VOLUME I

PRELIMINARY REPORT

ON

NANAIMO COAL BASIN

VANCOUVER ISLAND

92F 1

for

NETHERLAND PACIFIC MINES INC.

VANCOUVER, BRITISH COLUMBIA

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VOLUME I

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INTRODUCTION

Coal mining on Vancouver Island played an important part in the economy of British Columbia and Canada between the years 1875 to 1964. Most of the mining occurred in the Nanaimo and Cumberland coal fields on the East side of Vancouver Island. This coal supplied numerous railroad and steamship companies in both Canada and the United States, as well as satisfying large domestic markets.

The advent and the development of the oil and gas industry forced the closure of the producing mines in the Cumberland and Nanaimo fields. Due to the renewed demand for coal over the last few years, coal exploration has resumed on Vancouver Island. Most of the work has been confined to the Comox Basin, which contains the older coal deposits.

The Nanaimo Basin, which encompasses approximately 513 square miles (1,330 sq. km.) has been overlooked up until recently, for a variety of reasons. The main reason is that the majority of government memoirs and documents produced in the last few years maintain that all of the coal in the area has been mined in the past. This report outlines an area in the Nanaimo Basin that possesses reasonable potential of finding economic coal as evidenced by a preliminary field mapping program coupled with historical data research.

In consideration of the proximity to tidewater, the absence of any large infrastructure requirements, and availability of labor on Vancouver Island, this area warrents further exploration in order to evaluate the potential coal reserves.

ABSTRACT

Coal mining on Vancouver Island, during the period of 1875 to 1964 produced some 72,000,000 short tons of coal.

Approximately 50,000,000 of those tons were produced in the Nanaimo coal fields.

The Nanaimo and Cowichan Basin are estimated to comprise of 769 square miles (1,993 Km^2), and the total production to present was totally underground mined within 70 square miles (181 Km^2); primarily within the Nanaimo Basin.

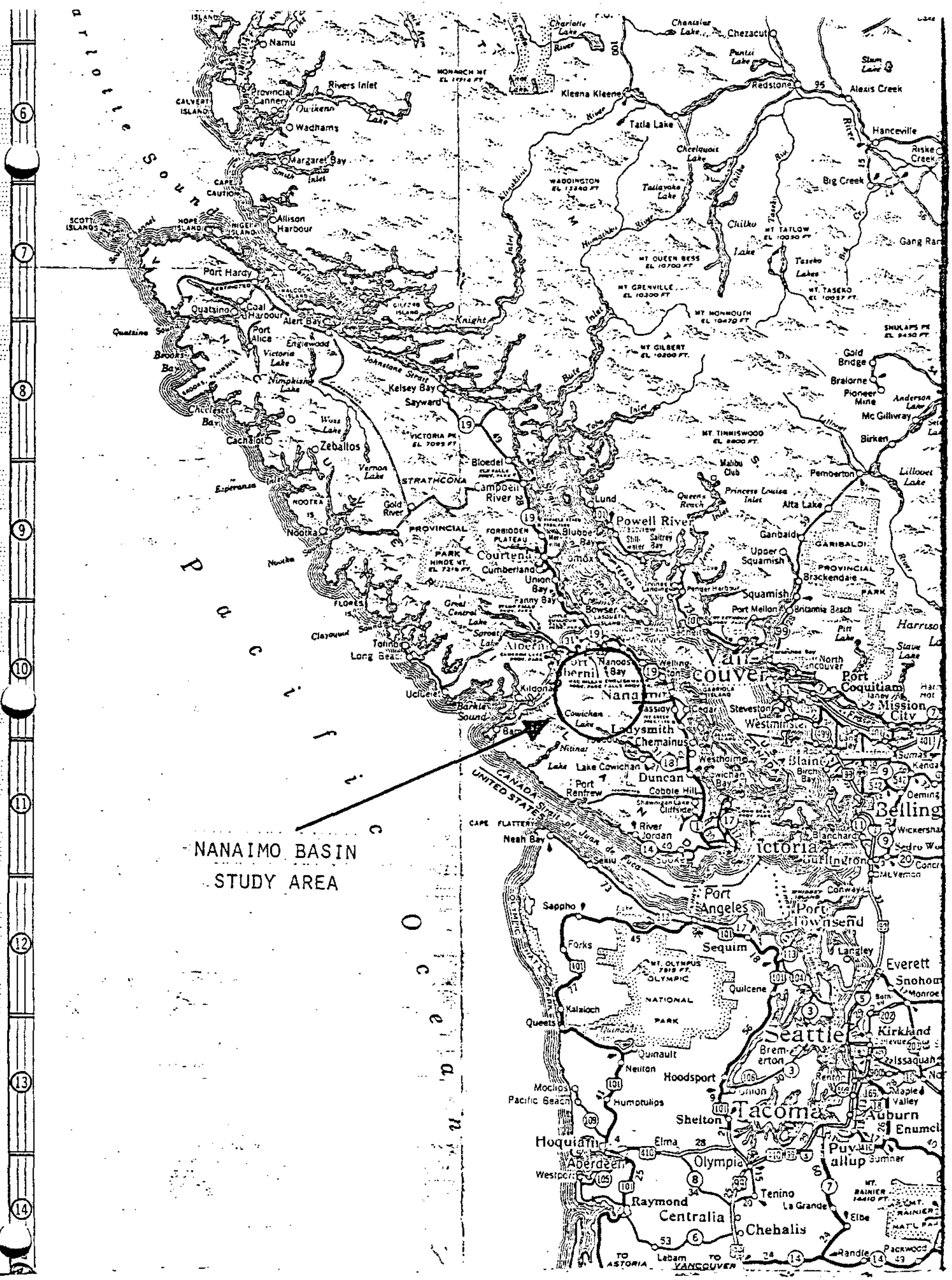
C.H. Clapp, in his report, "Coal fields of Vancouver Island", calculated the potential in-site coal measures to be 3.3 billion short tons within the Nanaimo and Cowichan Basin. He further stated that much of this coal was non recoverable due to; uneconomical seam thickness; complexities of Folding and Faulting, and the high cost of mining (1922).

More recent surface and photogeologic mapping of Vancouver Island, (Mueller 1971-75) indicates large potential coal areas within the Nanaimo and Cowichan Basin.

Examination of past research and published information, prompted a thorough mapping and field checking program, which has revealed the existence of sufficient data to warrant further detail work on several locations within the relatively unexplored areas of the Upper Cretaceous structures of the basins.

The complexities of the structure cannot be minimized, but it has been the experience of the author that a basic understanding of the folding and faulting can lead to suitable mining areas, with sufficient mineable coal reserves to warrant producing mines.

In the westerly portions of the Nanaimo Basin, the cyclical succession of clastic continental and marine facies that make up the Nanaimo Group, abuts unconformably on the old erosional surface of the Triassic Karmutsen basalts. The sediments have been structurally disturbed by faulting and folding action, spawned by the rapid uplift of the Island Intrusive granitic complex.


NANAIMO BASIN
STUDY AREA
Pacific Ocean
Namu
Rivers Inlet
Wadhams
Margaret Bay
Allison Harbour
Port Hardy
Quatsino
Coal Harbour
Port Alice
Alert Bay
Englewood
Kelsey Bay
Sayward
Zeballos
Cachalot
Nootka
Gold River
Campbell River
Bloedel
Courtenay
Cumberland
Union Bay
Fanny Bay
Bowser
Tofino
Long Beach
Ucluelet
Barkley Sound
Alberni
Port Alberni
Nanoose Bay
Nanaimo
Cowichan Lake
Ladysmith
Chemainus
Duncan
Lake Cowichan
Port Renfrew
Cobble Hill
Victoria
Powell River
Lund
Squamish
Vancouver
North Vancouver
Port Coquitlam
Mission City
New Westminster
Steveston
Blaine
Bellingham
Pemberton
Lillooet Lake
Alta Lake
Garibaldi
Brackendale
Britannia Beach
Port Mellon
Upper Squamish
Gold Bridge
Bralorne
Pioneer Mine
Birken
Kleena Kleene
Tatla Lake
Redstone
Alexis Creek
Chezacut
Hanceville
Big Creek
Chilko Lake
Neah Bay
Cape Flattery
Sekiu
Port Angeles
Port Townsend
Sequim
Quilcene
Forks
Kalaloch
Queets
Quinault
Olympic National Park
Mt. Olympus 7915 Ft.
Seattle
Bremerton
Tacoma
Everett
Kirkland
Issaquah
Renton
Auburn
Puyallup
Shelton
Hoodsport
Olympia
Aberdeen
Hoquiam
Raymond
Centralia
Chehalis
Tenino
Elma
Moclips
Pacific Beach
Humptulips
Strait of Juan de Fuca
Canada
United States
Strathcona Provincial Park
Garibaldi Provincial Park
Johnstone Strait

LOCATION AND PHYSIOGRAPHY

The Nanaimo basin is located on the east side of Vancouver Island, from Ladysmith in the south to Nanoose Bay in the North. The basin is confined on all sides but the east by mountains of basalt and granite from which the sediments were shed. On the east, where they are bound by the Strait of Georgia, (under which the sediments carry for an undetermined distance) the basins are essentially a lowland area.

Topography is variable due in part to deep seated stresses associated with volcanic activity and in part to the great differences in weathering between some of the harder, competent sandstones and conglomerates and the softer, easily credable shales.

Topography varies from 2,400 ft. above sea level to 200 ft. above sea level. It consists of a general sloping of the land surface to the east. The slopes are steeper close to the mountain front and become more gentle with distance away from the mountainous border on the west.

The principal drainage is the Nanaimo River, which flows through the middle of the study area. This large river flows in an easterly direction and it has cut a large valley in the landscape which can be up to 500 feet deep. A secondary drainage is the Haslam Creek drainage to the south of the Nanaimo River. Its valley is no more than 200 feet deep and the Haslam flows into the Nanaimo River east of the study area. Numerous creeks and small rivers flow into the Nanaimo River, incising the general topography with many steep sided valleys and gorges.

The area has reasonably good access with a paved secondary highway called the Nanaimo Lakes road, running along the north side of the Nanaimo River valley. There are several main logging roads, and numerous secondary logging roads that form a network throughout the back country.

The area is sparsely populated with a few acreages along the Nanaimo River. Most of the surface rights are owned by major forest companies and the area is heavily treed.

PREVIOUS WORK

Some early exploration work was conducted in the study area by Canadian Colleries (Dunsmuir) Ltd., which had producing mines in the Nanaimo area until 1960. The work consisted of field reconnaissance and locating coal outcrops. A four foot seam was located on the Nanaimo River below a large conglomerate member. A small mine, called the White Rapids mine, produced coal out of this seam - this was the most westerly producing mine in the Nanaimo Basin. Another outcrop of coal was located near Blackjack Mt. This seam, called the Blackjack seam, is placed by several sources as being the lowest seam in the stratigraphic sequence of the Nanaimo sediments. In fact it could occur in the earlier Comox depositional sequences, thus equating to the Comox No. 1 seam deposition of the Cumberland, Quinsam and Alberni areas. There is no record of it's measured thickness, however, later exploration drilling in the vicinity of Wolf Mountain (holes 135-138), more than four miles to the South-east, intersected a seam 10.5 feet thick that may correlate with the Blackjack outcrop. This would point to a substantial area of coal deposition that may prove to be continuous with additional drilling.

Other work in the Nanaimo Basin was conducted by government geologists from the Geological Survey of Canada. The most noteable of these were C.H. Clapp, J.D. Mackenzie, and more recently, J.E. Muller, who has taken all of the older work and combined it with a photogeologic survey to produce comprehensive maps of the geology of Vancouver Island. These maps outline the areas of sedimentary deposition (i.e. the Nanaimo Basin and others), and interprets some of the more prominent structural features.

Recent work on the study area by the authors includes researching all the historical data, field mapping and airphoto interpretations.

A detailed outline of the earlier work follows to allow for a better understanding of the general area.

Surface mapping has indicated that coal outcrops exist in this area of sufficient thickness to be economically mineable.

Coal in the Nanaimo Series is of a High Volatile Bituminous "A" rank. A typical range of analyses from the Nanaimo seams is as follows:

Proximate Analyses - (As received basis)

Moisture	1.1	4.14%
Ash	7.8	11.0%
Volatile matter	33.3	33.25%
Fixed Carbon	57.8	51.61%
Sulphur	0.4	1.2%
Calorific Value (dry btu)	13,160	12,830
Ash fusibility	2400° F	2000° F

Memoir 59, Page 135, No. 55, Geological Series COAL FIELDS AND COAL RESOURCES OF CANADA by D. B. Dowling, under the heading of COALFIELDS OF VANCOUVER ISLAND, by C. H. Clapp, the following is found:

> The total area underlain by the Nanaimo series is about 1,800 square miles (4,700 km^2). The principal basins are as follows: The Quatsino Sound basin, 49 square miles (127 km^2) at the northern end of the island, extending to the west coast; the Suquash basin, 164 square miles (425 km^2), on the east coast of the island separated from the Quatsino Sound basin by a narrow, low divide; and farther south on the east coast, bordering on the Strait of Georgia, the Comox basin 789 square miles (2,070 km^2); the Nanaimo basin 513 square miles (1,330 km^2), and the Cowichan basin, 256 square miles (663 km^2). In the central part of the island at the head of one of the long fiords which indent the west coast, is the Alberni basin, 66 square milles (171 km^2). Besides those given above, there are several small outliers and basins of only a few square milles in extent. The area which is underlain by workable coal-seams is, however, much less than the total area underlain by the Coal Measures, being approximately one-third of the latter. Those basins which probably contain workable coal-seams are the Koskeemo, which is a portion of the Quatsino Sound basin, the Suquash basin, and portions of the Comox, Nanaimo, and Alberni basins. Of these the Suquash, Comox, and Nanaimo basins contain workable coal-seams, which are being mined at present.

MEMOIR 96, No. 80, Geological series Sooke and Duncan Map areas, Vancouver Island, by C. H. Clapp and J. C. Cooke, Page 21 commencing with the fourteenth line, the following is found:

"Coal of commercial value probably does not occur in the Nanaimo series of the Duncan Map area, and neither does it seem as if oil will be found in the series in sufficient quantities to be commercial. It is certain that the Tertiary sediments along the southwest Coast of the Island, in the Sooke Map area, contains no coal of commercial value, and the conditions for the accumulation of oil in them are distinctly unfavourable.

In the same MEMOIR beginning Page 57, the following is found:

Resting uncomformably upon a surface of considerable relief cut in the rocks of the Vancouver group and in the irruptive rocks as well as in the Nanaimo series of fragmental sediments of Upper Cretaceaous age. The Nanaimo series occurs in two principal areas or basins; one, in the north-eastern part of the Duncan map area, is known as the Cowichan basin. There is also a small outlier of the lower shales of the series in the upper portion of the Koksilah valley. The rocks of the Nanaimo series consist of conglomerates, sandstones, and shales, with in places, thin coaly streaks and lenses. The conglomerates usually consist of sub-rounded pebbles, chiefly of quartz and quartzose rocks, although the basal conglomerates contain larger and angular fragments of the underlying schists, meta-volcanics, and granitic rocks. The sandstones are largely medium to coarse-grained, yellowish or brownish grey to greenish grey in colour, although those of one formation, the Protection are greyish white. They are composed of angular to sub-rounded grains of quartz, feldspar, and rock fragments in an argillaceous matrix, and are commonly cemented by calcite. Many of them are concretionary and some of them are cross-bedded. The shales are virtually all sandy and many are carbonaceous, varying from olive grey to dark grey or black. They are composed chiefly of small angular quartz grains in an argillaceous and carbonaceous matrix. Calcite is usually present although rarely in large amounts. The shales are rather massive and weather concentrically. The shales of the upper formation, especially those with a large number of thin sandstone interbeds, are cut by sandstone dykes, up to 3 or 4 feet.

The total thickness of the Nanaimo series varies considerably but averages about 10,100 feet. The upper portion of the series is missing, presumably eroded, in the Cowichan basin, where the thickness averages about 4,950 feet. The various rocks of the Nanaimo series grade rather rapidly into each other in both vertical and lateral directions. Nevertheless the series has been subdivided on a lithological and stratigraphical basis into various members or formations (enumerated in the following table of formations) each with its more or less distinguishing characteristics. Most of the formation may be definitely correlated with the formations of the Nanaimo basin in the adjoining Nanaimo map-area, but all of the formations in the Nanaimo map-area can not be distinguished and hence a few new and more comprehensive formations have been mapped.

The Nanaimo series has been moderately deformed almost entirely in zone of fracture during the lower Oligocene deformation, by forces which seem to have acted from the northeast. The rocks of the Nanaimo basin have a general northwest-southeast strike and a prevailing dip to the northeast. They are, however, involved in a few large, open, longitudinal folds and several smaller ones. The southwestern most large gold is the southeastward continuation of the Kulleet syncline of the Nanaimo map-area and it axis extends across the Duncan map-area to the southwest of Kuper and Thetis Islands and crosses Saltspring Island near the southern end of St. Mary Lake. The corresponding anticline, called the Thetis anticline, crosses Thetis and Kupper Islands and follows the northeastern shore of Saltspring Island. Another syncline and anticline crosses the northeastern corner of the map-area between Norway, Secretary and Wallace Islands to the southwest and Reid Hall and Galiano Islands to the northeast. The anticline is the southwestward continuation of the Trincomali anticline of the Nanaimo map-area, and the syncline, named the Channel syncline, also starts in the Nanaimo map-area. Only the deCourcey and Northumberland formations are involved at the surface in these folds. The limbs of the folds dip at angles varying from 5 to 60 degrees, averaging about 20 degress. To the southeast of the folds the rocks, except for minor wrinkles in the weaker ones, dip uniformly to the northeast, at angles varying from 15 to 90 degrees, averaging about 35 degrees. Where crumpled, the weaker rocks of the Nanaimo series are broken by small strike faults. There are also a few small cross faults, but so far as known there are no larger faults in the Nanaimo basin.

The rocks of the Cowichan basin have a general north 60 to 70 degrees west strike and steep dips of 30 to 90 degrees to the north. Apparently the eastern portion of the basin has been folded into two rather closely folded synclines slightly overturned to the southwest, and the northern limb of each syncline has been broken by a fault which brings the underlying crystalline rocks against the rocks of the Nanaimo series. The southern syncline extends across the map-area and is followed by the Cowichan valley, and apparently preserves its structure, since a similar faulted syncline is observed west of the map-area at Cowichan Lake. Whether the fault that breaks across the northern limb of the southern syncline extends across the map-area is problematical; all the evidence available goes to prove that it does, but with insufficient throw in its middle portion to bring the underlying crystalline rocks to the surface, so that in its middle portion the fault separates the Haslam shales on the north from the overlying Duncan shales on the south.

The fault that breaks across the northern syncline has a large throw only it its eastern portion, near Maple bay. It dies out to the west; for, along the Chenainus river, the Haslam shales grade downward into a rather metamorphic sandstone and somewhat schistose basal conglomerate, which rests directly upon the Tyee porphyrite. Although nearly parellel to the syncline the fault levels across it at a slight angle; at Maple bay, it cuts across the northward dipping, southern limb of the fold, while on Mt. Sicker the axis of the syncline occurs in Mr. Prevost, over a mile to the south of the fault. In Mt. Prevost the Haslam shales forming the lower portion of the mountain are isoclinally found, so that they all have a nearly vertical dip, but the overlying competent Extension conglomerates are folded into a small open synclinorium, consisting of three of four short folds, the limbs of which dip at angles varying only from 15 to 40 degrees. The conglomerates, therefore, appear to rest unconformably upon the shales, and the structure was formerly interpreted in this way, but farther west in the Mt. Prevost ridge, where the syncline is not so closely eompressed, the conglomerates are clearly conformable with the underlying shales.

In the western part of the Cowichan basin the rocks occur in three narrow basins, and apparently fill anticlinal valleys in the Sicker series. The southern and largest basin, that forming the Cowichan valley, is

probably a rather closely folded syncline that is overturned so that most of the rocks dip to the north, that is they are broken by a fault along the northern boundary of the basin. The other two basins are apparently rather closely folded synclines also. The southern of the two, which is followed by the Chemainus river, appears to be a continuation of the northern of the two eastern synclines and strikes about north to 65 degrees west. It is doubtful whether any of the contacts of these two basins with the underlying rocks are persistent faults, but considerable minor faulting has taken place along the contacts.

Besides the larger folds and faults in the Cowichan basin there are rather numerous, smaller, chiefly longitudinal folds, and doubtless there are also many other faults.

Again, the same MEMOIR, commencing at page 218 under the heading Nanaimo Series GENERAL DESCRIPTION AND STRATIGRAPHY, the following is found:

All of the unmetamorphosed sedimentary rocks of southern Vancouver Island supposed to be of Mesozoic (largely Upper Cretaceous, Nanaimo) age and possibly of lower Cenozoic (Eocene) age were previously grouped together with the writer because the sediments could not be definitely subdivided and were supposed to consist of two or more unconformable formations. They were called the Cowichan group. It was found, however, during the detailed work of 1910 and 1911 in the Saanich and Nanaimo map-areas, that all the sediments of the so-called Cowichan group rested unconformably upon the metamorphic and granitic rocks of the island, were conformable with each other, and were largely, if not entirely, of Upper Cretaceous age and members of the Nanaimo series of formation, so named and described by Richardson, Whiteaves, and Dawson. Since the probability of there being any Eocene members in the conformable series of sediments is very slight, the name Nanaimo was extended to embrace the entire conformable series which in the Nanaimo map-area was definitely subdivided into various members of formations. It has been found by Cooke that the transition supposed by the writer to occur along the Chemainus river between the unmetamorphosed rocks of the Cowichan group and the metamorphic rocks of the Sicker series does not exist; but that there is instead a transition between somewhat metamorphosed conglomerates and sandstones and conformably overlying unmetamorphosed sandstones and shales; and that

the metamorphosed conglomerates rest unconformably upon the schistoes Tyee quartz-feldspar porphyrites (sericitic schists) intrusive into the Sicker series. It was supposed that the steeply dipping sandstones and shales forming the base of Mt. Prevost were unconformably overlain by the gently dipping conglomerates forming the top of Mt. Prevost. The discordance of dip is now explained more satisfactorily in another way since the lower (Haslam) shales and sandstones are in most places clearly conformably overlain by the conglomerates (Extensive formation). The discordance is probably due to the crumpling and nearly isoclinal folding of the weak shales beneath the more competent conglomerates which were deformed only into broad open folds. Also some thrust faulting has probably occured along the contact of the shales and conglomerates. It is thus fairly certain that all of the sediments previously mapped as the Cowichan group are conformable and, since they contain in places fossils of Nanaimo age, are all members of the Nanaimo series. The term, Cowichan group, therefore, will no longer be used.

The rocks of the Nanaimo series occur in two principal areas or basins; one the southeastward extension of the Nanaimo basin, and the other the Cowichan basin. The portion of the Nanaimo basin within the Duncan map area fringes the east coast of Vancouver Island from Ladysmith to Crofton, and its rocks form the northern part of Saltspring island and all of the smaller islands of the northeastern part of the map-area. The Cowichan basin is separated from the Nanaimo basin by a narrow axis of the crystalline rocks of the Sicker series and their intrusive porphyrites occuring to the south of Crofton, and extends from the east coast of Vancouver island entirely across the map-area. It has a maximum width of nearly 10 miles, but in its eastern portion it is broken by a narrow axis of crystalline rocks of the Sicker series, and in its western part is divided into three elongate basins, which partly fill anticlinal valleys in the Sicker series. The southern and largest of the three basins between the Sicker series on the north and Vancouver volcanics on the south underlies the Cowichn valley.

A very small outlier of the Nanimo series occurs near the first forks of the Koksilah river.

The rocks of the Nanaimo series consist of conglomerates, sandstones, and shales, with, in places, thin, coaly streaks and lenses associated with carbanaceous shales and sandstones. The total of the average

thicknesses of the formations of the Nanaimo series within the Duncan map-area is 10,100 feet. Only the lower formations of the series are found in the Cowichan basin, although it is probable that the upper formations once occurred there and have been eroded, so that the total average thickness of the sediments in the Cowichan basin is only 4,950 feet. The totals of the minimum and maximum thicknesses of each formation are 7,950 feet and 13,200 feet in the Nanimo basin, and 3,400 feet and 7,400 feet in the Cowichan basin; but no complete section along any single line is as thin or as thick as these totals, in fact it is very doubtful if any complete section differs greatly from the total average thicknesses given above.

Within the Nanimo map-area, as has been already mentioned, the Nanaimo series was subdivided on a lithological and stratigraphical basin into eleven formations. The recognition of these formations within the Duncan map-area has been difficult owing to the change in the lithological character of some of the formations, the rapid vertical and lateral gradation of the sediments, the absence of distinct horizon markers, the deformed character of the rocks, and the poor and scattered exposures which in many places are separated by wide stretches of water, whereas in other places the rocks are hidden by a thick mantle of drift. However, it has been found possible to distinguish most of the formations by their continuity with the formations of the Nanaimo map-area, or by their lithological similarity, or by their stratigraphical position. One of the formations of the Nanaimo map-area, however, the East Wellington sandstone, the floor of the Wellington coal seam, is not developed in the Dunan map-area, nor are the three principal coal seams of the Nanaimo map-area, the Wellington, Newcastle, and the Douglas. Two of the formations of the Nanaimo map-area, the Cranberry and the Newcastly, are similar in lithology, but are separated by the Newcastle coal seam. As the seam is not developed in the Duncan map-area the two formations cannot be differentiated there and hence are mapped together as the Ganges formation. In the Cowichan basin it has been impossible to separate the rocks of the Ganges formation from those of the Cedar District formation since the intermediate formation, the Protection sandstones, can be recognized only in one place. Hence in the Cowichan basin the Ganges, Protection and Cedar District formations are all mapped together as the Duncan formation. The formations with their principal lithological character and thickness are enumerated in the following table:-

Table of Formations of the Nanaimo Series.

Name	Lithological Character	Thickness Min.	Max.	Average
Gabriola Formation (In the Nanaimo basin only)	Chiefly thick-bedded, but many medium to thin-bedded, yellowish grey, fine to coarse-grained and in places concretionary sandstones, with some shaly sandstones and sandy shales.	2,200	2,400	2,300
Northumberland Formation. (In the Nanaimo basin only)	Sandy shales with thin interbeds of sandstones at the top, unexposed in the Duncan map-area, an upper middle portion of coarse-grained thick-bedded sandstones which thick lens-like beds of coarse conglomerates of predominating well rounded fragments of granitic, prophyritic, and quartz-ose rocks; a lower middle portion of thick-bedded to shaly sandstones and sandy shales; and sandy shales with thin sandstone interbeds and dykes at the bottom.	1,700?	2,300	2,500
De Courcey Formation (In the Nanaimo basin only)	Chiefly thick-bedded, greenish grey, fine to coarse-grained gritty and even pebbly sandstones, in places cross stratified and concretionary, and some thin-bedded to shaly sand-stones and sandy shales.	800	1,400	900
Cedar District Formation. (In a Nanaimo basin only)	Chiefly dark grey, carbonaceous and ferruginous sandy shales, with num-erous thin interbeds of brownish grey, fine-grained sandstone, and some thicker beds of yellowish grey, coarse-grained sandstone.	750	900	800
Protection Formation. (In the Nanaimo basin only)	Chiefly thick to thin-bedded, grey-ish white, fine to medium-grained sandstone, in places coarse-grained and pebbly, and thin interbeds of shaly sandstone and sandy shale.	600?	700?	650
Ganges Formation. (In the Nanaimo basin only)	Chiefly dark greensih, thin-bedded shaly sandstones and sandy shales.	700?	800?	750

Table of Formations of the Nanaimo Series (Continued)

Name	Lithological Character	Thickness Min.	Max.	Average
Duncan Formation. (In the Cowichan basin only the equivalent of Cedar District, Protection and Ganges formations)	Chiefly dark greenish, sandy shales and shaly sandstones, with numerous thin layers of sandstones, and at least one horizon of thick-bedded, greyish white, fine to medium-grained sandstone.	2,000?	2,700?	2,500
Extension formation.	Chiefly conglomerate of subrounded pebbles of a great variety of rocks in a predominating sandstone matrix, with thick interbeds of coarse-grained sandstone and thin layers of shaly sandstone and sandy shales. Near Ladysmith composed of greyish white, medium-grained sandstone.	600	1,500?	800
Haslam formation.	Chiefly thin-bedded, light to dark grey, sandy and carbonaceous, calcareous, and in places concretionary shales and fine-graned shaly sandstones. Toward the base predominating sandstones and arkoses	600	2,500?	1,500
Benson formation.	Basal conglomerates and arkose . . .	0	700	150
	Total in Nanimo Basin	7,950?	13,300?	10,100
	Total in Cowichan Basin	3,400	7,400	4,950

DETAILED DESCRIPTION OF FORMATIONS.

Benson Conglomerate.

Distribution and thickness. The basal conglomerate of the Nanaimo series, called the Benson conglomerate, is developed only locally along the eastern base of Mt. Brenton, east of Crofton, and on Maxwell mountain and near Maxwell lake on Saltspring island, in the Nanaimo basin; and on and near Mt. Tzuhalem, overlapping upon Mt. Sicker, in places along the Chemainus river and in the narrow extensions to the west of the river, and on the south slope of the western part of the Cowichan valley, in the Cowichan basin. Elsewhere the arkosic but shaly sandstones of the lower part of the Haslam formations rest directly upon the underlying crystalline rocks. The basal conglomerate is well exposed in most of the localities mentioned, but especially well on Mt. Maxwell and Mt. Tzuhalem where it attains its maximum thickness of 700 feet. The conglomerate thins out rapidly, so that within 2 miles to the northwest of Mt. Maxwell the overlying sandstones and shales rest upon the crystalline rocks. Owing to its rapid variation it's average thickness can only be estimated approximately, as about 150 feet.

Lithological characters. The Benson conglomerate varies from a typical coarse basal conglomerate, composed of angular or subangular fragments of the immediately underlying rocks to a fine breccia-conglomerate, and in places even to an arkose which, although it rests upon the crystalline rocks, is interbedded with dark carbonaceous shales caracteristic of the Haslam formation. Where the conglomerate is thick, as on Mt. Tsuhalem and Mt. Maxwell, the fragments of the lower portion are distinctly angular and unsorted, while those of the upper portion are farily well rounded, sorted and arranged in layers. Some of the larger fragments are 3 or 4 feet in diameter, but the average size is not more than an inch. They are composed of all of the older metamorphic and granitic rocks, but fragments of chert, vein quartz, fine-grained meta-andesite, and granodiorite predominate. Near the samll outlier in the Kiskilah river, are boulders of a basal conglomerate with rounded pebbles of limestone. The fragments are contained in an abundant matrix of coarse arkosic sandstone of fine breccia which, as mentioned, forms in places the entire rock. The arkose is of a prevailing greenish colour and contains large amounts of feldspar, largely albite, as well as quartz and considerable biotite, chlorite, epidote, magnatite ilmenite, muscovite and calcite. Small angular grains of undecomposed rock

fragments, notably Sicker andesite and gabbro-diorite porphyrite, are also numerous. The conglomerate is cemented partly by calcite and ferrunginous minerals and largely by argillaceous and carbonaceous matter. In places it contains disseminated pyrite and in the south end of Copper canyon is somewhat foliated and schistose.

Haslam formation (Marine Shales)

Distribution and thickness. Overlying the Benson conglomerates, but in many places resting directly upon the underlying crystalline rocks, is the Haslam formation which is locally called the "marine shales" on account of the marine fossils which are found in the sandy shales composing the larger part of the formation. The Haslam formation extends along the inner, southwestern border of the Nanaimo basin in an unbroken belt, one-eighth of a mile to over 3 miles in width, from Ladysmith to south of Crofton. It also extends across the central part of Saltspring island, underlying the valley between Mt. Maxwell and Mt. Erskine. In the Cowichan basin, the Haslam formation outcrops along the southern boundary, in a belt from half a mile to over a mile wide; it also directly underlies the greater portion of the northern part of the Cowichan basin, being overlain only by the Extension conglomerates of Mr. Prevost and of the ridge extending westward from Mt. Prevost. In the three arm-like, westward extensions of the Cowichan basin the only remaining rocks are those of the Haslam formation and underlying Benson conglomerate. Although they are unexposed within the Duncan map-area it is quite certain that the Haslam shales underlie the broad, low valley on Saltspring island extending southeast from Burgoyne bay on the west coast of the island to Fulford harbour on the east coast. The rocks are exposed on the southwestern shore of Fulford harbour and a deep shaft near the head of the harbour penetrates the thick drift mantle into the Haslam shales. In addition, the sandy shales of the small outlier in the upper part of the Koksilah river doubtless belong to the Haslam formation.

The rocks of the Haslam formation are usually heavily drift covered, but many streams have cut through the drift cover and into the Haslam rocks. The larger streams especially the Chemainus river and the middle portion of Cowichan river, have cut deeply into the rocks to form narrow canyons or gorges, 100 to 200 feet deep, which afford excellent exposures of considerable thickness of the Haslam rocks.

The Haslam formation is much thicker in the Duncan map-area than in the Nanaimo map-area; in the latter it has an average thickness of about 600 feet. Although its thickness in the northern part of the Duncan map-area is not much more than 600 feet along the Chemainus river, well over 1,500 feet of rocks belonging to the Haslam formation are exposed. At the base and resting upon the basal conglomerates are 300 feet of massive, grey, arkosic sandstones, on which are 350 feet of shaly concentric-weathering sandstones, which are overlain in turn by nearly 1,000 feet of black sandy shales with thin sandstone beds. Within the Cowichan basin the thickness of the Haslam formation appears to be over 2,000 feet, and in places, as between Mt. Tzuhalem and Maple bay, where the Haslam formation rests upon the thick portions of the Benson conglomerate, there is openly 1,000 feet of sandstones at the base of the Haslam formation, which are overlain by about 1,500 feet of sandy shales. The thickness of the formation varies, therefore, from 600 feet to nearly 2,500 feet, and averages about 1,500 feet.

Lithological Characters. The Haslam formation as in the Nanaimo map-area is composed chiefly of thin-bedded, light to almost black, sandy, and usually carbonaceous shales. Some of the shales are ferruginous, and may contain pyrite, and weather to a reddish brown colour. Virtually all of the shales weather concentrically into rounded masses varying in size up to a foot in greatest diameter, and thus appear to have a concretionary structure. In places the shales contain hard sandy and flintlike concretions, with a calcareous cement. The concretions may vary from large ellipsoidal masses 3 to 5 feet in diameter and about 1 foot thick to small, irregular, grotesque forms 1 to 3 inches in diameter. On microscopic examination the shales are seen to be composed largely of fine, usually calcareous, silt in which are small angular grains of quartz and feldspar, chiefly albite, and more or less chlorite, epidote, muscovite, biotite, and calcite. Many of the shales are decidedly calcareous, and those exposed in the upper Koksilah are vitually consolidated marls, and in the lower part of Chemainus river, some of the shales are crowded with calcareous shells. Several of the shales are cut by calcite veinlets, and the shales in the southern end of Copper canyon are somewhat schistose and are cut not only by calcite but by quartz veinlets.

The shales grade into fine-grained, shaly or argillaceous sandstone and throughout their entire thickness they are interbedded with thin beds of light grey, fine-grained and often fairlysiliceous sandstones. The sandstones average less than a foot in thickness and occur in great numbers from 1 to 10

feet apart. Toward the base of the formation the sandstone layers are thicker and of coarser grain, where the Haslam formation rests upon the thick portions of the Benson conglomerate, as on Mt. Tzuhalem and Mt. Maxwell, yellow, grey, and greenish, coarse and even pebbly sandstones form nearly 1,000 feet of sediments at the base of the formation. Elsewhere the formation rests upon the thin Benson conglomerate or directly upon the crystalline rocks. The sandstones grade into arkose or arkosic sandstones. The arkoses vary in lithological character, some being composed largely of the detritus from the metamorphic volcanic and sedimentary rocks of the Vancouver group and others being composed largely of the detritus of the Saanich granodiorite. The latter resemble more or less closely the granodiorite. The are greyish green, medium-grained rocks, composed of angular grains of quartz and feldspar, with flakes of biotite in a greenish matrix. Under the microscope they are seen to contain the primary and secondary minerals of the granodiorite, and even the accessories, titanite and magnetite. The former are dark green, fine-grained rocks and they contain, in addition to quartz and feldspar, fragments of the dark, slaty and cherty rocks of the Sicker series and a large amount of chlorite, serpentine and calcite. Some of the arkoses are carbonaceous, containing small carbonaceous and even bright coaly fragments. In places, especially in the lower sandstones, as exposed in the southern part of Maple bay, there are small lenses and seams of impure coal a few inches to a few feet thick and a few feet in extent.

Extension Formation

Distribution and Thickness. The Extension, which consists chiefly of conglomerates, occurs within the Nanaimo basin in three places, to the west of Ladysmith in a narrow belt less that 1,000 feet wide, fringing the coast between Chemainus and Crofton, and extending across the central portion of Saltspring island in a belt 1,000 to 2,000 feet wide. In the Cowichan basin the Extension formation outcrops in a belt 1,500 to 2,000 feet wide; it extends from the coast westward for 15 miles along the base of the southern slope of the Cowichan valley and then turns and crosses the valley; the belt also caps the ridge between Chemainus and Cowichan valleys, that culminates at its eastern end in Mt. Prevost. Along the coast between Chemainus and Crofton, the Extension conglomerates are well exposed, and on Saltspring island they form a well defined cuesta-like ridge culminating in Mts. Erskine and Belcher; and in the southern steep slope of the two mountains, cut at right angles to their bedding, the conglomerates

are very well exposed. Elsewhere the conglomerates are not well exposed and are largely drift covered, although they form in places as in Mt. Prevost, large outcrops which, however, do not extend for any great distance in the direction of the strike.

The thickness of the Extension formation varies ordinarily from 600 to 1,000 feet, averaging about 800 feet. On Mt. Prevost, however, the thickness appears to be at least 1,500 feet but some of the beds may be repeated by unrecognized faults. Over a large portion of the map-area the thickness of the formation does not vary significantly from its average thickness of 800 feet.

Lithological characters. The Extension formation, as in the Nanaimo map-area is composed largely of conglomerate. Within the Nanaimo map-area the fragments are almost entirely of quartz or quartzose rocks, but within the Duncan map-area they consist of a great variety of rocks; quartz and quartzose, slaty, and cherty rocks of the Sicker series; granodiorite, and granodiorite and gabbro-diorite porphyrites; and even meta-volcanics. The fragments are angular to rounded, chiefly sub-rounded, and are somewhat larger than in the Extension conglomerates of the Nanaimo map-area. The largest fragments are over a foot in diameter and the average diameter is more than an inch. The fragments occur in a coarse-grained, predominating sandstone matrix, and in many places the conglomerates are interbedded with thick beds of coarse-grained sandstones, yellowish to olive grey in color, and composed largely of angular grains of quartz and feldspar. The sandstone interbeds increase in number and thickness in the upper part of the formation and may be interbedded with thin layers of shaly sandstones and sandy shales, similar to those of the overlying formations. In the vicinity of Ladysmith, where it is poorly exposed, the Extension formation appears to be composed largely, as in the southern part of the Nanaimo map-area, of greyish white, medium-grained siliceous sandstones. At places within the formation the conglomerates and sandstones are cross bedded and exhibit that the formation was deposited in shallow waters.

Ganges Formation.

Distribution and Thickness. Overlying the Extension formation in the Nanaimo basin is a very poorly exposed formation composed largely of sandy shales. This is equivalent of the Cranberry and Newcastle formations of the Nanaimo map-area. The Cranberry and Newcastle formations differ slightly in lithology but are separated by the Newcastly coal seam. As already noted the

Newcastle and Cranberry formations be distinguished. Hence the two formations are replaced by a single formation which is called the Ganges formation, since it is best exposed on the shores of Ganges harbour. This formation should outcrop in a narrow zone, 800 to 900 feet wide, extending through the town of Ladysmith, but the only exposure is on the shore south of the Ladysmith ferry wharf. It should outcrop to the north of Crofton between the Extension conglomerates and the Shoal islands built Protection sandstones but is unexposed. The formation extends across Saltspring island beneath the valley between Booth bay on the west coast and Ganges harbour on the east coast. The width of the outcrop of the formation is about a mile; for, although the dips are high, certain beds are repeated by folding. The rocks of the formation are exposed along the southern and inner shores of both Booth bay and Ganges harbour, but, although the the exposures are numerous, they are not continuous; hence it is impossible to do more that estimate roughly the thickness of the formation. The thickness of the formation is estimated to be about 750 feet and it does not appear to vary greatly in the different portions of the map-area.

Lithological characters. The Ganges formation is composed of alternating thin-bedded, concentric-weathering, shaly sandstones and sandy shales. They are usually carbonaceous and hence dark in colour, and greenish from chlorite, biotite, and epidote derived from the underlying metamorphic volcanics. In the dark greenish, silty matrix are small angular fragments (predominating in the sandstones) of quartz and feldspar and of slaty, cherty, and volcanic rocks. Although the equivalent formations within the Nanaimo-map-area contain the Newcastle and Douglas coal seams, no coal seams or even lenses are known in the Ganges formation of the Duncan map-area; and even the so-called "coal markings" impressions of leaves and bark, and coaly fragments are uncommon in the poorly exposed rocks of the Ganges formation.

Protection Formation

Distribution and Thickness. The Protection sandstone, which in the Nanaimo map-area is the best horizon marker in the Nanaimo series, extends into the Duncan map-area and is readily recongnized among the rocks of the Nanaimo basin. A similar and presumably equivalent sandstone occurs at one place in the Cowichan basin; but since it cannot be traced away from the single exposure within the Duncan map-area the formation is mapped only in the Nanaimo basin. The formation extends southeastward through the city of Ladysmith in a narrow belt less

than 1,000 feet wide, and is well exposed along the shore and on the point southwest of Coffin point at the entrance to Ladysmith harbour. Farther to the southeast the rocks of the formation octcrop along the southwestern shore of Willy island, and form those islands of the Shoal Islands group that are nearest the main island. The formation extends across Saltspring island to the north of the Ganges formation, outcropping in a belt and ridge between Booth bay and Vesuvius bay and again on the north shore of Ganges harbour, and to the east of the map-area they form the Chain islands extending southeastward in the Ganges harbour.

The thickness of the formation, as in the Nanimo map-area varies less than that of any other formation of the Nanaimo series and is everywhere about 650 feet.

Lithological characters. The formation consist chiefly of a greyish white, fine to medium and uniformly grained sandstone, consisting of subangular grains of quartz or of quartzose rocks and clear or white weathered feldspar, shreds of biotite and some white mica, and a few green and red grains of other minerals. Under the microscope the rock is seen to consist largely of granodiorite detritus both orthoclase and plagioclase feldspar being present. The accessory and secondary minerals, besides those already mentioned are epidote, chlorite, magnetite titanite, zircon and kaolin. The cement is chiefly secondary silica, and is not always sufficient to bind the rock firmly. The sandstone is thick to thin-bedded and in places ie even flaggy, but thick beds are the most common. Some beds are cross stratified and even concretionary, and weather to a concentric or honeycomb structure. Although usually greyish white, weathering to a dirty or brownish grey, some beds are slightly ferruginous and have a yellowish grey colour on fresh fracture, and a brownish weathered surface. In places the sandstones are coarse-grained and pebbly and pass into fine conglomerates with well-rounded fragments of quartz and quartzose rocks. Interbedded with the sandstones are fairly numerous, rather thin beds of olive grey, shaly sandstones, and of darker carbonaceous, siliceous, sandy shales. These beds are most numerous and thicker in the upper part of the formation and are transitional into the shales of the overlying Cedar District formation.

Cedar District Formation.

Distribution and Thickness. In the Nanaimo map-area the Protection formation is overlain by the Cedar District formation, which consists largely of sandy shales. Identical, and doubtless equivalent shales, and hence correlated with the Cedar District formation, overlie the Protection sandstones of the Duncan map-area. They are not, however, exposed near the boundary of the Nanaimo and Duncan map-area where they come to the surface. On Willy island they are well exposed, and are seen to overlie the Protection sandstones, and they also form the outer islands of the Shoal Island group. On Saltspring island the shales of the formation are exposed on the shore of Vesuvius bay, at a few places between Vesuvius bay and Ganges harbour, and to the east of the map-area along the northern portion of the inner shore of Ganges harbour.

Like that of the Protection formation, the thickness of this formation, which cannot be well determined since continuous cross sections are not to be had, seems to be fairly uniform and nearly the same as in the Nanaimo map-area varying but little from 800 feet.

Lithological characters. The formation consists chiefly of dark grey, concentric-weathering, carbonaceous, ferruginous, and in places calcareous, fine sandy shales, with a great number of thin (1 to 3 inches) interbeds of brownish grey, rather fine-grained sandstones. In the upper part of the formation of Saltspring island are small, rather thick (1 to 20 feet) beds of yellowish grey, medium to coarse-grained sandstones, similar to those which compose the larger part of the overlying DeCourcey formation.

Duncan Formation.

Distribution and Thickness. As already mentioned, the Protection sandstone can be recognized in the Cowichan basin only at one place, in the vicinity of the quarry to the east of the Esquimalt and Nanaimo railway nearly a mile northwest of Cowichan station. At that place the sandstones overlie shales which doubtless correspond with the shales of the Ganges formation. The overlying rocks are not exposed and neither may the sandstones be traced to the east or west. It is, therefore, impossible to separate in the Cowichan basin the sandstones and predominating shales, which overlie the Extension conglomerates into the Ganges, Protection, and Cedar District formations; hence they are all mapped together as an equivalent formation, and called, after the principal town in the

Cowichan valley, the Duncan formation.

The Duncan formation is the uppermost of the formations of the Cowichan basin, although it is probable that the upper formations of the Nanaimo series were once present but have been stripped away by erosion. The formation underlies most of the eastern and widest portion of the Cowichan valley. The rocks of the formation are repeated many times by complex folding and probably by faulting, so that the width of the area immediately underlain by the formation averages about 4 miles. The formation extends up the valley from Cowichan valley for more than 10 miles, and extends southeast to Saanich inlet. The rocks of the formation are very poorly exposed. Farily long sections are afforded by the gorges of the Cowichan and Koksilah rivers. Other exposures occur at places in the shallow gorges of some of the smaller streams, in a few cuts along the Esquimalt and Nanaimo railway especially along the Cowichan branch, and at one or two places along the shore south of Cowichan bay. One or two small outcrops of sandstone occur in other portions of the valley, but elsewhere the formation is covered by a thick mantle of drift.

Since the formation is so poorly exposed as well as being completely folded, its thickness cannot be determined. It must be fairly great, since in places, as along the Koksilah river, nearly 2,000 feet of sediments are exposed. If the formation was exactly the equivalent of the Ganges, Protection and Cedar District Formations, it would average about 3,200 feet thick; but it appears to be even thicker and 2,500 feet is doubtless a very moderate estimate.

Lithological characters. The rocks of the formation are predominantly dark, carbonaceous, and in places greenish, sandy shales, similar to those of the Ganges and Cedar District formations. They grade into fine-grained shaly sandstones and are interbedded with numerous sandstones. Most of the sandstone layers are thin but some of them are thick bedded. The sandstones in and near the quarry northwest of Cowichan, like those of the protection formation, are thick-bedded, greyish white, and fine to medium-grained.

DeCourcy Formation.

Distribution and Thickness. Overlying the Cedar District shales in the Nanaimo basin and continuing southeastward from the Nanaio map-area, is a thick and fairly uniform formation, consisting chiefly of sandstones, called the DeCourcy formation. The DeCourcy formation outcrops in the limbs and along the axes of four major folds in the northeastern portion of the map-area. The

formation occurs chiefly on the point northeast of Ladysmith harbour, on Thetis, Kuper and Northern Saltspring islands, and on Reid and Hall islands. Other small islands and reefs between the larger islands are also composed of the DeCourcy sandstones. The rocks of the formation are well exposed in the shores of the islands, the best sections being found along the northwest shore of Saltspring island. Inland the rocks form a few rather small cuesta ridges, but are largely drift covered.

The thickness of the formation on Saltspring island and the smaller islands of the northeastern part of the map-area varies from 800 to 1,000 feet, averaging, as in the Nanaimo map-area, about 900 feet. To the northeast of Ladysmith harbour as in the adjoining portion of the Nanimo map-area, the thickness increases to 1,400 feet.

