

SUPPLEMENT TO THE **HISTELEC NEWS**

No.S12

AUGUST 1999

THE CENTENARY OF PLYMOUTH ELECTRICITY

by **Ted Luscombe**

Electricity at last

On the fine morning of 22nd September 1899, the Mayor (Ald. John Pethick) together with the Aldermen and Councillors, and many distinguished guests, gathered at the Council Chamber. From there they were taken in carriages to Prince Rock, where the Chairman of the Electric Lighting Committee (Ald. C.H. Radford) invited the Mayor to perform the ceremony of the opening of the Plymouth Corporation Electricity Works and the inauguration of the first electric trams. After a brief inspection of the works, the whole company embarked on five tramcars and made the first official journey to the Guildhall for a celebration luncheon. The Mayor and Ald. Radford, together with Mr. J.H. Rider (Borough Electrical Engineer) took their places on the platform of No. 1 car, which was driven by motorman W. A. Smith, who little guessed that he was destined to be on the last electric tram to run, forty-six years later.

And so, at last, Plymouth had a public electricity system several years after comparable towns e.g. Taunton (1886), Bath (1890), Exeter (1890) and Bristol (1893). Plymouth was then one of three towns, the others being Devonport and Stonehouse, of which the stranger would have had difficulty in discerning the boundaries. But they were quite different administrations and guarded their independence jealously. It was the failure to agree with the proposals of the Devon and Cornwall Electricity Supply Company in 1889, which largely contributed to the lagging behind the other towns. In 1899 it was still to be another two years before electricity came to Devonport and Stonehouse.

Slow progress in the nineteenth century

There had been a demonstration of electric light in 1849, when Mr. J. M. Hearder installed an arc lamp at the top of the Devonport Column. But the first significant use of the electric light in Plymouth was for the lighting of the Promenade Pier, which was opened on 29th May 1884. It was lit by 18 Brush arc lamps and 32 incandescent filament lamps supplied from two Brush generators driven by 16 horse power Otto gas engines. It was a magnificent sight witnessed by thousands of townspeople assembled on the Hoe.

The 1882 Electricity Act was designed to systemise the procedures for setting up public supplies, but the terms discouraged private companies, and it

required the 1888 Electricity Act to stimulate development. Under the Act, supply undertakings had to obtain a Provisional Order from the Board of Trade to legitimise carrying out the necessary works. Although there were other attempts, the major approach to the Three Towns was in 1899, as we have seen, that from the Devon and Cornwall Electricity Supply Company (DCESCo), a consortium of mostly local business-men, but the attempt to satisfy the three authorities proved insurmountable. Also in those early days of a new technology, local authorities were reluctant to embark on a municipal scheme, but equally did not want a scheme foisted on them. However, both pressure from townspeople, particularly the shopkeepers, and also the need to electrify the tramways, lead to the decision by the Corporation to apply for its own Plymouth Corporation Electric Light Order, which was granted in 1894.

Being late on the scene, Plymouth was able to benefit from experience of other towns, and invited Dr. J. A. Fleming FRS. to make recommendations as to the type and size of a system, which was to include not only lighting, but also electric tramways. His proposals included a power station at Prince Rock, a tramway from Prince Rock to the Theatre Royal, and the provision of public arc lighting in the main shopping streets and on the Hoe Promenade. Incidentally several of the Hoe lamp posts still remain, emblazoned with the Borough Coat of arms and PCEW 1898 (Plymouth Corporation Electricity Works and the year in which they were erected).

records of the Devonport Corporation show very little interest in electricity. Probably because they already had a profitable Corporation gas works! However the Devonport and District Tramway Company (DDTC), seeing the coming electrification of the Plymouth Corporation Tramways (PCT), was anxious to do the same. In 1895 two companies were seeking a Provisional Order (PO); the Corporation realised that the Board of Trade had powers to dispense with the veto of local authorities, and so decided itself to apply for a PO which resulted in the granting of the Devonport Electric Lighting Order in 1896. As a result an Electric Lighting Committee was set up in August 1897 and in deciding to seek the advice of a consultant, chose Prof. A.B.W. Kennedy. With hindsight that can be seen as an unfortunate choice, since Prof. Kennedy was an advocate of direct current systems. In those early days both alternating current and direct current had their enthusiasts in the "battle of the systems". So Devonport embarked on a direct current system (admittedly also influenced by the requirements of the tramways) with a distribution network incompatible with that of its neighbour Plymouth.

