

5

A SOCIETY FOR PREVENTING ACCIDENTS IN COAL MINES.

At a numerous Meeting, holden at the School of Industry, Bishop-wearmouth, on Friday, the 1st. day of October instant,

SIR RALPH MILBANKE BART. IN THE CHAIR.

It was Resolved,

That this Meeting, impressed by the frequent and dreadful accidents, which have occurred by Explosions of Inflammable Gas, and from other causes in Coal Mines, particularly by those which have lately happened in the Counties of Durham and Northumberland, notwithstanding the precautionary measures which have been adopted, do form itself into a Society for the purpose of obtaining communications from scientific and practical men, as to what modes may be devised for the prevention of such accidents.

Resolved,

That the Nobility and Gentry be invited to become Members of the Society.

Resolved,

That a provisional Committee be formed for the purpose of forwarding the Views of the Society, and that it consist of the following Gentlemen.

SIR RALPH MILBANKE BART.
JAMES JOHN WILKINSON, ESQ.
REV. ROBERT GRAY, D. D.
REV. GEORGE STEPHENSON, M. A.
REV. THOMAS BAKER, M. A.
REV. JOHN HODGSON
STEPHEN PEMBERTON, M. D.
WILLIAM REID CLANNY, M. D.
HENRY FEARON, M. D.
JOHN ARMSTRONG, M. D.
GEORGE ROBINSON, ESQ.
RICHARD PEMBERTON, ESQ.

JACOB MAUDE, ESQ.
JOHN GOODCHILD JUN. ESQ.
THOMAS HOPPER, ESQ.
ADDISON FENWICK, ESQ.
THOMAS WILKINSON, ESQ.
MR MARKHAM
MR BURN
JOHN RALPH FENWICK, M. D.
ARTHUR MOWBRAY, ESQ.
JAMES HAMMETT, ESQ.
MR STOBART

Other Gentlemen were named to be of the Committee, who have not yet signified their acceptance of the Office.

Resolved,

That the Committee do call an early general Meeting of the Subscribers and well-wishers to this Institution, for the purpose of forming a permanent Committee, to consist partly of scientific and practical men.

Resolved,

That MR BURN be appointed Treasurer and Secretary.

Resolved,

That the thanks of the Society be given to JAMES JOHN WILKINSON ESQ. of the Temple, London, for having suggested the plan of this Society.

Resolved,

That these Resolutions be printed in the Newcastle Courant, the Chronicle, and in one of the London Papers.

SIR RALPH MILBANKE having left the Chair,

Resolved,

That the thanks of the Meeting be given to SIR RALPH MILBANKE BART. for the warm and able support he has afforded to the formation of the Society, and for his conduct in the Chair.

RALPH MILBANKE, CHAIRMAN.

A Subscription was entered into.—Subscriptions will be received by the Treasurer, and at the Banks in Durham, Sunderland and Newcastle.

The next Meeting of the provisional Committee will be on Friday, the 22d. instant, at the School of Industry, at 12 o'Clock.

Bishop-wearmouth, 1st. October, 1813.

Plan for illuminating coal mines

without Risque from explosion by fire lamp, or Carbur-
reted Hydrogene -

"Occidit quis non servat."

The Plan recommended by Sir Humphrey Davy recommends
itself to our notice by its simplicity, and therefore its merits
deserve an undivided attention, and ought to be well apprecia-
ted. I am of opinion that his deductions are somewhat question-
able and the grounds of my dissent from the Inferences of this
distinguished Philosopher shall follow a simple description
of the apparatus itself - An Air tight Lantern is recommended.

This machine is to have 2 small apertures at bottom for a
supply of Air to feed the Combustion and one at Top to prevent
the escape of the heated Air. - Sir Humphrey concludes that
should a quantity of carburreted Hydrogene enter the Lamp
by the Base, an enlargement of flame would ensue the
consequence of which would be the production of an in-
stantaneous extinction of the Ignited mass. -

1. It is evident that such a Lamp could be of no
service in the Roof of a mine, where the carburreted Hy-
drogene is collected, for even on Davy's own assumption, it
would cease to burn being enveloped by an atmosphere of
the gas in question, just so an ignited Paper is extinguished
when plunged into a volume of inflammable Air -

2. I strongly suspect that the quantity of atmospheric
Air which would enter the Lantern along with the Carbur-
reted Hydrogene might prevent the phenomenon he describes,
namely, an enlargement of flame, and granting a momentary

vacuum the air would as instantly rush into the Lamp from the upper orifice & supply the pabulum of combustion. But supposing that this did not take place, which may be very reasonably expected the flame would as soon kindle this communicating Pipe and inflame the external air of the mine. Having stated these disadvantages on the theory of Probabilities, I venture to suggest what I certainly must consider improvements, and then point out a method, which I have proposed some months ago.

