Richard Quiller Couch — an outstanding nineteenth century general practitioner

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SUMMARY. The boom in metal mining in the mid-nineteenth century produced a fearful mortality among miners. The history of this problem is described by the life and work of Mr R. Quiller Couch, a Cornish mine surgeon and general practitioner. He was a remarkable man and an outstanding general practitioner.

Introduction

THE population of Britain doubled between 1815 and 1871. There was an increase of five million between 1851 and 1871; the birth rate rose from 33·9 to 35·3 per 1,000 and the death rates were 22·7 and 22·4 (Thomson, 1975). Exports and imports trebled. There were better wages, improved working conditions, and regulation of working hours. Public health measures were being enacted under the driving influence of Snow and Chadwick (Flinn, 1968), a rudimentary social welfare service was initiated with the passing of the Poor Law Act of 1834, and an educational service had started. The grievous abuses of women and children had been alleviated. Living and working conditions were still bad but Britain was booming and had become the workshop of the world.

Foremost in the boom was the mining industry. Coal was required in ever-increasing quantities to produce iron and steel and to feed the trains and ships. But metals of all kinds were required, so there was a great proliferation of copper, lead, tin, silver, and gold mines. All this required an ever-increasing transport system of railways and canals. The population, therefore, became more mobile and was massing in the Midlands, Mersey, and Tyneside. They were also moving to more desolate places and so we see today the remains of various complexes on the coast of Cornwall, the mountain tops of Wales, the moors of Derbyshire, and the Lake District. When a doctor sees these remains he must think of the community which served them and the availability of medical services.

The period 1850 to 1870 was one of boom for metal mining before the rapid decline in the 1870s. Cornwall and Wales are worthy of study because the structural remains have not been so extensively obliterated in these areas as they have in our cities, and the areas were well circumscribed with closely knit communities. There is also much information about mining activities in these areas. Submerged in this unlikely information there are many medical facts, views, and personalities. I am describing one personality, but to understand his achievements it is necessary to know the historical background.

Metal mining and mine surgeons

The metal mines consisted of several shafts and a series of tunnels called 'adits' which were used for drainage and access (Bick, 1974). The miners would descend or ascend in one shaft by a series of ladders while the ore would be hauled to the surface in another shaft by a bucket called a 'kibble'. They worked by candlelight. Gunpowder was used to blast the rock and the ore was carted to the shaft bottom by barrow. Ventilation was virtually nonexistent and conditions were often made worse by the intense heat in the deeper parts of the tunnel.

The power source for all these activities was, even in 1864, the water wheel, which was fed by channels called 'leats' from a higher reservoir. There were sometimes several such wheels to cope with drawing the ore, pumping out water and working the crushing machinery on the 'dressing' floors. This surface work was invariably done by women and children often in the open exposed to all weathers.

The proprietors of the mines were called 'mine adventurers' and this was apt, for the whole business was risky. They appointed the doctors as mine surgeons (Parliamentary Papers, 1864) and there was often keen competition for the job. It was not unknown for a doctor to buy shares in a mine to increase his chances of appointment.

Occasionally the miners themselves would appoint their own surgeon. This happened to Mr Richard Burford Searle (*Medical Directory,* 1922) of St Just, who qualified in 1853 at the age of 21. He had been an assistant to a mine surgeon and when he came to leave the district the miners went on strike until he agreed to work for them. The same medical family would sometimes look after generations of miners. Evan Davies (Cule, 1973) was one of the first mine surgeons in the Rhondda Valley when mining began in earnest in 1832. He was the first in line of a remarkable medical family. In mid Wales in the 1860s Mr Rowland Rowland (Power, 1930) and his son looked after the large number of mines south of the river Rheidol (the Lisburne mines), while his brother Evan Rowland looked after those north of the river (the Goginan mines).

The surgeons were responsible for geographical areas rather than individual mines and their work could cover some 30 mines and 2,000 miners. They often employed an unqualified assistant who lived close to the mine, while they themselves lived quite a distance away. Quite often other posts were also held, such as union doctor or surgeon to the railways.