Lithological characters. The formation has the same lithological characters as in the Nanaimo map-area. The prevailing rock is a greenish grey, yellowish brown weathering, fine to coarse-grained, gritty, and even pebbly sandstone, composed of angular grains of quartz, feldspar, and meta-andesite, and shreds of muscovite and biotite, in a greenish matrix composed chiefly of chlorite. Also it is seen microscopically to contain magnetite, titanite, and epidote. Its cement is siliceous and ferriginous. It is chiefly thick-bedded, but there are many thin-bedded and even flaggy or shaly bedded portions. The sandstone is frequently cross-bedded and concretionary. Some of the concretions are very large, having a maximum diameter of 10 feet. They are frequently fissured and filled with indurated mud or fine sand, but in many places, the fissure filling has weathered out. The concretions themselves frequently weather out, leaving round holes in the sandstone. The sandstones also weather into "galleries" with honeycombed surfaces. In places, as in the northeast shore of Ladysmith harbour and in Reid and Hall islands, the sandstones are chiefly very coarse and pass into conglomerates with large subangular to well rounded fragments, averaging over an inch in diameter, of quartz, meta-volcanics, granodiorite, and granodiorite porphyrites, in a predominating sandstone matrix. Interbedded with the sandstones are relatively thin beds, a few inches to 2 to 4 feet in thickness, of darker carbonaceous sandy shales and shaly sandstones. These shaly interbeds are more numerous in the lower and upper portions of the formation which is transitional into the Cedar District shales below, the lower shales of the Northumberland formation above. The transitional zones, 100 to 200 feet thick, consist of interbedded shaly sandstones or sandy shales and thick-bedded sandstones in about equal amount. The first bed of coarse sandstone

20 feet or more in thickness, is considered as the bottom or top of the DeCourcy formation.

Northumberland Formation.

Distribution and Thickness. Overlying the Decourcy formation is the Northumberland, a formation consisting of shale, sandstone, and conglomerate, but limited at the top and bottom by persistent beds of sandy shale. Within the Duncan map-area the upper shale is not exposed, but it occurs at no great distance both to the northwest of Valdez island, and to the southeast in the southern part of Galiano island. The Northumberland formation outcrops with the DeCourcy formation in the limbs and along the axis of the four major folds in the northeastern part of the map-area. The formation occurs chiefly on Thetis, Kuper, and northern Saltspring islands, and on Norway, Secretary, and Wallace islands. On the map a small area is shown overlying the DeCourcy formation on the peninsual northeast of Ladysmith harbour, but the formation is not exposed on account of the thick drift mantle. However, considering the thickness and structure of the underlying DeCourcey formation, the Northumberland formation must outcrop below the drift, and was so shown on the map of the adjoining Nanimo map-area. Elsewhere the rocks of the formation are well exposed and excellent and fairly extensive sections are displayed along the shores of Thetis, Kuper, and Saltspring islands.

The Northumberland formation varies greatly in thickness. In the Nanaimo map-area the thickness varies from 1,100 to 1,200 feet, and to the southeast, in the northern part of Galiano island it is over 2,500 feet. In the Duncan map-area the entire thickness of the formation is not exposed, yet a section 1,670 feet thick is exposed along the north shore of Thetis island about a mile north of the map-area, and one 1,560 feet thick exposed along the northwest shore of Saltspring island. The upper shales of the Northumberland, unexposed within the Duncan map-area, average nearly 500 feet thick, so that the thickness of the Northumberland formation is the Duncan map-area is in most places doubtless more than 2,000 feet, and is probably nearly 2,250 feet, although it appears to be considerably less in the northeastern part of the map-area where it is perhaps not more than 1,700 feet.

Lithological characters. The Northumberland formation consists of shales, sandstones, and conglomerates, with the shales occurring chiefly at the top and bottom of the formation. The generalized section of the formation is as follows:

	Thickness in feet.
Sandy shales and thin layers of sandstones (unexposed in the Duncan map-area)	500
Coarse-grained sandstone and conglomerates	800
Interbedded sandstones and sandy shales	600
Sandy shales with thin layers of sandstone	350
Total	2,250

The relation of the generalized to the actual sections is shown by the two following sections of the formation, which are most complete and best exposed in the map-area:

Sections of the Northumberland Formation, Southwestward dipping rocks on the northwest shore of Saltspring island, from 2 to 3 miles north of Vesuvius Bay:

	Thickness(feet)
Sandstone, chiefly coarse-grained and medium to thick bedded	500
Unexposed, probably thin-bedded and shaly sandstones	70
Sandstone, chiefly coarse-grained and thick-bedded	100
Unexposed, probably sandy shales and shaly sandstones	50
Sandstone, chiefly coarse-grained and thick-bedded, but numerous beds of fine-grained sandstones which are medium and thin-bedded and even shaly	250
Sandy shales with thin beds of sandstone	100
Sandstone, medium to coarse-grained and thick-bedded	70
Sandy shales with a few thin beds of sandstone and sandstone dykes	370
Total	1,560

Southwestward dipping rocks, north shore of Thetis island.

Chiefly coarse-grained thick-bedded sandstone, some fine to coarse conglomerate, and a few thin beds of shaly, fine-grained sandstones	800
Thin-bedded and shaly sandstone	80
Unexposed, probably sandstone	100

	Thickness (feet)
Sandy shales with numerous sandstone layers 1 to 6 feet thick	140
Unexposed, probably sandstone	40
Coarse-grained thick-bedded sandstone	170
Unexposed, probably sandy shales	340
Total	1,670

The shales are grey, somewhat carbonaceous, thin-bedded and sandy, and are interbedded with numerous layers, 2. to 6. inches thick, of yellowish grey, fine to medium-grained sandstone, with a few beds, up to 10 feet thick, of coarse-grained sandstone. As in the Nanaimo map-area, the shales are cut by sandstone dykes which are especially well exposed in the northwest shore of Saltspring island 3 miles north of Vesuvius bay, and on the small inlet called Idol island nearly half a mile off shore. Many of the dykes, some of which are 3 feet thick, are regular but others are irregular and branching. In the shale at the southern extremity of the Secretary islands is a lens of conglomerate, 3 feet thick and 10 feet wide, which evidently fills an old channel eroded in the shale during its deposition.

The sandstones are chiefly yellowish to olive grey, brownish weathering, and thick-bedded, and are similar to the sandstones of the DeCourcy and overlying Gabriola formation. Like the DeCourcy and Gabriola sandstones, they are commonly concretionary and weather into "galleries" with honeycomb surfaces. The conglomerates occur as rather lens-like interbeds in the sandstones and measure as much as 15 feet thick; but to the southeast of the map-area and in southern part of Galiano island the Northumberland conglomerates are nearly 1,000 feet thick. The conglomerates consist of fragments of virtually all the crystalline and metamorphic rocks of Vancouver island: even quartz, cherty and schistose rocks of the Sicker series, granodiorite and diorite, porphyrites, meta-andesites, and even limestones and sandstones. The fragments are well rounded, some are several inches in diameter, and they average over an inch in diameter, and in most of the conglomerates they greatly predominate over the sandstone matrix.

Gabriola formation.

Distribution and Thickness. In the Duncan map-area the Gabriola formation, the highest of the Nanaimo series, occurs only on Galiano island, the outermost

of the island group. The rocks of the formation, mostly sandstones, are very well exposed along both shores of the island and in the interior of the island they form long cuesta ridges with steep, bare slopes on the southwest, perpendicular to the bedding, but with wooded, drift or talus covered slopes on the northeast, nearly parallel to the bedding. The exposed thickness of the formation in the Duncan map-area varies from 2,200 to 2,400 feet, but in the southern part of Galiano island, to the southeast of the map area, the thickness increases to 3,000 feet.

Lithological Characters. The Gabriola formation consists largely of sandstones. These are chiefly thick-bedded, but many are medium to thin-bedded, yellowish grey brownish weathering, fine to coarse-grained, concretionary, and in places inconspicuosly cross-bedded. The concretions, which average 1 to 3 feet in diameter, weather out leaving holes, and, where the sandstones are subject to wind and to some extent to wave erosion, especially along the shores where the calcareous cement has been partially dissolved by salt-water spray, the sandstones have been carved into hemispherical and hemicylindrical caves, or as they are locally called, galleries. In places the walls of the galleries are smooth, but in other places the sandstone is of unequal resistance and has been carved into fantastic shapes with lacework and honeycomb patterned surfaces. The sandstones are composed chiefly at angular grains 0.1 to 2 mm. in diameter, of quartz, feldspar, and meta-volcanics, and flakes of biotite in a greenish matrix composed of chlorite, serpentine, epidote, and magnetite cemented largely by calcite. Interbedded with the medium and thick-bedded sandstones are numerous, relatively thin layers of thin-bedded and shaly sandstones, and in places sandy shales. The shaly beds are exposed at a few places along the shores which are nearly parallel to the strike of the rocks; but in the interior of the island they are exposed at only one or two places in the steep southwestern cliffs of the cuestas, beneath massive resistant sandstones. It is probably, however, that the narrow valleys between the cuestas are directly underlain largely by shaly sandstones and sandy shales.

STRUCTURE

J.E. Muller, in his paper entitled: "Port McNeill and Nanaimo Basin Geological Survey of Canada", Paper 67-1, states:

"The structural pattern of the entire Nanaimo basin is one of gently northeastward tilted blocks separated by northwest trending faults, down thrown on the southwest side. Along these faults the Nanaimo Group rocks are tightly compressed and highly disturbed; elsewhere they generally dip gently, mainly to the northeast. These faults are two to five miles apart in the southwest part of the basin....."

A.F. Buckham describes the northwest trending faults as a series of strong northwest trending thrust faults, mainly with their down thrown sides to the northeast, with vertical displacements of 150 to 600 feet. Buckham quotes M.A. Peacock as concluding that these faults represent renewed movement along pre-existing fractures formed during pre-Upper Cretaceous mountain building. He attributes the pinching and swelling of some of the coal seams to this stress.

There is no doubt that large displacement bounding faults exist throughout the basin, no matter which hypothesis is correct. There also exists, localized folding which has caused deformation and structural thickening of the incompetent formations such as the coal seams and shales. These tight folds and rolls in the softer sediments may occur as brittle fracture in the more competent formations such as the conglomerates and the sandstones.

There is abundant field evidence verifying the presence of large anticlinal and synelinal structures as set forth by Mueller and others. The fact that these structures exist was proven in some of the mine workings of earlier times.

In short, the structure of the Nanaimo Basin appears complex. It exhibits the complete range of fold and fault features that are usually associated with thrusting and compressional stresses exerted over-confined basins. (Map 2)

STRUCTURAL RELATIONS OF THE NANAIMO SERIES

Internal.

Nanimo Basin.

Folding. The rocks of the Nanaimo basin have a general northwest-southwest strike and a prevailing dip to the northeast. The angle of the dip is chiefly from 15 to 30 degrees, but angles of 50 to 60 degrees are common, and near Ladysmith the dip is nearly vertical. The rocks, however, are involved in a few large folds and several smaller ones. Virtually all the folds are longitudinal, and hence have a northwest-southwest axes. Only a few of the folds have a decided pitch, but folds pitching and flattening out to the northwest and other pitching and flattening out to the southeast occur. The larger folds extend across the Duncan map-area, beginning the adjacent Nanimo map-area. These are the Kulleet syncline to the southwest and the Trincomall anticline to the northeast. Between these two are an anticline and a syncline which, although they begin in the Nanaimo map-area, are there of little importance and have not been previously named. These may be called the Thetis anticline and the Channel syncline.

The Kulleet syncline is a rather sharp crested syncline involving chiefly the Northumberland and DECourcy formations. Its axis extends from Kulleet bay in the Nanaimo district southeast beneath Stuart channel and between Kuper and Tent islands to and nearly across Saltspring island. The trend varies from north 35 degrees west to north 60 degrees west, and averages north 50 degrees west. The limbs dip at angles varying from 50 to 80 degrees. The southwestern, northeasterly dipping limb is the steeper, its dip averaging about 55 degree: the dip of the rocks on Saltspring island varies from 40 to 75 degrees, while that at Coffin point is 80 degrees. The dip of the northeastern southwesterly dipping limb averages only about 17 degrees. The southwestern end of the fold near Saltspring post office pitches to the northwest at a low angle. The fold near this place is virtually offset to the northeast for somewhat more than a mile, by a transverse anticline so that the northwesterly end of the offset portion of the syncline which extends many miles to the southeast, pitches at a low angle the southeast. Between the broken ends of the folds are three well-defined smaller folds are three well-defined smaller folds, two anticlines and a syncline, and numerous wrinkles or contortions.

The Thetis anticline is an open but fairly sharp crested anticline which extends southeastward from Yellow point in the Nanaimo map-area, crosses the

eastern portion of Thetis and Kuper islands, and continues across Saltspring island, parallel to and not far from the Northeasterly shore of the island. It varies very little from its average trend of north 45 degrees west. The crest of the fold varies is best exposed in the north shore of Thetis island, less than a mile north of the map-area, and the character of the fold is well shown in the shores of the little cove at the northern extremity of Saltspring island, although the crest of the fold at the latter locaility has been destroyed by erosion. The limbs of the anticline, consisting largely of the DECourcy sandstones, dip at angles varying from 20 to 45 degrees, and averaging about 25 degrees; the northeastern limb is somewhat steeper.

The Trincomali anticline with its eroded axis beneath Trincomali channel extends southeastward from the Nanaimo map-area with a trend of south 45 degrees east. Across the Duncan map-area the axis extends between Reid, Wall, and Galiano islands on the northeast and Norway, Secretary and Wallace islands on the southwest. However, a few hundred feet north of the map area, on a small roof off the northwestern point of Reid island the crest is actually exposed. The northeastern limb of the fold, in which the DECourcy and Gabriola sandstones are the only exposed rocks, dips at angles varying from 12 to 30 degrees and averages about 20 degrees. The southwestern limb is unexposed in the Duncan map-area, but its dip is probably steeper than that of the northeastern limb.

Between the Thetis anticline on the southwest and the Trincomali anticline on the northeast there must be a syncline. This syncline which is called the Channel syncline, since it extends southeast of Boat harbour in the Nanaimo map-area. Across the Duncan map-area its axis must be nearly parallel to the axis of the Trincomali anticline and cannot occur more than half a mile from it. The southwestern limb is, of course, the only one exposed and this, which is composed of both the Northumberland and DeCourcy formations, dips northeastward at angles varying from 35 to 65 degrees and averaging about 45 degrees.

Besides the larger folds just described there are many smaller folds, the larger and better exposed of which are shown on the accompanying maps. The smaller folds are largely of the nature of secondary folds produced by the slipping of the competent beds over each other during folding. The smaller folds, are, therefore, longitudinal; and as already mentioned, cross folding is nowhere conspicuous. Along the coast of Vancouver Island, between Crofton and Ladysmith, are two small basins. The southern and larger of the two basins drained by the Chemainus river is nearly 4 miles in width, and, separated from

it by an axis of the underlying crystalline rocks, is a smaller basin about 2 miles wide. These basins are largely underlain by the Haslam formation shales which are wrinkled into small, open, longitudinal folds, of no very great extent, with gnally dipping limbs, the southwestern limbs of the anticline being shorter and steeper. To the north of the probable fault contact with the Sicker series on Saltspring island and south of Booth bay, the Haslam shales are somewhat crumpled into small open folds; farther north the Ganges formation also is involved in two well-defined folds; a longitudinal syncline and anticline, and a few smaller wrinkles with accompanying faults of small displacement. These folds are not exposed in the Duncan map-area but are exposed a short distance to the east in the south shore of Ganges harbour, and must extend westward into the Duncan map-area.

The steeply dipping DECourcy sandstones to the northeast of Ladysmith harbour are contorted slightly and are broken by small faults. In central Saltspring island in the vicinity of St. Mary lake near the break of the Kulleet syncline, the rocks of the DeCourcy and Northumberland formations are greatly crumped into three relatively large folds, already mentioned; two anticlines and a corresponding syncline, and several smaller folds. Movements in the limbs of the larger folds are also recorded by the insifnigicant strike faulting in the Cedar District shales of Vesuvius bay, and by the crumpling, slight faulting, and sandstone dykes in the lower shales of the Northumberland formation on the northwest shore of Saltspring island three miles north of Vesuvius bay.

The most pronounced zone of folding occurs along the northeast shore of Saltspring island where the weaker rocks of the Northumberland and DeCourcy formations are involved in rather sharp crested longitudinal folds, two of which at least, an anticline and corresponding syncline, extend along the whole length of the shore.

Faulting. As already mentioned, the weaker rocks in the Nanaimo basin, where crumpled by the sliding of the strong competent beds over one another as a result of folding, are slightly faulted. These faults are usually strike faults of nearly vertical dip, and are of no great displacement, the slip being seldom more than two or three feet; many of the faults are little more than abrupt, sharp angled rolls or wrinkles. Cross or dip faulting has been noted in places, expecially in the Ganges formation to the east of the map-area, but is not common and the slip of the cross faults is only a few feet. Large strike faults such as those of the Nanaimo map-area do not occur in the Nanaimo basin of the Duncan map-area, although more or less strike faulting has taken place

along the contacts with the underlying metamorphic rocks. The amount of displacement along these faults, which have been noted southeast of Ladysmith, southeast of Crofton, and on Saltspring island south of Booth bay, is probably slight, perhaps not more than a few feet.

Jointing. The jointing of the rocks in the Nanaimo basin is usually irregular, although a few places parallel sheet jointing is to be observed. Along the axis of the folds and in the weaker rocks the jointing is extreme, but in most places in the thick-bedded sandstones and conglomerates the joints are few and small.

Cowichan Basin.

Major Folding and Faulting. The rocks of the Cowichan basin have a general north 60 to 70 degrees west strike and steep dips of 30 to 80 degrees to the north. The structure of the basin is in general synclinal, but the major synclinorium consists of two rather closely folded synclines slightly overturned to the southwest. The northern limb of each syncline is broken by a fault, and in each case the northern hanging-wall has been shoved up over the southern footwall. Along the northern fault the underlying crystalline rocks have been brought against the Haslam shales, but, along the southern fault, the crystalline rocks have been brought to the present surface only in the eastern and western portions of the basin. Although the fault is not actually exposed, its existence and location in the eastern portion of the map-area are reasonably certain. It extends from the Saanich map-area across the southern end of Saltspring island, where the Sicker series on the north are thrust against the basal (Benson) conglomerates and Haslam shales which are folded against the fault into a smaller, closed syncline. The fault extends northwest beneath the waters of Satellite channel and Cowichan bay, still separating the crystalline rocks of the Sicker series on the north from the Nanaimo sediments on the south. Northwest of Cowichan bay it is not clear whether the sediments which are in fault contact with the Sicker series and which are folded into a small cyncline like that on Saltspring island are members of the Duncan formation, or whether they are the basal rocks of the series and members of the Haslam, Benson, or even Extension formations. The sediments have been mapped with the Duncan formation and this interpretation seems the best. Somewhat farther northwest the northward dipping shales, more certainly of the Duncan formation, are in fault contact with the basal ricks, also northward dipping, the Benson conglomerates and lower sandstones of the Haslam formation, wing to the lack of outcrops, and to the lack of distinguishing features between the shales of the Duncan and Haslam formations the extension of the fault across the map-area is questionable. However, the west of the map-area, in the vicinity of Cowichan lake, a faulted syncline, similar to that at the eastern end of the valley, is observed. A similar structure best explains the relations of the rocks in the western portion of the Cowichan valley in the Duncan map-area, where the generally northward dipping rocks of the Haslam formation dip against the rocks of the Sicker series which

which form the ridge that steeply surmounts the valley on the north. That the fault extends northward from Cowichan bay for at least two and a half miles to beyond Quamichan lake, is proved by a small outcrop of the Sicker schists to the southwest of the lake. Farther west there are no outcrops of the Sicker rocks for eight miles, but throughout the valley are scattered outcrops of the Nanaimo sediments, chiefly shale. However, as is shown by the relations of the Haslam shale and the overlying Extension conglomerates on the Mt. Prevost ridge, the northern of the two closed synclines extends west completely across the basin, and it is fairly certain that the southern syncline does also. But the Extension conglomerates, well developed in the sourthern limb of the southern syncline, and again developed in the northern syncline are missing in what would be the north limb of the southern syncline. Thus all the evidence available goes to prove that the fault breaking across the southern limb of the southern syncline does extend entirely across the basin, with insufficient throw in its middle portion to bring the underlying Sicker series to the surface: so that in its middle portion the fault separates the Haslam shales on the north from Duncan shale on the south.

The character of the fault has already been indicated. The rocks on the north have been thrust up against, and apparently over, the rocks on the south. The dip of the fault cannot be ascertained, but, where it crosses the southern end of Saltspring island, it appears to be nearly vertical, or has a steep dip to the north. For the greater part it probably has a northward dip which is everywhere fairly steep and approaches the vertical. The fault trace is fairly straight and is nearly parallel to the strike of the rocks, but, in its west central portion, it appears to turn to the southwest for three miles and to bevel across the Duncan and Extension formations. The actual slip or throw appears to be greatest near Cowichan bay where, if the sedimentary rocks on the south are correctly mapped as members of the Duncan formation, the stratigraphic separation of the fault is at least 4,000 feet. The throw is doubtless least in in the middle portion of the fault to the south of Mt. Prevost where the stratigraphic separation appears to be less than 3,000 feet. Owing to the steep northward dip of the beds the throw and the slip of the fault must be considerably greater than the stratigraphic separation, presumably form about 4,500 to 6,000 feet.

The fault which breaks across the northern syncline is actually exposed only in its extreme western portion, in the Copper canyon of the Chemainus river

where it has but very little if any actual displacement; for, as Cooke describes, at that place the sheared basal conglomerate rests directly upon the eroded Sicker series. Between the Copper canyon and Maple bay the fault is well located at several places and southeast of Maple bay it extends beneath Sansum narrows to and across Saltspring island where it separates the Haslam shales underlying the valley between Burgoyne bay and Fulford Harbour from the igneous rocks that occur to the north. At Maple bay the fault separates the upper portion of the Haslam shales, which dip steeply to the north, from the Sicker series; so that there the stratigraphic displacment must be at least 1,500 feet and the throw and slip at least 2,200 feet. Across Mt. Sicker the lower portion of the Haslam shales, and at one place in the valley between Little and Big Sicker, the basal conglomerates are in contact with the Sicker rocks. Furthermore, as is indicated by the outliers of basal conglomerate on the southern flank of Mt. Sicker, the upthrow of the northern wall has been slight, perhaps not more than 700 to 800 feet. Although nearly parallel to the syncline the fault bevels across it at a slight angle; for, at Maple bay it cuts across the northward dipping, southern limb of the fold, whereas on Mt. Sicker the axis of the syncline occurs in Mt. Prevost over a mile to the south of the fault.

The northern syncline, only the eastern end of which is broken by the fault described above, consists chiefly of rather weak and incompetent rocks, shales and shaly sandstones of the Haslam formation. These have been closely compressed and the northern limb of the syncline has been slightly overturned in places, so that now on the lower flanks of Mt. Prevost the rocks are virtually isoclinal and have a general north 70 degrees west strike and nearly vertical dip. Along the axis of the syncline, on Mt. Prevost and on the ridge extending west from Mt. Prevost, the Haslam shales are overlain by the Extension conglomerates. These rocks are folded into a small open cynclinorium consisting of three or four short folds the limbs of which dip at angles varying only from 15 to 40 degrees. The conglomerates on Mr. Prevost, therefore, appear to bevel across the nearly vertical dipping shales outcropping on the flanks of Mt. Prevost. The contact between the shales and the conglomerates is not exposed on Mt. Prevost, but may be located within 100 or 200 feet, and both the shales and conglomerates retian their characteristic attitude near the contact. The disconformity in structure was formerly explained by the writer as due to unconformity; but it has been shown by Cooke that the shales

are not conformable with the underlying Sicker series as was formerly supposed, and that farther west on the Mt. Prevost ridge the conglomerates clearly conformably overlie the shales, as has been found to be true throughout the Nanaimo and Cowichan basins. The writer, therefore, fully concurs with Cooke's conclusions that the disconformity in structure is due largely to the fact that the conglomerate beds, being thick and competent, were not so greatly affected as the more incompetent shales beneath. In addition, as the folding took place in the zone of fracture the folds were of the parallel type, and as Van Hise and Leith have shown, such folds rapidly die out upward. The dying out of the folds downward is quite clearly shown by the more open folding in the Haslam shales, exposed along the railway track to the south of Tyee station. Furthermore, parallel folding is necessarily accompanied by a slipping between the competent and incompetent beds and hence it appears as if some slipping or faulting had taken place between the conglomerates and underlying shales. West of Mt. Prevost the syncline is poorly exposed but appears to be more open and less complex. Although somewhat offset the syncline apparently extends still farther west to form the long narrow basin striking north 65 degrees west, which is followed by the Chemainus river. A similar but smaller basin extends north 55 degrees west across the southern slope of Coronation mountain. The two narrow basins appear to be rather closely synclines, but their rocks vary greatly and irregularly in dip and considerable minor faulting has taken place along the contacts with the underlying Bicker series.

Subordinate Folding and Faulting. Most of the subordinate folding in the Cowichan basin is secondary or longitudinal in character, and incidental to the major folding: it is, however, abundant. The weaker rocks, the shale and shaly sandstones of the Haslam and Duncan formations which directly underlie the greater part of the Cowichan basin, wherever exposed for several hundred feet, are seen to be warped into small, rather closely compressed to open folds. The larger of these folds are shown on the accompanying maps. Owing to the lack of outcrops the folds cannot be traced for more than a few yards, and hence their longituinal extent cannot be traced. Most of the folds dip to the north, at low angles, that is their axial planes dip to the south at steep angles, and many of the folds pitch to the northwest.

Where the rocks are greatly crumpled they are also broken by strike faults of a reverse character. The rocks are in places, for example to the west of

Duncan, broken by dip faults also. These are usually of small throw and to the west of Duncan the northwest side of the faults is the downthrown side.

Koksilah Basin

The Haslam shales exposed in the single outcrop of the Nanaimo series in the Koksilah valley are greatly deformed. They have a general strike of north 75 degrees east and a dip of 50 to 80 degrees to the north. The rocks are not only contorted but are broken by a nearly horizontal thrust fault of small displacement, the upper wall having been pushed to the southwest over the lower wall.

External

Relations to Older Formations

The Nanaimo series rest unconformably upon the metamorphic sedimentary and volcanic rocks of the Vancouver group upon the granitic rocks and porphyrites of upper Jurrassic age that are intrusive into the metamorphic rocks. The unconformable contact is exposed and the structural relations are clearly revealed at several places. It was formerly supposed by the writer that the shales and basal conglomerates in Copper canyon of the Chemanus river, there somewhat metamorphosed and sheared, were transitional into the Sicker schists; but Cooke has clearly demonstrated that the somewhat metamorphosed sediments rest unconformably upon the schistose Tyee quartz-feldspar porphyrites. The basal sediments of the Nanaimo series consist of coarse basal conglomerates composed of fragments of the underlying metamorphic and crystalline rocks or arkoses composed largely of mechanically formed debris derived from the underlying rocks. These rocks rest upon an erosion surface cut indiscriminately across the deformed sedimentary and volcanic rocks and granitic and porphyritic rocks. The erosion surface is not, however, smooth but is of considerable relief. Small irregularities are directly observable in exposed unconformities, best displayed around the southern flanks of Mt. Maxwell and Mt. Tzyhalem. In addition it has been described how the basal (Benson) conglomerates thin out completely in places, while in other places they are 700 feet thick. The thick, somewhat lens-shaped masses of conglomerate were doubtless deposited in local basins, channels, lakes, or estuaries, in the old erosion surface. It was formerly thought that the basal sediments in portions of the Nanaimo basin should be correlated with

formations considerably above the base in other deeper parts of the basin. Thus it was supposed that the thick basal conlomerates of Mt. Tzuhalem and Mt. Maxwell were the equivalent of the Extension formation; but this conclusion has not been supported by the recent work within the Duncan map-area nor by the revision of the structure and correlation of the formations necessitated by the recent detailed field work. It seems quite certain, on the other hand, that within the Duncan map-area, as within the Nanaimo map-area, only the Benson conglomerates and lower rocks of the Haslam formation are in contact with the underlying rocks.

It has, however, been shown, although not clearly exhibited in the Duncan map-area that the contacts of the Nanaimo series with the underlying rocks, where not distributed by such intense folding and faulting as has been general along the contacts within the Duncan map-areas, follow very closely the contours of prevent elevations which must have elevations at the time of deposition also. It appears that the sediments were deposited in bayos, while resistant rocks form headlands which now project into the basins underlain by the Nanaimo series. It is believed that the crystalline rock ridge west of Blainey and the ridge northwest of Chemainus, the latter being a spur of Mt. Brenton, were such headlands. Although the three narrow western extensions of the Cowichan basin are synclinal, it is not at all clear that the crystalline rock ridges between them were once covered by the Nanaimo sediments. Instead it appears as if the sedimentation, at leasd during the the deposition of the rocks now found in the extensions, was more or less confined to anticlinal valleys in the Sicker series, for at several places where no significant faulting has occurred, the Nanaimo sediments appear to abut directly against the Sicker series. The outlier of the Haslam shales in the Koksilah valley is apparently a remnant of sediments that were deposited in a similar pre-Nanaimo valley, rather than a remnant of sediments that were deeply downwarped or downfaulted between the crystalline rocks that form the upland on either side of Koksilah valley. If the sediments were once continuous between the present basins it is to be expected that small outliers would be found in places on the upland between the basins; but no such outliers have been found on the upland, although there are many in the larger valleys which appear to have been eroded first in pre-Nanaimo times. From the evidence given above, it seems fairly certain that the surface upon which the Nanaimo series rests was one of the great variety and considerable relief; and it is possible that the differences in elevation were as great as 2,000 feet or more.

In places near the underlying crystallines the Nanaimo series have been

folded against them, so that the strikes of the lower beds of the Nanaimo series are parallel to the contacts and the dips are steep, usually away from the contact. In many other places southwest of Ladysmith, southeast of Crofton, on Saltspring island south of Booth bay, and in places along the contacts of the two northern of the narrow westward extensions of the Cowichan basin, faulting has taken place along the contacts. Most of the faults are probably small and of slight displacement; but they are marked by rather conspicuous shear zones, with quartz and calcite veins and veinlets.

Relations to Younger Formations.

In the Duncan map-area the Nanaimo series are not in contact with any younger rocks except the superficial deposits which, of course, rest unconformably upon the eroded Nanaimo rocks. However, a warter of a mile north of the northwestern corner of the map-area in Haslam creek canyon, the Benson conglomerate is cut by a dacite porphyrite dyke.

MODE OR ORIGIN

The Nanaimo series, as shown by its fauna, is partly of marine origin, doubtless estuarine, since it was deposited on a surface of considerable relief and under varying conditions shown by therapid vertical and lateral gradations of the sediments. The series also contains land plants and coal most probably of freshwater accumulation. Hence conditions of fresh or at least brackish water, that is terrestrial conditions, alternated with marine conditions. The upper part of the Nanaimo series, the Gabriola formation, however, contain few or no marine organisms, the only fossils being a few obscure plants. Therefore, it is possible that the alternating conditions recorded in the lower part of the Nanaimo series were finally replaced entirely by terrestrial conditions. The lithological character of the sediments, the sandstone being composed chiefly of angular to subangular fragments and of a large percentage of easily decomposed minerals, such as feldspar, indicates a very rapid accumulation and deposition in relatively small basins where the detritus, largely the result of mechanical decay was not subject to severe wave action.

Age and Correlation.

Based on the determination by Whiteaves of the fossils from the Nanaimo series, collected in great numbers by Richardson and others the series has been correlated with the Chico (Upper cretaceous) of the California Cretaceous, and approximately with the Pierre of the Great Plains. Identical species have been collected throughout the series, from the Haslam shales to the upper shales of the Northumberland formation. The Gabriola formation, as already stated, is virtually unfossiliferous.

Few fossils have been collected and determined from the Duncan map-area either during the recent investigation under the supervision of the writer or by earlier workers in the region. However, sufficient fossils have been collected to prove the Nanaimo (Upper Cretaceous) age of the sediment's in the Duncan map-area even if there were no other means of correlation or of age determination. From the Duncan map-area James Richardson collected in 1875 only the following fossils, determined by Whiteaves.

Haslam formation, Maple Bay:

Heteroceras elongatum Whiteaves

Cedar District formation, Vesuvius bay, Saltspring island:

Haminoa honi? (Gabb)

Tellina sp.

Inoceramus vancouverensis Shumard.

The writer previous to 1913 collected and identified the following fossils:

Haslam formation, Chemainus river, west of Fuller lake:

Ostrea sp.

Ostrea congesta conrad

Rhynchonella sp.

Haslam formation, Mt. Tzuhalem:

Trigonia tryoniana Gabb.

Duncan (?) formation, head of Cowichan bay:

Axinea veatchii Gabb.

Protection formation, quarry, north shore of Booth bay:

Inoceramus sagensis Owen.

The following fossils were collected by Cooke during 1913, and have been identified by L.D. Burling:

Haslam formation, Cowichan river, south of Cowichan river falls:

Anomia vancouverensis (Gabb)
Lima multiradiate (Gabb)
Ostrea sp.
Astarte sp.

Haslam formation, Chemainus river, western part of map-area:

Anomia vancouverensis (Gabb)
Ostrea sp.
Rhynchonella cf. suiensis Whiteaves.

The correlation of the formations in the Duncan map-area with the formations of the Nanaimo map-area have been already discussed sufficiently under the general description and stratigraphy of the Nanaimo series.

All the other indurated sedimentary rocks of Vancouver island that rest unconformably upon the upper Jurassic granitic rocks, with the exception of the Tertiary rocks of the west coast, are also of Upper Cretaceous age, and are equivalent of and indeed are at present mapped as the Nanaimo series. They are confined chiefly to the east coast of Vancouver island, and are most widely developed near Comox and Suquash. It was formerly supposed that the similar sediments on Queen Charolotte island were older than the Nanaimo and were largely of Lower Cretaceous age. However, it has been shown that the post-batholithic sediments of Queen Charolotte islands are of Upper Cretaceous age and contain a fauna similar to although not identical with the Nanaimo series. It is therefore, with considerable assurance that the Nanaimo and Queen Charolotte series are correlated with each other.

Upper Cretaceous sediments are apparently wanting over the greater portion of the interior of British Columbia, although the upper portion of the Pasayten series found on the eastern flanks of the Cascades, near the 49th parallel, is Upper Cretaceous and presumably the equivalent of the Nanaimo series which the Pasayten series resembles lithologically. Covering a large part of the western portion of the Interior plateaus of British Columbia is a thick shale, conglomerate, and sanstone, which closely resembles the Nanaimo series. This series was first described by Selwyn and was called by him the Jackass Mountain group from the locality on the Fraser river a few miles below the mouth of the Thompson where

he first encountered the rocks. Later Dawson found that Jackass Mountain rocks had a wide distribution throughout the Western portion of the interior plateaus and he correlated them with the supposed lower Cretaceous rocks of the Queen Charolotte Islands, mapping them as the Queen Charolotte Islands formation. He demonstrated, with the aid of fossils ound at several localities the Lower Cretaceous age of most of the rocks of the series but also noted that some of the upper beds of the series were probably Upper Cretaceous. Recent workers in the southwestern portion of the Interior plateaus have, however, failed to discouver any distinctly Upper Cretaceous rocks, but have found Lower Cretaceous or Jurassic rocks. It seems, therefore, as if the deposition of the Upper Cretaceous Nanaimo sediments was largely confined to the Coast region, although this deposition was preceded by a similar type of sedimentation in lower Cretaceous time in the interior of British Columbia.

TIME OF FOLDING.

The Nanaimo series was deformed by forces acting from the northeast, probably having their origin below the downfold between Vancouver island and the mainland, since the folds have been overturned and overthrust to the southeast. The deformation probably took place at or near the close of the Eocene period, at the same time that the Upper Eocene, Metchosin volcanics of the Sooke map-area were deformed. There seems to have been no widespread deformation on the Pacific Coast at the close of the Cretaceous corresponding with the Laramide revolution of the interior: for, as Arnold points out, with one exception at San Diego, California, the unconfirmity between the Eocene and the Chico (Equivalent to Nanaimo) is not angular but, as far as the stratigraphic evidence goes, the two formations represent an apparently uninterrupted period of sedimentation. This conculsion has been confirmed in general by the writer's work on Vancouver island; for, although there were local movements throughout the deposition of the Nanaimo sediments, and doubtless there was an uplift without much folding at the close of the Cretaceous since definitely lower Eocene sediments are not known in the region, the first pronouned deformation after the late Jurassic or early Cretaceous took place after the close of Eocne formentation and vulcanism.

The folding evidently followed close upon the cessation of Eocene vulcanism; for, before the deposition of the Sooke and Carmanah formations of lower Miocene or possibly upper Oligocene age erosion had worn down the deformed Metchosin volcanics deeply enough to expose the Sooke gabbro stocks irruptive into them and to obliterate the scarp that must have formed along the profound Leech River fault, separating the Metchosin volcanics and the Leech River formation. The deformation is, therefore, quite certainly of early Oligocene age.

The post-Eocene or early Oligocene deformation was of the first order and in general was widespread, being noted by Smith in central Washington, by Arnold in Oregon and California and by Drysdale in the interior of British Columbia. Although the deformation was intense in places, as in southern Vancouver island, the intense deformation as noted by Arnold in California was extremely localized. Even in the Puget Sound region in the vicinity of Tacoma, sedimentation appears to have taken place continuously from the Eocene to the Neocene although Weaver notes that the time interval following the Eocene is characterized by marked evolution of the marine faunas. Also the

Eocene sediements of the Fraser delta region and even the Nanimo sediments of Texada island are comparatively undisturbed and only partially consolidated.

MEMOIR No. 15, Southern Vancouver Island, by C. H. Clapp, on page 194 under the heading of Fuels, Coal and Oil, the following is found:-

Coal at present is the chief source of mineral wealth of Vancouver island. The coal mined is a high grade bituminous variety, and is obtained near the base of the formation (Nanaimo) of the Cowichan group. It is mined in large amounts along the east coast from the northern part of the Nanimo basin and from the Comox basin. These deposits were not examined during the present investigation and are not considered farther.

Other basins of sedimentary rocks of the Cowichan group have been considered as possible sources of coal, because of the frequent indications of coal which have been found, and on account of their proximity and lithological conformity to the coal bearing measures of the Nanimo and Comox basins. A large part of the rocks of the Cowichan group belong to the Nanaimo formation, but an exact correlation of the coal horizon in the various basins cannot be made at present. Although the rocks are well exposed, no thick or extensive seams are shown; but small lens-like seams are exposed in the southern part of the Nanimo basin and eastern part of the Cowichan basin. They are rarely more than a foot thick, although beds of impure, sandy shaly coal occur from three to six feet thick. Fossily coal plants and thin seams of coaly material, seldom more than one-quarter of an inch thick, are found in the western part of the Cowichan basin and in the minor basins exposed in the upper Chemainus and Koksilah valleys. Thin seams of coal are reported to occur also in the Alberni basins.

The coal, so far as is known, occurs near the base of the Nanaimo formation. Since it is known that the rocks of the Nanaimo formation were deposited on a surface of considerable relief, and that sedimentation probably first began in the down warped area off the west coast, it seems probable that part of the area now covered with the rocks of the Nanimo formation was above the depositional level during the period of coal formation. The Nanimo formation and conformaly overlying formations are very thick - 6,000 to 10,000 feet, and since the rocks of the southern part of the Nanaimo basin and of the Cowichan basin have been closely folded, the coal horizon, occurring as mentioned near the base of the Nanaimo formation, must occur chiefly at great depths. The folding and faulting increases the difficulty of prospecting, and in the southern Nanaimo and Cowichan basins is so extensive as to preclude mining. As far as known the structural

GENERAL GEOLOGY

The Nanaimo basin is essentially a downwarped trough that has received up to 10,000 feet of sedimentary deposition from Triassic time to present. During this time, the basin has been subjected to a number of rapid transgressive and regressive cycles of deposition during which conglomerates, sandstones, shales and coal were deposited under marine, shoreline and continental conditions.

The Table of Formations is a representation of the sequences from Jurassic to recent time.

The Vancouver Group

The Vancouver Group of Triassic-Lower Jurassic volcanics is chiefly represented in the Nanaimo basin by Karmutsen Formation. The Karmutsen Formation forms the basinal boundaries, as well as the underlying basement rock, upon which the later sediments were unconformably deposited. Karmutsen basalt is dark greenish grey to black with large amygdules of white to light green feldspar. It occurs in pillowed, brecciated or massive flows. The general theory of basaltic lava outpouring indicates that the pillowed and brecciated zones are the result of submarine extrusions, while the massive, bedded flows are indicative of outpourings after the volcanic pile has been built up above sea level.

Island Intrusives (9)

The Island Intrusives are granitic batholiths that have been thrust up through the older Vancouver group rocks. In the study area, the intrusives are composes of granodiorites and quartz diorites. Muller and Carson state that the age of the Island Intrusive bodies is always Middle to Late Jurassic. It may be that some of the intrusive bodies occurred into the Cretaceous period. These batholiths upwelling from great depths may provide the basis of the thrust-faulting that the Cretaceous and younger sediments have been subjected to.

Tofino Area Greywacke Unit (10)

Muller and Carson state that the Tofino Area Greywacke Unit is a sequence of dar-coloured partly conglomeratic greywacke with minor argillites. This unit has the superficial appearance of volcanic rocks, but there is a fainly visible clastic nature in the hand specimans. If the Greywacke occurred in the Nanaimo basin area, it has most probably been eroded, because of the younger Nanaimo sediments rest unconformably on the combined succession of Vancouver Group and Island Intrusives.

TABLE OF FORMATIONS

ERA	PERIOD OR EPOCH	GROUP AND FORMATION	MAP-UNIT	LITHOLOGY	THICKNESS (FEET)
Cenozoic	Pleistocene and Recent		23	Till, gravel, sand, silt	
	Unconformity				
			22	Rhyolitic to dacitic tuff, breccia, ignimbrite	
	Relation unknown, perhaps coeval				
			21	Hornblende quartz diorite, quartz monzonite, porphyritic dacide, breccia	
Mesozoic and Cenezoic	Relations unknown				
	Cretaceous or Tertiary		20	Sandstone, conglomerate, (may be younger than Tl, Tv)	
	Upper Cretaceous and (?) Tertiary	Nanaimo Group			6,000 - 8,000
Mesozoic	Upper Cretaceous	Gabriola Formation	19	Sandstone, conglomerate, shale	800 - 1,400
		Spray Formation	18	Siltstone, shale, fine sandstone	225 - 950
		Geoffrey Formation	17	Conglomerate, sandstone	400 - 700
		Northumberland Formation	16	Siltstone, shale, fine sandstone	500 - 1,000
		DeCourcy Formation	15	Conglomerate, sandstone	800 - 1,400
		Cedar District Formation	14	Shale, siltstone, fine sandstone	1,000
		✳ Extension - Protection	13	Sandstone, congomerate, shale, coal	0 - 1,900
		Haslam Formation	12	Shale, siltstone, fine sandstone	280 - 1,000
		✳ Comox Formation	11	Sandstone, shale, coal Benson member, mainly conglomerate	300 - 2,000
	Not known to be in contact				
	Upper Jurassic and/or Lower Cretaceous	'Tofino Area Greywacke Unit'	10	Greywacke, argillite, conglomerate	several thousand
	Nonconformity (also with Nanaimo Group)				
	Middle to Upper Jurassic	Island Intrusions	9	Biotite-hornblende granodiorite, quartz diorite	

Intrusive contact

The Nanaimo Group (11-19)

The Nanaimo Group of sediments is Upper Cretaceous and Tertiary in age. It is an alternating succession of clastic continental and marine facies containing several cyclical coal measures. Because of the economic significance of the Nanaimo Group, it will be examined in greater detail and categorized into various formations, starting with the oldest and scaling up the the youngest.

The Benson Basal Conglomerate: (11)

The Benson Basal Conglomerate member, or its equivalents, is found in most instances within the Nanaimo Group desposition on Vancouver Island. In the Nanaimo Basin, the Benson Conglomerate rests uncomfortably on the Karmutsen basalts in the western part of the basin. It appears to be at least thirty feet thick and probably thickens to as much as one hundred feet in some locations. It is composed of subangular to well-rounded pebbles, cobbles and boulders of Vancouver Karmutsen volcanic origin, firmly cemented in a greenish matrix derived from volcanic detritus.

A. In some zones within the Basin where the Nanaimo Group has been deposited on the Comox upper sandstones the Basal Conglomerates are evident.

The Comox Formation: (11)

The Comox Formation, together with the Benson Basal Conglomerate, represents the lower part of the first depositional cycle. The Comox Formation consists of alternating beds of conglomerate, sandstone, mudstone and shale with some coal measures. Comox sandstones are usually massive, medium grained, arkosid, and of medium hardness. In many instances they grade into fine grained sandstones with hard siltstone concretions that are calcareously cemented. The mudstones and shales signify a rapid change in deposition to a marginal continental, estuarine or lagoonal environment, usually responsible for the development of significant carbonaneous-coaly intervals. In the Comox-Cumberland area, the formation contains at least five coal seams, four of which had been mined. In the Campbell River-Quinsam area, the formation contains a minimum of three seams suitable for mining. In the Alberni Basin, present information indicates at least one seam exists near the base of the formation and based on outcrops located, there is a probability that other seams occur stratigraphically higher up in the formation.

The Haslam Formation: (12)

The Haslam Formation is the upper part of the first depositional cycle. It consists of a dark sandy shale horizon, and represents the near shore marine transgression of the first cycle.

The Extension-Protection Formation:

The Extension-Protection Formation represents the basal part of the second depositional cycle overlying the Haslam Shale. This formation is a coarse clastic facies where conglomerate, pebbly sandstone and arkosic sandstone are interbedded. The sandstones are commonly crossbedded and are of a salt and pepper appearance. In the Nanaimo area, this formation contained the Wellington, Newcastle and Douglas seams that yielded millions of tons of coal in past years. In the Chute Creek area south of the Quinsam region, the interbedded sands, shales and conglomerates contain numerous coal stringers and carbonaceous intervals.

Cedar District Formation: (14)

The Cedar District Formation is the marine flow of the second depositional cycle. It consists of thin graded beds (from 1/4 inch to 6 inches) of fine sandstones; siltstone and shale and is inferred by various sources to be a turbidite sequence. (Clapp, Muller.)

De Courcy Formation: (15)

This formation is the lower part of the third cycle of deposition. It consists of coarse clastic sandstones interbedded with conglomerates.

Northumberland Formation: (16)

The Northumberland Formation is a shale-siltstone unit and represents the marine upper part of the third depositional cycle.

Geoffrey Formation: (17)

The Geoffrey Formation is a conglomerate-sandstone unit representing the lower part of the fourth depositional cycle.

Spray Formation: (18)

This information forms the upper part of the fourth depositional cycle. It is shale, siltstone with minor sandstone sequence.

Gabriola Formation: (19)

The Gabriola Formation is the highest formation in the Nanaimo group and is believed to contain only a continental sandstone-conglomerate facies. It consists of massive, cross-bedded sandstone with minor shaly layers and thin conglomerate lenses.

COAL GEOLOGY

Several coal seams occur in the lower part of the Nanaimo group. The Blackjack seam, which the authors believe is actually part of the Comox deposition, is confined to the study area where the Comox laps on to the sides of the Karmutsen volcanics in the region of Blackjack ridge and Wolf Mt. It is the lowest coal occurence in the Nanaimo Basin. The second lowest seam, known as the Wellington seam, occurs in the east Wellinton formation, about 700 feet above the base of the Nanaimo group.

The Newcastle and Douglas seams occur in the Newcastle formation about 1,000 feet above the Wellinton, being separated by 600 feet of conglomerate (Extension Formation) and 400 feet of shaly sandstones and shales (Cranberry Formation). The Newcastle seam is 25 to 100 feet (average 60 feet) below the Douglas seam. Nearly all the coal produced in the Nanaimo field has come from the Newcastle, Douglas and Wellinton seams. The accompanying figure illustrates the sequence of seam deposition in the Nanaimo group.

In the study area, the Blackjack and Wellinton seams appear to be present over significant areas. Previous research has indicated that the Blackjack seam is approximately 10 feet thick and may be continuous for substantial distance.

The Wellington seam has an average thickness of four to seven feet, but in areas of structural deformation can vary from nil to 30 feet thick, according to old mine reports. The floor of the seam is usually the firm East Wellington sandstone. The roof is variable in character and minor disturbances in the seam tend to cause variations in the configuration of the roof rather than the floor. The Wellington is typical of the Nanaimo coals: a high volatile bituminous "A" with low sulphur content.

The Newcastle seam has an average thickness of 3.5 feet. The floor is usually flaggy or shaly sandstone and its roof varies from sandy shale to fine conglomerate. The seam, except in the vicinity of faults or folds, is clean and contains no partings.

The Douglas seam, is similar to the Wellington seam in so far as irregularity of thickness, with thickness differences from 0 to 30 feet, sometimes over very short distances. An average thickness of 6 feet was usual in early mines. Roof and floor are quite variable, from conglomerate to sandy shale.

ECONOMIC GEOLOGY

Coal mining in the Nanaimo sequence has produced most of the production from Vancouver Island.