1. I would suggest the propriety of attaching a flexible Tube to the lower aperture of the Lantern, the other end not being in contact with the flame of the mine, but about 3 inches and pass above it. The Tube might be covered over with Caput Mortis. The carbonaceous Hydrogen ascending & occupying the upper Region could not be ignited by this communication.

2. To the upper orifice which permits the escape of the heated air, I should advise adapting the following appendage. Let a double Recurved Tube (such as that of de Lavoisier which applies to the common gas Bottle and is exhibited in a writer's Tube of safety) or one in the form of an inverted siphon, enter into a cistern of Lime Water. This ~~provision~~ provision would be one of considerable moment and its advantages may be considered in the following point of view.

First. The Carbonic acid has displaced in the air of combustion, would be detained by the Lime, and chalk deposits, and thus this gas could not intermingle to deteriorate the air of the mine.

Secondly, were this even Water simply, the fresh air would be cooled by the refrigerating medium, so that it would sink to the earth and not incorporate with the ambient atmosphere for it may be accepted as represented numerically by 1500 Atmospheric Air being 1000.

Thirdly. Should a vacuum occur, the water would be by the external influence of the atmosphere on its surface, pushed in and deluge the Lantern.

The flame might be preserved of a uniform brilliancy by regulating the density of the included air by means of a double reservoir Tube containing water & hermetically sealed at the upper extremity which projects beyond the Lantern, the form might resemble an inverted Wetter's Tube of safety, and the column of water would be regulated by its rise or fall on expansion or condensation.

The other Proposal I beg to copy from page 134 of my Elements of Chemical Science. - I see that Mr. Murray of Edinburgh has in a paper written these few days before the R. S. E. du. recommending a plan similar to that herein suggested. But I have unfortunately for him, anticipated him by as many Months for my work has been before the Public nearly half a year. Summa cuique.

I have now only to add as an Improvement the adaptation of a double reservoir Tube (already described, entering into Lime water, for to receive the heated air instead of the second flexible Tube.

I should also recommend the Lantern to be furnished with a "Purlo's eye" lens on each burner, the combustion to be supplied from a Fountain Lamp, or one constructed on the same principle. The lamp might screw into the base of the Lantern & the whole apparatus be rendered more improvements to be by Capri Horns -

" A Lantern might be made air-tight and gas-tight affixed
Tube by air exterior to that of the mine; a division in this pipe
or another parallel to its inner promote a proper current
to supply the flame, and carry off in circulation the heated
Air impregnated with Carbonic acid gas. — Such a diffu-
sion of Light might be communicated and further dispensed by
reflectors as far ever to remove the danger of explosion
yet be effectual; or an air-tight Lamp might be formed
having a central Tube entering into a vessel of Lime
Water which should be frequently agitated to absorb
the Carbonic Acid Gas formed; a pipe might supply
it from the mine itself, the orifice of the Tube might receive
the supply from the stratum of air contiguous to the flame
the Carburated Hydrogen being lighter and ascending
~~through the air~~ ~~the upper part~~ ~~thus cause no trouble~~
the Tube."

Murray

Franklin, N.B.

4th December 1858.

On the Ventilation of Coal Mines

Continued.

I shall now beg to add further that in Page 153 I have ventured to express my surprise that the Miner is not enjoined to examine the Air of the mine at stated Intervals for this purpose it is merely necessary to procure a vessel which is emptied of Water in that part of the mine or stratum required to be ascertained and having brought it up over Water to pass into it Nitrous Gas obtained from Nitric acid & Quicksilver in a Retort with aid of heat) The volume is then instantly reddened aquiafortis being poured & by agitating it in contact with Water it is absorbed, all above three fourths in volume unabsorbed, may be returned advenitious, or the air may be brought in Bladders from the mine and a vessel of a given capacity be filled with it over the stuff of the Pneumatic Cistern.

The Carbonic Acid Gas which forms in some mines I apprehend may be easily destroyed by simply sprinkling the floor with Lime Water from the top of a common Watering Pan.

By the flexible tube being 9 Inches or 1 foot from the ground the Carbonic Acid Gas should any exist will not likely be so deep a rise so high as to overcome the orifice, but by simply digging a deep cavity in the floor of the mine & causing inclined Grooves or Gutters to terminate here, the work will be accomplished; Lime Water projected into the cavity would absorb the fixed air.