Miners' homes

The doctor's work involved calling at the mines and visiting the miner's home. Sometimes the mine owners built the homes. The London Lead Company built a new village centre at Nent Head in 1820 for the mine workers at Alston Moor (Raistrick, 1973). It was built in blocks of two and four, but the overmen, doctor, and schoolmaster were placed in semi-detached houses.

The miners would often build their own homes and lease the ground from the owners. "If they are not in swampy situations, they are as exposed as possible, their only protection being the undulations of the ground. Many of them have only one floor and only two rooms, the bedroom and the kitchen. The kitchens have only earth floors, the doors so dilapidated or so badly made as to admit every wind that blows, and the rooms are consequently cold and comfortless" (Couch, 1857).

These conditions were often made worse by the presence of lodgers. The houses built for the Van Mine in the 1860s were built on land owned by the Marquis of Londonderry and one of the conditions of the lease was that lodgers should be taken (Morrison, 1971).

Financial arrangements

The miners were paid on average £3 per month and their wages were sometimes a week or two late. There were many deductions to be made. Tallow candles and gunpowder were always charged for and the price was inflated by the adventurers (Hamilton Jenkin, 1972). The adventurers collected 6d a month for the miners' club and this was supposed to be for "visible hurt and sickness". The doctors' club deduction was also about 6d a month and collected by the owners. It covered the miner and his family for most things, but midwifery was always an extra at about half a guinea. At some mines the 'poundage' system operated at a rate of 4d in the pound per month. The doctor was not always obliged to see the family; some clubs only required him to hand out medicine.

The doctor was invariably appointed to look after the miner and his family. The miners' children caused the doctors a lot of anxiety. "Fifty-five deaths in every hundred in a mining parish are found to be under the age of five years. A large proportion die from debility within the first year of their existence; and no one who has not seen these miserable specimens of humanity can have the slightest idea of their diseased appearance; small, thin, and shrivelled, with scarcely strength to cry, it seems sometimes almost a crime to attempt to prolong their existence" (Couch, 1859). The common diseases were malnutrition, marasmus, scarlet fever, croup (diphtheria), and typhoid fever.

Medical conditions

The two main problems which the miners presented were accidents and respiratory disease. Their occurrence was so alarming in the early 1860s that a royal commission was set up under the chairmanship of Lord Kinnaird to look at all aspects of mining and particularly miners' health (Parliamentary Papers, 1864).

The Parliamentary Commission on Mining 1864

The Commission travelled around the country and held sessions at each centre of the mine fields. They interviewed the proprietors, the managers of mines (called the captains), miners, and the mine surgeons. Two or three surgeons were interviewed at each session and all the questions and answers were recorded.

The Commission explored all the factors that might have had some influence on the miners' health. Diet, housing, changing facilities, drinking habits, and working conditions were all considered. They asked the surgeons virtually the same questions.

There was agreement that miners showed premature ageing and died early; their diet, on the whole, was better than the agricultural worker, and their housing was universally bad and insanitary. They suffered all kinds of accidents and the most devastating were those due to 'tampering', whereby a bore hole was filled with gunpowder, and a premature explosion resulted in the loss of hands or eyesight or both. Everyone agreed that the real cause of concern was the incidence of chest diseases and that this led to the premature ageing and early death. A large number of surgeons identified the miners' chest affliction, called miners' consumption, as peculiar to miners and unrelated to tuberculosis. Others thought that they were the same or that miners' consumption led to phthisis.

Miners' consumption

The history of miners' lung diseases is long and

complicated. Initially it was concerned with coal mining and the pathological description of the lungs. Laennec (1806) talked about 'melanosis' of the lungs and George Pearson (1813) gave the first English contribution in a paper entitled "On the colouring matter of the black bronchial glands and the black spots of the lungs". It was Thomas Stratton (1837) who applied the term 'anthracosis' to black infiltration of the lung.