The coal production was derived from the down dip mining along the outcrop of the Wellington and Douglas seam, with minor amounts from the Newcastle.

Examination of all the data known would indicate that the complex structure of the Nanaimo Basin was not totally understood. Smaller mine plan examination indicated these were usually located in small uplifted, or downthrown blocks, displaying evidence of internal stress causing erratic seam thickness. Additionally the mines were generally within close proximity to the fault zones.

The best mines were in the less disturbed blocks between major downthrown or uplifted faults, and these produced consistent coal, both in thickness of seam and in quality of coal.

Current mapping and structure examination have delineated several large blocks, where disturbance can be forecast, and it is believed that the remaining, unexplored sediments could yield substantial mineable reserves if properly explored. This is evidenced by several old boreholes and outcrops located on the west portion of the basin.

It is hard to imagine the total field as being exploited of it's potential on the basis of the work to date.

Approximately 328,000 acres of sediments occur in the basin, and less than 13% (44,000 acres) had produced 50,000,000 tons of coal, thus it seems reasonable to assume further coal for economical mining do exist in the balance.

Clapp, in his report of the Nanaimo Coalfields, estimated the potential in site reserves at 3.3 billion tons and even the assumption that 10% may be recoverable would allow for a production in time of some 300,000,000 tons of coal.

In view of the proximity to water, quality of coal from the past, availability of infrastructure, power, water and labour, it would appear reasonable that this area warrants further examinations with the objective of producing a viable mining venture.

COAL QUALITY

The coal in the Nanaimo Basin occurs chiefly in the lower part of the Nanaimo Series in three seams,the Wellington Newcastle,and Douglas.

The coals of the three seams are much alike,and are ranked as High Volatile A Bituminous coals. The coals contain coke qualities,but the inconsistency of the coal quality, caused by faulting,folding,and irregularities of roof and floor conditions,sometimes over very short distances,tend to produce abnormal variation in the ash,and sulphur.Therefore the coke characteristics will vary. During the earlier mining era,the operators found that the variance made it impossible to produce a uniform product,and they ceased selling the coal as a coke product, and sold their coal as a thermal product. It should be noted that preparation plant improvements since that time may make it possible to produce both metallurgic and thermic coal from the three seams.

A representative analyses of the three seams taken from earlier mining would be as follows.

Proximate Analyses	Wellington	Newcastle	Douglas
Moisture	].]%	].9%	].6%
Ash	]0.0%	]].7%	]0.]%
Volatile Matter	39.3%	39.4%	39.7%
Fixed Carbon	49.2%	45.7%	47.7%
Sulphur	0.4%	].3%	0.9%
Fuel Ratio	].25	].]6	].20
BTU/LB	]3]60	]2470	]2830
K/Cal	73]0	6930	7]30
Ultimate Analyses			
Carbon	72.]%	67.7%	7].0%
Hydrogen	4.7%	4.7%	4.9%
Nitrogen	].2%	].2%	].2%
Oxygen	]].6%	]3.4%	]].9%
Carbon/Hydrogen Ratio	]5.3	]4.5	]4.5
Calories on Ultimate	6980	6530	6930

As mentioned,the variation in coal seam thickness and parting thickness will result in ash variation. Other impurities that occur in the coals are pyrites,and very thin veinlets or film of calcite,which may contribute to an increase in ash or sulphur.

The results of structure deformation,faults,folds,or bends,created dirty coal. The dirty coal or "rash" as it was commonly referred to,usually was very high in ash,especially in some of the early mines, where the roof was overturned.

Some "rash" was taken from an outcrop on Wolf Mountain and analysed. The results verified the earlier work,and a comparison is herein displayed.

	Wellington Seam Extension Mine	Outcrop Wolf Mountain
Moisture	].59%	].]5%
Ash	54.97%	58.85%
Volatile Matter	24.]5%	2].65%
Fixed Carbon	]9.29%	]8.35%

The Wolf Mountain "rash" was washed at].55 specific gravity to determine the yield of clean coal. The results were 22.]% floats, and 77.9% sinks.An analyses of the coal sections on Wolf Mountain produced the following results.

Analyses on "as received basis"		Ash Fusion		
Moisture	2.47%	Oxidizing	0°C	Reducing
Ash	]5.97%	]324		]25]
Volatile	33.36%	]365		1308
F.Carbon	48.20%	1382		1331
Sulphur	0.60%	1483		1339
BTU/LB	]]699			
K/Cal	6494	Grindability	48	

Several earlier mine plans and drill holes contain analyses of the coal encountered,and these bear out that although there are inconsistencies in the coal there were no problems in producing a suitable coal for thermal use.

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

/

Bore Hole No. 1 (Western Fuel Company)

Dated: 1876/6
(Oct. 11 '75 - May 9, '76)

Elevation:

Location: Sec. 13, R1 Cedar Dist.

Sandstone	0	-	25'
Sandstone, hard and jointy, with coal markings and bands of Sandy Shale	25	-	42'
Sandstone	42	-	51'8"
Shale, soft, dark, sandy	51'8"	-	65'6"
Sandstone	65'6"	-	75'
Sandstone, hard & very jointy with coarse grit	75	-	92'2"
Sandstone	92'2"	-	125'8"
Shale, dark sandy	125'8"	-	126'8"
Sandstone	126'8"	-	159'5"
Sandstone, hard and jointy	159'5"	-	191'11"
Sandstone, dark grey with white veins	191'11"	-	203'4"
Sandstone, light and coarse	203'4"	-	233'1"
Sandstone, hard, dark and close grained	233'1"	-	247'10"
Sandstone lighter and close grained	247'10"	-	254'7"
Sandstone, very jointy and hard	254'7"	-	271'
Sandstone, dark, shaley	271	-	272'
Sandstone, lighter and hard	272	-	310'4"
Sandstone, hard with hard quartz bands	310'4"	-	321'1"
Sandstone, hard brown, mixed with fine pebbles	321'1"	-	324'4"
Sandstone, hard brown	324'4"	-	327'4"
Sandstone, hard	327'4"	-	355'
Sandstone, with dark bands of shaley sandstone 2 - 3" thick	355	-	359'4"
Sandstone, hard and dark	359'4"	-	369'5"
Sandstone, hard	369'5"	-	378'
Sandstone, softer with coal markings	378	-	387'

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Sandstone , softer with less sand	387	-	393'7"
Shaley stone with little or no sand	393'7"	-	400'3"
Shale	400'3"	-	405'10"
Shale, dark and full of coal markings	404'10"	-	424'8"
Shale, dark	424'8"	-	463'9"
Conglomerate, fine, with small pebbles	463'9"	-	472'11"
Conglomerate	472'11"	-	491'4"
Black bands with shale and sandstone alternately	491'4"	-	497'1"
Black bands & coal shale mixed with dark brown sandy shale	497'1"	-	500'
Coal	500	-	509'
White sandy fine grained stone	509	-	510'3"
Sandstone, fine	510'3"	-	516'3"
Sandstone	516'3"	-	517'7"
Sandstone and Conglomerate	517'7"	-	527'7"
Conglomerate	527'7"	-	531'9"
Sandstone	531'9"	-	581'9"
Coal mixed with soft fireclay and dark Conglomerate	581'9"	-	583'9"
Conglomerate, small, dark shaley sandstone	583'9"	-	587'5"
Conglomerate, coarse and sandstone	587'5"	-	599'5"
Shale, soft and dark	599'5"	-	603'5"
Shale, and fireclay, soft	603'5"	-	608'5"
Fire clay, soft, dark shaley	608'5"	-	620'3"
Fire clay, soft, dark and sandy shale with coal marking	620'3"	-	628'9"
Coal markings, soft and dark	628'9"	-	639'9"
Shale, soft	639'9"	-	647'10"
Shale, dark	647'10"	-	654'7"
Coal and black shale	654'7"	-	656'1"
Shale, soft and white with coal markings	656'1"	-	669'7"
Shale, sandy	669'7"	-	671'11"
Shale, dark	671'11"	-	679'11"
Shale, sandy	679'11"	-	702'5"
Shale, soft	702'5"	-	724'8"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 1 Date:

Elevation:

Location: S.W. Corner, S 13, Range 1 Cedar

Clay & Sand	0	-	36'
Shale	36	-	212'
Sandstone	212	-	219'
Shaly Sandstone	219	-	244'
Shale	244	-	249'
Sandstone	249	-	255'
Shale	255	-	268'
Sandstone	268	-	375'
Shale	375	-	391'
Coal	391	-	393'2"
Sandstone	393'2"	-	918'
Shale	918	-	946'
Sandstone	946	-	953'
Shale	953	-	982'
Sandstone	982	-	1038'
Shale - broken slicken side - 50°(fault?)	1038	-	1054'
Sandstone	1054'	-	1168'
Shale	1168	-	1205'
Coal	1205	-	1209'9"
Shale	1209'9"	-	1307'
Sandstone	1307	-	1311'
Conglomerate (fine)	1311	-	1312'
Shale	1312	-	1314'
Conglomerate	1314	-	1317'
Shale	1317	-	1371'
Conglomerate, coarse	1371	-	1386'
Sandstone	1386	-	1420'

CANADIAN COLLIERIES BOREHOLE No. 1 B
RANGE 1 - Section 5 - Cranberry District

Elevation 662.5 feet

Depth : 148' 8"

	Thickness		Depth	
Conglomerate	71'	0"	71'	0"
Shale	5	1	76	1
Conglomerate	27	5	103	6
Black shale with sight coal	1	3	104	9
Fireclay	5	7	110	4
Shale with sandstone	0	7	110	11
Shale	1	11	112	10
Coal	1	9	114	7
Fireclay	3	5	118	0
Fireclay with sight coal	2	1	120	1
Fireclay	13	6 1/2	133	7 1/2
Black shale with sight coal	1	0	134	7 1/2
Coal	1	8	136	3 1/2
Dirt	0	1	136	4 1/2
Coal	1	11	138	3 1/2
Black shale	0	4	138	7 1/2
Coal	1	2	139	9 1/2
Fireclay	2	0	141	9 1/2
Coal	1	5 1/2	143	3
Shale	2	0	145	3
Sandstone	3	5	148	8

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 1E Date:

Elevation:

Location: 700' N.E. of Main Shaft
S 11, Range 8, Cranberry District

Till	0	-	5'
Sandstone	5	-	26'6"
Coal	26'6"	-	26'10"
Shale	26'10"	-	28'
Sandstone	28	-	43'3"
Shale	43'3"	-	43'6"
Coal	43'6"	-	44'
Sandstone	44	-	78'
Coal	78	-	78'7"
Sandstone	78'7"	-	92'8"
Coal	92'8 "	-	92'11"
Shale, carbonaceous	92'11"	-	138'
Sandstone	138	-	170'
Shale	170	-	173'
Coal	173	-	173'8"
Sandstone (6" Coal 232'; 2" coal 237')	173.8"	-	275'8"
Shale	275'8"	-	285'8"
Sandstone, Shale	285'8"	-	426'
Conglomerate	426	-	431'
Sandstone	431	-	447'
Conglomerate	447	-	448'
Sandstone	448	-	463'
Conglomerate	463	-	464'
Sandstone	464	-	550'
Shale	550	-	564'
Sandstone	564	-	590'
Shale	590	-	658'6"
Coal	658'6"	-	668'9"
Shale	668'9"	-	759'
Conglomerate	759	-	760'
Shale	760	-	814'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. "B" Date:

Elevation:

Location: East side Richardson Lake
Sec. 13, Range 4, Cranberry District

Till	0	-	38'
Sandstone	38	-	51'
Conglomerate	51	-	69'
Shale	69	-	97'
Conglomerate	97	-	100'
Shale	100	-	159'
Sandstone	159	-	168'
Conglomerate	168	-	180'
Shale	180	-	256'
Conglomerate	256	-	435'
Shale	435	-	448'
Conglomerate	448	-	551'
Shale	551	-	570'
Sandstone	570	-	590'
Conglomerate	590	-	626'
Shale	626	-	659'
Sandstone	659	-	667'
Conglomerate	667	-	777'
Shale	777	-	777'4"
Coal	777'4"	-	778'
Shale	778	-	822'
Sandstone	822	-	845'
Shale	845	-	937

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 2 Date:

Elevation: Above H.W.M.

Location: York Estate, Cedar District, Sec. 15, R. 1

Black soil	0	-	2'
Sandstone	2	-	96'
Shale (dark)	96	-	100'
Sandy Shale	100	-	116'
Shale (dark)	116	-	118'
Sandy shale	118	-	126'
Shale (dark)	126	-	129'
Sandy Shale	129	-	137'7"
Coal (soft)	137'7"	-	138'
Shale (dark)	138	-	139'
Sandy Shale	139	-	141'
Sandstone	141	-	160'6"
Coal	160'6"	-	161'
Shale (dark)	161	-	166'
Sandstone	166	-	168'
Sandy Shale	168	-	175'
Sandstone	175	-	195'8"
Coal	195'8"	-	196'
Sandstone	196	-	202'7"
Coal	202'7"	-	203'
Sandy Shale	203	-	210'
Sandstone	210	-	215'
Sandy Shale	215	-	235'3"
Coal (dirty)	235'3"	-	236'
Sandy Shale	236	-	255'
Sandstone	255	-	258'
Sandy Shale	258	-	260'
Sandstone	260	-	289'
Shale	289	-	290'
Sandstone	290	-	412'
Shale (dark)	412	-	419'
Sandstone	419	-	436'
Shale (dark)	436	-	441'
Sandstone	441	-	494'
Shale (dark)	494	-	503'
Sandstone	503	-	520'
Shale	520	-	531'
Sandstone	531	-	554'
Shale (dark)	554	-	630'8"

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Coal	630'8"	-	631'
Sandy Shale	631	-	635'
Soapstone	635	-	637'
Shale (dark)	637	-	673'
Shale (grey)	673	-	689'3"
Coal	689'3"	-	691'
Shale (dark)	691	-	705'
Sandy Shale	705	-	710'
Shale (grey)	710	-	715'
Sandstone	715	-	717'
Shale (grey)	717	-	720'
Soapstone	720	-	737'
Shale (dark)	737	-	740'
Soapstone	740	-	747'
Shale (dark)	747	-	748'
Soapstone	748	-	750'
Shale (dark)	750	-	755'
Sandstone	755	-	760'
Shale (dark)	760	-	770'
Sandstone	770	-	773'
Shale (grey)	773	-	785'
Sandstone	785	-	790'
Sandy Shale	790	-	793'
Shale (dark)	793	-	810'
Sandstone	810	-	811'
Sandy shale	811	-	815'
Shale (grey)	815	-	817'
Sandstone	817	-	825'
Sandy Shale	825	-	832'
Shale (dark)	832	-	847'
Sandstone	847	-	850'
Shale (dark)	850	-	852'
Sandy Shale	852	-	855'
Conglomerate	855	-	859'
Sandstone	859	-	861'
Shale (dark)	861	-	869'
Shale (grey)	869	-	871'
Sandstone	871	-	876'
Conglomerate	876	-	896'
Sandstone	896	-	898'
Conglomerate	898	-	906'
Shale (dark - Coal fossils)	906	-	910'
Shale (blue)	910	-	914'
Sandy Shale	914	-	916'
Shale (blue)	916	-	919'
Shale (dark)	919	-	921'
Sandstone	921	-	923'
Shale (dark)	923	-	926'
Sandstone	926	-	928'
Shale (dark)	928	-	929'
Sandstone	929	-	931'
Shale (dark - leaf fossils)	931	-	933'
Sandy Shale	933	-	936'
Shale (dark-leaf fossils)	936	-	943'

Bore Hole No. 2 (continued)

Conglomerate	943	-	951'
Sandstone (coal Markings)	951	-	954'
Conglomerate	954	-	963'
Sandstone	963	-	966'
Sandy Shale (coal markings)	966	-	997'
Shale (dark)	997	-	1004'
Sandstone	1004	-	1012'
Sandy Shale (fossils)	1012	-	1016'
Sandstone (coal markings)	1016	-	1024'
Shale (dark)	1024	-	1026'
Sandy Shale (fossils)	1026	-	1056'
Shale (dark)	1056	-	1061'
Sandy Shale	1061	-	1066'
Sandstone	1066	-	1080'
Shale (dark)	1080	-	1090'
Sandstone	1090	-	1095'
Shale (dark)	1095	-	1117'
Sandy Shale	1117	-	1120'
Sandstone	1120	-	1124'
Conglomerate	1124	-	1182'
Shale (grey)	1182	-	1189'
Conglomerate	1189	-	1247'
Sandstone	1247	-	1253'
Shale (dark coal markings)	1253	-	1282'

CANADIAN COLLERIES BOREHOLE No. 2 B

RANGE 2, SECTION 3, CRANBERRY DISTRICT

Elevation 313.0' Depth 325' 2"

	Thickness	Depth
Over burden	3' 0"	3' 0"
Conglomerate	126' 7"	129' 7"
Shale	1' 8"	131' 3"
Conglomerate	5' 7"	136' 10"
Shale	0' 2"	137' 0"
Conglomerate	93' 0"	230' 0"
Conglomerate and sandstone	3' 3"	233' 3"
Conglomerate	36' 9"	270' 0"
Shale with sight coal	6' 6"	276' 6"
Shale and sandstone	4' 0"	280' 6"
Shale with sight coal	2' 0"	282' 6"
Shale	1' 3"	283' 9"
Coal	2' 0"	285' 9"
Shale	10' 11"	296' 8"
Coal	1' 9"	298' 5"
Shale	21' 9½"	320' 2½"
Coal	2' 11½"	323' 2"
Sandstone	2' 0"	325' 2"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 2E Date:

Elevation:

Location: 650' W - SE Corner, S 13, Range 8
Cranberry District

Till	0	-	67'
Sandstone	67	-	176'6"
Coal	176'6"	-	176'9"
Shale	176'9"	-	188'
Sandstone, shale	188	-	193'
Sandstone	193	-	320'
Shale	320	-	325'
Sandstone	325	-	353'
Shale	353	-	377'
Sandstone	377	-	390'
Shale	390	-	400'
Sandstone	400	-	431'
Shale	431	-	442'
Sandstone	442	-	487'
Shale	487	-	495'
Sandstone	495	-	687'
Shale	687	-	693'
Sandstone	693	-	735'
Shale	735	-	803'
Coal	803	-	807'2"
Sandstone	807'2"	-	809'4"
Coal	809'4"	-	815'8"
Coal, shaly	815'8"	-	818'9"
Sandstone	818'9"	-	827'
Shale	827	-	890'
Sandstone	890	-	894'
Shale	894	-	909'
Conglomerate	909	-	911'
Shale	911	-	935'
Conglomerate	935	-	938'
Shale	938	-	1002'
Conglomerate	1002	-	1003'
Shale	1003	-	1026'
Conglomerate	1026	-	1030'
Shale	1030	-	1046'
Conglomerate	1046	-	1050'
Sandstone	1050	-	1058'
Shale	1058	-	1063'
Conglomerate	1063	-	1064'
Shale	1064	-	1080'

CANADIAN COLLERIES BOREHOLE No. 3 C

LOT 9, BRIGHT DISTRICT

Elevation 353.1' Depth 764'7"

	Thickness	Depth
Gravel and boulders	3' 0"	3' 0"
Clay	12' 0"	15' 0"
Clay and hardpan	5' 0"	20' 0"
Gravel (wash)	4' 0"	24' 0"
Sandstone boulders	2' 0"	26' 0"
Sandstone	4' 6"	30' 6"
Gravel (wash)	1' 1½"	31' 7½"
Sandstone	97' 0½"	128' 8"
Conglomerate	39' 3"	167' 11"
Sandstone and shale	11' 8"	179' 7"
Shale	68' 5"	248' 0"
Clay	4' 6"	252' 6"
Fireclay	16' 1"	268' 7"
Shale	7' 8"	276' 3"
Shale and fireclay	8' 4"	284' 7"
Clay	11' 11"	296' 6"
Shale	99' 6"	396' 0"
Shaly sandstone	13' 8"	409' 8"
Sandstone	2' 10"	412' 6"
Shale	10' 6"	423' 0"
Sandstone	10' 3"	433' 3"
Sandstone and shale	6' 2"	439' 5"
Shale	10' 3"	449' 8"
Sandstone	3' 2"	452' 10"
Shale	10' 2"	463' 0"
Clay shale	13' 8"	476' 8"
Shale	107' 8"	584' 4"
Conglomerate	3' 0"	587' 4"

CANADIAN COLLERIES BOREHOLE No. 3 C CONT.

Clay shale	5'	5"	592'	9"
Conglomerate	38'	9"	631'	6"
Shale	29'	3"	660'	9"
Sandy shale	6'	0"	666'	9"
Shale and sandstone	7'	9"	674'	6"
Shale	39'	6"	714'	0"
Clay shale	17'	8"	731'	8"
Shale and sandstone	5'	2"	736'	10"
Shale	20'	6"	757'	4"
Clay shale	5'	1"	762'	5"
Sandy shale	2'	2"	764'	7"

CANADIAN COLLERIES BOREHOLE No. 4 A

SECTION 5, RANGE 2, CRANBERRY DISTRICT

Elevation 507.6' Depth 127'4"

	Thickness	Depth
Conglomerate	39' 1"	39' 1"
Black Shale	0' 2"	39' 3"
Conglomerate	40' 6"	79' 9"
Black shale with coal	1' 2"	80' 11"
Fireclay	4' 5"	85' 4"
Fireclay with sight coal	3' 7"	88' 11"
Fireclay	6' 7"	95' 6"
Black shale	0' 4"	95' 10"
Coal	1' 11"	97' 9"
Fireclay	4' 7"	102' 4"
Black shale	1' 5"	103' 9"
Sandy shale	6' 2"	109' 11"
Black shale	3' 3"	113' 2"
Coal	2' 0"	115' 2"
Fireclay	3' 8"	118' 10"
Black shale	1' 2"	120' 0"
Fireclay	2' 4"	122' 4"
Black shale	0' 5"	122' 9"
Coal	1' 11"	124' 8"
Sandstone	2' 8"	127' 4"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 5 Date:

Elevation:

Location: Nanaimo River Sec. 3, R.2 Cranberry Dist.

Sand & Gravel	0	-	67'
Sandstone	67	-	258'
Shale	258	-	288'
Sandstone & Shale	288	-	731'
Shale	731	-	778'
Coal	778	-	778'2"
Shale	778'2"	-	803'
Coal	803	-	807'2"
Shale	807'2"	-	809'4"
Coal	809'4"	-	815'8"
Coal & Shale	815'8"	-	820'6"
Shale	820'6"	-	909'
Conglomerate	909	-	911'
Shale	911	-	935'
Conglomerate	935	-	937'5"
Shale	937'5"	-	1000'
Conglomerate	1000	-	1004'
Shale	1004	-	1027'
Conglomerate	1027	-	1031'
Shale	1031	-	1082'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 5 (Western Fuel Company)

Date: 1878 (March - August)

Elevation:

Location: Sec. 13, R. 8 Cranberry Dist.

Sandstone	0	-	14'6"
Sandstone and shale with a band of coal 8" thick	14'6"	-	37'3"
Sandstone	37'3"	-	46'7"
Hard sandstone	46'7"	-	51'7"
Sandstone with shale bands	51'7"	-	57'7"
Sandstone with quartz veins	57'7"	-	69'7"
Hard sandstone	69'7"	-	72'9"
Shale and sandstone	72'9"	-	77'1"
Hard sandstone	77'1"	-	81'5"
Light grey sandstone	81'5"	-	89'3"
Hard sandstone	89'3"	-	95'2"
Hard sandstone with shale bands	95'2"	-	129'9"
Hard sandstone	129'9"	-	143'3"
Hard sandstone with shale bands	143'3"	-	150'9"
Hard sandstone	150'9"	-	183'11"
Hard sandstone with shale bands	183'11"	-	194'6"
Hard & coarse sandstone	194'6"	-	207'4"
Soft sandstone with shale bands	207'4"	-	228'5"
Soft shale, whitish	228'5"	-	246'
Soft shale with coal markings	246	-	252'
Hard sandstone	252	-	258'5"
Sandstone, soft shale band of coal 1'3" thick	258'5"	-	276'7"
Coarse sandstone with soft shale bands	276'7"	-	289'7"
Soft shaley sandstone	289'7"	-	309'
Hard sandstone	309	-	379'7"
Hard sandstone with coal markings and small conglomerate band	379'7"	-	439'2"
Hard sandstone	439'2"	-	448'8"
Soft sandstone	448'8"	-	479'8"
Hard sandstone	479'8"	-	488'10"
Conglomerate band and seam of coal 6"	488'10"	-	545'6"
Soft dark shale	545'6"	-	581'6"
Coarse sandstone with coal markings	581'6"	-	615'8"

.../2

Shaley sandstone quartz veins	615'8"	-	638'8"
Dark shale	638'8"	-	651'11"
Shale and conglomerate fine shale bands mixed	651'11"	-	662'11"
Shale and conglomerate and coal seam about 12" thick	662'11"	-	687'
Dark Shale	687	-	695'
Hard sandstone	695	-	703'11"
Sandstone conglomerate veins	703'11"	-	706'9"
Sandstone and dark shale	706'9"	-	715'3"
Soft boring	715'3"	-	725'
Soft shale coal markings & veins	725	-	747'10"
Soft greenish shale coal markings	747'10"	-	754'10"
Soft broken shale	754'10"	-	778'10"

CANADIAN COLLERIES BOREHOLE No. 5 A

SECTION 9, RANGE 2, CRANBERRY DISTRICT

Elevation 587.6' Depth 441'7"

	Thickness	Depth
Conglomerate	37' 8"	37' 8"
Sandy shale	13' 0"	50' 8"
Fireclay	0' 10"	51' 6"
Conglomerate	37' 7"	89' 1"
Sandy shale	2' 4"	91' 5"
Conglomerate	48' 10"	140' 3"
Shale	2' 9"	143' 0"
Black shale	4' 9"	147' 9"
Shale	2' 1"	149' 10"
Black shale with traces of coal	3' 1"	152' 11"
Coal	1' 0"	153' 11"
Shale	5' 1"	159' 0"
Black shale	0' 7"	159' 7"
Sandy shale	6' 0"	165' 7"
Black shale	0' 3"	165' 10"
Conglomerate	27' 4"	193' 2"
Hard pressed grey sandstone	5' 8"	198' 10"
Conglomerate	38' 0"	236' 10"
Coal	0' 3"	237' 1"
Conglomerate	2' 5"	239' 6"
Shale	0' 9"	240' 3"
Black shale	1' 3"	241' 6"
Sandy shale	4' 1"	245' 7"
Conglomerate	142' 11"	388' 6"
Hard grey sandstone	5' 11"	394' 5"
Sandstone	6' 1"	400' 6"
Conglomerate	15' 11"	416' 5"
Shale	3' 9"	420' 2"

CANADIAN COLLERIES BOREHOLE No. 5 A CONT.

Coal	0' 4"	420' 6"
Black shale	3' 4"	423' 10"
Coal	0' 7"	424' 5"
Black shale	0' 10"	425' 8"
Sandstone	10' 0"	435' 10"
Conglomerate	5' 9"	441' 7"

CANADIAN COLLERIES BOREHOLE No. 6

SECTION 4, RANGE 2, CRANBERRY DISRTICT

Elevation 308.5' Depth 1,475'6"

	Thickness	Depth
Conglomerate	252' 2"	252' 2"
Sandy shale	9' 10"	262' 0"
Shale	3' 4"	265' 4"
Coal and fireclay	1' 7"	267' 5"
Clay	9' 6"	276' 11"
Shale and fireclay	11' 3"	288' 2"
Shale	6' 10"	295' 0"
Coal (Wellington seam)	1' 1"	296' 1"
Black slate	0' 10"	296' 11"
Sandstone with coal	3' 0"	299' 11"
Sandstone	36' 1"	336' 0"
Shale	800' 3"	1,136' 3"
Sandstone	39' 3"	1,175' 6"
Shale	300' 0"	1,475' 6"

CANADIAN COLLERIES BOREHOLE No. 7

SECTION 1, RANGE 2, CRANBERRY DISTRICT

Elevation 645.5' Depth 912'6"

	Thickness	Depth
Conglomerate	57' 10"	57' 10"
Shale	1' 6"	59' 4"
Conglomerate	44' 2"	103' 6"
Sandy shale	5' 0"	108' 6"
Conglomerate	22' 1"	130' 7"
Shale	7' 9"	138' 4"
Conglomerate	21' 4"	159' 8"
Shale	8' 10"	168' 6"
Conglomerate	75' 1"	243' 7"
Sandstone (bands of)	4' 1"	247' 8"
Conglomerate	119' 3"	366' 11"
Clay, shale	364' 7"	731' 6"
Sandy shale	22' 1"	753' 7"
Clay, shale	158' 11"	912' 6"

CANADIAN COLLERIES BOREHOLE No. 8 A

SECTION 5, RANGE 2, CRANBERRY DISTRICT

Elevation 466.7' Depth 108'2"

	Thickness	Depth
Conglomerate	56' 8"	56' 8"
Shale	8' 7"	65' 3"
Coal	1' 3"	66' 6"
Black shale	0' 9"	67' 3"
Fireclay	1' 7"	68' 10"
Shale	8' 10"	77' 8"
Sandy shale	0' 8"	78' 4"
Shale	0' 10"	79' 2"
Fireclay	1' 3"	80' 5"
Shale	1' 2"	81' 2"
Fireclay	2' 4"	93' 11"
Shale	9' 5"	93' 4"
Coal	0' 11"	94' 3"
Shale	0' 5"	94' 8"
Sandstone	13' 6"	108' 2"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 8A Date: 1910-1911

Elevation: 2040.0

Location: Fiddick Estate, 1073'E, 540'S., of N.W. cor., S.14, R.6 Cranberry District.
Underground No.1 Slope, P.C.C.M. No.1 Mine.

Shale, dk., carbonaceous	0	-	5'0"
Sandstone, brown, fine, flintlike	5'0"	-	8'6"
Conglomerate, fine	8'6"	-	14'0"
Shale, soft, brown	14'0"	-	20'6"
Sandstone	20'6"	-	23'0"
Shale, soft	23'0"	-	28'0"
Conglomerate, fine	28'0"	-	31'0"
Shale, soft	31'0"	-	35'0"
Coal (Newcastle)	35'0"	-	35'7"
Shale	35'7"	-	37'0"
Sandstone, bluish	37'0"	-	44'0"
Sandy Shale	44'0"	-	48'0"
Sandstone, hard, brown	48'0"	-	51'0"
Shale, brown	51'0"	-	54'0"
Sandy Shale	54'0"	-	55'0"
Shale, brown	55'0"	-	70'
Shale, blue	70'	-	90'

CANADIAN COLLIERIES - BOREHOLE No. 9

Block 87 - Bright District

Elevation 519

Depth 1572' 0"

	Thickness	Depth
Surface gravel	8' 6"	8' 6"
Conglomerate	116 9	125 3
Clay shale	5 8	130 11
Sandstone	3 2	134 1
Conglomerate	297 10	431 11
Hard sandstone	5 0	436 11
Conglomerate	230 7	667 6
Clay shale	22 5	689 11
Shale	207 0	896 11
Conglomerate	265 7	1162 6
Clay shale	19 10	1182 4
Sandstone	2 4	1184 8
Conglomerate	16 2	1300 10
Sandstone	74 8	1375 6
Shale	196 6	1572 0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 9A Date: 1910-1911

Elevation:

Location: Underground, No.2 Slope to the left, P.C.C.M. No. 2 Mine
Sec. 1, R. 7 Cranberry Dist.

Shale, dark brown	0	-	12'0"
Sandstone	12'0"	-	12'6"
Conglomerate	12'6"	-	13'0"
Shale, brown	13'0"	-	20'
Sandy Shale	20	-	38'6"
Conglomerate	38'6"	-	46'
Shale, soft	46	-	46'10"
Coal	46'10"	-	47'6"
Shale, soft	47'6"	-	48'
Coal	48	-	48'9"
Shale, dark grey	48'9"	-	58'0"
Sandy shale, blue	58	-	61'

CANADIAN COLLIERIES - BOREHOLE No. 10a

Extension District

Sec, 5 R.5 Cranberry District

Elevation 172' 0" Depth 327' 0"

	Thickness		Depth	
Surface Drift	28	0	28	0
Sandy shale	22	0	50	0
Conglomerate	42	0	92	0
Shale	5	0	97	0
Conglomerate	187	0	284	0
Sandy shale	8	0	292	0
Coal	2	0	294	0
Rash (some coal)	1	0	295	0
Coal - Dirt mixed	2	0	297	0
Sandy shale	2	0	299	0
Sandstone	6	0	305	0
Conglomerate	14	0	319	0
Sandy shale	1	0	320	0
Coal	0	2	320	2
Sandy shale	1	10	322	0
Sandstone	5	0	327	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 10A Date: 1910-1911

Elevation:

Location: Underground, Wilkinson's level, P.C.C.M., No. 2 Mine
Sec. 6, R. 5 Cranberry Dist.

Shale and Coal	0	-	5'0"
Shale, dark	5'0"	-	10'
Sandstone, hard, brown, close grain	10	-	20'3"
Coal	20'3"	-	20'6"
Shale	20'6"	-	20'8"
Coal	20'8"	-	21'5"
Shale, hard, brown	21'5"	-	26'6"
Sandy shale, blue	26'6"	-	36'
Shale, brown, with coal markings	36	-	43'
Sandy Shale	43		52'
Shale, brown, with coal markings	52	-	58'
Sandy shale, blue	58	-	

CANADIAN COLLIERIES - BOREHOLE No. 11

Extension District Sec. 1 R.6 Cranberry district

Elevation (not given) Depth 495' 1"

	Thickness		Depth	
Surface drift	37'	1"	37'	1"
Conglomerate	5	10	42	11
Shale	5	5	48	4
Sandstone	35	2	83	6
Conglomerate	10	0	93	6
Sandstone	6	0	99	6
Clay shale	4	11	104	5
Conglomerate	6	5	110	10
Clay shale	106	4	217	2
Conglomerate	40	4	257	6
Sandstone	4	1	261	7
Conglomerate	2	11	264	6
Clay shale	25	7	290	1
Conglomerate	61	4	351	5
Shale	1	3	352	8
Conglomerate	27	1	379	9
Clay shale	7	9	387	6
Conglomerate	41	2	428	8
Shale	3	5	432	1
Clay shale	63	0	495	1

CANADIAN COLLIERIES BOREHOLE No. 12

Extension District

Sec.5, R.6 Cranberry District

Elevation 121.0' Depth 850' 10"

Surface Drift	17	1"	17'	1"
Shale	44	1	61	2
Clay shale	17	4	78	6
Conglomerate	237	0	315	6
Shale	0	3	315	9
Rash	0	8	316	5
Coal	5	4-	321	9
Shale (Little Coal)	3	4	325	1
Sandy shale	8	0	333	1
Clay shale	10	4	343	5
Coal	0	9-	344	2
Clay shale	6	2	350	4
Conglomerate	3	2	353	6
Sandstone	11	0	364	6
Conglomerate	22	0	386	6
Sandstone	10	0	396	6
Shale	10	0	406	6
Clay shale	444	4	850	10

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 12A Date: 1910-1911

Elevation:

Location: Underground, Brogg's place P.C.C.M. No. 1 Mine
1284'E., 825'S., of N.W. corner, S.14, R.6.
Cranberry district

Shale, brown	0	-	19'
Sandy shale	19	-	22'
Sandstone	22	-	38'
Conglomerate	38	-	46'
Shale, brown	46	-	55'
Shale, blue	55	-	66'
Shale, brown	66	-	69'
Shale, grey	69	-	71'
Sandstone	71	-	74'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 13A Date: 1910-1911

Elevation: 2053.61'

Location: Underground, No. 3 West, P.C.C.M., No. 1 Mine
550'E., 574'S., of N.W. corner, S.14, R.6
Cranberry district

Coal	0	-	1'6"
Shale	1'6"	-	3'
Coal	3	-	4'6"
Conglomerate	4'6"	-	5'
Coal	5	-	9'6"
Shale, brown	9'6"	-	20'
Sandstone	20	-	28'
Shale, brown	28	-	29'10"
Coal	29'10"	-	31'4"
Shale, clay, white	31'4"	-	32'
Sandy shale	32	-	34'
Sandstone	34	-	39'
Sandy shale, brown	39	-	40'
Shale, dark brown	40	-	40'6"
Coal	40'6"	-	41'4"
Shale	41'4"	-	51'

CANADIAN COLLIERIES BOREHOLE No. 13

Extension District

Sec. 13 R.8 ~~District Prob~~. Douglas Dist.

Elevation 906.0' Depth 673' 2"

	Thickness		Depth	
Sand + gravel	16'	0"	16'	0"
Boulders	3	0	19	0
Coarse gravel	11	0	30	0
Boulders	3	0	33	0
Hard pan	17	0	50	0
Conglomerate	70	6	120	6
Sandy conglomerate	10	6	131	0
Conglomerate	60	6	191	6
Sandstone	0	6	192	0
Shale	5	0	197	0
Sandstone + shale	9	0	206	0
Coal	0	2	206	2
Shale	62	10	269	0
Soft shale (very brown)	0	8	269	8
Sandy shale	8	4	278	0
Shale	27	0	305	0
Sandstone	2	0	307	0
Shale	5	6	312	6
Conglomerate	2	0	314	6
Sandstone (very hard)	6	6	321	0
Conglomerate	23	0	344	0
Sandy shale	5	0	349	0
Sandstone	7	3	356	3
Sandy shale	5	0	361	3
Shale	3	2	364	5
Brown shale + coal	2	2	366	7
Coal (Boney)	0	7	367	2
Coal	0	2	367	4
Shale	5	8	373	0
Shale + Boney Coal	1	0	374	0
Shale + Boney coal	1	0	374	0
Shale	11	4	385	4
Coal (Boney)	1	4	386	8
Shale	24	11	411	7
Coal	1	9	413	4
Brown shale	0	8	414	0
Grey shale	3	6	417	6
Coal (Boney)	0	10	418	4
Shale	6	0	424	4
Coal	0	8	425	0
Shale	9	0	434	0
Brown shale	0	8	434	8
Sandy shale	1	6	436	2
Shale	0	4	436	6
Coal	0	5	436	11
Sandy shale	4	3	441	2
Coal	0	9	441	11
Shale	4	6	446	5
Coal	0	2	446	7
Sandstone	38	4	484	11
Shale	160	1	645	0
Conglomerate	7	2	652	2

CANADIAN COLLIERIES BOREHOLE No. 13-8

Extension District

Douglas District Sec. 13 R.8

Elevation : 915' Depth 489' 9"

	Thickness		Depth	
Cemented gravel	25'	8"	25'	8"
Conglomerate	154	0	179	8
Shale	39	4	219	0
Sandstone	2	10	221	10
Shale	27	10	249	8
Shale + coal	2	5	252	1
Shale	38	5	290	6
Sandstone	1	6	292	6
Sandy shale	3	3	295	3
Conglomerate	36	10	332	1
Shale	21	3	353	4
Shale + Coal	1	10	355	2
Coal	1	3	356	5
Coal + shale	0	4	356	9
Coal	0	6	357	3
Shale	7	8	364	11
Coal + shale	1	5	366	4
Shale	5	8	372	0
Shale + coal	1	9	373	9
Coal	1	3	375	0
Shale	26	9	401	9
Coal + shale	2	3	404	0
Shale	1	11	405	11
Coal	1	0	406	11
Shale	2	9	409	8
Coal	0	2	409	10
Coal + shale	0	8	410	6
Coal	0	5	410	11
Shale	0	2	411	11
Coal	0	7	411	8
Shale + sandstone	12	1	423	9
Shale	6	0	429	9
Coal + shale	1	0	430	9
Shale	1	0	431	9
Coal	1	3	433	0
Coal + shale	2	7	435	7
Shale	0	2	435	9
Sandstone	39	0	474	9
Shale	15	0	489	9

CANADIAN COLLIERIES BOREHOLE No. 14a

Extension District

Sec. 9 R. 4 Cranberry District

Elevation 131' Depth 1076' 0"

	Thickness		Depth	
Surface drift	19'	6"	19'	6"
Conglomerate	193	5	213	1
Clay shale	7	4	220	5
Sandstone	2	4	222	9
Conglomerate	59	2	281	11
Sandstone	31	5	313	4
Conglomerate	13	3	326	7
Sandstone	6	0	332	7
Conglomerate	4	2	336	9
Sandstone	5	2	341	11
Conglomerate	5	1	347	0
Sandstone	5	3	352	3
Conglomerate	11	1	363	4
Shale	31	6	394	10
Conglomerate	255	6	650	4
Clay shale	5	3	655	7
Sandy shale	90	1	745	8
(the hole was extended after a lapse of 5 years)				
Sandy shale	15	0	760	8
Sandstone	9	6	770	2
Sandy shale	57	10	828	0
Clay shale	248	0	1076	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 14 E Date:

Elevation:

Location: N.W. Corner, Sec. 8, Range 1
Cedar District

Till	0	-	114'
Sandstone	114	-	209'
Shale	209	-	221'
Coal	221	-	222'
Shale	222	-	240'
Coal	240	-	240'6"
Sandy Shale	240'6"	-	252'
Sandstone	252	-	255'
Shale	255	-	261'6"
Coal	261'6"	-	262'
Sandstone	262	-	296'
Shale	296	-	301'
Sandstone	301	-	344'
Shale	344	-	345'6"
Coal	345'6"	-	346'2"
Shale	346'2"	-	352'
Sandstone	352	-	397'6"
Coal	397'6"	-	398'
Shale	398	-	425'
Sandstone	425	-	432'8"
Coal	432'8"	-	432'9"
Sandstone	432'9"	-	452'4"
Coal	452'4"	-	452'10"
Sandstone	452'10"	-	555'
Conglomerate	555	-	570'
Sandstone	570	-	589'
Conglomerate	589	-	598'
Sandstone	598	-	670'
Conglomerate	670	-	676'
Sandstone	676	-	772'
Shale	772	-	814'
Conglomerate	814	-	837'
Shale	837	-	848'
Sandstone	848	-	883'
Shale	883	-	940'
Sandstone	940	-	960'
Shale	960	-	987'
Chert(?)	987	-	988'

CANADIAN COLLIERIES BOREHOLE No. 15

[redacted]

Sec. 14 R.7 Douglas District

Elevation 979.0' Depth 723'0"

	Thickness		Depth	
Surface drift	2'	0"	2'	0"
Conglomerate	37	0	39	0
Sandstone	3	0	42	0
Conglomerate	53	6	95	6
Shale	0	6	96	0
Conglomerate	2	0	98	0
Shale	125	0	223	0
Sandstone	1	0	224	0
Conglomerate	35	0	259	0
Shale	1	0	260	0
Shale	19	0	279	0
Shale	1	0	280	0
Shale	25	0	305	0
Coal	1	2	306	2
Shale	0	8	306	10
Coal	1	2	308	0
Shale	12	9	320	9
Coal (dirty)	1	3	322	0
Shale	8	6	330	6
Coal	0	8	331	2
Shale	0	6	331	8
Coal	0	10	332	6
Shale	34	10	367	4
Coal (bony)	0	8	368	0
Shale	0	9	368	9
Coal (Bony)	0	3	369	0
Shale	1	0	370	0
Sandstone	1	0	371	0
Coal	0	6	371	6
Coal (Bony)	0	2	371	8
Coal	0	9	372	5
Shale	1	9	374	2
Shale + coal (mixed)	2	0	376	2
Shaly sandstone	3	10	380	0
Sandstone	3	0	383	0
Shale + coal	3	0	386	0
Sandstone	3	0	389	0
Sandstone	38	0	427	0
Shale	281	0	708	0
Shale + limestone	14	0	722	0
Trap	1	0	723	0

CANADIAN COLLIERIES BOREHOLE No. 15-A

[redacted]

Douglas District Sec. 13 R.8

Elevation 927.0' Depth 407' 10"

	Thickness	Depth
Conglomerate	143' 3"	143' 3"
Shale	3 5	146 8
Sandstone	3 0	149 8
Shale	15 10	165 6
Sandstone	2 5	167 11
Shale	78 5	246 4
Sandstone	1 7	247 11
Sand shale	18 2	266 1
Conglomerate	36 9	302 10
Shale	21 3	324 1
Coal + shale	0 8	324 9
Coal	1 0	325 9
Coal + shale	0 3	326 0
Coal	0 3	326 3
Shale	12 5	338 8
Coal + shale	0 9	339 5
Shale	8 7	348 0
Coal	1 6	349 6
Shale	20 8	370 2
Coal	2 7	372 9
Shale	2 2	374 11
Coal	0 3	375 2
Coal + shale	0 4	375 6
Shale	5 1	380 7
Coal	0 11	381 6
Shale	6 4	387 10
Coal	0 3	388 1
Shale	0 9	388 10
Coal	0 4	389 2
Shale	9 7	398 9
Sandstone	4 8	403 5
Coal + shale	0 4	403 9
Coal	1 0	404 9
Coal + shale	1 10	406 7
Coal	0 2	406 9
Shale	0 2	406 11
Coal	0 11	407 10

CANADIAN COLLIERIES BOREHOLE NO. 16

Extension District

Sec. 5 R.7 Cranberry District

Elevation 64.0 Depth 876' 7"

	Thickness		Depth	
Wash + boulders	8'	0"	8'	0"
Boulders	10	0	18	0
Hardpan + boulders	12	0	30	0
Gravel & boulders	27	0	57	0
Quicksand, gravel + haropan	5	0	62	0
Quicksand + gravel	18	0	80	0
Quicksand	2	0	82	0
Quicksand + cement gravel	12	0	94	0
Quicksand + cement boulders	15	0	109	0
Quicksand, blue clay + boulders	12	0	121	0
Gravel + boulders	5	0	126	0
Sandstone	184	0	310	0
Shale	3	0	313	0
Sandstone	13	7	326	7
Shale	3	0	329	7
Sandstone	43	11	373	6
Conglomerate	4	3	377	9
Sandstone	18	4	396	1
Conglomerate + sandstone	8	6	404	7
Sandstone	9	6	414	1
Conglomerate	21	6	435	7
Sandstone	8	0	443	7
Conglomerate	9	2	452	9
Sandstone	55	4	508	1
Conglomerate	15	0	523	1
Sandstone	24	0	547	1
Conglomerate	16	0	563	1
Sandstone	19	0	582	1
Conglomerate	1	0	583	1
Sandstone	12	6	595	7
Shale	2	0	597	7
Sandstone	2	0	599	7
Shale	37	6	637	1
Sandstone	5	6	642	7
Shale	14	6	657	1
Conglomerate	0	6	657	7
Sandstone	15	6	686	1
Shale	1	3	687	4
Sandstone	3	0	690	4
Shale	20	11	711	3
Coal	0	2	711	5
Brown shale with coal	3	8	715	1
Yellow clay	1	0	716	1
Brown shale with coal	8	3	724	4
Shale	6	0	730	4
Sandstone	12	6	742	10
Shale	9	0	751	10
Sandstone	23	3	775	1
Shale	64	0	839	1
Sandstone	1	0	840	1
Shale	36	6	876	7

CANADIAN COLLIERIES BOREHOLE No. 17

EXTENSION DISTRICT BLOCK 87 - Bright District

No elevation given Depth 490' 11"

	Thickness		Depth	
Gravel	4'	1"	4'	1"
Conglomerate	11	3	15	4
Sandstone	10	1	25	5
Conglomerate	5	1	30	6
Shale	137	5	167	11
Conglomerate	66	10	234	9
Clay shale	12	3	247	0
Conglomerate	134	7	381	7
Clay shale	109	4	490	11

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 17 E Date:

Elevation:

Location: 794' N, 435' W, S.E. Corner, Sec. 13, Range 5, Cranberry District

Clay	0	-	6'
Gravel	6	-	13'
Clay	13	-	20'
Shale	20	-	24'
Sandstone	24	-	38'
Shale	38	-	113'
Conglomerate	113	-	116'
Sandstone	116	-	119'
Shale	119	-	121'
Sandstone	121	-	124'
Shale	124	-	137'
Sandstone	137	-	174'
Conglomerate	174	-	181'
Sandstone	181	-	211'
Conglomerate	211	-	230'
Shale	230	-	367'
Conglomerate	367	-	394'
Shale	394	-	509'
Conglomerate	509	-	560'
Shale	560	-	568'
Conglomerate	568	-	656'
Shale & Sandstone	656	-	679'
Conglomerate - 2½" Coal Seam at 730'	679	-	779'
Shale	779	-	781'
Coal	781	-	783'4" 2'4"
Shale	783'4"	-	800'
Conglomerate	800	-	845'
Sandstone	845	-	855'
Conglomerate	855	-	869'
Shale	869	-	879'
Conglomerate	879	-	997'
Coal	997	-	998' x 1.0'
Shale	998	-	1022'
Sandstone	1022	-	1039'
Conglomerate	1039	-	1044'
Shale	1044	-	1053'6"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 17F

Date:

Elevation:

Location: 900' NE of SW Corner, Sec. 13, Range 5, Cranberry District

Sand & Gravel	0	-	20'
Shale	20	-	174'
Conglomerate	174	-	181'
Shale	181	-	211'
Conglomerate	211	-	250'
Shale	250	-	377'
Conglomerate	377	-	404'
Shale	404	-	509'
Conglomerate	509	-	560'
Shale	560	-	568'
Conglomerate	568	-	656'
Shale	656	-	679'
Conglomerate	679	-	779'
Shale	779	-	781'
Coal	781	-	783'4"
Shale	783'4"	-	800'
Conglomerate	800	-	845'
Shale	845	-	855'
Conglomerate	855	-	869'
Shale	869	-	879'
Conglomerate	879	-	997'
Coal	997	-	1000'
Sandstone	1000	-	1049'

CANADIAN COLLIERIES BOREHOLE No. 18
Extension District

Sec. 4 R.7 Cranberry District

Elevation 66' Depth 538' 6"

	Thickness		Depth	
Gravel	8'	0"	8'	0"
Boulders	31	0	39	0
Sandstone	77	0	116	0
Shale + coal markings	1	0	117	0
Sandstone	16	0	133	0
Sandy shale	4	0	137	0
Sandstone	35	0	172	0
Conglomerate	2	0	174	0
Sandstone	5	0	179	0
Conglomerate	0	7	179	7
Sandstone	45	5	225	0
Conglomerate	5	0	230	0
Sandstone	3	6	233	6
Conglomerate	2	6	236	0
Sandstone	44	6	280	6
Conglomerate	52	9	333	3
Sandstone	3	6	336	9
Conglomerate	2	0	338	9
Sandstone	34	9	373	6
Shale	128	6	502	0
Coal with some rash (core mostly powder)	7	1	509	1
Shale	29	5	538	6

Douglas seam compilation map shows borehole at elbow of Nanaimo River in this section ; "Hole down about 60' supposed to be 8' of coal". Elevation fits, coal thickness also, not depth. Would have to be Wellington Seam, coal within shale is suspicious.