I think that when the Carbonated Hydrogen which enters the lamp is ignited, it would through the aperture at base communicate with the air exterior to the mine, as a spark igniting Gunpowder however lengthens be the train. I can conceive that the flame of the lamp would be extinguished when plunged into a volume of Carbonated Hydrogen, but tho' this is the fact when we experiment in our Laboratories, the case assumes a different position in the mine for there is not only an atmosphere of carb^d Hydrogen but an external shell of atmospheric air. I would advise a lantern (as the simplest and most effectual construction) be 1st Air tight 2nd the Wick formed of abestos which suffers no decrease from combustion 3rd the Oil supplied exterior to the lantern from a Reservoir and admitted by means of a funnel such as supply Air tight vessels wth liquids 4th That a curved tube enter a Cistern of Water from the Summill

of the lantern & that a delicate clock valve opening upwards cover the two apertures at the base. Thus by the air rushing towards the rarefied medium in order to restore an equilibrium, this valve will always remain open but should Carburetted Hydrogen enter & a detonation ensue the reaction resulting would by its impetus or immediate impulse instantly shut the valve prevent contact with external air and extinguish the flame. a double advantage would attend such a construction of the lantern. Should there occur a detonation the valve will fall down & prevent an admission of air prolonging the lamp. Should the volume simply inflame in its escape above it would be met by water. Should a void form under any circumstances that void would be met by a flood of water which "matters of course" so that what might be only a momentary extinction could not be banimatis.

There are only two ways of getting rid of the Carburetted Hydrogen or Fire damp. The one is by firing it. The other by ventilation. at the best, the former is attended with no small or unimportant risk. The latter is beyond all comparison the most desirable mode. It is too obvious that even granting all risk of human life to be removed, still the machinery over the shaft as well as the Interior workings must be considerably disturbed or be destroyed by it. yet it would be easy to fire such without personal risk. Let the Wick of the taper or candle to be ignited be moistened with Spirits of Turpentine & powdered Oxymuriatic Potassa, be added, then let the Wheel Work be wound up so as to let fall a Lever on the Wick after a given time. this Lever to be armed with asbestos and oil of vitriol (sulphuric acid). In such a case it would be indispensable to examine with the Nitrous Gas test the state of the mine frequently so that it be taken in time & before it can accumulate to a maximum.

As to the getting rid of the Carburetted Hydrogen. I should advise a Stove made quite air tight placed under the mouth of the Pit shaft. the door which supplies the fuel to be in like manner air tight. The chimney of the common form. let a pipe with a funnel shape upper receive the Carburetted Hydrogen from the upper stratum of the air of the mine and this pipe enter under the lower bars of the grate to supply the combustion of the fuel. It will thus pass off to the furnace as it forms. It would be necessary to promote the opening

of a free communication throughout the mine - i.e. the upper
strata with each other, by a proper orifice above the several trap doors
which entered the workings.

I much approve of Mr Brander's
proposition of exploring the mine on the principle of the Diving Bell &c.
it is difficult to ascertain under what circumstances the vessel which
envelopes the head could be rendered air tight, the top of the glass vessel
might have attached to it, varnished silk to lie round the neck the
flexible tube which supplies respiration wth Atmospheric air would enter
the side and a pipe of a small calibre would allow the escape of the
heated & impure air.

Since writing the above, a Newspaper has
been put into my hands containing a notice that Dr. Dany has sim-
plified the principle of the lamp which he has projected, by applying a
fine wire grate to the lower orifice of the Lantern which he finds allows
the air to pass but is an effectual barrier to flame, by my ex-
periments, I find the Principle just, but I discover also that it
will not apply as a barrier to the chimney unless the wires be from
 $\frac{1}{10}$ to $\frac{1}{15}$ in. apart. The smoke will pass thro' yet the flame will
be retained - This I recommend in preference to the curved tube
as being more simple, but I still must suggest the flexible
tube as applied to the base of the Lantern, to supply it with
pure air, for a lamp without this, would be liable to
perpetual extinction and could be of no permanent service.
I tried a light insulated in water, covered by a close wire cage
such as is used to ^{envelope} ~~enclose~~ squares when fractured by external
force with the air Pump, and found it effectual - Such a Lamp
might be of service to explode the gas, but the trouble would be
endless, seeing so much a quantity could be disposed of at once.

The Lamp might be multiplied ad infinitum & perpetually
relighted yet to little purpose where the gas is liable to accumu-
late - Add to this, from these frequent explosions, Carbonic
acid gas may be formed in such abundance as to excite just
cause of alarm, & due by consuming the Carbonated Hydro.

given as it appears in the manner I have proposed, The
effect is removed from the scene of action

Spencer

23rd Decemr 1855

Trinity