The classic contribution, however, came from Thomson (1837) of Edinburgh in the same year. He attended a series of postmortems on miners and then sent out questionnaires to their doctors. He and his father were able to distinguish between the nodulation in stone workers as opposed to the black crepitus lungs in workers on the coal face. The term 'pneumoconiosis' was coined by Zencker in 1866. Koch described the tubercle bacillus in 1882 but it was not until 1896 (Robert Jones and Oliver Lodge) that the first x-ray was taken in this country (Cartwright, 1977). It was nearly another 50 years before the roles of tuberculosis, silica, and coal dust were distinguished (Meiklejohn, 1951).

With this background and hindsight we can understand more clearly what the Commission of 1864 established. There was general consensus that the early symptoms of the miners' affliction were lassitude, pallor, breathlessness, cough, and indigestion. This led to premature ageing by 10 to 15 years; a miner of 40 would look at least 50 years old. Most doctors distinguished it from phthisis (tuberculosis) because it occurred in older men, was not accompanied by hectic temperatures, and the physical signs tended to be in the bases and not in the apices of the lung.

The 'man engine' was only just being introduced at this time and this enabled men to be lowered to underground workings. The commonest method of descent and ascent was by 'laddering' and it featured prominently in the Commission's investigations. Some mines were 600 fathoms deep and it would take three quarters of an hour to descend and one and a half hours to ascend.

There were resting platforms in the shaft, but it is no wonder the surgeons found the men breathless and having tachycardia after working a shift and making the long arduous ascent. Laddering was considered a significant factor by a few surgeons in causing the miners' affliction.

Most surgeons were in agreement as to the cause of miners' disease, which they considered was due to poor ventilation in the mines. There were many possible reasons for this: lack of oxygen, excess of carbon dioxide, sulphurous acid from the explosions, smoke from the tallow candles, or simply dust were all considered and had their supporters. Few surgeons had conducted postmortem examinations and only the occasional sputum specimen had been looked at to reveal carbon particles. Although many opinions were offered, few hard facts were available. Richard Quiller Couch had plenty of facts to offer (*Provincial Medical Directory,* 1859).

Richard Quiller Couch

Richard Quiller Couch (*Dictionary of National Biography,* 1887) was born at Polperro, Cornwall, on 14 March 1816 and was the eldest son of Jonathan Couch. His father (Boase and Courteney, 1874) was the local general practitioner but he became famous as a naturalist, and some authorities placed him beside Gilbert White. He wrote innumerable articles on natural history and his magnum opus was *A History of Fishes of the British Isles.* He also wrote a journal of natural history in 12 volumes, a treatise on dreams, and was a noted local antiquary of customs, words, and remains.

His second marriage in 1815 to Jane Quiller produced three sons, Richard, the eldest, Thomas, and John; all three became doctors. Thomas (Boase and Courteney, 1874) practised at Bodmin and followed his father by writing many articles on Cornish folklore and Cornish words. He died in 1884 and he is best remembered as the father of Sir Arthur Quiller Couch, the novelist.

Richard studied medicine under his father and in 1835 enrolled as a student at Guy's Hospital, where he won several honours among which was a silver medal in ophthalmic surgery. He became an LSA in 1838 and was admitted as an MRCS in 1839. After this he returned to Polperro to assist his father in his practice.

His leisure time was spent in the study of marine zoology, "an inclination inherited from, and strengthened by, the example of his father. He daily watched and recorded with pen and pencil the gradual development of the frog from the ovum upwards, and the changes of crustacean animals and engaged himself in the minute investigation of the morphology of the zoophytes of his native coast" (Couch, 1871). This passion for natural history was to last all his life and he wrote over 60 articles on these subjects.

Another interest was geology and he became the curator of the Royal Geological Society of Cornwall and wrote 12 papers on the subject (Boase and Courteney, 1874). The Prince Consort printed for private circulation *The Natural History of the Dee Side* and three copies were sent to Cornwall: one to Richard, one to his father, and the other to the Royal Institution (*Lancet,* 1863).

