The fault area was marked by ~~a high~~ discharge of water.

In his letter of June 21, 1878 Fallows mentions the discovery of two more seams of coal within easy reach of the slope by a cross tunnel, west of the General, and of excellent quality. A cross section of the Ainsworth shows a total thickness of ~~9'-8"~~ 9 ft. 8 in. of coal between slate walls, dipping west

7ft. 3in.

about 65°. The Wright is 7'-3" between walls and has the same dip as the Ainsworth. An attached sketch map shows the position of gangways on the General; the Ainsworth at 180 ft. east; the Wright, 370 ft. east; the Stark 170 ft. west; Black 200 ft. west, intersected by gangway from west; portal distance approximately 240 ft. west. A trestle extends from General vein gangway southwesterly to coal bunkers and railway.

In a letter of July 31, 1878, Fallows says that a report of progress every Saturday is sent to Colonel Black for transmission to General Stark. On July 27, the slope had been sunk 174 ft. through bad ground; the water in slope had increased in quantity. The gangway in the 8 ft. bed will tomorrow be in the vein proper. The coal at face looks well, although soft. On August 29 the report is that progress in slope is slow, requiring timbering every ~~five feet~~ ft. because of soft roof, etc. Again he notes the discovery of the two veins west of the General. Slope is down 223.3 ft. On October 1 the slope is down 260 ft. but the dip has been reversed; the total distance is estimated at 335 ft., which gives a depth of 300 ft. measured at an angle of 60°, probably the average dip of the measures south of this point. By October 23 the dip of the measures in the slope has changed to the west at about 80°. The rock is hard, compact, and in regular layers, indicating regularity in the coal vein on the same level; water does not increase and pumps handle it with perfect ease.

No more letters are available to give information about the completion of the slope, but data were obtained in 1941, when this slope, after being full of water for many years, was reopened.

The last letter in the series, a 21-page ~~affair~~ document dated January 15, 1879, refers to the great interval that had elapsed and to the difficulties

encountered by Fallows. Apparently things were not going well and there was little agreement or harmony between the mine officials and the superintendent at Tacoma. Fallows reports that after his last report the strata in the slope changed dip again to the east, and he lost all hopes of again seeing the General vein in the slope itself. As sinking progressed the strata were crossed so rapidly that he anticipated being near the Ainsworth vein by the time the slope reached its full depth, but did not expect encountering it in the slope. On January 12, 1879 the Ainsworth vein was bared at the foot of the slope and next day cut across, disclosing a splendid seam of coal over 8' thick.

In the last fifty-five feet of sinking, the slope was gradually contracted in width from 18'-9" to 12' to bring it to a single track. A considerable amount of work was necessary before mining could begin. The slope was again contracted in width below the level of the gangway for a carway 8' in depth. The vein was then opened and well timbered, leaving a clear opening the full width of the slope back through the coal and about 2½' into rock. There a turntable and tipple were placed in order to permit pit cars coming to the slope to be turned half around, run forward on the tipple and dumped into slope cars below. On the 31st [December?], at 7 a.m. after an all-night session, the gangways north and south were started under contract, the former at $7.00 and the latter at $6.00 per yard. A sump is planned for the north gangway. The south gangway is in 75', the north 65', the first 20' having the rock taken down on each side. Explosive gas is encountered. The slope has been partitioned into two compartments for ventilation and to save the expense of driving an airway through the rock and broken measures. The hoisting way on the north side is downcast; the

eastern compartment in which are placed the pump, steam pipes, etc., is the upcast. Now mining about 30 tons per day from the two gangways.

A large part of the letter is devoted to enumeration of difficulties in securing supplies, in differences with Colonel Black. The tone of the letter indicates dissatisfaction and intimates that Fallows was about ready to quit or be discharged.

A sketch, dated January 16, 1879, gives a cross section of the slope showing the Big Fault, the General vein, and the rock strata along the bottom of the slope before reaching the Ainsworth vein; also headstocks, hoisting car, and top and bottom of slope.

Benjamin Fallows appears to have left the employ of the Railroad in 1879 after the slope from the General to the Ainsworth bed was completed. His last report dated January 15, 1879, is a tearful recital of his difficulties, and it is apparent that he was ready to give up his job as superintendent. I have no exact record of his severance nor of the date the Tacoma Colliery was shut down, but the probable time is June 1879. Fallows was in the employ of the company on April 21, 1879, and not employed on August 1, 1879; severance took place between these dates.

An occasional reference to Fallows is to be found in local items of the newspapers of this period, but the only specific information was found in the Weekly Ledger, New Tacoma, May 14, 1880: "Mr. B. Fallows of Wilkeson is now employed in the engineering department of the Oregon Railway Co. Ltd. The Ledger wishes him well." In Rev. Whitworth's diary he reports meeting Fallows in Tacoma early in 1880. The 1887 Polk's Directory, p. 525, lists a B. Fallows as a resident of Tacoma.

The records indicate that a considerable amount of information had been obtained by him about the beds of coal lying above the General, on both the east and west dips of the Wilkeson anticlinal axis. The names Ainsworth and Wright had been applied to west-dip beds, and Black and Sprague had been suggested for easterly dipping seams, but/the only two former designations had received approval of the Railroad officials. The Ainsworth bed had been bared on December 12, 1878; on December 31, the gangways were started under contract, and by January 16, 1879, ventilation and loading arrangements were being carried out. Before the slope had been closed or abandoned, the gangway had been mined for a distance of 210 feet north and 730 feet south of the slope intersection. No figures of output are available. The Tacoma Herald issue of May 29, 1879, reports, "We understand that less than ten men are working at the mine and that two will be employed in pumping water."

It is interesting to read some of the newspaper comments at the time the mine was closed. The Tacoma Herald of Friday, February 21, 1879, contains an editorial entitled, "A Needed Change," in which the writer deplores Colonel S. A. Black as Superintendent of the Pacific Division: "His ideas of economy are narrowed down to such a minuteness that they resolve themselves into actual parsimonious pusillaniminity." On March 26, 1880, the comment is made, "from the date when the mine was inaugurated up to the present time, the company has been annoyed by reverses, losses, and vexatious delays. For some months past, the coal fields at Wilkeson have been practically abandoned, landslides and fallen timbers over the paths where were formerly hurrying feet and busy."

PHILIP G. EASTWICK, 1875

Philip G. Eastwick plays an important part in contributing information about the Puyallup River coal field at the time of its active exploration. On June 11, 1875, the Weekly Pacific Tribune of Tacoma, Vol. XV, No. 9, on its editorial page under the heading, "Our Coal Deposits," says: "We publish an article on the Puyallup Coal Fields from the pen of Philip G. Eastwick, a civil and mining engineer, who has lately made this field a subject of special examination and study. Mr. Eastwick has been for many years, intimately connected with the anthracite coal fields of Pennsylvania as a mining engineer and is therefore fully conversant with the subject upon which he treats."

In the same issue, on page 2, Eastwick's article is printed in full.[28] The article is too long to reproduce in its entirety but extracts of the salient points dealing with the Puyallup area are given here: "From the fact that a similar report had been given concerning the coals of our localities, which, upon examination, however, proved to be lignite, no great reliance had been placed in the rumors concerning superior values of the coal on the Puyallup River until July of last year, when a tract 320 acres, on a branch of South Prairie Creek, a tributary of the Puyallup River, was entered under the coal land law of March 1873." A bed was opened and a few tons of coal shipped to Tacoma, from whence it was distributed for trial. Superior value of the coal became manifest at once when it was subjected to a practical test.

"During the summer and fall of last year, this coal region was visited by a number of explorers who confirmed earlier reports and added many new

facts. The favorable reports induced many people to go to this region during the past winter and spring for the purpose of entering lands under the coal land law. Through diligent labor the outcrops of a number of beds have been found . . . and importance as a valuable coal field fully demonstrat[illegible].

This field, as far as explored, lies between and in a branch of the Puyallup River in the south, and South Prairie Creek on the north, an area of but 25 square miles. As explorations have been pushed to north, south, east, coal-bearing rocks have been found to outcrop . . . No limits to this coal field have thus far been reached. Structures of the principal folds of strata, basins, saddles, steep dips, faults, fractures and dislocations are described . . . The coal beds have been so numerous . . . the supply is ample to meet all needs of Pacific Coast for many years to come. In view of comparatively small amounts of funds and labor expended in explorations . . . it is reasonable to suppose that future search will reveal many more beds of coal at present unknown. Within the field are found non-coking lignite, a number of varieties and qualities of bituminous, and anthracite coal of good quality. Of the bituminous coking coals, a great variety have been found. But few analyses are available; only practical tests, have been made in blacksmith forges. Also, the beds will be found to contain those coals suitable for gas heating and for steam generating purposes, forges, and gas manufacture.

Eastwick then devotes some attention to other factors of exploration and working conditions, to extension of coal areas, and transportation routes to New Tacoma. He then ends his article on an optimistic note:

"That this coal field is at no distant day to be of immense value in developing new industries on the Pacific Coast, will be apparent to anyone who will take the trouble to investigate the subject. It but awaits the advance of energy and capital to develop it and inaugurate a thriving and prosperous coal mining industry."

A map showing streams, trails, positions of outcrops, dips and strikes of coal beds was made by Eastwick, but I have not been able to locate an original copy. A blueprint was found in the Seattle Public Library from which a photostat copy has been made for study (Eastwick, 1875). It is not as comprehensive as a printed report, but does give a general picture of the field as it was then known. The word "Gules" near the center of the east-west line between Sections 27 and 34, T. 19 N., R. 6 E., indicates a coal bed on Flett's Creek, which I have assumed to mark the location of the Gale Mine opening made in 1874.

Eastwick's original contribution to the Pacific Tribune was supplemented by manuscript material presented to the Bancroft Library of the University of California. A microfilm copy is available at the University of Washington Library.* The microfilm is titled, "Coal Mines on Puget Sound," by Phillip** G. Eastwick, Mining Engineer, Seattle, W.T., 1878. Philip G. Eastwick's statement. Time and Place - Eastwick's Office, W.T., June 5, 1878. Eastwick states: "Some additional information and data not included in the 1875 article in the Weekly Pacific Tribune is here given in outline. Coal was known to exist on Puyallup River by reports from

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* Microfilm No. 18. Micro copy of the original manuscript in the Bancroft Library, Berkeley, California.

** Phillip is apparently misspelled.

explorers many years ago, but no great weight was attached to this discovery until 1874, when the first claim was taken up by Gale and the Flett brothers. They drove in 50 or 60 feet in 1874, on what was subsequently called Flett's Creek, a branch of the Puyallup, 30 miles from Tacoma by the railroad now built. The exploration of the region has extended over about 30 square miles.

I went up the same year in November on behalf of the Northern Pacific Railroad Company and examined and described a region embracing about 25 square miles; researchers have not extended much beyond that since. A sketch of the results of my examination was published in the Weekly Pacific Tribune of June 11, 1875 . . . The country has been minutely prospected only in the immediate neighborhood of the Railroad Company's locations; and the fact has been established that there is a great deal of coal there, in a great number of veins, in short, a good coal field.

The Railroad Company operations have driven in from the prospects about 800 feet in one vein with a view to mining. That was done in 1877. The miners at that point came to a gravel fault. They then started sinking a slope for the purpose of getting below the fault at the mouth of the gangway that ran into the fault, and are at work on that still. In about a year's time they will have a capacity of 500 tons a day. The point opened and in process of development by the Railroad Company is one-half mile north of the Gale vein opened in 1874.

I have not been able to verify Eastwick's statement that he was sent in 1874 to the Puyallup field on behalf of the Northern Pacific Railroad. The Company officials have no record of such employment in their head

later

Further information about Eastwick was found and is here recorded. He came to Tacoma in 1874; the Weekly Pacific Tribune, March 17, 1874, says: Capt. P. G. Eastwick is in the Engineer's office drawing up the plat of Tacoma Upper Town.

The Seattle Post-Intelligencer of December 5, 1905 contains an obituary news item referring to the late Major Eastwake [Eastwick] as one of the first city engineers; it was he who established the first street grades and laid out the first streets in the city from Front Street back as far as Ninth Avenue, which at that time was but a cow trail through the forest. At that time what is now First Avenue was known as Front Street; it was on the shoreline of the bay, and in places the tide at times submerged a portion of the thoroughfare in the vicinity of Marion Street. First and Commercial Avenues were graded, and bulkheads established all along Front Street to protect it from the tides. He had come to Seattle in 1875, formed a partnership with Morris and Whitworth under the firm name of Eastwick, Morris and Company, civil engineers. Thereafter, he was made City Surveyor (1879).

He afterwards became connected with the U.S. Engineers as assistant engineer and worked on preliminary surveys for the Lake Union and Lake Washington canals, surveyed and laid out foundations of the Cascade Locks on the Columbia and other projects. ~~Mr. Eastwake~~ left Seattle a number of years ago to pursue his profession in various parts of the country and on foreign soil. His death in Panama from yellow fever was announced in a dispatch to the P.I. on February 4, 1905.

EDWARD SLADE (SKOOKUM) SMITH, 1878

Another colorful personage in the history of Tacoma and development of coal mining nearby was Edward Slade Smith, popularly known as "Skookum" Smith. He was a New Yorker, born February 28, 1827, who came to Washington Territory in 1870 and operated a small sawmill at Kalama for a short period, after which he went to Tacoma. It is reported that he was selected by General J. W. Sprague to assist in construction operations as manager of the interests of the Northern Pacific Railroad in the building of the line from Kalama to Tacoma in 1871. There had been difficulties with J. B. Montgomery, the contractor, and it appeared for a time, as construction neared Tacoma, that these difficulties would prevent completion of the road before the date of expiration of the charter. In the autumn of 1873, when Jay Cooke Co. failed and financial affairs were in bad shape, through the efforts of Capt. J. C. Ainsworth, Smith was given charge of the work of completion when approximately 16 miles yet remained to be finished. The contractor and his men were involved in disputes and labor controversies. Financial assistance to pay the crews was furnished by Capt. Ainsworth and others; with characteristic force and vigor Smith handled the rebellious group, induced the men to return to work, and succeeded in completing the line into Tacoma ~~twenty-four~~ 24 hours before the time of expiration of the charter. He is said to have driven the locomotive Minnetonka into Tacoma. The last spike was driven December 16, 1873, by General Mathew McCarver. The story of Skookum Smith has been drawn from a number of biographical and other sketches written by contemporary writers.

It is natural that Smith, in close contact with developments in the nearby Puyallup River area, should have become interested in the potentialities of coal mining. He is reported to have prospected for coal in

1874. Some time after the beginning of operations on the General Bed in Section 27 by the Railroad Company, Smith was reported to be driving a "tunnel" in his mine nearby; he was sending samples of the coal all over the country especially to San Francisco, and was instrumental in 1878 in organizing a company to operate coal land near Wilkeson known as the Tacoma Coal Co.

According to the records of the U.S. Bureau of Land Management, Smith entered coal lands in Section 34, NW ¼ SW ¼, T. 19N., R. 6 E., on January 21, 1878, and was given patent to the claims on December 16, 1879, but these claims do not appear to have been worked until later.

Smith apparently worked in close contact with some of the Northern Pacific Railroad officials on the Pacific Coast in connection with his coal-mining venture; there is a letter from him written from New York, April 8, 1878, to General Stark, dealing with coal exploration at Wilkeson. In letters written October 1, 1878; October 23, 1878; and January 15, 1879, Benjamin Fallows[50] refers to Smith's interest and activities in the Smith and Goodwin mine adjacent to the operations of the Railroad Company on the General Bed. From the information contained in Fallows' letters and reports, Smith was in New York City on matters relating to coal at Wilkeson and with the installation of loading trestles from his mine to the railroad siding. The matter of marketing of Wilkeson coal in San Francisco was also given attention. Ultimately, the Tacoma Coal and Coke Company was operating beds in Section 34 and shipping coal from Tacoma.

The first coke in Washington was made in pits at Wilkeson about 1880. Up to 1885 all the coke came from this installation; in 1885 two beehive ovens were built, and subsequently there was a marked increase in oven

construction and coke production in this area,[31,32] ~~36~~ Skookum Smith is given credit as being the individual responsible for the beginning of the coking industry of Pierce County. Smith died on his way to San Francisco on December 31, 1885, and did not live to see the full development of the mining and coking industry in Pierce County.

During 1942, in connection with a Plancor project for building a new battery of byproduct ovens and making coke at Tacoma, it became necessary to develop new supplies of coal from the Wilkeson area. Ultimately, two seams of coal, Beds 2 and 3, in Section 27, were developed from a slope driven in ~~interlying~~ beneath the two seams rock from the surface portal in Section ~~34~~, at elevation 860 ft. to a landing at the projected gangway level, 410 ~~f~~eet. The work began in 1940 and the opening was fittingly named the Skookum Slope in recognition of Edward Slade Smith, the man.

CAPT. JOHN C. AINSWORTH, 1873-1880

Capt. John C. Ainsworth, whose title came to him originally as a steamship captain, was an important person in the development and management of the Northern Pacific Railroad construction from the Columbia River at Kalama to its terminal at Tacoma. His early life was inseparably associated with marine pursuits.

Ainsworth was a leader in transportation enterprises in the Northwest; he was born in Iowa, June 6, 1822, engaged in steamboating on the Mississippi, then came to Milwaukie, Oregon, in 1850, shortly after the discovery of gold in California. He became associated with the Oregon Steam Navigation Company of Oregon as president until 1879, when all its belongings were sold to the Henry Villard Syndicate for five million dollars, and a new company, the Oregon Railroad and Navigation Company, was formed.

He was elected to the Board of Directors of the Northern Pacific Railroad on May 13, 1873, and served until September 29, 1875; he again was elected to the Board on September 26, 1887, and served until June 24, 1890. At the time of his appointment he was residing at Portland and was appointed Managing Director of the Railroad for the Pacific Coast, and in that capacity to have charge of the affairs and property west of the Rocky Mountains in the absence of the Vice President. In July 1873 he was one of a group of the directors named to manage the lands at Tacoma held by the Puget Sound Land Company; on May 23, 1879 he was Managing Director of the board of the Tacoma Land Co.

The town of Ainsworth in eastern Washington ~~near Spokane~~ was named for him in 1872 when he was President of the Oregon Steam Navigation Company.

The route of the railroad from St. Paul extended to the Pend Oreille River south to Cheney, Washington Territory, southwest to Ainsworth, where a ferry transported cars across the Snake River. It was proposed that the line would run south to Wallula, junction point with the Oregon Railroad and Navigation Company, whose rail line ran along the south bank of the Columbia to Portland. Villard's plan was to route the coastal line from Tacoma to the Columbia River at Kalama, there to use a ferry to cross the Columbia, and make a connection with O.R.R.N.C. south shore route to Wallula.

He was prominently identified with the construction of the line from the Columbia River to Puget Sound. When a party of officials consisting of General Cass, Secretary Samuel Wilkeson, Chief Engineer W. Milnor Roberts, and Directors Canfield, Billings, Wright, and Windon came to the Pacific Coast in October ~~1872~~ 1869 to select a terminus they cruised Puget Sound for a week on the steamer "North Pacific" as guests of Captain Ainsworth. They visited Olympia, Nisqually, Steilacoom, Tacoma, and Seattle, but they returned to the east without making a decision. Later the Company sent R. D. Rice, vice-president on the coast, and Ainsworth as commissioners to make further investigations and report their findings. They telegraphed President Cass, June 30, 1872, and on July 14, ~~(June 14),~~ and later ~~also~~ sent a message from Kalama to General McCarver at Tacoma and others, "We have located terminus on Commencement Bay."

