

them greater comfort, and better principles have secured them from excesses; these things lead me to believe that the evils which now affect the miner may for the most part be hereafter obviated, if, together with the removal, as far as shall be found possible, of those injurious agencies which have been pointed out in this Report, effectual measures shall be taken for the intellectual, moral, and religious education of this class of the population of the West of England.

I have the honour to be, Gentlemen,
Your very obedient servant,
CHARLES BARHAM,
Sub-Commissioner.

APPENDIX (A)

4, Clarence-street, Penzance
May 10th, 1841.

SIR,

ONE of the most fatiguing circumstances to which our miners are exposed is the elevated temperature which prevails in deep mines. I have personally inspected every part of about 200 mines in Cornwall and Devon, and have made many hundreds of observations on the temperature of the streams of water which flow into them immediately as they issue from the unbroken rock. The following is a general summary of my results:

Depth, in Fathoms, of Place of Observation.	Temperature.	
	In Slate. Degs. (Fahr.)	In Granite. Degs. (Fahr.)
Surface to 50	57·0	51·6
50 " 100	61·3	55·8
100 " 150	68·0	65·5
150 " 200	72·0	••
200 and upwards	85·6	81·3

The fatigue of climbing 200 fathoms is very great, and when this is done in an atmosphere of 80 degrees the exertion is of course considerably greater. But added to this, one party, (of the three gangs who relieve each other at every eight hours) have to leave their work at 10 o'clock at night; and I have known instances where labourers, who had to remain in a temperature of 96 degrees whilst at their employ, at this late hour of the night had to walk three miles to their homes. Some of these were too poor to be well clad; and after so frightful a transition of temperature, and so long a walk against a fierce and biting wind, they have often reached a home without a fire, and had to creep to bed with no more nourishing food and drink than barley-bread or potatoes with cold water.

The rewards which private benevolence and the exertions of the Polytechnic Society have offered for the production of a safe machine applicable to the general features of Cornish mining economy, have brought into notice several ingenious pieces of mechanism, for the purpose of lowering the labourers to their work, and raising them to the surface after their day's employment is over.

That none of these machines have been introduced to practice is a sufficient proof that the project, or the modes of effecting it, have not met the approbation of practical men. You will perhaps allow me to glance at an objection or two which I think it may be found very difficult, if not impossible, to obviate.

All these machines require a shaft to be set apart for their use; and a shaft of 200 or 250 fathoms deep, in the centre of the workings, is in the first place an item of enormous cost, and in the second the shafts in such situations are required every moment both of day and night for the purposes of the pumping-engines, or for drawing the ore and rubbish to the surface. Of course, if the shaft through which the workmen are drawn to the surface is not in the vicinity of the *workings*, its utility will be but small. Again, the masses or *bunches* of ore in our *lodes* (veins) have almost invariably a dip or inclination, which is in most cases from the nearest mass of granite. From this reason the chief portions of the *deep workings* are seldom *immediately beneath* the shallow ones; and thus whilst the workings increase in depth, they almost always have a horizontal progression.

Thus the shafts which at the commencement of a mine serve for the working of the deeper parts, are almost abandoned as the mine gets deeper. The steam-engines for pumping water thus often require occasional removal; and the same remark applies to any other machinery fixed in the shafts, and of course bears on the subject of the raising and lowering of the labourers.

I have little doubt but that the mode in universal use in the coal-mines, of lowering and drawing up the workmen in a basket, box, or other vehicle attached to a rope or chain, and that wound by a steam-engine, might be as beneficially employed in Cornwall as it is elsewhere; and if it was only adopted for 100 or 150 fathoms from the surface, it would produce a saving in the animal power, which would be most advantageous as well to the adventurer (mine-owner) as to the workman.

I dare say some difficulty would be found in inducing the men to trust themselves to a mode of conveyance which, if less laborious than that of ladders, is surely also less secure; but I think no more objection would be stated to this mode than to any of the various ingenious contrivances which have so often enriched the exhibitions of the Polytechnic Society.

