

**ESSAYS ON THE
PREVENTION OF
EXPLOSIONS AND
ACCIDENTS IN COAL MINES**

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Essays on the Prevention of Explosions and Accidents in Coal Mines by Wilfred Creswick & William Galloway & William Hopton

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WILFRED CRESWICK & WILLIAM GALLOWAY & WILLIAM HOPTON

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The Hermon Prize Essays.

ESSAYS

ON THE

PREVENTION OF EXPLOSIONS

AND

ACCIDENTS IN COAL MINES,

TO WHICH WERE AWARDED THE FIRST AND SECOND PRIZES GIVEN BY
EDWARD HERMON, ESQ., M.P., PRESTON.

ESSAY I. BY WILFRED CRESWICK, OF SHEFFIELD.

ESSAY II. BY WILLIAM GALLOWAY, OF LONDON.

ESSAY III. BY WILLIAM HOPTON, OF ST. HELENS.



LONDON:

W. M. HUTCHINGS, 5, BOUVERIE STREET, FLEET STREET, E.C.

1874.

188. 1. 36

INTRODUCTION.

IN the latter part of the year 1871, Edward Hermon, Esq., Member of Parliament for Preston, deeply lamenting the frequency of explosions and other accidents in coal mines, and the terrible loss of human life resulting therefrom, determined to offer prizes for the best essays on the means of preventing such calamities. This intention he communicated to the Mayor of Preston, Miles Myres, Esq., as follows:—

“I have felt deeply the terrible calamities that have befallen our mining population of late, and have considered whether anything could be done to prevent these catastrophes. With this object in view, I propose to give a premium of £200 for the best essays on the subject, to be competed for by practical miners in the coalfields of Lancashire and Yorkshire—say, £150 for a first prize, and £50 for a second. In your official capacity as Mayor and Coroner, I am sure you will assist in gaining the attention of those concerned to the subject. I have no doubt we shall find three able and impartial judges to decide on the merits of the pamphlets, one of the conditions being that phraseology and spelling shall not influence the decision, but the prize to be awarded for the most useful and life-preserving suggestions.”

The Mayor of Preston readily responded to the call made upon him, and announcements were issued and invitations given to practical men to compete for the prizes. Alexander Staveley Hill, Esq., M.P., Thomas Hughes, Esq., M.P., and Rupert Kettle, Esq., were appointed judges, and, in June, 1873, they gave the following

AWARD.

June, 1873.

We have perused the essays forwarded to us on the subject of the best means of preventing accidents in mines, especially with regard to explosions; and we have agreed upon bracketing as of equal merit for the first prize the essays of “Mr. Robert Eloit,”* of 63, West-street, Sheffield; and Mr. William Galloway, of 3, Duke-street, Portland-place, London. These essays are both of very high merit. We place as next to these an essay by Mr. Hopton, of St. Helens; and we are of opinion that the essay by Mr. Bainbridge, of the Duke of Norfolk’s Colliery Office, Sheffield, is entitled to high commendation.

Several of the other essays show a great amount of practical knowledge of mining, and we desire to express our gratification at the high order of ability and accurate knowledge of their duties which the essays show to exist among those who manage mining operations, and our sense of the great service rendered by Mr. Hermon in offering this prize, in inducing the writers of these essays to bring their minds to a careful consideration of the subject.

ALEX. STAVELEY HILL,
THOMAS HUGHES,
RUPERT KETTLE.

* This was the *nom de guerre* adopted by Mr. Wilfred Creswick, now of 8, George-street, Sheffield.

Upon receiving the award, Mr. Hermon resolved to increase the amount he had originally offered in prizes, and to so re-arrange the amounts as to meet the case of the two essays declared to be of equal merit, and to be entitled to the first prize. He, therefore, wrote again to the Mayor of Preston (Mr. Myres still holding that office) as follows:—

TO MILES MYRES, ESQ., MAYOR OF PRESTON.

"My dear Sir,—‘Essays on Prevention of Explosions and Accidents in Coal Mines.’ You were kind enough to call the attention of the mining population to my offer of prizes in this matter. Finding you still occupying the same honourable position, I venture to ask you in your official capacity to distribute the enclosed cheques to the parties indicated in the next award. You will remember that I named £200 for this purpose, allotting £150 for the first and £50 for the second prize; but the judges, you will observe, place two as equally deserving a first prize. They then select one as second, and, further, highly commend another essay. I have, therefore, with much pleasure increased the amount to be distributed to £275, that is to say—Two first prizes at £100 each, £200; one second prize, £50; one third prize, £25; total, £275. I hope this will be satisfactory to all concerned. I have only further to express my acknowledgments to you, and my deep obligation to the judges for the labour, care, and time they have bestowed upon the consideration of these essays.—Yours sincerely,

“EDWARD HERMON.