News of the failure of Jay Cooke and Co., September 18, 1873, came to Captain Ainsworth saying that only $50,000 would be supplied to carry the line to tidewater. At that time the contract for building the line from Tenino to Tacoma was held by J. B. Montgomery. The workers threatened to strike, but Captain Ainsworth and other interested persons personally

guaranteed to meet the unpaid wages due them; they returned to work, and under Skookum Smith's drive completed the roadway before the contract date expired.

Ainsworth was also interested in the search and development of the coal deposits near Wilkeson. One of the Tacoma newspapers of January 1, 1876, contains a reference to the organization of a company, the Puyallup Coal Company, by Messrs. J. C. Ainsworth, S. G. Read, and H. B. Thompson, to develop land adjoining the Gale Mine. Apparently, the company did not go beyond the organization stage.

Newspaper reports in 1880 say that he was interested in iron ore lands near Scappoose, Oregon.

He is reported to have withdrawn from active railroad services in January 1880. After a successful career at Portland, he retired to Oakland, California, where he passed away December 30, 1893.

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W. H. RUFFNER, LL.D., 1877

An interesting sidelight on the Pierce County coal area is to be found in a book written in connection with an investigation sponsored by the Seattle, Lake Shore and Eastern Railway of the resources and potentialities of Washington. The writer, Dr. W. H. Ruffner of Lexington, Virginia, was graduated from Washington College, later studied at a theological seminary, was ordained January 14, 1852, and became a pastor. Subsequently he appears to have worked in the field of educational management; after 1887 he engaged in making extensive physical surveys for large companies. He spent five weeks in Washington Territory during October, November, and December 1877.

Dr. Ruffner does not identify his clients, but since his report was issued by the railroad it may be assumed that they were persons interested in the financial side of the organization. Conceivably they were eastern people, New York City folk, who were being approached to assist financially, or they may have been among the eastern sponsors of the project. It does not appear that any of the western promoters brought Dr. Ruffner to Washington Territory to make a report for them. On his trip to the Pacific Coast he spent five weeks and two days in Washington Territory; his book[33] describes the coal, iron ore, and other resources, particularly with reference to their use in potential iron and steel manufacturing establishments. The Wilkeson area is broadly reviewed, a map of the coal field and railroad to Wilkeson and Carbonado is shown, and he discusses the importance of the coking coals of this area. The book as a whole is an interesting general review of the Territory seen through the eyes of a southern gentleman.

~~REVEREND~~ GEORGE FREDERICK WHITWORTH, 1880

George Frederick Whitworth, pioneer clergyman, public servant, and good citizen of the State of Washington, took an active part in the development of coal resources of King and Pierce Counties. He wrote several articles, clear and informative, that were widely quoted; and more than as a passive observer he actively participated in the organization and direction of coal properties near Seattle in the Newcastle field and later played a part in the history of the Puyallup or Pierce County coal areas near Tacoma.

Most of the story of Whitworth's activities can be found in early newspaper accounts, in his own writings,[34,35] in personal diaries written from 1883 to 1907,[36] and in reminiscences and personal history written by members of his family and by his friends. A large amount of material is available dealing with the man and this has been examined in the preparation of this contribution to the coal-mining industry of the State.

A brief biographic summary is included here to give the reader who is not familiar with Whitworth as a pioneer citizen some idea of his personal history. He was born in Boston, England, March 15, 1816; came to America in 1828; graduated from Hanover College, Indiana, in 1838; later studied for the ministry; and in the spring of 1853 led a party to the Pacific Coast across the plains, planning to go to Steilacoom, Washington. He remained at Portland, Oregon, through 1853-1854 and reached Olympia in February 1854, then moved his family to Seattle in 1865 after he had organized the first Presbyterian Church in Washington Territory at Olympia.

Whitworth worked in many public capacities, such as Chief Clerk of Indian Affairs (1865), Deputy Collector of Customs for the Puget Sound District (1865), and Deputy District Surveyor (1868). He is reported to have politely declined an offer to serve as the president of the Territorial University in 1865, but later accepted the offer of the regents and became the third president, 1866 to June 1867. Later, from the spring of 1875 to Christmas 1876 he again served as president. In order to earn enough money to support his family he had to take on outside employment during the years that he occupied the pulpit and the administrative position at the University.

It appears that he sometimes worked as a surveyor, and it may be that this employment brought him in contact with coal mines and other engineering activities.

His daughter, Etta B. Whitworth White, in a memorandum dated Seattle, November, 1938, says "Mr. Whitworth was an authority on the coal and mineral resources in Western Washington. He discovered the New Castle coal, the Renton, South Prairie, and other coal beds. At various times he wrote articles on these deposits both for home and other purposes." It is not exactly correct to credit Whitworth with the discoveries reported, but he was intimately a factor in the promotion and operation of many of these enterprises.

Various references have been consulted to get a clear picture of these activities. In the following pages, an attempt will be made to give a reasonably accurate review of Reverend Whitworth's efforts during the years from 1863 on. There are some discrepancies that cannot be clarified, but in the main, the story is a fair presentation that can be accepted until other searchers can examine the records more closely.

King County Newcastle Field

The first definite information about Whitworth's interest in coal mines dates to 1862 or 1863. Clifford M. Drury, in the February 21, 1900 issue of the "Occident," a Presbyterian weekly published in San Francisco, states that Whitworth, "with others, opened up the New Castle mines in 1862 and the first mine developed in King County. He was a member of the syndicate which opened the South Prairie coal mine in 1884, and supervised the work during the first year, and still retains an interest."

Another reference, entitled "George Frederick Whitworth, Pioneer of the Pacific Northwest," an unpublished manuscript by Wayne Barnard, compiled from diaries, contains an extended story of Whitworth's many activities. Professor Alfred O. Gray, Head of the Department of Journalism at Whitworth College, prepared an abstract summary for me which I subsequently reviewed by a personal search through some of the original Whitworth diaries. The original Barnard manuscript, dated February 24, 1960, was part of a Project for the History of Christianity on the Pacific Coast. This material was helpful in following Whitworth's mining interests over a span of years. Whitworth himself contributed a great deal of information about mining developments, but he modestly refrains from personal reference to his contacts. In his diaries he avoids criticism and comments that involve other persons with whom he was associated.

From all the material consulted it is possible to arrive at a fairly complete story of his "extra-clergical" efforts to promote a substantial interest in the development of coal mining in Washington during Territorial and Statehood days. During the period when he first served as President of the University, when school was over for the summer vacation, he attended to matters of a coal company while preparing incorporation papers for another. Coal had been discovered on the banks of Black River in King

County in 1859; also on Issaquah Creek, vulgarly called Squak, near Sammamish Lake in 1862 or 1863; near Coal Creek at a place in Section 27, T. 24 N., R. 5 E., afterward known as New Castle or Newcastle. A group of citizens, Reverend Daniel Bagley, Reverend George F. Whitworth, Philip H. Lewis, John Ross and other pioneers, started a mine about 1865. Daniel Bagley seems to have been the responsible leader and supervisor of operations; Whitworth handled financial matters, introducing the coal into the market, and trying to secure outside capital for the project. In 1866 or 1867 the Lake Washington Coal Company, consisting of the men named above, was organized to develop the property on a larger scale. During these early years the coal had to be crudely moved to Lake Washington by wagon road, transported by small boats across the Lake to Leschi (then known as Fleaburg), thence to Seattle. It seems that the company was not prosperous in the way the projectors had hoped, and the coal field lay practically idle for some time.

The area was examined in the spring and summer of 1868 by T. A. Blake, mining engineer of San Francisco, for private persons who were interested in finding a source of coal for the San Francisco market, but Blake's recommendations were not carried out. Whitworth in 1868 was appointed Secretary of the Lake Washington Coal Company in which capacity he attended to legal matters, prepared a stock subscription book, and negotiated for the sale of the coal property. The company, it is reported, entered into an agreement to sell the property to Captain C. F. Winsor; at any rate in 1871 the Seattle Coal and Transportation Company was organized and made the first real attempts to mine coal for the market.[37]

BAILEY WILLIS, 1885

No history of the coal fields of Western Washington would be complete without reference to the work of Bailey Willis and George Otis Smith, geologists, of the United States Geological Survey. Practically all of the early exploration and development had been carried out by prospectors and miners, men without scientific training in geology. When Willis entered the field in 1885 and undertook his geologic studies near Wilkeson, the first real contribution to fundamental knowledge of the Pierce County coal field became available.

Raphael Pumpelly of the United States Geological Survey, head of the Division of Mining Geology, reports that in 1879 his division was detailed by Honorable Clarence King, the Director of the Geological Survey, as special agents of the Census Office. Pumpelly himself was designated Special Agent Tenth Census and placed in charge of studies and investigations that were to constitute a report on the mining industries of the country. In view of the significance of developments of mineral resources along the lines of the transcontinental railroads, special emphasis was to be given to this phase of the census. The Northern Transcontinental Survey was made by members of the United States Geological Survey 1882-1884.

BAILEY WILLIS

Bailey Willis, a young geologist, was first assigned to a study of iron ore resources as a special agent under Pumpelly. He was born in New York State, May 31, 1857, received degrees from Columbia University School of Mines in 1878 and 1879, and was appointed special expert on iron ores on the Tenth Census 1879-1881, then geologist of the Northern Transcontinental Survey on the explorations of the Northern Pacific 1881-1884, and

later geologist of the United States Geological Survey from 1884-1916. In 1915 he became professor of geology at Stanford University and continued his career as a distinguished geologist until his death on February 19, 1949.

Pumpelly ~~later~~ designated Willis to make geologic studies of the coal fields of Washington Territory. This was the beginning of a series of investigations made by competent geologists to compile accurate data about the resources of the northwestern part of the United States. Willis established himself in Washington Territory, organized field parties, and carried on his own field work in the area extending from Ashford on the south to Wilkeson and South Prairie on the north. A horse trail was cut through the heavy forest from Fairfax to Wilkeson, later designated the "Bailey Willis Trail." Surveys were made, test pits sunk on coal exposures, diamond drilling was carried out, coal samples collected, and geological studies made over the entire area. After completing study of the Wilkeson area he worked on the Fairfax-Ashford structure. The general surveys in the Pacific Northwest were published as various parts of the Tenth Census Report.[38]

Willis contributed portions dealing with the samples of iron ore collected over the United States; Pumpelly wrote "The Coals of the United States. Bituminous Coals and Lignites of the Northwest," pages 691-695; F. A. Gooch reported "Analyses of Coals and Lignites of the Northwest," pages 775-790. Pumpelly, in the introduction to this volume, gave many interesting facts: When the Northern Transcontinental Survey was organized in 1881, the question of good steam coal available to the Northern Pacific system of roads was of the first importance for the railroad and for the development of the mining and other industries of the Northwestern Territories . . . There is true bituminous coal on Puget Sound . . . Bailey

Willis in Washington Territory discovered and explored, under cover the extensions of these two fields (Wilkeson and Carbonado). Willis' test pits, sunk for Transcontinental Survey, exposed more than 700 cross sections of the seams in the Wilkeson coal field alone.

The Willis report of explorations[39] ~~was a part of the Tenth Annual Census Report.[39]~~ It gives a comprehensive geological picture of what was later called the Pierce County Coal Field. Also given are Columnar Sections from surveys made by Finley and Knight; a map of the Wilkeson Coal Field; maps and sections of the coal measures at Wilkeson; complete geologic section of the area from Ashford to South Prairie; and sections of the coal beds at Wilkeson, and ~~are given in addition to~~ analyses of the samples collected during the field investigation.

The second contribution by Willis was his report in 1897.[40]

After the opening of the Gale prospect in 1874 and the Northern Pacific Railroad mine operation in 1877 other properties had been opened, and it became possible to make underground studies of locations, extent, structure, and stratigraphy of the various beds into a more comprehensive structure map of the entire field. Plates in the publications deal particularly with the structure of the Wilkeson-Carbonado field, and have been the basis of later work delineating the complicated structure of the Pierce County Coal Field. George Otis Smith, 1899

George Otis Smith then comes into the picture[41] with further material dealing with Washington, and the Pierce County area. Smith gives a geological sketch map of a portion of Washington, columnar sections of the Puget Formation, geographic and geologic relations, descriptions of the coal, mine development and distribution, and reports production statistics

[39] see list of footnotes

[40] " " " " " "

from 1885. Smith was a native of Maine, born in 1871, first became associated with the U.S. Geological Survey in 1893, and was its director from 1907 to 1930. His field work extended over many parts of the United States, but his main significance in this history comes from his writings about the Pacific Northwest. He was another of the distinguished men who contributed much to the knowledge of mineral resources of Washington. He was joint author, with Willis, of the Tacoma Folio,[42] of the U.S. Geological Survey

In this folio an extended treatment of the Wilkeson-Carbonado-Fairfax area is assembled, together with topographic, geologic, and structure maps, as well as the economic factors dealing with the development of the mining operations. Both these two publications give a good picture of the advances made in knowledge of Pierce County mining as the industry was developing from prospects into operating properties.

E. EGGLESTON SMITH, 1871

The field work inaugurated by Willis and Smith was later continued by another geologist, E. Eggleston Smith, who wrote an official publication dealing with the coals themselves.[43] He spent the field seasons of 1909-1910 visiting all the known coal occurrences, measuring the beds, describing mining operations, and sampling the coal according to standard methods. All of these data were assembled in his report.

In subsequent years, geologic studies of the coal fields of Washington were continued by the Washington State Geologic Survey and a bulletin was published in 19 The United States Geological Survey also contributed several publications dealing with coal.

Coal Fields of Pierce County by Joseph Daniels, Wash. Geol Survey Bulletin 1915

[42] See List of References

T. B. COREY, 1893

Theron B. Corey, Superintendent of the Oregon Improvement Co., a mine operating official familiar with operations in Washington, read a paper in May 1893 before the Illinois Mining Institute.[44] Corey ~~had been~~ was superintendent of Western American Mine at Fairfax, 1895, ~~also~~ at Ashford under J. J. Moore; also at Franklin and Newcastle. He reports that At the northern end of the Pierce County field several branches of the Northern Pacific have been built to the mines at Carbonado, Wilkeson, South Prairie, Pittsburg, and Acme. At Wilkeson there are two mines opened on the opposite sides of the anticlinal fold. Much trouble has been met with in consequence, and one of the mines has been shut down. The other, a strong corporation, has pushed ahead and at present has large bodies of coal opened for the future. The Wilkeson coal is used as a standard by the United States Government in making comparisons of coal in this western country.

The Carbonado mine was the largest in the field, an operation that supplied coal for the use of the Southern Pacific Railroad, just as the Wilkeson mine furnished fuel for the Northern Pacific Railroad. Three other mines were in operation - South Prairie, Pittsburg, and Acme. Tonnage production for 1892 is reported as follows:

Carbonado	182,000
Wilkeson	91,000
South Prairie	40,000
Acme	3,000
	316,000

Corey He read a second paper ~~was read~~ before the Washington State Irrigation Convention at Seattle, January 1896.[45] Both papers contain references to Pierce County mines written from the standpoint of a superintending mine official and are ~~included~~ mentioned here for their importance. Mining was a new publication sponsored by the Northwest Mining Association of Spokane; L. K. [illegible] of this publication [illegible]

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Mining, the journal listed above, was a new publication sponsored by the Northwest Mining Association of Spokane. The first issue, No. 1, January 1896, contains references to Wilkeson, to Henry Landes who later was to be appointed State Geologist, and an article by C. C. Woodhouse, Jr., on the Coal Fields of Washington.

MINING DEVELOPMENT AND OPERATIONS AFTER 1874

The principal coal areas of Washington, their distribution and extent are shown in the accompanying map, Plate I, which was prepared originally to outline all the known districts extending from the Canadian border to the Columbia River boundary near Oregon. The portion identified as the Pierce County district is a segment or division of what is believed to be a continuous series of smaller areas of sedimentary rocks of Eocene age in which coal deposits exist. Many of these have been explored, some have been exploited, and a few attained the status of significant coal producers. The principal resources of Pierce County other than coal have been sand and gravel, building and construction stone such as sandstone and basalt, clays of many varieties used in the ceramic industry, peat, and some limestone. The Northern Pacific Railroad at one time operated a sandstone quarry at Wilkeson. Petroleum has been reported but only "wildcats" have materialized. Other natural advantages have led to the construction and operation of metallurgical establishments such as copper and lead smelters, ferro alloys, and aluminum, and chemical industries based on adequate water supplies, low-cost electric power, and transportation facilities for raw materials and for shipment of finished products.

The coal districts within Pierce County are deliniated on Plate I according to rank of coal. Many publications of the State and Federal Governments are available that give more details of extent and structure. Two general reports may be found useful as a background aid to the reader.[52,53]

Figure 1. Principal Coal Areas of Washington, Showing Rank of Coal According to American Society for Testing Materials Classification.

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To understand the difficulties and the problems encountered in the first mining operations at Wilkeson it may be desirable to give a brief review of the geology and structure of the Pierce County coal area. The early prospectors and miners had practically no geologic data on which to base their searches for coal. Heavy timber growth, and glacial deposits of sands and gravels masked the deposits, outcrops occurred only along stream beds where erosion had cut away the banks and exposed the coal. Trenching was necessary to reveal thickness, strike, and dip, to measure sections of the beds, and to secure samples of the coal. But this was not sufficient; underground development later revealed the fact that the veins were irregular in ~~section~~ thickness and in composition, the beds were broken, and lacked regularity and continuity, recorded streams had eroded portions of the coal and left barren areas of clay, sand, and gravel in place of the coal-bearing ~~regular~~ formation. Conditions were very different from these in other parts of the country and the world from which the miners came. One can understand the perplexities and complications that faced Benjamin Fallows in 1877 and thereafter. The major over-all structure was unknown until Bailey Willis of the Northern Transcontinental Survey came to the area and in 1880 to 1884 carried on field studies, dug test pits, and sunk drill holes that gave the first scientific information about the field.

It was not until after many years of exploration and mining operations had been completed that sufficient information was available to permit correlations, structural patterns of the beds, and major fault systems to be identified.

The intense folding had changed the rank of the coal to high-volatile A bituminous and low-volatile bituminous, some of which were coking varieties;

in a few isolated locations semi-anthracitic coals, probably due to subsequent local metamorphism, are known to exist.

The dynamic forces that accompanied the uplift gave rise to complicated anticlines and synclines together with normal and reverse faults. The major structures of the Carbonado formation contained the important coal seams; on its east and west flanks, beds of sandstone, the Wilkeson and the Burnett formations, contain beds of coal that were explored and worked at Spiketon (Pittsburg), South Willis, and near Fairfax, but these were not of much importance. On the west flank the Wilkeson and Burnett formations are not prominent and the beds, at low dips, disappear under Pleistocene gravels. It was not until many years of exploration and mining operations yielded the information that enabled correlation, structural patterns of the beds, and major fault patterns to be identified.

The complex structure of the beds in the area between South Prairie, Wilkeson, and Carbonado showing the synclinal basins and anticlinal saddles, the major faults, and the traces of the main mine workings may be studied in Plate XI of Bulletin No. 10, Washington State Geological Survey, September, 1913, also in Tacoma Folio, U.S. Geological Survey.

