The most prominent feature of the coal treated, a soft bituminous variety, is the high percentage of volatile and combustible matter which is typical of the Cape Breton coal measures. The coal mixture also has a high percentage of sulphur and more ash than is consistent with economy. Most of the impurity is present in the form of slate, there being only a small percentage of bone coal. The following analysis is that of the impurity which sinks in a calcium chloride solution of 1.35 specific gravity.

$Fe S_2$	13.64	
$Si O_2$	28.50	combined
Al_2O_3	17.59	as slate.
Ca O	6.74	
$Mn Co_3$	2.91	
Mg O	0.44	
Chem. Comb. H_2O	15.10	
Carbonaceous matter	14.80	partly bone coal.
	99.72	

About one-half of the sulphur contained exists as iron pyrites ($Fe S_2$), which seems to occur evenly and uniformly distributed through the coal and bone in the form of small nodules, leafy formations between the layers, and as a series of particles in size between 80 and 100 mesh; the remainder of the sulphur is present as organic sulphur. It is impossible to get rid of this latter portion by any specific gravity method of separation, and it is called the fixed sulphur.

The following are the specific gravities of the coal constituents:—

Slate	3.83
Coal	1.27
Splint or bone	1.50
Pyrite	4.80

In order to determine the best possible separation that can be effected with the coal in question by means of a specific gravity method, the following experiment has been made: A calcium chloride solution of slightly higher specific gravity than that of coal, and less than that of the other constituents, was put into a glass jar of about three-quarter-gallon capacity; to this solution was added a weighed quantity of coal of the same size as supplied to the jigs. The contents were stirred briskly and allowed to settle. The sample was now found to be divided into two portions. All particles of a specific gravity less than that of the solution had floated while all the particles heavier than that had gone to the bottom. Between these two layers there remained suspended in solution a small proportion of the particles whose specific gravity was about that of the solution. The floating and sinking portions were separately removed, washed free from the solution, weighed, and analyzed. From the data thus obtained we calculate the purity and yield of the floating portion of the washed coal obtainable. This is the simplest and most effective coal washing operation that can be performed, and the results of this experiment determine absolutely for any coal the maximum purity of the washed coal obtainable from it by any washing process. The calcium chloride solution used was of 1.35 specific gravity, which was found best suited for this coal.

The results of a series of such experiments conducted at the same time as the analysis already given, are as follows:—

Average composition of float on $Ca Cl_2$ solution 1.35 sp. gr.:

Vol. and Com. Mat.	Fix. Carb.	Ash.	Sulphur.
36.67	59.92	3.41	121

From these figures we learn that the coal treated had a fixed ash of 3.41 per cent., and 1.21 per cent. of fixed sulphur. Consequently the plant washed the large tonnage of coal treated in the five months to within one and one-quarter per cent. of the best possible reduction in ash, and to within a third of one per cent. (0.3) of the best possible reduction in sulphur.

The loss in washing for the large amount of coal treated has been 13 per cent. plus 8 per cent., which is the difference in moisture, a total of some 21 per cent., and of this the impurity removed as ash and sulphur is 12 per cent., which leaves an actual coal loss of about 9 per cent. in the process.

The slate resulting from the washing process from the coarse jigs contains about 25 per cent. of good coal, and is therefore lifted by bucket elevator to the top of the jigs and re-washed in No. 4 coarse jig with the following results:—

	Original slate.	Washed coal from slate.	Slate produced contans about 13% impure coal.
Vol. and Com. Mat.	21.80	30.59	19.10
Fix. Carb.	37.10	51.61	24.40
Ash	41.10	17.18	50.50
Sulphur	4.06	2.79	9.07

This re-washed product is used about the plant under such boilers as are worked below their rated capacity.

A point of interest about the washer is the ingenious method of disposing of the slate, which was introduced last spring by Mr. John Preston, the engineer who had supervision of this department. Hitherto the slate had been elevated to a bin in the storage tower, from whence, at proper intervals, it was removed on cars to a convenient dumping place. The present scheme is quite simple, and consists in flushing the slate from the jigs directly to the sea.

The following description of the equipment will explain the method in detail: An 8-inch pipe has been laid from the shore to the central condensing plant at the colliery where the washer is situated, and through it a 7-inch Gwynne centrifugal pump supplies salt water for condensing purposes. This pump has a rated capacity of 1,200 imperial gallons per minute at 900 revolutions per minute, and is directly connected to a 50 horsepower, 3-phase, 60-cycle, 220-volt induction motor located at the seashore. The condenser is a 12 and 17x19x15 Worthington jet condenser, arranged to take steam from a Walker double compound compressor, a tandem compound fan engine, a tandem compound haulage engine, and a simple cylinder haulage engine; the four engines totalling up about 1,500 horsepower. The discharge pipe of the 7-inch centrifugal pump, which has a lift of 50 feet, is directly connected to the suction pipe of the air pump of the condenser. The air pump discharge delivers the salt water, after condensing the steam from the engines, to a 6-inch cast iron pipe, which passes through the wash plant, and is used for conveying the slate from the wash plant to the cliff, a distance of about 700 feet.

A valve controlling the amount of water supplied to this pipe is placed between the air pump discharge and the square hopper through which the slate enters the