Working conditions

Mining, particularly for copper, was a labour intensive process and in the early nineteenth century many of the region’s mines were huge employers. In 1836-37 Tresavean employed over 1,300 men, women and children while Consols and United employed over 3,000, East Wheal Crofty and Wheal Vor over a thousand each, and Fowey Consols and Lanescot over 1,500.

Life at or just above subsistence level required a maximum of familial co-operation which meant that in the early 1800s women and children worked in the mining industry. The 1842 Children’s Employment Commission noted that the mines from Dartmoor to Land’s End employed about 19/20ths of the region’s young people. The total number of persons employed in the mines of Cornwall in 1842 was approximately 28,000 - 30,000 and those of Devonshire a further 1,500. By contrast the Alston Moor District in the North of England employed in the region of 5,000, Ireland, approximately 4,500 and Scotland around 400. Clearly the Cornubian ore-field was the key metalliferous mining region in the British Isles in terms of young labour, and it was not unusual to find children as young as 7 or 8 working at the mine’s surface, and occasionally boys of this age underground. One of the first jobs he would be given would be operating an air machine.

However, in spite of this bad air remained a problem that had serious repercussions for miners’ health. An analysis of 18 samples of air taken in Cornish mines in 1842 showed the average percentage composition of oxygen to be 17.076, carbonic acid gas 0.85 and nitrogen 82.848 (normal oxygen percentage is 21 and carbonic acid gas 0.05). Added to this were carbonaceous particles from miners’ dips and blasting and mineral dust. The agent of Tretharrup Mine in Gwennap, noted that for most of the time the air would be so thick with powder smoke that one could barely see one’s hand. The air in Levant at the 130 fathom level was described in 1864 as "dry, dusty and hot" in which a candle would not burn properly. A miner who worked at the Consolidated Mines in Gwennap in areas where a candle could only be got to burn on its side, regularly spat up quantities of phlegm "as black as ink." At times it was almost impossible to see the shining end of the drill bit which miners had to strike to drive the holes in which to place the explosives.

In 1864 a former miner from Tavistock reported to the Commission that working in Wheal Maria in bad air had "shortened his breath." A period of further employment at Wheal Emma in a part of the mine in which no one else would work had led to his chronic lung condition, described as broncho-pneumonia, rendering him unfit for work. Mineral dust was to become more of a problem when pneumatic rock drills were introduced in the latter nineteenth century. These rapidly increased productivity and although the number of Cornish mines fell from 377 in 1870 to 138 in 1880, and the labour force contracted from 26,528 to 12,211, the amount of ore produced per person increased over the decade from £55.04 to £56.42. However, a terrible price was to be paid by the miners for this increase in terms of output, as rock drills were seen to be the main culprit responsible for miners’ phthisis, a chronic and fatal lung disease.

The early rock drills were based on the reciprocating piston principle, which bored dry and threw out clouds of dust and chippings. Cornish miners preferred to drill dry (a practise that they claimed was faster), resisting the use of a jet of water to
dampen the dust. This in fact only made matters worse as fine globules of spray floating in the air acted as a most perfect conveyor of dust to the lungs. It was only when the axial feed water drill of the hammer type replaced the reciprocating piston drills did any improvement occur, over 40 years after the large scale introduction of the rock drill to Cornwall. It is well known that the fine mineral dust created by rock drills ravaged the lung cavities and caused the premature death of thousands of miners, particularly miners who had migrated to the Transvaal in their thousands and where by 1896 about 1,015 machines were in operation.

In the early 1900s, Redruth rock-drill operators who worked on the Rand had an average life expectancy of four years. For this reason the drill used to excavate the particularly hard quartz rock of the gold reefs in South African mines became known as "the widow maker." Yet miners in Cornwall’s mines fared little better; the average life expectancy for men working with rock drills in 1911 was only marginally better at five years, and their average age was 39 (Burke, 1978). Sadly, employers were not at all keen to acknowledge the long-term damage to rock drill operatives’ health, and little in the way of compensation was undertaken in Cornwall, in contrast to the Rand where in 1912 miners received a lump sum payment.

Surface workers too were not immune to the effects of mineral dust, particularly the bal maidens who crushed up copper ore into small fragments on anvils with large hammers. Conditions of work for those at the surface were not ideal, with women and children working in open sided sheds or on cobbled dressing floors that were exposed to the sun, wind and rain. As lots of water was used in the dressing of ores, surface workers’ shoes and clothing were often wet and stained red from the iron oxide in the ore. Bal maidens wore large hats called ‘gooks’ to protect their head and face from flying stones and the elements, a coarse hessian apron and wrapped their legs in strips of material to protect them from the cold and damp.

Surface workers’ tasks were sometimes arduous and many complained of the effects of over-exertion in the 1842 Children’s Employment Commission, especially young boys employed at ‘jigging’; being bent double over large sieves which they had to constantly shake, they often brought up blood after a prolonged period at this task. The Commissioner noted the poor physical condition of many of the children and women on the dressing floors who did not have sufficient nourishment to undertake hard, physical labour. Around half an hour was allowed for lunch, but the agent at Trethellan Mine, Gwennap noted that rather than eat communally, some of the bal maidens disappeared to eat their lunch behind a hedge embarrassed by the "meanness of their fare."

Miners carried their meal underground in a metal box called a dinner pail, which commonly contained a ‘pasty’ or ‘hobban’ – pastry cases enclosing scraps of meat or fish with vegetables. Water was taken underground in a small wooden barrel called an ‘anker’, and mealtimes were communal. But some of those questioned in the 1842 Children’s Employment Commission remarked that it was not always easy to locate an anker when one needed a drink to quench a raging thirst in dry, dusty conditions.

