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## **Hydro-Electric Schemes in Mines in West Devon and East Cornwall**

**By Peter Richardson**

*Lieut. Commdr. Peter Richardson RN Ret. has spent many years researching ancient mining, remains in West Devon and East Cornwall and gives here some details of hydroelectric schemes he has encountered.*

*Peter, who now lives at Totnes, showed an interest in old mining remains from the early age of seven. By 1926 he had looked at the important mines of South Caradon and Phoenix United, north of Liskeard, and by the time he was 17, he had begun to build up a collection of books, maps etc., relating to West Country Mining. By 1937 he visited the Devon Great Consols Mine, four miles west of Tavistock, once the richest copper mine in Europe, as well as Wheal Friendship and Wheal Jewell, Mary Tavy, Devon United Mines, Peter Tavy and many others. He kept copious diary notes of these visits, which were then interrupted by the outbreak of the World War II.*

*Since retiring he has taken up his interest with increased vigour writing numerous articles and a small book on the subject "Mines of Dartmoor and the Tamar Valley after 1913" priced at £9.95. Copies still available via SWEHS Secretary.*

### **Vitifer Mine, Postbridge**

(East of Warrenhouse Inn off B3212, SX681809)

Vitifer was a very old tin mine which began work in the late 18th century, but underground work ceased there in 1915 and surface work by 1926. A water turbine and generator was installed probably in the 20's and then removed to nearby Golden Dagger as below.

### **Golden Dagger Mine, Postbridge**

(East of Warrenhouse Inn off B3212, SX685799)

An old mine, re-worked for alluvial tin 1923-30 and 1937-39. Between 1925 and 1930 Donald Smith, who died in 1993, was employed initially as an engineer and later as manager. When Donald took over as manager, he obtained a water turbine and generator from the nearby Vitifer Mine, which had by then been abandoned. He installed them in the engine house at the Golden Dagger and obtained water for the turbine by cutting a 1/4 mile extension to an existing leat. Some items of plant were driven by small water wheels and others by individual motors. Electricity was essential for a magnetic separator, acquired from Vitifer, which was needed to pick out the unwanted iron ore, which occurred in tin ore in the area. Incidentally the new connecting pipework was made by F.Braby & Co of Bristol.

The transfer of the turbine and generator from Vitifer to Golden Dagger was a considerable achievement for a 21 year old and Donald said that one of the finest moments of his life was when he opened the inlet valve for the first time and saw the needle on the meter rise to 240 volts, enough to run the magnetic separator which he had refurbished. A Petter semi-diesel engine was installed also to take over when there was a drought.

Peter Richardson's first visit was made in September 1937, when he noted that the ore dressing equipment was functional, that there appeared to be several small water wheels and that overhead electric cables ran in various directions. A year later the plant was operational with the then manager Mr. Olver commenting on the free electricity, except for the cost of a pound of grease each year!

The next visit was many years later in 1987. when the site had changed beyond recognition. The engine house and its contents had gone, including the Petter engine, but many of the bases of the plant and buildings were visible, while the leat and headbox could still be seen further up the hillside.

### **Henroost Tin Mine, Hexworthy**

(1 mile south of Forest Inn, SX655708)

The immediate vicinity of the Mine has been worked for tin from time immemorial by open-cast methods, but conventional underground mining started at Hexworthy in the middle of the 19th century. The Mine was modernised at about 1905 when all the machinery, except the main pump (still driven by a large water wheel), was operated by electricity generated by a small hydro-electric station at Saddle Bridge. Here a 6ft diameter Pelton wheel took its water supply from a old Wheal Emma leat via 16inch diameter riveted iron pipe with a fall of 183ft. The 110kilowatt DC generator provided a supply at 500 volts.