The main area of the Puget Formation in the Wilkeson-Carbonado-Fairfax districts is approximately 12 miles north to south; its maximum width is approximately 6 miles west to east near Carbonado and Fairfax. To the south an extension exists from the Puyallup River to Ashford in the valley of the Nisqually River, but because of complexities, prospecting has been limited to a small area north of Ashford where a small tonnage of coking coal has been produced.

TABLE 1 - Coal production, Pierce County, Washington, 1884-1962

Year	Net tons	Year	Net tons
1884	267,884	1925	403,654
1886	199,252	1926	407,499
1887	229,785	1927	342,210
1888	276,956	1928	284,288
1889	273,618	1929	299,565
1890	285,886	1930	264,534
1891	271,053	1931	182,039
1892	364,294	1932	156,251
1893	408,074	1933	174,346
1894	406,631	1934	139,542
1895	437,029	1935	135,437
1896	419,568	1936	134,087
1897	458,394	1937	55,032
1898	509,142	1938	37,171
1899	506,385	1939	39,213
1900	577,127	1940	38,586
1901	585,984	1941	20,226
1902	383,603	1942	27,159
1903	572,800	1943	30,918
1904	531,589	1944	48,952
1905	479,912	1945	16,300
1906	513,639	1946	14,369
1907	572,169	1947	19,468
1908	551,678	1948	18,191
1909	609,467	1949	8,537
1910	786,096	1950	6,489
1911	783,196	1951	6,725
1912	788,293	1952	3,410
1913	856,425	1953	1,788
1914	556,519	1954	2,081°
1915	497,633	1955	1,602
1916	528,581	1956	1,623°
1917	608,767	1957	1,371°
1918	600,471	1958	1,121°
1919	355,104	1959	885°
1920	413,579	1960	395°
1921	102,517	1961	472°
1922	303,659	1962	
1923	360,220		
1924	387,574		
		Total	21,949,089

Figures from U.S. Geological Survey, Mineral Resources of the United States, 1884-1923; U.S. Bureau of Mines, Mineral Resources of the United States, 1924-1931; Minerals Yearbook 1932-1955; °Annual Reports of Coal Mines, State of Washington.

COAL PRODUCTION, 1884-1962

A summary of coal production of the county is given in Table 1 . This has been compiled as the most representative picture of the annual figures reported by various agencies; it is not entirely accurate but it shows the trends in production over the years.

Accurate figures for production during the earlier years are not available because no agencies existed for collecting this information; some tonnage estimates are given by the first territorial mine inspectors; reports made to the U.S. Geological Survey for use in its Mineral Resources volumes began in 1884 and continued until 1923 but these only give the figures sent in by some of the operators. The U.S. Bureau of Mines assumed the compilation of mineral statistics in 1924 in Mineral Resources and from 1932 to the present in its Minerals Year Book. The State Inspector of Coal Mines, in his annual reports, gives statistics of production reported to him, but these also are not strictly accurate, and frequently do not agree with figures sent in to Federal agencies. Consequently, the data in Table 1 represents the best general estimate that can be made from the data collected over the years from 1884 to 1962. The estimated total production figure is approximately 22 million tons.

COAL PREPARATION

The coal beds of the Wilkeson district are made up of bands or layers of coal, bone, and shale; they usually lie at steep angles and cannot be mined by selective methods. The high ash content of run-of-mine coal makes it necessary to clean or wash the coal before it goes to a competitive market. The early washeries were comparatively simple: the run-of-mine was screened at the tipple, loose pieces of rock picked by hand, after which rock and refuse were separated in so-called "tub washers" usually of the Howe type. In a few cases, jig-type separations were employed, and one installation of a shaker table of Wilfley design was installed to clean the fine sizes. Coal preparation began at an early date in the state and practically every type of coal-separation apparatus has been used. There are no recorded attempts at washing coal until about 1887; a Scaife washer was in operation that year at the Tacoma Coal Co. at Wilkeson. In 1888 it was reported that P. C. Forrester had devised the machine that is now known as the Forrester jig. Between 1890 and 1900 most of the washers installed in the state were Forrester machines.

In another portion of this history it is reported that special attention had been given about 1912 to the coal resources, their beneficiation, and utilization, by the introduction of classes and laboratory work at the College of Mines. Efforts were made to utilize the ore-dressing facilities but it was soon evident that different equipment and techniques were needed. When the Northwest Experiment Station of the U.S. Bureau of Mines was established on the University of Washington campus in 1916 fellowships were made available and men assigned to study the problems; in addition, a new coal-washing laboratory was later built and completed with equipment of new and up-to-date types.

E. R. McMillan was one of the first men awarded a coal fellowship; later Byron M. Bird, a graduate of the University joined the staff of the Bureau of Mines as assistant mining engineer. They began a comprehensive study of representative types of coal beds, nature of the components of the beds, specific gravity studies of the components, processes and equipment for making washery tests. A review of the program at Seattle was presented in Nov. 1920 as U.S. Bureau of Mines Rept. of Investigation 2184 by McMillan; Bird and Messmore reviewed the float-and-sink test for fine coal in Rept. Investigation 2586; float-and-sink testing of coarse coal, McMillan and Bird, Rept. Investigation 2570, Feb. 1924. A comprehensive report of the investigation made by McMillan and Bird was published on Nov. 1, 1924.

Coal Washing Problems of the Pacific Northwest, by Earl R. McMillan and Byron M. Bird. Univ. of Wash. Eng. Expt. Station Series, Bull. No. 28, Nov. 1, 1924.

During the following years McMillan, Bird, Messmore and others continued their investigations and studies and presented many papers dealing with the coal-washing table. Dr. H. F. Yancey was appointed head of Northwest Experiment Station in 1925; under his leadership and direction field and laboratory studies in coals continued and expanded. Dr. Yancey was succeeded in 1961 by M. R. Geer who has been an active member of the staff since he came to the University, completed his work for the degrees of Master of Science and Engineer of Mines and appointment to the Bureau in 1935. He has played an important part in developing the cyclone washer and dense-medium processes in coal beneficiation.

For a complete list of references to the publications of the coal beneficiation and other papers, the reader should consult "Cooperative Publications of the Northwest Experiment Station, U.S. Bureau of Mines, and the School of Mineral Engineering, University of Washington." From establishment of Station in 1916 to ~~1963~~ (Mimeographed).

Since Pierce County coals have been of such significance and importance in connection with their present and future utilization, this list is a valuable source of references to the work done at the local station. With the increased attention given to lowering the ash content of the cokes, the weathering properties, agglutinating values of coals, physical and chemical characteristics, recovery of byproducts, and related questions, the scope of investigations extended over a number of years, and much valuable data became available to the ~~investigators~~. New combinations of equipment and processes were tried in various plants and decided improvements were made. Attention was also given to firing and combustion problems. In more recent years the possibilities of using some of the coal for production of petrochemicals and related products has resulted in additional interest in beneficiation and utilization.

Under the structural conditions existing in the Wilkeson, Carbonado, and Fairfax districts no single or fixed system was possible. The early miners came from the eastern part of the United States or from European countries and it was difficult for them in many cases to adapt themselves to the conditions in Pierce County. No attempt will be made here to discuss mining operations in detail; they will be found, however, in bulletins of the State Geologic Survey, in publications of the United States Bureau of Mines, and in mining journals. Attention must be drawn to the work of Simon H. Ash, born in the Roslyn field of a mining family, who attended Lehigh University for a period, then completed his technical studies at the College of Mines, University of Washington in 1924 and 1929. During his active career he worked as a surveyor, draftsman, mine superintendent, as deputy State Mine Inspector from 1913 to 1919, and as mining engineer with the United States Bureau of Mines. In all these engagements he became an authority on coal mining methods, safety practices, on production and economics. He was retired in 1956 with the title of Chief of Safety Division.

Some of his contributions that deal with Pierce County are included in the following references:

Analyses of Washington Coals, U.S. Bureau of Mines Tech. Paper 491, 1931. The Coal Fields of Washington. Methods of Mining and Preparation of Coal, with H. F. Yancey.

Tech. Paper 618, supplement to Tech. Paper 491, 1941.

Bull. 572 Supplement to Tech. Papers 491, and 618, 1958.

Coal Age, Vol. 9, Nov. 18, 1916. Working a Steep Coal Seam by the Longwall Method.

MINING METHODS IN THE PIERCE COUNTY FIELD

The systems of mining employed in mining flat seams of coal in the eastern fields of the United States were applicable only in limited areas in Washington; the nearest approach to the steeply pitching seams of Washington was that of the anthracite fields of Pennsylvania where folds and high dips made it necessary to adopt modifications of the room-and-pillar method of driving rooms or chambers of varying widths leaving pillars of solid coal between for support until later times when the pillars would be mined "on the retreat." No selection or separation of interlying waste rock could be made and the total thickness of the bed had to be sent to the surface plants or washeries for separation of waste from the commercial coal that could be shipped after screening to meet the demanded market sizes. Hand cutting or mining, strong timbering, and skilled miners were required, with the result that high operating costs were involved, particularly in Pierce County, a handicap that faced these properties through all the years. Were it not for the superior adaptability of the products, the industry might not have been able to satisfy the demands of the competitive market. Labor problems also aggravated the situation.

High dips, faults, and variations in the component members of the beds have limited extraction largely to conventional room-and-pillar mining carried on by hand-mining methods; some longwall mining has been employed on a limited scale. The use of mechanical methods, coal cutters, conveyors, and accessory machinery, was practically impossible, with the result that mining costs have been high.

THE COKING INDUSTRY 1884 - 1937

Coking coals are known to exist in several areas of Washington, but the Wilkeson-Carbonado-Fairfax district has the distinction of being practically the only important source among the Pacific Coast states.

Production of coke in Washington began at Wilkeson by the Tacoma Coal and Coke Company. At first the coke was made in primitive pits four feet high which later were replaced by beehive ovens. Production records are available for this company beginning with 1884; the first ~~two~~ 2 beehive ovens were built in 1885, more were afterwards added to the plant. The Wilkeson Coal and Coke Company began production in 1891 with fifty 50 ovens in operations. Other plants were later built at South Willis, Carbonado, Montezuma, and Fairfax in Pierce County. Beehive coke has also been produced in the past at ovens in Skagit and in King Counties, but Pierce County has been the principal producer during all the years. The product was used for metallurgical purposes in the manufacture of pig iron, in foundries, steel plants, and in copper and lead smelters.

At one time there were 407 beehive ovens in Pierce County: Wilkeson 160, Carbonado 71, Crocker 66, Fairfax 60, Montezuma 25, South Willis 25. Production records from 1884 to 1931 are given in Table 2. The market decline has been due to the high mining costs and to competition with imported foreign coke, development of electric furnaces in the ferrous industries, the application of reverberatory furnace smelting in copper metallurgy, and the sintering of fine ores in lead smelting.

The beginning of the coking industry of Washington is told in a publication of the University of Washington.[56] and the production of beehive and by-product coke during the years 1884 to 1937 is shown in Table 2, on page [illegible]

56 See List of footnotes

Many phases of the development have been published in reports, bulletins, and technical publications of the U.S. Geological Survey and of the Bureau of Mines. In connection with studies and coking tests from 1900 to 1937 a review was published[57] that gives a story of the progress made to that time.

In 1940 a study was undertaken to determine the potentialities of employing Curran-Knowles sole-flue ovens to coke Washington coals for the growing needs of industry brought about war conditions. An extended series of tests made under operating conditions in ovens at Michel, British Columbia, the results of which are presented in another publication[58].

In 1914 the Seattle Gas Co. installed a battery of byproduct ovens of the Klönne type primarily for the manufacture of gas: the resulting coke was sold for domestic use and during 1917 and 1918 it came into demand for metallurgical and other purposes. Much of the coke made was used in the production of water gas at the plant, some was sold for domestic use, and during the war years some was sold for foundry and smelter coke. Coal from Wilkeson and Carbonado was the principal source of raw material for this plant, which ceased production of illuminating gas in 1937.

TABLE 2 - Production of beehive and byproduct coke in Washington, net tons[1]

Year	Beehive	Byproduct	Total
1884	400	.....	400
1885	311	.....	311
1886	825	.....	825
1887	14,625	.....	14,625
1888	0	.....	0
1889	3,841	.....	3,841
1890	5,837	.....	5,837
1891	6,000	.....	6,000
1892	7,177	.....	7,177
1893	6,731	.....	6,731
1894	5,245	.....	5,245
1895	15,129	.....	15,129
1896	25,949	.....	25,949
1897	26,189	.....	26,189
1898	30,197	.....	30,197
1899	30,372	.....	30,372
1900	33,387	.....	33,387
1901	49,197	.....	49,197
1902	40,305	.....	40,305
1903	45,623	.....	45,623
1904	45,432	.....	45,432
1905	53,137	.....	53,137
1906	45,642	.....	45,642
1907	52,028	.....	52,028
1908	38,889	.....	38,889
1909	42,981	.....	42,981
1910	59,337	.....	59,337
1911	40,180	.....	40,180
1912	49,260	.....	49,260
1913	76,221	.....	76,221
1914	78,171	2/ 6,752	84,923
1915	3/88,695	2/30,182	118,877
1916	4/98,644	27,228	125,872
1917	4/96,412	26,346	122,758
1918	93,659	30,129	123,788
1919	35,999	26,547	62,546
1920	33,111	26,284	59,395
1921	3,495	23,765	27,260
1922	26,063	5,611	31,674
1923	37,987	31,081	69,068
1924	31,712	39,903	71,615

TABLE 2 - Production of beehive and byproduct coke in Washington, net tons - Continued

Year	Beehive	Byproduct	Total
1925	38,500	40,757	79,257
1926	24,702	42,584	67,286
1927	30,701	40,570	71,271
1928	18,747	40,755	59,502
1929	25,844	40,879	66,723
1930	12,252	36,221	48,473
1931	582	30,104	30,686
1932	736	32,610	33,346
1933	379	31,817	32,196
1934	1,694	27,199	28,893
1935	2,475	28,744	31,219
1936	312	28,368	28,680
1937	0	14,993	14,993
Total	1,631,319	709,429	2,340,748
1944 5/		53,484	

1/ Figures from Geological Survey, Mineral Resources of the United States, 1884 to 1923; Bureau of Mines, Mineral Resources of the United States, 1924 to 1931; Bureau of Mines, Minerals Yearbook, 1932 to ~~1938.~~ 1944.

2/ Figures from Seattle Gas Co.

3/ Figure from Annual Report of Coal Mines, Department of Labor and Industries, Olympia, Washington, 1917.

4/ Estimated.

5/ Made in 1943-1944 from Washington and Utah coals in sole-flue ovens at Tacoma.

WILKESON PRODUCTS COMPANY

Beehive coke production in Washington virtually ceased in 1927, but the revival of industrial activity that came about in 1939 as a result of the war breaking out in Europe led to an awakening of interest in Pierce County coals. Attention was drawn to the possibility of using Curran-Knowles sole-flue ovens instead of the more conventional, vertical slot-types represented by Koppers and other installations. Methods of cleaning the coal to improve ash content were studied, and the possibilities of mixing low-ash coal from sources outside of Wilkeson were examined. Another suggestion was made that petroleum carbon or Dubbs Still residues might be employed to bring the ash content down to lower levels. Preliminary box tests were made during the summer of 1940 in Curran-Knowles ovens at West Frankfort and Millstad, Illinois; and later, July 1942, full-scale oven tests were made at the ovens of the Crows'Nest Pass Coal Company, Ltd. at Michel, British Columbia. The resulting cokes were shipped to Seattle for detailed tests; ultimately a detailed report was published .[59] As a result of all the studies, plans were made for developing a new mine operation and washery at Wilkeson and for building a small battery of Curran-Knowles ovens at Tacoma. The sponsoring groups, The Wilkeson Co., Northwestern Improvement Co., Continental Coal Co., formed the Wilkeson Products Co., a corporation to mine coal and produce coke and byproducts.

The original application to finance the operation was made on January 13, 1942 to the Reconstruction Finance Corporation of Washington, D.C. by Corydon Wagner of Tacoma, President. This was modified on February 4, 1942. The request was approved, and contracts signed under the designation Plancor

602 for a battery of 17 ovens, and Plancor 603 for the mine, on February 13. Public announcement was made February 27, 1942.

A new mine, to develop No. 1, No. 2, and No. 3 Beds in Section 27, T. 19 N., R. 6 E., from a rock slope, was started on April 4, 1942. The opening was named Skookum Slope in honor of E. A. Smith. This part of the project was near the site of the original mine opened by the Northern Pacific Railroad in 1877 and the "Chinaman Slope." Production of coal began May 6, 1943; operations continued until November 22, 1944 when the mine was closed.

Construction of the Curran-Knowles installation was begun April 20, 1942, operations began May 28, 1943, production ceased in December 1944 after the supplies of raw materials on hand had been consumed. Detailed figures of the operations are not available, but a general approximate summary, made by Mr. Corydon Wagner, follows: Tonnage of washed coal recovered at Wilkeson 53,864 tons; coal coked at Tacoma to November 24, 1944, total 76,972 tons made up of 51,507 tons of Wilkeson and 25,465 tons of others. Coke production 53,484 and breeze 1973 tons. The byproducts amounted to 352,536 million cubic feet of gas, and 790,580 gallons of tar. The coke was sold for industrial and domestic use, and for heating at housing projects.

Efforts made to lease the coking plant were not successful. The War Assetts Administration on November 4, 1946 offered to sell; bids to be opened March 24, 1947 brought no response, and ultimately the plant and equipment were sold to a foreign purchaser.

MINES IN THE AREA BETWEEN SOUTH PRAIRIE AND ASHFORD

In the pages that follow, the names of most of the coal mine operations in Pierce County are listed in geographical order from the Burnett and Spiketon properties on the north to Ashford on the south. Summaries are presented to permit the reader to trace the developments. The detailed information about these mines will be found in many publications available to the investigator; only a sketchy review is presented here.

BURNETT MINES

The presence of coal along South Prairie Creek east of the town of South Prairie was known at an early date, but no development took place until 1880. In that year the South Prairie Coal Company was organized, a water-level drift was opened from the creek in Section 16, T.19N.,R.6E., by Charles Herbert Burnett. Burnett was superintendent and also served as president of the company after its formation. The operation of the property was designated as Burnett Mines, and the townsite was named Burnett.

Charles H. Burnett was born at Providence, Rhode Island, came to Port Gamble with his parents in 1857, then to Seattle in 1863, engaged in the general merchandising business, later became interested in the coal mining industry. At one time he was superintendent of the Newcastle Mine, and later of the Renton Mine in which he had an interest. In 1904 he disposed of all his mining interests. He died January 9, 1916 at the age of sixty-eight. It is conceivable that he and Rev. Whitworth may have found similar interests at Newcastle, Renton, and South Prairie that brought them together.

It appears that Reverend G. F. Whitworth had something to do with the development and operation of the property. Besides being minister to a new church at Renton, records indicate that in 1882 he was serving in some capacity at the mine, issuing payrolls and keeping accounts, and in 1883 he was arranging with the owners to sell their interests for $100,000. I have not been able to verify all this information, except to note that he must have become interested in the property after the failure of the Mines Cooperative Group at Wilkeson in 1881.