Before the introduction of man engines and much later, mechanised skips or cages, miners often had to climb vast distances carrying their tools, supplies and dinner pails before and after working. Man engines were costly devices to install and only the bigger mines were prepared to undertake the expense. Miners only got paid when they started work at their pitch and were grateful for any time saving device that also spared them the physical ordeal of climbing up and down numerous ladders. The first man engine in Britain was installed at Tresavean Mine in Gwennap in 1842 and the last to operate was at Levant, where a terrible disaster occurred in 1919 claiming the lives of 31 people when the cap that held the rod broke.
On the whole, the man engine had a fairly good safety record and doubtless saved many miners’ lives, as countless accidents were caused by exhausted and malnourished miners falling from ladders, particularly at the end of shifts. The depth varied but could have been as much as 300-600 meters which was not always close to their place of work underground, often a cramped, hot tunnel end occasionally fouled by the stench of human excrement. In such damp, moist conditions, a disease named ankylostomiasis thrived, the symptoms of which were red skin blotches and anaemia, caused by contact with a parasitic worm that lived in human faeces. It was not until the early twentieth century that mines such as Dolcoath introduced pails to curb the spread of the disease.

In the United Mines, levels in the ancient workings did not exceed 5 feet by 2 feet wide, making it difficult to manoeuvre, whilst in some of the deepest mines high temperatures made working conditions appalling. In Cooks Kitchen Mine near Camborne, the temperature soared to above 100 degrees Fahrenheit below 350 fathoms and heightened by hot exhaust from rock drills. In 1884 the east end of the 335 fathom level had to be left to cool for two months before it was possible to work there. In such temperatures miners often worked virtually naked. Flannel trousers, heavy boots without socks and a strong, resin-impregnated felt hat with a convex crown onto which was stuck a lump of clay to secure a candle, was all that most could suffer to wear. In Tresavean, hot water issuing from a cross cut deep in the mine in 1855 was measured at 114° F, and burns from hot water were not uncommon (Schwartz & Parker, 1998). Men coming to grass after a shift encountered vast changes in temperature, sometimes exceeding 40° F, and had no proper facilities to wash and change into dry clothes. Miners sometimes left their clothing in the engine house and were forced to remove the worst of the grime at the end of their shift in the engine pool. To try and improve working conditions, some bigger mines introduced miners’ ‘drys’ (changing facilities at the surface) where miners could wash and don dry warm clothing before leaving for home. Although primitive at first, these became more sophisticated eventually by the twentieth century containing heated lockers and bathing facilities. But arduous physical labour in poor conditions and on an often meagre diet - exacerbated by the onset of lung disease - made nineteenth century miners old men by their 40s.

Mining was a dangerous occupation, in which accidents from falling, blasting, drowning, rock-falls and entanglement in machinery maimed and sometimes killed. In 1846, thirty one men were killed in the mines of East Wheal Rose and North Wheal Rose by torrential rain that flooded the workings, while at Wheal Owles in 1893 miners inadvertently broke into the flooded workings of Wheal Drea. This caused a catastrophic run (subsidence) to surface and nineteen men and a boy were drowned. Accidents with explosives were common, even after the introduction of the miners' safety fuse, invented by William Bickford in 1831, through miss-timed holes or carelessness with charges. So dangerous was mining that the Gwennap Vestry Book of 1836 noted that "from the nature of the mines’ occupation the average duration of male lives is from accidents and other causes, very materially shortened and in consequence, the number of widows with young families is very large."

The Health of Towns Association returns for 1841 showed that the average age of death of all those who died in the Redruth district at the heart of Cornish mining, was 28 years and 4 months, the lowest of any district in Cornwall. In 1851 over 19 per cent of the adult female population were widows in the mining village of Lanner (Schwartz and Parker, 1998) and nearly 18 per cent in Kenidjack in Penwith (Sharpe, 1998).

Many mines operated a Miners’ Club, a weekly levy to ensure a few shillings a week would be paid to the miner’s family in case of accident or injury. Doctor's Pence usually covered surgical assistance only and medical provision was often primitive. The mine surgeon never ventured underground and injured men had to be hoisted to
surface to receive medical attention. The time delay in doing so often proved fatal. There was clearly a need for proper medical care, highlighted as early as 1778 by Price in his *Mineralogia Cornubiensis*. The only hospital that existed was that at Truro opened in 1799. In 1844 mine adventurers set up a Practical Miner’s Society to remedy the lack of a hospital, and E.W.W. Pendarves offered to turn a country house into one.

But these attempts were met with suspicion by the miners who threatened to tear down any buildings constructed, an attitude by no means unique among British workers at the time. With diseases and accidents so common in the mining districts, it took a concerted effort by the Rt. Hon. T.C. Agar-Robartes of Lanhydrock to initiate a successful scheme for a miners’ hospital in the 1860s that resulted in a hospital at Redruth supported by Lady Basset of Tehidy, Sir Redvers Buller and Mr. Williams of Caerhayes Castle.

Despite the dangers, mining was the first choice occupation for many Cornish men and women in the nineteenth century. It created a tough group of people bound together with bonds of friendship and trust rarely paralleled in other branches of industry. Their work was arduous, the hours long and the rewards often little. But the Cornish took an intense pride in their work and carried the technology and achievements of their industry throughout the world.

### Suggested Further Reading


Schwartz, S. P., 2000, "'No Place for a Woman': Gender at Work in Cornwall’s Metalliferous Mining History", *Cornish Studies* 8, Exeter, 69-96.


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