CANADIAN COLLIERIES BOREHOLE No. 19

~~Extension District~~

Sec. 7 R-7 Cranberry District

Elevation 53.0' Depth 614' 6"

	Thickness		Depth	
Clay + boulders	12'	0"	12'	0"
Gravel	3	0	15	0
Sandstone	195	6	210	6
Conglomerate	11	6	222	0
Sandstone	2	6	224	6
Conglomerate	32	6	257	0
Sandstone	12	6	269	6
Conglomerate	2	0	271	6
Sandstone	3	6	275	0
Conglomerate	4	0	279	0
Sandstone	26	0	305	0
Conglomerate	3	0	308	0
Sandstone	5	6	313	6
Shale	68	0	381	6
Coal (dirty)	0	9	382	3
Sandstone	5	0	387	3
Conglomerate	1	0	388	3
Coal + shale	1	0	389	3
Shale	45	3	434	6
Coal (dirty)	2	3	436	9
Coal (clean)	2	6	439	3
Coal (dirty) + shale	2	6	441	9
Shale	26	9	468	6
Sandstone	5	0	473	6
Shale	60	8	534	2
Conglomerate	3	0	537	2
Shale	43	4	580	6
Sandstone	18	6	599	0
Shale	11	0	610	0
Sandstone	4	6	614	6

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 19 (Western Fuel Company)
(In Journal -"No.3 Westfield Bore"
later known as No. 3 Northfield)

Date: 1888
(Apr. 13 - Sept. 1)

Elevation: 364.6 above H.W.M. Heyland

Location: S18, R VII, Mountain District
49' East and 62'5' South of N.W. corner

Cement, gravel etc.	0	--	35'
Conglomerate, coarse	35	-	40'
Conglomerate, coarse with clay parting at 43'14"	40	-	54'
Conglomerate, coarse and fine	54	-	80'
Conglomerate	80	-	92'6"
Shale, sandy, light blue	92'6"	-	100'
Shale, dark brown, with coal markings	100	-	102'
Shale, blue	102	-	103'
Shale, dark, with coal markings	103	-	104'
Shale, light blue with sandstone bands	104	-	110'
Shale, dark, with coal markings	110	-	112'6"
Shale, light blue sandy	112'6"	-	115'
Shale, light blue and gray sandy	115	-	130'
Shale, light blue, sandy	130	-	139'
Conglomerate	139	-	158'6"
Conglomerate, fine	158'6"	-	174'
Shale, sandy	174	-	175'
Conglomerate	175	-	182'6"
Shale, sandy	182'6"	-	183'
Conglomerate	183	-	188'6"
Shale, light and dark brown sandy	188'6"	-	203'
Shale, light blue and gray sandy	203	-	247'
Shale, light blue and dark brown, sandy, with sandstone bands	247	-	263'
Shale, light blue, sandy	263	-	267'
Conglomerate	267	-	289'6"
Shale, dark, sandy	289'6"	-	290'6"
Shale, light blue, sandy with sandstone bands	290'6"	-	294'
Shale, sandy, with sandstone bands	294	-	301'
Sandstone, fine gray	301	-	305'6"
Shale, sandy	305'6"	-	308'
Shale, light, sandy	308	-	312'6"
Shale, dark	312'6"	-	313'
Coal, good, hard	313	-	315'11"
Shale, dark brown and light blue sandy	315'11"	-	324'11"

.../2

Shale, light and dark blue, sandy	324'11"	-	331'
Shale, light and dark blue	331	-	332'8"
Coal	332'8"	-	334'11"
Shale, gray, blue	334'11"	-	346'6"
Coal, soft, and black shale	346'6"	-	348'
Black Shale and coal mixed	348	-	350'
Shale gray	350	-	351'3"
Coal, soft	351'3"	-	353'
Shale, gray, blue	353	-	362'6"
Shale, dark brown	362'6"	-	363'
Coal, soft and shale	363	-	365'
Shale, gray, blue, sandy	365	-	372'
Sandstone, fine gray with coal markings and shaley bands	372	-	376'6"
Shale, light gray, sandy	376'6"	-	378'
Shale, brown sandy with coal markings	378	-	378'6"
Shale, blue gray, sandy, with fine gray sandstone bands	378'6"	-	393'6"
Shale, gray, blue and light brown	393'6"	-	398'8"
Coal, clean, hard, good quality	398'8"	-	402'
Sandstone, fine with coal markings	402	-	404'1"
Coal, clean and good quality	404'1"	-	406'1"
Sandstone, light brown with coal markings	406'1"	-	407'8"
Sandstone, light brown	407'8"	-	409'4"
Coal, hard	409'4"	-	409'10"
Sandstone, dark and light brown with coal markings	409'10"	-	411'10"
Sandstone, light blue	411'10"	-	417'6"

CANADIAN COLLIERIES BOREHOLE No. 20

~~Extension District~~

Sec. 10 R.7 Cranberry District

Elevation 76.0' Depth 623'6"

	Thickness		Depth	
Sand + clay	5'	0"	5'	0"
Clay + boulders	30	0	35	0
Boulders	5	0	40	0
Sandstone	42	0	82	0
Shale	1	0	83	0
Sandstone	2	6	85	6
Shale	1	6	87	0
Sandstone	223	0	310	0
Sandy shale	61	6	371	6
Shale	26	0	397	6
Sandy shale	10	6	408	0
Sandstone	3	0	411	0
Conglomerate	3	0	414	0
Sandstone	3	0	417	0
Conglomerate	1	0	418	0
Shale	5	6	423	6
Coal	0	6	424	0
Coal + rash	8	0	432	0
Shale	19	6	451	6
Sandstone	8	0	459	6
Shale	47	6	507	0
Sandstone	4	0	511	0
Shale	112	6	623	6

CANADIAN COLLIERIES — BOREHOLE No. 21a

~~[illegible]~~ — Sec. 9 R. 2 Cranberry District

Elevation 489.0' — Depth 432

	Thickness		Depth	
Gravel	2'	0"	2'	0"
Conglomerate	66	0	68	0
Shale	17	6	85	6
Sandstone	6	6	92	0
Conglomerate	117	6	209	6
Sandstone	7	0	216	6
Conglomerate	116	0	332	6
Shale	2	4	334	10
<u>Coal</u>	0	8	335	6
Brown sandstone	2	0	337	6
Brown shale	0	6	338	0
Brown sandstone	3	0	341	0
Brown shale	0	6	341	6
Sandstone	1	6	343	0
Shale	0	6	343	6
Sandstone	35	6	379	0
Conglomerate	2	0	381	0
Sandstone	1	0	382	0
Sandy shale	50	0	432	0

CANADIAN COLLIERIES BOREHOLE No. 22a

Sec. 6 R. 1 Cranberry District

Elevation 745.0' Depth 695' 4"

	Thickness		Depth	
	2'	3"	2'	3"
Surface soil	33	0	35	3
Conglomerate	2	1	37	4
Sandstone	94	10	132	2
Conglomerate	4	0	136	2
Broken shale	4	0	140	2
Clay shale	1	8	141	10
Shale laminae	1	1	142	11
Mining shale	3	4	146	3
Coal	0	11	147	2
Clay shale	13	4	160	6
Broken shale	100	0	260	6
Compressed sandstone	434	10	695	4
Clay shale				

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 23 (Western Fuel Company)

Date: 1891
(Feb. 2 to May 9)

Elevation : 238.7 above M.H.W.

Location: 400' N.E. of N.E. corner Brown Estate (S 17, R VIII, Mountain) in Section 1, Nanaimo District

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Gravel & Cement	0	- 84'6"
Conglomerate	84'6"	- 110'
Conglomerate, shale and Sandstone	110	- 120'
Conglomerate	120	- 179'
Conglomerate and Sandy Shale	179	- 189'
Shale, sandy shale and sandstone	189	- 220'
Sandstone, sandy shale and conglomerate	220	- 244'
Conglomerate and sandy shale	244	- 265'
Sandy shale and shale	265	- 287'
Sandy shale and sandstone	287	- 311'
Conglomerate	311	- 364'
Coal	364	- 365'5"
Sandstone	365'5"	- 373'
Sandstone	373	- 390'
Sandstone and Conglomerate	390	- 399'
Sandstone and Conglomerate and Shale	399	- 402'
Coal	402	- 402'6"
Sandstone and Conglomerate and Shale	402'6"	- 419'
Coal	419	- 420'
Shale, light	420	- 441'
Shale, and sandy shale	441	- 463'
Shale, and sandy shale	463	- 482'
Sandstone	482	- 523'
Sandy Shale	523	- 686'

CANADIAN COLLIERIES LTD. BOREHOLE No. 23a

[redacted]

Sec. 6, R. 2 Cranberry District B.C.

Elevation 406.5' Depth 703' 8"

	Thickness		Depth	
Surface soil	7'	0"	7'	0"
Conglomerate	44	1	51	1
Shale	4	1	55	2
Conglomerate	85	8	140	10
Shale	22	0	162	10
Conglomerate	57	9	220	7
Shale	4	0	224	7
Conglomerate	177	7	402	2
Shale	12	0	414	2
Conglomerate	36	6	450	8
Rash	2	2	452	10
Coal	0	11	453	9
Shale	1	4	455	1
Sandstone	72	1	527	2
Clay shale	176	6	703	8

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 24 (Western Fuel Company) Date: 1891 (April to July)

Elevation:

Location: On Beach at Departure Bay, about 400 yards on north side of old S.W. wharf (Northfield Estate) Sec. 1, Nanaimo Dist.

Drift cement, gravel & boulders	0	-	15'	
Shales & Sandy Shales	15	-	104'	
Sandstone & Conglomerate	104	-	106'	
Sandy shale	106	-	147'	
Clay Shale	147	-	162'	
Sandy shale	162	-	169'	
Conglomerate	169	-	171'	
Sandstone & Conglomerate	171	-	175'	
Sandstone	175	-	177'3"	
Coal traces	177'3"	-	177'4"	
Mixed conglomerate	177'4"	-	180'	
Conglomerate	180	-	185'	
Sandstone	185	-	186'	
Conglomerate	186	-	273'	
Sandstone & Conglomerate	273	-	275'	
Conglomerate	275	-	276'	
Sandstone	276	-	297'	
Shale	297	-	301'	
Shale with coal traces	301	-	302'	
Shale	302	-	307'	
Sandstone	307	-	309'	
Conglomerate	309	-	320'	
Sandstone	320	-	321'	
Sandstone & Conglomerate	321	-	329'	
Conglomerate	329	-	359'	
Sandstone	359	-	364'	
Conglomerate	364	-	374'	
Sandstone & Shale	374	-	387'	
Dark shale, coal traces	387	-	387'9"	struck flow water at
Shale	387'9"	-	402'	375'
Shale with coal traces	402	-	403'	
Dark shale	403	-	403'2"	
Sandy shale	403'2"	-	422'	
Sandstone	422	-	425'	
Conglomerate	425	-	437'	
Sandstone	437	-	442'	
Conglomerate	442'	-	453'6"	

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Brown Slate	453'6"	-	454'	
Conglomerate	454	-	463'	
Mixed sandstone	463	-	468'	
Shale	468	-	482'	
Blue shale, soft	482	-	492'	
Sandy shale	492	-	494'	
Conglomerate	494	-	517'	
Brown shale & coal traces	517	-	518'	
Sandy shale	518	-	523'	
Conglomerate	523	-	570'	struck big flow water
Sandy shale	570	-	575'	at 533'
Brown shale, coal traces	575	-	577'	
Slate & coal	577	-	578'	Mr. McGregor at drill
Coal, some dirt in coal	578	-	580'6"	
Brown shale & coal mixed	580'6"	-	581'8"	
Brown shale	581'8"	-	583'	
Sandy shale	583	-	588	
Shale	588	-	596'6"	
Brown shale, coal traces	596'6"	-	597'	
Shale	597	-	606'	
Sandstone, coal traces	606	-	607'	
Sandstone	607	-	614'	
Brown shale, coal traces	614	-	615'	
Sandstone	615	-	627'4"	
Sandy shale	627'4"	-	630'	
Sandstone	630	-	651'9"	
Brown shale, coal traces	651'9"	-	652'	
Sandstone	652	-	668'	
Sandy shale	668	-	688'	
Sandy shale, lime slips in shale	688	-	714'	
Sandy shale	714	-	760'	
Sandy shale, coal traces	760	-	761'	
Sandy shale	761	-	822'	
Blue shale	822	-	824'	
Shale, coal traces	824	-	832'	
Shale	832	-	864'	
Conglomerate with lime streaks	864	-	887'	
Trap rock or Vancouver Vit. rock	887	-	935'7½"	

SUMMARY: (by Mr. McGregor)

Nature of strata passed through:	The usual measures, shales, sandstone & cong. and lying in the order named, always found in this field. The beds of cong. however rather thick and the shales bearing traces of coal profusely.
No. of coal seams struck:	One, the Wellington as shown by the bedrock.
At what depth struck:	578 ft.
Thickness of seam	2 ft. 6 ins.
Nature & Quality of coal:	Very poor, being greatly mixed with dirt.
Nature of Measure under the coal:	Shale and sandstone gradually changing when bore stopped in trap rock.

CANADIAN COLLIERIES BOREHOLE No. 24

[redacted]

Cranberry District S.9-R.3

Elevation 368' Depth 640' 9"

	Thickness		Depth	
Hard clay	25'	0"	25'	0"
Hard pan	39	5	64	5
Gravel	3	3	67	8
Sandstone	3	0	70	8
Conglomerate	115	10	186	6
Sandstone	5	6	192	0
Conglomerate	75	6	267	6
Shale	8	10	276	4
Coal	0	2 -	276	6
Shale	2	0	278	6
Coal	0	2 -	278	8
Shale	2	4	281	0
Coal	1	7 -	282	7
Sandstone	25	0	307	7
Conglomerate	11	0	318	7
Sandstone	30	0	348	7
Shale	292	2	640	9

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 25 (Western Fuel Company) Date: 1891 (May 11 to October 28)

Elevation: 263.0 above M.H.W.

Location: Section 19, Range 8
Mountain District, Departure Bay

Gravel & Sand	0	-	186'
Conglomerate	186	-	250'
Shale	250	-	252'
Conglomerate	252	-	283'
Sandy shale	283	-	302'
Sandy shale and sandstone	302	-	314'
sandstone and conglomerate	314	-	321'
Conglomerate	321	-	331'
Conglomerate and sandstone	331	-	339'
Sandstone, conglomerate and shale	339	-	349'
Sandstone	349	-	362'
Sandstone and conglomerate	362	-	366'
Sandstone and shale with 1" of Coal	366	-	375'
Sandstone	375	-	384'
Sandy shale and sandstone	384	-	396'
Sandy shale	396	-	404'
Sandy shale and conglomerate	404	-	416'
Conglomerate	416	-	458'
Conglomerate and shale	458	-	466'
Coal	466	-	468'5"
Shale, sandy	468'5"	-	476'
Sandstone	476'	-	483'
Conglomerate	483	-	512'
Conglomerate and shale	512	-	515'
Shale	515	-	517'
Coal	517	-	517'10"
Shale and sandy shale	517'10"	-	531'
Coal	531	-	531'7"
Shale	531'7"	-	537'
Shale, sandy	537	-	552'6"
Coal	552'6"	-	553'
Shale, sandy	553	-	554'4"
Coal	554'4"	-	556'
Sandy shale and sandstone	556	-	566'
Sandstone	566	-	610'

CANADIAN COLLIERIES BOREHOLE No. 25

[redacted] Sec. 10 R.3- Cranberry District

Elevation 390' 0" Depth 551' 4"

	Thickness		Depth	
Clay	4'	0"	4'	0'
Conglomerate	76	3	80	3
Shale	46	9	127	0
Shale + sandstone	11	2	138	2
Shale	17	0	155	2
Conglomerate	202	0	357	2
Sandy shale	11	2	368	4
Broken shale with coal marks	7	6	375	10
Shale	18	6	394	4
Sandstone	17	6	411	10
Sandy shale	67	0	478	10
Shale	72	6	551	4

CANADIAN COLLIERIES BOREHOLE No. 26

[redacted]

Cranberry District S.8-R.4

Elevation 362.5 Depth 411' 5"

	Thickness		Depth	
Hardpan	10'	6"	10'	6"
Conglomerate	147	0	157	6
Sandstone	2	0	159	6
Conglomerate	25	0	184	6
Shale	0	9	185	3
Conglomerate	25	9	211	0
Shale	3	10	214	10
Conglomerate	23	0	237	10
Shale	27	2	265	0
Conglomerate	146	5	411	5

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 27 (Western Fuel Company) Date: 1891 (July to September 22)

Elevation:

Location: Northfield Estate. On beach Departure Bay, about 600 yards south of No. 24 Bore. Sec. 1, Nanaimo Dist.

Cement, clay & gravel	0	-	42'	
Boulders & gravel	42	-	44'	
Shale	44	-	98'	
Sandy shale	98	-	101'	
Conglomerate	101	-	116'	
Sandy shale	116	-	117'	
Conglomerate	117	-	118'	
Sandy shale	118	-	122'	
Conglomerate	122	-	129'	
Shale	129	-	237'	
Brown shale	237	-	239'	
Sandy shale	239	-	397'	
Conglomerate	397	-	463'	
Shale	463	-	468'	
Sandstone	468	-	489'	
Shale	489	-	496'	
Shale with coal traces	496		500'	
Dark shale, coal traces in cavity	500	-	501'	
Shale with coal traces	501	-	512'	
Conglomerate	512	-	554'10"	
Coal	554'10"	-	555'	
Conglomerate	555	-	563'	
Brown shale and Coal traces	563	-	565'	
Brown shale and Coal traces	565	-	566'	
Shale	566	-	570'	
Shale with coal traces	570	-	571'	
Shale	571	-	575'	
Shale & coal traces	575	-	576'	
Shale with coal markings	576	-	616'	
Shale	616	-	635'	
Brown shale	635	-	636'6"	
Brown shale & coal	636'6"	-	637'	stopped work until Mr.McGrego
Brown shale & coal	637	-	638'	came & took drill
Shale	638	-	641'	
Conglomerate	641	-	690'	
Shale	690	-	691'	
Shale with coal traces	691	-	692'	
Coal	692	-	694'8"	
Dark shale	694'8"	-	696'	
Hard sandstone	696	-	702'	

.../2

Dark sandstone	702	-	703'
Sandstone	703	-	717'
Blue shale	717	-	718'
Sandstone	718	-	719'
Sandstone, some coal traces	719	-	743'
Sandstone	743	-	744'
Sandstone with coal traces	744	-	745'
Sandstone, some coal traces	745	-	792'
Shale with some coal traces	792	-	932' Struck gas at 767'
Trap rock	932	-	941'4½"

SUMMARY: (Mr. McGregor)

Nature of strata passed through:	The same as No. 24 bore.
Number of coal seams struck:	Two. One, however, very thin.
Depth at which first seam struck:	554'10"
Thickness of seam:	2"
Depth at which second(Wellington) seam struck:	692'
Thickness of second seam:	2'8"
Nature & Quality of coal:	Soft, poor, being more or less mixed with dirt

CANADIAN COLLIERIES BOREHOLE No. 27

[redacted]

Douglas District Sec 19 - R. 8

Elevation 940' Depth 759' 0"

	Thickness		Depth	
Surface soil	5'	1"	5'	1"
Sandstone	39	2	44	3
Clay shale	8	0	52	3
Sandy shale	136	9	189	0
Clay shale	570	0	789	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 27 E Date:

Elevation:

Location: SW Corner of Sec. 11, Range 8
Cranberry District

Till	0	-	12'
Sandstone	12	-	22'
Shale	22	-	23'8"
Coal	23'8"	-	24'
Sandstone	24	-	74'
Shale	74	-	82'6"
Coal	82'6"	-	82'9"
Shale	82'9"	-	87'
Coal	87	-	87'2"
Shale	87'2"	-	92'
Coal	92	-	94'
Sandstone	94	-	124'3"
Coal	124'3"	-	124'9"
Shale	124'9"	-	132'
Sandstone	132	-	170'
Shale	170	-	185'
Sandstone	185	-	295'
Conglomerate	295	-	306'
Sandstone	306	-	400'
Shale, sandstone	400	-	546'
Conglomerate	546	-	551'
Shale	551	-	554'
Sandstone	554	-	562'
Shale	562	-	586'
Sandstone	586	-	598'
Shale	598	-	636'
Conglomerate	636	-	639'
Shale	639	-	664'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 28 (Western Fuel Company) Date:

Elevation:

Location: Sec. 19, R. 2 Cranberry Dist.

Surface gravel	0	-	2'	
Hardpan	2	-	6'	
Hard coarse conglomerate	6	-	38'	
Dark grey coarse conglomerate, dark grey fine sandstone with coal markings, dark grey coarse conglomerate	38	-	49'	
Dark grey coarse and fine cong.	49	-	67'	
Light grey coarse and fine cong.	67	-	88'3"	
Dark grey coarse conglomerate	88'3"	-	103'9"	
Fine conglomerate	103'9"	-	104'3"	
Brown shale or clay parting - no thickness given. Hard coarse and fine dark grey cong. with coal markings	104'3"	-	116'6"	
Hard coarse and fine dark grey cong, with coal markings	116'6"	-	134'2"	
Dark grey coarse conglomerate	134'2"	-	136'2"	) This is 16'6". According t
Dark grey sandy shale with coal mkgs.	136'2"	-	143'2"	) Journal 17'9". Either an
Dark grey shale with coal mkgs and fossils	143'2"	-	144'2"	) error in addition or one) layer omitted. From here on
Light grey sandstone	144'2"	-	145'5"	) top figures are those
Dark grey shale with coal markings and fossils	145'5"	-	148'8"	) using 16'6". Those in) brackets from Journal
Curly Coal (Curly Coal 5'4")	148'8"	-	150'8" (151'11")	))
Curly Coal	150'8" (151'11")	-	154' (155'3")	
Light & dark grey shale	154 (155'3")	-	157'9" (159')	
Brown Shale	157'9" (159)	-	158' (159'3")	
Light grey shale	158 (159'3")	-	158'6" (159'9")	
Brown shale & Coal mixed	158'6" (159'9")	-	159'3" (160'6")	

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	Dark grey shale	159'3" (160'6")	161'3" (162'6")	
	Sandy shale with coal markings	161'3" (162'6")	167'3" (168'6")	
	Dark grey(shale?) with coal mkgs.	167'3" (168'6")	168'11" (170'2")	
	Brown Shale	168'11" (170'2")	169'2" (170'5")	(struck a small feeder of water)
	Hard coal	169'2" (170'5")	170'2" (171'5")	
	Dark grey sandstone with coal mkgs.	170'2" (171'5")	171'5" (172'8"	pencilled note:
*	Light grey fine conglomerate	171'5" (172'8")	181'5" (182'8")	(* this was not conglomerate but coarse gritty sandstone - Wellington bed rock. W.McG.??)
*	Fine conglomerate (a parting)	181'5" (182'8")	183'8" (184'11")	
	Light grey sandstone	183'8" (184'11")	188'8" (189'11")	
	Light grey sandstone	188'8" (189'11")	195'8" (196'11")	
	Dark sandy shale	195'8" (196'11")	196'2" (197'5")	
	Light grey sandstone	196'2" (197'5")	202'9" (204')	
	Light grey sandstone) Dark grey sandy shale)	202'9" (204')	206'3" (207'6")	
		206'3" (207'6")	227'9" (229')	
	Dark grey sandstone	227'9" (229')	234'3" (235'6")	(struck a feeder of water. 2 feeders fill 3/4" pipe)
	Dark grey sandy shale with coal mkgs	234'3" (235'6")	257'9" (259')	
	Dark grey sandy shale with small shells	257'9" (259')	282'9" (284')	
	Dark blue shale	282'9" (284')	352'3" (353'6")	

* Total given as 24'. Thicknesses equal 25'. From here on the bracketed thicknesses are 1' more than those in the journal.

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NOTE: This is Western Fuel Co's Bore 28.

It was drilled by the New Vancouver Coal Co. and is listed in the journal as No. 2 Harewood Bore. Later someone has added in blue pencil "on the shaft - No. 28 - H.W.M. 534' "

The same occurs on Heyland's Nov 1895 10 ch = 1 map (No. D-31)

In the 1891 Mines Report, page 583, a bore "about one and a half miles in a south-east direction from the old Harewood Mine". which said "when down 150 feet they struck the coal which proved by boring to be five feet six inches thick" (curly coal 5'4")

They started to sink here - 1892 Mines Report, page 553.
"The shaft that was referred to as sinking did not turn out as well as the bore hole had indicated, although the coal that was got is very good and hard."

CANADIAN COLLIERIES BOREHOLE No. 28

Extension Field - Sec 19 - R. 2 CRANBERRY DIST.

Elevation 937' Depth 421' 0"

	Thickness		Depth	
Surface soil	5'	2"	5'	2"
Sandstone	31	0	36	2
Clay shale	281	10	318	0
Sandstone	36	0	354	0
Clay shale	67	0	421	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 28 E Date:

Elevation:

Location: N.W. Corner, Sec. 11, Range 8, Cranberry District

Till	0	-	6'
Sandstone	6	-	44'
Coal	44	-	45'
Sandstone	45	-	87'
Coal	87	-	87'6"
Sandstone , shale	87'6"	-	128'
Coal	128	-	128'3"
Shale	128'3"	-	135'
Sandstone	135	-	156'
Shale	156	-	159'
Sandstone	159	-	171'
Shale	171	-	186'
Sandstone	186	-	291'
Conglomerate	291	-	301'
Sandstone	301	-	327'
Conglomerate	327	-	329'
Sandstone	329	-	384'
Shale	384	-	418'
Sandstone	418	-	436'
Shale	436	-	551'6"
Coal	551'6"	-	552'
Shale	552	-	613'

CANADIAN COLLIERIES BOREHOLE NO. 29

Extension Field Sec 19 R 8 Douglas District

2000' West from Fontana's shaft (BH.27)

Elevation 901.7' Depth 65' 0"

	Thickness	Depth
Fire clay shale	11' 0"	11' 0"
Clay shale	54 0	65 0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 31 (Western Fuel Company)

Date: 1892
(Jan. 19 to Apr. 14)

Elevation:

Location: Northfield (old)
Sec 18, R. 8 Mountain Dist.

Cement, gravel & sand	0	-	155'
Conglomerate	155	-	198'
Shale, with coal markings @ 202-203	198	-	213'
Sandstone	213	-	215'
Shale	215	-	223'
Shale, black with coal markings	223	-	226'
Shale	226	-	240'
Sandstone, fine	240	-	251'
Conglomerate	251	-	275'
Shale, sandy	275	-	277'
Sandstone	277	-	278'
Shale	278	-	281'
Conglomerate	281	-	284'
Sandstone	284	-	286'
Conglomerate	286	-	310'
Shale, brown	310	-	314'
Shale, with coal markings	314	-	315'
Shale, sandy	315	-	316'
Shale, sandy, with coal markings	316	-	318'
Shale	318	-	327'4"
Coal	327'4"	-	327'6"
Shale, brown, with coal markings	327'6"	-	330'
Shale	330	-	344'4"
Coal	344'4"	-	344'6"
Shale, with coal markings	344'6"	-	350'
Sandstone	350	-	351'
Conglomerate	351	-	354'
Sandstone	354	-	355'
Conglomerate	355	-	397'
Shale, brown	397	-	398'
Shale, sandy	398	-	402'8"
Shale, brown	402'8"	-	403'7"
Coal	403'7"	-	405'5"
Shale, sandy	405'5"	-	414'
Sandstone	414	-	418'
Conglomerate	418	-	453'
Shale, brown	453	-	455'8"
Coal	455'8"	-	456'
Shale, brown	456	-	470'9"
Coal	470'9"	-	471'

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Shale, brown with coal markings	471	-	476'
Shale, brown	476	-	480'
Soap stone	480	-	480'6"
Shale, with thin streak of coal at 483'	480'6"	-	494'6"
Coal	494'6"	-	495'1"
Shale, brown	495'1"	-	495'2"
Coal	495'2"	-	496'
Shale, with coal markings at 502-503'	496	-	506'
Soap stone	506	-	507'
Shale	507	-	514'
Soap stone	514	-	514'6"
Shale	514'6"	-	524'
Sandstone with coal markings	524	-	527'9"
Coal	527'9"	-	528'
Shale	528	-	532'3"
Coal	532'3"	-	533'
Shale	533	-	535'
Sandstone	535	-	577'
Shale, sandy, with shell markings at 595'	577	-	601'
Sandy shale	601	-	610'
Shale	610	-	842'
Green stone	842	-	852'
Sandstone	852	-	867'
Green stone	867	-	870'
Sandstone	870	-	912'
Conglomerate, fine	912	-	1031'
Green stone	1031	-	1036'
Conglomerate	1036	-	1051'
Green stone	1051	-	1057'
Conglomerate	1057	-	1112'
Sandstone	1112	-	1123'
Conglomerate	1123	-	1126'
Sandstone	1126	-	1129'

CANADIAN COLLIERIES BOREHOLE NO. 31

SOUTH WELLINGTON DISTRICT

Sec. 11-R. 7 Cranberry District

Elevation 169' 34" Depth 223' 3"

	Thickness		Depth	
Top soil	5'	6"	5'	6"
Sandstone-hard	57	6	63	0
Sandy shale	33	0	96	0
Sandstone-hard	24	0	120	0
Shale	31	0	151	0
Conglomerate	5	0	156	0
Sandstone-Crystallized	9	0	165	0
Shale	1	0	166	0
Conglomerate	2	6	168	6
Coal - Boney with rash	2	6	171	0
Coal Top	2	7	173	7
Rash with bands of coal	7	8	181	3
Coal clear	18	6	199	9
Shale	23	6	223	3

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 33 (Western Fuel Company) Date: 1893/4
(Nov. 27 '93 to Jan. 15 '94)

Elevation:

Location: Sec. 19, R.7 Mountain Dist.

Gravel	0	-	5'
Hardpan	5	-	10'
Gravel	10	-	38'
Sand	38	-	174'
Sand and Boulders	174	-	177'
Sand	177	-	180'
Gravel, hard	180	-	189'6"
Conglomerate	189'6"	-	255'
Sandstone with coal markings	255	-	256'
Conglomerate	256	-	300'
Shale, sandy	300	-	310'
Shale	310	-	343'
Conglomerate	343	-	370'
Shale	370	-	371'6"
Conglomerate	371'6"	-	375'
Shale	375	-	376'
Conglomerate	376	-	418'
Shale	418	-	457'
Shale, sandy & hard	457	-	460'
Shale	460	-	465'8"
Coal	465'8"	-	465'10"
Shale	465'10"	-	502'
Sandstone	502	-	511'
Conglomerate	511	-	512'
Sandstone	512	-	514'
Conglomerate with sandstone	514	-	516'
Shale	516	-	516'6"
Sandstone	516'6"	-	520'
Shale, light	520	-	521'
Shale, brown	521	-	521'6"
Coal	521'6"	-	521'10"
Shale	521'10"	-	537'
Shale, brown	537	-	538'6"
Coal and brown shale	538'6"	-	539'
Shale	539	-	540'
Shale, brown	540	-	542'
Shale	542	-	550'
Shale, sandy	550	-	555'
Shale with coal markings at 563'	555	-	573'

.../2

Shale, brown	573	-	574'
Shale	574	-	576'
Shale, brown	576	-	580'
Shale	580	-	587'
Shale, brown, with coal markings	587	-	590'
Shale, brown	590	-	594'
Sandstone	594	-	597'2"
Shale, brown	597'2"	-	598'2"
Coal, soft	598'2"	-	601'
Shale	601	-	601'7"
Shale, brown	601'7"	-	602'
Sandstone	602	-	602'10"
Shale, brown	602'10"	-	603'
Coal, hard	603	-	606'3"
Shale, brown	606'3"	-	606'6"
Shale	606'6"	-	609'6"
Sandstone	609'6"	-	612'6"
Shale	612'6"	-	614'6"
Shale, brown	614'6"	-	614'8"
Coal markings	614'8"	-	615'8"
Sandstone, white	615'8"	-	620'
Shale, brown with coal markings	620	-	621'
Sandstone, white	621	-	623'
Shale, brown	623	-	623'11"
Coal	623'11"	-	624'
Sandstone, white	624	-	628'
Shale, brown	628	-	628'5"
Coal	628'5"	-	628'8 "
Shale, brown	628'8"	-	628'11"
Sandstone, dark	628'11"	-	643'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 34 (Western Fuel Company)

Date: 1894
(February to March)

Elevation:

Location: Sec. 16, R 7 Mountain Dist.

Dirt	0	-	3'
Conglomerate	3	-	49'
Sandstone	49	-	52'
Conglomerate	52	-	69'
Shale, sandy	69	-	76'
Conglomerate	76	-	92'
Shale	92	-	96'
Sandstone	96	-	108'
Shale	108	-	169'
Coal	169	-	169'3"
Shale	169'3"	-	172'
Sandstone	172	-	173'
Shale, sandy	173	-	179'
Shale	179	-	182'
Shale, sandy	182	-	187'
Shale, with coal markings at 192'	187	-	198'3"
Shale, sandy	198'3"	-	240'
Shale	240	-	252'
Sandstone	252	-	255'
Conglomerate	255	-	257'
Shale	257	-	257'9"
Conglomerate	257'9"	-	261'
Conglomerate, fine	261	-	275'
Shale, brown	275	-	275'9"
Shale, sandy	275'9"	-	291'
Shale	291	-	296'
Coal	296	-	297'8"
Shale	297'8"	-	302'
Shale, sandy	302	-	304'
Shale	304	-	313'
Shale, brown	313	-	314'
Coal	314	-	314'2"
Shale, sandy	314'2"	-	324'5½"
Coal	324'5½"	-	326'
Shale	326	-	333'
Shale, brown & coal markings	333	-	334'
Shale	334	-	346'
Shale, brown	346	-	347'6"
Coal	347'6"	-	347'9"
Shale, with coal markings at 351'	347'9"	-	357'

.../2

Coal	357	-	358'5½"
Shale	358'5½"	-	363'
Coal	363	-	364'4"
Shale, brown	364'4"	-	366'
Shale, sandy	366	-	370'
Shale	370	-	376'
Sandstone, white	376	-	380'
Shale,with coal markings at 382'	380	-	383'3"
Coal	383'3"	-	383'8"
Sandstone, brown	383'8"	-	385'
Sandstone	385	-	427'
Shale, sandy	427	-	458'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 35 (Western Fuel Company) Date: 1894 (March)

Elevation:

Location: Sec. 16, R. 7 Mountain Dist.

Dirt	0	-	3'
Conglomerate	3	-	25'
Sandstone	25	-	32'
Conglomerate	32	-	38'
Sandstone	38	-	40'
Conglomerate	40	-	74'
Conglomerate with sandstone bands	74	-	79'
Conglomerate	79	-	87'
Conglomerate with sandstone bands	87	-	90'
Conglomerate	90	-	100'
Shale, sandy	100	-	171'
Shale, dark	171	-	185'
Shale, dark brown	185	-	186'
Shale, sandy	186	-	187'
Shale, brown	187	-	198'
Shale, sandy	198	-	223'
Shale, brown, with coal markings	223	-	225'
Shale, sandy	225	-	248'
Sandstone	248	-	249'
Conglomerate	249	-	256'
Shale, sandy	256	-	267'
Shale, brown	267	-	269'
Conglomerate	269	-	271'
Sandstone	271	-	281'
Shale, brown	281	-	282'
Coal	282	-	284'2"
Shale	284'2"	-	290'
Sandstone	290	-	295'
Shale, dark with coal markings	295	-	300'
Shale, sandy	300	-	308'
Shale, brown	308	-	310'
Coal, soft	310	-	311'4"
Shale, brown	311'4"	-	324'9"
Coal, soft	324'9"	-	325'6"
Shale, brown, with coal markings	325'6"	-	330'
Shale	330	-	344'

.../2

Coal	344	-	345'10"
Shale, brown	345'10"	-	348'
Coal, poor, with shale	348	-	348'7"
Shale	348'7"	-	357'7"
Shale, sandy	357'7"	-	362'
Sandstone, white, with black markings	362	-	368'
Shale	368	-	370'6"
Shale, brown, with coal markings	370'6"	-	370'8"
Sandstone	370'8"	-	372'10"
Coal	372'10"	-	373'3"
Shale, dark	373'3"	-	375'
Sandstone	375	-	416'
Shale	416	-	422'
Sandstone	422	-	424'6"
Shale	424'6"	-	459'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 36 (Western Fuel Company)

Date: 1895
(Nov. 19 to Dec. 7)

Elevation:

Location: Sec. 17, R.7 Mountain Dist.

Gravel & Dirt	0	-	6'
Conglomerate	6	-	10'
Shale, sandy	10	-	26'
Conglomerate	26	-	31'
Shale, sandy	31	-	92'6"
Shale, brown, with coal markings	92'6"	-	92'9"
Shale, sandy, with coal markings at 96 and 119'	92'9"	-	144'
Sandstone	144	-	147'
Shale, sandy	147	-	156
Conglomerate	156	-	164
Shale, sandy	164	-	177
Sandstone	177	-	183
Shale, brown with coal markings	183	-	185'4"
Coal	185'4"	-	185'5"
Shale, dark with coal markings at 188' & 193'	185'5"	-	200'
Shale, black, with coal markings	200	-	202'
Shale	202	-	218'
Shale, brown with coal markings	218	-	219'
Shale, with coal markings at 223' & 227'	219	-	230'
Shale, sandy	230	-	242'
Rock, black	242	-	243'
Green stone, light	243	-	250'
Red stone, dark	250	-	252'
Green stone	252	-	263'
Red stone, dark	263	-	266'
Green Stone	266	-	278'6"
Red stone, dark	278'6"	-	281'
Green & Red stone	281	-	300'
Green stone	300	-	307'
Red stone	307	-	308'
Green stone	308	-	330'
Green stone, hard	330	-	362'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 38 (Western Fuel Company)

Date: 1896
(Jan. 20 to Feb. 21)

Elevation:

Location: Section 1, R 1 Nanaimo Dist.

Red Soil	0	-	3'	
Hardpan	3	-	12'	
Gravel & Sand	12	-	27'	
Gravel & Boulders	27	-	31'	
Conglomerate	31	-	61'	
Shale, sandy	61	-	71'	
Conglomerate	71	-	80'	
Conglomerate, very hard	80	-	93'	
Shale, brown	93	-	93'10"	
Coal	93'10"	-	94'	
Shale, light	94	-	95'	
Sandstone, fine	95	-	98'	
Shale, sandy, with coal markings at 117'	98	-	125'	
Shale, light	125	-	125'5"	
Shale, brown with coal markings	125'5"	-	126'	
Shale, light	126	-	126'7"	
Coal	126'7"	-	126'9"	2"
Shale, brown	126'9"	-	127'9"	
Coal	127'9"	-	128'	3"
Shale, brown	128	-	129'6"	
Coal, good	129'6"	-	130'9"	1'3"
Shale	130'9"	-	133'9"	
Coal	133'9"	-	133'11"	2"
Shale with coal markings	133'11"	-	140'	
Sandstone, fine	140	-	141'	
Coal	141	-	142'	1.0'
Shale, brown, with coal markings	142	-	144'8"	
Coal	144'8"	-	145'4"	8"
Shale, brown, with coal markings	145'4"	-	149'8"	
Coal	149'8"	-	151'6"	10"
Shale, brown	151'6"	-	152'	
Shale, black	152	-	153'2"	
Coal	153'2"	-	154	10"
Shale, black	154	-	155'4"	
Coal	155'4"	-	156'	8"
Shale, brown	156	-	157'	
Shale, light	157	-	159'	
Conglomerate, fine	159	-	160'4"	
Sandstone	160'4"	-	178'	

12 40" 36

5' 4" over interval of 29' 7"

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VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 39 (Western Fuel Company)

Date: 1896
(Mar. 2 to Apr. 6)

Elevation:

Location: Sec. 1, R. 2 Nanaimo Dist.

Soil	0	-	2'
Conglomerate	2	-	49'
Sandstone	49	-	50'
Shale, sandy	50	-	57'
Conglomerate	57	-	94'
Sandstone	94	-	95'6"
Conglomerate, with coal markings at 119'	95'6"	-	121'
Shale	121	-	154'
Sandstone	154	-	176'
Conglomerate	176	-	179'8"
Shale, brown, with coal markings	179'8"	-	180'
Shale	180	-	186'
Sandstone	186	-	189'
Conglomerate	189	-	191'
Sandstone	191	-	204'
Shale	204	-	204'3"
Sandstone	204'3"	-	218'
Conglomerate	218	-	222'
Sandstone, with small pebbles	222	-	231'
Conglomerate	231	-	234'
Sandstone & Conglomerate	234	-	243'
Conglomerate	243	-	246'
Sandstone	246	-	249'
Conglomerate	249	-	251'
Sandstone & Conglomerate	251	-	253'
Conglomerate	253	-	268'6"
Sandstone	268'6"	-	269'
Conglomerate, very hard	269	-	303'
Conglomerate and Sandstone	303	-	306'
Conglomerate	306	-	337'6"
Shale, sandy	337'6"	-	341'
Shale, with markings of leaves	341	-	342'
Shale	342	-	344'
Shale, brown	344	-	345'
Shale	345	-	357'
Shale, sandy	357	-	378'
Shale, brown, with markings of leaves	378	-	382'
Sandstone	382	-	385'
Shale, sandy, with markings of leaves at 391'	385	-	393'

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Shale, sandy, with shell markings at 182' & 188'	178	-	206'
Shale, sandy, very hard, with white markings	206	-	210'
Shale, sandy	210	-	300'
Shale, with shell markings at 325', 595', 602', 662'	300	-	680'
Shale, sandy	680	-	710'
Shale, with shell markings at 716'	710	-	726'
Green stone	726	-	759'

Shale, brown	393	-	394'6"
Shale	394'6"	-	397'6"
Sandstone, with markings of leaves at 401'	397'6"	-	402'6"
Shale	402'6"	-	412'
Shale, sandy	412	-	434'
Conglomerate	434	-	436'9"
Shale, brown	436'9"	-	437'
Coal, good	437	-	439'2"
Shale, sandy, with markings of leaves at 444' & 452' and white markings at 447'	439'2"	-	462'
Shale	462	-	464'
Shale, brown	464	-	465'
Shale, brown, with coal markings	465	-	466'
Shale, brown	466	-	466'7"
Coal	466'7"	-	467'5"
Shale	467'5"	-	474'
Shale & Coal	474	-	479'
Mill stone grit, with black markings	479	-	485'
Sandstone	485	-	509'
Shale	509	-	510'
Sandstone, very hard	510	-	511'
Shale, sandy, with shell markings at 582', 591'	511	-	602'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 40 (Western Fuel Company)

Date 1896
(April 1 to May)

Elevation:

Location: South end, Five Acre Lots
Sec. 1, R. 2 Nanaimo Dist.

The first 346' were spent in reaming out the old bore hole.

Conglomerate	0	-	346'3"
Brown shale, coal markings	346'3"	-	350'3"
Shale	350'3"	-	356'3"
Shale with leaf markings	356'3"	-	360'3"
Brown shale, coal markings	360'3"	-	374'3"
Sandy shale	374'3"	-	394'3"
Brown shale, coal markings	394'3"	-	400'3"
Sandy shale	400'3"	-	406'3"
Brown shale, coal markings	406'3"	-	410'8½"
Shale	410'8½"	-	430'8½"
Brown shale, coal markings	430'8½"	-	438'8½"
Sandstone	438'8½"	-	444'8½"
Conglomerate, hard	444'8½"	-	464'8½"
Sandstone	464'8½"	-	466'8½"
Conglomerate	466'8½"	-	468'8½"
Shale	468'8½"	-	482'8½"
Coal & Dark Shale	482'8½"	-	483'9½"
Millstone Grit, black markings	483'9½"	-	492'
Sandstone	492	-	527'
Sandy shale	527	-	544'
Sandy shale, with shell markings	544	-	560'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 41 (Western Fuel Company) Date: 1896 (May 11 to June 30)

Elevation:

Location: Sec. 18, R.3 Cranberry Dist.

Soil	0	-	2'
Conglomerate	2	-	25'
Shale, sandy, with pebbles	25		28'
Conglomerate	28	-	56'
Shale, sandy	56	-	79'
Conglomerate, very hard	79	-	93'
Shale, sandy	93	-	119'
Conglomerate, very hard	119	-	157'
Shale	157	-	157'3"
Conglomerate and Sandstone	157'3"	-	168'
Conglomerate, very hard	168	-	172'
Shale	172	-	174'
Conglomerate	174	-	182'
Shale, sandy	182	-	187'
Conglomerate	187	-	226'
Conglomerate, with coal markings	226	-	226'6"
Shale	226'6"	-	227'
Conglomerate	227	-	247
Shale, sandy	247	-	252'
Sandstone	252	-	254'
Sandstone & Conglomerate	254	-	260'
Conglomerate, fine	260	-	276'
Conglomerate	276	-	280'
Conglomerate, fine	280	-	288'
Conglomerate with coal markings at 292', 294' & 307'	288	-	333'
Shale, brown	333	-	334'
Shale	334	-	340'
Sandstone	340	-	346'
Conglomerate, with coal markings at 366'	346	-	420'
Sandstone, fine	420	-	422'
Conglomerate	422	-	440'6"
Shale, brown	440'6"	-	451'9"
Coal	451'9"	-	452'
Shale	452	-	455'6"
Coal	455'6"	-	455'9"
Shale, sandy, with coal markings 466'	455'9"	-	467'
Shale, dark	467	-	467'2"
Mill stone grit, with black mkgs.	467'2"	-	470'
Sandstone	470	-	486'

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Conglomerate	486	-	490'
Shale, sandy, with shell markings at 526', 545', 582', 596' and 668'	490	-	724'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 42 (Western Fuel Company)

Date: 1896/7
(July 10 '96 to June 3 '97)

Elevation:

Location: Sec. 17, R 3 Cranberry Dist.