Whitworth turned his attention to coal land on South Prairie Creek, later to be known as the Burnett Mine. It was reported that the property name was South Prairie Coal Co.; it was not incorporated but was under the direction of the Washington Coal Co. which, it will be recalled, was one of the early promoters of the New Castle mine. The interested parties were George F. Whitworth, A. M. Simpson of San Francisco, T. B. Morris, and a Mr. Burnett, who had been a foreman or supervisor at Newcastle and also had mined at Renton. A Contract had been made with Northern Pacific Railroad for a spur of the railroad 1100 feet long to the mine opening. The branch, later known as the Spiketon branch, was completed to Burnett in 1882, and later to Spiketon. In April and May 1882 coal was mined and some of it sent to San Francisco. On August 4, 1882 it was reported that work had begun on the railroad branch, that track would be ready in ~~six~~ 6 weeks and freight rates were to be the same as those for Carbon Hill Co. On November 10 an article appeared in the Tacoma Weekly Ledger about construction work at the mine, and in December it was stated that important shipments were being made to Tacoma and to San Francisco. No details are available about the organization of the South Prairie Coal ~~Company~~, but C. H. Burnett was in charge early in 1883 and Reverend Whitworth was intimately associated in the venture. In fact, one of the newspapers suggested that the correct name of the mine at South Prairie should be "Whitworth" in recognition of his efforts.

The water-level operation was followed about 1890 to 1892 by slopes sunk to veins on the east dip and by developing gangways to the southwest from section 16 into section 21. Rock tunnels also gave access to the west dip of these beds revealing a picture of the structure of the north end

of the anticlinal fold and the flanks of the Carbonado formation. Under Burnett's management the property prospered. The beds did not coke as heavily as did those farther south, but ~~the coal~~ it was excellent for domestic and industrial uses and especially valuable for gas-making. The first production figures were recorded for 1885. State Coal Mine Inspector Report indicates that a total production of 139,782 tons was made during 1885 to 1887. In September 1906 control of the company was transferred to the Pacific Coast Coal Company which extended its mining operations into the ~~Southwest quarter of Section~~ SW¼ of Sec. 22, and into Sec. 27, T.19N.,R.6E. William E. Maltby ~~was~~ superintendent ~~for many years~~. The Pacific Coast Coal Company closed the mine at the end of 1927.

In view of the proximity of coal mining at the eastern limits of South Prairie Creek in ~~Sections~~ Secs. 15 and 22, T.19N.,R.6E., an account of the mines ~~in~~ at Spiketon and at South Willis will be here reported. The South Willis operations were served by a railroad branch from Wilkeson. These two areas lie at the eastern ~~end of~~ side of the area underlain by the Eocene Puget Formation near the contact with ~~Post Eocene~~ younger andesites. The coal beds ~~are identified with~~ as lying the Wilkeson Formation.

SPIKETON (PITTSBURG) AND SOUTH WILLIS MINES

A minor part of the production of Pierce County coal has come from mines along the eastern boundary of the Puget Series from the Burnett formation which extends from South Prairie Creek on the north to the Carbon River on the south.

The names Spiketon and Pittsburg were given to the mines of the northern area. The townsite on the south side of South Prairie Creek was officially known as Spiketon. The name Spiketon was changed to Morristown by act of the State Legislature and approved by Governor Ernest Lister on March 12, 1917, as a tribute to Hon. Abe Morris, representative from the Wilkeson district. He was a member of a family long identified with the mining industry of Pierce County, and several generations of the Morris family have occupied positions of skill and responsibility at South Willis, Gale Creek, Wilkeson, and Carbonado, as well as operating mines in King County. Jonah Morris was manager of South Willis Coal Co. in 1914. A few mines at Spiketon (Pittsburg) and at South Willis were active for a few years; one property southeast of Fairfax in the Burnett formation was of no significance. The beds at Spiketon attracted attention about 1890, those at South Willis in 1909; the prospects in many cases were of short life, and except for promotion purposes of little importance. Many of the properties passed through different ownerships and were given different names during the period from 1890 to 1918, consequently it is difficult to trace the exact sequence of these operations. Annual Reports of the State Coal Mine Inspectors give some data that are of help; also the Mineral Resources volumes of the U.S. Geologic Survey and the U.S. Bureau of Mines should be consulted.

The information is summarized below.

Mines or Company Names and Years of Production

Spiketon (Pittsburg)

Washington Improvement Co.----------1890, 1891

Acme Coal Co.----------1892-1894

Oimette Mine----------1893-1896

Willis Coal Co.----------1903

Luzon Coal Co.----------1903

Black Carbon Coal Co.*----------1914-1927

Coast Coal Co.----------1907-1911

American Coal Co.----------1912-1913

South Willis

Gale Creek Co.----------1907, 1908

Commonwealth Coal Co.----------1909-1910

South Willis Coal Co.----------1912, 1913, 1916, 1917

The Washington Improvement Co. of Spokane began operations at Spiketon in NE 1/4 Section 15, T.19N.,R.6E., November 8, 1891, although a small production was reported for 1890. The property was leased to Reed, Williams and Co., but this group did little and the mine was reported idle in 1892 and 1893. In 1890 and 1891 the total production is given as 1000 tons. A railroad spur from Burnett had been extended to permit coal shipments.

The Acme Coal Co. in the SE 1/4 section 15 came into the picture in 1892 and produced to 1894, when the water-level drift was closed; the new

* Old Luzon Mine, 1903

Oimette Mine lying between Acme and Burnett in Section 22, beginning in September 1893, shipped a small amount during 1893 to 1896. The Oimette Mine was opened in 1903 under the name of Luzon Coal Co. of Spokane, and again in 1908 by the Black Carbon Coal Co. The president of the Black Carbon Coal Co. in 1908 was F. C. Robertson of Spokane. F. N. McCandless of Tacoma was president of the Coast Coal Co. and W. D. C. Spike, treasurer. In 1911, W. D. C. Spike was president of Coast Coal Company.

American Coal Co. in 1912 succeeded Coast Coal Co. W. V. Reinhart, Seattle, president, D. R. Swem, manager, S. H. Ash, engineer.

The Willis Coal Co. mined 4800 tons at Spiketon in 1900.

The Coast Coal Co. acquired the original Spiketon mines and shipped from 1907 to 1911; then the American Coal Co. operated from 1912 to 1913. During these years there was considerable activity at the property from development of gangways from the Lady Wellington and the Pittsburg slopes.

The southward extensions of some of the beds at Spiketon in the ~~East~~ 1/2 of Section 22 were opened about 1902 as the South Willis Mines. A railroad branch was constructed from Wilkeson into this area. The Gale Creek Co. worked the beds but no separate record of the production was kept. In 1909 the Commonwealth Coal Co. acquired the properties, which were later transferred to the American Coal Co. operating at Spiketon. The South Willis Coal Co., President, Abe Morris, reports production beginning in 1912 to 1917 under leases from the American Coal Co. from workings mainly on the Winsor bed. Small igneous dikes or sills of andesite had been encountered intersecting some of the beds mined at South Willis, but they were of no significance except to locally alter the coal near the contacts.

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In 1917 South Willis abandoned Wellington mine but opened three new seams on south side of South Prairie Creek.

The Snell Mine was organized by the Pacific Coal and Oil Wells Company about 1904 in NW 1/4 Section 26, T.19N.,R.6E. southeast of the South Willis operations. Access was by way of Wilkeson. Operations began about 1904; it produced 2400 tons of coal in 1905, a small tonnage in 1906 and 1907, and finally closed in 1907. The organizers were F. N. McCandless of Tacoma, president, and W. D. C. Spike, treasurer, who in 1911 became president.

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GALE CREEK MINES

The Gale Creek Mines are located in the ~~east half of~~ E½ Section 28, T.19N.,R.6E., on the west side of the Burnett-Wilkeson anticline. The first openings were drifts; later slopes were sunk from the surface on the westerly dipping beds, and gangways extended from them to the southeast on beds No. 1, 2, and 3; the latter, designated as the Queen or Queen No. 3, ultimately reached the ~~northwest corner of~~ NE. Cor. Section 34. The townsite of Hope, now a part of Wilkeson, was plotted by A. J. Hill, a settler, and his wife Margaret in July 1888. Hill had acquired title to land on July 29, 1886.

An opening, known as the Hill and Driver prospect, was being explored by Hill and Arthur Driver, who, according to local information, had been granted a homestead patent dated April 27, 1894, for the ~~east half of the northeast quarter of~~ E½ NE¼ Section 28, T.19N.,R.6E. Arthur Driver was the brother of George Driver who was later to play an important part in local mining operations at Gale Creek and at Wilkeson. The prospecting was done before 1897 or 1898.

The Miners' Coal and Coke Co. was incorporated May 14, and recorded on May 20, 1897, by Arthur Driver, A. J. Hill, C. F. Owen, and John P. Judson. John P. Judson was an attorney of Tacoma; C. F. Owen, one of the group, later was appointed to the position of State Inspector of Coal Mines, December 10, 1898, and served to December 31, 1904. His annual reports are very comprehensive. The organization was a cooperative venture that produced a small tonnage of coal in 1897, 1898, and 1899. George Driver is named as superintendent of the mine in 1898.

In 1900 the Gale Creek Coal Co. was incorporated. The articles were signed on March 28, 1900 by Frank H. Knight and F. A. Huffer; the latter's

name appears as a trustee of the Miners' Coal and Coke Co. Production was reported in 1900 and continuously thereafter for many years. George Driver was an active officer and also served as mining superintendent. The name Gale Creek Co. was applied to later groups, and it is not possible to clearly differentiate each. In 1901 it was reported that Gale Creek Coal Co. and Willis Coal Co. were opening new mines in the district; in 1904 the Gale Creek group acquired coal land at South Willis, and part of its reported production of 42,000 tons for 1904 included coal from South Willis.

Randolph F. Radenbaugh was a prominent citizen of Tacoma who had arrived there in 1880; owner of the Tacoma Ledger, became interested in the coal areas in the eastern part of Pierce County. He sold his interest in the newspaper in 1890, retired from journalism in 1892, and spent ~~sixteen~~ 16 years in real estate and other activities.[60] It is reported that in 1893 he was interested in the development of mines at Gale Creek (Gale Creek Coal Mining Co.). He returned to journalism in June 1908 as publisher and editor-in-chief of the Tacoma Daily Tribune.

Operations after 1904 were conducted by other organizations as successors to the original groups. Names and dates are given as follows:

Tremont Coal and Coke Co.	1905-1906
Gale Creek Coal and Coke Co.	1907-1909
West Tacoma Coal Mines Co.	1910-1911
Gale Creek Coal Mines Co.	1912-1918

These many changes in title and management are not clear except that they may have represented speculative ventures into a promising coal field. It has not been possible to secure names of officers or officials of all these organizations; a few listings are given.

Gale Creek. C. H. Haswell, manager, J. B. Winsor, superintendent, 1905-1906.

Tremont Coal Co. Otto D. Swain, manager and general superintendent.

Gale Creek Mining Co. E. J. Hughes, superintendent.

Gale Creek Coal Co. Henry Hewitt, Jr. (1910-1911).

West Tacoma Coal Mines. J. J. Hewitt, president, J. T. Lee,

he men who

These properties collectively known as the "Gale Creek Mines" ceased aser in the operations in November 1918, but production by lessors continued for losed. several years.

Melmont and

just west

of Wilkeson, was opened in 1907 and produced a small tonnage in 1907 and 1908. The property was owned 1905-1906 by the Brier Hill Coal and Coke Co.

The Hi Davis, another small operation, was started in 1909 to supply fuel for the town water and light supply. C. W. Weatheray of Portland, president, and R. T. Smith of Wilkeson were the promoters.

~~Production in the field ceased in November 1918 when the Gale Creek Coal Mines were abandoned.~~

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TACOMA COAL CO. AND TACOMA COAL AND COKE CO., 1878-1879

Edward Slade Smith (Skookum Smith) continued his activities in railroad construction along the line of the branch from Tacoma to the Puyallup Coal Field, and interested himself in looking for coal in the vicinity of the new mine near Wilkeson. He obtained a coal permit from the government for 320 acres of coal land in ~~Southwest~~ NE SW 1/4 ~~of~~ Sec~~tion~~ 34, entered January 21, 1878 and patented December 16, 1879, but before that time he was engaged in explorations in ~~Section~~ 27. In 1878 he was in New York City in negotiations with officials of the Railroad; he was also in touch with citizens of San Francisco and of Portland in relation to the development of mining properties. When the original mine on the General bed was closed and the No. 2 Wilkeson Mine on the Ainsworth bed was opened some time in 1879 he appears to have worked at this location. He is reported to have become interested in the coal beds on the east dip of the Wilkeson anticline before 1878 and to have taken leases in Section 27.

On May ~~10~~, 1878 there were rumors of a new arrangement to be made in mining operations at the Railroad mine, sometimes called Tacoma Colliery. "Little doubt now that a new company will begin operations on the Gale claim owned by E. S. Smith, Judge Rice, and others, and perhaps working on the railroad mines payment by royalty." Newspaper items in July 1878 indicate that he organized the Tacoma Coal Co. and assumed control of opening the "Gail claim veins" by a tunnel begun sometime earlier. Smith informed the journalists, July 26, that work was progressing satisfactorily and as rapidly as possible, that the tunnel had been cut some 60 feet and work kept up day and night. Some hard rock made progress difficult, but soon

the tunnel will lie through the bed of coal which will be easier cutting, the length will be 300 feet, but mining will be begun before that distance is reached. On November 8, 1878, reference is made to coal being shipped from Tacoma from the mine opened by Smith and Co.; later in November,"a sample lot of five tons of coal will be shipped to San Francisco," and on January 31, 1879 it was reported as having been shipped on the Steamship Shirley. Comment is made that the shipment came from the Smith and Goodwin mine and would have been prevented had the Railroad had its way.

The Tacoma Coal Co. ~~was~~ appears to have been organized by Smith about 1879 or 1880. The name Smith and Goodwin was reported during the earlier period in 1878, but it is not clear whether it referred to the work on the west dip Ainsworth bed or to the east dip operation. The Smith bed and the Goodwin bed were named among the active operations. The name of the company was changed to Tacoma Coal and Coke Company after coke manufacture was begun. Smith's partners in the promotions are not definitely known, but Judge R. D. Rice is mentioned, also W. H. Fife, a successful businessman of Tacoma who became associated in the enterprise as vice-president. Andrew C. Smith, younger brother of Skookum, assumed the presidency, after the latter's death in 1886. George O. Kelly was secretary.

The extent of the leases and the holdings at the time of organization could not be learned; in later years property maps indicate some 320 acres in ~~Section~~ 34, T.19N.,R.6E., namely, $E\frac{1}{2}$ $NW\frac{1}{4}$; $W\frac{1}{2}$ $NE\frac{1}{4}$; $SE\frac{1}{4}$ $NE\frac{1}{4}$; $NW\frac{1}{4}$ $SE\frac{1}{4}$; $E\frac{1}{2}$ $SE\frac{1}{4}$. This block was later transferred to the Railroad which in turn transferred the leases to the Wilkeson interests, giving this organization access to both east and west flanks of the anticlinal structures south of ~~Section~~ 27. The beds on the property dipping easterly are designated Smith,

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Goodwin, and Gale on some early maps; the first mine operation was on the Smith, now known as No. 3 East. The Kelly vein, worked in this area, is also designated No. 3 East. The mine gangways and workings were later extended southeasterly into ~~Sections~~ 34 and into ~~Section~~ 3, T.18N.,R.6E. Two beds of coal, No. 4 and No. 5, lying farther east, were opened much later (1909?) by drifts in the SE¼ ~~of Section~~ 27 at elevation 875 feet.

The production of the Tacoma Co. mines began about 1878, but no records were published before 1885, the reported ~~tonnage~~ figures are:

1885	5,042
1886	2,833
1887	2,134
1888	0
1889	8,081
1890	23,181
1891	30,848

All refer to east dip operations and include Tacoma Coal and Coke Co. to 1889 and the Wilkeson output for later years.

To Smith, and his associates, goes the credit for producing the first coke made in the state, in 1880, ~~made in~~ pits ~~four~~ feet high enclosed on ends and sides with stone walls. The earliest reported production, 400 tons, was ~~recorded for~~ 1884; this coke was used in local foundries and at Portland. Two beehive ovens were built during 1885, ~~ten~~ were operated in 1886, the original plant of thirty ovens was abandoned in 1898.[61] Specimens of the coke were on display at the International Exposition in San Francisco, 1887. After the death of Skookum Smith in 1886 no pit coke was made; subsequent production of beehive coke came from the new installation of the Wilkeson Co. erected in 1898 adjacent to the old battery.

WILKESON DEVELOPMENTS AFTER 1880

The story of mining development in ~~Section~~ 27 after the Tacoma Colliery of the Northern Pacific Railroad had ceased operations on the General bed is obscured by lack of dependable data and reports. The most accurate picture is given in the summary that follows.

After the mine was closed in 1879 a new entry or gangway was ~~driven~~ in the Ainsworth bed in the southwest quarter of the section, near Gale Creek at elevation 849 ~~and~~ advanced southerly. It is likely that the Wright bed was also opened by a gangway. Presumably the Railroad Company drove the earliest openings, but other operators took over. Skookum Smith, Smith and Goodwin, the Miner's Cooperative Group, George Driver, The Oregon Improvement Company, W. D. Tyler and Associates, and the Wilkeson Coal and Coke Company are the names that appear in available records as developing west dip beds.

On the easterly dipping beds Skookum Smith and some of his associates acquired leases and began operations on the Smith bed. Sometimes this operation was designated as Smith and Goodwin Co. but the name Tacoma Coal Co. appears about 1878 or 1879. Shipping began ~~and coke was made in pits~~ shortly after 1880. The name Tacoma Coal and Coke Co. was given later.

The inference is that Skookum Smith had some agreement with the railroad for coal leases in 1878, and with associates proceeded with plans to open mines. Some time about 1879 he took over the Ainsworth gangway of the No. 2 Wilkeson Mine. Information about this opening is available from two maps, dated 1889 and 1890, prepared by W. J. Wood for the Land Department of the Northern Pacific Railroad, and some light is thrown on other work done in ~~Section~~ 27 in the period prior to the dates of the maps.

Vulcan mine Ainsworth coal gangway

The Miner's Cooperative Group worked the mine for a short period, to 1880-1881, George Driver is reported to have a lease but the mine was idle until the Oregon Improvement Co. began work about 1883 under the superintendency of Evan Lewis. The Vulcan Mine appears to be the name given to this operation which continued until ~~1885.~~ 1883

W. D. Tyler and his associates in 1887 acquired a lease and carried on some mining, but their efforts were handicapped by gravel beds and by faulting. Finally, as will be described later, the Wilkeson Coal and Coke Co. acquired leases in 1888 and afterwards.

The Wright vein or No. 3 Tunnel was also opened in this period near the Ainsworth at elevation 850 feet.

The Wood maps throw some light on the operations in ~~Section~~ 27. The 1890 map[62] gives a cross section of the Wilkeson measures; on the west dip at creek level intrusive rock is shown; above this are five beds, General, Ainsworth, Wright, then two thin beds. A tunnel is indicated on the General at upper elevation, and a gangway, on the Ainsworth and on the Wright at lower elevations near the creek level. On the east dip three thick and two thin beds are indicated.

In plan view, gangways or drifts from the SW ¼ Sec. 27 and SE ¼ Sec. 28, designated General Vein, Ainsworth Vein, Wright Vein, Fireclay, and South Prairie beds, strike east of south into Section 34, extending into ~~Sections~~ 3 and 9, but actual working distances are not indicated. All dips are west.

No workings are shown on the east dip, but strike and dip symbols are shown along "Fleet" Creek in ~~Sections~~ 27 and 34 indicating southeast strike and northeast dips.

This map also shows strikes and dips at Carbonado in Sec. 4 T.18N.,R.5E.

