

run up through the centre of the pillar, and timbered with the usual setts. Thus between the centre sett and the timber in the rooms outside, there is a distance of two setts. The top of the pillar is taken out to the depth of one sett, and caps of double length are used to connect the centre with the outside setts. This is done on the four sides and the top heavily lagged. The ore is then worked downward using the long caps at each step, but without lagging. The material of the pillar is readily broken up and sent down the chutes in the outside setts; in fact it is the most rapid method of breaking ore in the mine.

When the pillars have all been robbed the tracks are taken up, a flooring of poles is laid, except where there is a rock floor, and every second leg is blasted out, thus bringing down the whole mass of timbers as well as the roof.

A system called "scramming" is used to mine on the level below. The level is divided into 50' squares, and in each a raise 4' x 9', in two compartments, is run up to the lagging above, the levels being 85' apart. Starting 9' down a drift is driven from the raise 25' each way, and timbered with light setts. The ore is shovelled directly into the chute or a wheelbarrow is used. A second drift is run beside the first, though not always, and the bottom is lagged over. Then the legs are blasted, and the overlying debris caved, as in the Hematite Mine. The process is repeated until the 2,500 sq. ft. is lowered 9'. The miners now drop once more, and repeat the operation, and so work down to the level.

While work is progressing in the drift the timbers begin to crack, which is a good sign, because it shows that the mass above is slowly settling. If the timbers do not show that they are supporting great weight the debris has become "hung up," and is liable to come down at any moment. Seeing this the miners either blast it down, or get out of the place. When the timbers show pressure the workmen are safe, as the mingled rock and timbers settle very slowly, an inch or so a day.

This method of scrambling is also used in new workings under gravel, sand or loose rock. In that case great pits are formed on the surface immediately above.

In the foregoing description of these several mining methods, little attempt has been made to go into the minute details of the various schemes presented. The systems taken up represent the actual practice, in their most essential features, of underground work in Western America, outside of coal mining. Much more might be said in regard to many matters connected with them, such