

WORKING AND TIMBERING THE STOPES AT THE  
GREAT COBAR COPPER MINE, N.S.W.

*(Paper read before the Sydney University Engineering Society,  
November 9th, 1905.*

BY C. H. CROPPER.

The following method of working and timbering stopes, is one which is applicable to wide lodes in which the ore is very strong. This is the case at the Great Cobar Copper Mine, where the ore at present being worked, practically requires no support and consists of low grade sulphides occurring in large bunches about 50 feet wide, some 300 feet in length and of unknown depth; the country rock is a slate formation and stands well. The climate of Cobar being a very dry one, necessitates a system of water conservation and for this purpose large tanks have been sunk and the excavated material, which is of a clayey nature and packs well, is used for filling in the stopes.

The only straight timber in the district is Lachlan Pine, which is sufficiently strong if built up pigsty fashion, but owing to its brittleness is unsuitable if put in as sets. Box timber has proved itself the most durable for the latter purpose and is obtained in the vicinity of Dubbo.

Before describing the present system of working and timbering the stopes, it would perhaps be as well to describe the old method known as the

BARRICADE SYSTEM.—Fig. I. represents a plan of the shaft, platt and ore body at the 500 feet level, the shaft A passing through the ore body.

A level B was started and after leaving about 10 feet of ore as a pillar on either side of the shaft, a face was opened for the full width of the ore body and overhand stoping then begun, the leading stope being taken out at the same time, as the level by working the ore away on an incline forwards and upwards to a height of about 20 feet.

This is shown in sectional elevation in Fig. II.

In Fig. II., K is the leading stope and KR the inclined bench of ore which is broken down as the leading stope advances. The broken ore rolled down on to the floor of the stope and was trucked away so that the men were always standing on solid ground (K) at the working face.

Having stoped out the ore in this manner for a length of some 70 or 80 feet, it became necessary to fill in the excavated portion so that stoping could be continued up to the next level. Figs. II. and III. illustrate the way in which this was done.

First of all a level 6 feet wide was formed by building up pigsty timbering. On each side of the level, two parallel rows of stringers of Lachlan Pine (A) and (B), 7 feet apart, were laid down, then cross logs (C) were placed across the stringers about every four feet. These stringers and cross logs were built up alternately to a height of about 7 feet and the level thus formed, was then covered in by placing logs across the top. When nearing the working face a bulkhead (D) of pigsty timbering was built up across the full width of the stope to within about 4 feet from the top. Ore passes were left in the ordinary way on either side of the level, and ladderways immediately over level.

In Fig. II. :—

E.—Ore pass.

F.—Ladderway.

D.—Bulkhead.

Fig. III. represents a plan of the stope showing the level partly covered in. The ladderway comes up through F.

The mullock passes are winzes sunk from the level above. As soon as the level was properly timbered and the bulkhead started, filling material was run in through the winzes and levelled up, the bulkhead preventing it from getting mixed with the broken ore at the working face.

While the level was being continued on for another section, the second stope of the first section was proceeded with up to the next level, and the men, in order to keep up to the working face, stand on the broken ore until it becomes necessary to fill up again. The ore is then put down the passes and discharged into trucks by means of ore shoots; the bulkhead, ladderways and ore passes are built up higher; filling is run in and levelled as before, and the stope is ready again. It will be seen that this method required a large amount of timber, and it was probably owing to this that the Company adopted a system of timbering the stopes which they call the SET SYSTEM.

The stoping was commenced in the same way as before and when it became necessary to fill in, the level was built up by means of sets of Lachlan Pine, lagged at the sides; the same method being used for crosscuts. This was not altogether a success, since the sets were more liable to crush under the heavy pressure, especially when wet, and should one of the caps break it meant that the level was blocked while the cap was being replaced.

PRESENT METHOD OF WORKING.—This led to the present method of working in which the sets are built up of box, instead of Lachlan Pine.

Fig. IV. represents a plan at the 800 feet level. A drive (P) is made in the ore, the usual pillar is left round the shaft and the leading stope commenced and worked in a similar manner to that described under the Barricade System.

The stopes attain a height of from 25 to 30 feet, and the working face in plan is in the form of an arc extending across the full width of ore body.

While this work has been going on a short crosscut (M) has been started, from which a level is driven in the country rock with the object of running parallel to the ore body, but on account of its irregular form they occasionally cut into it unintentionally.

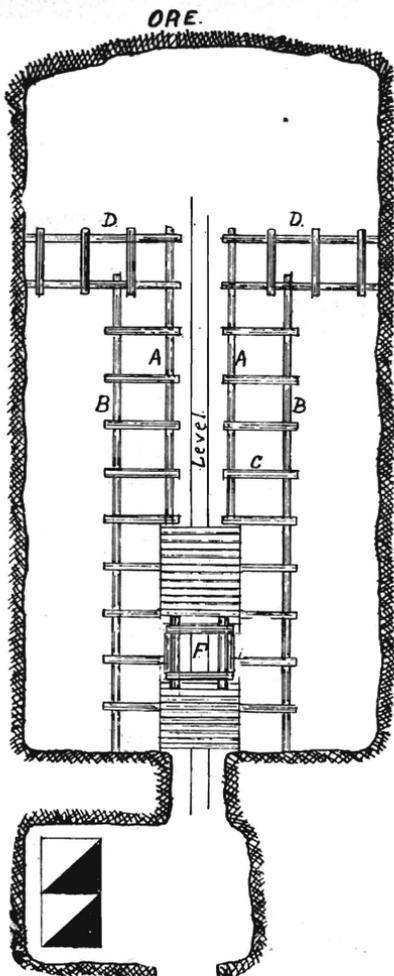


FIG. III.