The 1889 map[63] is much more detailed and comprehensive. It also gives an elevation or cross section of a bluff at mouth of tunnels looking from the south and records the thickness of the beds on both dips. A plan view shows Wilkeson and the railroad tracks, coal bunker, and coke ovens east of the bunker. In addition it shows the transportation arrangements from the Wright and Ainsworth tunnels, and from the old General to the bins; also the trackage to the bunkers from the Smith vein on the east dip of the Tacoma Coal Co.

Boundary lines are shown in ~~Sections~~ cc 27 and 34. A profile view shows the Ainsworth gangway from the tunnel entrance at Gale Creek, elevation 850 feet, across ~~Sections~~ cc 27, 34, 3, and 10, a total distance of 2200 feet.

Measured sections of the Wright, Ainsworth, General, and Smith veins are also given on this map. Altogether, a fair picture of the development in ~~Section~~ cc 27 can be drawn from the data given.

Another of Wood's maps[64] became available for study.[64] This map gives a sectional view of veins to show connections in June 1879 from the General to the Ainsworth beds by a rock drift or slope, which maps the work carried out by Fallows in 1879.

The most interesting information shown on this map is a long profile or section beginning at the tunnel entrance or portal of the Ainsworth gangway, elevation 850 feet above sea level, extending southerly for a distance of approximately one mile. Some desired information is lacking, but the main facts about ~~its~~ progress of the tunnels are noted below:

From the ~~entrance~~ portal the coal was worked by the pillar-and-breast system for a distance of approximately 1500 feet, of which 1350 feet was shown as of May 1888 and 1400 feet on February 1889. The first 400 feet

are designated as part of the mine opened by the Northern Pacific Railroad and by Lewis and Company to May 1888; then by the Oregon and Improvement Company to February 1889; thence by Tyler, Matterson, (Masterson?) Bowman, and Driver to July 1890, and afterwards by Wilkeson Coal and Coke Co. At a distance of 4362 feet, the date November 20, 1891 is given; the distance at the end of the map is 5262 feet from the portal.

These maps and notations are helpful in understanding the work done prior to the operations of the Wilkeson Coal and Coke Co. but they do not permit an accurate chronology of events or locations of the areas mined by the successive lessors. Perhaps, some day, the Northern Pacific Railway Co. will permit its files of leasing and mining operations during the years 1880 to 1890 to be studied in detail to clarify much of the information now available from inadequate sources.

~~The writer has chosen to pass over this period of Pierce County history to concentrate on the more important history of the beginnings and growth of the Wilkeson Coal and Coke Co. and the Tacoma Coal and Coke Co.~~

THE WILKESON COAL AND COKE CO. 18[illegible]

Two significant and important events in the history of Pierce County took place in the late eighties, namely, the beginning of the St. Paul & Tacoma Lumber Co. and the Wilkeson Coal and Coke Co. by a group of men headed by Col. Chauncey W. Griggs of St. Paul, Minnesota, and by Henry Hewitt, Jr., of Menasha, Wisconsin, a man who had wide financial interests in many enterprises.

From the narratives of Peter C. Forrester, who went to Tacoma in March, 1888, it is possible to review the beginning of this development.

In 1887 Col. Griggs had gone to the Pacific Coast to look over the timber resources and had been impressed by their magnitude and importance. Hewitt had also arrived in January, 1888 and, like Griggs, was also impressed. The two men were brought together and promptly organized the St. Paul and Tacoma Lumber Co., purchased 80,000 acres of timber land owned by the Northern Pacific Railroad and started what was to become one of the largest logging and milling operations in the Pacific Northwest. Joining them were A. G. Foster, George Browne, Charles H. Jones, and Percy D. Norton. The organization meeting of the first stockholders was held on June 4, 1888, and elected Chauncey W. Griggs, president, A. G. Foster, vice president, Henry Hewitt, Jr., treasurer, George Browne, Secretary, and Charles H. Jones, Percy D. Norton, and Herbert S. Griggs, the first trustees. Operations were begun at a small mill located on the tideflats at Tacoma. An interesting account will be found in an article in the American Lumbermen of May 21, 1921, Whole No. 2401, under the title "A Story of the Development of One of America's Greatest Lumber Manufacturing Institutions."

Organization of the Wilkeson Coal and Coke Co. came as a result of Hewitt's interest in the St. Paul Company. As already narrated, Peter Forrester came to Tacoma at the end of March 1888 to join forces with the Hewitt group; Hugh A. White and Milo Kelly began negotiations with Driver and his associates and reached an agreement with them on April 23 for acquisition of a part of their coal lease from the Northern Pacific Railroad. This lease, signed May 1, 1887, gave mining rights to George Driver, W. D. Tyler, Charles Masterson, and Theodore Hosmer to coal land in ~~Section~~ 27 that had previously been leased to others. Tyler was manager of the Tacoma Hotel; Masterson was president of the Pacific National Bank which he had organized on January 2, 1886, after his arrival in Tacoma. Theodore Hosmer, businessman, was manager of the Tacoma Land Co.; ~~who~~ he apparently had succeeded Bowman, one of the early members of the group. George Driver was the practical coal expert; he had worked for Bailey Willis on explorations in Pierce County with the Transcontinental Survey field party, was reported to have had field experience with Union Pacific Railroad Surveys, and had already been superintendent for some of the coal mines in the Gale Creek area. No work had been done in the Northern Pacific lease during 1886, but the mine was reported to be active in March 1887 by the State Coal Mine Inspector.

The agreement between the two groups for part of the Driver lease was substantially as follows: "Parties of the first part are owners of a certain lease of land, dated May 1, 1887, for a term of twenty years from said date for mining and taking coal and timber from Sec. 3, T.18N., R.6E., Sec. 27, and all that part of Sec. 28 lying south of right-of-way of the Cascade Branch of the Northern Pacific Railroad, and Sec. 34 all in T.19N., R.6E., in Pierce County. The parties are desirous of selling and

transferring to the parties of the second part a half-interest in said lease, and the parties of the second part are desirous of purchasing the same, consideration to be $25,000. Upon completion of the said sale and purchase a corporation is to be organized to continue for twenty years, capital to be $100,000 made up of 1000 shares; the directors for the first six months to be the original holders." This agreement was signed by the four first parties and by White and Kelly for the new owners; it was the first step in the formation of what later became the Wilkeson Coal and Coke Co. The mine operation appears to have been directed by Driver, but production was delayed by "troubles" — gravel channels and by faulting such as had plagued Fallows — and it was not until 1891 that normal operations were being carried out.

The name Wilkeson Coal and Coke Company did not formally come into being until many years after the creation of the original company in 1888 to last for twenty years. Many steps had to be taken to legalize the various changes in corporate structure made necessary by changes in the membership of the directors or trustees; increases in capitalization; extensions of life of the corporation; adjustment of old and new leases. The lease dated May 1, 1887, between the Northern Pacific Railroad and Driver and his associates was cancelled and superseded by a lease dated September 1, 1901 between the railroad and Wilkeson Coal and Coke Co. This latter lease, as amended, is still in force.* These matters were satisfactorily cleared up on August 19, 1895 when the Driver-Tyler group made complete assignment of their leases and agreements, and the way cleared for the new operating organization to get under way. The first

* All of these matters are set forth in the original minute books now filed in the manuscript collection at the University of Washington Library.

corporation expired on April 30, 1908; new articles to take the place of the old were passed in 1909 extending the life for ~~fifty~~ 50 years and enlarging the rights of the new corporation.

The name Wilkeson Coal and Coke Co. was legally shortened to The Wilkeson Co. on September 22, 1937. To simplify matters, subsequent references to this organization will be designated The Wilkeson Co.

Expansion of the mining operations appears to have begun after 1891; the principal mine entry or gangway, according to Wood's maps, had reached a length of nearly a mile from the portal in 1891 or early 1892. The company had acquired a 99-year lease of lands containing the east and west dipping beds including the areas formerly worked by the Tacoma Coal and Coke Co. and it was now possible to develop mine openings across the strike on the flanks of the anticlinal structures.

The names of the directors and officers over the years is a roster of leading citizens. Beginning with Col. Chauncey W. Griggs in 1887 members of the Griggs family have been active in the lumber and coal operations together with the Hewitt family and associates who came from Menasha after 1888. In 1898 Leonard Howarth of Santa Rosa, California, who had been employed by Henry Hewitt, joined the official family and took an important part in corporate affairs of the lumber and the coal companies.

Hugh A. White, an uncle of Peter Forrester, who had come to Tacoma with Henry Hewitt, Jr., was the first manager, 1888-1889; in 1900 J. H. Scott was appointed manager of operations in general charge of coal affairs. Peter Forrester was given a position in the mines in 1888 and worked in various capacities until 1896. His knowledge of mechanical details was a valuable asset to the operating officials and led him to design improvements in the washing equipment that resulted in the improved machine subsequently called the Forrester jig. He played a part in the construction

of new coke ovens being built in 1891. Scott hired J. T. Lee after Forrester left. Capt. F. A. Hill was later named as manager, and afterwards J. T. Lee succeeded him. Lee had previously been in the employ of the Northern Pacific Railroad, and had a background of contacts with coal mining when he took up his duties at the Gale Creek mines. In 1901 he was appointed general superintendent and continued until he died on August 16, 1933. At different times he was a member of the Board of Trustees of the company. His services extended over a period of approximately 37 years, during which the officers left the entire management of the mines in his hands. The mine development continued to expand over a wide extent of new territory and many new operations contributed to the output of the Wilkeson properties.

~~George Watkin Evans, mining engineer of Seattle, served as general superintendent about 1934.~~

Affairs improved after 1891 under the leadership of the company officers and competent mine foremen. Wood's maps show that in 1891 or 1892 the principal mine entry or gangway on the Ainsworth bed had reached a length of nearly a mile from the portal in Section 27 southward toward Sections 34 and 3. After the company had acquired a 99-year lease of lands containing the east and west dipping beds, including the areas formerly worked by the Tacoma Coal and Coke Co., it became possible to drive rock tunnels and open other seams across the strike on the flanks of the anticlinal structures. So, the mines grew and production increased. Washing facilities were installed. The original beehive ovens were operated from 1888 to 1898; and new ovens were constructed after these were abandoned. The demand for domestic, industrial, and gas-making, as

well as for coking coals, steadied the market. At no time did Wilkeson ~~[illegible]~~ top production in Pierce County—that was a distinction that went to the Carbon Hill Coal Co. The banner years of production for Pierce County came in 1917 and 1918, followed by a slow decline at all the mines. Difficult mining conditions, long hauls from the mining faces to the railroad siding, competition, and reduced market all contributed to declining production. Production fell off, and about the year 1931 the Company entered a program of leasing its holdings, and by 1936 had virtually turned its operations to former operating men of its mining staffs. By 1936 it had virtually ceased direct production. Wilkeson had taken over the Fairfax Mine in 1925, had made some coal briquets there, but had abandoned the lease in 1930. The names of some of the sub-leases are given below:

Some fourteen leases or grants of mining rights were made when the coal markets began to drop and the company found it desirable to curtail its own operations and lease parts of its holdings to employees, largely men of experience and skill as minor officials or bosses. It has not been possible to check all the leasers, particularly for chronological purposes, but the following list gives the best tabulation that could be made from available sources. Detailed records may have been kept by the State Mine Inspector who had to make official examinations and secure figures of output.

Acme Coal Co.
Apex Coal Co.
Dependable Coal Co.
Wilkeson-Wingate Coal Co.
Bonato Coal Co.
Kelly Coal Co.
Domestic Gem Coal Co.

The foregoing names are of groups who were in existence in September 1936 when the official notices were sent out by Corydon Wagner, president, and C. L. Griggs, Secretary.

Under the leadership of the company officers and a staff of competent mine foremen the production of the Wilkeson mines grew. The main underground gangways were extended southerly into Sections 34 and 3, and rock crosscuts and tunnels were driven east and west to develop and open seams other than the original workings in the Ainsworth bed. The coke ovens, ultimately called for steady tonnages and domestic, industrial, and gas-manufacture markets supplied basic market demands. At no time did Wilkeson top production in Pierce County--that was a distinction that went to the Carbon Hill Coal Co.

The banner years of production for Pierce County came in 1917 and 1918, followed by a slow decline at all the mines. Difficult mining conditions, long transportation hauls from the face to the railroad siding, competition, and reduced markets all contributed to declining production.

About the year 1931, the Wilkeson Company entered a program of leasing some of its holdings to former operating men of its mining staffs, and by 1936 the company had virtually ceased operations.* From time to time there were rumors of awakened interest in the coal rights held under lease from the Northern Pacific. But nothing definite transpired until 1942, when the Defense Plant Corporation entered into an agreement with the Wilkeson Products Company, to open a new mine, a washery, and build a new byproduct Curran-Knowles coking plant at Tacoma. A new slope, the Skookum, was begun on March 4, 1944 and mining operations followed later. The mine was closed on November 22, 1944.

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* The names of the small properties leased in Pierce County is given in another portion of this narrative. Some 14 leases were made.

The Pacific Coast Co. of San Francisco, the original owners of the Pacific Coast Coal Company and related enterprises, became interested early in 1957 in the possibility of developing a new mine in the southerly portion of the Wilkeson field. Announcement was made that an investigation would be conducted; William A. Harding, vice president, was assigned to direct the study, and George W. Rust of San Francisco, geologist, was named Director of Mines and Explorations of the Company to direct the field operations. Leases were secured from the Wilkeson Co. and a prospecting program was initiated in the NE ¼ Section 3, T.18N.,R.6E., mainly on Bed No. 2. Prospecting test pits were opened, samples of coal were obtained for analysis and tests, including coal preparation and coking investigations, and office studies were carried on. During August 1959 a short test of the hydraulic jet mining method was made on No. 2 bed but this gave little conclusive data.

The Mount Rainier Coal Co. was formed and Mr. Harding named as President; on January 31, 1961 he announced that four years of investigation and research had paved the way for opening the leased coal area in Section 3. A four-year contract had been signed with Japanese interests to supply coal for their metallurgical operations; actual shipments to begin January 1, 1962, for a total of 800,000 tons for use in Japanese steel plants. A comprehensive account was reported in the Buckley-News-Banner, issue of February 2, 1961. No shipments, however, were made as contemplated, and the agreement was cancelled.

It will be recalled that in 1924, D. E. McLaughlin of the Pacific Coast Steel Co. of San Francisco and some associates had sponsored investigations

in an area in the Carbon River field east of Carbonado as a source of coking coal for steel manufacture. E. F. Larson had done some prospecting in the area and he was engaged to do some checking in the field. His original report was dated April 9, 1921; the new field work was extended by Larson and M. C. Butler and reports were submitted to a group called the Pacific Coke and Coal Co. Butler's map, entitled Pacific Coke and Coal Co. Prospecting Program, is dated August 27, 1923, extended to October 25, 1924. Prospecting locations are shown in Sections 2, 3, 10, 11, 14, 15, 16, and 22, of T.18N.,R.6E., and the accompanying reports give much detail of the findings and the structure.

Plans were considered for driving a long crosscut tunnel from a site in Section 9 near the railroad line from Carbonado to Fairfax to tap the areas prospected from the surface, but these were not carried out.

Samples of coal were collected for washability studies and for coking tests by Byron M. Bird and Stewart M. Marshall. Results of this phase of the investigation together with a description of the area and its coal beds are available in two publications.[65,66]

Other studies were made of raw materials and of economic factors relating to the feasibility of establishing an iron and steel industry on the Pacific Coast but the project was not consummated by this group of investigators.

The area continued to attract interest as a potential source of metallurgical and industrial coal, and many investigators have examined the field. Mr. Norman Barnes, Seattle, of Consolidated Coal Exporters, Inc. in 1960 secured an option to lease, then took a lease from the Northern Pacific Railway on the Carbon River property that had been explored by Larson and

Butler as a possible source of (~~exporting~~ to be exported) coking coal to Japanese markets. Subsequently in 1962 an arrangement was entered into with Utah Construction Co. to complete further exploration with a view to leasing for mining operations. At the present time (June 1963) this is the status of the Pierce County coking coal investigations. ~~Utah Exploration Co.~~ is actively interested

AREA - MINING

CARBONADO, CARBON RIVER COAL CO. AND CARBON HILL COAL CO.

The coal beds on the Carbon River, commonly identified as the Carbonado area, were among the first to be opened in the Puyallup River Field. Many references in early newspapers and writings refer to the occurrence of thick steeply-dipping beds of coal along the canyon walls. There are reports that some coal was mined in the early sixties; this statement has not been authenticated, but it is probable that some prospecting was done and some samples collected prior to 1874. Lack of transportation facilities prevented full mine development until a railroad branch was built from Wilkeson in 1880. The property operated continuously for many years; at one time the Carbon Hill mine was rated as the largest in the state, and its output was the highest of the Pierce County mines.

Californians were actively interested in developing the property as a source of coal for railroad, steamship, and other uses in the San Francisco market. Water shipments from docks at New Tacoma began at an early date, and the California trade was an important factor in the growth of that city, not alone for coal and coke but for lumber and other commodities.

The library of the Washington State Historical Society at Tacoma contains letters and reports,* originally collected by Judge James Wickersham, that include a wealth of information about the development at Carbonado. This material was consulted but contains too much detail for the purposes of the present story. Other investigators will find a field of great interest and significance relating to use of Washington coals in California before California's rich petroleum resources were known.

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* Washington Territory Miss, 979.7 W 279 m. Ex Libris James Wickersham. Donated December 8, 1898. No. 24. Carbon River Coal Mines.

A prospectus of the Carbon River Coal Mining Co., April 11, 1879, and other documents reveal that this company had been incorporated with General W. S. Rosecrans, president, Col. Isaac W. Smith, vice-president, and J. A. Stone, secretary-treasurer, and a capital stock of $1,000,000 divided into 10,000 shares. On August 6, 1870, Joseph Le Conte, professor of geology at the University of California discussed the extent and value of seams;--"in my opinion . . . these measures are by far the most valuable I have seen on this coast." A letter from N. P. Gutelius to Colonel Smith on August 19, 1874, states that he examined coke made in open pits and recommends it highly. G. H. Mendell of San Francisco, on August 21, 1879, submitted a report to Isaac W. Smith, C.E. on the "Position and Occurrence of Coal, Description of Seams, Accessibility of the Mines and Favorable Conditions for Mining Timber, and Iron Ore, Concluding Remarks." A letter dated July 5, 1879 from J. W. Sprague, general superintendent, Northern Pacific Railroad, to Col. C. A. Henry, superintendent, Carbon River Coal Mining Co. discusses royalty on coal leases, and arrangements for taking care of transportation costs on building a branch line from Wilkeson to Carbonado. An item in one of the newspapers dated January 2, 1880 reports that the Carbon River Coal Company got purchase rights to 750 acres of coal land for which they paid $15.00 or $20.00 per acre. On June 3, it was reported that R. Wingate had men to cleaning out the road to Carbonado.

According to the Weekly Tacoma Ledger of April 21 and April 30, 1880, the original coal company found it difficult to secure means to carry out its plans. R. D. Chandler of San Francisco had obtained information which satisfied him that the property offered was by far the best on the coast. R. Wingate, superintendent of the South Wellington, British Columbia, mines

had made an examination at Carbonado. Chandler is reported to have sold his South Wellington mine to Dunsmuir, Diggle and Company, owners of the adjacent Wellington mine, and negotiated for the Carbon River lands. The problem was complicated by legal questions relating to filings and ownership in the original company, but the purchase was finally consummated late in 1879. Wingate was placed in charge of the property and was doing development work in 1880. The Wingate bed was named after him. Engineers in May 1880 were at work surveying a line for the connections with the Northern Pacific Railroad.