Peter Richardson first saw the Power House in 1927. when he considered it to be in a serviceable state. Then the Pelton wheel was enclosed in a wooden case at the NW end of the building near the door with a 5ft diameter flywheel on its NE side, connected to a much smaller pulley on the generator by a broad belt. The building, of corrugated iron with windows along the long sides, also housed the generator, the switchgear and meters. The generator had two stator coils and Mr. Richardson believes that they were 90° apart, but maybe 180° ? He heard a tale that when the man in charge (Harold Simmons) was showing children around the plant, he would play a joke on them. He would throw a spanner to them near the generator, but before a child could catch it, it would be whisked away by the magnetic field of the coils.

Mr. Richardson visited again in 1929 and noted that the plant was being stripped out. Nowadays there is not a lot left.

### **Devon United Mines, Peter Tavy**

(East bank of River Tavy, SX522794 to 513786)

There were three mines at Peter Tavy, North, Central and South. The North Mine was worked for copper and abandoned years ago. Central and South were worked for tin and arsenic well into the 20th century. Electricity was used at the latter two mines, with a dynamo driven by a 6 foot high water turbine situated at the South Mine. The turbine of the Thomson (USA?) "inward flow" design, was made by Gilbert Gilkes & Gordon Ltd. of Kendall and still appeared operational in the thirties, the amount of water impinging on the central rotor vanes connected to a hand-wheel, and although rusty has (as at 1990) survived in the open. It is thought that given an adequate head of water the dynamo could have produced about 200kW.

Mr. Richardson tells an entertaining tale of how he and some friends, immediately before the War, tried to divert some water from the Tavy down the leat to activate the turbine, but they were thwarted by fall in the river level due to a lack of rain.

### **Wheal Friendship Mine, Mary Tavy**

(on either side of the A386, mostly east, SX506794)

This mine, which was very famous for its copper, arsenic and tin, worked almost continuously from the late 1700's until 1925. It used water power extensively, obtaining the water from the River Tavy via two leats.

Ingeniously 16 water wheels were driven in this way plus a huge one, known as Buller's Wheel, which was 50ft in diameter and 10ft width.

By 1900 the Mine was failing, but in an attempt to arrest the decline in 1924 the water wheels were replaced by more modern 200 hp. turbine driving electric generating plant. It seems probable that power was still transmitted to individual items by shafting and belts.

### **Wheal Martha (New Consols) Mine, Lucket, East Cornwall (River Tamar)**

(either side of stream through Lucket Village, SX 388737)

This was an old mine originally worked for copper and later known as the New Consols Silver and Arsenic Works. Noteworthy for its lack of success in relation to the amount of money invested in it and secondly for its astonishing array of traditional mining machinery, which had lain undisturbed, since abandonment in 1877 until it was most regrettably broken up and sold for scrap in 1938.

It was then re-opened unsuccessfully between 1946 and 1952 when it was reported that £400,000 had been invested with only a return of £100,000 for the sale of tin ore. In this last venture, electric power was provided from two generators driven by two large diesel engines, one Paxman and the other a Mirlees. There had been plans to set up a hydroscheme, but by 1950 a supply via the public supply had been obtained with the diesel sets in reserve.

However information from a Mr. Veal of Callington revealed that the hydro-scheme had been attempted with a dam below the hamlet. Old Mill, but this had proved to be impracticable due to inadequate supplies of water.

### **River Meavy Hydro-Scheme**

(Burrator House. Sheepstor SX552677)

Additionally Peter Richardson has information on a small hydro-electric plant beside the River Meavy, near Yelverton. Before the Second World War, electricity was provided to Burrator House (then the home of Capt. E.A. Nicolson RN) by a turbine driving a generator situated on the east bank of the River Meavy. downstream from the Burrator Reservoir (Plymouth's main water supply), and taking water from a tributary stream. The plant was housed in a small building not far above river level.

In the 1940's the local Water Board made an arrangement with Capt. Nicolson that if he would close down his electric plant to enable the water, it used, to go instead into the reservoir, they would arrange for him to have free electricity! Since the house is now a hotel, Peter Richardson wonders what has happened to this arrangement.