

rope, being about 2 in. in diameter, and capable of lifting 20 tons. This capstan is provided with a powerful screw conical brake. The engine being of such small dimensions, the piston speed is very high, and is reduced down by the gearing described, so as to lift 20 tons at a moderate speed. Two sets of plungers have been fixed in position in the shaft at 327 ft. below the surface, and above the plunger-poles there is a large chamber cut out, where balance-bobs are placed to take the weight off the rods, and above this, directly below the end of the first rod, two beams are being placed across the shaft, each 9 ft. deep by 12 in. wide, to prevent the rods from going down in case of any accident or breakage occurring. Each of the plunger-rods is 10 in. in diameter, of solid steel, and are jointed every 30 ft. On each end of every rod there are two heavy collars about 13 in. in diameter. The ends of the rods are butted together, and a heavy cast-iron coupling bored out in the centre to admit the collars on the rods, which are made in two pieces. This coupling is slipped on each joint, and bolted together. In order to keep the rods firm at the joints, a cotter about 3 in. wide is driven through the coupling, and through the key-ways, cut in the ends of each collar on the rods, which wedges the collars on the rods hard up against the recess in the coupling, and keeps them firm. It is fixed below the lowest coupling, where the beams are placed across the shaft to prevent the rods going down. Both plungers discharge into one uprise column of pipes, and this column is now fixed in position to the surface. Notwithstanding the large size of the shaft where the pumps are placed—namely, 17 ft. 6 in. by 8 ft. 6 in. in the clear inside the timber—there is very little room in it when the pumps and rods are placed in position. Guides for the rods working in are also to be placed about 60 ft. apart, to prevent vibration on the downward stroke of the plunger-poles. Sinking-pumps: There are two draw-lift pumps on the ground, the uprise columns of which are 26 in. in diameter, to admit of the bucket being hauled up inside the column in the event of the water rising too fast to get the bucket taken out and replaced at the door-piece, directly above the working-barrel. The working-barrels of these draw-lifts are made with three heavy wings, which project beyond the outside of the pipe for about 18 in., and form a solid base to bear the whole weight of the column full of water. These large projecting wings were never anticipated, and when these pumps have to be put down, the centres dividing the winding from the pumping compartment will have to be taken out before they can be got into place. The wind-bores at the end of the suction-pipes for these two draw-lifts have holes in them to a height of 3 ft., so that there would always have to be a depth of 3 ft. of water before they would commence to lift any, and this would make the sinking of the shaft very expensive, as the men would always be working in water. It has now been decided not to put down these draw-lift pumps until the shaft is sunk to the desired depth, and, instead of these, two double-action Cameron steam sinking-pumps will be got, and used in sinking the shaft. As these pumps have a very short stroke they will keep the bottom of the shaft comparatively dry during the sinking operations. The manager has not yet got authority to order these sinking-pumps, which the Union Ironworks require ninety days to deliver at Auckland; so that it is a difficult matter to state at what date pumping operations will commence. Judging from what can be seen at the present time, there is no likelihood of commencing to pump any water from this shaft before December. One of the most complete air-compressors there is in the Australasian Colonies is erected on the foundation where the second pumping-engine is intended to be placed, if it is ever required. It is of the compound type, the cylinders being 19½ in. and 31 in. in diameter respectively, having water-jackets around the cylinders. It was intended to work this air-compressor with a separate steam-engine, but the engine was eliminated from the contract, with the view of working the compressor with a Pelton water-wheel; but the power required to drive this compressor is more than was anticipated by the manager, and it is now considered out of the question to get sufficient water from the county race to work this machine. This is to be regretted, as this air-compressor is required to supply compressed air to work the Cameron sinking-pumps, instead of steam, and in all likelihood a steam-engine will yet have to be procured to drive this compressor. The exhaust of compressed air instead of steam will always have the effect of drawing the noxious gases from the bottom of the shaft, and producing good ventilation. One of Tangyes winding-engines is erected, and everything is ready to commence sinking as soon as the pumps are in position and the erection of the pumping-engine completed. The winding-engine has double cylinders, with the winding-drums fitted with heavy brakes, worked by screw-lever. This engine and the capstan-engine, with all gearing, is erected in a separate building from the pumping-engine and air-compressor. A very compact compound-wound dynamo for lighting purposes is fixed in the same building as the pumping-engine and the compressor, but none of the lamps are yet fitted up. The whole of the workmanship in connection with the manufacture of this plant, and erection, are of the best class, and when once completed it will not only be the largest pumping plant in Australasia, but it will also be equal, if not superior, to any machinery yet manufactured in, or imported to, these colonies. It reflects the highest credit on the manufacturers, and all those who have charge of its erection. The manager, Mr. T. A. Dunlop, who has displayed marked ability in constructing the foundations, shafts, poppet-heads, and buildings in connection with it, has furnished the following report on the mine, which may afford additional information:—

“The object of the undertaking is to test the deep levels of the Thames Goldfield to a depth of 2,000 ft. To assist this object the Government granted a subsidy of £25,000, at the rate of pound for pound. The property consists of 250 acres, and is divided into three sections, known as the Queen of Beauty (47 acres), Deep Sinker (93 acres), and Deep Levels Consolidated (110 acres). The old Queen of Beauty shaft was down to a depth of 750 ft. The present company commenced operations by stripping, enlarging, and retimbering the shaft, the present size being 17 ft. 6 in. by 8 ft. 6 in. clear of timber. This was done down to the 327 ft. level, where a chamber 17 ft. 6 in. by 16 ft. 6 in. and 48 ft. deep was opened out, after which the sinking of the shaft at its former dimensions was resumed, and carried to a depth of 423 ft., at which point the water-level was reached, and thus prevented further sinking operations until such time as the new pumping machinery is erected and in working-order. The work of dismantling and removing the old machinery and buildings was then