to see the different skips weighed as they come up, each having a tally or tin number attached to it, which indicates where it comes from. A skip is picked out promiscuously from each party of miners, and the weight of that skip is taken for the average weight of skips for the day. This system makes the miners very careful to see that all the skips they send up are about the same weight, as they do not know what skip may be taken and weighed until after their shift is over.

The Australian and Agricultural Company's Mine.—This company are working from two shafts, one of 171ft. and the other 197ft. in depth and 13ft. in diameter, having double cages in each shaft. Their system of haulage is similar to that adopted by the Wallsend Company, which the manager prefers to the endless-chain haulage, he having had experience of both systems. The quantity of skips hauled out in one train is about 60, carrying about 12cwt. of coal each, and the rope is $\frac{7}{8}$in. in diameter, made of steel wire. There are 556 men employed underground and nine horses; the total number of men on the works is 840, and the quantity of coal raised per day is about 1,000 tons. There is a little water in this mine, which is lifted by three Tangye pumps, but, with the exception of one which is 10in. in diameter and lifts the water 197ft., the rest are all small and only lift the water about 40ft. There is no safety-hook employed nor any safety appliances on the cages, they being all of the ordinary type.

The Wickham and Bullock Island Coal Company.—This company is sinking a new shaft with cast-iron cylinders made in segments 1in. thick of such a weight as can easily be handled. These are all bolted together with the flanges inside; the shaft being 10ft. in diameter in the clear is now sunk to the bottom of the coal seam, which is 19ft. thick and 227ft. below the surface. These cylinders are all put on from the top and pressed down as the sinking is carried on. The average cost of the shaft, including cylinders and all expenses connected with it, has been £27 per foot. This seam is one of the best in the district, being what is termed the "Bore" hole seam, and is the same as that on which the Wallsend Company is working.

The Maryville Coal Company.—This company is likewise sinking a new shaft which is lined with 14in. brick work, having wooden combs every 7ft. apart in order to bolt the whole lining together. The brick lining is built on the top as the sinking goes on and the whole is pressed down. This shaft is likewise 10ft. in diameter, and is now down 145ft., having cost up to the present time £10 per foot.

Katoomba Coal Mine.—This mine is situated in the Blue Mountains, about one and a half miles from the western line of railway, near the Katoomba Station. I had no opportunity of visiting the underground workings; but the machinery employed on the surface, and the mode of haulage from the mine to the railway is that known as the endless-rope system with low velocity. There is a light iron tramway following to a certain extent the inclination of the ground, with the exception that there are viaducts built on trestles across the gullies that intervene between the mine and the shoots, which are alongside the railway line. The tramway is worked by an endless steel-wire rope, travelling at the rate of about two miles per hour. The skips as they come out of the mine are made fast to this endless-rope by two short pieces of chain at each end of the skip. The slow motion at which the rope travels admits of this being done without stoppage, and the long distance between the skips give ample time for a boy to meet the empty skip coming back and loose the chain at both ends before it comes up to the pulley; and in the same way, when the full skip is ready, the boy gives the front chains two or three turns round the rope, which is sufficient to set it in motion; after the front end of a skip is made fast to the endless-rope the tail chain to the same skip is made fast, by this means the skip is kept steady either going up or down an incline. The endless-rope is worked by a steam-engine at the mine. The coal from this mine is much inferior to the Newcastle coal, having more the appearance of brown coal.

Hydraulic Cranes, Newcastle.

The systems of loading vessels with coal are, with one or two exceptions, done by hydraulic and steam cranes. The bodies of the waggons, which are detached from the frame, are lifted and brought over the hatchways of a vessel, when the trip-bolt is loosened and the bottom of the waggon, which is hinged, falls down, thus allowing the coal to drop into the hold.

The pressure to work the hydraulic cranes is got by a stationary engine forcing water inside a vertical cast-iron cylinder 20in. in diameter, having metal 4in. in thickness. This cylinder is of sufficient length to admit of the ram or plunger being forced out 26ft. There is a stuffing-box and gland at the upper end of the cylinder packed with vulcanized indiarubber so as to be perfectly water-tight, with a pressure of water up to 700lbs. per square inch.

Attached to the head of the ram is a wrought-iron tank about 22ft. in depth and 11ft. in diameter; this tank has also an inside cylinder like the fire-box or flue of a Cornish boiler, and has the appearance of a steam boiler with a circular flue in the centre, being open on the upper end. There is a cross-head on the top of the ram which works in guides to keep it moving up and down in a truly vertical position. This wrought-iron cylinder is hung to the cross head of the ram, and the inner cylinder or centre portion of it is large enough to move up and down over the cylinder of the ram, it being kept vertical by working in the same guides as those in which the cross head of the ram works. The wrought-iron cylinder being in position, it is filled with about 90 tons of copper slag, and this acts as an accumulator and keeps the pressure on the hydraulic cranes always the same. When several of the cranes are working at once the stationary engine would not keep up the same pressure, but as the water is used for the cranes the accumulator moves down, forcing the ram down with it, and thereby keeps the pressure always the same. There are two pairs of double steam-engines, which can be used when required to force the water into the cylinder, but only one pair works at one time, the other pair is kept in case of accident. The engines have 14in. cylinders and 2ft. stroke, and the plungers for forcing the water into the cylinder of the ram are 3in. in diameter.

The hydraulic cranes are so constructed that the ram can be made to exert a force equal to either 9 or 15 tons by one ram working inside another when the lesser force is required, and by