Naturally the tipping space provided was then rapidly filled up, and it became necessary to provide further tipping room. The problem was solved by simply adding on 25 ft. to the height of the tipping standards and the return terminal, so making these 75 ft. high from the original ground level, and at the same time the gauge of the ropeway was widened out from the original 7 ft. up to 12 ft. This had the result of not only gradually increasing the height of the tipping space, but also increasing the width of the heap at the top, the original capacity of 60,000 tons being increased up to 130,000 tons of dirt by these means.

Dummy Standards.—Yet another method of increasing the tipping height is by having a dummy standard, or probably a better term would be a portable standard, say, 21 ft. high, which is placed in the centre of the span to support the carrying ropes and take up the sag on them, which naturally increases the tipping height in the centre by this 21 ft. The standard itself is lightly built, and is merely bolted on to two long crossing timbers, without requiring any other foundations. It is easily moved from time to time as required. Care is taken in tipping not to put any debris on the standard itself, and after the extra tipping height thus provided is filled up, the debris at one point near the centre is levelled and the standard raised on to a new position, 21 ft. higher, of course providing for this height of tipping room in the centre of the span. This raising of the dummy standard goes on as tipping proceeds, until finally the ultimate tipping height is reached.

In one instance where this system is followed the length of the tipping ground is 1,120 ft., whilst the tipping standards and return terminal are 65 ft. and 75 ft. high, respectively. With the ordinary arrangement of tipping, this would give a capacity of 141,000 cubic yards. However, with the aid of four of these portable standards, erected in the way described, this capacity would be ultimately increased by 2,769,000 cubic yards, giving a total tipping capacity of 2,910,000 cubic yards, with a height at the centre of 300 ft., and covering the ground at the bottom for a width of 900 ft.

The return standard of a ropeway in Scotland is 150 ft. high. The tipping span in this case is only 400 ft. long, as it was desired to make the best possible use of the limited area at disposal. With the ordinary rate of tipping this one span of 400 ft. would provide a tipping room of 650,000 cubic yards. However, with the aid of two of these portable dummy standards the ultimate tipping content will be increased to 1,740,000 cubic yards, with a height in the centre of 250 ft., and practically filling an area of 750 ft. diameter.

Take the case of a ropeway 1,000 yards long, with tipping standards and return terminal 100 ft. high; this would give a capacity of about 1,250,000 cubic yards, whilst with the use of dummy standards the total tipping room would be about 47,200,000 cubic yards. It will thus be seen what enormously extra tipping space is provided by the simple expedient of using these portable dummy standards.

An interesting installation of ropeways occurs at a quarry on an exposed coast with a flat shore. To save the steamers having to come alongside the pier and take the ground at low water during loading, it was decided to build a bunker capable of holding 1,000 tons of stone out in deep water. Steamers can come alongside this bunker at almost any state of the tide and load a cargo of several hundred tons of stone in about half an hour, the floor of the bunker being laid at the natural angle of repose of the stone to facilitate the sliding of the stone by gravity down chutes directly into the hatchways of the vessel. A ropeway was provided 1,935 ft. long to load the stone automatically into the bunker at the rate of 30 tons per hour. No attendance whatever is required on the bunker during this loading, except that about twice a day a man goes down to alter the position of the tipping bar. This ropeway in its course makes an angle of 148 deg., and the final span from the shore to the bunker is 530 ft. long.

The author has had a lot of interesting figures given to him by various users of ropeways, in each case under the seal of secrecy, but he may say that the expense varies from about 1d. per ton up to 3d. per ton of material carried per mile. The latter figure is probably the maximum. It may probably be taken that 2d. per ton per mile is about a fair average cost of working, including depreciation, interest on capital and actual working expenses, under reasonably fair working conditions.

In one case the actual cost of working a line of ropeway for conveying washed slack from a coal washer to the storage bunker worked out at 0.526d. per ton, whilst the cost of upkeep of the plant is 0.09d. per ton, on a working capacity of 300 tons per day.

In another case, on a ropeway 1.3 miles long, the total charges came to 2.76d. per ton for the whole length, or just over 2d. per ton per mile.

In the case of a ropeway somewhat less than a mile in length, with one automatic angle standard *en route*, the detailed charges are as follows, per ton:—

	d.
Man looking after engine, oiling buckets, ropes, rollers, etc., and shifting the automatic tipper when required	0.266
Filling buckets at the loading end from the tramway trolleys and clutching on to the rope...	0.234
Boy pulling round empty carriers at loading terminal	0.140
Cost of running engine, petrol, oil, belt, and sundries	0.261
Wear and tear of wire ropes	0.192
Wear and tear of wheels, grippers, etc.	0.064
Labor expended for repairs of the whole ropeway	0.801
	1.967

MANUFACTURE OF COAL BRIQUETTES.

Up to the present European crisis the coal-briquetting industry of the world has been practically limited to Germany, France and Belgium. The magnitude of this industry is shown by a total output of nearly 40 million tons in 1912, and its vitality by a threefold increase in 11 years. The importance of the industry for Germany is exhibited in the fact that that country produced 61 per cent. of the total world-output last year, France sharing it to the extent of 8.74 per cent. and Belgium 6.73 per cent. It is instructive to note that the production of this form of fuel increased in Germany from 9.251 million tons in 1901 to 24.392 million in 1912, in France from 1.883 to 3.496 million tons, and in Belgium from 1.588 to 2.691 million tons in the same period. These figures evidence great vitality in this young industry. It is remarkable that it has not yet taken a deep root in Great Britain, the United States or in Canada. The German product consists largely of brown coal.