There is, however, an improvement in the dimensions and adjustments of the ladders, which has been for some years in use at *Tresavean Mine*, and which I have been the humble means of having introduced at *Wheal Mary*, in Lelant, which I think has not been generally known, although I have described it in the newspapers. This consists in simply diminishing the distance between the staves, bars, or rungs of the ladders to 10 inches instead of the usual space of a foot; and in fixing the ladders at an uniform inclination of about 70 degrees. This diminished rise of the step, and an inclination which allows the climber to stand nearly erect whilst moving in the ladder, has been found so efficacious in *Tresavean*, that aged men who had previously abandoned working in the deeper parts have now been enabled to return to labour in the very bottom; and although there is another very excellent series of ladders of the ordinary description in *Wheal Mary*, the workmen have entirely abandoned it for the new one.

I venture most unhesitatingly to recommend this plan for universal adoption, for I am sure, from my own experience, that it relieves the operator from at least one-third (and I may say even a larger portion) of the labour. I have little doubt but that its general introduction would effectually answer the benevolent objects of the parties by whom attention to the subject was first drawn.

There is no doubt but that rapid travelling in the ladders is very injurious, and in this respect there is considerable difference in various districts. In the central districts of Cornwall, viz., at Gwennap, Redruth, Camborne, &c., where the mines have long been very deep, the workmen climb much faster than they do either at St. Just, in the vicinity of St. Ives, or in the eastern part of Cornwall, where there are but few deep mines. I have little doubt but that this difference will be found to affect the vital statistics of these respective districts.

There are some other topics which I might enlarge on, but as some of them are of general occurrence, and others may be as readily met with on the surface as under ground; you have probably found them yourself, or heard of them from other parties. I have therefore confined myself chiefly to matters which have not been so fully observed by others, or which I imagined the agents of mines, confined to their own localities, but not so fully observed as I have had opportunity of doing from so long and general an acquaintance as I have enjoyed with every mining district in the West of England. In Ireland there are some striking peculiarities among the mining population; but, as your own inquiries do not extend to that country, I do not trouble you with them.

I wish these things had been better worthy of your notice, and that my full employment had given me time to shorten and improve the arrangement of them.

I have, &c.,
W. J. Henwood

P.S. A most important and invaluable suggestion was made by Dr. Carlyon to the Polytechnic Society of Cornwall some years since, and which cannot be too generally known. It was that each labourer, on his ascent from the mine, and before his return home, should be supplied with a small quantity of coffee, soup, or other warm and nutritious fluid to sustain them under the exhaustion from labour, and to keep out the cold. Owing to the liberality of the Right Honourable the Lady Basset this excellent plan has been tried at Dolcoath Mine with perfect success, and to the great delight of the grateful miners. It is greatly to be desired that this wise suggestion and this enlightened benevolence would lead to its general adoption.

APPENDIX (B)

WHEAL BUDNICK CLUB

The appropriation of the sums contributed by the Budnick miners, viz. 12d per man per month, and 6d per boy per month, is as follows: for the club, a moiety and for the surgeon, the other moiety.

1. Every man wounded or injured under or above ground while actually working in or about the mine, shall, upon his producing a certificate from the surgeon purporting that in consequence of such wound or injury he is unable to work, receive 12d per day during the period of such inability.
2. Every boy, under a similar circumstance, and upon the production of a like certificate, shall be entitled to 6d. per day.
3. But in case the club-fund should at any time be inadequate to afford those rates of relief, a proportionate reduction will be made therefrom.
4. Every person who shall be proved to be drunk or intoxicated with ardent spirit or malt liquor, or who shall go into any public-house or beer-shop at any time whilst he shall be a claimant on the above unless satisfactory testimony can be produced that extreme expediency required it, shall be totally disqualified from participating in or entitled to receive any relief there from.

Wheal Budnick, 24th June, 1839.