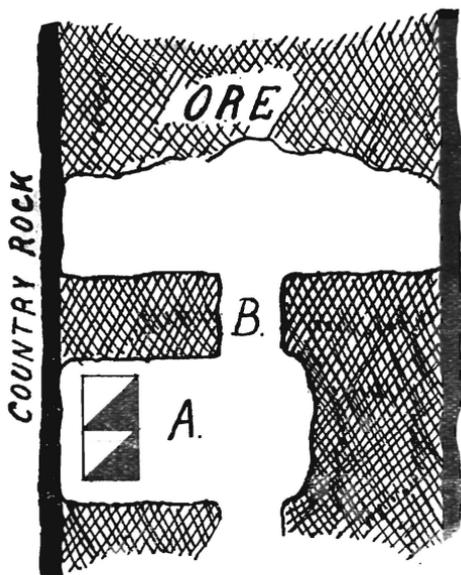


FIG. I.

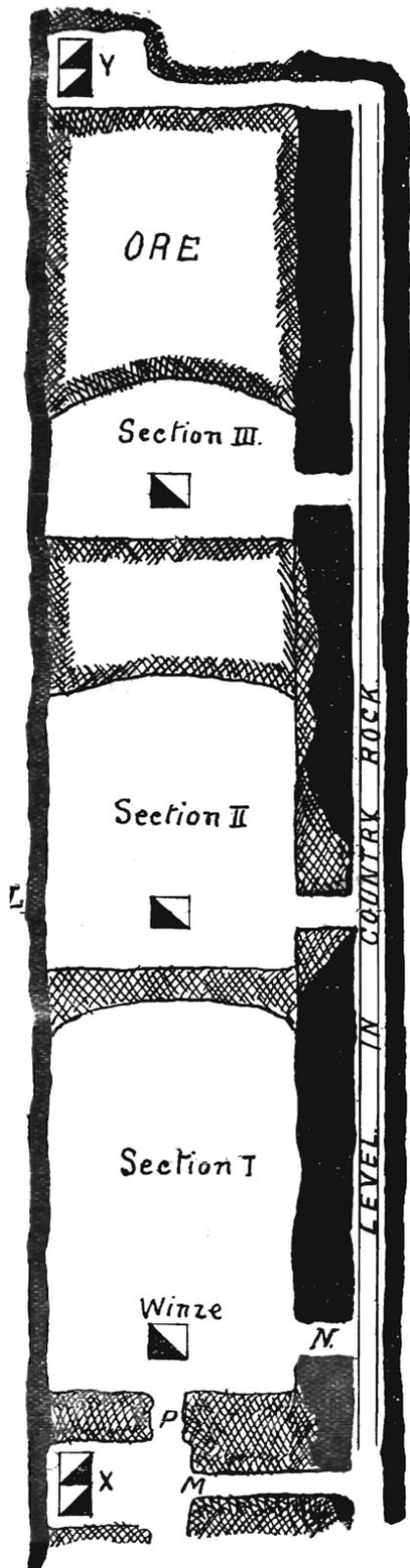


FIG. IV.

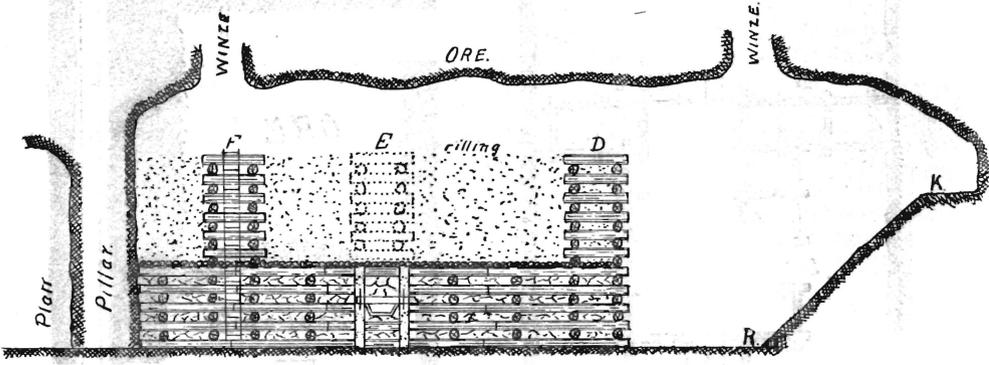


FIG. II.