Soil	0	-	3'
Conglomerate	3	-	70'
Sandstone & Shale	70	-	73'
Conglomerate	73	-	84'9"
Shale, very hard	84'9"	-	85'
Conglomerate, very hard	85	-	117'
Shale, with coal markings	117	-	118'
Conglomerate	118	-	146'
Sandstone and Conglomerate	146	-	163'
Conglomerate, very hard, with coal markings at 212' & 216'	163	-	260'
Sandstone	260	-	266'
Conglomerate	266	-	305'8"
Shale	305'8"	-	306'4"
Sandstone & Conglomerate	306'4"	-	310'
Conglomerate, very hard	310	-	377'
Shale, brown	377	-	380'
Shale, sandy	380	-	382'9"
Coal	382'9"	-	383'
Shale, sandy	383	-	385'
Coal	385	-	385'3"
Shale, sandy	385'3"	-	394'
Sandstone	394	-	400'
Shale, brown	400	-	407'
Shale, sandy	407	-	413'
Shale, dark brown	413	-	415'
Shale	415	-	422'
Sandstone, brown	422	-	426'
Shale	426	-	430'
Conglomerate, fine	430	-	435'
Sandstone	435	-	470'
Shale, sandy	470	-	1088'
Conglomerate	1088	-	1089'
Sandstone	1089	-	1135'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 43 (Western Fuel Company)

Date: 1896/7
(Sept. 2 '96 to Feb. 2 '97)

Elevation: 1986.63

Location: On Mud Flats at head of Nanaimo Harbor

Sand	0	-	53'
Gravel	53	-	58'
Sand & Clay	58	-	64'
Hardpan	64	-	71'
Boulders & Sand	71	-	75'
Hardpan and Gravel	75	-	81'
Gravel & Sand	81	-	112'
Sandy shale	112	-	180'
Sandstone, fine	180	-	191'
Sandstone	191	-	239'
Shale	239	-	245'
Sandstone	245	-	311'
Sandstone & Shale	311	-	321'
Sandstone	321	-	368'10"
Coal	368'10"	-	369'
Sandstone & Shale	369	-	382'7"
Coal	382'7"	-	384'
Shale	384'	-	391'
Shale with Coal markings	391	-	392'
Shale	392	-	396'
Sandstone & Shale	396	-	409'7"
Coal	409'7"	-	410'
Sandstone and Shale	410	-	414'
Black shale with coal markings	414	-	418'
Sandstone	418	-	428'
Sandy shale	428	-	431'3"
Coal	431'3"	-	431'9"
Sandstone & shale	431'9"	-	441'
Sandstone	441	-	455'
Sandstone & Shale	455	-	461'
Sandstone	461	-	478'2"
Coal	478'2"	-	478'9"
Shale	478'9"	-	483'9"
Coal	483'9"	-	484'
Sandstone	484	-	509'
Sandstone & Shale	509	-	511'2"
Coal	511'2"	-	511'6"
Sandstone	511'6"	-	521'
Shale	521	-	527'
Sandstone with coal markings	527	-	607'

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Sandy shale	607	-	609'
Sandstone	609	-	629'9"
Coal	629'9"	-	630'
Sandstone	630	-	645'
Sandstone & Shale with coal markings	645	-	651'
Sandstone, very hard	651	-	659'
Sandy shale withcoal markings	659	-	671'
Sandy shale	671	-	683'
Sandstone	683	-	805'
Coal markings at 777'			
Shale	805	-	807'
Sandstone	807	-	808'
Shale	808	-	808'6"
Sandstone	808'6"	-	871'
Shale	871	-	891'
Sandstone & Shale	891	-	903'
Sandstone	903	-	914'
Sandy shale	914	-	927'
Shale	927	-	942'
Conglomerate	942	-	948'
Conglomerate with shale bands	948	-	964'
Sandstone	964	-	968'
Coal	968	-	974'10"
Brown shale	974'10"	-	986'
Conglomerate	986	-	987'2"
Coal	987'2"	-	987'6"
Shale with coal markings	987'6"	-	989'
Coal	989	-	989'2"
Shale	989'2"	-	993'
Brown shale	993	-	997'8"
Coal	997'8"	-	998'
Brown shale	998	-	1001'
Shale	1001	-	1081'
Sandy shale	1081	-	1107'
Sandstone	1107	-	1123'
Shale	1123	-	1130'
Sandstone	1130	-	1135'6"
Conglomerate	1135'6"	-	1138'6"
Sandstone	1138'6"	-	1139'
Shale	1139	-	1140'
Sandstone	1140	-	1141'
Conglomerate	1141	-	1142'
Sandstone	1142	-	1151'
Sandstone & Shale	1151	-	1161'
Sandstone	1161	-	1186'
Conglomerate, fine	1186	-	1189'
Sandstone	1189	-	1191'
Shale	1191	-	1208'
Conglomerate	1208	-	1210'
Sandstone	1210	-	1233'
Conglomerate	1233	-	1244'
Sandstone	1244	-	1245'
Shale	1245	-	1247'

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Sandstone	1247	-	1248'
Shale	1248	-	1249'
Sandstone	1249	-	1252'
Conglomerate	1252	-	1256'
Shale	1256	-	1273'
Sandstone	1273	-	1292'
Conglomerate	1292	-	1295'
Sandstone	1295	-	1461'
Conglomerate	1461	-	1471'

NOTE:

These depths are taken from top of mud, which is nineteen (19) feet below the top of platform, the point measured from in the original record. F.J.G.

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 44 (Western Fuel Company)

Date: 1897
(Feb. 14 to Apr. 23)

Elevation:

Location: Sec 2, R 3 Nanaimo Dist.

Hardpan	0	-	4'
Sandstone, soft	4	-	13'
Sandstone	13	-	15'
Coal & shale	15	-	15'10"
Sandstone	15'10"	-	26'
Coal	26	-	26' 5"
Shale	26'5"	-	26'9"
Sandstone & sandy shale	26'9"	-	36'
Conglomerate, fine	36	-	40'
Sandstone, fine, hard, like shale	40	-	100'
Sandstone, fine, hard	100	-	101'10"
Coal and shale	101'10"	-	102'
Sandstone, fine hard	102	-	114'10"
Coal & shale	114'10"	-	115'
Sandstone	115	-	140'
Sandstone, white	140	-	173'
Sandstone, dark	173	-	180'
Sandstone, white	180	-	189'
Shale	189	-	189'2"
Coal	189'2"	-	189'5"
Shale	189'5"	-	189'7"
Sandstone, white	189'7"	-	196'
Shale, sandy	196	-	214'4"
Shale	214'4"	-	214'6"
Coal	214'6"	-	215'4"
Shale	215'4"	-	215'7"
Shale & sandstone	215'7"	-	230'
Sandstone, white	230	-	240'
Shale, dark with coal markings	240	-	244'
Shale, sandy	244	-	246'
Sandstone, white	246	-	320'
Sandstone, very hard	320	-	330'
Sandstone, white	330	-	340'
Sandstone, very hard	340	-	360'
Sandstone, white	360	-	380'
Sandstone, dark	380	-	387'
Shale, dark sandy	387	-	394'
Sandstone, white	394	-	400'
Sandstone	400	-	453'
Conglomerate	453	-	458'
Sandstone, white	458	-	465'

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Shale, sandy	465	-	469'
Sandstone, white	469	-	477'
Conglomerate, fine	477	-	487'
Sandstone, coarse	487	-	514'
Shale	514	-	524'
Sandstone, very hard	524	-	526'
Shale, sandy	526	-	548'
Sandstone	548	-	564'
Shale, sandy	564	-	594'
Conglomerate	594	-	597'
Shale, brown	597	-	598'6"
Coal	598'6"	-	599'
Coal and Shale	599	-	600'6"
Coal	600'6"	-	600'10"
Shale, black	600'10"	-	602'3"
Shale, dark	602'3"	-	620'
Shale	620	-	624'
Sandstone, very hard	624	-	627'
Shale, very hard	627	-	653'9"
Coal	653'9"	-	654'6½"
Shale	654'6½"	-	655'11½"
Coal, clean, but tender	655'11½"	-	658'10½"
Shale	658'10½"	-	659'3½"
Shale, soft	659'3½"	-	660'8½"
Shale, dark	660'8½"	-	667'
Shale	667	-	673'
Coal	673	-	673'5"
Shale, brown	673'5"	-	680'7"
Coal, soft	680'7"	-	681'
Shale, black, considerable coal mkgs.	681	-	681'10"
Coal, soft	681'10"	-	682'4"
Coal	682'4"	-	682'7"
Coal, hard	682'7"	-	682'10"
Shale, brown, very soft	682'10"	-	693'
Shale, sandy	693	-	697'
Sandstone, very hard	697	-	703'
Shale	703	-	704'
Coal	704	-	704'4"
Shale, brown	704'4"	-	706'
Shale	706	-	713'
Coal (in all)	713	-	714'5"
Shale, sandy	714'5"	-	832'
Conglomerate	832	-	835'
Shale	835	-	856'
Sandstone	856	-	864'
Shale, sandy	864	-	899'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 45 (Western Fuel Company)

Elevation:

Location: I.R. , R.7 Nanaimo Dist.

Date: 1897/99
(after Apr. 23 1897 to before March 7, 1899)

Sediment	0	-	8'
Shale	8	-	22'
Sandstone	22	-	30'
Shale	30	-	60'
Sandstone	60	-	68'
Shale	68	-	75'
Sandstone	75	-	90'
Shale	90	-	96'
Sandstone	96	-	100'
Shale and Sandstone in thin layers	100	-	116'
Sandstone	116	-	146'
Shale	146	-	150'
Shale & Sandstone in thin layers	150	-	161'
Sandstone	161	-	215'
Coal	215	-	215'1"
Sandstone	215'1"	-	224'1"
Shale	224'1"	-	228'1"
Sandstone	228'1"	-	251'1"
Coal	251'1"	-	251'2½"
Sandstone	251'2½"	-	256'1"
Shale	256'1"	-	264'1"
Shale, sandy	264'1"	-	276'1"
Coal	276'1"	-	276'9"
Shale	276'9"	-	277'
Coal	277	-	277'2½"
Shale	277'2½"	-	291'1"
Sandstone	291'1"	-	292'1"
Shale	292'1"	-	297'1"
Sandstone	297'1"	-	344'1"
Shale	344'1"	-	352'1"
Sandstone	352'1"	-	357'1"
Shale	357'1"	-	362'1"
Sandstone	362'1"	-	372'1"
Shale	372'1"	-	376'1"
Coal	376'1"	-	376'5"
Shale	376'5"	-	379'5"
Sandstone	379'5"	-	398'1"
Coal	398'1"	-	398'6"
Shale	398'6"	-	402'6"

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Sandstone	402'6"	-	404'6"
Shale	404'6"	-	407'6"
Sandstone	407'6"	-	434'1"
Shale	434'1"	-	435'1"
Coal	435'1"	-	435'5"
Shale	435'5"	-	436'1"
Sandstone	436'1"	-	476'9"
Shale, brown and coal	476'9"	-	477'1"
Sandstone	477'1"	-	487'1"
Shale, sandy	487'1"	-	497'1"
Sandstone	497'1"	-	497'10"
Coal	497'10"	-	498'
Sandstone	498	-	555'1"
Shale	555'1"	-	561'1"
Sandstone	561'1"	-	619'1"
Conglomerate	619'1"	-	620'1"
Sandstone	620'1"	-	632'1"
Shale, with coal markings	632'1"	-	638'1"
Sandstone	638'1"	-	639'1"
Shale	639'1"	-	640'1"
Sandstone	640'1"	-	642'7"
Shale	642'7"	-	646'1"
Sandstone	646'1"	-	726'7"
Shale	726'7"	-	727'1"
Sandstone	727'1"	-	728'7"
Shale	728'7"	-	741'1"
Sandstone	741'1"	-	748'1"
Shale	748'1"	-	760'1"
Sandstone	760'1"	-	784'1"
Shale, sandy	784'1"	-	794'1"
Shale	794'1"	-	843'1"
Sandstone	843'1"	-	882'1"
Shale	882'1"	-	909'1"
Conglomerate & Sandstone	909'1"	-	937'1"
Shale & Sandstone in thin layers with coal markings	937'1"	-	947'5"
Coal	947'5"	-	958'1"
Shale	958'1"	-	960'1"
Coal	960'1"	-	964'1"
Shale	964'1"	-	967'5"
Coal	967'5"	-	968'1"
Shale	968'1"	-	970'1"
Coal	970'1"	-	971'7"
Shale	971'7"	-	1019'11"
Shale, sandy	1019'11"	-	1123'11"
Sandstone	1123'11"	-	1127'11"
Shale & Sandstone in thin layers	1127'11"	-	1137'11"
Conglomerate	1137'11"	-	1151'11"
Sandy shale	1151'11"	-	1157'11"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 47 (Western Fuel Company) Date: 1899 (Mar. 29 to April 8)

Elevation:

Location: At present position of Newcastle Shaft
Nanaimo Harbour Nanaimo Dist.

Soil	0	-	3'
Clay	3	-	10'
Gravel	10	-	11'
Fine Sand	11	-	12'
Gravel	12	-	13'
Sandstone	13	-	27'
Coal	27	-	27'4"
Brown Shale	27'4"	-	28'
Sandstone	28	-	35'
Brown Shale	35	-	35'2"
Sandy Shale	35'2"	-	42'
Sandstone	42	-	115'
Sandstone with coal markings	115	-	125'
Sandstone	125	-	153'
Shale	153	-	166'
Sandy Shale	166	-	168'
Sandstone	168	-	171'6"
Sandy Shale	171'6"	-	172'
Sandstone	172	-	173'
Brown Shale	173	-	173'10"
Coal	173'10"	-	174'
Shale	174	-	174'4"
Sandstone	174'4"	-	176'8"
Shale	176'8"	-	177'
Sandstone	177	-	194'6"
Sandy shale	194'6"	-	196'6"
Shale	196'6"	-	199'
Sandy shale	199	-	200'
Sandstone	200	-	246'
Sandstone & Shale in thin layers	246	-	248'
Sandstone	248	-	251'
Shale	251	-	264'
Sandstone	264	-	266'
Shale	266	-	274'
Sandstone	274	-	279'
Shale	279	-	280'
Sandy shale	280	-	298'
Conglomerate	298	-	299'
Shale	299	-	319'4"
Bone	319'4"	-	320'

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Coal	320	-	324'1"
Shale	324'1"	-	330'
Coal	330	-	330'1"
Brown Shale	330'1"	-	330'8"
Coal	330'8"	-	331'4"
Shale	331'4"	-	336'
Sandstone	336	-	363'
Conglomerate	363	-	375'
Sandstone	375	-	379'
Brown Shale	379	-	379'6"
Coal	379'6"	-	382'1"
Brown Shale	382'1"	-	383'1"
Coal	383'1"	-	383'5"
Brown Shale	383'5"	-	383'7½"
Coal	383'7½"	-	383'10½"
Shale	383'10½"	-	384' ½"
Coal, dirty	384' ½"	-	384'3"
Coal	384'3"	-	385'2"
Shale	385'2"	-	387'11"
Sandstone	387'11"	-	397'
Coal	397	-	397'2"
Shale	397'2"	-	397'3½"
Coal	397'3½"	-	398'2½"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 48 (Western Fuel Co.)

Date: 1899
(April 18 to May 8)

Elevation:

Location: Lot 2 Bright Dist.

Unknown	0	-	249'4"
Conglomerate	249'4"	-	254'
Conglomerate with bands of shale	254	-	257'
Conglomerate	257	-	261'
Shale with coal markings	261	-	262'
Coal	262	-	267'2½" — 5'2½"
Shale, brown	267'2½"	-	270'
Coal	270	-	270'2" —
Shale	270'2"	-	272'
Coal	272	-	272'3" —
Shale, with coal markings	272'3"	-	276'
Shale	276	-	289'
Conglomerate	289	-	292'
Sandstone	292	-	322'4"
Coal	322'4"	-	324'5" — 2'
Shale	324'5"	-	326'5"
Coal	326'5"	-	326'8" —
Shale	326'8"	-	331'
Shale, black	331	-	331'9"
Coal	331'9"	-	332'3" —
Shale, brown	332'3"	-	333'3"
Coal	333'3"	-	333'5" —
Shale	333'5"	-	334'5"
Shale, brown, with coal markings	334'5"	-	335'5"
Shale, soft	335'5"	-	340'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 49 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1899 (Apr. 13 to Aug. 4)

Elevation:

Location: Lot 2 Bright Dist.

Sandstone	0	-	73'
Shale	73	-	75'
Sandstone	75	-	76'6"
Conglomerate	76'6"	-	77'
Shale	77	-	81'
Sandstone	81	-	84'
Shale	84	-	91'6"
Sandstone	91'6"	-	189'
Shale	189	-	233'
Sandstone	233	-	301'3"
Shale with sandstone bands	301'3"	-	310'4"
Shale	310'4"	-	332'10"
Sandstone	332'10"	-	333'4"
Shale	333'4"	-	359'8"
Shale with conglomerate bands	359'8"	-	365'9"
Shale	365'9"	-	374'1"
Coal	374'1"	-	378'10"
Shale	378'10"	-	379'11"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 50 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1899 (May 17 to July 21)

Elevation:

Location: Sec. 2 Nanaimo Dist.

Soil	0	-	2'
Gravel	2	-	5'
Sandy clay	5	-	11'
Fine sand	11	-	21'
Gravel & Boulders	21	-	26'
Clay with Boulders	26	-	41'
Hard Sandstone	41	-	51'
Fine Conglomerate	51	-	54'
Sandstone with (gravels?)	54	-	63'
Fine Conglomerate	63	-	64'
Sandstone	64	-	72'
Shale, brown	72	-	72'7"
Sandy shale, grey	72'7"	-	76'6"
Shale, brown	76'6"	-	77'
Dark Shale with Coal markings	77	-	80'
Sandy Shale with coal markings	80	-	81'
Shale	81	-	82'
Sandy Shale	82	-	83'
Shale	83	-	85'
Sandstone	85	-	90'
Brown Shale	90	-	93'
Sandstone	93	-	100'
Sandstone with shale layers	100	-	121'
Sandstone with coal markings	121	-	127'9"
Fine conglomerate	127'9"	-	136'
Sandstone	136	-	138'
Conglomerate	138	-	140'
Sandstone	140	-	157'
Conglomerate	157	-	174'6"
Sandstone	174'6"	-	192'
Shale	192	-	200'
Sandy Shale	200	-	203'6"
Sandstone	203'6"	-	205'
Sandy Shale	205	-	223'
Sandstone with shale layers	223	-	225'
Sandstone	225	-	243'
Sandy shale with layers of sandstone	243	-	253'
Conglomerate, very hard	253	-	270'9½"
Coal, clean, soft	270'9½"	-	273'0½"
Shale	273'0½"	-	273'1½"

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Coal, dirty	273'1½"	-	273'5 3/4"
Shale	273'5 3/4"	-	274'6½"
Coal	274'6½"	-	275'3½"
Shale, soft	275'3½"	-	276'2½"
Conglomerate	276'2½"	-	277'6½"
Shale, soft, black	277'6½"	-	278'
Shale, hard	278	-	279'1"
Coal	279'1"	-	279'6"
Shale	279'6"	-	279'8"
Coal	278'8"	-	279'10"
Shale	279'10"	-	280'10"
Coal	280'10"	-	281'2"
Coal & Shale	281'2"	-	281'8½"
Shale	281'8½"	-	281'11½"
Coal & Shale	281'11½"	-	282'2½"
Coal	282'2½"	-	282'5½"
Shale	282'5½"	-	283'3½"
Coal	283'3½"	-	283'11½"
Coal & Shale	283'11½"	-	285'3½"
Coal	285'3½"	-	285'7"
Shale & Coal	285'7"	-	285'10"
Shale	285'10"	-	286'3"
Coal, shaly	286'3"	-	287'2½"
Shale & Coal	287'2½"	-	290'
Coal	290	-	291'3"
Shaly Coal	291'3"	-	294'
Shale	294	-	324'6"
Conglomerate	324'6"	-	334'
Sandstone	334	-	338'
Conglomerate	338	-	341'
Sandstone with coal markings	341	-	343'
Conglomerate	343	-	344'
Sandstone	344	-	346'
Conglomerate	346	-	347'
Shale	347	-	348'
Conglomerate	348	-	350'
Sandstone	350	-	352'
Conglomerate, fine	352	-	357'
Conglomerate	357	-	360'
Shale with coal markings	360	-	362'
Conglomerate	362	-	367'
Shale with coal markings	367	-	369'7"
Coal, shaly	369'7"	-	370'
Shale with coal markings	370	-	388'10½"
Coal	388'10½"	-	389'8½"
Shale with coal markings	389'8½"	-	400'
Shale, soft	400	-	407'
Shale, brown, with coal markings	407	-	407'3"
Shale, soft	407'3"	-	418'6"
Fine conglomerate	418'6"	-	419'
Coarse sandstone	419	-	423'
Shale	423	-	444'
Sandy shale	444	-	450'
Shale	450	-	452'

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VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 51 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1899 (June 24 to August 1)

Elevation:

Location: Sec. 2 Nanaimo Dist.

Surface soil, etc.	0	-	10'
Sandstone	10	-	23'
Shale	23	-	27'3"
Coal	27'3"	-	27'6½"
Sandstone	27'6½"	-	37'
Sandstone with shale layers	37	-	40'6"
Shale	40'6"	-	44'
Sandstone with shale markings	44	-	49'
Sandstone	49	-	62'6"
Coal	62'6"	-	62'7"
Shale	62'7"	-	63'
Sandstone	63	-	64'6"
Shale	64'6"	-	65'
Sandstone with shale layers	65	-	70'
Sandstone with coal markings	70	-	70'4"
Shale	70'4"	-	71'4"
Coal	71'4"	-	71'9"
Shale	71'9"	-	72'
Sandstone	72	-	75'
Shale	75	-	77'
Sandstone	77	-	80'
Shale	80	-	84'8½"
Coal	84'8½"	-	85'
Shale	85	-	88'
Sandstone	88	-	110'9"
Coal	110'9"	-	111'
Shale	111	-	114'
Sandstone with ½" band of shale at 118'	114	-	152'3"
Shale with coal markings	152'3"	-	153'
Shale	153	-	154'
Sandstone	154	-	165'
Coal	165	-	165'7½"
Shale	165'7½"	-	166'4½"
Sandstone	166'4½"	-	169'
Shale	169	-	174'
Sandstone	174	-	175'
Shale	175	-	180'3"
Shale with coal markings	180'3"	-	181'
Shale	181	-	184'

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Sandstone with shale markings	184	-	197'3"
Shale	197'3"	-	197'9"
Coal	197'9"	-	198'
Shale	198	-	198'3"
Coal	198'3"	-	198'5"
Shale	198'5"	-	199'7"
Coal	199'7"	-	200'
Shale	200	-	201'8"
Coal	201'8"	-	202'
Shale	202	-	205'
Sandstone	205	-	222'
Shale	222	-	222'4"
Sandstone with shale markings	222'4"	-	227'
Shale	227	-	229'
Sandstone with shale markings	229	-	234'
Shale	234	-	236'
Sandstone	236	-	237'6"
Shale	237'6"	-	244'
Sandstone	244	-	257'
Sandstone with shale markings	257	-	261'
Shale	261	-	266'
Sandstone with coal markings at 296'4"	266	-	353'
Conglomerate	353	-	353'3"
Sandstone	353'3"	-	354'3"
Conglomerate	354'3"	-	355'
Sandstone	355	-	359'
Conglomerate	359	-	361'
Sandstone with coal marking	361	-	365'
Conglomerate	365	-	372'
Sandstone	372	-	388'
Conglomerate	388	-	390'
Shale	390	-	401'
Sandstone	401	-	419'
Conglomerate	419	-	419'3"
Sandstone	419'3"	-	445'
Conglomerate	445	-	446'6"
Sandstone	446'6"	-	456'
Conglomerate	456	-	458'
Sandstone	458	-	462'
Conglomerate	462	-	463'
Sandstone	463	-	465'6"
Conglomerate	456'6"	-	468'
Sandstone	468	-	474'
Conglomerate	474	-	476'
Sandstone	476	-	477'
Conglomerate	477	-	478'
Sandstone	478	-	500'
Shale	500	-	514'
Sandstone with shale layers	514	-	520'
Shale	520	-	534'
Sandstone with shale layers	534	-	540'
Sandstone	540	-	546'
Shale	546	-	559'

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Sandstone	559	-	561'
Shale	561	-	570'
Sandstone	570	-	572'
Shale	572	-	577'
Sandstone	577	-	579'
Shale	579	-	587'
Sandstone	587	-	588'
Shale	588	-	606'
Conglomerate	606	-	606'1"
Shale	606'1"	-	607'1½"
Coal	607'1½"	-	629'
Sandstone	629	-	640'
Shale	640	-	692'
Conglomerate	692	-	692'2"
Shale	692'2"	-	692'8"
Coal	692'8"	-	695'
Shale	695	-	706'
Conglomerate	706	-	713'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 52 (The New Vancouver Coal Mining & Land Co. Limited)

Date: 1899 (Aug. 5 to Sept. 12)

Elevation:

Location: Sec. 2 Nanaimo Dist.

Soil, clay, boulders, etc.	0	-	12'
Sandstone	12	-	28'
Shale with coal markings	28	-	32'
Sandstone	32	-	45'
Sandstone with shale layers	45	-	48'
Sandstone	48	-	69'8"
Coal	69'8"	-	70'
Shale	70	-	70'6"
Sandstone	70'6"	-	81'
Coal	81	-	81'5½"
Shale	81'5½"	-	81'6"
Coal	81'6"	-	81'9½"
Shale	81'9½"	-	82'1"
Sandstone	82'1"	-	83'
Shale	83	-	94'10"
Coal	94'10"	-	95'
Shale	95	-	100'
Sandstone	100	-	100'3"
Shale	100'3"	-	102'
Sandstone	102	-	127'
Shale	127	-	138'
Sandstone	138	-	139'
Shale	139	-	144'6"
Sandstone	144'6"	-	147'6"
Shale	147'6"	-	156'
Sandstone	156	-	171'
Shale	171	-	187'
Sandstone	187	-	190'
Shale with coal markings	190	-	190'4"
Sandstone	190'4"	-	243'
Conglomerate	243	-	244'6"
Sandstone	244'6"	-	278'5"
Shale with coal markings	278'5"	-	279'
Shale	279	-	290'
Sandstone	290	-	299'9"
Shale	299'9"	-	300'
Sandstone	300	-	306'11½"
Conglomerate	306'11½"	-	307'
Sandstone	307	-	311'6"
Shale	311'6"	-	311'7"
Sandstone	311'7"	-	311'11"

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Shale	311'11"	-	312'
Sandstone	312	-	322'
Conglomerate	322	-	323'
Sandstone	323	-	331'6"
Conglomerate	331'6"	-	332'
Sandstone	332	-	345'
Conglomerate	345	-	349'
Sandstone	349	-	399'
Shale	399	-	437'
Sandstone	437	-	452'
Shale	452	-	456'
Sandstone	456	-	460'
Shale	460	-	504'
Conglomerate	504	-	506'
Coal	506	-	507'2"
Shale	507'2"	-	518'
Conglomerate	518	-	521'
Sandstone	521	-	528'
Conglomerate	528	-	548'
Sandstone	548	-	549'
Conglomerate	549	-	561'6"
Sandstone	561'6"	-	562'
Conglomerate	562	-	564'
Sandstone	564	-	565'
Conglomerate	565	-	574'
Sandstone	574	-	577'
Shale	577	-	582'
Coal	582	-	583'5½"
Shale	583'5½"	-	592'

Coal	170'4"	-	170'6"
Shale	170'6"	-	173'
Sandstone	173	-	177'
Shale	177	-	178'8"
Coal	178'8"	-	180'
Shale	180	-	190'
Coal	190	-	190'6"
Shale	190'6"	-	193'
Sandstone	193	-	202'4"
Coal	202'4"	-	202'5"
Coal	202'5"	-	202'6"
Shale	202'6"	-	221'
Sandstone	221	-	222'6"
Shale	222'6"	-	240'
Shale with leaf & coal markings	240	-	242'
Shale	242	-	246'
Sandstone	246	-	247'
Shale	247	-	258'6"
Sandstone	258'6"	-	260'
Shale & Sandstone layers	260	-	261'6"
Brown Shale	261'6"	-	262'
Hard sandy shale	262	-	263'9"
Coal & Shale	263'9"	-	264'
Shale	264	-	277'
Shale with coal markings	277	-	278'
Shale	278	-	280'
Sandstone	280	-	285'6"
Shale	285'6"	-	293'
Sandstone	293	-	299'7"
Coal	299'7"	-	300'
Sandstone	300	-	301'
Shale	301	-	306'
Sandstone	306	-	329'
Coal	329	-	329'0½"
Sandstone	329'0½"	-	339'10"
Coal	339'10"	-	340'
Sandstone	340	-	341'
Shale	341	-	347'
Coal	347	-	347'9"
Shale	347'9"	-	348'1"
Sandstone	348'1"	-	355'
Shale with sandstone layers	355	-	361'
Coal & Shale	361	-	361'4"
Shale	361'4"	-	363'
Sandstone	363	-	364'
Shale	364	-	364'3"
Sandstone	364'3"	-	376'
Shale	376	-	378'7"
Coal	378'7"	-	379'
Shale	379	-	384'
Sandstone & Sandy Shale mixed	384	-	390'
Shale	390	-	396'
Sandstone	396	-	399'
Shale	399	-	404'6"

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VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 54 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1899/1900 (Nov. 15 to February 10)

Elevation:

Location: Sec. 2 Nanaimo Dist.

Soil	0	-	4'
Gravel	4	-	9'
Boulders	9	-	12'
Gravel & Sand	12	-	20'
Gravel	20	-	25'
Sand	25	-	28'
Gravel	28	-	36'
Sand	36	-	38'
Gravel	38	-	47'
Boulders	47	-	49'
Gravel	49	-	51'6"
Boulders	51'6"	-	60'
Sandstone	60	-	62'
Shale	62	-	80'
Shale with coal markings	80	-	81'
Shale	81	-	83'
Sandstone	83	-	94'4"
Coal	94'4"	-	94'6"
Shale	94'6"	-	100'
Sandstone	100	-	101'
Shale	101	-	103'5"
Coal	103'5"	-	103'6"
Shale	103'6"	-	107'
Sandstone	107	-	110'
Shale	110	-	118'
Sandstone	118	-	119'8"
Coal	119'8"	-	120'
Sandstone	120	-	121'
Shale	121	-	136'
Sandstone	136	-	137'
Shale	137	-	138'
Sandstone	138	-	140'
Shale	140	-	147'2"
Shale with coal markings	147'2"	-	147'6"
Shale	147'6"	-	148'
Sandstone	148	-	156'4"
Coal	156'4"	-	156'8"
Shale	156'8"	-	161'
Sandstone	161	-	168'
Shale	168	-	170'4"

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Sandstone	404'6"	-	467'6"
Sandstone with shale layers	467'6"	-	468'
Sandstone	468	-	520'
Sandstone with coal markings	520	-	523'
Conglomerate with coal markings	523	-	525'
Sandstone	525	-	530
Conglomerate	530	-	531
Sandstone	531	-	533
Conglomerate	533	-	535
Shale	535	-	545
Sandstone	545	-	556
Conglomerate	556	-	557
Sandstone	557	-	558
Conglomerate	558	-	559
Sandstone	559	-	599
Conglomerate	599	-	599'5"
Sandstone	599'5"	-	601'
Conglomerate	601	-	601'4"
Sandstone	601'4"	-	623'
Shale	623	-	647'
Sandstone	647	-	658'
Shale	658	-	691'
Conglomerate	691	-	691'2"
Shale	691'2"	-	694'
Shale with coal markings	694	-	695'
Shale	695	-	735'9"
Coal	735'9"	-	736'5"
Shale	736'5"	-	744'
Shale with coal markings	744	-	745'
Shale	745	-	769'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 55 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (Jan. 3 to Feb. 21)

Elevation:

Location: No. 3 bore on Indian Reserve

Surface soil	0	-	2'6"
Clay	2'6"	-	3'6"
Cement	3'6"	-	11'
Blue Clay, full of rocks	11	-	15'
Sand, coarse	15	-	15'3"
Blue Clay	15'3"	-	22'5"
Black Shale	22'5"	-	23'11"
Coal and dirt, soft (at 23'11")	23'11"	-	24'2"
Sandstone	24'2"	-	57'7"
Coal (at 57'7")	57'7"	-	57'10"
Shale	57'10"	-	64'7"
Coal (at 64'7")	64'7"	-	64'9"
Sandstone	64'9"	-	73'7"
Shale	73'7"	-	80'7"
Sandstone	80'7"	-	164'9"
Shale	164'9"	-	165'
Conglomerate and Sandstone beds	165	-	170'6"
Sandstone	170'6"	-	172'
Shale	172	-	178'6"
Sandstone	178'6"	-	268'10"
Shale	268'10"	-	271'
Sandstone	271	-	274'7"
Shale	274'7"	-	279'
Sandstone	279	-	280'2"
Conglomerate	280'2"	-	304'1"
Sandstone	304'1"	-	313'6"
Coal (at 313'6")	313'6"	-	313'9"
Shale	313'9"	-	315'3"
Sandstone	315'3"	-	330'1"
Shale	330'1"	-	339'10"
Sandstone	339'10"	-	341'1"
Shale	341'1"	-	342'1"
Sandstone	342'1"	-	343'1"
Shale	343'1"	-	346'1"
Sandstone	346'1"	-	347'1"
Shale	347'1"	-	348'1"
Sandy shale	348'1"	-	354'1"
Sandstone	354'1"	-	355'1"
Sandy Shale	355'1"	-	367'5"
Sandstone	367'5"	-	385'
Sandy Shale	385	-	391'8"

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Sandstone	391'8"	-	393'2"
Shale	393'2"	-	394'
Sandy Shale	394	-	402'8"
Shale	402'8"	-	404'10"
Sandy Shale	404'10"	-	419'9"
Shale	419'9"	-	439'3"
Conglomerate, shale & Sandstone	439'3"	-	445'10"
Shale	445'10"	-	447'4"
Black Shale	447'4"	-	454'10"
Coal (at 454'10")	454'10"	-	465'1"
Shale	465'1"	-	467'1"
Coal & Shale (at 467'1")	467'1"	-	467'7"
Coal, soft (at 467'7")	467'7"	-	468'4"
Shale	468'4"	-	469'1"
Coal (at 469'1")	469'1"	-	470'1"
Shale	470'1"	-	491'
Shale, with streaks of black dirt	491	-	492'3"
Sandstone	492'3"	-	493'3"
Shale	493'3"	-	500'
Sandy Shale	500	-	504'7"
Sandstone	504'7"	-	505'7"
Shale	505'7"	-	512'
Sandy Shale	512	-	516'3"
Shale	516'3"	-	517'7"
Sandy Shale	517'7"	-	528'1"
Shale	528'1"	-	550'

Shale	1256	-	1258'
Sandstone	1258	-	1261'
Shale	1261	-	1263'
Sandstone	1263	-	1267'
Shale	1267	-	1268'
Sandstone	1268	-	1273'
Shale	1273	-	1282'
Sandstone	1282	-	1290'
Sandstone with shale layers	1290	-	1309'
Sandstone	1309	-	1311'1"
Sandstone with shale layers	1311'1"	-	1315'
Shale	1315	-	1316'
Sandstone	1316	-	1324'
Sandstone with shale layers	1324	-	1327'
Shale	1327	-	1330'
Sandstone	1330	-	1340'
Sandstone with shale layers	1340	-	1343'
Sandstone	1343	-	1352'6"
Shale	1352'6"	-	1353'
Sandstone	1353	-	1356'
Shale	1356	-	1357'
Sandstone	1357	-	1357'6"
Shale	1357'6"	-	1358'
Sandstone	1358	-	1360'
Shale	1360	-	1368'8"
Coal	1368'8"	-	1369'
Shale	1369	-	1377'2"
Shale with coal markings	1377'2"	-	1378'
Shale	1378	-	1381'2"
Shale with coal markings	1381'2"	-	1382'
Sandstone	1382'	-	1385'
Shale	1385	-	1386'
Sandstone	1386	-	1404'
Coal	1404	-	1404'6"
Shale	1404'6"	-	1409'
Sandstone	1409	-	1412'
Shale	1412	-	1419'
Shale with coal markings	1419	-	1420'
Sandstone	1420	-	1431'6"
Coal	1431'6"	-	1432'
Shale with coal markings	1432	-	1441'
Sandstone with coal markings	1441	-	1445'
Shale	1445	-	1450'
Shale with coal markings	1450	-	1455'3"
Shale	1455'3"	-	1460'
Sandstone	1460	-	1483'6"
Shale with Coal markings	1483'6"	-	1485'11"
Coal	1485'11"	-	1486'
Shale	1486'	-	1520'
Shale with Coal markings	1520	-	1542'
Sandstone	1542	-	1561'2"
Coal	1561'2"	-	1561'8"
Shale	1561'8"	-	1563'6"
Sandstone	1563'6"	-	1564'6"

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VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 56 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (Feb. 26 to Nov. 10)

Elevation:

Location: On Indian Reserve R 7 , Nanaimo Dist.

Surface Soil, Gravel, Sand, etc.	0	-	68'
Sandstone	68	-	69'
Shale	69	-	80'
Shale with Pebbles	80	-	98'5"
Shale with Sandstone Bands	98'5"	-	100'
Shale	100	-	377'11½"
Sandstone	377'11½"	-	378'
Shale	378	-	464'11½"
Sandstone	464'11½"	-	465'
Shale	465	-	494'
Sandstone	494	-	494'5"
Shale	494'5"	-	673'5"
Sandstone	673'5"	-	673'7"
Shale	673'7"	-	690'
Shale with Boulders	690	-	700'
Shale	700	-	755'
Boulders	755	-	756'
Shale	756	-	765'
Shale with Small Boulders	765	-	770'
Shale	770	-	812'
Boulders	812	-	813'
Shale	813	-	829'9"
Sandstone	829'9"	-	830'
Shale	830	-	836'
Sandstone	836	-	836'2"
Shale	836'2"	-	899'4"
Sandstone	899'4"	-	900'7"
Shale	900'7"	-	925'9"
Sandstone	925'9"	-	926'
Shale	926	-	967'2"
Sandstone	967'2"	-	967'10½"
Shale	967'10½"	-	992'
Sandstone	992	-	992'6"
Shale	992'6"	-	1061'3"
Boulders	1061'3"	-	1061'9"
Shale	1061'9"	-	1094'
Boulders	1094	-	1095'
Shale	1095	-	1218'2"
Sandstone	1218'2"	-	1223'
Shale	1223	-	1244'6"
Sandstone	1244'6"	-	1256'

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Shale	1564'6"	-	1571'
Sandstone	1571	-	1600'
Shale	1600	-	1602'6"
Shale with coal markings	1602'6"	-	1603'6"
Shale	1603'6"	-	1605'8"
Coal	1605'8"	-	1606'
Shale	1606	-	1607'
Sandstone	1607	-	1625'
Shale with coal markings	1625	-	1625'5"
Sandstone with shale layers	1625'5"	-	1630'
Shale	1630	-	1631'
Sandstone	1631	-	1632'4"
Shale	1632'4"	-	1633'
Sandstone	1633	-	1634'9"
Shale	1634'9"	-	1645'3"
Coal	1645'3"	-	1645'6"
Shale	1645'6"	-	1649'
Sandstone	1649	-	1667'
Shale with coal markings	1667	-	1671'
Sandstone	1671	-	1681'10"
Shale	1681'10"	-	1682'
Sandstone with coal markings	1682	-	1690'
Sandstone with shale markings	1690	-	1701'
Sandstone	1701	-	1707'
Shale	1707	-	1720'
Sandstone	1720	-	1721'6"
Shale with coal markings	1721'6"	-	1722'
Sandstone	1722	-	1723'6"
Shale	1723'6"	-	1724'
Sandstone	1724	-	1725'8"
Shale	1725'8"	-	1730'
Sandstone	1730	-	1740'
Sandstone with shale markings	1740	-	1746'
Sandstone	1746	-	1750'
Sandstone with shale layers	1750	-	1762'
Sandstone with coal and shale layers	1762	-	1790'4"
Shale	1790'4"	-	1790'7"
Sandstone with coal & shale mkgs.	1790'7"	-	1797'
Shale	1797	-	1800'
Shale with sandstone layers	1800	-	1804'
Sandstone	1804	-	1806'6"
Shale	1806'6"	-	1810'
Shale with Coal Markings	1810	-	1811'
Sandstone with coal markings	1811	-	1824'
Sandstone with shale layers	1824	-	1846'10"
Shale Parting	1846'10"	-	1847'2"
Sandstone with shale layers	1847'2"	-	1850'
Sandstone	1850	-	1862'6"
Conglomerate	1862'6"	-	1863
Sandstone	1863	-	1866'10"
Conglomerate	1866'10"	-	1867'
Sandstone	1867	-	1868'
Conglomerate	1868	-	1870'
Sandstone	1870	-	1895'

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Shale	1895	-	1937'
Sandstone	1937	-	1942'
Shale	1942	-	1944'
Sandstone	1944	-	1948'
Shale	1948	-	1948'9"
Sandstone	1948'9"	-	1956'
Shale	1956	-	1960'
Sandstone with coal markings	1960	-	1965'9"
Shale	1965'9"	-	1977'
Sandstone	1977	-	1982'
Shale	1982	-	1984'
Sandstone	1984	-	1990'
Shale	1990	-	1992'
Sandstone with shale layers	1992	-	2010'
Sandstone	2010	-	2018'
Shale	2018	-	2020'
Sandstone	2020	-	2031'
Shale	2031	-	2054'
Sandstone	2054	-	2062'
Shale	2062	-	2078'
Sandstone	2078	-	2081'
Shale	2081	-	2082'
Sandstone	2082	-	2121'
Sandstone with shale layers	2121	-	2122'
Sandstone	2122	-	2157'
Shale	2157	-	2158'
Shale with coal markings	2158	-	2166'
Sandstone	2166	-	2172'
Shale with coal markings	2172	-	2177'
Sandstone	2177	-	2187'6"
Shale	2187'6"	-	2188'8'
Sandstone	2188'8"	-	2191'3"
Shale with sandstone bands	2191'3"	-	2193'
Sandstone with shale layers	2193	-	2204'
Sandstone with coal markings	2204	-	2218'8"
Conglomerate	2218'8"	-	2219'
Sandstone	2219	-	2219'8"
Conglomerate	2219'8"	-	2220'
Sandstone	2220	-	2224'
Shale layers	2224	-	2224'2"
Sandstone	2224'2"	-	2228'
Conglomerate	2228	-	2228'6"
Sandstone	2228'6"	-	2234'
Shale	2234	-	2237'
Sandstone	2237	-	2244'
Shale	2244	-	2289'
Sandstone	2289	-	2293'
Shale	2293	-	2302'
Shale with leaf markings	2302	-	2303'
Shale	2303	-	2326'
Conglomerate	2326	-	2326'11"
Sandstone	2326'11"	-	2327'1"
Conglomerate	2327'1"	-	2328'
Shale	2328	-	2389'
Sandstone	2389	-	2390'4"

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Shale	2390'4"	-	2391'
Sandstone	2391	-	2434'
Shale	2434	-	2445'
Sandstone	2445	-	2450'6"
Shale	2450'6"	-	2460'6"
Conglomerate	2460'6"	-	2460'10"
Sandstone	2460'10"	-	2462'
Spar	2462	-	2462'1"
Shale	2462'1"	-	2483'
Sandstone	2483	-	2486'
Shale	2486	-	2497'
Sandstone	2497	-	2501'
Conglomerate	2501	-	2501'6"
Sandstone	2501'6"	-	2527'
Sandstone with coal markings	2527	-	2528'
Sandstone	2528	-	2556'
Shale	2556	-	2586'
Sandstone	2586	-	2586'9"
Shale	2586'9"	-	2588'
Sandstone	2588	-	2594'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 57 (The New Vancouver Coal Mining & Land Co. Limited)

Date: 1900 (March 26 to May 26)

Elevation:

Location: Sec. 17, R 7 Nanaimo Dist. on I.R.

Surface soil etc.	0	-	15'
Sandstone	15	-	26'7"
Coal (at 26'7")	26'7"	-	27'3"
Shale	27'3"	-	28'5"
Sandstone	28'5"	-	41'10"
Coal (at 41'10")	41'10"	-	42'6"
Shale	42'6"	-	44'6"
Sandstone	44'6"	-	45'10"
Coal	45'10"	-	45'11"
Sandstone	45'11"	-	46'4"
Shale, black	46'4"	-	46'5"
Sandstone	46'5"		47'5"
Shale, black	47'5"	-	47'6"
Sandstone	47'6"	-	48'3"
Shale, black	48'3"	-	48'4"
Sandstone	48'4"	-	49'8"
Shale, black	49'8"	-	49'9"
Sandstone	49'9"	-	56'6"
Shale	56'6"	-	57'11"
Coal	57'11"	-	58'1"
Sandy Shale	58'1"	-	61'7"
Sandstone	61'7"	-	67'
Shale	67	-	68'
Sandstone	68	-	70'
Shale	71'10"	-	71'10"
Sandstone	71'10"	-	76'2"
Sandy Shale	76'2"	-	79'2"
Coal (at 79'2")	79'2"	-	79'3"
Sandy Shale	79'3"	-	82'4"
Sandstone	82'4"	-	83'2"
Shale, black	83'2"	-	83'5"
Coal (at 83'5")	83'5"	-	84'1"
Shale, brown	84'1"	-	84'4"
Shale, black	84'4"	-	84'7"
Sandstone	84'7"	-	84'10"
Shale	84'10"	-	85'1"
Sandstone	85'1"	-	96'2"
Shale	96'2"	-	96'6"
Sandstone	96'6"	-	100'2"
Shale	100'2"	-	100'5"
Sandstone	100'5"	-	114'11½"

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Shale	114'11½"	-	115'5½"
Sandstone	115'5½"	-	124'1"
Shale, black	124'1"	-	124'2"
Coal (at 124'2")	124'2"	-	124'4"
Shale, black	124'4"	-	124'6"
Sandy Shale	124'6"	-	129'2"
Coal (at 129'2")	129'2"	-	129'6"
Sandy Shale	129'6"	-	133'
Sandstone	133	-	135'
Sandy shale	135	-	136'
Sandstone	136	-	142'
Sandy shale	142	-	145'
Shale	145	-	147'
Sandy shale	147	-	149'4"
Sandstone	149'4"	-	150'4"
Shale	150'4"	-	154'4"
Sandstone	154'4"	-	169'1"
Coal	169'1"	-	169'2"
Shale, brown	169'2"	-	170'9"
Sandstone	170'9"	-	172'3"
Shale	172'3"	-	179'7"
Sandy Shale	179'7"	-	182'1"
Sandstone	182'1"	-	196'7"
Sandy Shale	196'7"	-	205'11"
Sandstone	205'11"	-	207'5"
Sandy Shale	207'5"	-	210'5"
Shale with coal markings	210'5"	-	210'11"
Sandstone	210'11"	-	284'1"
Shale	284'1"	-	284'3"
Clay	284'3"	-	284'4"
Sandstone	284'4"	-	296'4"
Conglomerate	296'4"	-	301'4"
Shale	301'4"	-	304'4"
Sandstone	304'4"	-	313'10"
Shale	313'10"	-	315'10"
Sandstone	315'10"	-	353'3"
Sandstone with shale & coal mkgs.	353'3"	-	362'7"
Sandstone	362'7"	-	375'10"
Sandy shale	375'10"	-	380'
Sandstone	380	-	392'9"
Shale	392'9"	-	401'9"
Sandstone	401'9"	-	407'3"
Sandy Shale	407'3"	-	410'7"
Sandstone	410'7"	-	418'7"
Sandy Shale	418'7"	-	471'9"
Shale	471'9"	-	476'10"
Sandy Shale	476'10"	-	481'7"
Shale, black	481'7"	-	488'7"
Sandy Shale	488'7"	-	489'4"
Shale	489'4"	-	491'4"
Shale, black	491'4"	-	491'9"
Shale, brown	491'9"	-	493'3"
Sandy Shale	493'3"	-	493'9"
Shale, brown	493'9"	-	494'3"

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Sandy shale	494'3"	-	495'
Shale, black	495	0	499'10"
Coal (at 499'10")	499'10"	-	500'
Shale, black	500	-	502'4"
Coal (at 502'4")	502'4"	-	502'6"
Shale, brown	502'6"	-	503'2"
Shale, brown with coal markings	503'2"	-	510'3"
Sandy shale	510'3"	-	511'
Shale, brown	511	-	525'8½"
Shale, black	525'8½"	-	527'2½"
Sandy Shale	527'2½"	-	527'8½"
Sandstone	527'8½"	-	528'1½"
Shale (soapstone)	528'1½"	-	528'3½"
Sandstone	528'3½"	-	530'8"
Sandy shale & Sandstone	530'8"	-	532'6"
Shale, black	532'6"	-	533'4"
Shale, brown	533'4"	-	533'10"
Sandy shale	533'10"	-	541'1½"
Sandstone	541'1½"	-	544'3½"
Sandy shale	544'3½"	-	547'3½"
Conglomerate	547'3½"	-	555'6"
Sandy Shale	555'6"	-	558'
Shale, blue	558	-	560'3"
Sandy shale, blue	560'3"	-	565'3"
Shale, blue	565'3"	-	567'
Conglomerate	567	-	570'3"
Shale, blue	570'3"	-	574'9"
Sandy shale	574'9"	-	576'9"
Shale, blue	576'9"	-	577'9"
Sandy shale, blue	577'9"	-	582'1"
Shale	582'1"	-	585'1"
Sandy shale	585'1"	-	593'10"
Sandstone	593'10"	-	596'10"
Sandy shale	596'10"	-	610'9"
Shale, blue	610'9"	-	622'8"
Sandy shale	622'8"	-	639'9"
Shale, blue & sandy shale	639'9"	-	642'11"
Sandy shale, blue	642'11"	-	653'5"
Shale, blue	653'5"	-	655'11"
Sandy shale	655'11"	-	668'
Sandstone	668	-	670'
Shale	670	-	677'
Conglomerate	677	-	678'
Sandy shale	678	-	702'5"
Shale	702'5"	-	711'3"
Sandstone	711'3"	-	713'3"
Sandy shale	713'3"	-	714'7"
Shale	714'7"	-	723'10"
Sandy shale	723'10"	-	736'
Conglomerate	736	-	738'7"
Sandy shale	738'7"	-	750'8"
Conglomerate	750'8"	-	754'8"
Sandy shale	754'8"	-	755'2"
Conglomerate	755'2"	-	756'10"

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Bore Hole No. 57 (continued)

Sandy shale	756'10"	-	763'5"
Shale	763'5"	-	800'3"
Sandy shale	800'3"	-	831'5"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 58 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (June 3 to June 25)

Elevation:

Location: No. 5 Bore on Indian Reserve
Sec. 17, R. 7 Nanaimo Dist. on I.R.

