

ture which permits a supply of crushed coal to be kept one day ahead. Thus the washer proper is enabled to run on a day when the collieries are idle. The bottom of the tank is designed with two rows of parallel openings, fitted with sliding covers, each in line with a horizontal scraper conveyor delivering the crushed coal to the foot of No. 4 elevator, which delivers it in turn upon the shaking screen. This last has three-eighth-inch perforations, and being set at an angle of about 15 degrees, is supported upon rocker arms, and has an eccentric motion closely resembling that of hand screening. Owing, however, to the fine coal being more or less damp, it is impossible to separate the two sizes on a dry screen, so that, as the coal is delivered to the screen, it is met with a number of jets of water, which flush the coal through the screen plates. When the screen was flushed with the ordinary coal washing water the perforations in the jet pipes became plugged up, consequently clear water has to be used, and a cheap and convenient supply is found in the circulating water from a surface condenser, connected to the main centrifugal pump engine; this water being warm, is less trying for the jig tenders, who have their hands immersed continually. The combined effect then of the incline and the supply of water is to rapidly flush away by flume those screenings under three-eighth-inch to the fine jigs. The remainder, under half-inch and greater than three-eighth-inch, being sluiced to the coarse jigs.

There are four coarse jigs on one side of the building, and as many fine ones on the other, all of them being essentially modifications of the Luhrig jig, and designed especially for coal washing work by Mr. Stein, the engineer whose firm had charge of the erection of the plant. The fine jigs, styled "Standard two-compartment fine-corn jig" by the designer, are built of wood, and wash $7\frac{1}{2}$ tons of coal per hour.

Thus about 65 per cent. of the coal is washed by the fine jigs, since only three of the coarse jigs, with a capacity of six tons per hour each, are used at a time. The fine jigs, which have one compartment fitted with quarter-inch perforated plates, and the other with three-eighth-inch perforated plates, are run at 135 pulsations per minute. The feldspar used in the bed is of five-eighth-inch cubes. The coarse jigs are run at 72 pulsations per minute, and have a bed of seven-eighth-inch feldspar varying from 2 to 4 inches in thickness, depending on the amount of slate flowing. The purified product from the jigs is sluiced to the washed coal bin, while the slate runs to a waste bin, from which it is removed by No. 7 elevator to the slate bin in a storage tower, or flushed away by the slate ejector.

The water from both these bins, carrying in suspension certain fine coal and extremely fine particles of slate, returns to the sludge tank, directly under the jigs. There this fine material settles, and at proper intervals is drawn off. This tank, being the reservoir to which all leakages drain, also acts as a sump for the washer, and the centrifugal circulating pump drawing from it uses the water over and over again. Thus the only loss of water is that carried away by the products as moisture, a small amount as leakage, and that used for flushing purposes. This amounts, in all, to about 25 per cent. by weight of the coal washed.

The washed coal is all elevated to a drainage and storage tower by No. 6 elevator, which is equipped with perforated buckets, as also are the elevators Nos. 5 and 7, and the amount required for the coke ovens located

nearby is lowered by chute and re-elevated by No. 5 elevator to another tower. This additional handling is found to pay, owing to the reduction of moisture by drainage.

The amount of water required in circulation is about 2,000 gallons per minute, and is supplied by a 12-inch centrifugal pump direct connected to a 12x10 vertical engine, running at 250 revolutions per minute. This engine exhausts into a surface condenser, the circulating water of the condenser being used as mentioned above to flush down the coal over the shaking screen.

As originally laid down, a 100 horsepower engine supplied all the power necessary, but now electricity is used for motive power as follows: Crushing house complete, including elevators; one Westinghouse 75-H.P., 60-cycle, 3-phase, 200-volt, 650 revolutions per minute, induction motor; washer house proper, jigs, etc.; 50-H.P. induction motor; Bernard tower; 30-H.P. 220-volt induction motor. All the motors are of the same type.

The following analyses are in each case averages of many determinations, and represent as close an approximation to the actual composition of the products as can possibly be obtained. The raw coals from the three separate collieries have been analysed at regular intervals over a period of several consecutive months, and give the following results:—

Coll.	Vol. and				
	Moist.	Comb. Mat.	Fix. Carb.	Ash.	Sulphur.
A	4.86	29.11	56.73	14.87	2.14
B	5.96	28.38	57.38	14.23	2.09
C	6.51	23.11	54.27	22.61	2.45
Aver.	5.77	26.87	56.12	17.23	2.23

As the weight of coal received from each colliery for each month was known, the following analyses of the mixture received at the wash plant for each month were calculated, and are as follows:—

Month.	Vol. and				
	Moist.	Comb. Mat.	Fix. Carb.	Ash.	Sulphur.
1	5.62	27.71	56.48	15.93	2.17
2	5.61	27.82	56.50	15.98	2.18
3	5.67	27.75	56.54	15.83	2.16
4	5.69	27.40	56.31	16.53	2.19
5	5.68	27.25	56.28	16.72	2.20
Aver.	5.65	27.56	56.43	16.19	2.18

The average analyses of the washed coal resulting from the washing of the above coal, and covering the same period, are as follows:—

Month.	Vol. and				
	Moist.	Comb. Mat.	Fix. Carb.	Ash.	Sulphur.
1	16.25	34.86	60.58	4.52	1.27
2	13.87	35.01	61.00	3.96	1.25
3	11.95	38.20	58.14	3.66	1.45
4	14.01	35.70	58.56	5.80	1.74
5	11.00	35.92	59.36	4.72	1.75
Aver.	13.42	35.94	59.53	4.53	1.50

Thus it is seen that the average reduction for the five months has been from 16.19 per cent. to 4.53 per cent. in ash, or 72 per cent., and in sulphur from 2.18 per cent. to 1.50 per cent., over 30 per cent. reduction. It might be said in regard to the above figures that the greater quantity of ash in the coal in the last two months was due to the increased percentage of "C." coal used. This coal was not run over a picking belt since that colliery was newly opened, and was not as well equipped as the other collieries.