ANNEXURE F.

EXAMINATIONS UNDER "THE MINING ACT, 1908."

QUESTIONS ASKED AT THE 1909 EXAMINATION FOR FIRST AND SECOND CLASS CERTIFICATES OF COMPETENCY AS MINE-MANAGERS.

SUBJECT A.—*The Laying-out and Construction of Shafts, Chambers, Main Drives, Adits, Rises, Stopes, &c.*

1. Describe fully the work required to be done before commencing to sink a shaft.

2. A shaft is to be timbered with planking: the length of the shaft in the clear is 11 ft.; the shaft is to be divided into three compartments. Give (*a*) the size (in the clear) of each compartment, (*b*) the width and thickness of planking; also, show by sketch how you would fit the end and side planks so that battens or pegs would not be required, and give the width and thickness of the centre pieces. The width of the shaft is 4 ft.

3. A winze is sunk on a lode to a depth of 300 ft. on an underlie of 25° to the east; a perpendicular shaft is to be sunk to touch the bottom of the winze. Give the distance from the centre of winze at the surface to the centre of the shaft, and also the depth of the shaft. The shaft is at a right angle to the course of the lode, and the shaft and winze are on the same level at the surface.

4. A lode outcrops on the top of a spur having an underlie of 25° from the perpendicular, to the west, and an adit level is to be constructed from the eastern side of the spur; the angle of depression from the outcrop on this side is 60°. Show by calculation the length of adit required to cut the lode at a depth of 200 ft. below the outcrop.

5. Describe fully how you would sink a shaft through wet ground until you touched country rock impervious to water, and the steps you would then take to make sure that no water followed down the shaft as the sinking proceeded.

SUBJECT B.—*On the Timbering of Shafts, Adits, Main Drives or Levels, Passes, Stopes, and generally on the Systems of Timbering Mines, and also in filling up Old Workings.*

1. Give height, width, and length of a chamber where the output is 100 tons per shift of eight hours, sizes and description of timbers, and distance of sets apart (centre to centre)—(*a*) in hard rock; (*b*) in loose rock.

2. The crosscut from the chamber to the lode requires timbering: give sizes of timbers and distance of sets apart, also dimensions of sets in the clear, for a single line of rails.

3. The walls along the lode are heavy, and the material swells and crushes the usual timbering: give sketch showing the best method of fitting the sets, sizes and description of timbers, number of pieces in the set, distance of sets apart (centre to centre); also, show side and top lathing.

4. The width of the lode in the stopes is 60 ft.; the usual style of timbering collapses: show by sketch and explain fully how you would timber the stopes to insure perfect safety; state when you would fill in, and show by sketch your method of doing it.

5. Give the position and distance apart of passes on the above lode, and state whether single or double, or the proportion of each.

6. Give sketch showing how you would timber the passes (*a*) with logs, (*b*) with slabs. Figure sizes on sketch.

7. Give the breaking-strain of a black-birch cap-piece: the length between the legs is 4 ft., and the diameter of the cap is 20 in.

8. If you were constructing a level on alluvial ground through black sand containing water, describe fully how you would keep the material from running, and the precautions necessary to keep the level secure.

SUBJECT C.—*Ventilation of Mines and Composition of Gases.*

1. What gases are met with in metalliferous mines? Give their symbols, specific gravities, and characteristic effects on the human system. Explain how each gas may be detected in the mine.

2. Explain the reason why Atkinson's formula is $p = \frac{ksv^2}{a}$, where

p = pressure per square foot;
a = square feet of sectional area;
s = the area of the rubbing-surface exposed to the air;
v = the velocity of the air in thousands of feet per minute (being the unit of velocity);
k = the coefficient of friction in the same terms or unit as p is taken in.