

APPENDIX III.

MINE-MANAGERS' EXAMINATION-PAPERS.

QUESTIONS USED IN EXAMINATION OF MINING MANAGERS FOR SECOND-CLASS CERTIFICATES.

SUBJECT No. 1.—*On Prospecting, Shaft-sinking, Tunnelling, and opening out a Colliery.*

1. If placed in charge of prospecting operations in a new district, how would you proceed—
 - (a.) To ascertain if coal existed on the ground?
 - (b.) To ascertain the depth from surface, dip, strike, and general character?
2. State your experience in shaft-sinking. Describe the necessary plant required for such work under various conditions, and state usual difficulties met with.
3. How would you proceed to put in a walling curb in a shaft? And what form of cradle would you use in walling a shaft with brick?
4. Describe and show by sketches how you would proceed in driving a tunnel through heavy ground with side pressure.
5. State conditions regulating the size of pillars to be left for supporting colliery-shafts, and make sketch of what you think a good plan for the bottom of a winding-shaft, having in view the rapid handling of tubs.

SUBJECT No. 2.—*On working Coal and timbering underground.*

1. What system of coal-working have you been accustomed to? Describe same, with sketches and also system of timbering.
2. How would you secure a road where the floor lifts and there is heavy side pressure?
3. Many colliers are injured or killed by falls of roof and sides: state what you have noticed to be the principal cause of such accidents, and how, in your opinion, they may be avoided.
4. What is the effect of drawing the back timber when taking out pillars; and what precautions are required to prevent injury to workmen when doing this work?
5. Give sketches of timbering (suitable) under the following conditions:—
 - (a.) Good roof, but heavy side pressure.
 - (b.) How timber set in a pitching seam.
 - (c.) How chocks should be applied so as to effectually support roof, and be easily removed if necessary.
6. Describe precautions necessary to prevent accidents from blasting; say how, in your opinion, blown-out shots can be prevented.

SUBJECT No. 3.—*On the Gases of Mines, Spontaneous Combustion, and Ventilation.*

1. Describe the gases you have met with in your mining experience.
 - (1.) Inflammable gas: If ever you discovered a body of this gas, what was its presence due to?
 - (2.) What means would you adopt to remove this gas if you have—
 - (a.) Furnace ventilation?
 - (b.) Fan ventilation?
2. Describe the other gases you have met with, and state in what part of the mine they were present and to what their presence was due, and what (if any) means you adopt to remove such gases; also say what effect such gases have on animal life.
3. What has your experience been with the barometer and thermometer; and how do the changes affecting the two instruments affect the mines?
4. If you have a gassy and dusty mine, what arrangement would you make for blasting? Under ordinary circumstances, what rules have you seen applied for blasting?
5. What do you understand is meant by the term "spontaneous combustion"? Describe what steps you would adopt in dealing with an outbreak of fire in underground workings.
6. State conditions under which you would apply—
 - (a.) Furnace ventilation, and
 - (b.) Fan ventilation.
7. Which workings are easiest to ventilate, "dip" or "rise"? If any difference, state why.

SUBJECT No. 4.—*On dealing with old Workings and other Sources of Danger.*

1. What are the dangers to be guarded against in reopening old workings which have been sealed off for a length of time?
2. What precautions would you adopt in approaching old workings known to contain water? Show by sketches the plan on which you would carry forward your headings and means adopted to prevent accident.
3. Give sketch of suitable dam to resist a pressure of 100 lb. per square inch. Assume tunnel 8 ft. wide by 6 ft. high, explain how site should be prepared.
4. What dangers are to be apprehended from the existence of an extensive area of goaf or worked ground in a colliery; and what steps would you adopt to guard against accident? Also state whether you prefer goaf to be on the rise or dip side of your workings in a seam giving off firedamp.
5. What are the requirements of the Coal-mines Act regarding duties to be discharged by the manager and under-manager respectively of a colliery?
6. What, in your opinion, is the best explosive for use in coal-mines, having regard to the maximum of safety and effectiveness?