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Who started it all?

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It used to be said that if you shouted down a hole anywhere in the world the answer invariably came back in Cornish. But that was after the collapse of the Cornish copper industry over 100 years ago, when miners left Cornwall in their thousands to start new mining industries in all corners of the earth. Towns like St. Day, a great mining centre of 100 years ago, became ghost towns almost overnight. Today, St. Day is a village surrounded by miles of derelict copper workings.

Names like Wheal Basset, Wheal Unity, Wheal Virgin, Cooks Kitchen, Ding Dong Mine are now but names on a map. 'Wheal' means working and most Cornish mines were called 'Wheals'. The Cornish for mine is 'bal' and the mine manager was the 'bal captain'. The owners were called 'adventurers', and the girls who sorted the ores were called 'bal maidens'. The odd sounds which echoed through the workings were the work of the 'knockers', the imprisoned spirits of dead miners. At a distance of 100 years it all sounds pleasantly romantic yet these names conceal a grimmer reality.

The metal in Cornwall was either in or under granite; the mines were deep and readily filled with water. For almost the whole of its history access was by ladder. In the deeper working a miner might take an hour climbing in the morning to reach his work and an hour and a half in the evening to return. Toward the end of the nineteenth century a few mines installed a curious labour-saving device

called a 'man engine'. Even this has left a grim memory behind, for in 1919 one of the very few still working collapsed at lonely Levant Mine near Lands End and killed upwards of 30 miners (Abbott, 1920).

Cornish copper was refined either in Swansea or in Bristol. The vessels which took away the ore returned with coal for the pumping engines. Many attempts to set up their own refining business were made by the Cornish mine owners but, with few exceptions, they came to nought, largely, it is said, through the intrigues of the interests in Swansea and Bristol. Bristol boasts a fascinating monument to the Cornish copper industry in Arncliffe Castle. Built by a Bristol copper refiner it is made with bricks of black copper slag in the manner of an eighteenth-century Gothic folly. It lies within a stone's throw of the main Bath road.

Cornwall was the cradle of the world's industry, for not only did she teach the world the hard lessons of metalliferous mining, but it was to get the water out of Cornish mines that Newcomen invented the atmospheric engine and Watt the steam engine, so giving mankind the key that has unlocked every door since — man-made power. For many decades she was the world's major source of copper. Hayle, near St. Ives, which had the only copper refinery in Cornwall, also once boasted the largest iron foundry in Europe. Even up to 1914, Harveys were producing cylinder castings for pumping engines of prodigious girth which are among the largest iron castings ever

FIGURE Bal maidens at Dolcoath Copper Mine, Camborne, Cornwall.

made. Redruth had gas lighting before London.

Into this industrial world there penetrated in 1794 a physician, William George Maton. His visit to Cornwall was part of an extended tour of the west country and forms the basis of a two-volume chronicle of travel in which the author's observations on the topography, geology, and natural history of the West of England is recorded (Maton, 1797).

In addition, Maton had a close look at its industries. He has a good deal to say about fishing, but more interesting to us in these days is his description of mining in the county.

He was nothing if not thorough and descended a number of mines, generally by ladder, though it seems as if he went down one mine with a rope tied round his thighs for he writes:

'A person . . . must often descend in the same shaft wherein the steam engine works, and the noise arising from its movements together with the "horrible appearance of the rod when lifted over his head" occasions the most uneasy sensations imaginable.

The miners themselves invariably recommend to us to use the ladder shafts in which one has to trust to one's own strength and the spokes of a ladder.'

but this has its drawbacks for at Huel, Mexico

'the only silver mine in the county' . . . 'I found it very dangerous to descend on account of ladders continuing straight to the bottom and there being no resting place

except a niche cut out on one side in the earth, should one unfortunately miss one's hold of the ladder in this shaft there is nothing to prevent a fall to the very floor of the mine.'

