

## The Scottish Oil Industry

### **The Addiewell Oil Works**

It required a whole day to visit the oil works at Addiewell, and even allowing for such a time to be shown over, some very interesting departments of the works had to be skipped. It is only when one begins to examine an oil work that he realises its extent. Young's Company own two works for the production of oil – one at Uphall and another at Addiewell. The one at Addiewell is the greater, and it was this that the writer visited. It extends over an area of 75 acres, 50 acres of which are buildings. Having already described the process of distilling and refining, it is unnecessary to do it here, as the methods in all the works in the Lothians are similar to those at Broxburn. There are some things, however, purely relative to Addiewell, and it would be robbing this series of articles of much of their interest were those things not mentioned.

### **Half the size of the Meadows**

The area occupied by the Addiewell works is equal to about half the size of the Meadows in Edinburgh. The works lie parallel with the Caledonian Railway line between Edinburgh and Glasgow, and passengers on this line are afforded a good view of them. Unlike the Broxburn works, where the crude oil work is about a quarter of mile away from the refinery, the works at Addiewell are undivided. The shale distilled at Addiewell is taken from the different mines of the Company, but more particularly from the West Calder pits, two miles distant, whence the shale is conveyed by the private railway owned by the Company.

### **Crushed in the breakers**

Arrived at Addiewell, it is put through the breaker which has already been described. This breaker keeps about three days abreast of the retorts, so that in the event of accident, the work will not be interfered with. Sometimes as many as 1,800 tons of broken shale are stored up. Passing through the breaker into a hopper below, and falling into hutches in waiting, the shale is then taken to the top of the retorts.

### **The 160 retorts**

The retorts are of the Young and Fyfe Patent Retort type, for which it is claimed that they will distill much more material than any other retorts known. There are two benches of retorts, 50 feet high, 14 feet broad, and 150 feet long. There are 80 retorts in each bench, and the total throughput is 600 tons of shale in twenty four hours. The retorts are kept working seven days a week, so that a week's throughput is 4,200 tons. Whereas each of the present retorts affords a throughput of 75 cwts. per day, the former retorts which Young's Company had at their works only allowed a throughput of 30 cwts., and in this connection an interesting fact may be mentioned, which bears out the previous remarks about the great saving of fuel. In the old retorts,  $\frac{3}{4}$  cwt. of coal was required for each ton of shale distilled, and this meant the consumption of over 20 tons of coal per day. Now, however, the permanent gas given off at the same time as the condensable vapours is scrubbed free from any light oil or ammonia, and is returned to the retorts to supply the heat required for the distillation. In addition to this, there is a surplus of gas which provides fuel for some of the steam boilers. It is an interesting example of the progress of science.

### **Products**

The refining process is much the same as that at Broxburn, and therefore does not call for treatment again. Young's Company pride themselves on the purity of their ammonia, and have a good sale for their product. While our representative was visiting the works, a specially high

flash oil was being manufactured for a foreign Government for use in their lighthouses. At the same time, in another department, oil was being manufactured which would ignite at sight.

### **Candle-making**

As the previous articles dealt in a passing manner only with the manufacture of candles, this opportunity may be taken to give a description of how they are made.

It has already been explained how the solid wax from which the candles are made is obtained. The cooling and filtering was also described, and it is now left to say that after the filtering has taken place, the solid paraffin is taken to hydraulic plate-presses, where it undergoes a pressure of 30 cwts. per square inch on the ram. The paraffin scale or crude wax is then purified in the sweating chamber, which consists of a series of steel trays into which the melted scale is allowed to cool until it is solid. The water is run off, and then the doors of the chamber are closed and steam introduced to a series of pipes round the chamber and underneath the trays. The temperature is gradually raised, until the oil still contained in the paraffin has oozed out, and in this manner the wax becomes gradually purified. This operation completed, the temperature is still further raised in order to entirely melt the remaining wax. It is then transferred to other vessels, where the remaining impurities are extracted by a treatment with a proportion of animal charcoal.

After the wax has passed through filtering vessels it is known as semi-refined paraffin wax. To make candles the semi-refined paraffin requires to be still further dealt with before it attains the requisite quality for the higher class candles, surgical and electrical insulating purposes, etc. The semi-refined paraffin is again melted and treated with naphtha, run into tins, and cooled into cakes. These cakes are wrapped in sheets and placed in horizontal hydraulic presses heated with steam. In this manner the remaining easily melted wax, as well as the bulk of the naphtha, is squeezed out. After a repetition of this, the wax is thoroughly steamed to extract the remaining naphtha. It is once more taken to the animal charcoal treating department, where it undergoes a similar process to that already described. The paraffin wax is then delivered into vats in the candle work in a liquid condition, in which condition it is kept until the candlemakers come to take it away in pails to their machines.

### **Candle-making**

These machines are simple looking in construction, and their very simplicity is a testimonial to the inventor. The framework is principally of cast-iron. At the top is an iron water-tight box, and suspended from the bed which overlies the box, and immersed in the water, are the candle moulds, which are made of special metal. At the base of the machine are a number of pins fitted with bobbins, on which the wick for the candles is wound. This wick is secured to the top of the candle mould. Taking a canful of liquid wax from the vats, the candlemakers pour it into the bedplate, from which it flows into the individual moulds, the wick meantime stretching up the centre. The steam which has till now being permitted to flow into the box to prevent the wax cooling too suddenly, is now turned off, and cold water allowed to flow freely around the moulds. In this way, the wax is solidified, and when sufficiently hard, the candlemaker again applies the steam that the candles may leave the mould easily. A little planing at the bottom of the candles (which are now upside down), and the operation is complete.

### **Varieties of candles**

Various varieties of candles are produced in this way, and the moulds are capable of turning out from 1 to 72 candles in the lb. The number of the moulds in each machines varies from 36 to 300 per charge. The candles, when they are completed, present a striking contrast to the dirty-looking material in the form of shale from which they were made, and this contrast is all the

more striking in the case of the decorative candles, on which flowers, etc., are hand-painted. This candle business at Young's works is an extensive one, a statement which will readily be admitted when it is mentioned that sometimes the output amounts to 100 tons a week.

### **600 employed at Addiewell**

To keep these large works going, of course, requires a large number of men, of whom there are 600 at Addiewell, and 400 at the mines in the West Calder section. Before concluding the article, there are a few other facts worthy of mention. As for instance, the fact that the company owns almost the entire village of Addiewell, where they have 800 houses. They own several farms, have control of 1,500 acres of land in the vicinity of their works, and they have large vitriol works at Bathgate and a factory at Birmingham for the manufacture of lamps.

### **Vast reserves of shale**

It has been calculated that the probable available supplies from the whole of the Company's shale area, old and new, owned or leased, is 14,000 tons of shale, Of this quantity, the greater portion is accessible from existing openings. The statement of the quantity in reserve may mean very little to the ordinary reader, and it may be as well to say, therefore, in order to let him understand, that, despite the length of the time Young's Company have been taking shale to the surface, only about 36 percent of what they have opened up has been wrought out. This places the Company in a very strong position, and makes shareholders feel safe. When one reads a statement like that, he is reminded of the Company which was started when there was an oil fever in Scotland, and which, after six months' working, had to give up because the supply of shale had run out. What a contrast!

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