The San Francisco Globe, May 7, 1880, reports that the Carbon Hill Coal Company filed articles of incorporation under the laws of Washington Territory. The directors are: J. Lawrence Pool, Richard Chandler, George Fritch, Joseph G. Eastlane, and Thomas W. Jones; capital stock $200,000. Later, R. D. Chandler was elected president. The coal lands ultimately acquired appear to have been located in ~~Sections~~ 4, 5, 8, W½ of 9, W½ of 16, ~~Section~~ 17 ~~in~~ T.18N.,R.6E., and ~~Sections~~ 32 and 33, T.19N.,R.6E. The townsite occupied a portion of ~~Section~~ 5.

Production began to be reported officially in 1885, although some tonnage was shipped before that time. Mineral Resources of the United States for 1882-1883 says that the Carbon Hill Coal Mine, largest on the Coast, belongs to the management of the Central Pacific Railroad Co. (Pacific Improvement Co.) who have a line of steam colliers carrying coal to San Francisco Bay for the use of steamers and locomotives of the Central Pacific and the Southern Pacific Railroads. The reported production in 1882 was 64,745 tons, 140,135 in 1883, 122,060 in 1884, and 135,926 in 1885, according to the Mineral Resources volumes. The Washington Inspector

of Coal Mines reports only 120,965 tons in 1886 because of labor strike troubles, and 145,316 tons in 1887, a grand total of 728,147 tons from 1882 to 1887. Production continued regularly and steadily thereafter. During these ~~operations~~ activities the mine is reported to have produced 1½ million tons of coal, practically all of which came from water-level operations.

The name Carbon Hill Coal Co. was retained until September 1924, when the California interests who held ownership leased the property to the Pacific Coast Coal Company of Seattle. Production in 1924 was reported by both companies, and Pacific Coast Coal Company in turn continued to operate until 1937, when the mine was closed. Strain Coal Company then took a lease for a short period, 1939 to 1940. Only a few tons produced by small leasors have been shipped in recent years.

Wingate in 1880 opened the Carbonado mine near the level of the Carbon River in ~~Section~~ 5 by drifts along the beds and by rock or crosscut tunnels that gave access to coal under cover; the coal was hoisted to the townsite level above the river and then loaded into railroad cars for transportation to Tacoma.

The railroad connection from Wilkeson was completed early in December, 1880 and the mine had capacity to ship 150 tons per day. All the coal had to be hoisted up the incline from the river to the townsite. The first carload of coal ascended December 3, 1880 at 11:40 a.m., after which a reception followed; later the first train of 20 cars freighted with coal passed from Carbon Hill to Tacoma, ~~20 cars of 5 tons each~~. Additional shipments followed immediately but no ships were available and some coal was moved south by rail. Steam colliers were used as well as sailing ships. More coal moved early in 1881. Later, 1888 or 1889, a railroad spur known as the Crocker branch was

extended along the river valley from a point near Orting, giving a direct route to the mine openings along the valley and also to a site selected for coke ovens. For many years the operation stretched along the water-level horizon into surrounding areas; later as these beds were mined slopes were sunk to lower elevations and coal hoisted for discharge at the surface. There were miles and miles of trackage, and many rock tunnels had to be driven for haulage roads; in fact transportation and ventilation were two problems that constantly faced the operators. As electric power became available the old coal-fired mine locomotives were superseded by more efficient equipment. Carbon Hill for many years was the largest mine in the state, and was always the largest producer in Pierce County. Management was of a high order, and an assured outlet for the production provided excellent market conditions.

John A. Steinberger in October 1881 took over the duties of superintendent in place of Wingate, who had resigned to look after other interests. Capt. David D. Davies was superintendent for 17 years from 1884 to the time of his death on December 28, 1901; L. W. Davies took over management duties in 1902. Other members of the Davies family worked in various operating capacities in the mines. It was reported that J. H. Shaw was general superintendent for a period; that J. F. Menzies was appointed to the position of manager on January 1, 1904; after which S. F. B. Morse is listed as general manager. Following him were Frank Good in 1918, then B. B. Nieding and D. E. Roberts. The old Melmont Mine was operated during 1917 to 1919 to supply tonnage needed by Carbon Hill, then it was permanently abandoned.

Coal washing operations began in 1888, followed by newer installations in 1889 and 1900; in 1916 Elmore jigs were introduced. Records of

operations and of washability studies are available in a 1924 publication[67] issued by the University of Washington.

In 1902 six experimental beehive ovens were built; but the experimental operations were not successful, and the project was abandoned. Two ovens had been built earlier in 1885 and made approximately 311 tons of coke; it was proposed to add 25 more during 1886, but this was not done. Finally in 1912 Carbonado completed ~~fifty~~ 50 ovens of which ~~six~~ 6 represented the experimental battery constructed in 1902, and coke was produced for shipment. Twenty one ovens were added to this plant in 1913, making a total installation of 71 ovens for the company. In 1917 the company began construction of 66 additional ovens, a total of 137, but because of limited space available at Carbonado the new plant was located at Crocker, the junction of the mine branch with the Buckley Branch of the Northern Pacific. In 1919 the Crocker ovens were leased to the M. S. Allison Co., Inc.

Coking coal from the Carbonado operation was largely mined in the so-called Douty beds in the western portion of Section 4, T.18N.,R.6E. These beds are the southwestern extension of the seams mined in ~~Section~~ 3 by the Wilkeson Co.

Some semi-anthracitic coal was mined from beds lying near the Melmont Sill west of the Carbon River in ~~Section~~ 9 T.18N.,R.6E. This igneous intrusion of andesitic rock was responsible for metamorphosing or altering the normally bituminous coal near its contact—purely a local condition confined to a small area—but it was interesting because it supplied a limited amount of coal of domestic grade that was similar to coal from Pennsylvania.

Tonnage records are available ~~practically~~ from late 1880, when shipments from Tacoma began, to the close of operations in 1937. To the owners of the Carbon Hill Coal Company credit is due for their activity in transportation of coal from Washington to California by sailing vessels, steam colliers, and by rail, and providing loading and transportation facilities at Tacoma. The movement of coal also led to trade in other commodities and to the growth of industrial activities in Washington. The discovery of petroleum in California and the growth of this industry also marked a great change in the Pacific Coast fuel situation, including California.

An interesting sidelight of the Carbonado enterprise is its relationship to proposed iron and steel projects in Washington is indicated in the following items:

In 1880 a company of San Francisco businessmen interested in the lumber business and steamship trade between Puget Sound and California ports had begun work at Port Townsend mining ore, building houses, furnaces, and other needful preparations for the manufacture of pig iron in anticipation of obtaining coke supplies from the mines at Wilkeson and Carbonado. The principal shareholders were John A. Paxton; J. H. Redington; Hinckley, Spiers, and Hayes; Pope and Talbot; H. L. Dodge; G. W. Prescott; A. Chabot; and J. G. Kellog. Cyrus Walker was president. The company, Puget Sound Iron Company, transferred its interests to a new organization which was incorporated in California in November; in February 1882 the company filed papers at Olympia, Washington, and on April 5, H. L. Blanchard of Irondale was appointed statutory agent. The officers were San Francisco residents, John A. Paxton, president; John H. Redington, vice-president; Charles H. Simpkins, treasurer; and A. Halsey, secretary.

Other local groups also became interested in the possibilities of establishing iron industries. The New Tacoma Iron Co. organized on June 20, 1881, with incorporators Gen. J. W. Sprague of the Northern Pacific Railroad, D. D. Lister, a foundryman of Tacoma, and R. F. Radebaugh, a leading citizen. The capital was set at $75,000 to consist of 3000 shares at $25.00 each; the corporation was to engage in mining, smelting iron, transportation, and other activities; iron properties in the Cumberland District of Skagit County had been purchased from J. J. Connor.

John A. Steinberger in October 1881 took over the duties of superintendent in place of Wingate, who had resigned to look after other interests. Captain David D. Davies was superintendent for 17 years from 1884 to the time of his death on December 28, 1901; L. W. Davies took over management duties from 1902 to January 13, 1913, and other members of the Davies family worked in various operating capacities in the mines.

J. F. Menzies was named manager in January 1913, and took charge at Carbonado; he had gone to Roslyn for the Northwestern Improvement Co. in January 1904 to take over Shaw's place at Roslyn. Frank Good went to Carbonado with him. Menzies took over active management about 1918, and Frank Good replaced the incumbent as superintendent. Menzies returned to San Fernando, California, August 1922, and remained there until he died. S.F.B. Morse in 1918 headed Carbon Hill Coal Company for the Crucker interests but was not active in mine operations.

B. B. Neiding, who had been in charge of mining operations at the Gastineau Mine near Juneau was then (1919) assigned to Carbonado. Richard W. Wulzen was appointed as manager under Neiding and promoted to this position in August 1922. D. E. Roberts was mine superintendent in 1919.

Simon H. Ash was appointed as mining consultant at Carbonado in 1922. He remained in this capacity until 1924 when he was designated chief engineer and assistant manager under Wulzen in 1924 and 1925. [N. D. Moore was general manager of the Pacific Coast Coal Co. at Seattle.] When the Pacific Coast Coal Co. acquired Carbonado in 1924, he was appointed superintendent 1925 to 1926, then field engineer 1926 to 1927, and superintendent at Ravensdale 1927.

During the period after 1927 to the close of the operation in March 1937, the names of the superintendent are reported as Pierrpont Morgan, Robert Simpson, and James Ash.

The old Belmont Mine was operated during 1917 to 1919 to supply tonnage needed by Carbon Hill, then it was permanently abandoned.

MELMONT MINE

Active mining operations were confined largely to the area centering around Wilkeson and Carbonado until 1900, when the Northwestern Improvement Co., then a mining subsidiary of the Northern Pacific Railway Co., began a prospecting program at Blossburg on the Carbon River. When the branch line was extended from Carbonado to Fairfax in 1896 the coal in sections 15, 16, 21, 22, T.18N., R.6E., became accessible to transportation, and a drift and slope operation known as the Melmont Mine was opened. This was the only property worked by the railroad company in Pierce County after the original mine at Wilkeson had been closed. The principal workings were in Section 16, east of the Carbon River, on the west dips of an anticline; later the beds were opened in Section 15 on the east dips. The mine was worked from 1902 to 1915; some of the coal was coked in the ovens at Fairfax. B. F. Bush was general manager, and John McDowell, superintendent of mining operations in 1902.

For a period during 1917 to 1919 the Carbon Hill Coal Co. operated the property to supply needed tonnage for its markets, after which the mine was permanently abandoned.

FAIRFAX

Development of the coal areas near Fairfax began about 1896 when the Western American Company opened a property in Section 26, T.18N.,R.6E., called the Fairfax Mine. A railroad line, 7½ miles long, was projected from Carbonado to Fairfax and built in 1897 and 1898; some coal was mined and shipment made in 1899. H. S. Huson and W. A. McNeil were reported as general manager and superintendent in 1901. Production continued under this management until 1906.

W. R. Rust had organized the Tacoma Smelting and Refining Company during the winter of 1889 and in 1890 had bought the old smelter at Tacoma. Dennis Ryan of St. Paul conceived, financed, and launched the first smelter. Rust came out in 1890 from Colorado with $30,000 and organized the Tacoma Smelting & Refining Co.; bought and enlarged the smelter. In 1905 Rust sold out to American Smelting and Refining Co. Copper furnaces and converters were installed in 1902; the first electrolytic refinery was put into operation in 1905. Coke was an essential reducing agent used in blast-furnace smelting of lead and copper ores. In 1901-1902 some 35 beehive ovens were constructed; later the battery was increased to 60 ovens. Rust, president and general manager, acquired the property as a source of coke in 1907. In 1911 a new mine was opened in Section 34; this operation was known as Fairfax Mine, Inc., and the term Old Fairfax Mine was applied to the earlier openings. Although the American Smelting and Refining Company had purchased the Tacoma Smelter in 1905, Rust remained at the smelter until the end of 1915. The mine and coke oven plant was taken over by American Smelting Refining Company in 1924. When the use of blast furnaces was discontinued in favor of new and improved metallurgical practice, the demand for coke

virtually ceased, and the company decided to purchase its future requirements. It sold the Fairfax holdings to the Wilkeson group in April 1925. Unfortunately, the market for coke had declined over the entire Pacific Coast and the decline hit the new owner and production practically ceased. Some coal briquets were made in a plant that operated from 1926 to 1929. The entire operation ceased early in 1930, and Fairfax became a ghost town, dependent on nearby logging operations rather than mining.

MONTEZUMA AREA

Along Evans Creek, a tributary of the Carbon River, south and east of Fairfax, in Sections 35, T.18N.,R.6E., and in Section 2, T.17N.,R.6E., a number of attempts were made to develop and operate by drifts the coking coal seams occurring in this area. The Montezuma Mine was opened in 1901 in Section 2; from 1901 to 1916 prospecting, development and mining operations were carried on, under the general term "Montezuma Operations," by various groups. These companies were known as the Washington Cooperative Mining Co.; The Montezuma Mining Co; Evans Creek Coal & Coke Co.; Montezuma Coal Mines Co.; and a company later called the Washington Manganese Coal & Copper Co.

1902-1903	Washington Cooperative Mining Syndicate and Montezuma Mining Co. (joint venture)
1904	Montezuma Coal Mining Co.
1905	Western Iron, Coal & Coke Co.
1906-1910	Evans Creek Coal and Coke Co.
1913-1914	Montezuma Coal Mines Co.
1915-1916	Washington Manganese Coal and Copper Co.

Twenty-five beehive coke ovens were built about 1901 by the Washington Cooperative Mining Co., and the Montezuma Mining Co., in N.W.¼ Section 35, near the townsite of Montezuma, about one mile southeast of Fairfax, and some coke was produced and shipped.

During 1902 and 1903 development and mining continued; in 1907 and 1908 gangways were extended and small tonnages mined. Operation continued during 1909 and 1910, but the property was closed in April 1910 and remained idle during 1911 and 1912. The Montezuma Coal Mines Co. resumed operations in

1913 and carried on further exploration; in 1915 the company name was changed to Washington Manganese Coal and Copper Co.; in 1916 production ceased.

The State Mine Inspector reports tonnage production for 1902 and 1903 by Washington Cooperative and Montezuma Mining Co., and for 1906 to 1918, from Evans Creek Coal & Coke Co. Most of the active mining was done in Section 2 and the coal transported by flumes to the washery plant and coke ovens.

The coal is semi-bituminous in rank; it was screened, $1\frac{1}{2}$", and the oversize picked for use as domestic and steam coal; the undersize was washed in feldspar jigs and flumed to bins at the railroad track and used in the manufacture of coke.

Reference has already been made to a prospect opening in $SW\frac{1}{4}$, Section 36, T.~~17~~ 13 N., R.6E., 2 miles south of Fairfax known as the Olympic Mine. The ~~opening~~ Property lies in the upper portion of the Burnett Formation, corresponding in position to the Spiketon Mines, and is sometimes known as the Hillsboro Coal Co. which was an allied organization of the Olympic Mining Co. of Seattle.

PUYALLUP - ASHFORD COAL AREA

South of the Wilkeson-Carbonado-Fairfax field the coal measures extend from the Puyallup River to the Nisqually River, in what has been designated the Puyallup-Ashford area, lying in Townships 15 and 16 North and Ranges 6 and 7 East. Search, and prospecting for deposits of coal were carried out many years ago, but no significant development had taken place except near the town of Ashford on a branch of the Chicago, Milwaukee, and St. Paul Railroad, called the Tacoma and Eastern Railroad. Primarily a rich timber area, served by railroad transportation, efforts have been made to find a commercial deposit of the semi-bituminous coal known to be present in the area. A summary of the mining chronology is here given to complete the record for Pierce County.

The coals have coking properties and have been of interest to potential consumers of metallurgical coal and coke and coals for use in chemical applications, and prior to 1904 prospecting was undertaken to discover commercial beds. The Mashell Coal and Coke Co. was carrying on exploration prospecting north of Ashford in Sections 22, 15, 10, and 3 in T.15N., R.6E. In 1904 this company, Edward Cookingham of Portland, president and John Bagley, manager, was reported to be driving openings in the $NE\frac{1}{4}$, $NE\frac{1}{4}$ Section 27, T.15N.,R.6E; it continued this program in 1905 and 1906 and drove a long rock tunnel to intersect beds from which some coal was mined.

From September 30, 1906 to January 31, 1907 the Northwest Iron and Steel Company continued explorations under the direction of T. B. Corey. The company was also referred to as the Northwestern Coal Co. James A. Moore of Seattle was president; he had purchased the Irondale plant near Port Townsend and was promoting several enterprises. In October 1909 the

Western Steel Corporation was organized, with Moore as president, to undertake an ambitious program of industrial development. The Irondale blast furnace plant was included, and the coal property at Ashford selected as one of the ultimate sources of coking coal for its operation. The furnace was blown in July 5, 1910, but the whole project of the steel corporation failed and it passed into receivership in 1911.

The only coal shipment reported from Ashford was 292 tons in 1910; no record of actual tonnage was kept, but the production was considerably greater than this amount.

Efforts have since been made to revive activity in the Ashford area. Andrew Kennedy, a coal mine operator of Seattle, made reports in June and October of the Mashell property; a supplemental memorandum was prepared in October 21, 1918, by Henry Landes. In 1943 J. G. Hodge of Seattle investigated the area, particularly Section 22, to determine whether suitable samples could be obtained for a proposed investigation of utilizing the coal for chemical utilization. In 1949, Amos Slater, mining engineer, examined the area and prepared a map and report.

A LOOK TO THE FUTURE

The chronicle of the history of coal mining in Pierce County is a story of hopes, ambitions, frustrations and failures, and the efforts of pioneers to bring trade and industries to build up a prosperous state. So long as coal was a prime and necessary raw material the industry contributed much to the commerce and trade of the Pacific Coast rim. Competition with fuel oil, natural gas, hydroelectric power, and changes in industrial and metallurgical practice led to a decline in demand and to virtual demise. Today there is no demand for coal as a raw fuel, but there is a hope and a possibility that in the future economic factors will again favor the growth of the coal industry.

Washington is unique in possessing resources of high-rank bituminous coals suitable for coke-making, for utilization in chemical and petrochemical processes, possibly for direct firing under boilers and furnaces, when demands on the Pacific Coast, north and south, of Washington's coal fields make necessary their renewed development. It is hoped that the presentation of this historical material will make a helpful contribution to the literature of the raw materials of the state.

CHRONOLOGY OF MINING ORGANIZATIONS, 1874-1960

This story of coal mining in Pierce County concludes with a review of dates, beginning in 1874 and ending in 1960, listing the names of some of the older companies, and small groups who ventured into the field of production. In the case of the small leasers it has been very difficult to secure names and dates that are accurate and dependable; only in a few instances are records obtainable, and the searcher must depend on fragmentary material to put together a picture of the many efforts made to establish active and stable operations in the Wilkeson-Carbonado-Fairfax districts. There is a historical value in obtaining this information; in addition it also gives a key or clue for data that may have significance to the investigator who may be interested in studies to determine future possibilities of this area. ~~There always will be an interest in~~ the potentialities of this unique occurrence as a supply of high rank bituminous coal for coke manufacture and for chemical and metallurgical raw materials suitable for chemical and metallurgical needs.