“London, 38, Grosvenor-place, June 12, 1873.

“P. S.—I hope the prize essays may be published, and, perhaps, some of the others, as I entertain a strong expectation that ultimately the mining population will derive the advantage intended by this endeavour to bring out from practical experience the best means for the prevention of explosions and other accidents in coal mines.—E. H.”

In accordance with Mr. Hermon's expressed wish the two essays by Messrs. Creswick and Galloway were published in several newspapers, and, together with that of Mr. Hopton, they were published at length in the *Colliery Guardian*. They excited considerable public interest, and as the numbers of the *Colliery Guardian* in which they originally appeared are now out of print, the essays have been reproduced in the present volume in the hope that thus they may be found of service to those engaged in mining enterprise, and contribute in some degree to the economy of human life in underground operations.

Colliery Guardian Office,
5, Bouverie-street, London, E.C.
January, 1874.

Mr. Hermon's Prize Essays.

THE PREVENTION OF ACCIDENTS IN MINES.

MR. WILFRED CRESWICK'S ESSAY,

(Signed "Robert Eloin.")

TO WHICH A FIRST PRIZE WAS AWARDED.

PRELUDE.

An essay on the Prevention of Accidents in Mines would be very incomplete unless referring to the General Rules of the Acts of Parliament, and the Special Rules which are framed with the approval of her Majesty's Secretary of State, and her Majesty's Inspectors of Mines. As each rule is intended to prevent accidents, therefore I subjoin them in their usually printed form (with my remarks on the margin); for the same reason I refer to the number of rules relating to suggestions I make in the course of this essay, it being understood that, as I approve of the subjoined rules, excepting where it is expressly stated to the contrary, or an explanation is given, no reference on the margin of any rule signifies my approval of that rule. This essay will also treat on subjects not mentioned in the subjoined rules.

The Laws affecting Coal Mines and Ironstone Mines now require that—

The owner of the mine shall establish such Special Rules for the conduct and guidance of the persons acting in the management of the mine, and of all persons employed in or about the same, as shall be approved by the Secretary of State.

The owner or agent of the mine shall cause the General Rules and Special Rules to be painted or posted on a board, and hung up at the principal office, and at the place where the workmen are paid; and a printed copy of the General Rules and Special Rules shall be supplied to all persons employed in and about the mine who shall apply for such copy. The General Rules and Special Rules so painted, or posted, or printed, shall be renewed and restored as often as the same, or any part thereof, may be changed, defaced, or destroyed. A person who pulls down, injures, or defaces any notice hung up or affixed as required by the Mines Regulation and Inspection Act, will be liable to a penalty of not exceeding forty shillings.

The owner or agent of the mine shall provide accurate maps of the underground workings; and shall in all respects manage the mine, and conduct the proceedings thereof, in accordance with the requirements of the Act 23 and 24 Vict., c. 151, and of the Act 5 and 6 Vict., c. 99.

The Mines Regulation and Inspection Act recites that every person employed in or about a mine, who neglects or wilfully violates any of the Special Rules established for such mine, shall, for every such offence, be liable to a penalty not exceeding two pounds, or to be imprisoned, with or without hard labour, for any period not exceeding three calendar months.

The same Act of Parliament also recites that, after the 1st of July, 1861, a boy above ten years and under twelve years of age can only be employed in a mine on either of the following conditions, namely:—The owner of the mine shall obtain a certificate from a competent schoolmaster that such boy is able to read and write; or, that in the second and every subsequent lunar month during which such boy is employed, the owner shall obtain a certificate from a competent schoolmaster that such boy has attended school for not less than three hours a day for two days in each week during the lunar month immediately preceding, exclusive of any attendance on *Sundays*.

*General Rules, according to the Act 23 and 24
Vict., c. 151.*

The following General Rules shall be observed by the owner and agent:—

1. An adequate amount of ventilation shall be constantly produced in all coal mines or collieries and ironstone mines, to dilute and render harmless noxious gases to such an extent that the working places of the pits, levels, and workings of every such colliery and mine, and the travelling roads to and from such working places, shall, under ordinary circumstances, be in a fit state for working and passing therein.

See page 29.
Explanation.

2. All entrances to any place not in actual course of working and extension, and suspected to contain dangerous gas of any kind, shall be properly fenced off, so as to prevent access thereto.

3. Whenever safety lamps are required to be used, they shall be first examined and securely locked by a person or persons duly authorised for this purpose.

See page 32.

4. Every shaft or pit which is out of use, or used only as an airpit, shall be securely fenced.

Drop gates would ensure this in a drawing shaft.
See page 37.