He moved to Penzance in 1843, scarcely knowing anybody, and began to practise on his own. The term 'general practitioner' was already being used at this time (McLachlan and McKeown, 1971), but in order to practise properly it was essential for him to have the two separate qualifications MRCS and LSA, which indicated that he had passed examinations in medicine, surgery, midwifery, paediatrics, and pharmacy. He soon became a mine surgeon to several mines, and a surgeon to both the Cornwall Railway and to the Penzance Public Dispensary. In all this work he was acting as a general practitioner as we use the term today.

His work as a general practitioner and his passion for natural history and geology were still not enough for his fertile mind. He took an active interest in the town and

became a member of the council and an alderman of the borough. As president of the Penzance Institute he gave innumerable lectures on science and general subjects; he took an active interest in the arts and literature and was regarded as an authority on everything relating to Cornwall.

His work on the miners' disease

Richard Quiller Couch was appalled by the prevalence of chest disease in miners, its crippling effect on their health, and their short lives. In four papers published in the Royal Cornwall Polytechnic's annual reports (Couch, 1857; 1858; 1859; 1860) he set out to "examine statistically the mortality of Cornish miners and . . . the diseases by which that mortality is produced". Interest in statistics had really begun after Finlaison of the Treasury demonstrated in 1882 the faulty actuarial methods of the friendly societies. Statistical societies sprang up all over the country and in 1837 William Farr, a doctor, was appointed compiler of abstracts to the Registrar General and the statistical weapon became a potent force in public health reform (Flinn, 1968). It was used by Dr Greenhow (1861) to study the diseases of occupations, and Richard Quiller Couch presented his reports in numerical terms.

The four mining districts of Lelant, St Just in Pennith, St Ives, and Marazion, and the agricultural district of St Buryan were selected for study. He analysed the mortality figures over a 20-year period beginning in 1837, and he divided the figures into four classes: the miners with their ages, numbers, and cause of death; the males above the age of five years with their numbers and cause of death; the females above five years; and the children, male and female, below five years. Each year was subject to separate analysis and a summary every five years.

The following extract shows a typical one-year analysis and is taken from his article "On the Mortality of the Cornish Miners in the District of Marazion" (Couch, 1857-1860), and was published in 1860. The population of Marazion in 1851 was 4,250, and the extract relates to the year 1851.

The number of deaths for the year is 86; of these, 14 were miners, 30 males not miners, and 42 females. Of the 14 miners: 50·00 per cent died of consumption, 7·14 per cent died of pneumonia, 7·14 per cent died of pleurisy, 7·14 per cent died of pulmonary apoplexy, and 7·14 per cent died of bronchitis.

Of the remainder, one died of tuberculous disease of the liver, one of meningitis, and one of apoplexy.

The youngest miner died at 15, of pneumonia, the oldest of meningitis, at 59. The average age for the year is 41 years and four months.

Of the 30 males, not miners, 17 died above five years of age, and 13 at and below five.

Of the 17 above five: 23·52 per cent died of consumption, and 11·76 per cent died of pneumonia.

Of the 13 at and below five: 23·07 per cent died of pneumonia, and 61·53 per cent died of debility. Of these 13, eight were the children of miners.

Of the 42 females, 30 died above five, and 12 at and below five years of age.

Of the 30 above five years of age: 16·66 per cent died of consumption, 6·66 per cent died of pneumonia, and 6·66 per cent died of pulmonary apoplexy.

Of the 12 below five: 41·16 per cent died of debility, and 16·66 per cent died of pneumonia. Of these 12, ten were the children of miners.

The mortality from chest diseases from 1852 to 1856 is shown in Table 1.

The investigations showed without doubt that the mortality of Cornish miners was appalling and due mainly to chest diseases caused by working underground. The high accident rate in the young miner and the high mortality of miners' children were also highlighted.

He presented meticulous case histories to demonstrate that the black expectoration of miners was due to inhaled carbon particles and he was critical of Thomson's classic paper in this respect. These papers, the result of many years of careful study, were regarded as elaborate and striking, and probably were a strong contributory factor in the creation of the Royal Commission on Mining, which reported in 1864.

