been of great advantage in facilitating the loading of vessels whether by night or day.

The main slope runs east from the bottom of No. 2 shaft, the16-foot upcast shaft, for some 2,200 yards from which levels Nos. 1, 2, and 3, north, have been run.

Hauling is done in two parts, along No. 1 level for  $2\frac{1}{2}$  miles, and down No. 3 level for about  $1\frac{1}{2}$  miles. The motive power employed is provided by electric motors, which haul as many as 96 loaded mine cars at a trip, each car having a capacity of 15 tons of coal. From points farther in than is reached by electric haulage sixteen mules are used.

Mining is carried on by the "pillar and stall panel system."

The seam is from 3 to 8 feet thick and is well bedded with good roof and floor.

Air ways are well constructed of sufficient sectional area for ample ventilation. Connection has been made by way of the No. 1 and No. 3 north levels with the Protection Island shaft, which is used as an air "intake" for the ventilation of the workings on these levels. No. 2 shaft, Esplanade (16 feet diameter) is the hoisting shaft, and serves also as the "intake" for the ventilation of that portion of the mine in its vicinity, as well as for the mule stables, etc.

Ventilation is effected through No. 2 shaft by a 36foot by 12-foot Guibal fan, to which is directly connected an engine making from 40 to 46 revolutions per minute.

The volume of air drawn by these agencies through and around the faces and workings amounts to from 150,000 to 165,000 cubic feet per minute.

An underlying seam of coal was discovered in 1887 at a depth of 71 feet below the Douglas seam, some six feet in thickness.

A large percentage of the screenings of the coal are passed through a coal washer consisting of two jigs with fixed screens, and having a capacity of ten tons per hour.

The hoisting plant consists of a pair of 30 x 60 inch Cornish valve, direct-acting, high-pressure engines, operating a 15-foot drum, provided with a 10-inch cylinder steam brake, and capable of hoisting six tons 30 feet per second on a steam pressure of 50 lbs. The steam is generated by a plant of four two-flue Lancashire boilers and four "egg-ended" boilers.

No. 1 shaft and the engine houses above and below ground are lighted by incandescent electric lights.

The electric plant consists of two flue boilers, two 150 horse-power Ball engines, each running a separate dynamo, generating a current of 275 volts. This plant supplies power for three electric motors and an electric winch underground, besides providing all the electric lighting.

## WELLINGTON COLLIERY.

No. 1 shaft, distant about 12 miles from Departure bay, was sunk about 25 years ago by the late Hon. Robert Dunsmuir. The coal was found at a depth of 300 feet below the surface, the seam being about three feet thick.

The mine is worked by a slope from the bottom of the shaft, with levels therefrom to the westward. The roof of the seam is tender. The ventilation is good, there being 8,000 cubic feet of air per minute for thirty men and two mules. The shaft is the "intake," the "return" being the fan shaft at No. 5 shaft.

## UNION COLLIERY.

The shipping wharves for this colliery are located at Union Bay, Baynes sound, on the east coast of Vancouver Island, where are also situated a well-equipped Luhrig coal washer, a coking plant consisting of two batteries, each of 100 bee-hive ovens, and large coal bunkers. The mines being operated are situated at the town of Union, about 11 miles north of Union bay, connection between the two points being maintained by means of the standard gauge railway, built, owned and operated by the company.

No. 4, the main slope, is down some 5,600 feet (N. 25 degrees W.), and from it a point 300 feet from the surface the No. 2 or diagonal slope branches off to the east at an angle of 45 degrees (N. 20 degrees E.). This diagonal slope has been run about 4,000 feet, nearly to the true dip of the coal, and although not as long as the main slope, the vertical depth attained is greater than in the latter, which runs across the dip.

At a point some 5,280 feet down the main slope a second diagonal slope has been run parallel to the one already mentioned (N. 20 degrees E.).

The hoisting plant consists of a large double cylinder engine, geared to double-loose drums, boilers, etc. It is situated about 700 feet from the mouth of the slope, from which point the engineer hoists and dumps the mine cars. The slope head arrangements are such that the cars run to and from the tipple automatically.

Ventilation is effected by a  $14 \times 5$  feet Guibal fan, causing a circulation of 85,000 cubic feet of air per minute if run to its full capacity of 95 revolutions.

The coal averages about four feet in thickness, and is worked by the "pillar and stall" system.

There are two steam and eight triple electric pumps in the mine, the power for the latter being generated by two dynamos on the surface.

No. 5 shaft is sunk vertically and cuts through two seams of coal, the upper at 275 feet, and the lower at a depth of 590 feet from the surface. The shaft is  $23 \times 8$ feet inside, very substantially constructed of heavy timbers and well lined. A partition of  $3 \times 12$  inch planking, lined with tar paper, divides the shaft into two compartments, one used as the air "downtake," and the other as the "upcast."

The hoisting plant consists of a double cylinder engine,  $30 \times 60$  in., connected with a 14-foot winding drum fitted with steam brakes, and has ample boiler service.

This shaft is connected by railway with the wharves. No. 6 shaft was bottomed in October, 1899, at a depth of 814 teet. It is well constructed and timbered with a mid-wall, and has been in working order since spring of 1900.

The pit bottom is all timbered with 12 x 18 sawn bulks, built solidly together, 16 feet wide and 12 feet high.

The hoisting plant consists of a 16 x 35 engine, provided with suitable and sufficient boiler service.

The shaft is located close to the railway, and all necessary sidings have been provided.

## THE UNITED STATES GOVERNMENT ASSAY OFFICE AT SEATTLE.

## BY A. W. DEE.

**T**<sup>HE</sup> business done at the United States Assay office at Seattle is not nearly so great this year as in

1900. The exact figures up to September 10, are \$7,000,000 as against \$12,000,000 for the twelve months preceding. The assayer in charge, Mr. F. A. Wing, denies, however, that the falling off is in any way due to the establishment of the Dominion Purchasing Assay office in Vancouver during July last, an ac-