All shafts should be lined, unless the inspector directs otherwise.
See page 37.

5. Every working and pumping pit or shaft shall be properly fenced when operations shall have ceased or been suspended.

6. Every working and pumping pit or shaft where the natural strata, under ordinary circumstances, are not safe, shall be securely cased or lined, or otherwise made secure.

7. Every working pit or shaft shall be provided with some proper means of communicating distinct and definite signals from the bottom of the shaft to the surface, and from the surface to the bottom of the shaft.

8. All underground, self-acting, and engine planes, on which persons travel, are to be provided with some proper means of signalling between the stopping places and the ends of the planes, and with sufficient places of refuge at the sides of such planes at intervals of not more than twenty yards.

It may, in some cases, be found desirable to have a separate road for persons to travel on. These cases should be left to the inspector, who can decide when such is needful.

9. A sufficient cover overhead shall be used when lowering or raising persons in every working pit or shaft where required by the Inspectors. See page 36.

10. No single-linked chain shall be used for lowering or raising persons in any working pit or shaft, except the short coupling chain attached to the cage or load.

11. Flanges or horns of sufficient length or diameter shall be attached to the drum of every machine used for lowering or raising persons.

12. A proper indicator, to show the position of the load in the pit or shaft, and also an adequate brake, shall be attached to every machine worked by steam or water power used for lowering or raising persons. A brake should be fixed to the drum. See page 36.

13. Every steam boiler shall be provided with a proper steam gauge, water gauge, and safety valve.

14. The fly wheel of every engine shall be securely fenced.

15. Sufficient boreholes shall be kept in advance, and, if necessary, on both sides, to prevent inundations in every working approaching a place likely to contain a dangerous accumulation of water. See pages 33, 34, 35.

Special Rules.

The following special rules shall be observed by the agent, underground viewer, deputies, miners, and workpeople:—

1. The agent and underground viewer shall see that competent deputies are appointed to superintend the works and workpeople; that qualified enginemen, banksmen, and hangers-on (*above the age of eighteen years*) are employed to attend the engines and pits; and shall be responsible for the general safety of the works, machinery, ropes, and tackle, and for the adequate ventilation of the mines; and shall at least once a week measure with an anemometer the several air currents, and examine the workings of each mine, and see that the air is circulating in a proper manner, and in sufficient quantities to dilute and render harmless noxious gases to such an extent that the shafts, levels, and working places of the mines, and the travelling roads to and from such working As to the age, see pages 36, 37; for adequate ventilation, see page 29.

MR. HERMON'S PRIZE ESSAYS.

places shall, under ordinary circumstances, be in a fit state for working and passing therein; and shall further see that all entrances to any place not in actual course of working and extension, and suspected to contain dangerous gas of any kind, shall be properly fenced off so as to prevent access thereto.

See page 32; also
page 22.

2. The agent and the underground viewer shall see that careful and steady men are employed every day and night at the ventilating furnaces or other ventilating apparatus; that an adequate stock of proper safety lamps is provided and maintained; that lampkeepers are appointed to examine and lock them; and shall not allow a safety lamp to be used that has fewer than twenty-eight parallel wires in an inch, or which is not furnished with a lock, shield, and wire picker.

See page 36 about
cover.

3. The agent and the underground viewer shall see that an ample stock of good timber, props, bricks, lime, ropes, brattices, air-pipes, and other requisite materials, is always on the premises; and that a sufficient cover overhead is provided for use when lowering or raising persons in a working pit or shaft.

4. The agent and the underground viewer must provide the signals mentioned in General Rule 7, and in Special Rules 49 and 50; and must see that all *underground* self-acting and engine planes on which persons travel are provided with some proper means of signalling between the stopping places and the ends of the planes, and with sufficient places of refuge at the sides of such planes at intervals of not more than twenty yards; and with suitable "*backstays*" or "*drags*" to fix behind the trains going up the planes.

5. The agent and the underground viewer must supply to every person employed in and about the mines a printed copy of the General Rules and Special Rules.

See page 37.

6. The underground viewer shall see that all underground shafts, and openings into the sides of shafts, are securely fenced when practicable. Wherever there is a sump at the bottom of a working pit, the underground viewer must have it safely covered with a scaffold, and see that there is adequate ventilation beneath all scaffolds in shafts.

Tight stoppings,
&c. See pages 22,
28.

Roof supports, &c.
See page 35.

7. The underground viewer or his deputy shall see that the aircourses and air crossings are kept properly open; that regulators, tight stoppings, doors, and sheets are fixed where needful; that air-pipes, brattices, danger signals, fire boards, packwalls, props, bars, and "*sprags*" are put where required; that the ventilating furnaces or other ventilating apparatus are constantly attended to; and that the various roads are well