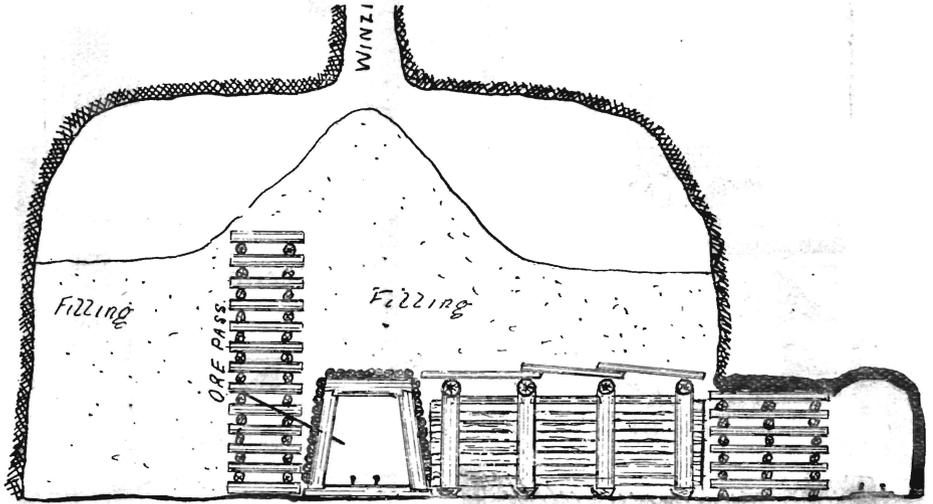


FIG. V.

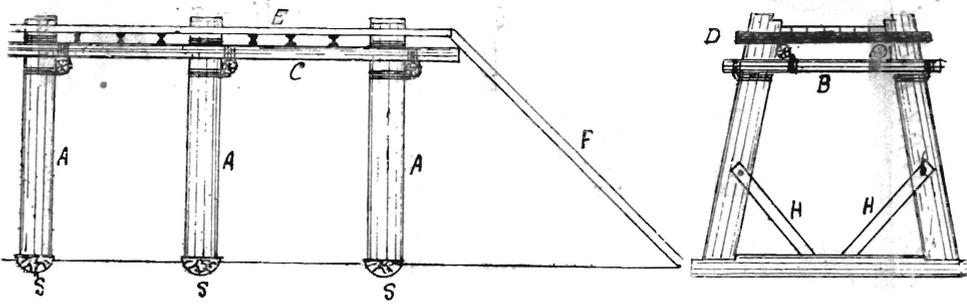


FIG. VI.

In Fig. V. we have a sectional elevation through LL where the ore body has been cut into. In such a case the ore between Section II. and the level, is removed locally and pigsty timbering put in.

A crosscut (N) is driven into each section so that it will be opposite a winze (6 feet by 4 feet) sunk beforehand from the level above. The crosscuts are about 100 feet apart.

The cost of driving the level in the slate country is less than driving it in the ore, slate being easier to break down, standing well and requiring little support. Compressed air is used for working the drills, the main air pipes running through the level, and branch pipes from these feed the drills in the stopes. The ore is shot down in large lumps which are broken up by "Pops" or small charges of explosive. Holes in the lumps of ore are made by the use of Pneumatic Hammer Hand Drills.

Fig. IV. shows the level in plan connecting the two shafts X and Y, which are about 320 feet apart; three sections are being stoped out at the same time. Section I. being so far advanced that there is only a pillar of ore four or five feet thick separating it from Section II., this pillar is not broken down until Section I. is almost timbered and filled up, which is done in the following manner.

On the floor of the stope a level is built up of straight sets of box, about fifteen inches in diameter, placed four feet apart and logged at the sides and top by means of logs placed longitudinally as in Fig. V. The crosscuts to the level in the country rock are timbered in the same way. Ore passes are built up pigsty fashion on either side of the level, those on the same side being 24 feet apart. The old bulkheads between the stopes are done away with and the material excavated at the surface is run in through the winze and the stope filled up.

Fig. VI. illustrates the method of building up the sets, and placing the heavy caps in position.

The legs AAA are set up on their sills S and kept in position by temporary struts H, then temporary logs B are lashed across from leg to leg, and on top of these longitudinal stringers C are laid, which are also lashed to the legs. Rails (D) are placed across the stringers and on top of these rails, boards (E) are laid longitudinally; a skid F is then set up and the caps rolled up this and along the staging boards, and levered into position. In this manner four or five pairs of legs can be set up as described, and their caps put on one after another. The logging consists of poles and is built up as the filling is run in.

The stopes are not picked up; a ledge of ore being left between the bottom of a level and the top of the stopes below. They do not attempt to win this ore as the expense of extracting it would be greater than the value of the ore.

The advantages of this method over those formerly used are:—

- (1) A greater number of stopes can be worked at the same time.
- (2) A larger quantity of ore can be won.
- (3) Much less timber is required.
- (4) The level driven in the country rock, serves as a means of escape should the sets in the stopes collapse.
- (5) The level being connected with both shafts induces a better system of ventilation than formerly.



THE POPPET HEAD AT MOUNT BOPPY MINE.

