

in the Sandhurst and Stawell Districts are hereto attached. These plans, together with geological maps of Sandhurst, Ballarat, and Stawell, were supplied by the Mines Department of Victoria, and they will give a much better idea of the formation of the lodes than can be conveyed by a mere written description.

ALLUVIAL MINING.

Creswick Creek.

This is a district where deep alluvial mining is being worked. I inspected the underground workings of the Madam Berry Company, which are on a similar principle to the deep workings at Ross, but with this difference, that the shaft is put down outside the gutter or lead, and, after the chamber is constructed, a main tunnel is driven, cutting the gutter or lead at about right angles; then, when the centre of the lead is reached, a main tunnel is constructed on both sides of the tunnel coming from the shaft, following as nearly as can be ascertained the centre of the gutter. The main tunnels are constructed some distance under the washdirt in order that the ground may be worked over head, having the main roads always kept good, and when the strike of the bottom on which the washdirt lies comes to the level of the main tunnel that determines the distances, that the ground can be taken out from the one level. The dip or inclination of the gutter being determined beforehand, there is always a sufficient amount of bottom or reef allowed below the washdirt to carry the main tunnel in to such a distance, that it is considered economical to work from one shaft. As soon as the main tunnel is a sufficient distance from the cross tunnel leading to the shaft, or about 100ft., a jump up or uprise is made from the side of the main tunnel into the washdirt, and when this is completed, and the ground secured over head, it is converted into a pass for holding washdirt and a ladder-way for the workmen to get up and down, by being partitioned off. A cross-drive is now made at each side of the pass until the reef on the outside of the gutter or lead is reached. Afterwards a drive at right angles to this cross-drive is made, following the edge of the gutter, and the ground is then blocked out from the back. When the gutter is a great width other drives are made running parallel with the blocking-out drive, a considerable distance apart, and, when these drives reach the end of the block intended to be worked from this pass, another cross-drive is made towards the outer edge of the gutter, and the ground blocked out in two directions. Not more than one drive at a time is allowed to go forward in one face, so that the roads are always alongside the face of the solid ground. When the main tunnel gets in about 100ft. or so further another pass is constructed, and so on, until the fall is entirely run out, or to such a distance as it is considered advisable to work from the one shaft. The main tunnel is constructed wide enough for a double line of rails, so that the empty trucks can go up one line and the full ones come down the other; and at intervals, near the different shoots, there are points and crossings, or in some instances flat sheets, for changing the empty trucks from the one line to the other. In blocking out the ground 7ft.-caps are used, and the timber that is used for blocking out is generally pretty light, as it only requires to keep up the ground until the men get a short distance from it before it breaks down. As there are scarcely any stones in the washdirt there is nothing with which to pack up the ground as it gets worked out. The depth of this company's workings is about 500ft. The washdirt is hauled up in cages to the top of the brace, emptied into puddling machines, and, when it is sufficiently puddled and a fair collection of gravel left in the machine, a trap-door is opened under the bottom of the machine, and the gravel falls down a shoot on to another brace or platform, and from there hand-filled into sluice-boxes and sluiced in the ordinary manner, the sluice-boxes being fitted with false cast-iron perforated bottoms. This company is sinking a new shaft further down the lead and has experienced considerable difficulty in getting it down, as there is about 60ft. of drift-sand to go through. About 350ft. of basaltic rock has to be gone through, underneath which there is about 50ft. of clay, then the drift. The method adopted for sinking through this drift is by three sets of cast-iron cylinders, sunk down side by side with compressed air. There is first a chamber cut into the basaltic rock, into which are placed heavy beams to hang the remainder of the timber in the shaft. The timber from this point downwards through the clay is made 12in. square, and all hung together with ten 2-in. iron bolts. Underneath this timber, about 20ft. from the bottom of the layer of clay, there are placed two heavy wrought-iron girders, 3ft. 6in. in depth, and under these are placed two cross-girders, 3ft. in depth, to act as a butt for the hydraulic ram, that presses down the cast-iron cylinders, which is capable of exerting a force equal to 1,000 tons. A frame is placed in the shaft for guiding the ram, the piston of which is about 3ft. in diameter, fitted with angle-leather rings. Directly above the top of the drift or quicksand a platform is made, and a horizontal face-plate laid down on which the cylinders are bolted together. The hydraulic ram forces the cylinders down as the ground gets excavated, and when it is out to its full stroke, which is about 6ft., the ram is lifted up again by a jet of water and another cylinder slipped from the face-plate on to the top of the previous one, and the whole forced down from the top as before. Two of the cylinders are 6ft. in diameter and 1½in. in thickness, which are intended as winding-shafts, having double cages; and the other cylinder is 4ft. 9in. in diameter, which is to be used as a pump- and ladder-shaft. Each cylinder is made in segments, with the flanges inside, having the edges or joints all planed, and the top and bottom ends or joints are all faced in a turning-lathe, so that when they are bolted they form a water-tight cylinder. The cylinders are taken down the shaft in segments, set on their ends on the horizontal plate, and bolted together, the face-plate being for keeping the top and bottom joint true during the time that the segments are being bolted to each other. An air-lock is fixed on the cylinders, and the sinking continued by compressed air supplied from one of Ford's compressors. The extra precautions taken by this company in sinking through the drift is in a measure due to the adjoining company having lost their shaft in trying to get through.