Polgooth mine, he observes, was yielding £1,500 a month clear profit in 1794 – a fortune for somebody. He mentions near Penzance descending the Wherry mine, an early example of off-shore drilling. The shaft was protected by a cast-iron 'chimney' from the sea and access was by a raised narrow platform. The pump shaft from the engine was apparently taken over the sea by a system of rods and levers.

To those who go from what is now industrial England to Cornwall for holidays and relaxation, away from dirt, smoke, and atmospheric pollution, Maton's description of Hayle will come as a surprise:

'The country around Hayle is entirely covered with sand which is blown about by every blast and renders its appearance truly dismal. The immense volumes of smoke that roll over it, proceeding from the copper houses, increases its cheerless effect, whilst the hollow jarring of the distant steam engines remind us of the labours of Cyclops in the entrails of Mont Aetna.'

a bit flowery perhaps, but any one from Lancashire or the West Riding will know what he means.

Coal for the pumping engines was carried on pack horses; a 'prodigious number of these animals

travel together', he notes, and goes on to record 'in narrow lanes we were often much inconvenienced by these unceremonious travellers'.

At Tincroft mine he notes that the engine was on 'Hornblower's principle'. This is an interesting footnote to history, for Hornblower was trying to break the monopoly which patent rights had given to Boulton and Watt. The latter were eventually forced to fight a lawsuit to retain their monopoly.

Maton, however, was a physician and his observations in this field are interesting. He gives the mining population of the country as 15 000 men, women, and children. Of the miners he says:

'Most of the miners have a wretched, emaciated appearance, for they suffer from dampness, impurity of air, heat, and numerous other causes, though in Cornwall they are subjected to the fatal effects of choak damps less than in any other mining countries. *From enquiries we made amongst these miners*, the most general inconvenience experienced with regard to their bodily health is a tightness and constant uneasiness of the thorax.'

The significant fact here, apart from the symptoms described, is that he made enquiries, surely one of the earliest excursions in the field of industrial disease in this country.

In Hayle he visited the copper smelting houses, and he writes:

'Nothing can be more shocking than the appearance which the workmen in the smelting houses exhibit. So dreadfully deleterious are the fumes of arsenic constantly impregnating the air of these places and so profuse is the perspiration occasioned by the heat of the furnaces that those who have been employed at them but a few months become most emaciated figures and in the course of a few years are generally laid in their graves. Some of the poor wretches who were ladling the liquid metal from the furnaces to the moulds looked more like walking

corpses than living human beings. How melancholy a circumstance to reflect upon yet to how few does it occur, that in preparing the materials of those numerous utensils which we are taught to consider indispensable in our kitchens, several of our fellow creatures are daily deprived of the greatest blessing of life, and too seldom obtain relief but in losing life itself.'

No doubt modern industrial physicians will disagree with his diagnosis but this was 1794 and his observations must have been novel for those days. There is probably little copper worth getting in Cornwall now, but a good deal of tin. As the earth's tin reserves shrink, mining must eventually come back to the county. Only Geevor and South Crofty now work, though there is talk of opening up Levant again and prospecting elsewhere. One of the limiting factors in reopening the Cornish mining industry could be that the Cornishman, after more than 1 000 years of disembowelling his own county, may be losing his taste for mining. Foreigners are now employed in those mines which still continue to function, so if you shout down a hole in Cornwall now or in the future the answer may well come back in Italian!

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Erythrocytes of uranium miners: the red blood picture

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Vích, Z., and Křiklava, J. (1970). *Brit. J. industr. Med.*, 27, 83-85. **Erythrocytes of uranium miners: the red blood picture.** Haemoglobin concentrations, erythrocyte counts, haematocrit values, and mean corpuscular volumes, haemoglobin, and haemoglobin concentrations were determined on a group of miners in a uranium mine and in unexposed persons. There were small, statistically significant differences of mean values from those of controls, but the mean values remained well within normal limits. There was no evident damage to red blood cell formation.