Surface soil	0	-	5'4"
Sandstone	5'4"	-	25'6"
Sandy shale	25'6"	-	30'6"
Sandstone with black shale marks	30'6"	-	43'
Sandy shale with dark brown shale markings	43	-	55'5"
Sandy shale, with coal markings	55'5"	-	59'5"
Brown shale	59'5"	-	60'5"
Sandstone	60'5"	-	62'5"
Sandy shale	62'5"	-	64'5"
Sandstone	64'5"	-	118'10"
Sandy shale	118'10"	-	124'10"
Sandstone	124'10"	-	154'6"
Sandstone with conglomerate and shale markings	154'6"	-	162'
Sandstone with shale markings	162	-	173'4"
Sandstone	173'4"	-	187'8"
Sandy shale	187'8"	-	191'2"
Sandstone with shale markings	191'2"	-	199'6"
Sandstone with coal and shale markings	199'6"	-	216'9"
Sandstone	216'9"	-	239'3"
Sandstone with shale markings	239'3"	-	275'2"
Sandy shale	275'2"	-	277'8"
Sandstone	277'8"	-	283'1"
Sandstone with shale markings	283'1"	-	292'7"
Sandstone	292'7"	-	296'1"
Sandy shale	296'1"	-	306'2"
Sandstone	306'2"	-	309'
Sandy shale	309	-	319'6"
Sandstone	319'6"	-	330'6"
Sandy shale	330'6"	-	379'6"
Brown shale, with coal markings	379'6"	-	386'9"
Brown shale	386'9"	-	389'
Coal (	389	-	389'2"
Brown shale	389'2"	-	403'6"
Conglomerate	403'6"	-	404'2"
Brown shale	404'2"	-	404'8"
Coal	404'8"	-	404'11"
Light sandy shale	404'11"	-	405'5"
Brown shale	405'5"	-	409'5"

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Light brown shale	409'5"	-	413'3"
Brown shale, with conglomerate and sandstone markings	413'3"	-	425'4"
Brown shale	425'4"	-	428'4"
Sandy shale	428'4"	-	430'4"
Black shale	430'4"	-	433'
Conglomerate	433	-	435'9"
Brown shale	435'9"	-	436'9"
Blue shale with brown shale mkgs.	436'9"	-	441'9"
Sandy Shale	441'9"	-	449'3"
Yellow shale	449'3"	-	451'9"
Sandy shale	451'9"	-	455'
Black shale	455	-	455'6"
Shale	455'6"	-	463'6"
Blue shale	463'6"	-	467'6"
Hard shale	467'6"	-	468'6"
Blue shale	468'6"	-	471'
Sandy shale	471	-	474'2"
Blue shale with brown shale markings	474'2"	-	479'2"
Blue sandy shale	479'2"	-	480'2"
Soft blue shale	480'2"	-	482'2"
Hard shale	482'2"	-	482'8"
Blue shale, sandy	482'8"	-	484'2"
Brown shale	484'2"	-	486'
Coal and black shale	486	-	488'6½"
Coal	488'6½"	-	491'10"
Grey shale	491'10"	-	493'6"
Sandy shale	493'6"	-	497'6"
Brown shale with coal markings	497'6"	-	498'
Coal	498	-	498'6"
Hard shale	498'6"	-	501'
Blue shale	501	-	502'4"
Hard shale	502'4"	-	505'9"
Brown shale	505'9"	-	508'11"
Sandy shale	508'11"	-	510'11"
Brown shale	510'11"	-	511'11"
Brown shale with coal markings	511'11"	-	512'9"
Coal	512'9"	-	513'2"
Brown shale	513'2"	-	513'11"
Black shale with coal markings	513'11"	-	514'8"
Brown shale	514'8"	-	515'2"
Coal	515'2"	-	518'
Brown shale and coal	518	-	518'8"
Hard shale	518'8"	-	519'2"
Brown shale	519'2"	-	519'9"
Sandy shale	519'9"	-	522'9"
Sandstone	522'9"	-	523'9"
Brown sandy shale	523'9"	-	524'5"
Blue sandy shale, with coal mkgs.	524'5"	-	531'9"
Hard shale	531'9"	-	535'2"
Black shale and coal	535'2"	-	535'6"
Brown shale	535'6"	-	535'11"
Sandy shale	535'11"	-	541'2"

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Blue shale	541'2"	-	560'4"
Sandy shale	560'4"	-	563'4"
Brown shale with coal markings	563'4"	-	564'10"
Sandy shale	564'10"	-	565'7"
Brown shale	565'7"	-	566'7"
Sandy shale	566'7"	-	567'9"
Blue shale	567'9"	-	570'9"
Sandy shale	570'9"	-	572'9"
Blue shale	572'9"	-	583'3"
Sandy shale	583'3"	-	591'6"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 59 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (June 29 to July 21)

Elevation:

Location: No. 6 Bore on Indian Reserve Sec. 17, R. 7 Nanaimo Dist.

Sandy soil and very soft sandstone	0	-	5'2"
Sandstone	5'2"	-	60'4"
Coal	60'4"	-	60'6"
Sandstone	60'6"	-	62'10"
Sandy shale	62'10"	-	67'10"
Sandstone	67'10"	-	82'4"
Sandy shale	82'4"	-	82'6"
Sandstone	82'6"	-	116'1"
Grey shale	116'1"	-	124'1"
Sandy shale	124'1"	-	132'7"
Sandstone	132'7"	-	182'5"
Sandstone with shale markings	182'5"	-	196'8"
Sandstone	196'8"	-	287'3"
Sandy shale	287'3"	-	302'9"
Sandy shale with black shale mkgs.	302'9"	-	316'5"
Sandstone	316'5"	-	318'11"
Sandy shale	318'11"	-	361'6"
Dark brown shale with coal markings	361'6"	-	363'6"
Light brown shale with coal mkgs.	363'6"	-	365'6"
Black shale	365'6"	-	365'8"
Coal	365'8"	-	365'10"
Light brown shale with coal mkgs.	365'10"	-	366'10"
Sandy shale	366'10"	-	368'6"
Light brown shale	368'6"	-	369'6"
Brown shale	369'6"	-	420'9"
Shale, blue	420'9"	-	436'9"
Sandy shale	436'9"	-	438'9"
Conglomerate	438'9"	-	439'3"
Sandy shale	439'3"	-	441'8"
Blue shale	441'8"	-	443'8"
Black shale	443'8"	-	444'8"
Blue shale	444'8"	-	459'5"
Sandy shale and yellow shale	459'5"	-	463'7"
Blue shale	463'7"	-	472'6"
Light brown shale	472'6"	-	472'9"
Coal and shale	472'9"	-	473'9"
Coal	473'9"	-	477'3"
Sandy shale	477'3"	-	479'7"
Sandstone and Sandy shale	479'7"	-	487'3"
Brown shale and coal	487'3"	-	487'7"

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Brown shale	487'7"	-	489'7"
Yellow shale	489'7"	-	491'1"
Blue shale	491'1"	-	502'5"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 60 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (August 1 to 8)

Elevation:

Location: Sec. 3, R5 Nanaimo Dist.

Surface soil etc.	0	-	18'8"
Conglomerate	18'8"	-	20'8"
Hardpan	20'8"	-	22'8"
Shale	22'8"	-	27'3"
Conglomerate	27'3"	-	28'3"
Shale	28'3"	-	31'9"
Shale with coal markings	31'9"	-	32'3"
Shale	32'3"	-	46'10"
Conglomerate	46'10"	-	87'4"
Shale with Conglomerate pebbles	87'4"	-	91'2"
Conglomerate	91'2"	-	92'
Shale with conglomerate pebbles	92	-	94'4"
Conglomerate	94'4"	-	97'6"
Shale with coal markings	97'6"	-	101'6"
Coal (at 101'6")	101'6"	-	101'11"
Coal and shale	101'11"	-	105'4"
Coal (at 105'4")	105'4"	-	112'2"
Shale	112'2"	-	113'2"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 61 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (August 12 - 21)

Elevation:

Location: Sec. 3, R. 5 Nanaimo Dist.

Surface Soil etc.	0	-	2'10"
Conglomerate	2'10"	-	30'
Shale	30	-	33'4"
Conglomerate	33'4"	-	37'9"
Shale	37'9"	-	40'3"
Coal (at 40'3")	40'3"	-	42'5"
Shale	42'5"	-	49'7"
Shale with coal markings	49'7"	-	51'4"
Shale	51'4"	-	51'10"
Shale & Coal	51'10"	-	52'6"
Shale	52'6"	-	53'
Shale & Coal	53	-	53'6"
Coal (at 53'6")	53'6"	-	54'
Shale	54	-	81'5"
Coal (at 81'5")	81'5"	-	81'7"
Shale	81'7"	-	82'1"
Shale with coal markings	82'1"	-	84'3"
Shale	84'3"	-	135'6"
Sandstone	135'6"	-	135'10"
Shale	135'10"	-	156'
Conglomerate	156	-	157'
Shale	157	-	175'6"
Shale withcoal markings	175'6"	-	176'5"
Shale	176'5"	-	181'
Shale with coal markings	181	-	186'3"
Shale	186'3"	-	205'6"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 62 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (August 28 to September 14)

Elevation:

Location: Sec. 3, R. 5 Nanaimo Dist.

Surface soil, etc.	0	-	5'
Conglomerate	5	-	9'6"
Shale	9'6"	-	22'6"
Conglomerate	22'6"	-	28'3"
Shale	28'3"	-	32'4"
Conglomerate	32'4"	-	36'9"
Sandstone	36'9"	-	38'9"
Sandstone with Pebbles	38'9"	-	41'10"
Shale	41'10"	-	43'9"
Coal (at 43'9")	43'9"	-	44'2"
Coal & Shale	44'2"	-	44'3"
Shale	44'3"	-	49'3"
Sandstone	49'3"	-	52'6"
Shale with coal markings	52'6"	-	53'
Shale	53	-	56'1"
Shale with coal markings	56'1"	-	60'1"
Shale	60'1"	-	80'8"
Sandstone	80'8"	-	81'8"
Shale	81'8"	-	84'4"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 63 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1900 (Sept. 18 to Oct. 8)

Elevation:

Location: Sec. 3, R. 5 Nanaimo Dist.

Surface soil etc.	0	-	19'6"
Boulders	19'6"	-	25'5"
Conglomerate	25'5"	-	61'
Shale & Conglomerate, mixed	61	-	63'
Conglomerate	63	-	83'9"
Shale	83'9"	-	85'4"
Coal &Shale	85'4"	-	86'2"
Shale	86'2"	-	88'
Conglomerate	88	-	126'
Shale	126	-	127'
Conglomerate	127	-	132'
Sandstone	132	-	135'8"
Shale & Coal	135'8"	-	135'11"
Conglomerate	135'11"	-	137'4"
Sandstone	137'4"	-	139'4"
Conglomerate	139'4"	-	183'5"
Shale	183'5"	-	200'2"
Shale with coal markings	200'2"	-	201'7"
Coal & shale	201'7"	-	202'
Shale	202	-	208'10"
Shale with coal markings	208'10"	-	209'2"
Coal & Shale	209'2"	-	211'2"
Shale	211'2"	-	217'7"
Coal & Shale	217'7"	-	218'1"
Shale	218'1"	-	231'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 64 (The New Vancouver Coal Mining & Land Co. Limited)

Date: 1900 (Oct. 22 to Dec. 31)

Elevation:

Location: Fiddicks Sec. 3, R. 7 Nanaimo Dist.

Surface soil etc.	0	-	26'
Shale	26	-	36'6"
Coal (at 36'6")	36'6"	-	37'2"
Shale	37'2"	-	43'
Sandstone	43	-	56'7"
Coal (at 56'7")	56'7"	-	57'4"
Shale	57'4"	-	60'4"
Sandstone	60'4"	-	75'8"
Shale	75'8"	-	76'8"
Sandstone	76'8"	-	78'
Shale	78	-	101'6"
Coal (at 101'6")	101'6"	-	101'8"
Shale	101'8"	-	105'8"
Sandstone	105'8"	-	113'5"
Shale	113'5"	-	114'5"
Sandstone with shale markings	114'5"	-	120'8"
Sandstone	120'8"	-	128'
Shale	128	-	139'
Sandstone	139	-	141'
Shale with coal markings	141	-	144
Shale	144	-	149'1"
Coal (at 149'1")	149'1"	-	149'2"
Shale	149'2"	-	155'8"
Sandstone	155'8"	-	181'8"
Shale	181'8"	-	186'3"
Sandstone	186'3"	-	234'9"
Shale	234'9"	-	241'6"
Sandstone	241'6"	-	242'6"
Shale	242'6"	-	243'3"
Sandstone	243'3"	-	263'
Shale	263	-	267'
Sandstone	267	-	277'6"
Shale	277'6"		283'6"
Sandstone	283'6"	-	284'9"
Sandstone with shale markings	284'9"	-	291'3"
Sandstone	291'3"	-	330'2"
Sandstone with conglomerate markings	330'2"	-	332'8"
Sandstone withshale markings	332'8"	-	342'5"
Sandstone with conglomerate markings	342'5"	-	344'2"

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Conglomerate	344'2"	-	344'7"
Shale	344'7"	-	344'8"
Conglomerate	344'8"	-	345'
Sandstone	345	-	350'5"
Sandstone with conglomerate markings	350'5"	-	358'5'
Shale	358'5"	-	368'8"
Sandstone	368'8"	-	373'8"
Shale	373'8"	-	374'8"
Sandstone with shale markings	374'8"	-	384'8"
Sandstone	384'8"	-	385'8"
Conglomerate	385'8"	-	387'8"
Sandstone	387'8"	-	388'8"
Shale	388'8"	-	391'2"
Sandstone	391'2"	-	402'0"
Shale	402	-	405'
Sandstone	405	-	410'
Shale	410	-	411'3"
Sandstone with shale markings	411'3"	-	417'3"
Shale	417'3"	-	418'3"
Sandstone	418'3"	-	437'1"
Shale	437'1"	-	442'1"
Sandstone	442'1"	-	452'9"
Shale	452'9"	-	458'7"
Sandstone with shale markings	458'7"	-	468'7"
Sandstone	468'7"	-	498'
Shale	498	-	512'1"
Sandstone	512'1"	-	514'1"
Shale	514'1"	-	529'5"
Sandstone	529'5"	-	545'
Shale	545	-	589'
Sandstone with shale markings	589	-	590'
Shale	590	-	595'
Shale with coal markings	595	-	598'7"
Shale	598'7"	-	627'
Shale & Coal	627	-	627'4"
Coal (at 627'4")	627'4"	-	627'8"
Shale & Coal	627'8"	-	628'4"
Coal (at 628'4")	628'4"	-	631'7"
Coal & Shale	631'7"	-	632'1"
Coal (at 632'1")	632'1"	-	632'6"
Coal (dirty)	632'6"	-	632'10"
Shale	632'10"	-	635'4"
Coal & Shale	635'4"	-	636'4"
Shale	636'4"	-	638'4"
Shale with coal markings	638'4"	-	640'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 66 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1901 (January 11 to February 1)

Elevation:

Location: Harewood Estate Sec. 1, R. 1 Nanaimo Dist.

Surface soil, etc.	0	-	2'	
Conglomerate	2	-	128'5"	
Shale	128'5"	-	134'	
Sandstone	134	-	136'	
Shale	136	-	136'6"	
Conglomerate	136'6"	-	140'11"	
Shale	140'11"	-	141'5"	
Coal (at 141'5")	~~141'5"~~	~~-~~	~~142'10"~~	1'5"
Shale	142'10"	-	143'3"	
Coal (at 143'3")	~~143'3"~~	~~-~~	~~143'5"~~	2"
Coal & Shale	143'5"	-	143'11"	6"
Coal (at 143'11")	~~143'11"~~	~~-~~	~~146'4"~~	2'5"
Shale	146'4"	-	146'5"	
Coal (dirty)	146'5"	-	146'11"	
Shale	146'11"	-	147'5"	

CANADIAN COLLIERIES BOREHOLE No. 67

Wellington Division

S.W. Corner Sec. 1-R.8 Wellington District

Elevation 275.4' Depth 499' 0"

	Thickness		Depth	
Sand gravel & boulders	135'	0"	135'	0"
Conglomerate boulder	6	0	141	0
Gravel	3	0	144	0
Conglomerate	60	0	204	0
Sandstone	9	0	213	0
Shale	13	0	226	0
Sandstone	10	0	236	0
Shale	7	0	243	0
Sandstone	3	0	246	0
Conglomerate	30	0	276	0
Sandstone	2	0	278	0
Conglomerate	45	0	323	0
Brown shale	1	0	324	0
Black shale	2	0	326	0
Shale	20	6	346	6
Sandy shale	1	6	348	0
Shale	23	0	371	0
Brown shale	1	6	372	6
Shale	14	6	387	0
Sandstone	7	0	394	0
Shale	5	6	399	6
Shale or black dirt	3	2	402	8
Coal (very soft)	3	1	405	9
Brown shale	0	3	406	0
Shale	4	0	410	0
Sandstone	6	0	416	0
Conglomerate	33	0	449	0
Shale	22	0	471	0
Sandy shale	4	0	475	0
Sandstone	9	0	484	0
Brown shale	5	0	489	0
Black shale-coal markings	2	6	491	6
Sandy shale-coal markings	0	6	492	0
Sandy shale	4	0	496	0
Sandstone	2	0	498	0
Sandy shale	1	0	499	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 67 (The New Vancouver Coal Mining & Land Co. Limited)

Date: 1901 (Feb. 16 to March 5)

Elevation:

Location: On Harewood Estate
Sec. 20, R. 1 Cranberry Dist.

Surface soil	0	-	2'
Conglomerate	2	-	121'
Shale	121	-	132'
Coal (at 132')	132	-	132'5"
Coal (dirty)	132'5"	-	133'1"
Coal (clean)	133'1"	-	137'1"
Shale	137'1"	-	141'
Sandstone	141	-	143'
Coal (at 143')	143	-	145'
Shale	145	-	147'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 68 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1901 (March 9 to March 29)

Elevation:

Location: On Harewood Estate
Sec. 20, R. 2 Cranberry Dist.

Surface Soil, etc.	0	-	5'
Conglomerate	5	-	16'
Sandstone	16	-	17'
Conglomerate	17	-	66'
Shale	66	-	66'7"
Conglomerate	66'7"	-	72'
Shale	72	-	82'
Sandstone	82	-	87'
Conglomerate	87	-	166'
Shale	166	-	160'
Conglomerate	160	-	177'6"
Sandstone	177'6"	-	180'
Conglomerate	180	-	203'6"
Shale	203'6"	-	213'
Coal (at 213')	213	-	215'3"
Shale	215'3"	-	222'6"
Coal (at 222'6")	222'6"	-	222'9"
Shale	222'9"	-	226'
Coal (at 226')	226	-	226'3"
Shale	226'3"	-	234'
Coal (at 234')	234	-	234'3½"
Shale	234'3½"	-	240'
Coal (at 240')	240	-	240'7"
Shale	240'7"	-	248'
Sandstone	248	-	250'

DRILL HOLE NO. 68

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 118'

FROM	TO	FEET	MATERIAL
0	15	15	top soil
15	40	25	blue clay
40	42	2	sand and fine gravel
42	58	16	gravel
58	59	1	clay
59	65	6	gravel
65	70	5	conglomerate
70	84	14	conglomerate or sandstone with pebbles
84	90	6	shale
90	118	28	marine shale

DRILL HOLE NO. 69

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 73'

FROM	TO	FEET	MATERIAL
0	45	45	top soil, gravel, clay
45	45'5"	5"	COAL
45'5"	48	2'7"	shale
48	56	8	shale
56	65	9	clean COAL
65	72	7	COAL showing a little dirt
72	73	1	shale

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 69 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1901 (March 38 to May 15)

Elevation:

Location: On Harewood Estate
Sec. 19, R.2 Cranberry Dist.

Surface Soil etc.	0	-	5'8"
Conglomerate	5'8"	-	46'4"
Sandstone	46'4"	-	51'8"
Conglomerate	51'8"	-	53'
Sandstone	53	-	53'2"
Shale	53'2"	-	56'6"
Conglomerate	56'6"	-	62'1"
Conglomerate with coal & shale markings	62'1"	-	72'9"
Conglomerate	72'9"	-	118'10"
Sandstone	118'10"	-	121'10"
Conglomerate	121'10"	-	123'
Conglomerate with coal markings	123	-	127'4"
Conglomerate	127'4"	-	130'4"
Shale with coal markings	130'4"	-	131'9"
Shale	131'9"	-	133'9"
Conglomerate	133'9"	-	133'11"
Shale	133'11"	-	134'3"
Conglomerate	134'3"	-	156'6"
Shale	156'6"	-	156'7"
Conglomerate	156'7"	-	158'2"
Shale with coal markings	158'2"	-	159'1"
Shale	159'1"	-	169'4"
Sandstone	169'4"	-	174'2"
Shale	174'2"	-	177'2"
Conglomerate	177'2"	-	235'5"
Shale	235'5"	-	237'3"
Conglomerate	237'3"	-	290'8"
Sandstone	290'8"	-	293'
Conglomerate	293	-	301'6"
Shale	301'6"	-	304'2"
Shale & Coal	304'2"	-	304'4"
Coal (at 304'4")	304'4"	-	304'8"
Shale	304'8"	-	306'2"
Coal & Shale	306'2"	-	306'8"
Coal (dirty)	306'8"	-	307'2"
Shale	307'2"	-	308'8"
Shale & Coal	308'8"	-	309'2"
Shale	309'2"	-	310'8"
Coal & Shale	310'8"	-	311'2"
Shale	311'2"	-	316'11"

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Bore Hole No. 69 (continued)

Coal & Shale	316'11"	-	317'1"
Shale	317'1"	-	320'
Shale with Coal markings	320	-	321'
Shale	321	-	330'
Shale with Coal markings	330	-	334'4"
Coal (at 334'4")	334'4"	-	335'8"
Shale	335'8"	-	340'

DRILL HOLE NO. 70

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 100'

FROM	TO	FEET	MATERIAL
0	15	15	top soil
15	65	50	clay and sand
65	76	11	marine shale
76	100	24	marine shale

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 70 (The New Vancouver Coal Mining & Land Co. Limited) Date: 1901 (April 4 to May 24)

Elevation:

Location: On Harewood Estate
Sec. 18, R 2 Cranberry Dist.

Surface Soil etc.	0	-	4'
Conglomerate	4	-	28'
Sandstone	28	-	29'
Conglomerate	29	-	54'
Shale	54	-	66'6"
Sandstone	66'6"	-	77'
Shale	77	-	86'6"
Conglomerate	86'6"	-	88'1"
Shale parting	88'1"	-	88'3"
Conglomerate	88'3"	-	129'
Shale	129	-	135'
Sandstone	135	-	140'
Conglomerate	140	-	167'6"
Sandstone	167'6"	-	169'
Conglomerate	169	-	195'
Shale parting	195	-	195'1½"
Conglomerate	195'1½"	-	272'8"
Shale	272'8"	-	276'8"
Coal	276'8"	-	276'11"
Shale	276'11"	-	277'1"
Coal	277'1"	-	277'4"
Shale	277'4"	-	280'
Sandstone	280	-	285'10"
Shale	285'10"	-	288'
Sandstone	288	-	290'
Shale Parting	290	-	290'2"
Sandstone	290'2"	-	292'8"
Shale	292'8"	-	304'

DRILL HOLE NO. 71

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 104'

FROM	TO	FEET	MATERIAL
0	75	75	drift
75	84	9	shale
84	96	12	shale
96	102	6	COAL
102	104	2	shale with markings

DRILL HOLE NO. 72

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 74'

FROM	TO	FEET	MATERIAL
0	12	12	top soil
12	16	4	boulder
16	20	4	sandstone with COAL markings
20	38	18	sandstone
38	65	27	sandstone
65	67	2	sandy shale
67	70	3	sandy shale
70	74	4	marine shale

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 72 (Western Fuel Company) Date: 1902/3 (Dec. 30 to Jan. 13)

Elevation: 58.90 above high tide mark

Location: On New Castle Island near southern end

Soil	0	-	7'9"
Sandstone	7'9"	-	23'6"
Shale, sandy with brown shale markings	23'6"	-	24'3"
Shale, sandy	24'3"	-	25'7"
Shale, brown	25'7"	-	25'9"
Shale, sandy	25'9"	-	27'9"
Shale, black with coal markings	27'9"	-	28'2½"
Shale, sandy	28'2½"	-	33'9"
Shale, black	33'9"	-	33'10"
Shale, sandy	33'10"	-	42'6"
Sandstone	42'6"	-	66'11"
Shale, sandy	66'11"	-	70'11"
Sandstone	70'11"	-	71'3"
Shale, sandy	71'3"	-	72'3"
Shale, grey	72'3"	-	72'11"
Shale, brown	72'11"	-	74'11"
Shale, sandy	74'11"	-	79'11"
Sandstone	79'11"	-	99'5"
Shale, sandy	99'5"	-	114'5"
Sandstone	114'5"	-	116'9"
Shale, sandy	116'9"	-	117'9"
Sandstone with shale layers	117'9"	-	123'9"
Sandstone	123'9"	-	150'5"
Sandstone with sandy shale markings	150'5"	-	155'5"
Shale, sandy with brown shale markings	155'5"	-	161'
Shale, brown	161	-	165'
Shale, sandy, with brown shale markings	165	-	173'
Shale, brown	173	-	175'
Shale, sandy	175	-	185'1"
Sandstone	185'1"	-	187'7"
Shale, sandy	187'7"	-	190'7"
Sandstone	190'7"	-	199'1"
Shale, brown	199'1"	-	199'6"
Sandstone with shale markings	199'6"	-	246'6"
Sandstone with shale bands	246'6"	-	253'6"
Shale, sandy	253'6"	-	265'6"
Sandstone	265'6"	-	266'9"

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Shale, sandy, withshale markings	266'9"	-	275'9"
Sandstone with shale markings	275'9"	-	284'6"
Shale, sandy with shale markings	284'6"	-	300'6"
Shale, sandy	300'6"	-	309'6"
Shale, brown	309'6"	-	309'7"
Shale, sandy	309'7"	-	311'
Shale, dark	311	-	312'6"
Shale, light brown	312'6"	-	314'6"
Shale, sandy	314'6"	-	315'
Shale, brown	315	-	316'2"'
Conglomerate	316'2"	-	316'7"
Shale, black	316'7"	-	318'11"
Shale, black and sandy	318'11"	-	323'11"
Shale, brown	323'11"	-	324'5"
Conglomerate	324'5"	-	325'2"
Coal & Shale	325'2"	-	325'9"
Shale, black with coal and leaf markings	325'9"	-	333'5"
Shale, black	333'5"	-	338'
Coal	338	-	338'4"
Coal and Shale	338'4"	-	339'1"
Coal	339'1"	-	339'4"
Shale, brown	339'4"	-	340'7"
Conglomerate	340'7"	-	356'2"
Conglomerate, hard and coarse	356'2"	-	361'8"
Conglomerate	361'8"	-	365'5"
Sandstone	365'5"	-	367'5"
Conglomerate	367'5"	-	368'5"
Sandstone	368'5"	-	373'
Sandstone with bands of conglomerate	373	-	377'4"
Sandstone with coal markings	377'4"	-	386'7"
Sandstone	386'7"	-	392'11"
Conglomerate	392'11"	-	394'11"
Shale, sandy with shale markings	394'11"	-	399'9"
Shale, dark brown	399'9"	-	399'11"
Coal, hard, clean	399'11"	-	401'7"
Coal, dirty	401'7"	-	402'1"
Coal, soft	402'1"	-	402'4"
Coal, clean	402'4"	-	402'7"
Shale, brown	402'7"	-	403'
Sandstone	403	-	403'3"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. "A" Date:

Elevation:

Location: Little Ash (Louden Farm)
Section 19, Range 3, Mountain District

Top Soil	0	-	15'
Clay	15	-	40'
Gravel	40	-	58'
Clay	58	-	59'
Gravel	59	-	65'
Conglomerate	65	-	83'
Shale	83	-	118'

DRILL HOLE NO. 73

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 58'

FROM	TO	FEET	MATERIAL
0	10	10	top soil
10	22	12	gravel
22	29	7	clay
29	38	9	gravel with boulders
38	40	2	gravel to bedrock
40	48	8	sandstone with COAL markings
48	58	10	sandstone

DRILL HOLE NO. 74

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 143'

FROM	TO	FEET	MATERIAL
0	15	15	top soil
15	70	55	clay
70	90	20	gravel
90	117	27	gravel
117	120	3	gravel
120	130	10	soft shale
130	133	3	shale
133	135	2	black shale
135	136'9"	1'9"	black shale
136'9"	137'3"	6"	COAL
137'3"	137'9"	6"	sandy shale
137'9"	138'3"	6"	COAL
138'3"	138'6"	3"	dark sandstone
138'6"	143	4'6"	sandstone

DRILL HOLE NO. 75

SECTION 19, RANGE 3, MOUNTAIN DISTRICT

TOTAL DEPTH 44'

FROM	TO	FEET	MATERIAL
0	20	20	gravel and boulders
20	30	10	gravel and boulders
30	42	12	gravel and boulders
42	44	2	conglomerate

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 75 (Western Fuel Company) Date; 1903 (Sept. 4 to Oct. 5)

Elevation:

Location: Brechin On beach near/Northfield mine.

Black soil	0	-	3'
Clay	3	-	10'
Clay, sand and gravel	10	-	20'
Sand and Gravel	20	-	80'
Clay, sand and gravel	80	-	90'
Sandstone	90	-	96'
Sandstone	96	-	97'
Sandstone	97	-	98'
Shale	98	-	100'
Sandstone	100	-	109'
Shale	109	-	118'
Sandstone	118	-	119'
Conglomerate	119	-	119'5"
Sandstone	119'5"	-	173'
Shale	173	-	176'
Sandstone	176	-	179'
Shale	179	-	181'
Sandstone	181	-	209'
Conglomerate	209	-	217'
Sandstone	217	-	220'
Shale	220	-	222'
Sandstone	222	-	223'7"
Conglomerate	223'7"	-	225'7"
Shale	225'7"	-	227'
Sandstone	227	-	229'
Shale	229	-	230'6"
Sandstone	230'6"	-	237'
Conglomerate	237	-	242'6"
Sandstone	242'6"	-	244'
Conglomerate with shale mkgs.	244	-	251'6"
Sandstone	251'6 "	-	253'
Shale	253	-	270'
Sandstone	270	-	273'
Conglomerate	273	-	279'
Sandstone	279	-	280'
Shale, brown	280	-	280'5"
Conglomerate	280'5"	-	291'
Shale	291	-	295'
Sandstone	295	-	298'
Shale	298	-	299'
Sandstone	299	-	312'5"

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Conglomerate	312'5"	-	313'5"
Sandstone	313'5"	-	315'
Shale, with conglomerate mkgs.	315	-	318'
Sandstone	318	-	324'
Shale	324	-	326'
Sandstone	326	-	327'6"
Shale	327'6"	-	334'
Sandstone	334	-	351'
Shale	351	-	353'9"
Sandstone	353'9"	-	355'6"
Shale	355'6"	-	356'
Sandstone	356	-	357'6"
Shale	357'6"	-	373'
Sandstone	373	-	376'
Shale	376	-	377'
Sandstone	377	-	379'
Shale	379	-	385'
Sandstone	385	-	386'
Shale	386	-	387'
Sandstone	387	-	400'
Shale	400	-	401'6"
Sandstone	401'6"	-	402'6"
Shale	402'6"	-	405'
Sandstone	405	-	408'6"
Shale	408'6"	-	412'
Sandstone	412	-	414'
Shale	414	-	416'6"
Sandstone	416'6"	-	419'
Shale	419	-	420'
Sandstone	420	-	422'
Shale	422	-	425'
Sandstone with coal markings	425	-	429'
Shale	429	-	442'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 76 (Western Fuel Company) Date: 1903/4
(October 21 to May 12)

Elevation:

Location: At bottom of New Castle Island Shaft.

N.B. This is evidently a continuation of No. 47 Bore and was drilled from the bottom of New Castle Island Shaft, which was put down after No. 47 Bore was drilled.

Collar	0	-	330'2½"
To bottom of old No. 47 bore	330'2½"	-	396'8½"
Shale	396'8½"	-	397'10½"
Coal	397'10½"	-	398'2½"
Shale	398'2½"	-	402'2½"
Sandstone	402'2½"	-	403'2½"
Shale	403'2½"	-	433'2½"
Sandstone	433'2½"	-	434'2½"
Shale	434'2½"	-	436'2½"
Sandstone	436'2½"	-	437'2½"
Shale	437'2½"	-	444'2½"
Sandstone	444'2½"	-	451'2½"
Shale	451'2½"	-	456'2½"
Sandstone	456'2½"	-	478'2½"
Conglomerate	478'2½"	-	481'2½"
Sandstone	481'2½"	-	504'2½"
Conglomerate	504'2½"	-	509'2½"
Shale	509'2½"	-	517'2½"
Sandstone	517'2½"	-	522'2½"
Shale	522'2½"	-	523'2½"
Conglomerate	523'2½"	-	526'2½"
Sandstone	526'2½"	-	530'2½"
Conglomerate	530'2½"	-	542'2½"
Sandstone	542'2½"	-	554'2½"
Conglomerage	554'2½"	-	556'8½"
Sandstone	556'8½"	-	568'2½"
Conglomerate	568'2½"	-	574'2½"
Sandstone	574'2½"	-	576'8½"
Shale	576'8½"	-	579'2½"
Sandstone	579'2½"	-	581'2½"
Shale	581'2½"	-	589'2½"
Sandstone	589'2½"	-	590'11½"
Shale	590'11½"	-	593'2½"
Sandstone	593'2½"	-	594'5½"
Shale	594'5½"	-	600'2½"
Sandstone	600'2½"	-	602'2½"
Conglomerate	602'2½"	-	604'5½"

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Shale	604'5½"	-	608'2½"
Sandstone	608'2½"	-	630'2½"
Shale	630'2½"	-	640'8½"
Conglomerate	640'8½"	-	642'2½"
Sandstone and conglomerate	642'2½"	-	644'2½"
Conglomerate	644'2½"	-	646'2½"
Shale, blue	646'2½"	-	647'2½"
Conglomerate	647'2½"	-	652'2½"
Sandstone	652'2½"	-	653'2½"
Conglomerate	653'2½"	-	656'9½"
Shale, sandy	656'9½"	-	657'2½"
Conglomerate, hard	657'2½"	-	680'2½"
Shale, very hard	680'2½"	-	690'2½"
Shale, blue	690'2½"	-	693'2½"
Shale, very hard	693'2½"	-	694'2½"
Shale, blue	694'2½"	-	696'2½"
Shale,hard	696'2½"	-	700'2½"
Shale, black	700'2½"	-	720'2½"
Sandstone	720'2½"	-	724'2½"
Conglomerate (coal markings at 728'8½")	724'2½"	-	729'2½"
Conglomerate, fine	729'2½"	-	737'2½"
Conglomerate	737'2½"	-	754'2½"
Shale, very hard (781'2½" struck blower in the hole)	754'2½"	-	783'2½"
Sandy Shale with soft shale layers	783'2½"	-	785'9½"
Coal markings	785'9½"	-	785'10½"
Shale, soft	785'10½"	-	786'2½"
Shale, hard, sandy	786'2½"	-	790'2½"
Sandstone	790'2½"	-	795'2½"
Conglomerate	795'2½"	-	796'2½"
Shale	796'2½"	-	796'8½"
Conglomerate	796'8½"	-	798'2½"
Sandstone	798'2½"	-	799'2½"
Conglomerate, coarse	799'2½"	-	809'2½"
Shale, dark	809'2½"	-	811'2½"
Shale, brown	811'2½"	-	811'8½"
Shale, light	811'8½"	-	814'2½"
Shale, sandy, very hard,	814'2½"	-	821'2½"
Shale, very hard	821'2½"	-	822'5½"
Conglomerate, coarse	822'5½"	-	869'2½"
Conglomerate, very hard	869'2½"	-	890'2½"
Conglomerate, soft	890'2½"	-	903'2½"
Conglomerate, fine	903'2½"	-	905'2½"
Shale	905'2½"	-	929'2½"
Shale, blue	929'2½"	-	934'2½"
Conglomerate	934'2½"	-	941'2½"
Conglomerate, with sandstone layers	941'2½"	-	956'8½"
Sandstone & conglomerate	956'8½"	-	959'2½"
Sandstone	959'2½"	-	962'8½"
Sandstone with sandstone layers	962'8½"	-	963'5½"
Sandstone	963'5½"	-	987'2½"

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Sandstone, fine	987'2½"	-	989'2½"
Shale	989'2½"	-	1010'8½"
Conglomerate	1010'8½"	-	1011'2½"
Shale	1011'2½"	-	1015'2½
Sandstone, fine	1015'2½"	-	1017'5½"
Shale	1017'5½"	-	1019'5½"
Sandstone, fine	1019'5½"	-	1024'5½"
Shale, brown with coal mkgs.	1024'5½"	-	1024'11½"
Shale	1024'11½"	-	1049'2½"
Sandy Shale	1049'2½"	-	1054'8½"
Shale, brown, with coal mkgs.	1054'8½"	-	1055'2½"
Shale, sandy	1055'2½"	-	1059'2½"
Shale	1059'2½"	-	1063' ½"
Shale, brown with coal mkgs.	1063'2½"	-	1063'6½"
Shale	1063'6½"	-	1073'4½"
Shale, brown	1073'4½"	-	1074'2½"
Shale	1074'2½"	-	1081'2½"
Shale, sandy	1081'2½"	-	1083'10½"
Shale, brown	1083'10½"	-	1084'2½"
Shale	1084'2½"	-	1089'2½"
Shale, light and brown	1089'2½"	-	1106'5½"
Shale, brown with coal mkgs.	1106'5½"	-	1107'5½"
Coal	1107'5½"	-	1107'11½"
Shale	1107'11½"	-	1131'2½"
Shale, brown	1131'2½"	-	1131'8½"
Coal, dirty	1131'8½"	-	1132'8½"
Shale, brown	1132'8½"	-	1132'11½"
Coal	1132'11½"	-	1133'2½"
Sandstone, light	1133'2½"	-	1139'2½"
Sandy shale, light	1139'2½"	-	1145'2½"
Shale, brown	1145'2½"	-	1146'2½"
Shale, sandy, white	1146'2½"	-	1150'2½"
Sandstone with coal markings	1150'2½"	-	1152'8½"
Shale, brown	1152'8½"	-	1153'2½"
Shale, light, sandy	1153'2½"	-	1166'2½"
Sandstone, fine white	1166'2½"	-	1177'2½"
Sandstone, fine	1177'2½"	-	1209'2½"
Shale, hard sandy	1209'2½"	-	1219'2½"
Sandstone, fine	1219'2½"	-	1221'2½"
Shale, hard	1221'2½"	-	1239'2½"
Shale, hard, with layers of sandy shale	1239'2½"	-	1249'2½"
Shale	1249'2½"	-	1299'2½"
Shale with shells	1299'2½"	-	1313'2½"

CANADIAN COLLIERIES BOREHOLE No. 82

CASSIDY DISTRICT

Elevation 254.69' Depth 325'

	Thickness		Depth	
Sandy loam	2'	6"	2'	6"
Clay	3	0	5	6
Packed clay with boulders	6	6	12	0
Gravel & sand with clay	6	0	18	0
Hard packed clay with boulders	5	0	23	0
Rotten conglomerate	3	0	26	0
Conglomerate	28	0	54	0
Rotten conglomerate	3	6	57	6
Shale	2	6	60	0
Conglomerate	58	0	118	0
Conglomerate with bands of sandstone	14	0	132	0
Conglomerate	1	0	133	0
Brown shale	0	2	133	2
Conglomerate with bands of sandstone	7	10	141	0
Conglomerate	8	0	149	0
Shale with coal	0	2	149	2
Coal	3	0	152	2
Coal + shale	0	10	153	0
Broken shale	10	8	163	8
Shale + coal	0	3	163	11
Coal	0	6	164	5
Broken shale	25	7	190	0
Broken hard sandstone	3	5	193	5
Brown shale + coal markings	1	2	194	7
Broken shale	43	5	238	0
Sandy shale	13	0	251	0
Broken hard fine sandstone	4	0	255	0
Fine sandstone	10	0	265	0
Sandy shale	13	0	278	0
Broken shale	11	0	289	0
Sandy shale	8	0	297	0
Broken sandy shale	15	0	312	0
Sandy shale	13	0	325	0

CANADIAN COLLIERIES BOREHOLE No. 83

CASSIDY DISTRICT

Elevation 100.71' Depth 269'6'

	Thickness		Depth	
Loam	4'	6"	4'	6"
Sand and gravel	6	6	11	0
Gravel and boulders	3	0	14	0
Clay and sand	6	0	20	0
Sand and clay	15	0	35	0
Clay	4	0	39	0
Gravel and sand with boulders	5	0	44	0
Loose gravel	4	0	48	0
Packed sand	2	0	50	0
Dark shale	1	4	51	4
Coal + shale	9	3	60	7
Shale	9	5	70	0
Sandstone	2	0	72	0
Conglomerate, fine	9	0	81	0
Conglomerate, fine, sandstone bands	14	0	95	0
Conglomerate, fine	9	8	104	8
Sandy shale	6	2	110	10
Shale, soft	0	3	111	1
Coal (Water clear)	2	8	113	9
Shale	0	6	114	3
Coal + shale	0	2	114	5
Shale	1	8	116	1
Coal + shale	0	5	116	6
Shale, broken	5	6	122	0
Sandstone broken with coal markings	2	10	124	10
Coal	0	4	125	2
Coal + shale	0	8	125	10
Sandy shale	0	8	126	6
Shale- broken	2	6	129	0
Shale	2	0	131	0
Sandstone with shale markings	5	0	136	0
Sandy shale	11	0	147	0
Sandstone fine	5	6	152	6
Sandy shale	1	0	153	6
Shale, Brown + coal	1	6	155	0
Sandy shale	3	0	158	0
Shale + sandy shale bands broken	5	0	163	0
Shale	14	0	177	0
Sandstone, fine	4	0	181	0
Shale broken	4	0	185	0
Shale and bands of fine sandstone	3	0	188	0
Sandy shale + bands of shale	22	0	210	0
Sandy shale	10	0	220	0
Shale	5	0	225	0
Sandy shale	13	0	238	0
Sandstone fine	1	0	239	0
Sandy shale with shale streaks	2	0	241	0
Sandy shale	9	0	250	0
Sandy shale with shale bands	19	6	269	6
Dark shale roof			51	4

CANADIAN COLLERIES BOREHOLE No. 83 CONT.

Coal	0	4	51	8
Coal + Shale	1	0	52	8
Shale, brown	0	10	53	6
Coal + shale	0	6	54	0
Coal	0	10	54	10
Shale + Coal	0	4	55	2
Shale, dark	1	0	56	2
Shale with coal markings	0	3	56	5
Coal	0	2	56	7
Shale brown	0	8	57	3
Coal + shale	0	2	57	5
Shale dark with coal markings	0	8	58	1
Coal	0	8	58	9
Shale + coal	0	4	59	1
Coal	1	6	60	7

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 83 (Western Fuel Company)

Date: 1910
(February 10 to June 21)

Elevation:

Location: Chase River Slope

Surface soil etc.	0	-	20'
Conglomerate	20	-	58'
Sandstone	58	-	95'6"
Coal (New Castle Seam)	95'6"	-	98'
Shale	98	-	343'
Conglomerate	343	-	364'
Sandshale	364	-	380'
Shale	380	-	421'
Conglomerate	421	-	427'
Shale	427	-	553'
Conglomerate	553	-	649'
Conglomerate	649	-	657'6"
Sandstone & Shale	657'6"	-	661'
Shale	661	-	668'
Sandstone & Shale	668	-	678'
Shale	678	-	711'
Sandstone	711	-	719'
Conglomerate	719	-	734'6"
Black Slate	734'6"	-	735'
Shale	735	-	751'
Conglomerate	751	-	755'
Shale	755	-	756'
Sandrock	756	-	762'
Conglomerate	762	-	776'
Shale	776	-	782'
Sand Shale	782	-	788'
Conglomerate	788	-	813'
Sandshale	813	-	813'6"
Sandstone	813'6"	-	824'
Conglomerate	824	-	854'
Shale	854	-	877'6"
Shale & Coal	877'6"	-	879'
Shale	879	-	895'
Conglomerate	895	-	911'
Shale	911	-	950'
Sandstone	950	-	951'
Sandshale	951	-	960'
Conglomerate	960	-	986'
Shale	986	-	992'

.../2

Bore Hole No. 83 (continued)

Black Slate & Bands of Coal	992	-	992'4"
Shale	992'4"	-	999'
Sandstone	999	-	1032'
Shale	1032	-	1058'
Coal	1058	-	1059'
Shale	1059	-	1618'
Difference in Measurement of Rods	1618	-	1620'7"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 83 Date:

Elevation:

Location: Cassidy District

Loam	0	-	4'
Sand and Gravel	4	-	14'
Clay	14	-	35'
Sand and Gravel	35	-	48'
Shale	48	-	51'4"
Coal & Shale (3'5" Clean Coal)	51'4"	-	60'7"
Shale	60'7"	-	70'
Sandstone	70	-	72'
Conglomerate	72	-	104'8"
Shale	104'8"	-	110'10"
Coal	110'10"	-	113'9"
Shale & Coal	113'9"	-	114'5"
Shale	114'5"	-	116'1"
Coal	116'1"	-	116'6"
Shale, with sandstone bands	116'6"	-	122'
Shale	122	-	147'
Sandstone	147	-	152'6"
Shale	152'6"	-	153'6"
Brown Shale with Coal	153'6"	-	155'
Shale	155	-	177'
Sandstone	177	-	181'
Shale	181	-	269'6"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 84 (Western Fuel Company)

Date: 1910
(January 27 to February 23)

Elevation:

Location: Newcastle Island

NOTE: Hole abandoned with loss of about 160 ft. rods bound tight in hole. Unable to move them with hydraulic jack.