A few organizations survived the years of trials and tribulations, others, mainly small groups, did not last very long and disappeared leaving no records of value. All available sources of information have been searched; the resulting notes have been ~~compiled~~ assembled into the chronology that follows, ~~in the hope that it will prove of some value some day.~~ The basic background has been the yearly reports of the State Coal Mine Inspectors which give the names of the coal producers, their tonnage outputs, and occasionally some brief notations about the development work carried out by the operators.

During the years when production by the major companies declined and there was constant variation in the completeness of the records it was not

always possible to make accurate listings; when subleases were made in the years following 1930 a tabulation was made showing the names of the organizations reporting substantial outputs and shipments of coal. These were largely the days of the "truck mines" that worked only when a market was available and delivery could be made directly from mines to consumer. ~~This study shows the over-all picture and graphically reveals the situation~~ in the last days of the industry ~~and the final collapse of the dreams~~ of ~~the pioneers~~.

In the annual listings the names of the group, the mine name or designation, and the location are reported. In the tabulation given on page 142, the name of the company or the leaser is given and the year in which substantial production was recorded. Fuller details may be obtained from the tables given in the annual reports issued from the office of the State Inspector of Coal Mines. The annual fluctuations ~~and the decline~~ may be visualized from these tabulations.

1874

J. P. Gale and Flett Brothers, Gale Mine, Sec. 34, T.19 N, R.6 E, North Line, at Gale Creek. Gale Bed East Dip. First coal mine in Pierce County. Small tonnage, hauled to South Prairie and Tacoma. Closed in 1874.

1877

Northern Pacific Railroad Co. Tacoma Colliery. General Bed, West Dip. Sec. 27, T.19 N, R.6 E. Opened by Benjamin Fallows. Closed in 1879.

1879

Northern Pacific Railroad Co. No. 2 Wilkeson Mine, Ainsworth Bed, West Dip. Sec. 27, T.19 N, R.6 E. Main gangway entrance for development of future Wilkeson Co. operations. E. S. Smith may have participated. Wright Bed also opened.

1880

Carbon Hill Coal Co., originally Carbon River Coal Co. Sec. 5, T.18 N, R.6 E. Beds opened from Carbon River. Railroad branch line from Wilkeson built 1880. First recorded production 1885. Coke ovens built 1911 and 1912. Operations taken over by Pacific Coast Coal Co. of Seattle in Sept. 1924 who operated property until 1937.

1880 or 1881

Rev. G. F. Whitworth and C. H. Burnett preliminary explorations. South Prairie Coal Co. opened Burnett Mine 1881. Sec. 16, T.19 N, R.6 E. Shipments reported 1888 to 1895. Taken over in 1906 by Pacific Coast Coal Co. and operated until 1927.

1880 - 1881

Miners' Cooperative. Ainsworth Bed. West Dip. Sec. 27, T.19 N, R.6 E. Leased from Northern Pacific Railroad to Whitworth and others. Short-lived operation.

1880

Tacoma Coal & Coke Co., originally called Tacoma Coal Co. Sec. 27, T.19 N, R.6 E. Smith Bed (No. 3) East Dip. Opened in 1878 or 1879 by E. S. Smith and associates, name changed 1880. Production reported from 1885 to 1892. Pit coke made in 1881, beehive ovens built in 1885, 1886, (a total of 30) then abandoned. Mine closed in 1892, reopened by Wilkeson Coal & Coke Co. about 1889 as part of their major operations.

1883

Oregon Improvement Co. Vulcan Mine. Lease of No. 2 Wilkeson Mine. Sec. 27, T.27 N, R.6 E. Ainsworth Bed gangway. Extension of former workings on west dip, now referred to as Wilkeson No. 2 Bed. Operated for approximately 1½ years.

1887

George Driver and Associates. Wilkeson Mine No. 2 Lease from Northern Pacific Railroad. Extension from Sec. 27 into Sec. 34, T.19 N, R.6 E. Little tonnage reported except from gangway extension.

1890

Washington Improvement Co. Spiketon Mines, South Prairie Creek, Sec. 15, T.19 N, R.6 E. West dipping beds in Burnett formation. Commenced operations Nov. 8, 1891 under name of Reed, Williams & Co.

1891

Tacoma Coal & Coke Co. Operating but one gangway, Smith bed. Driving tunnel north from Goodwin bed.

1891 - 1892

Acme Coal Co. East of Burnett, Sec. 15, T.19 N, R.6 E. Opened east dipping bed on water level tunnel No. 1. Mined some coal in 1892-1894; closed in 1895.

1893

Oimette. East of Burnett, SW¼ Sec. 15, T.19 N, R.6 E. Opened coal 1891, reported small production 1893-1896. Reopened 1903 under name Luzon Coal Co.

1894

Wilkeson Coal & Coke Co. Sec. 34, T.19 N, R.6 E. Rock tunnel driven across measures, and east dip beds 1, 2, 3 and 7 opened.

1895

Carbon Hill Coal Co. working by longwall methods.

Tacoma Coal & Coke Co. mine closed.

1896

Western American Co. Fairfax. Work began on properties in Sec. 26, T.18 N, R.6 E. Railroad spur located from Carbonado constructed 1897-1898; mine production in 1899. Became Fairfax Mine in 1906; Tacoma Smelting Co. 1907.

1897

Miners' Coal & Coke Co. Articles of Incorporation, May 14. Arthur Driver, A. J. Hill, C. F. Owen, John P. Judson. Mine opened in 1899, worked only above water level and slope being sunk, known as Gale Creek Coal Co., George Driver, Supt.

1898

Gale Creek Coal Co. Formerly opened by Miners' Coal & Coke Co. Gale Creek. Sec. 28, T.19 N, R.6 E. Coal measures worked only above water level; and slope being sunk on the property.

Willis Coal Co. Pittsburg. On Acme spur track, Sec. 15 or Sec. 22, T.19 N, R.6 E.

1899

Gale Creek Coal & Coke Co. Gale Creek Mine. Sec. 28, T.19 N, R.6 E. Production listed in 1904 as 42,000 tons, including output of Willis Mine. Officers in 1907, C. W. Haswell, Seattle, President, J. B. Winsor, Tacoma, Manager. Production 1907 to 1911 reported for Gale Creek Mine and for South Willis Mine. George Driver named as Superintendent until 1905, then Tremont Coal & Coke Co. is named as operator.

1901

Northwestern Improvement Co. Melmont Mine. Sec. 22, T.18 N, R.6 E. Property developed at Blossburg on Carbon River above Carbonado. Prospected seams in ~~Sections~~ 22 and 27. First coal output reported 1902. Luhrig (~~Luhrig~~) washer installed 1902.

Washington Cooperative Mining Syndicate and Montezuma Mining Co. The Montezuma Mine on Evans Creek 1½ miles south of Fairfax. Built bunkers and washing plant, erected coke ovens. Produced coal in 1902, 1903, 1906-1910, 1913, 1914. Later known as Evans Creek Coal & Coke Co. in 1906. Produced coke in 1909.

Olympic Mining Co. Hillsboro Mine. Sec. 36, T.18 N, R.6 E. Developing mine on Carbon River southeast of Fairfax on coal bed in the Burnett formation. Shipped small tonnage, then abandoned.

Mashell Coal & Coke Co. Ashford. Sec. 22 and 27, T.15 N, R.6 E. Prospecting, developing, and driving rock tunnel in 1904. President 1905, Edw. Cookingham, Portland, doing development work only. Reported coal shipment of 655 tons in 1909. Company name in 1906-1907, Northwest Iron & Coal Co. James A. Moore, Seattle, President.

Carbon Hill Coal Co. Carbonado. Capt. D. T. Davies, Superintendent for 17 years, died Dec. 28, 1901. J. F. Menzies became General Superintendent in 1904.

Gale Creek Mining Co. No. 1 and Queen Mines. Sec. 28. R. S. Loring, President. Company also owns the Willis Mine at Pittsburg where they intend to build coke ovens. In 1903 reported production of 37,182 tons of coal. Twenty-five coke ovens built by South Willis mine in 1903.

1903

Black Carbon Coal Co. Formerly opened under name of Luzon Coal Co. Pittsburg, Sec. 15, T.19 N, R.6 E. F. C. Robertson, President, James Malone, Secretary. Small tonnage produced.

Pacific Coal & Oil Co. Snell Mine. Sec. 26, T.19 N, R.6 E. East of Wilkeson. Reported opening of property; small shipment of coal reported in 1905, also 1956, and 1957. D. C. Spike, Tacoma, listed as President, and Evan Lewis, Superintendent.

Western American Co. Fairfax Mine. Sec. 26, T.19 N, R.6 E. W. F. McNeil, Superintendent. Coal and coke produced 1903.

1904

Tremont Coal & Coke Co. formerly Gale Creek. Otto D. Swain, Manager and General Superintendent. A rock tunnel is being driven to open the Queen Seam. Coal production reported in 1905-1906.

1905

Pacific Coast Coal Co. Burnett Mine, South Prairie. Acquired this property in 1905 or 1906 and operated it until 1927.

Pacific Coal & Oil Co., Snell Mine, President W. D. C. Spike, Tacoma; Evan Lewis, Foreman. Driving slope and two gangways. Produced 2400 tons of good quality blacksmith coal.

1906

1907

~~Tacoma Smelting Co.~~ Western American Mine, Fairfax.

Evans Creek Coal & Coke Co., Fairfax. President, John A. Wood, San Diego, California, Manager, Donald B. Olson, Seattle.

Brier Hill Coal & Coke Co. Opening a new mine near Wilkeson. President, G. W. Wetherley, Portland, General Superintendent, R. T. Smith, Wilkeson.

1908

Gale Creek Coal & Coke Co. South Willis. President, C. H. Haswell, Jr., Manager, T. B. Winsor.

Northwestern Iron & Steel Co. Ashford. President, James A. Moore, Seattle, Manager, T. B. Corey, Ashford.

Coast Coal Co. Snell Mine. Pittsburg. President, F. N. McCaudles, Manager, W. D. C. Spike, Tacoma.

Black Carbon, formerly Luzon Coal Co., Pittsburg. Production reported 1908. Mine closed down Oct. 31, 1908.

Northwestern Improvement Co. Melmont. Sec. 22, T.18 N, R.6 E. Entry driven and a rock tunnel to No. 2 vein started.

1909

Coast Coal Co. Pittsburg. Manager, W. D. C. Spike, Tacoma, Superintendent, John Humble. Production reported from east dip beds.

Commonwealth Coal Co. South Willis. President, R. L. McCormick, Tacoma, Manager, D. B. Crocker, Tacoma, General Superintendent, Abe Morris, Wilkeson.

Pacific Coast Coal Co. Burnett Mine. Superintendent, J. H. Watkins, Mine Foreman, J. H. Davies.

1910

Coast Coal Co. Spiketon. Sunk a 700-foot slope on the Pittsburg seam, and are sinking for a second level on the Lady Wellington bed.

Commonwealth Coal Co. South Willis. Have opened the Jones seam north and south, and the Winsor seam south.

Evans Creek Coal & Coke Co. Montezuma. Very small production.

Gale Creek Coal & Coke Co. Gale Creek. Small production.

Wilkeson Coal & Coke Co. Wilkeson. Development work on Smith 2; No. 4; No. 5 beds.

1911

Coast Coal Co. Spiketon. Working Lady Wellington mine.

West Tacoma Coal Mines Co. Gale Creek. President, J. J. Hewitt, Tacoma, General Superintendent, J. T. Lee, Wilkeson.

Tacoma Smelting Co. Fairfax. Commenced work on rock tunnel in Sec. 34 and expect to develop a good mine in this section.

1912

American Coal Co. Spiketon. Working three seams, Nos. 6, 8, and 10.

South Willis Coal Co. formerly the Commonwealth Coal Co. Winsor Mine. President, Abe Morris, Wilkeson, General Superintendent, Frank Merritt. Commenced sinking a slope on the Champion bed.

The Fairfax Mine, Inc. formerly the Tacoma Smelting Co. President, W. R. Rust, Tacoma, Manager and Vice President, M. C. Butler, Fairfax.

Gale Creek Coal Mines, formerly the West Tacoma Coal Mines. President, Henry Hewitt, Jr., Tacoma, General Superintendent, J. T. Lee, Wilkeson.

American Coal Co. Spiketon, formerly the Coast Coal Co. President, W. V. Reinhart, Seattle, Manager, D. R. Swem, Tacoma, Engineer, Simon Ash, Spiketon. Have driven rock tunnel tapping No. 6 and No. 12 seams which ~~are~~ were expected to become producers.

Carbon Hill Coal Co. Carbonado. First year of coke production.

1913 - 1914

Montezuma Coal Mines Co. President, Henry O. Marcy, Boston, Mass., Manager, Frank W. Hale. Under development. Drove 600 feet of gangway. Opened No. 5 seam.

1914

American Coal Co. Name changed to South Willis Coal Co. Spiketon. Work~~ing~~ed No. 7 and No. 10 seams.

Gale Creek Coal Mines Co. Gale Creek Mine. Drove 1100 feet of gangway. Production 29,000 tons.

South Willis Coal Co. South Willis. Manager, Jonas Morris. Opened Champion gangway 800 feet on first level.

Pacific Coast Coal Co. Burnett Mine. General Superintendent, William Hann, Superintendent, William Maltby.

1915

American Coal Co. No. 10 Mine, Spiketon. Drove 450 feet of gangway.

South Willis Coal Co. Champion Mine. Abe Morris, President. Small production.

Gale Creek Coal Mines Co. Drove 1200 feet of gangway. Produced 1900 tons coal.

Northwestern Improvement Co. Melmont Mine. Abandoned July 1916.

1916

Montezuma Mine. Evans Creek. Changed name to Washington Manganese, Coal and Copper Co. President, H. O. Marcy, Manager, W. H. Rowe, Superintendent, George Savage. Did not operate in 1917.

American Coal Co. Spiketon. No. 8 slope permanently abandoned. Name changed to South Willis Coal Co.

South Willis Coal Co. 1917, Abe Morris, Manager. Abandoned Wellington slope and opened three new seams, 7, 8, and 10, on south side of South Prairie Creek.

1918

South Willis Coal Co. Spiketon. Champion Mine and Wellington Mine. Abandoned in 1918.

Gale Creek Coal Mines Co. Abandoned October 1918 by Hewitt interests.

Gale Creek Coal Mines. Abandoned Gale Creek Mine in October or November 1918.

Carbon Hill Coal Co. Melmont Mines. Produced tonnage on lease, and abandoned operation 1918.

1919

South Willis Coal Co. Mines 7, 8, and 10 Morristown. Changed name to Pierce County Coal Co. November 1, 1919. No. 7 Winsor Mine. Manager, E. W. Lyon.

Carbon Hill Coal Co. Carbonado. Manager, B. B. Neiding.

Fairfax Mine Co. Fairfax. Manager, H. Y. Walker.

1924

Black Carbon Coal Co. Resumed operations and shipped some coal.

Pacific Coal and Coke Co. Carbon River area. E. F. Lawson in charge and M. C. Butler, consulting engineer, conducted exploratory and prospecting operations in sections 2, 3, 10, 11, 14, 15, 16 and 23 T 19 N, R 6 E.

Pacific Coast Coal Co. Carbonado Mine. Acquired lease. Production reported for 1924.

1925

Fairfax Mine taken over by Wilkeson Co. Briquetting plant constructed. Production of briquets reported in 1926, 1927, 1928, 1929, 1930. Mine operated for three months in 1930.

Burnett Mine operated until end of 1927, then shut down and dismantled.

1926

Black Carbon Coal Co. Black Carbon. Very small production reported.

1937

Pacific Coast Coal Co. Carbonado mine. Ceased operations in March. No coke production in 1937.

1939

Strain Coal Co. ~~Took over Carbonado mine~~; production reported for 1939 and 1940, but did not operate in 1941.

1941

Defense Plant Corporation signs agreement with Wilkeson Products Co. to develop property near Wilkeson; Sec. 27, T.19 N, R.6 E; opened a new slope and partings between No. 2 and No. 3 beds by gangways in each seam. New washery erected, and Curran-Knowles byproduct coke plant planned for Tacoma.

1942

Wilkeson Products Co. closed its mines in Nov. 1944 after producing 39,744 tons of coal.

The following mining organizations are listed as having operated small properties from 1930 to 1959 under subleases. The tabulation on page 134 is very sketchy, but is presented to give the best available picture during these years.

Page 134

Coal producers, 1930 - 1960

Name of Mine, Company, or Lease	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Apex	X					X	X	X	X	X	X	X	X	X	X	X	X	X														
Bartoy	X					X	X	X																								
Bonato Miller	X					X	X	X	X	X	X																					
Burn-It		X	X	X	X																											
Burralli	X		X	X	X	X																										
Commercial	X					X	X	X	X	X																						
Dependable	X			X	X	X	X																									
Wingate No. 4									X	X	X	X	X	X	X																	
Gale Creek	X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									
Peanut			X	X	X																											
Pacific Coast Coal Co. Carbonado (PCC-Co)	X	X	X	X	X	X	X	X																								
Strain Carbonado									X	X	X																					
Carbonado Coal Co.									X	X																						
Queen	X		X	X	X	X	X	X	X	X	X	X																				
Wilkeson C & CC	X		X	X	X	X	X																									
Wilkeson-Wingate East Dip							X		X		X	X	X	X	X	X	X	X	X	X		X	X									
Wilkeson-Miller West Dip								X	X	X	X	X																				
Carbonado Fuel & Timber												X	X																			
Carbonado Coal Co.									X		X					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
East Miller												X	X	X	X																	
Windsor Stoker No. 1											X	X																				
Defense Plant Corp. (Wilkeson Products Co.)													X	X	X																	
South Prairie, Spiketon													X																			
Peacock														X	X																	
Champion																X	X			X												
Sparton																			X	X	X											
Peloli & Locke																										X	X	X	X	X	X	

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~~APPENDIX~~

~~WASHINGTON STATE GEOLOGISTS~~

The Territory of Washington did not have any agency dealing with its geology, minerals, or mining industry in spite of the fact that great interest in its mineral resources was shown by its citizens. The territorial governors in their messages to the legislative assemblies and in their reports to the Secretary of the Interior, Washington, D.C., occasionally made references to these matters, but on the whole, there was a lack of recognition. Examination of the published annual messages and reports from 1873 to 1889 reveal very little material of historical significance. Governor Watson C. Squier, 1885-1886 quotes Reverend George C. Whitworth and gives excerpts of articles written by him about coal occurrences in the Territory, and mention is made of the Wilkeson operations of 1876 by the Northern Pacific Railroad and by Smith, Goodwin & Co. Governor Eugene Semple in 1887 makes reference to a report of the Inspector of Coal Mines, but much of the information is second-hand. However, there were many speeches made in the legislative assembly and other places urging that something be done to correct the situation.

George A. Bethune was appointed to the position of State Geologist in 1890 and served to 1892. He issued two reports. The first report is a general discussion mainly dealing with ore developments and says very little about coal and coal mines; in the second report he states that at the session of the State Legislature convened in January 1891 a bill was passed whereby a certain sum of money was appropriated for preliminary work necessary to the commencement of a geological survey of the state, but this action was declared illegal and the project was curtailed. This practically

ended any plans for the director and the field work of his office. Bethune did pay some attention to coal and other nonmetallic resources; under the head of "Washington Coals," pages 13-34, he gives some information about the principal mines then operating and a brief statement about the Wilkeson group. The data are not too accurate.