APPENDIX (C)

Sir,

I have been making inquiry respecting the manner in which the miner lays out his monthly gettings, and cannot find an instance to bear me out in stating that there is a rule or scale of guidance to be found among them; this habit of improvidence is induced from the irregularity of their gettings, the amount being often below what is sufficient whereon to subsist: on which occasions they dive as far into their supplier's credit as they are *allowed* to; and he knowing the average of their gettings, does not of course allow them credit for an ample quantity. I have conversed with a person who has dealt largely with the miners in St. Agnes, Illogan, Camborne, Redruth, and Gwennap, who knows their habits, and what they have been during 20 years, and who could probably refer to accounts with them in those parishes 50 years ago: he is an intelligent man, and says that the miner's pay is not sufficient; that he eats barley because he cannot pay for wheat; that he gets in debt as far as he can, presuming on the success of his children to help him out 10 or 20 years hence; after this long forbearance, the standby, as he is styled, finds very few children enabled or disposed to liquidate their parents' debt. The same person makes the assertion that he cannot look around and one family of miners without a fag end of debt either to him or to his predecessors in the business; with the exception of those who have the help of an acre or two of land, a house, &c., as a beginning; such by care and industry are the only ones that maintain their standing. I have no doubt but he would show you hundreds of accounts of arrears, varying from £1 to £20 and upwards, that he regards as loss; in a word, his steadiest dealers of the order in question have an account with this feature. So much for the miller, and I find it to be no better with the shopkeeper; the itinerant drapers and others have found out a way to deal with the working class which I think must work well. For instance, a garment may be accepted on credit, the payment being made at say 6d, 1s, or upwards per month. In this way some get into household furniture also, the tradesman being content to await the small monthly payments. It seems to be impracticable for some of them to lay by a sum for casual purposes, but being answerable for goods already had, they anticipate the punctual visit of the teaman or clothier, and by an easy compulsion put the idle pence aside to complete the payment, which would otherwise be unwarily squandered. It may be said that this enables them to obtain dress beyond their means of payment, but I think the sellers are too well acquainted with the finances of their customers, and the danger of offering expensive articles.

[Here follows the list of articles of furniture with their prices given in the body of the Report.]

The miners are much in the habit of making their utensils about the house, and generally mend their own shoes. The borrowing and lending of culinary utensils is very prevalent; this is an accommodation to the indigent among them.

I am, &c.,

John Phillips.

Tuckingmill, 28th June, 1841.

APPENDIX (D)

The following cases of injuries received by miners in the Fowey Consols, and treated by Mr. Pace, the principal surgeon of that mine, within the last two years, have been obligingly sent me by that gentleman. They will exhibit the nature of some of the severer casualties, not necessarily fatal, frequently occurring in the mines of the West of England, as well as that restorative power of the miner's constitution which often seconds, to an extent which could not be hoped for in hospital practice, the skilful and assiduous efforts of the surgeon, whose attendance is provided at so low a charge to the individual. Some professional details given by Mr. Pace have been omitted here.

No. 1. *Stephen Sylvester*, aged 16:

Fell a distance of eight fathoms under-ground, and his head came in contact with a sharp stone. After being removed to his mother's I saw him immediately, and upon examination, found that the os frontis was fractured, and several pieces of it were driven into the brain, leaving a triangular space with an oblique serrated edge. [Mr. Pace urged the necessity of operating, and after some difficulty on the part of the boy], operated upon him about six hours after the accident, and removed several pieces of bone which were imbedded in the brain, and also about a table spoonful of the brain itself, which protruded after the first incision was made. I also removed the serrated portion of bone and elevated the depressed, a suture was inserted and the wound dressed with adhesive plaister; the head was then raised upon and supported by pillows, and ordered to be kept constantly wet with a refrigerant lotion. The boy was also bled freely from the arm, and calomel &c., given to him. [Very strict antiphlogistic treatment, and attention to quietude, &c., followed.] The mother and relations strictly