Surface soil etc.	0	-	4'11"
Sandstone	4'11"	-	24'8"
Brown Shale with coal markings	24'8"	-	25
Sandstone	25'1"	-	41'9"
Sandy Shale	41'9"	-	43'9"
Sandstone with conglomerate markings	43'9"	-	55'4"
Sandy Shale	55'4"	-	67'10"
Soapstone	67'10"	-	70'10"
Sandy Shale	70'10"	-	89'11"
Sandstone	89'11"	-	97'11"
Sandstone (hard, fine)	97'11"	-	111'3"
Sandstone	111'3"	-	115'3"
Brown Shale	115'3"	-	118'3"
Sandstone	118'3"	-	130'3"
Conglomerate	130'3"	-	135'3"
Shale	135'3"	-	144'3"
Coal & Shale	144'3"	-	144'11"
Coal, good	144'11"	-	145'8"
Shale with coal markings	145'8"	-	148'2"
Brown shale	148'2"	-	149'6"
Shale	149'6"	-	155'6"
Conglomerate	155'6"	-	177'8"
Sandstone, very hard, with cong. markings	177'8"	-	184'8"
Conglomerate	184'8"	-	195'8"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 84 Date:

Elevation:

Location: Cassidy District

Till	0	-	21'
Shale (bottom 10' broken)	21	-	41'
Conglomerate	41	-	53'6"
Sandstone	53'6"	-	67'
Shale with Coal markings	67	-	68'9"
Shale	68'9"	-	85'6"
Conglomerate-sandstone bands	85'6"	-	126'6"
Sandstone	126'6"	-	127'6"
Coal	127'6"	-	127'8"
Shale	127'8"	-	136'6"
Conglomerate	136'6"	-	185'6"
Shale	185'6"	-	191'
Coal-shaley	191	-	193'10"
Shale	193'10"	-	218'8"
Coal	218'8"	-	220'7"
Shale	220'7"	-	223'
Shale with coal	223	-	224'
Shale	224	-	288'
Sandy Shale broken (fault?) Coal markings at 290'	288	-	303'
Sandstone-broken	303	-	308'
Shale	308	-	316'

CANADIAN COLLIERIES BOREHOLE No. 84

CASSIDY DISTRICT

Elevation 147.47 Depth 316.0

	Thickness		Depth	
Sandy clay	6'	0"	6'	0"
Sand + clay	12	0	18	0
Sand + gravel	3	0	21	0
Shale	10	0	31	0
Sandy shale-broken	10	0	41	0
Conglomerate	9	0	50	0
Sandstone	1	0	51	0
Conglomerate	2	6	53	6
Sandstone with brown bands of shale	4	6	58	0
Sandstone, fine with brown shale streaks + conglomerate bands	9	0	67	0
Sandstone fine broken	1	1	68	1
Shale-soft brown with coal markings	0	8	68	9
Shale-soft	1	2	69	11
Shale-soft, brown with coal markings	0	4	70	3
Shale brown	7	3	77	6
Sandy shale broken	8	0	85	6
Conglomerate	10	6	96	0
Sandstone broken	1	0	97	0
Conglomerate	1	0	98	0
Sandstone, broken, hard with bands of fine conglomerate	5	0	103	0
Conglomerate, fine	0	6	103	6
Conglomerate with shale + coal markings	1	2	104	8
Conglomerate, fine with shale markings	4	4	109	0
Conglomerate	17	6	126	6
Sandstone	1	0	127	6
Shale dark	0	2	127	8
Coal	1	3	128	11
Shale, soft dark	2	0	130	11
Sandy shale soft broken	5	1	136	0
Sandstone fine with coal markings	0	6	136	6
Conglomerate	10	6	147	0
Conglomerate broken	3	0	150	0
Conglomerate	35	6	185	6
Shale with sandstone streaks, broken	2	0	187	6
Shale broken	3	6	191	0
Brown shale	0	6	191	6
Coal	0	5	191	11
Shale, brown + coal	0	6	192	5
Shale, brown	0	2	192	7
Coal	1	0	193	7
Shale, brown	0	3	193	10
Shale, broken	2	2	196	0
Sandstone fine broken	2	0	198	0
Shale, broken	4	0	202	0
Shale	16	8	218	8
Shale, dark with coal	0	9	219	5

CANADIAN COLLIERIES BOREHOLE No. 84 CONT.

Shale, light	0	3	219	8
Coal	0	2	219	10
Shale	0	5	220	3
Shale brown	0	2	220	5
Coal	0	2	220	7
Shale	2	5	223	0
Sandy shale with coal markings at 224'	1	0	224	0
Shale-broken	4'	0"	228'	0"
Sandstone fine	2	0	230	0
Shale, broken	3	0	233	0
Sandy shale	1	6	234	6
Sandstone fine	1	0	235	6
Shale, broken with fine sandstone bands	7	6	243	0
Shale broken	3	0	246	0
Shale with sandy shale bands	12	0	258	0
Sandy shale	14	0	272	0
Sandy shale with bands of fine sandstone	16	0	288	0
Sandy shale, broken with coal markings at 290'	14	0	302	0
Sandy shale	1	0	303	0
Sandstone, fine, broken	5	0	308	0
Sandy shale	8	0	316	0

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 85 (Western Fuel Company)

Date: 1910
(February 27 to April 29)

Elevation:

Location: Newcastle Island

Surface	0	-	4'6"
Sandstone	4'6"	-	22'3"
Shale	22'3"	-	22'9"
Sandstone with shale markings	22'9"	-	52'3"
Sandy shale	52'3"	-	109'3"
Shale with coal markings	109'3"	-	128'10"
Conglomerate	128'10"	-	131'10"
Coal	131'10"	-	133'8"
Shale	133'8"	-	139'11"
Coal & Shale	139'11"	-	140'5"
Shale	140'5"	-	141'5"
Conglomerate	141'5"	-	165'1"
Sandstone	165'1"	-	177'1"
Conglomerate	177'1"	-	229'
Sandy Shale	229	-	229'6"
Soft Material with indication of Coal	229'6"	-	230'
Conglomerate	230	-	296'
Blue Shale	296	-	303'
Sandstone	303	-	309'
Blue Shale	309	-	315'6"
Shale with Conglomerate Markings	315'6"	-	319'
Blue Shale	319	-	321'
Sandy Shale	321	-	324'
Shale	324	-	328'8"
Sandy Shale	328'8"	-	337'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore HOle No. 86 (Western Fuel Company) Date: 1910 (May 13 to June 26)

Elevation: 103.17

Location: (Newcastle Island - North of Swamp)

Casing	0	-	1'6"
Red Soil	1'6"	-	4'
Sandstone	4	-	5'6"
Conglomerate	5'6"	-	53'5"
Conglomerate with shale & coal markings	53'5"	-	53'10"
Conglomerate	53'10"	-	57'6"
Conglomerate with coal markings	57'6"	-	63'6"
Conglomerate	63'6"	-	76'
Sandstone (fine gritty & hard)	76	-	82'
Conglomerate, very hard	82	-	125'7"
Sandy Shale with coal markings	125'7"	-	125'10"
Shale with coal markings	125'10"	-	126'11"
Sandstone	126'11"	-	127'5"
Conglomerate	127'5"	-	128'5"
Sandstone with shale markings	128'5"	-	129'5"
Sandy shale with coal markings	129'5"	-	129'9"
Sandstone & Coal	129'9"	-	130'
Coal	130	-	130'7" 7"
Conglomerate	130'7"	-	131'
Blue Shale	131	-	140'
Conglomerate with coal and shale markings	140	-	141'8"
Coal	141'8"	-	141'10" 2"
Blue Shale	141'10"	-	150'3"
Sandstone (hard)	150'3"	-	152'3"
Sandstone with shale partings	152'3"	-	155'3"
Blue Shale	155'3"	-	165'3"
Sandy Shale	165'3"	-	170'3"
Blue Shale	170'3"	-	175'3"
Sandy Shale	175'3"	-	178'9"
Sandstone (coarse)	178'9"	-	179'3"
Blue Shale	179'3"	-	187'3"
Sandy Shale	187'3"	-	195'3"
Sandstone	195'3"	-	196'3"
Blue Shale	196'3"	-	211'3"
Sandstone with blue shale	211'3"	-	213'3"
Shale, sandy	213'3"	-	215'3"
Blue Shale	215'3"	-	217'3"
Sandstone with shale and cong. markings	217'3"	-	223'3"

.../2

Bore Hole No. 86 (continued)

Blue Shale	223'3"	-	233'9"
Fine Conglomerate	233'9"	-	237'9"
Shale	237'9"	-	241'9"
Shale, sandy	241'9"	-	242'9"
Shale, blue	242'9"	-	252'6"
Sandstone with conglomerate markings	252'6"	-	261'6"
Blue shale	261'6"	-	273'6"
Sandstone	273'6"	-	278'6"
Conglomerate	278'6"	-	279'6"
Sandy Shale	279'6"	-	284'6"
Blue Shale	284'6"	-	302'6"
Sandy Shale	302'6"	-	312'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 87 (Western Fuel Company)

Date: 1910
(July 12 to August 2)

Elevation: 72.13

Location: Newcastle Island

Surface Soil etc.	0	-	25'9"
Soapstone	25'9"	-	35'
Sandy Shale	35	-	37'
Soapstone	37	-	49'
Sandy Shale	49	-	64'
Soapstone	64	-	72'
Brown Shale	72	-	84'
Sandy Shale	84	-	92'
Brown Shale	92	-	99'11"
Coal	99'11"	-	101'7"
Shale, brown	101'7"	-	105'7"
Shale	105'7"	-	109'7"
Shale, brown	109'7"	-	111'4"
Coal and Shale	111'4"	-	111'7"
Coal and Black Shale	111'7"	-	113'3"
Black Shale or Mining Dirt	113'3"	-	113'6"
Brown Shale	113'6"	-	114'3"
Conglomerate	114'3"	-	141'10"
Sandstone	141'10"	-	142'
Conglomerate	142	-	149'3"
Sandstone	149'3"	-	150'
Conglomerate (162-166 very soft)	150	-	166'
Sandy Shale (soft)	166	-	168'6"
Sandstone with coal markings & shale	168'6"	-	171'6"
Conglomerate (soft)	171'6"	-	174'
Conglomerate (very hard)	174	-	176'
Conglomerate (soft)	176	-	179'
Sandy Shale, brown	179	-	180'
Conglomerate, soft, coal & shale markings	180	-	180'10"
Coal)	180'10"	-	183'4"
Mining Dirt) Newcastle Seam	183'4"	-	183'11½"
Coal)	183'11½"	-	184'7"
Shale)	184'7"	-	186'2½"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 88 (Western Fuel Company)

Date: 1910
(July 29 to October 24)

Elevation:

Location: (Continuation of Bore No. 75
located on beach near Brechin Mine)

Reamed out Hole from	93	-	437'
Shale	437	-	467'
Sandy Shale	467	-	473'
Shale	473	-	475'
Conglomerate, hard 497-500'6", very hard 517-542', very hard 563-565'	475	-	573'
Shale	573	-	574'
Sandy Shale	574	-	577'
Sandstone & Shale	577	-	587'
Sandy Shale	587	-	602'
Shale	602	-	614'
Conglomerate, very hard 636-643'	614	-	653'
Conglomerate & Sandstone	653	-	661'
Conglomerate very hard 672-675'	661	-	675'
Shale, very fine with coal markings	675	-	680'
Shale	680	-	735'
Shale with coal markings	735	-	745'
Shale	745	-	757'
Conglomerate	757	-	808'
Shale	808	-	828'
Shale, sandy	828	-	838'
Shale	838	-	848'
Sandstone with coal markings	848	-	857'
Sandstone	858	-	884'
Shale, sandy, very hard 896-907'	884	-	907
Shale, hard	907	-	922'
Shale, hard & blue	922	-	930'
Shale, hard	930	-	936'
Shale, sandy	936	-	945'
Shale, blue	945	-	982'

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 88

Sect. 19, Rge 3, Mtn. Dist.

SCALE: 1 IN. = 20 FEET.

Section	Thickness	Depth	Material	Elevation
		0' 0"	Collar of hole	2242.77
				Datum 2000 below M.S.L.
	6' 0"	6' 0"	Clay soil	
	2' 0"	8' 0"	Gravel	
	3' 0"	11' 0"	Gravel and sand	
	14' 0"	25' 0"	Sand and clay	
	5' 0"	30' 0"	Clay	
	7' 0"	37' 0"	Clay and sand	
	3' 0"	40' 0"	Shale chips (gravel size) with coal	
	8' 0"	48' 0"	Sand and gravel with clay	
	6' 0"	54' 0"	Clay	
	9' 0"	63' 0"	Clay with sand and gravel	
	3' 6"	66' 6"	Sand and gravel with clay	2176.27
	20' 6"	87' 0"	Sandy shale, grey, broken (slips)	2155.77
	4' 0"	91' 0"	Shale, grey, few sandy sh. bands	2151.77
	11' 0"	102' 0"	Sandy sh., few sandy streaks, br.	2140.77
	2' 0"	104' 0"	Shale brown, soft, coal marks	2138.77
	1' 11"	105' 11"	COAL, good, last 1" slightly sandy	2136.85
	0' 9"	106' 8"	Sandstone, dark, coal marks	2136.10
	1' 2"	107' 10"	COAL, good.	2134.93
	0' 10"	108' 8"	Sandstone, brown few coal marks	2134.10
	27' 6"	132' 6"	Ss. light grey, fine to coarse and grain	2106.60
	0' 6"	136' 8"	Conglomerate, fine.	2106.10
	6' 4"	143' 0"	Sandstone, grey.	2099.77
	21' 6"	164' 6"	Sandstone, dirty, with mollusc trails, shell fragments at 157'	2078.27
	0' 6"	165' 0"	Sandstone with pebbles	2077.77
	1' 0"	166' 0"	Sandstone, dirty.	2076.77
	5' 7"	171' 7"	Ss. & sand. sh. dk grey [illegible]	2071.19
	4' 5"	176' 0"	Sandstone, dirty.	2066.77

EXTENSION FORMATION (2176.27 – 2136.85)

EAST WT. FORM. (2134.93 – 2099.77)

MAIN WELL SEAM 3'10"

HASLAM FORMATION (below 2099.77)

Begun: May 25, 1950.
Finished: June 3, 1950
Driller: F.H. WALL

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 89 (Western Fuel Company)

Date: 1910
(August 17 to September 3)

Elevation: 97.71

Location: Newcastle Island

Surface soil, etc.	0	-	4'8"
Sandstone	4'8"	-	28'5"
Coal	28'5"	-	28'7"
Shale	28'7"	-	29'1"
Sandstone	29'1"	-	32'4"
Shale, sandy	32'4"	-	38'4"
Shale, brown	38'4"	-	42'4"
Shale, sandy	42'4"	-	47'4"
Sandstone	47'4"	-	102'
Sandstone with shale markings	102	-	106'
Shale, sandy	106	-	111'
Sandstone with shale markings	111	-	118'
Shale, brown	118	-	123'
Shale, sandy	123	-	128'
Shale, brown	128	-	139'
Sandstone	139	-	159'
Shale, sandy	159	-	163'
Conglomerate	163	-	164'
Sandstone with shale & cong. markings 177-198'	164	-	209'6"
Shale, sandy	209'6"	-	211'6"
Soapstone	211'6"	-	223'
Sandstone	223	-	225'
Soapstone	225	-	226'6"
Shale	226'6"	-	236'
Sandstone	236	-	239'
Shale	239	-	251'
Shale, sandy	251	-	259'
Shale	259	-	275''
Shale, grey	275	-	276'6"
Shale, soft	276'6"	-	277'
Shale, grey	277	-	280'
Shale, soft	280	-	281'3"
Shale, brown with conglomerate mkgs.	281'3"	-	282'
Conglomerate	282	-	282'10"
Coal	282'10"	-	285'10"
Coal & Shale	285'10"	-	286'1"
Shale	286'1"	-	299'1"
Sandstone	299'1"	-	300'1"
Conglomerate	300'1"	-	300'6"

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 89

Sect. 19, Rge. 3, Mtn. Dist.

SCALE : 1 IN. = 20 FEET.

SECTION	THICKNESS	DEPTH	MATERIAL	ELEVATION
		0' 0"	Collar of hole	2242.72 Datum 2000 below M.S.L.
	6' 0"	6' 0"	Clay soil	
	9' 0"	15' 0"	Sandy clay with gravel	
	5' 0"	20' 0"	Clay	
	6' 0"	26' 0"	Sand and clay with gravel	
	12' 0"	38' 0"	Sand and clay	
	4' 0"	42' 0"	Gravel	
	4' 0"	46' 0"	Shale chips with gravel & coal	
	4' 0"	50' 0"	Brown shale chips & piece of coal	2192.72
	2' 0"	52' 0"	Shale brown with coal marks	2190.72
	6' 1"	58' 1"	COAL, good; - see below	2184.64
	1' 4"	59' 5"	Shale, soft, brown (prob. "mining dirt")	2183.31
	1' 9"	61' 2"	COAL, good; (13% core rec'd by length)	2181.56
	0' 2"	61' 4"	Sandstone, dark with coal marks	2181.39
	1' 6"	62' 10"	COAL, good, (100% core rec'd by length) sandy coal band (1' 8¾"-2' 3½"	2179.89
	1' 0"	63' 10"	Sandstone, brown, coal marks	2178.89
	5' 0"	68' 10"	Sandstone, grey.	2173.89

Note:

Top bench, 61" coal, 52'0"-58'1"
Chopped 6" into top of remaining 5'7."
80%+ represented in core by length
51.2% recovery by weight

Moisture	1.16
Volatile	43.66
Fixed Carbon	48.14
Ash	7.04
Sulphur	0.69
B.T.U.	13,169
Coke	Poor F.S.I 1½
S.G.	1.308

Begun : June 7, 1950.
Finished : June 9, 1950.
Driller : F.H. WALL.

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 90 (Western Fuel Company)

Date: 1910
(September 12 to October 24)

Elevation:

Location: Newcastle Island

Collar	0	-	1'
Casing, soil,	1	-	3'
Sandstone, rotten	3	-	7'
Sandstone	7	-	25'
Shale	25	-	32'6"
Sandstone	32'6"	-	38'6"
Shale, sandy	38'6"	-	47'6"
Sandstone	47'6"	-	68'
Brown shale & coal	68	-	68'6"
Shale, sandy	68'6"	-	69'6"
Sandstone	69'6"	-	70'6"
Shale, brown	70'6"	-	75'6"
Sandstone	75'6"	-	132'9"
Shale, brown	132'9"	-	132'10"
Sandstone	132'10"	-	146'
Sandy Shale	146	0	150'
Shale, brown with coal markings	150	-	151'6"
Shale, sandy	151'6"	-	156'6"
Shale with grey coal markings	156'6"	-	165'
Shale	165	-	176'
Sandstone with shale markings 187-218'	176	-	218'
Grit, yellow, very hard	218	-	241'
Sandy shale	241	-	271'6"
Sandstone	271'6"	-	275'
Sandstone with shale markings	275	-	280'
Shale, sandy	280	-	292'
Shale	292	-	300'
Shale, sandy	300	-	320'
Shale, brown	320	-	325'
Sandy shale, grey, conglomerate mkgs.	325	-	333'6"
Conglomerate	333'6"	-	336'
Shale	336	-	344'10"
Coal	344'10"	-	345'
Shale, conglomerate markings	345	-	347'8"
Conglomerate	347'8"	-	352'8"
Sandstone, conglomerate markings	352'8"	-	363'8"
Conglomerate	363'8"	-	369'

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 90

Sect. 19, Rge. 4, Mtn. Dist.

SCALE: 1 IN = 20 FEET

SECTION	THICKNESS	DEPTH	MATERIAL	ELEVATION
		0' 0"	Collar of hole	2239.46 Datum 2000 below MSL.
	6' 0"	6' 0"	Clay, soil,	
	24' 0"	30' 0"	Sand and clay	
	15' 0"	45' 0"	Sand and gravel with clay	
	9' 10"	54' 10"	Gravel and sand.	2184.63
	4' 0"	58' 10"	COAL, good (cuts only) cuts fr. bot. ft cont. few pebbles prob. in from bot. of casing	2180.63
	1' 3"	60' 1"	Shale, soft, brown (prob. min. dirt)	2179.38
	1' 11¼"	62' 0¼"	COAL, good: sec "A"	2178.44
	0' 0¾"	62' 1"	Sandstone with coal marks	2178.38
	0' 8"	62' 9"	COAL, good: sec "B"	2176.31
	0' 2"	62' 11"	Sandstone, coaly	2176.54
	1' 4"	64' 3"	COAL, good: sec "C" bot. ¼" sandy coal	2175.21
	0' 8"	64' 11"	Sandstone, very dark with coal marks	2174.54
	5' 0"	69' 11"	Sandstone, grey, fine med. grain	2169.54

NOTE:

	"A"	"B"	"C"
Portion of seam	60' 1" – 62' 0¼"	62' 1" – 62' 9"	62' 11" 64' 3"
Core recovery by length	51 %	100 %	81 %
Part analysed	same	same	62' 11" – 64' 1⅛"
Core recovery by weight	31.5 %	85.3 %	80.1 % of 64.9 % of total
Moisture	1.14	1.15	1.18
Volatile	43.06	42.85	40.49
Fixed carbon	44.94	45.61	46.93
Ash	10.86	9.39	11.40
Sulphur	0.69	0.70	0.70
B.T.U.	12,598	12,722	12,425
Coke & free swelling index	Poor 1	Poor 1	Poor 1
SG	1.335	1.333	1.338

Begun: June 13, 1950
Finished: June 16, 1950
Driller: F.H. WALL

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 91 (Western Fuel Company)

Date: 1910/11
(November 22 to February 28)

Elevation:

Location: (Newcastle Island)

Casing		0	-	1'6"
Surface Soil		1'6"	-	2'6"
Broken sandstone		2'6"	-	4'6"
Sandstone		4'6"	-	28'10"
Shale		28'10"	-	31'4"
Sandstone		31'4"	-	37'6"
Shale		37'6"	-	38'6"
Sandstone		38'6"	-	123'
Sandstone, with conglomerate mkgs.		123	-	135'
Sandstone		135	-	139'
Grit (very hard)		139	-	142'
Sandstone		142	-	164'6"
Shale		164'6"	-	175'6"
Sandy Shale		175'6"	-	177'
Sandstone		177	-	186'
Soapstone		186	-	188'
Shale, brown		188	-	189'6"
Sandstone (shale mkgs 194-227', 237-247') (shale & cong. mks. 247-257'6")		189'6"	-	257'6"
Shale, sandy		257'6"	-	259'6"
Sandstone with shale markings		259'6"	-	269'6"
Shale		269'6"	-	277'
Sandy shale		277	-	282'
Shale		282	-	290'6"
Sandy Shale		290'6"	-	300'
Shale		300	-	301'
Sandstone		301	-	305'
Shale, sandy		305	-	307'
Sandstone		307	-	310'
Shale, sandy		310	-	318'
Shale		318	-	322'
Sandy Shale		322	-	337'
Conglomerate		337	-	339'6"
Conglomerate & Coal	)	339'6"	-	339'9"
Conglomerate, Shale & Coal	)	339'9"	-	340'3"
Coal	) Douglas Seam 5'	340'3"	-	341'10"
Conglomerate	)	341'10"	-	342'
Coal	)	342	-	343'1"
Coal & Shale	)	343'1"	-	344'6"
Shale		344'6"	-	345'6"

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 91

Sect. 19, Rge. 4, Mtn. Dist.

SCALE : 1 IN. = 20 FEET.

Section	Thickness	Depth	Material	Elevation
		0' 0"	Collar of hole	2238.32 Datum 2000 below M.S.L.
	8' 0"	8' 0"	Clay soil	
	3' 0"	11' 0"	Sand and gravel	
	13' 0"	24' 0"	Clay	
	16' 0"	40' 0"	Sand and gravel with clay	
	10' 0"	50' 0"	Sand and gravel	
	10' 0"	60' 0"	Packed sand with clay	
	5' 6"	65' 6"	Packed sand and gravel	2172.82
	0' 6"	66' 0"	Shale, dark.	2172.32
	2' 2"	68' 2"	Shale, brown.	2170.15
	0' 8"	68' 10"	Shale.	2169.48
	1' 8"	70' 6"	Shale, brown.	2167.82
	2' 0"	72' 6"	Shale, brown sdy.	2165.82
	3' 4"	75' 10"	Coal, good (No core)	2162.49
	0' 2"	76' 0"	Shale, brown.	2162.32
	1' 6½"	77' 6½"	Coal, good (44% core rec. by length)	2160.78
	0' ½"	77' 7"	Sandstone, dark with coal marks	2160.74
	0' 8"	78' 3"	Coal, good (100% core rec. by length)	2160.07
	0' 6"	78' 9"	Sandstone, a few coal marks	2159.57
	1' 1"	79' 10"	Coal, good (100% core rec. by length)	2158.49
	0' 1"	79' 11"	Coal, sandy (100% core rec. by length)	2158.41
	0' 1"	80' 0"	Sandstone, heavy coal marks.	2158.32
	8' 0"	88' 0"	Sandstone.	2150.32

Begun : June 19, 1950.
Finished : June 26, 1950.
Driller : F.H. WALL.

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 93 (Western Fuel Company)

Date: 1912
(March 1 to April 1)

Elevation: 56.48 above high water mark

Location: Newcastle Island

Red Soil & Sand	0	-	4'
Grey & blue clay & gravel	4	-	15'
Blue clay and boulders	15	-	17'
Blue clay	17	-	27'
Blue clay & boulders	27	-	34'
Sandy shale	34	-	36'
Sandy shale with brown shale mixed	36	-	52'
Shale, brown & coal	52	-	52'6"
Sandstone	52'6"	-	83'
Sandy shale, brown	83	-	85'
Sandstone	85	-	127'
Shale	127	-	135'
Sandstone	135	-	138'
Shell fossil & conglomerate	138	-	138'6"
Shale	138'6"	-	153'
Sandstone with shale markings	153	-	155'
Conglomerate	155	-	156'
Sandstone with shale markings	156	-	165'
Shale, sandy	165	-	185'
Shale	185	-	195'
Shale, soft	195	-	198'
Coal	198	-	200'9"
Shale, black	200'9"	-	201'
Shale, brown	201	-	209'
Shale, black	209	-	209'6"
Shale, brown	209'6"	-	210'
Coal, & Black shale	210	-	210'9"
Shale, brown	210'9"	-	212'9"
Conglomerate, very coarse, all boulders 224-234'6"	212'9"	-	248'
Sandstone & Conglomerate with coal & shale markings	248	-	262'
Coal	262	-	262'5"
Shale, brown with coal markings	262'5"	-	262'8"
Coal	262'8"	-	262'11"
Sandstone	262'11"	-	263'2"
Coal	263'2"	-	264'10"
Shale, brown & Coal	264'10"	-	265'1"
Shale, brown	265'1"	-	265'6"
Coal	265'6"	-	266'

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Bore Hole No. 93 (continued)

Shale, brown & Coal	266	-	266'6"
Shale, coal markings	266'6"	-	269'6"
Shale, brown	269'6"	-	270'
Shale, black	270	-	270'6"
Coal	270'6"	-	270'9"
Shale, brown	270'9"	-	271'
Shale, grey	271	-	272'

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 93

Sect. 19, Rge. 3, Mtn. Dist.

SCALE : 1 IN. = 20 FEET

SECTION	THICKNESS	DEPTH	MATERIAL	ELEVATION
		0' 0"	Collar of hole	2245.73
	5' 0"	5' 0"	Clay soil	Datum
	5' 0"	10' 0"	Clay	2000 below M.S.L.
	11' 0"	21' 0"	Gravel with chips of shale	
	4' 0"	25' 0"	Sand with a little clay.	
	40' 0"	65' 0"	Sand with clay	
	23' 0"	88' 0"	Sand	2157.73
	12' 0"	100' 0"	Shale, broken (slips)	2145.73
	2' 0"	102' 0"	Sandy shale, broken (slips)	2143.73
	1' 6"	103' 6"	Sandstone fine with coal marks	2142.23
	0' 2"	103' 8"	Shale, brown	2142.06
	0' 8"	104' 4"	Sandstone, dark.	2141.39
	1' 1"	105' 5"	Coal (core rec. 46% by length) At least 2' sandy coal near bottom.	2140.31
	0' 6"	105' 11"	Sandstone, dark heavy coal marks	2139.81
	1' 0"	106' 11"	Sandstone, dark	2138.81
	6' 1"	113' 0"	Sandstone.	2132.73

Begun : July 3, 1950.
Finished : July 13, 1950.
Driller : F.H. WALL

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 94 (Western Fuel Company) Date: 1912
(April 2 to April 30)

Elevation: 107.67 above High Water Mark

Location: N.W. of swamp on Newcastle Island

Bore stopped on account of being below the Newcastle Seam and into the strata overlying the Wellington Seam.

Soil	0	-	2'6"
Conglomerate	2'6"	-	30'5"
Shale, grey	30'5"	-	30'10"
Shale, brown	30'10"	-	31'6"
Shale, black with coal markings	31'6"	-	32'10"
Shale, grey	32'10"	-	33'6"
Conglomerate	33'6"	-	38'
Conglomerate or trap rock	38	-	43'
Conglomerate	43	-	87'
Shale, blue	87	-	103'
Sandy shale, soft	103	-	103'6"

94

CANADIAN COLLIERIES (DUNSMUIR) LTD.

BOREHOLE NO. 94

Sect. 19. Rge. 3 Mtn. Dist.

SCALE: 1 IN. = 20 FEET.

SECTION	THICKNESS	DEPTH	MATERIAL	ELEVATION
		0' 0"	Collar of hole	2259.95 Datum 2000 below M.S.L.
	18' 0"		Clay	
	2' 0"	18' 0"	Clay with gravel	
	20' 0"	20' 0"	Clay with fine sand.	
	4' 0"	40' 0"	Fine sand with gravel	
	12' 0"	44' 0"	Sharp gravel with boulders	
	4' 0"	56' 0"	Gravel	
	5' 0"	60' 0"	Fine gravel and sand	
	4' 0"	65' 0"	Sandy shale	2194.95
	12' 0"	69' 0"	Sandy shale, broken (slicked slips)	2190.95
	25' 0"	81' 0"	Fine sandstone and sandy shale interbedded, numerous small marine fossils (pelecypods) at 91' and shell fragments thereafter	2178.95
		106' 0"		2153.95

Begun: July 17, 1950.
Finished: July 28, 1950
Driller: F.H. WALL

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 95 (Western Fuel Company)

Date: 1912
(May 15 to June 17)

Elevation: 58.79 above High Water Mark

Location: Newcastle Island

Soil - clay with boulders	0	-	18'
Sandstone	18	-	39'
Shale	39	-	42'
Coal	42	-	42'5"
Shale	42'5"	-	45'6"
Sandstone	45'6"	-	81'
Coal & Shale	81	-	81'2"
Shale, brown	81'2"	-	82'2"
Sandstone, shale markings	82'2"	-	90'6"
Shale, brown	90'6"	-	93'
Sandstone	93	-	126'
Sandstone, very hard, fine	126	-	135'
Sandstone, gritty, very hard with white spar	135	-	141'
Sandstone, very hard, yellow	141	-	147'
Sandstone	147	-	165'
Sandstone, with shale markings	165	-	168'6"
Shale, brown, coal markings	168'6"	-	178'6"
Shale, sandy	178'6"	-	185'
Shale	185	-	188'
Shale, sandy	188	-	190'
Sandstone with shale markings	190	-	212'
Shale, sandy	212	-	217'
Sandstone	217	-	229'
Sandstone with shale markings	229	-	249'
Sandstone	249'	-	259'
Sandstone, yellow, very hard	259	-	261'
Sandstone, fine, hard	261	-	265'
Shale	265	-	271'
Soapstone	271	-	275'
Sandstone, fine	275	-	281'
Shale	281	-	293'
Sandstone, with shale markings	293	-	301'
Shale & sandstone mixed	301	-	316'
Shale	316	-	323'
Conglomerate	323	-	339'9"
Shale, brown	339'9"	-	340'
Sandstone & shale	340	-	341'
Conglomerate & brown shale	341'	-	342'4"

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Coal	342'4"	-	345'10"
Shale	345'10"	-	348'
Shale, brown	348	-	351'9"
Coal	351'9"	-	352'7"
Coal & Shale	352'7"	-	352'11"
Shale, brown, coal markings	352'11"	-	352'7"
Conglomerate	352'7"	-	354'4"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 96 (Western Fuel Company)

Date: 1912
(June 26 to August 17)

Elevation: 83.54 above High Water Mark

Location: Newcastle Island

Casing	0	-	1'
Soil	1	-	2'
Sandstone, soft	2	-	4'6"
Sandstone	4'6"	-	34'
Sandstone, hard, yellow	34	-	37'
Shale with coal markings	37	-	40'6"
Sandstone	40'6"	-	68'6"
Coal	68'6"	-	68'9"
Sandstone	68'9"	-	77'
Shale, sandy	77	-	79'
Sandstone	79	-	115'
Sandstone, very fine, hard	115	-	128'
Sandstone, black, very hard	128	-	132'
Sandstone, hard, grey, with white spar	132	-	137'
Sandstone	137	-	157'
Shale, brown, coal markings	157	-	167'
Sandstone	167	-	176'
Shale, brown, coal markings	176	-	177'
Sandstone	177	-	202'
Sandstone with shale markings	202	-	205'
Sandstone	205	-	210'
Sandy shale	210	-	214'
Sandstone	214	-	226'
Sandstone with shale markings	226	-	255'6"
Shale	255'6"	-	280'
Sandstone &shale markings	280	-	294'
Sandstone, very hard	294	-	304'
Sandstone, very hard, fine	304	-	306'
Sandstone, very hard, yellow	306	-	307'
Shale	307	-	311' 6"
Sandstone, shale & coal markings	311'6"	-	313'6"
Shale, black, coal markings	313'6"	-	314'
Shale	314	-	327'7"
Coal & shale markings	327'7"	-	328'2"
Coal & shale	328'2"	-	328'11"
Coal	328'11"	-	329'4"
Shale	329'4"	-	329'10"
Coal	329'10"	-	329'11"
Coal & brown shale	329'11"	-	339'2"
Shale, brown	339'2"	-	330'6"
Shale, grey	330'6"	-	330'9"
Shale	330'9"	-	343'
Coal	343	-	343'6"
Shale, brown	343'6"	-	343'9"
Conglomerate	343'9"	-	344'9"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 97 (Western Fuel Company)

Date: 1912
(August 29 to September 23)

Elevation: 72.40' above High Water Mark

Location: Newcastle Island

Red soil	0	-	1'6"
Clay	1'6"	-	3'6"
Sand	3'6"	-	6'6"
Gravel	6'6"	-	7'
Blue Clay & boulders	7	-	27'4"
Gravel, fine	27'4"	-	28'4"
Clay, blue	28'4"	-	32'4"
Blue Clay & boulders	32'4"	-	34'4"
Sandstone	34'4"	-	57'
Sandstone, fine, very hard & gritty	57	-	63'
Coal	63	-	63'2"
Shale, brown	63'2"	-	63'8"
Shale	63'8"	-	64'2"
Sandstone, very hard & gritty 112'-112'6"	64'2"	-	151'
Shale, sandy, coal markings	151	-	161'
Shale, grey	161	-	162'
Shale, brown coal markings	162	-	163'
Shale	163	-	173'
Sandstone	173	-	193'
Shale	193	-	199'
Sandstone	199	-	210'
Shale, brown	210	-	212'
Sandstone	212	-	227'
Sandstone with shale markings	227	-	247'
Shale,sandy	247	-	259'
Sandstone	259	-	264'
Shale	264	-	280'
Sandstone, shale markings	280	-	289'
Shale	289	-	295'
Shale with conglomerate markings	295	-	320'
Shale	320	-	330'
Shale, sandy, with conglomerate markings	330	-	338'
Shale, sandy	338	-	352'3"
Coal & shale	352'3"	-	352'9"
Shale, coal markings	352'9"	-	355'3"
Conglomerate	355'3"	-	356'6"
Shale, sandy	356'6"	-	358'9"
Conglomerate	358'9"	-	359'3"
Sandstone	359'3"	-	361'6"
Conglomerate	361'6"	-	366'6"
Sandstone	366'6"	-	367'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 98 (Western Fuel Company) Date: 1912
(October 3 to November 1)

Elevation: 39.43 above High Water Mark

Location: Newcastle Island

Blue Clay & boulders		0 -	18'
Sandstone		18 -	84'6"
Shale		84'6" -	95'6"
Shale, brown, with coal markings		95'6" -	100'
Shale, grey, with coal markings		100 -	107'
Shale, brown, with coal markings		107 -	111'
Sandstone		111 -	115'
Sandstone with shale markings		115 -	124'
Sandstone, very hard & gritty		124 -	129'
Sandstone		129 -	131'
Shale, brown		131 -	132'
Sandy shale		132 -	134'
Sandstone, a little conglomerate markings 148'-170'		134 -	184'
Shale, grey		184 -	196'
Sandstone		196 -	201'
Shale, grey		201 -	207'
Sandstone		207 -	209'
Shale, grey		209 -	213'
Sandstone		213 -	214'
Shale, grey		214 -	217'
Sandstone		217 -	218'
Shale, grey		218 -	227'
Conglomerate		227 -	227'6"
Shale, brown		227'6" -	240'
Shale		240 -	261'
Shale with coal markings		261 -	266'9"
Shale black)		266'9" -	266'10"
Coal)Upper Seam - Douglas		266'10" -	267'9"
Coal & Shale)		267'9" -	268'2"
Shale, brown		268'2" -	276'
Shale, black, with coal markings		276 -	279'
Shale, brown, withconglomerate markings		279 -	281'6"
Conglomerate		281'6" -	316'
Conglomerate with shale markings		316 -	317'
Sandstone, shale & coal markings		317 -	320'4"
Coal & shale)		320'4" -	320'11"
Coal)		320'11" -	323'4"
Coal & shale) Lower		323'4" -	323'8"
Shale, brown, coal markings) Seam		323'8" -	324'9"
Coal, little shale) Newcastle		324'9" -	325'3"

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Bore Hole No. 98 (continued)

Shale, brown	325'3"	-	330'6"
Shale, black, coal markings	330'6"	-	332'
Coal	332	-	332'1"
Shale, brown	332'1"	-	333'7"
Coal, & black shale	333'7"	-	334'1"
Shale, brown	334'1"	-	334'10"
Shale, blue	334'10"	-	336'4"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 99 (Western Fuel Company) Date: 1915
(January 12 to February 6)

Elevation:

Location: Foot of Lamb's or No. 3 Incline

Shale, soft		0	-	2'
Conglomerate		2	-	17'
Sandstone, conglomerate markings 5'6"-22'6" sandstone & cong. 6'6" - 29', sandstone congl. & shale markings 6'0 - 35'		17	-	35'
Sandstone, very hard		35	-	42'
Shale, sandy		42	-	47'9½"
Coal		47'9½"	-	48'2"
Shale, brown		48'2"	-	48'5"
Coal		48'5"	-	50'11"
Shale, brown		50'11"	-	51'1"
Coal & shake markings	)	51'1"	-	51'10"
Shale with coal markings	)Newcastle	51'10"	-	52'2"
Shale	) Seam	52'2"	-	52'10"
Coal	)	52'10"	-	53'7"
Coal & shale markings	)	53'7"	-	53'10"
Shale, brown		53'10"	-	54'
Shale, soft		54	-	55'2"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 100 (Western Fuel Company) Date: 1915
(February 17 to March 11)

Elevation:

Location: On Lambs or No. 3 Incline, No. 1 Mine

Shale	0	-	3'
Conglomerate, very hard 14' - 20'	3	-	26'
Conglomerate & Sandstone	26	-	41'
Sandstone with conglomerate markings 41 -48'	41	-	49'
Shale, sandy with coal markings	49	-	50'
Sandstone, with coal & shale markings	50	-	52'
Shale, sandy with coal &shale markings	52	-	54'
Sandstone, with coal & shale markings	54	-	58'
Coal	58	-	60'2"
Shale, brown, - coal markings 60'10"- 61'1"	60'2"	-	61'1"
Coal with colouring of brown shale	61'1"	-	61'9"
Shale, brown	61'9"	-	62'1"
Shale, with coal markings	62'1"	-	63'6"
Shale	63'6"	-	65'10"
Coal	65'10"	-	66'11"
Shale	66'11"	-	67'9"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 101

Date: 1915
(July 9 to August 30)

Elevation:

Location: On No. 1 Level inside No. 3 Incline

Fire Clay		0 -	0'6"
Shale, dark		6" -	4'
Conglomerate		4 -	11'
Conglomerate, coarse		11 -	11'9"
Conglomerate		11!9" -	13'4"
Conglomerate, coarse		13'4" -	13'11"
Sandstone		13'11" -	14'2"
Conglomerate		14'2" -	14'8"
Sandstone		14'8" -	15'10"
Conglomerate		15'10" -	17'5"
Sandstone		17'5" -	29'3"
Sandstone with pebbles		29'3" -	34'3"
Sandstone, hard		34'3" -	41'
Sandstone		41 -	47'
Coal		47 -	47'1"
Shale, dark	) Newcastle Seam	47'1" -	48'
Fire Clay	)	48 -	49'6"
Shale	)	49'6" -	51'4"
Coal	)	51'4" -	52'3"
Shale, sandy		52'3" -	53'8"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 102 (Western Fuel Company)

Date: 1917
(July 10 to October 13)

Elevation: 240.70 above High Water Mark

Location: On Western Fuel Company's Farm

Surface	0	-	45'
Volcanic Grit	45	-	47'
Gravel	47	-	48'4"
Boulders	48'4"	-	48'7"
Boulders & Gravel	48'7"	-	50'
Clay & Gravel	50	-	54'
Clay	54	-	58'
Clay, Gravel & Boulders	58	-	59'
Clay & Gravel	59	-	66'
Clay, Gravel & Boulders	66	-	67'
Clay & Gravel	67	-	68'
Shale	68	-	70'
Clay, Shale, coal markings at 76 & 79'	70	-	85'
Sandstone	85	-	105'
Shale, soft, brown, with coal markings	105	-	106'
Sandstone, shaly	106	-	130'
Shale, soft brown with coal markings	130	-	131'6"
Shale, s aty colour	131'6"	-	138'
Shale & Sandstone mixed	138	-	151'
Shale, slaty	151	-	154'
Shale, brown	154	-	155'8"
Shale, slaty	155'8"	-	168'
Sandstone, dark, shaly & broken	168	-	178'
Sandstone, shaly	178	-	200'
Shale, brown	200	-	201'
Shale, slaty	201	-	203'
Shale, brown	203	-	203'6"
Sandstone, dark	203'6"	-	210'
Shale, brown, coal markings	210	-	210'4"
Shale, slate colour	210'4"	-	220'
Shale, brown	220	-	221'6"
Shale, slate colour	221'6"	-	224'6"
Sandstone	224'6"	-	229'
Shale, slaty	229	-	233'
Coal	233	-	233'5"
Shale, brown	233'5"	-	234'
Shale & Sandstone, mixed stratas	234	-	246'
Sandstone, dark grey	246	-	260'
Sandstone, fractured, with strong dip	260	-	270'
Sandstone, dark, blocky with strong dip	270	-	278'
Sandstone	278	-	298'

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Shale	298	-	299'7"
Coal	299'7"	-	305'3"
Shale	305'3"	-	312'6"
Coal	312'6"	-	315'6"
Shale, light brown	315'6"	-	322'6"
Shale, dark brown with coal markings	322'6"	-	323'
Coal	323	-	326'9"
Shale	326'9"	-	329'4"
Coal	329'4"	-	338'8"
Sandstone with coal markings	338'8"	-	341'
Sandstone, pinkish grey	341	-	346'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 103

Date: 1917
(October 23 to December 13)

Elevation: 10.45 above H.H.W.

Location: On Stoves Land, Nanaimo River

Soil	0	-	7'
Gravel	7	-	21'
Clay	21	-	22'
Sandstone	22	-	62'
Shale	62	-	63'
Sandstone	63	-	68'
Shale	68	-	68'6"
Coal	68'6"	-	68'11"
Sandstone	68'11"	-	82'
Shale, coal markings	82	-	83'
Sandstone	83	-	90'
Shale, sandy	90	-	92'
Sandstone	92	-	101'6"
Coal	101'6"	-	101'10"
Shale	101'10"	-	102'6"
Sandstone	102'6"	-	135'
Sandstone, brown, coal markings	135	-	136'
Sandstone	136	-	141'
Coal	141	-	141'4"
Shale	141'4"	-	143'
Sandstone	143	-	152'
Coal	152	-	152'6"
Sandstone	152'6"	-	166'
Sandstone, shaly	166	-	179'
Shale	179	-	181'
Shale, sandy	181	-	183'
Shale	183	-	191'
Sandstone, coal markings	191	-	195'
Shale	195	-	200'
Sandstone	200	-	250'
Shale, sandy, coal markings	250	-	251'
Shale, brown	251	-	257'
Sandstone	257	-	300'
Shale	300	-	301'
Sandstone	301	-	345'
Shale	345	-	346'
Sandy shale	346	-	348'
Sandstone	348	-	406'
Shale	406	-	418'
Sandstone, with showing of conglomerate	418	-	427'
Sandstone, broken	427	-	437'

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Bore Hole No. 103 (continued)

Shale	437'	-	440'
Sandstone	440	-	445'
Shale, broken	445	-	452'
Shale, sandy, broken	452	-	458'
Sandstone	458	-	466'
Shale	466	-	477'
Sandstone, broken	477	-	486'
Sandstone, shaly	486	-	493'
Sandstone	493	-	502'
Shale	502	-	503'
Sandstone	503	-	505'
Shale	505	-	520'
Sandstone, coarse	520	-	528'
Sandstone	528	-	529'
Shale, sandy	529'	-	545'
Shale	545	-	558'
Shale, sandy	558	-	562'
Shale	562	-	582'
Conglomerate	582	-	591'
Shale	591	-	599'
Coal	599	-	605'
Shale	605	-	607'
Coal	607	-	607'6"
Shale	607'6"	-	608'
Coal	608	-	608'10"
Coal, soft, not very clean	608'10"	-	610'
Shale	610	-	611'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 108

Date: 1918
(February 27 to April 3)

Elevation: 53'9" above M.H.W.