The post of State Geologist lapsed after Bethune's term of office expired. Demand for a reorganized geological survey led to a law, passed by the legislature of 1901, providing for a Geological Survey and appropriating funds for carrying it out. The Governor appointed a board that met on June 5, 1901, Henry Landes was chosen State Geologist, and field work was begun in 1901. The first report of the Survey was published in 1902. The coal deposits of the state were described in Part IV and later amplified in Volume II, 1903.

In these annual reports reference is made to the work of Bailey Willis; a brief history of beginnings of coal mining at Burnett, Wilkeson, Gale Creek, Carbonado, Fairfax, Montezuma; sections of coal beds, analyses, and production statistics for the mines are given.

In 1910 work was commenced on a base map of Pierce County, and in 1911 a survey was begun under the direction of George Watkin Evans, but this work was not completed; in 1913 Joseph Daniels was sent into the field to complete the study, and in 1914 a report was published covering the Wilkeson-Carbonado-Fairfax area.

The publications begun by the Washington Geological Survey in 1901 have been continued over the years to the present time. The original title of the organization and its scope have been changed from time to time with changes in state government at Olympia. The names of the State Geologists and the titles of the offices are given below.

1890-1892 - George A. Bethune, State Geologist
State Mining Bureau, 1890-1900 (inactive from 1893-1900 because of no appropriations)

1901-1920 - Henry Landes, State Geologist
Washington Geological Survey (1901-1920)

1920-1925 - Solon Shedd, Supervisor
Division of Geology (1920-1945)
Department of Conservation and Development

1925-1945 - Harold E. Culver, Supervisor
Division of Geology
Department of Conservation and Development

1945-1957 - Sheldon L. Glover, Supervisor
Division of Mines and Geology (1945 - present)
Department of Conservation and Development (name was changed to Department of Conservation, 1957)

1957-present- Marshall T. Huntting, Supervisor
Division of Mines and Geology
Department of Conservation

During the period 1935-1945, a Division of Mines and Mining was established in the Department of Conservation and Development. Thomas B. Hill was named as supervisor.

There is some question whether Washington ever had a true Mining Bureau. Apparently, there was an act to create a Mining Bureau and to define its powers and duties, and declaring an emergency which was approved February 25, 1890, but I cannot confirm this. However, Chapter 20 of the

laws of the first State Legislature established the office of a State Geologist, prescribing his duties and compensation, making an appropriation for the same, and declaring an emergency. This was approved on February 28, 1890. There are twelve sections in the act, nine relating to the duties of the official, and three dealing with reports to be made by him, his salary and appropriations for other salaries, purchase of chemicals and apparatus, traveling expenses, and rent of office and laboratory. In Section I it is stated that the term of office of the state geologist "shall be the same as that of the officers who, ex officio, comprise the mining bureau."

A state publication entitled First Annual Report of the Mining Bureau of the State of Washington from April 1, 1891 to April 1, 1892, Olympia, Washington, O. C. White, State Printer, 1892, throws some light on the situation.

Mr. Charles F. Laughton, President, Mining Bureau, Olympia, and Mr. A. A. Lindsley, Secretary, Mining Bureau, Carbonado, made this report to Elisha P. Ferry, Governor. The Bureau met April 9, 1891 to consider organization; it was decided to place three surveying parties in the field immediately, and Eugene Ricksecker, Paul F. Rieker, and H. E. Parrish were selected as engineers in charge to be known as assistant state geologists. Ricksecker was assigned to Okanogan County, Riecker to Stevens County and Parrish to the Carbon River area at Carbonado. Monthly reports by Ricksecker were received from April to July 1891; from Riecker from May to July 1891, Parrish met almost insurmountable difficulties from the outset, heavy rains, underbrush and fallen trees obstructed progress. He wrote several letters from May to July and then abandoned his work.

The associate geologists' reports are printed in the publication, together with maps and illustrations. Of particular interest to the history of Pierce County are drawings showing the bunkers, washers, coal chutes and coal pickers of the Carbon Hill Coal Company, a topographic sheet of the Carbonado district, and a townsite map of Section 5, T. 18 N., R. 6 E.

The final portion of Laughton's and Lindsley's published report deals with financial difficulties. The State Auditor, on or about June 1, informed the secretary of the Bureau that objections had been urged and a protest made against the payment of any further indebtedness by reason of the proposal of the Geological and Mineral Survey. The matter of defining the legality was determined. Money had been advanced by the president and secretary of the Bureau to meet immediate needs of employees most in need of help. All judgments were against the payment out of the $3,000 appropriated by the legislature of which $702.00 already had been expended.

In the general appropriation act for 1891 appropriation was made for the Mining Bureau and for a state geologist. Apparently, there was conflict in the interpretation of how the funds were to be spent, with the result that the projects outlined by the officials of the mining bureau had to be abandoned. There is implication that the Bureau was a group to select and guide the state geologist and not to be an agency headed by the geologist. This may explain Bethune's comments and problems as the first geologist to be appointed.

OFFICE OF

The ~~State~~ Inspector of Coal Mines

The need for control of coal-mine operations was recognized at an early date and was discussed in the legislative assemblies, but just as in the case of an official geologist, nothing was done until the Ninth Biennial Session of the Territorial Assembly in 1883 enacted a law relating to Inspection of Coal Mines and Ventilation, the act to take effect and be in force after the first day of January 1884, and after its approval by the Governor.[1] The act contained 28 sections relating to the inspector and his duties, safety equipment and regulations for mining practice, and the payment of the inspector out of a levy of four mills on each ton of coal mined and used by the operators. Thomas Heacock was the first mine inspector of the Territory; he was appointed in 1884 and served until June 30, 1886. His report, published in 1885[2], indicates that he visited the mines at Carbonado, South Prairie, and the Tacoma Coal Co. at Wilkeson, and he gives production of these mines.

The Auditor of the Territory in a report dated October 1, 1887, gives information about the "Mining Fund" created by the act of 1883 and states that the salary was not to exceed $1800 annually.

The original act was later amended to provide that the inspector should hold office for a term of two years from and after the first Monday in February 1886, shall set forth an annual report to the Governor and, in addition, make quarterly reports of his preceding acts on the first of May, August, and November. The amended act, approved February 4, 1886 was to take affect and be in power after its approval by the Governor.[3]

1/ Session Laws of Washington, Laws Enacted by Ninth Biennial Session of Legislative Assembly in the Year 1883. (page 25)

2/ Report of the Inspector of Coal Mines of Washington Territory to the Legislative Assembly, Session of 1885. Published by Authority, Olympia: Public Printer, 1885 Office of Inspector of Coal Mines, Tenino, W. T., July 1885. Report from July 1, 1884 to June 30, 1885.

3/ Laws of Washington Territory Enacted by the Legislative Assembly, Tenth Biennial Session, 1885-1886.

James H. Watson was appointed to succeed Heacock on May 18, 1886, and served until April 17, 1888. In his report for the year ending June 30, 1887[1] he states "the first law was passed in 1883 when the mines were practically undeveloped and there was no necessity for a complete code. Amendments passed in 1885-1886 added little of importance. The law as it now stands makes the Inspector of Mines dependent on the mine owner for his salary, since he is paid out of the tax levies and in case this proves insufficient he simply has to do without it. In the next place the present law leaves too much to the discretion of the Inspector ..... what is needed is a general and complete set of regulations."

Insert

H. C. Paige was appointed Coal Mine Inspector for District No. 1 from October 1, 1888 to September 30, 1889, and John Sullivan[2] as inspector of the second district for the same period. No reference to Pierce County mines is to be found in Sullivan's report.

The session of the legislature in 1891 passed a law which was more comprehensive and complete.[3] Senate Bill No. 68, under the title Ventilation of Coal Mines, approved March 5, 1891, provided that the state shall be divided into two inspection districts, the First composed of Whatcom, San Juan, Skagit, Island, Snohomish, King, Okanogan, Kittitas, Douglas, Stevens, Lincoln, Spokane, Adams, and Whitman; the Second Clallam, Jefferson, Kitsap, Chehalis, Mason, Thurston, Pacific, Wahkiakum, Pierce, Lewis, Cowlitz, Skomania, Clarke, Yakima, Klickitat, Franklin, Walla Walla, Columbia, Garfield and Asotin. The Governor shall, upon recommendation of a Board, by him selected and approved, appoint two properly qualified persons,

1/ Report of Inspector of Coal Mines and Ventilation of Washington Territory. James H. Watson, Published by Authority, Olympia, 1887. Transcript Press.
2/ Report of Inspector of Coal Mines of Washington, H. C. Paige.
Report of Inspector of Coal Mines of Washington, John Sullivan.
3/ Session Laws of the State of Washington, Session of 1891. Published by Authority, Olympia, Wash. O. C. White, State Printer, 1891.

Insert
The Legislative Assembly at its eleventh biennial session, 1887-1888, enacted legislation relating to the coal mine inspector and inspections, and regulations for safety and ventilation. The act contains 24 sections, and was approved on February 2, 1888

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one for each district, whose commissions shall be for the term of ~~four~~ 4 years..... provided that no inspector shall be appointed whose term of office shall begin prior to the first Monday in February in February 1891. Reports of the said inspectors shall be published biennially by the state in pamphlet form.

Ed T. Morgan, for the First District, and William Griffiths, for the Second District, received appointments for the year ending December 31, 1891. Subsequent appointments have been listed chronologically in a separate memorandum to accompany this story of the mine inspection service in the state.

The Act contained ~~twenty-two~~ 22 sections, in addition to those dealing with the Inspector, which extended and amplified regulations for safe operation of the mines. The Board of Examiners was to hold office for ~~two~~ 2 years.

During the same session, House Bill No. 83 was approved on March 16, 1891, regulating screening and weighing of coal to assure fair methods of payment to the miners.

It was during the same session that an appropriation was made for a Mining Bureau and a State Geologist, but the Act was not clearly drawn, and difficulties arose in its interpretation.

As the production of the coal mines expanded, and as new problems presented themselves, the legislatures were called on for additional laws.

H. C. Paige was appointed on October 1, 1888 to succeed Watson and served until September 30, 1889, and contributed a report of his activities. John Sullivan also served as inspector from some time in 1888 until September 30, 1889. The Legislative Assembly of 1891 (Senate Bill No. 68, approved March 5, 1891[1/]) enacted a law that was more comprehensive and complete than the early legislation; it provided that the state be divided into two inspection districts. The First was composed of Whatcom, San Juan, Skagit, Island, Snohomish, King, Okanogan,

1/ Session Laws of the State of Washington, Session of 1891. Published by Authority, Olympia, Wash., O. C. White, State Printer, 1891.

Kittitas, Douglas, Stevens, Lincoln, Spokane, Adams, and Whitman; the Second embraced Clallam, Jefferson, Kitsap, Chehalis, Mason, Thurston, Pacific, Wahkiakum, Pierce, Lewis, Cowlitz, Skomania, Clarke, Yakima, Klickitat, Franklin, Walla Walla, Columbia, Garfield, and Asotin. The decision appears to have been made on geographical lines rather than on existence of mines. The Governor upon recommendation of a Board, by him selected and approved, was to appoint two properly qualified positions, one for each district, whose commissions were to be for ~~four~~ 4 years, but no inspector was to be appointed whose term of office shall begin prior to the first Monday in February 1891. Reports of the inspector ~~shall~~ be published biennially by the state in pamphlet form. The Board of Examiners was to hold office for ~~two~~ 2 years.

The Act contained, in addition to those dealing with the Inspectors, ~~twenty-two~~ 22 sections that extended and amplified the regulations for safe operation of the mines.

During the same session, House Bill No. 83, approved March 16, 1891, regulated the screening and weighing of coal to assure fair methods of payment to the miners.

During this first session of the State Legislature an appropriation was made for a Mining Bureau and a State Geologist, but the act was not clearly drawn and difficulties arose in its interpretation.

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Joseph Daniels

COAL MINE INSPECTORS OF WASHINGTON

Name	Report for Period, Year, or Years Ended	
Thomas Heacock	July 1, 1884--June 30, 1885	
James H. Watson	July 1886--Oct. 1886 ?	
H. C. Paige	Oct. 1, 1888--Sept. 30, 1889	
John Sullivan	Oct. 1, 1888--Sept. 30, 1889	
Ed T. Morgan, First Dist.	Dec. 31, 1891	
Wm. Griffith, Second Dist.	Dec. 31, 1891	
David Edmonds, First Dist.	1892, 1893, 1894, 1895, 1896	
Joseph James, Second Dist.	1892, 1893, 1894, 1895, 1896	
R. H. Norton	1897, June 19, 1897 to Dec. 10, 1898	In First Biennial Rept. Bureau of Labor, 1897-1898. Division III, Pages 1-44.
C. F. Owen	Dec. 10, 1898--Jan. 1, 1901	Ninth Biennial
	1901-1902 — 1902-1903	Tenth Biennial
	1903-1904	Eleventh Biennial
D. C. Botting	Jan. 1, 1905--Sept. 30, 1906	Twelfth Biennial
	Sept. 30, 1906--Dec. 31, 1907-- Dec. 31, 1908	Thirteenth Biennial* Also includes 1908
	Jan. 1909--Dec. 31, 1909-- Dec. 31, 1910	Fourteenth Biennial
?	Dec. 31, 1912, 1911, 1912	Fifteenth Biennial
James Bagley	Dec. 31, 1914	Sixteenth Biennial
	Dec. 31, 1916	Seventeenth Biennial
	Dec. 31, 1917	Annual Report
	Dec. 31, 1918	
	Dec. 31, 1919	
Wm. R. Reese	1920, 1921, 1922, 1923	In Report of Dept. Labor and Industry
	Dec. 31, 1924	
	Dec. 31, 1925	
	Dec. 31, 1926	
	Dec. 31, 1927	
	Dec. 31, 1928	
	Dec. 31, 1929	
	Dec. 31, 1930	
W. A. Wilson	Dec. 31, 1931	
	Dec. 31, 1932.	

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J. E. Bergin	Dec. 31, 1933	
	Dec. 31, 1934	
	Dec. 31, 1935	
	Dec. 31, 1936	
	Dec. 31, 1937	Missing
	Dec. 31, 1938	
	Dec. 31, 1939	
	Dec. 31, 1940 to July 15, 1941	Missing
George T. Wake	July 15, 1941--Dec. 31, 1941	
	Dec. 31, 1942	
	Dec. 31, 1943	
Tom Voyce	Dec. 31, 1944	Dated Feb. 28, 1945
W. J. Evans	Dec. 31, 1945	
	Dec. 31, 1946	
	1947	
	1948	
	1949	
	1950	
	1951	
Clarence R. Holmes	Dec. 31, 1952	
	Dec. 31, 1953	
	1954	
	1955	
	1956	
	1957	
	1958	
Robert H. Pierce	Dec. 31, 1959	
	Dec. 31, 1960	
	Dec 31, 1961	

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Coal Mining Laws of Washington Joseph Daniels

A search was made of the laws of the Territory and of the State from 1881 - 1961 on file in the Law Library of the University of Washington. It would be complicated for the ordinary investigator to digest all of this material, nor is it necessary for one who is not concerned with legal details. However, it is interesting to trace the development of the laws relating to coal mining, the appointment of mine inspectors, their qualifications and duties; the regulations made for the safety of workers and the mine; ventilation; ~~the safety of workers and the mine: ventilation:~~ the modifications that had to be made as changes in mining practices occurred as mechanization replaced many of the hand methods previously employed; the introduction of electricity into mines and their surface operations. Questions of welfare, health, insurance, payment for work done, and a host of personal questions relating to the worker and his employer had to be met as the whole concept of industrial relations grew up in the mineral industry.

The trends are revealed in the passage of laws in practically every legislative session. Detailed study is required to follow the changes in the "Mining Code" from the early efforts of 1880 to the most recent in 1961. For the investigator who may be interested in specific years, a tabulation has been made that may be of help. To simplify the tabulation all data are for Washington Laws by years without distinction as to territorial or state legislative assemblies or sessions.

The year indicates the date the law was passed: the date of approval by the Governor is also shown. The Chapter number, the bill number, legislative designation, and the main or short title are given; and in some instances, a fuller description of the Act is recorded. No attempt has been made to copy the full data given on title pages of the law books.

~~It must be remembered that~~ For many years the State Inspector of Coal Mines carried on his own office as chief of his department; in 1921 his office was transferred to the Department of Labor and Industries and since that time the reports of

the State Inspector of Coal Mines have been printed as part of the publications of the state department of labor.

The mining laws from time to time have been compiled into pamphlet form and issued as guides and helps to interested persons, such as mine workers who wished to study the laws for examination requirements for certification; for potential candidates for mine inspector qualification; for owners and operators of properties as a guide to their responsibilities, and for general information about the Mining Code. They are available from the office of the chief mine inspector.

Joseph Daniels

Virtually every session of the legislature from 1881 to 1947 enacted laws dealing with mining involving payment or appropriations for salary of inspectors, qualifications and appointment of chief inspectors and deputies, creation of boards of examiners, examinations for competency, and the like. In addition, mining practices were carefully regulated to promote safety in operations, safety for the men, health measures, and ventilation. As the years went on, changes from hand to mechanized mining brought about alterations and new rules to govern the use and application of these advances. Provisions for first-aid instruction and mine-rescue training were drawn up and incorporated in safety regulations. The growing use of electricity in mines and mine plant led to new codes just as comprehensive in scope as the earlier regulations. The social and economic aspects of administration and management of industry in recent years was reflected in laws relating to health, working conditions, payment of labor, accident insurance and compensation, and similar considerations.

An example of one of the acts enacted by legislative assembly is indicated by the following summary of Chapter 36, Senate Bill 152, Laws of 1917, approved March 2, 1917.

I. Definition
II. Inspection Department
III. Examining Board
IV. Certified Men
V. Ventilation
VI. Maps and Plans
VII. Hoists and Hoisting
VIII. Duties of Operators
IX. Duties of Officials
X. Mine Rescue Equipment
XI. Powder and Explosives
XII. Safety Lamps
XIII. Shaft Sinking
XIV. Installation of Electricity
XV. Hours of Labor
XVI. General Rules
XVII. Offenses and Penalties
XVIII. General

This law or code represented the best thought of labor, management, and the mine inspection service. Subsequent changes were made from time to time and the laws published in pamphlet form by Chief Mine Inspectors James Bagley, 1917; and by J. E. Bergin, in 1934; ~~and by Geo. T. Wake, 1943~~. In 1943 after new laws had been adopted by the legislature, a new compilation was published ~~the State Department of Labor and Industries, Robert H. Harlin, Director, Jno. E. Morgan, Supervisor of Safety, Geo. T. Wake, Chief Inspector, under the title Coal Mining Laws of Washington as Amended 1919, 1927, 1939, and 1943. Olympia State Printing Plant 1943, published its latest compilation~~. This 129-page pamphlet is a complete and comprehensive statement of the coal mining code of the state. Two typed sheets have been issued as a Supplement to Coal Mining Laws--Amendments and Additions, representing changes made in 1945 and 1947.

1/ Coal Mining Laws of Washington As Amended 1919, 1927, 1939, and 1943 Department of Labor and Industries. Robert E. Harlin, Director, Jno. E. Morgan, Supervisor of Safety, Geo. T. Wake, Chief Inspector. Olympia. State Printing Plant. 1943

1. Daniels, Joseph, 1914, The coal fields of Pierce County: Washington Geol. Survey Bull. 10, 146 p.

2. Daniels, Joseph, 1920, The coking industry of the Pacific Northwest: Univ. of Washington Engineering Experiment Station Bull. 9, 33 p.

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