His evidence to the Royal Commission

The qualities so evident in his written papers are even more striking when one reads the evidence he gave to the Royal Commission in 1862 at Penzance. Most surgeons had been down a mine once and some never at all. He had been down often in order to give advice to the captains so that the miners' conditions of work

Table 1. The mortality from chest diseases for the five years 1852 to 1856 inclusive (Couch, 1857-1860).

		1852	1853	1854	1855	1856	Average
Miners	Consumption	66.66	46.15	20.00	50.00	40.00	55.76
	Pneumonia	8.33	7.69	10.00		30.00	
Males not miners above five years of age	Consumption	16.66	30.76	47.05	33.33	22.22	34.74
	Pneumonia	8.33	7.69				
Females above five years of age	Consumption	27.27	44.44	9.09	19.23	23.52	27.26
	Pneumonia	3.03			3.84	5.84	

could be improved. It was quite clear that his visits to the mines were not always welcomed by the proprietors and he made it clear that he had been barred from some.

He was appalled by the accidents caused by tampering and had invented a tool to overcome the danger. He often ordered extra nourishment for the miners and had some very pertinent things to say about miners' clubs. The miners paid 6d per month to the club for "sickness and visible hurt". Their money was collected by the proprietors. Miners frequently found that there was never any money to claim. He was scathing about the fraudulent behaviour of the proprietors.

Very few surgeons had conducted postmortem examinations and each said it was extremely difficult to obtain consent. He accepted this but he had conducted over 30 examinations. Half his cases had phthisis but he warned that his cases were highly selected and a wrong conclusion could easily be drawn.

He kept a record of every case of miners' consumption and miners' accidents and he had investigated the average age of miners in the area. He had figures over a five-year period proving that phthisis was more common in miners than agricultural workers, and more common in fishermen than agricultural workers. The commissioners told him that the Registrar General's figures showed less than average tuberculosis in miners under 30 years. He replied, in effect, that this was rubbish and asked how they determined whether someone had tuberculosis.

He had weighed 1,200 miners before and after shift work and found an average weight loss of 1,360·8 grams. It was greater in the deeper mines and among the captains. He had examined their blood under the microscope because some specimens had a bronze appearance, as described by Dr Addison. His miners had been given pots to collect their sputum after working a shift and he had consistently found minute granite particles in them. This is significant since very few surgeons had taken the trouble to examine sputum and those that had had found only carbon particles, which they thought came from the tallow candles.

Finally, he had no doubt as to the cause and the treatment of miners' consumption. He concluded that it was caused by impure air due to improper ventilation, and that the treatment was to put 'the men to grass', that is, stop them working underground. A few cases of 'black lung' in coal miners had been described prior to this, but now the problem was clear and the treatment definite. Incredibly, it took another hundred years before miners got their fair compensation.

Richard Quiller Couch gave evidence to the Commission in 1862 and he died of "subacute inflammation of the lungs" in 1863 at the age of 47, leaving a widow and four children (*Lancet*, 1863). There had been two small clues that all was not well: he mentioned three attacks of severe bronchitis in 1857 (Couch, 1858), and said, when considering his future investigations, "if health permits" (Couch, 1859). Penzance mourned his passing, for he was now well known and respected not only in his own country but in Europe and America.

Richard Quiller Couch was a remarkable man and an outstanding practitioner. His careful recording, his meticulous investigations using statistical methods, and his insatiable appetite for all knowledge put him in the front rank of our illustrious predecessors. More than this, he had that rare quality which stands outside medicine—he tried to improve the lot of his fellow human beings. His father ended his obituary on his son with this epitaph:

Untimely when thy reason in its strength,
Ripened by years of toll and studious search,
And watch of Nature's silent lessons, taught
The hand to practise best the lenient art
To which thou gavest thy laborious days,
And last, thy life.

J. Couch, 1871

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