Location: On South Wellington Road, near No. 5 Shaft

Sandy Loam	0	-	4'
Sand & Gravel	4	-	7'6"
Fine gravel	7'6"	-	16'
Gravel & Boulders	16	-	21'
Fine gravel	21	-	24'
Clay & Gravel	24	-	26'
Sandstone	26	-	43'6"
Shale and coal	43'6"	-	43'8"
Coal	43'8"	-	43'9"
Sandstone	43'9"	-	99'9"
Dark Shale	99'9"	-	100'7"
Sandstone	100'7"	-	120'4"
Dark Shale	120'4"	-	120'8"
Sandstone	120'8"	-	143'
Dark Shale	143	-	146'
Sandstone	146	-	155'9"
Dark Shale	155'9"	-	156'
Sandstone	156	-	177'3"
Conglomerate	177'3"	-	178'
Sandstone	178	-	182'
Hard sandstone	182	-	192'
Sandstone	192	-	213'3"
Dark Shale	213'3"	-	213'5"
Sandstone	213'5"	-	214'3"
Dark Shale	214'3"	-	214'9"
Sandstone	214'9"	-	241'
Dark Shale and coal markings	241	-	241'5"
Sandstone	241'5"	-	244'
Sandy shale with leaf fossil	244	-	245'
Sandstone	245	-	248'
Sandy Shale	248	-	253'
Sandstone	253	-	259'
Sandy Shale	259	-	260'6"
Sandstone	260'6"	-	265'
Sandstone (very hard)	265	-	269'9"
Conglomerate	269'9"	-	271'
Dark Sandy shale	271	-	271'6"
Fine Sandstone	271'6"	-	277'9"
Conglomerate	277'9"	-	278'
Sandstone	278	-	300'

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Hard Sandstone	300	-	302'7"
Sandstone	302'7"	-	311'9"
Conglomerate	311'9"	-	312'
Sandstone	312	-	344'
Shale	344	-	344'3"
Sandstone	344'3"	-	350'
Sandy Shale	350	-	356'
Shale	356	-	383'
Hard Sandstone	383	-	390'
Sandstone	390	-	403'
Shale	403	-	411'
Sandy Shale	411	-	415'9"
Conglomerate	415'9"	-	426'
Hard Sandstone	426	-	427'
Conglomerate	427	-	436'
Sandstone	436	-	437'
Conglomerate	437	-	443'7"
Sandstone	443'7"	-	444'
Dark Sandy Shale	444	-	444'3"
Dark Shale with Coal Markings	444'3"	-	444'7"
Conglomerate	444'7"	-	445'6"
Sandstone	445'6"	-	446'
Dark Sandy shale with coal markings	446	-	448'
Sandstone	448	-	449'
Conglomerate	449	-	453'
Dark Sandy Shale	453	-	453'6"
Sandstone	453'6"	-	454'6"
Conglomerate	454'6"	-	454'8"
Sandstone	454'8"	-	455'6"
Dark Shale	455'6"	-	455'8"
Sandstone	455'8"	-	456'4"
Conglomerate	456'4"	-	456'9"
Dark Shale	456'9"	-	456'11"
Dark Sandstone	456'11"	-	457'6"
S/stone with dk shale & cong. bands	457'6"	-	457'10"
Sandstone	457'10"	-	460'
Conglomerate	460	-	463'4"
Sandy Shale & Coal markings	463'4"	-	464'
Conglomerate	464	-	466'
Sandstone	466	-	466'5"
Shale with coal	466'5"	-	466'10"
Coal & Shale	466'10"	-	467'2"
Shale with coal markings	467'2"	-	467'3"
Coal	467'3"	-	467'5"
Coal & Shale	467'5"	-	467'6"
Shale with coal	467'6"	-	467'9"
Coal	467'9"	-	468'
Shale	468	-	468'6"
Coal & Shale	468'6"	-	468'7"
Coal & Shale	468'7"	-	468'9"
Coal & Shale	468'9"	-	468'10"
Coal & Shale	468'10"	-	468'11"
Coal	468'11"	-	470'1"
Coal with Shale	470'1"	-	473'2"
Shale with coal	473'2"	-	474'11"

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Bore Hole No. 108 (continued)

Sandy Shale	474'11"	-	479'5"
Shale	479'5"	-	481'
Hard Sandy Shale	481	-	482'
Shale	482	-	483'
Sandy Shale	483	-	487'
Conglomerate	487	-	489'
Sandstone - fine	489	-	490'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 111 (Western Fuel Company)

Date: 1918
April 12 to May 11

Elevation: 201.69

Location: East of junction of Northfield & Departure Bay roads, Sec. 1, Nanaimo District

Conglomerate	0	-	70'3"
Sandy shale	70'3"	-	84'
Sandstone	84	-	85'9"
Shale	85'9"	-	90'4"
Sandy Shale	90'4"	-	91'10"
Shale	91'10"	-	92'6"
Sandy Shale	92'6"	-	93'6"
Shale	93'6"	-	101'
Sandy Shale	101	-	113'
Sandstone	113	-	114'6"
Sandy Shale	114'6"	-	120'6"
Conglomerate	120'6"	-	125'
Sandstone	125	-	127'
Conglomerate	127	-	130'
Shale	130	-	132'
Sandy Shale	132	-	135'3"
Conglomerate	135'3"	-	172'6"
Shale	172'6"	-	173'
Shale, dark and coal markings	173	-	174'
Coal & Shale	174	-	174'6"
Shale	174'6"	-	181'
Shale & Coal	181	-	181'4"
Shale, dark and coal markings	181'4"	-	182'
Shale, dark	182	-	183'
Shale, light	183	-	187'
Sandy shale	187	-	189'
Shale	189	-	198'9"
Shale, dark and coal markings	198'9"	-	199'
Shale	199	-	207'
Shale, dark	207	-	208'
Sandy shale	208	-	211'
Sandstone	211	-	213'
Conglomerate	213	-	221'
Sandstone	221	-	224'
Conglomerate	224	-	240'
Sandstone	240	-	241'
Sandstone with pebbles	241		242'
Conglomerate	242	-	248'6"
Shale	248'6"	-	249'3"
Shale, cark & coal markings	249'3"	-	250'7"

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Coal and Shale	250'7"	-	251'
Coal	251	-	253'5½"
Shale, dark and coal	253'5½"	-	253'7½"
Shale	253'7½"	-	254'
Sandy shale	254	-	263'
Sandstone with pebbles	263	-	270'6"
Conglomerate, hard	270'6"	-	271'
Sandstone with pebbles	271	-	277'
Sandstone	277	-	284'10"
Shale	284'10"	-	285'
Sandy shale	285	-	286'3"
Shale with coal markings	286'3"	-	286'6"
Shale, dark	286'6"	-	287'10"
Coal & shale	287'10"	-	288'1"
Shale, soft, dark	288'1"	-	293'
Shale	293	-	301'
Shale, dark	301	-	302'
Shale with coal markings	302	-	302'4"
Coal and shale	302'4"	-	302'8"
Coal	302'8"	-	303'
Coal and shale	303	-	303'1"
Shale	303'1"	-	303'3"
Shale, light	303'3"	-	304'
Shale, dark	304	-	308'
Shale	308	-	310'
Shale and Coal	310	-	310'3"
Shale	310'3"	-	318'
Shale, dark	318	-	318'5"
Coal	318'5"	-	318'8"
Shale	318'8"	-	321'
Sandy shale	321	-	326'9"
Shale, dark	326'9"	-	327'6"
Sandy shale	327'6"	-	337'10"
Shale, dark	337'10"	-	338'
Sandy shale	338	-	340'3"
Shale, soft and coal	340'3"	-	340'6"
Shale, dark and coal markings	340'6"	-	341'5"
Sandy shale	341'5"	-	342'
Sandstone, fine	342	-	384'
Sandy shale	384	-	396'
Sandy shale, hard	396	-	397'
Sandy shale	397	-	412'
Sandy shale, hard	412	-	414'
Sandy shale	414	-	421'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 114

Date: 1918
(July 2 to August 29)

Elevation: 159.6

Location: Departure Bay Road, near Ham.
Powder Co.'s Magazine

Gravel & Boulders	0	-	45'
Sand	45	-	50'
Fine Gravel	50	-	58'
Sand & Gravel	58	-	67'
Gravel	67	-	75'
Hard Packed Sand	75	-	86'
Clay & Sand	86	-	88'
Fine Sand	88	-	101'
Gravel	101	-	103'
Sand	103	-	105'
Sand & Gravel with boulders	105	-	110'
Dark Sand	110	-	117'
Fine Gravel	117	-	121'
Sand	121	-	130'
Clay	130	-	134'
Clay & Sand with boulders	134	-	141'
Sand & Clay	141	-	152'
Clay & Gravel	152	-	155'
Conglomerate	155	-	168'6"
Shale	168'6"	-	171'
Conglomerate	171	-	173'
Sandy Shale	173	-	176'6"
Conglomerate	176'6"	-	181'
Sandstone	181	-	183'
Conglomerate	183	-	186'
Sandy Shale	186	-	190'
Shale	190	-	198'
Sandy Shale	198	-	199'6"
Shale	199'6"	-	203'
Hard Shale	203	-	205'
Conglomerate	205	-	206'
Sandy Shale	206	-	223'
Fine Sandstone	223	-	229'
Sandy Shale	229	-	230'
Shale	230	-	242'
Fine Sandstone	242	-	245'
Sandy Shale	245	-	255'
Shale	255	-	266'9"
Sandstone	266'9"	-	271'
Conglomerate	271	-	381'

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Shale	381	-	387'
Sandy Shale	387	-	388'
Shale	388	-	393'
Sandy Shale	393	-	398'
Shale	398	-	400'
Brown Shale	400	-	401'
Sandy Shale	401	-	403'
Conglomerate	403	-	413'
Sandstone	413	-	416'
Conglomerate	416	-	418'
Sandstone with pebbles	418	-	420'
Conglomerate	420	-	422'
Sandstone	422	-	425'
Conglomerate	425	-	426'
Sandstone with pebbles	426	-	428'
Conglomerate	428	-	436'
Sandstone with pebbles	436	-	437'
Conglomerate	437	-	445'
Conglomerate	445	-	446'6"
Sandstone	446'6"	-	452'
Sandstone with pebbles	452	-	454'
Fine Sandstone	454	-	460'
Sandy Shale	460	-	461'
Fine Sandstone	461	-	463'
Sandy Shale	463	-	467'
Fine Sandstone	467	-	468'4"
Conglomerate	468'4"	-	470'
Sandstone with pebbles	470	-	476'
Shale	476	-	477'
Sandstone with pebbles	477	-	482'
Shale	482	-	489'
Sandy Shale	489	-	492'
Shale, dark	492	-	493'
Shale	493	-	501'6"
Shale, dark	501'6"	-	502'3"
Shale, dark with coal markings	502'3"	-	502'6"
Shale	502'6"	-	510'
Sandy Shale	510	-	516'
Shale	516	-	528'4"
Conglomerate	528'4"	-	539'6"
Sandstone with pebbles	539'6"	-	541'
Conglomerate	541	-	548'9"
Shale	548'9"	-	549'
Conglomerate	549	-	578'10"
Shale	578'10"	-	579'
Dark Shale & Coal Markings	579	-	579'6"
Light Shale	579'6"	-	580'4"
Shale & Coal Markings	580'4"	-	580'7"
Coal	580'7"	-	580'10"
Shale & Coal	580'10"	-	581'4"
Coal	581'4"	-	583'7"
Coal & Shale	583'7"	-	583'10"
Shale	583'10"	-	586'7"
Sandy Shale	586'7"	-	595'7"

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VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 115

Date: 1918
(September 9 to October 12)

Elevation: 16.95

Location: On Nanaimo River above Reserve Mine RR Bridge

Sand	0	-	8'6"
Sandstone	8'6"	-	27'
Coal	27	-	27'3"
Dark Shale	27'3"	-	28'
Sandy Shale	28	-	36'
Sandstone	36	-	48'3"
Shale, dark & coal markings	48'3"	-	48'6"
Coal	48'6"	-	48'8"
Shale, dark	48'8"	-	49'
Shale	49	-	50'
Sandy shale	50	-	53'
Sandstone	53	-	69'6"
Shale	69'6"	-	69'10"
Coal	69'10"	-	70'3"
Shale	70'3"	-	71'
Sandy Shale	71	-	75'8"
Dark Shale	75'8"	-	75'9"
Coal	75'9"	-	75'10"
Shale	75'10"	-	76'2"
Sandy Shale	76'2"	-	89'
Sandstone	89	-	92'6"
Shale	92'6"	-	95'
Sandstone	95	-	110'
Shale	110	-	110'2"
Coal	110'2"	-	110'7"
Shale	110'7"	-	115'8"
Coal	115'8"	-	116'
Shale	116	-	117'
Sandy Shale	117	-	119'
Sandstone	119	-	121'6"
Shale	121'6"	-	123'
Sandstone	123	-	136'
Sandy Shale	136	-	140'
Sandstone	140	-	156'3"
Coal	156'3"	-	156'7"
Sandstone	156'7"	-	161'6"
Sandy Shale	161'6"	-	162'
Soft Brown Shale	162	-	167'
Soft shale	167	-	170'
Sandstone	170	-	183'
Sandy Shale	183	-	191'

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Sandstone	595'7"	-	599'7"
Conglomerate	599'7"	-	600'7"
Sandstone	600'7"	-	601'7"
Sandstone with pebbles	601'7"	-	604'7"
Conglomerate	604'7"	-	614'1"
Sandstone	614'1"	-	620'7"
Conglomerate	620'7"	-	624'7"
Sandstone	624'7"	-	629'7"
Conglomerate	629'7"	-	635'6"
Sandstone	635'6"	-	636'
Shale	636	-	639'
Dark Shale	639	-	639'6"
Shale	639' 6"	-	639'10"
Coal & Shale	639'10"	-	640'2"
Shale & Coal Markings	640'2"	-	640'5"
Shale	640'5"	-	641'2"
Shale & Coal Markings	641'2"	-	641'6"
Coal	641'6"	-	644'4"
Shale	644'4"	-	651'1"
Sandy Shale	651'1"	-	652'1"
Fine Sandstone	652'1"	-	655'7"

Sandstone	191	-	192'
Sandy Shale	192	-	196'
Fine Sandstone	196	-	197'6"
Dark Shale	197'6"	-	197'8"
Sandy Shale	197'8"	-	198'
Sandstone, fine	198	-	201'
Sandstone	201	-	287'
Sandstone & Brown Shale Markings	287	-	288'
Sandstone	288	-	302'3"
Brown Shale	302'3"	-	302'6"
Sandy Shale	302'6"	-	303'6"
Sandstone	303'6"	-	308'
Shale	308	-	310'
Sandy Shale	310	-	313'
Sandstone	313	-	366'
Shale	366	-	375'
Sandy Shale	375	-	379'
Sandstone	379	-	384'2"
Sandy Shale	384'2"	-	401'
Hard Sandstone	401	-	409'
Fine Saddstone	409	-	422'
Sandy Shale	422	-	440'
Shale	440	-	446'
Sandy Shale	446	-	460'
Dark SandyShale	460	-	462'
Dark Shale	462	-	464'
Conglomerate	464	-	466'
Dark Shale &Sandstone bands	466	-	469'
Dark Shale	469	-	470'8"
Conglomerate	470'8"	-	471'
Dark Shale	471	-	474'9"
Conglomerate	474'9"	-	475'4"
Dark Shale	475'4"	-	475'6"
Conglomerate	475'6"	-	475'8"
Dark Shale	475'8"	-	477'3"
Sandstone	477'3"	-	477'8"
Dark Shale	477'8"	-	479'
Dark Shale & Sandstone Bands	479	-	483'6"
Sandstone	483'6"	-	484'
Dark Sandy Shale	484	-	485'
Dark Shale & Coal	485	-	485'8"
Dark Shale	485'8"	-	485'10"
Coal	485'10"	-	486'7"
Coal & Shale	486'7"	-	486'10"
Coal	486'10"	-	488'9"
Brown Shale	488'9"	-	489'1"
Sandy Shale	489'1"	-	490'7"
Hard Sandstone	490'7"	-	493'
Light Sandy Shale	493	-	495'
Hard Sandstone	495	-	497'
Sandy Shale	497	-	497'9"
Dark Sandy Shale	497'9"	-	498'
Light Sandy Shale	498	-	498'9"
Brown Shale	498'9"	-	499'

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Bore Hole No. 115 (continued)

Dark Shale	499	-	500'
Shale	500	-	501'
Shale - coal markings	501	-	501'4"
Shale	501'4"	-	505'
Sandy Shale	505	-	506'
Shale	506	-	507'
Hard Shale	507	-	508'
Sandy Shale	508	-	509'
Shale	509	-	519'6"
Sandstone	519'6"	-	520'
Shale	520	-	544'
Sandy Shale	544	-	545'
Shale	545	-	548'8"
Sandy Shale	548'8"	-	551'3"
Sandstone	551'3"	-	554'
Sandy Shale	554	-	555'
Sandstone	555	-	556'
Shale	556	-	557'
Sandy Shale	557	-	559'
Shale	559	-	577'9"
Dark Shale	577'9"	-	578'6"
Shale	578'6"	-	581'
Sandy Shale	581	-	585'
Shale	585	-	593'
Sandy Shale	593	-	610'
Shale	610	-	612'
SandyShale	612	-	614'
Sandstone	614	-	615'
Sandy Shale	615	-	618'
Fine Conglomerate	618	-	620'
Fine Sandstone	620	-	621'
Hard Sandstone	621	-	628'
Sandy Shale	628	-	629'
Shale	629'	-	631'6"
Sandstone	631'6"	-	639'
Shale	639	-	647'6"
Sandy Shale	647'6"	-	648'
Shale	648	-	651'
Sandy Shale	651	-	653'
Shale	653	-	654'
Sandy Shale	654	-	655'
Fine Sandstone	655	-	656'
Sandstone	656	-	660'
Sandy Shale	660	-	662'
Conglomerate	662	-	663'
Sandstone	663	-	666'5"
Sandy Shale	666'5"	-	671'
Shale	671	-	673'
Sandy Shale	673	-	676

Bore Hole No. 116 (continued)

Sandstone	205	-	209'
Sandy Shale	209	-	214'
Dark Shale, coal markings	214	-	214'2"
Coal	214'2"	-	214'4"
Brown Shale	214'4"	-	215'
Dark Sandy Shale	215	-	215'8"
Sandstone	215'8"	-	221'
Hard Sandstone	221	-	232'
Sandy Shale	232	-	236'
Sandstone	236	-	237'6"
Shale	237'6"	-	240'
Sandy Shale	240	-	245'
Sandstone	245	-	257'6"
Sandy Shale	257'6"	-	260'
Shale	260	-	263'
Sandstone	263	-	267'
Hard Sandstone	267	-	283'
Sandstone	283	-	364'
Fine Conglomerate	364	-	365'
Sandstone	365	-	383'
Dark Shale	383	-	385'
Dark Shale, coal markings	385	-	386'
Sandstone	386	-	407'
Fine Conglomerate	407	-	408'
Sandstone	408	-	451'6"
Sandy Shale	451'6"	-	456'
Shale	456	-	456'3"
Sandstone	456'3"	-	456'9"
Shale	456'9"	-	458'
Sandy Shale	458	-	461'
Sandstone	461	-	467'
Shale	467	-	469'
Sandstone	469	-	475'
Sandy Shale	475	-	481'
Sandstone	481	-	482'
Sandy Shale & Shale	482	-	483'9"
Sandstone	483'9"	-	484'
Sandy Shale	484	-	489'
Shale	489	-	490'
SandyShale	490	-	495'
Sandstone	495	-	496'
Sandy Shale	496	-	512'
Dark Shale	512	-	562'
Shale	562	-	567'
Dark Shale	567	-	568'5"
Dark Shale, coal markings	568'5"	-	571'
Dark Shale	571	-	582'
Conglomerate	582	-	582'3"
Dark Shale	582'3"	-	583'
Conglomerate	583	-	583'3"
Dark Shale	583'3"	-	583'6"
Conglomerate	583'6'	-	583'9"

.../3

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 116

Date: 1918
(October 19 to December 16)

Elevation: + 0.75

Location: South of Reserve Mine on Indian Reserve

Clay	0	-	3'
Sandy Clay	3	-	17'
Gravel	17	-	20'
Clay	20	-	64'
Fine Gravel	64	-	67'
Clay & Gravel	67	-	71'
Fine Gravel	71	-	76'8"
Sandstone	76'8"	-	89'
Coal	89	-	89'4"
Shale	89'4"	-	90'
Sandstone	90	-	109'8"
Coal	109'8"	-	109'11"
Brown Shale	109'11"	-	110'
Sandstone	110	-	114'6"
Shale & Coal	114'6"	-	114'8"
Sandstone - coal markings	114'8"	-	115'
Fine Sandstone	115	-	128'
Sandy Shale	128	-	130'
Sandstone	130	-	144'
Sandy Shale	144	-	145'
Shale	145	-	146'
Sandstone	146	-	148'
Sandy Shale	148	-	151'
Shale	151	-	152'
Sandy Shale	152	-	154'
Fine Sandstone	154	-	155'
Sandy Shale	155	-	165'
Sandstone	165	-	166'6"
Dark Sandy Shale	166'6"	-	168'
Fine Sandstone	168	-	172'6"
Sandy Shale	172'6"	-	175'
Sandstone	175	-	186'6"
Dark Shale & coal markings	186'6"	-	187'
Coal	187	-	187'3"
Shale & Coal	187'3"	-	187'7"
Coal	187'7"	-	187'9"
Dark Shale coal markings	187'9"	-	188'
Dark Sandy Shale	188	-	189'
Sandy Shale	189	-	202'
Sandstone	202	-	203'
Sandy Shale	203	-	205'

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Bore Hole No. 116 (continued)

Dark Shale	583'9"	-	585'
Soft Shale & Coal	585	-	585'6"
Soft Coal	585'6"	-	587'11"
Soft Coal	587'11"	-	588'2"
BrownShale	588'2"	-	588'4"
Soft Shale	588'4"	-	591'6"
Hard Grey Sandy Shale	591'6"	-	592'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 117

Date: 1918/19
(December 21 to June 13)

Elevation: + 6.94

Location: On Nanaimo River below Reserve Mine RR Bridge

Sandy Loam	0	-	3'
Gravel & Boulders	3	-	23'
Fine Gravel	23	-	28'
Fine Gravel & Boulders	28	-	36'
Gravel & Boulders	36	-	44'
Fine Gravel	44	-	50'
Large Boulders	50	-	53'
Hard Packed Gravel	53	-	65'
Gravel	65	-	75'
Gravel & Sand	75	-	80'
Sand	80	-	82'
Clay	82	-	89'
Clay & Gravel	89	-	91'
Soft Shale	91	-	198'
Shale	198	-	223'
Sandy Shale	223	-	268'
Sandstone	268	-	282'
Sandy Shale	282	-	287'
Sandstone	287	-	297'
Sandy Shale	297	-	301'
Sandstone	301	-	302'
Sandy Shale	302	-	303'
Sandstone	303	-	317'
Sandstone & Shale Markings	317	-	327'
Sandstone	327	-	358'
Sandy Shale	358	-	361'
Sandstone	361	-	366'
Sandy Shale	366	-	367'
Sandstone	367	-	368'
Sandy Shale	368	-	369'
Sandstone	369	-	377'
Sandy Shale	377	-	384'
Shale	384	-	388'
Sandstone	388	-	391'
Sandy Shale	391	-	392'
Sandstone	392	-	396'
Sandy Shale	396	-	397'
Sandstone	397	-	421'
Sandy Shale	421	-	423'
Sandstone	423	-	429'
Sandy Shale	429	-	430'
Sandstone	430	-	433'

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Sandy Shale	433	-	436'
Dark Shale, coal markings	436	-	436'8"
Fine Sandstone	436'8"	-	439'
Sandstone	439	-	443'
Shale	443	-	446'2"
Coal	446'2"	-	447'
Sandy Shale	447	-	450'
Shale	450	-	452'
Sandstone	452	-	453'
Sandy Shale	453	-	454'
Sandstone	454	-	456'
Sandstone	456	-	486'
Shale	486	-	489'
Dark Shale	489	-	493'
Sandy Shale	493	-	495'
Sandstone	495	-	511'
Soft Shale & Coal	511	-	511'6"
Sandstone	511'6"	-	516'6"
Sandy Shale	516'6"	-	520'
Sandstone	520	-	523'
Shale & Coal Markings	523	-	524'
Sandy Shale	524	-	525'
Sandstone	525	-	526'
Sandy Shale	526	-	530'
Sandstone	530	-	532'6"
Dark Sandy Shale	532'6"	-	533'
Sandstone	533	-	545'
Sandy Shale	545	-	545'6"
Dark Shale	545'6"	-	546'4"
Sandy Shale	546'4"	-	547'
Sandstone	547	-	564'
Sandy Shale & Coal Markings	564	-	564'4"
Sandy Shale	564'4"	-	565'
Soft Sandstone	565	-	578'
Sandy Shale	578	-	585'
Hard Sandy Shale	585	-	587'
Fine Sandstone	587	-	588'
Sandy Shale	588	-	595'9"
Dark Shale & Coal Markings	595'9"	-	596'
Sandy Shale	596	-	601'
Dark Shale & Coal Markings	601	-	601'3"
Shale	601'3"	-	603'
Sandstone	603	-	610'
Dark Shale	610	-	612'
Sandy Shale	612	-	618'
Sandstone	618	-	621'
Sandy Shale	621	-	625'
Sandstone	625	-	639'9"
Brown Shale	639'9"	-	640'
Coal	640	-	640'8"
Dark Sandy Shale	640'8"	-	641'
Sandstone	641	-	643'
Sandy Shale	643	-	645'
Sandstone	645	-	648'

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Bore Hole No. 117 (continued)

Sandy Shale	648	-	649'
Sandstone	649	-	683'
SandyShale	683	-	688'
Sandstone	688	-	693'
Coal & Shale	693	-	693'8"
Shale	693'8"	-	694'
Sandstone	694	-	696'
Sandy Shale	696	-	697
Fine Sandstone	697	-	698'
Sandy Shale	698	-	699'
Shale, brown	699	-	699'3"
Sandy Shale & Coal Markings	699'3"	-	700'
Sandy Shale	700	-	701'
Sandstone	701	-	702'
Sandy Shale	702	-	709'
Sandstone	709	-	712'
Sandy Shale	712	-	718'
Dark Shale	718	-	718'2"
Sandstone	718'2"	-	738'
Shale	738	-	740'
Dark Sandy Shale & Coal Markings	740	-	743'
Dark Shale	743	-	748'
Sandstone	748	-	751'
Sandy Shale	751	-	755'
Dark Shale	755	-	758'
Sandstone	758	-	765'
Sandy Shale	765	-	769'
Sandstone	769	-	782'
Dark Shale	782	-	783'
Sandstone	783	-	804'
Sandy Shale	804	-	806'
Sandstone	806	-	814'
Sandy Shale	814	-	818'
Sandstone, hard (860'-904')	818	-	904'
Sandstone with pebbles	904	-	905'
Sandstone, hard	905	-	910'
Soft Shale	910	-	912'
Sandstone	912	-	915'
Sandy Shale	915	-	917'
Dark Shale	917	-	925'
Sandy Shale	925	-	928'
Sandstone	928	-	934'
Sandy Shale	934	-	937'
Sandstone	937	-	938'3"
Conglomerate	938'3"	-	938'6"
Dark Sandy Shale	938'6"	-	938'8"
Conglomerate	938'8"	-	940'
Sandstone	940	-	949'6"
Conglomerate	949'6"	-	950'6"
Sandstone	950'6"	-	973'
Fine Sandstone	973	-	985'
Sandstone	985	-	1020'
Sandy Shale	1020	-	1025'

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Sandy Shale & Sandstone Layers	1025	-	1031'
Fine Sandstone	1031	-	1040'
Sandy Shale	1040	-	1041'
Sandstone	1041	-	1047'
Sandy Shale	1047	-	1049'
Shale	1049	-	1055'
Sandy Shale	1055	-	1072'
Sandstone	1072	-	1085'
Sandy Shale	1085	-	1090'
Fine Sandstone	1090	-	1093'
Sandy Shale	1093	-	1095''
Sandy Shale & Sandstone layers	1095	-	1097'
Sandy Shale	1097	-	1105'
Shale	1105	-	1108'
Sandy Shale	1108	-	1111'
Shale	1111	-	1119'
Dark Shale	1119	-	1124'
Brown Shale	1124	-	1125'
Dark Shale	1125	-	1126'
Conglomerate	1126	-	1126'3"
Brown Shale	1126'3"	-	1127'
Dark Shale & Coal Markings	1127	-	1128'
Dark Shale	1128	-	1129'
Shale	1129	-	1140'
Hard Shale	1140	-	1141'
Dark Shale	1141	-	1142'
Shale, dark, & coal markings	1142	-	1142'6"
Hard Shale	1142'6"	-	1143'
Hard Sandstone	1143	-	1145'
Dark Sandy Shale	1145	-	1146'
Dark Shale	1146	-	1146'6"
Soft Dark Shale	1146'6"	-	1147'
Fine Sandstone	1147	-	1149'
Hard Sandstone	1149	-	1150'6"
Sandstone	1150'6"	-	1154'
Sandy Shale	1154	-	1164'
Shale	1164	-	1166'
Sandstone	1166	-	1167'
Sandy Shale	1167	-	1169'
Shale with leaf fossils	1169	-	1179'
Shale	1179	-	1181
Dark Shale & Coal Markings	1181	-	1183'
Shale	1183	-	1209'
Hard Shale	1209	-	1212'
Shale	1212	-	1218'
Shale, very hard	1218	-	1220'
Shale, very hard	1220	-	1238'
Shale, hard	1238	-	1288'
Sandy Shale	1288	-	1289'
Sandstone	1289	-	1291'
Sandy Shale	1291	-	1296'
Shale	1296	-	1300'
Sandstone	1300	-	1301'
Sandy Shale	1301	-	1312'
Shale	1312	-	1313'

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Sandy Shale	1313	-	1319'
Shale	1319	-	1323'
Sandy Shale	1323	-	1326'
Sandstone	1326	-	1327'
Sandy Shale (fossils)	1327	-	1329'
Sandstone	1329	-	1330'
Conglomerate	1330	-	1332'
Sandstone	1332	-	1333'
Sandy Shale	1333	-	1334'
Sandstone	1334	-	1336'
Sandy Shale	1336	-	1337'
Sandstone	1337	-	1348'
Sandy Shale	1348	-	1350'
Shale	1350	-	1354'
Sandstone	1354	-	1356'
Sandy Shale	1356	-	1362'
Sandstone	1362	-	1367'
Conglomerate	1367	-	1370'
Sandstone	1370	-	1373'
Hard Sandy Shale	1373	-	1377'
Shale	1377	-	1383'
Sandy Shale	1383	-	1385'
Sandstone	1385	-	1387'
Conglomerate	1387	-	1391'
Sandstone	1391	-	1393'
Sandy Shale (leaf fossils)	1393	-	1399'
Fine Sandstone	1399	-	1401'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 123

Date: 1922
(April 20 to June 21)

Elevation: 299.8' above M.H.W.

Location: On the Brown Estate, Northfield,
Sec. 17, Range 8, Mountain District

Loam	0	-	3'
Gravel	3	-	8'
Gravel & Hardpan with boulders	8	-	30'
Gravel & Boulders	30	-	35'
Gravel	35	-	40'
Gravel & Sandy Clay	40	-	45'
Clay, sand & gravel	45	-	54'
Sand & Clay	54	-	68'
Clay & Sand	68	-	96'
Gravel & Sand	96	-	99'
Gravel & Sand	99	-	101'3"
Conglomerate	101'3"	-	160'
Sandstone with pebbles	160	-	167'
Conglomerate	167	-	169'
Shale	169	-	203'
Conglomerate	203	-	266'
Shale	266	-	275'
Shale & Coal	275	-	275'6"
Shale	275'6"	-	306'6"
Coal & Shale	306'6"	-	307'6"
Shale	307'6"	-	309'
Sandy Shale	309	-	313'
Conglomerate	313	-	350'
Sandstone with pebbles	350	-	353'
Conglomerate	353	-	363'6"
Shale	363'6"	-	366'9"
Coal (clean & hard)	366'9"	-	369'2"
Soft shale & coal	369'2"	-	369'6"
Shale (dark &light)	369'6"	-	371'
Sandy Shale	371	-	382'
Conglomerate	382	-	388'
Conglomerate & Sandstone with pebbles	388	-	394'
Sandstone with pebbles	394	-	403'
Shale	403	-	404'1"
Coal	404'1"	-	404'5"
Coal & shale	404'5"	-	404'6"
Coal	404'6"	-	404'7"
Coal & Shale	404'7"	-	405'
Shale	405	-	411'

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Bore Hole No. 123 (continued)

Sandy Shale	411	-	434'
Shale & Coal	434	-	434'10"
Shale	434'10"	-	446'
Coal	446	-	446'1"
Shale	446'1"	-	474'6"
Coal & Shale	474'6"	-	475'
Shale	475	-	476'
Sandstone	476	-	502'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 124

Date: 1922
(July 3 to September 22)

Elevation: 192.4' above H.W.M.

Location: On Canadian Explosives Property,
Sec. 20, Range 8, Mountain District

Gravel	0	-	13'
Gravel & large boulders	13	-	16'
Gravel & Sand	16	-	35'6"
Sand	35'6"	-	60'
Gravel	60	-	65'
Sand	65	-	127'4"
Hard Boulder	127'4"	-	128'4"
Sand	128'4"	-	146'
Sand and fine gravel	146	-	177'
Clay & sand	177	-	193'
Sand with clay	193	-	208'
Clay and Sand	208	-	211'
Clay with boulders	211	-	214'
Conglomerate (soft)	214	-	218'
Conglomerate	218	-	229'6"
Sandstone with pebbles	229'6"	-	236'
Conglomerate	236	-	314'
Sandstone	314	-	331'
Sandy Shale	331	-	345'
Sandstone (1" coal at 347')	345	-	356'
Sandy shale	356	-	366'
Conglomerate	366	-	395'6"
Shale	395'6"	-	396'9"
Sandstone	396'9"	-	400'
Conglomerate	400	-	421'6"
Shale	421'6"	-	438'6"
Coal	438'6"	-	438'7"
Shale	438'7"	-	444'
Sandy Shale	444	-	456'
Shale (coal markings at 461')	456	-	466'
Sandstone	466	-	473'
Conglomerate	473	-	523'6"
Shale	523'6"	-	531'
Conglomerate	531	-	547'
Shale	547	-	563'
Sandy shale	563	-	570'6"
Conglomerate	570'6"	-	574'
Conglomerate	574	-	590'3"
Shale	590'3"	-	594'2"
Sandy Shale	594'2"	-	606'8"

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Dark Shale	606'8"	-	606'11"
Coal & Shale	606'11"	-	610'2"
Shale	610'2"	-	610'10"
Sandstone	610'10"	-	612'7"
Sandy Shale	612'7"	-	614'11"
Sandstone	614'11"	-	621'4"
Sandy Shale	621'4"	-	624'6"
Sandstone	624'6"	-	642'10"
White sandstone with markings	642'10"	-	656'11"
Sandstone	656'11"	-	671'6"

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 125

Date: 1922
(September 27 to November 23)

Elevation: 143.7 above H.W.M.

Location: On Canadian Explosives Property,
Sec. 1, Nanaimo District, near Departure Bay

Sandy Loam	0	-	4'
Hard pan	4	-	16'
Fine gravel & sand	16	-	55'
Sandy clay	55	-	128'
Boulders	128	-	131'
Sandy shale	131	-	188'6"
Sandstone	188'6"	-	207'
Sandy Shale	207	-	213'
Dark Shale	213	-	235'6"
Conglomerate	235'6"	-	348'3"
Sandy Shale	348'3"	-	350'
Sandstone	350	-	355'
Sandy Shale	355	-	368'6"
Sandstone	368'6"	-	373'6"
Conglomerate	373'6"	-	440'6"
Shale	440'6"	-	469'6"
Dark Shale coal markings	469'6"	-	475'9"
Shale	475'9"	-	485'
Sandstone with pebbles	485	-	489'6"
Conglomerate	489'6"	-	528'2"
Shale	528'2"	-	528'9"
Dark Shale	528'9"	-	530'11"
Dark Shale with coal markings	530'11"	-	531'7"
Clean Coal	531'7"	-	532'2"
Dark Shale with coal markings	532'2"	-	532'7"
Clean Coal	532'7"	-	534'3"
Shale	534'3"	-	540'2"
Sandstone	540'2"	-	542'6"
Conglomerate	542'6"	-	578'
Sandstone	578	-	580'4"
Coal	580'4"	-	580'6"
Sandstone	580'6"	-	586'3"
Dark Shale	586'3"	-	590'9"
Clean Coal	590'9"	-	591'2"
Coal & Shale	591'2"	-	591'6"
Clean Coal	591'6"	-	591'10"
Coal & Shale	591'10"	-	592'2"

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Shale	592'2"	-	592'10"
Dark Shale with coal markings	592'10"	-	593'11"
Shale & Coal	593'11"	-	595'3"
Brown Shale and Coal	595'3"	-	595'7"
Light Shale	595'7"	-	600'3"
Shale	600'3"	-	607'6"
Sandy Shale	607'6"	-	642'6"
Sandstone	642'6"	-	645'
Sandy Shale	645	-	646'7"
Sandstone	646'7"	-	662'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 126

Date: 1922/23
(December 2 to January 29)

Elevation: 276.8 above M.H.W.

Location: North part of Sec. 1, Nanaimo District, West of E. & N. R.R.

Gravel & Boulders	0	-	47'
Conglomerate	47	-	101'5"
Sandy Shale	101'5"	-	106'6"
Sandstone	106'6"	-	112'
Conglomerate	112	-	118'6"
Sandy Shale	118'6"	-	140'10"
Shale, soft	140'10"	-	156'10"
Shale, dark	156'10"	-	157'10"
Shale	157'10"	-	166'
Conglomerate	166	-	202'10"
Shale	202'10"	-	214'6"
Clean Coal	214'6"	-	215'8"
Dark Shale coal markings	215'8"	-	216'8"
Sandstone	216'8"	-	220'6"
Sandy Shale	220'6"	-	237'6"
Dark Shale	237'6"	-	238'6"
Sandy Shale	238'6"	-	253'
Sandstone	253	-	258'
Conglomerate	258'	-	288'
Dark Shale coal markings	288	-	288'8"
Shale	288'8"	-	301'1"
Dark Shale	301'1"	-	301'7"
Light Shale	301'7"	-	302'9"
Dark Shale	302'9"	-	303'2"
Dark Shale coal markings	303'2"	-	303'5"
Coal	303'5"	-	304'11"
Dark shale	304'11"	-	305'1"
Coal	305'1"	-	305'7"
Dark Shale coal markings	305'7"	-	305'10"
Shale	305'10"	-	328'5"
Coal	328'5"	-	328'11"
Coal & Black Shale	328'11"	-	329'2"
Dark Shale, coal markings	392'2"	-	330'2"
Shale	330'2"	-	341'
Dark Shale	341	-	342'4"
Dark Shale, coal markings	342'4"	-	343'1"
Shale	343'1"	-	361'8"
Dark Shale coal markings	361'8"	-	362'2"
Shale	362'2"	-	370'11"
Dark Shale coal markings	370'11"	-	371'3"

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Bore Hole No. 126 (continued)

Shale	371'3"	-	376'1"
Sandy Shale	376'1"	-	381'
Dark Shale	381	-	381'4"
Shale	381'4"	-	384'6"
Sandstone	384'6"	-	405'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 129

Date: 1923
February 5 to April 28

Elevation: 206.9 above H.W.M.

Location: Sec. 14, Range 6, Five Acre Lots

Gravel	0	-	3'
Conglomerate	3	-	7'
Conglomerate, very coarse 22'-24'	7	-	122'
Shale	122	-	182'8"
Sandy Shale	182'8"	-	198'8"
Sandstone	198'8"	-	208'4"
Shale, very soft at 238'	208'4"	-	238'
Shale, soft	238	-	250'7"
Shale, soft & broken slips	250'7"	-	324'5"
Shale soft	324'5"	-	376'3"
Shale	376'3"	-	440'3"
Sandstone	440'3"	-	442'10"
Shale	442'10"	-	449'
Sandstone	449	-	451'8"
Sandy Shale	451'8"	-	457'5"
Shale	457'5"	-	482'2"
Conglomerate	482'2"	-	545'5"
Shale (dark)	545'5"	-	545'8"
Sandy Shale	545'8"	-	554'
Sandstone	554	-	555'

Flow of water coming up from 238 after rods hoisted.

"Loose material" and "loose conglomerate"	43'11"	-	45'2" fault?
"loose conglomerate"	94'	-	99'6"
Broken conglomerate	118'6"	-	122'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 131

Date: 1923
(May 4 to July 28)

Elevation: 108.1' above H.W.M.

Location: Sec. 19, Range 9, Five Acre Lots

Gravel & Loam	0	-	5'
Clay	5	-	10'
Sand & Gravel	10	-	21'
Sandy Shale	21	-	66'8"
Conglomerate	66'8"	-	70'
Sandstone	70	-	78'9"
Sandy Shale	78'9"	-	82'6"
Sandstone	82'6"	-	84'6"
Conglomerate	84'6"	-	105'
Shale	105	-	110'4"
Sandstone	110'4"	-	113'4"
Sandy Shale	113'4"	-	117'
Sandstone	117	-	119'
Sandy Shale	119	-	159'
Conglomerate	159	-	184'
Sandy Shale	184	-	190'2"
Sandstone	190'2"	-	203'11"
Shale	203'11"	-	214'8"
Sandy Shale	214'8"	-	234'11"
Shale	234'11"	-	257'
Sandstone	257	-	290'8"
Shale	290'8"	-	324'9"
Sandstone	324'9"	-	327'8"
Conglomerate	327'8"	-	387'4"
Shale	387'4"	-	393'10"
Sandstone	393'10"	-	396'10"
Conglomerate	396'10"	-	440'4"
Sandstone	440'4"	-	445'10"
Conglomerate	445'10"	-	447'10"
Sandstone	447'10"	-	448'10"
Sandy Shale	448'10"	-	455'7"
Shale	455'7"	-	460'3"
Sandy Shale	460'3"	-	477'6"
Shale	477'6"	-	481'6"
Sandy Shale	481'6"	-	486'2"
Shale	486'2"	-	499'
Shale & Coal	499	-	499'4"
Shale - coal markings	499'4"	-	499'9"
Shale	499'9"	-	501'
Shale & Coal	501	-	501'4"

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Shale	501'4"	-	517'10"
Sandy Shale	517'10"	-	520'10"
Sandstone	520'10"	-	537'7"
Conglomerate	537'7"	-	555'6"
Sandstone	555'6"	-	560'6"
Conglomerate	560'6"	-	574'3"
Sandstone	574'3"	-	575'
Conglomerate	575	-	633'
Shale	633	-	647'8"
Conglomerate	647'8"	-	698'7"
Shale	698'7"	-	737'10"
Coal	737'10"	-	738'6"
Shale	738'6"	-	741'2"
Sandy Shale	741'2"	-	747'7"
Shale	747'7"	-	750'
Shale & Coal	750	-	750'10"
Brown Shale	750'10"	-	751'1"
Shale	751'1"	-	752'9"
Dark Shale & Coal	752'9"	-	753'4"
Shale	753'4"	-	753'9"
Sandy Shale	753'9"	-	760'1"
Sandstone	760'1"	-	775'
Sandy Shale	775	-	795'10"
Shale	795'10"	-	805'6"
Sandy Shale	805'6"	-	834'10"
Shale	834'10"	-	859'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 135 (Western Fuel Corp. of Canada) Date: 1935 (June 6 to June 18)

Elevation:

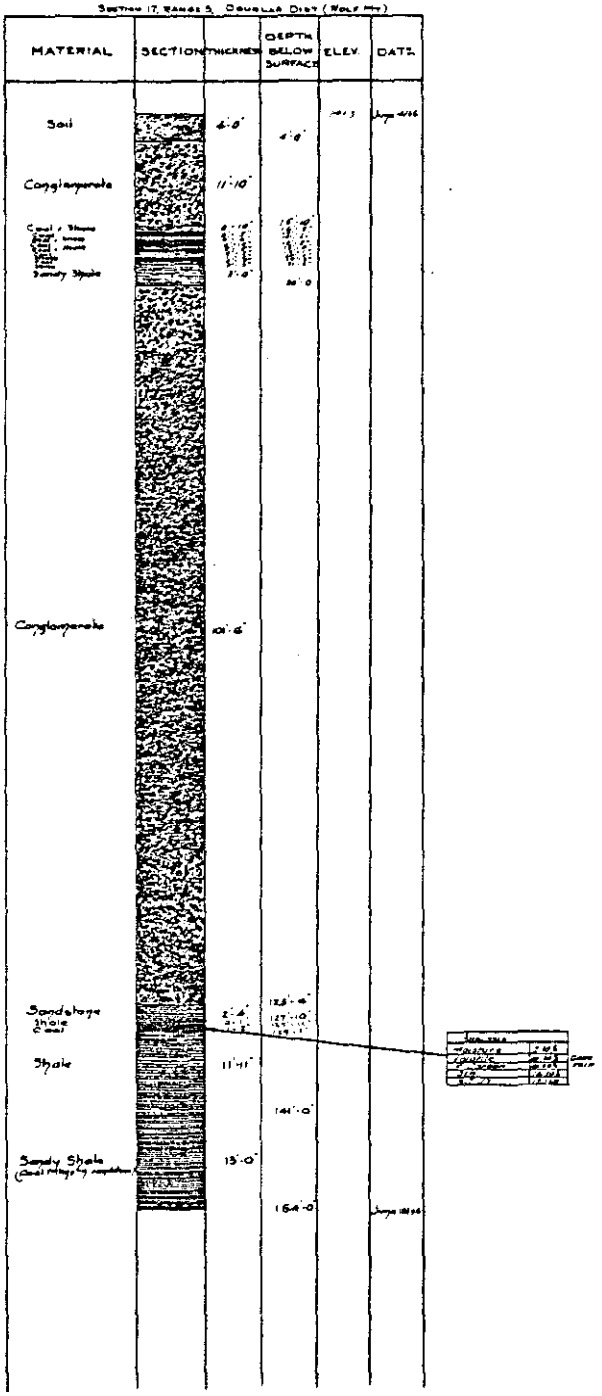
Location: Section 17, Range 5, Douglas District (Wolf Mountain)

Soil	0	-	4'
Conglomerate	4	-	15'10"
Coal & Shale	15'10"	-	16'8"
Coal	16'8"	-	17'1"
Coal & Shale	17'1"	-	17'7"
Coal	17'7"	-	18'5"
Coal & Shale	18'5"	-	18'10"
Coal	18'10"	-	19'1"
Shale	19'1"	-	20'4"
Coal	20'4"	-	20'9"
Shale	20'9"	-	21'
Sandy Shale	21	-	24'
Conglomerate	24	-	125'6"
Sandstone	125'6"	-	127'10"
Shale	127'10"	-	127'11"
Coal	127'11"	-	129'1"
Shale	129'1"	-	141'
Sandy Shale (coal markings)	141	-	154'

WESTERN FUEL CORPORATION OF CANADA LTD.

BORE HOLE N9135

Scale Inch-10 feet



VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 135 Date:

Elevation:

Location: Section 17, R.5, Douglas District (Wolf Mtn.)

Till	0	-	4'
Conglomerate	4	-	15'10"
Coal with Shale partings	15'10"	-	20'9"
Shale	20'9"	-	24
Conglomerate	24	-	125'6"
Sandstone	125'6"	-	127'11"
Coal	127'11"	-	129'1"
Shale	129'1"	-	141'
Sandy Shale	141	-	154'

VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 136 (Western Fuel Corp. of Canada Ltd.) Date: 1935 (June 22 to July 20)

Elevation:

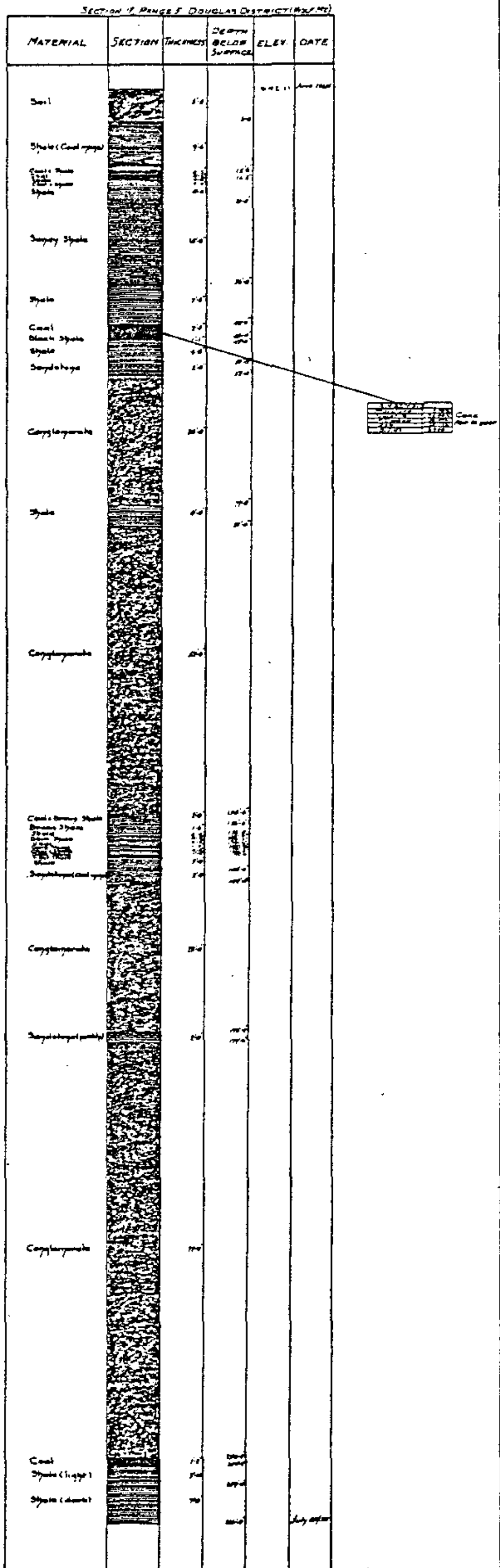
Location: Section 17, Range 5, Douglas District (Wolf Mountain)

Soil	0	-	6'
Shale (coal markings)	6	-	15'6"
Coal & Shale	15'6"	-	15'9"
Coal	15'9"	-	15'11"
Shale	15'11"	-	16'5"
Coal & Shale	16'5"	-	16'8"
Shale	16'8"	-	21'
Sandy Shale	21	-	36'
Shale	36	-	43'8"
Coal	43'8"	-	45'11"
Black Shale	45'11"	-	47'
Shale	47	-	51'
Sandstone	51	-	53'
Conglomerate	53	-	77'
Shale	77	-	81'
Conglomerate	81	-	134'6"
Brown Shale & Coal	134'6"	-	136'6"
Brown Shale	136'6"	-	138'
Shale	138	-	138'9"
Dark Shale	138'8"	-	139'3"
Coal	139'3"	-	139'6"
Dark Shale	139'6"	-	140'6"
Coal & Shale	140'6"	-	140'9"
Dark Shale	140'9"	-	141'
Light Shale	141	-	142'
Shale	142	-	145'
Sandstone (coal markings - bands cong.)	145	-	147'
Conglomerate	147	-	175'
Sandstone with pebbles	175	-	177'
Conglomerate	177	-	254'
Coal	254	-	255'2"
Shale (light)	255'2"	-	259'
Shale (dark)	259	-	266'

WESTERN FUEL CORPORATION OF CANADA LTD

BORE HOLE No 136

Scale 1inch: 10 feet



VANCOUVER ISLAND COAL

NANAIMO COAL BASIN

Bore Hole No. 136 Date:

Elevation:

Location: Section 17, R5, Douglas District (Wolf Mtn.)

Till	0	-	6
Shale (coal markings)	6	-	15'6"
Coal with shale partings	15'6"	-	16'8"
Shale	16'8"	-	21'
Sandy Shale	21	-	43'8"
Coal	43'8"	-	45'11"
Black Shale	45'11"	-	47'
Shale	47	-	51'
Sandstone	51	-	53'
Conglomerate	53	-	77'
Shale	77	-	81'
Conglomerate	81	-	134'6"
Brown Shale	134'6"	-	138'
Shale with 3 coal stringers (2" to 6")	138	-	142'
Shale	142	-	145'
Sandstone	145	-	147'
Conglomerate	147	-	175'
Sandstone	175	-	177'
Conglomerate	177	-	254'
Coal	254	-	255'2"
Shale	255'2"	-	266'