The Prince Rock Power Station

A new Electric Lighting Committee was set up on 9th November 1895 under the Chairman, Councillor J. Willoughby, to consider these recommendations, and it appointed Mr. J. H. Rider as Borough Electrical Engineer on 27th April 1896. Mr. Rider had had considerable experience at Bolton (the Committee had visited the works there) and together with his assistant, Mr. E. G. Okell set about the detailed planning. Mr. Okell was himself to become Borough Electrical Engineer in 1901 and remained as such until 1934, when he retired. The foundation stone of the Station was laid by the Mayor, Ald. J. T. Bond, on 21st April 1898. Meanwhile the first cables were laid in Ebrington Street and Old Town Street and the overhead lines erected for the trams.

The Power Station was one of the first in the Country to supply power for both lighting and traction. There were two Ferranti steam engines directly coupled to Ferranti alternators each of capacity of 200kW at 2000v and 50Hz. These supplied the lighting load and, through rectifiers, direct current for the street arc lamps. Also two Bellis and Morcomb steam engines were each connected to one Ferranti 100kW alternator and one Westinghouse 525v 190amp. D.C generator on the same shaft. Thus both A.C. for domestic lighting and D.C. for traction could be supplied or either alone. With the engine uncoupled, either A.C. or D.C. could be generated with the other machine acting as a motor supplied from a storage battery (600Ah), or from one of the larger machines. This versatile arrangement was devised by Mr. Rider and allowed the plant to be operated at a high load factor and at maximum efficiency. The total installed capacity was thus 800kW. Initially there were 133 private consumers and in addition to the trams, the plant was able to supply 7,500 8 candle-power lamps. The undertaking made a profit right from the beginning and such was its success that within 3 months the installation of more generators was already in hand. By 1914 the total installed capacity had reached 3,150kW and the number of private consumers was 1753. But the vast majority of the townspeople did not have electricity until well after the Great War.

Devonport and Stonehouse

Apart from abortive attempt by the DCESCo to set up a system in the Three Towns in 1889, the

The Newport Street Power Station

Several sites were considered for the Power station, but all were objected to by the Admiralty or Lord St. Levan, who between them owned most of Devonport. The East Stonehouse District Council had already obtained their own PO in 1898, but agreed to transfer their rights to Devonport, and offered a site in Newport Street for the proposed power station. Therefore Devonport Electricity Works was built in Stonehouse! Mr. Charles Furness was appointed Borough Electrical Engineer on 1st June 1899. In February 1900 Mr. Furness submitted detailed plans. He was under pressure from both the DDTC and the Plymouth Stonehouse and Devonport Tramway Company (PSDTC) to supply current. (The PSDTC ran from the Theatre Royal in Plymouth to Fore Street in Devonport and thus traversed all three towns. It eventually received current from the Prince Rock at one end and from Newport Street at the other!). Clearing the Newport Street site caused several problems and it was not until 21st February 1901 that the Mayor Mr Harman J.H. Greaves was able to lay the foundation (or rather the memorial

stone). Already machinery was being installed under temporary sheds, the DDTC was supplied with current from 26th June 1901 and the PSDTC was connected on 18th November 1901.

The initial plant at Newport Street consisted of a Browett-Lindley engine driving an ECC 150kW 525v D.C. generator used solely for traction (No. 1 Set). But already installation had begun of two Ferranti engines each driving an ECC 350kW generator. Even when these two machines came on stream there was little current to spare for public and private lighting. An additional 500kW set was ordered in October 1901, and a lighting supply was commenced on 28th April 1902. The build up of private consumers, and of the street lighting was very slow; the Corporation could see little reason for replacing the gas lamps, especially since, as we have seen, they owned the gas works! There was dissatisfaction in Stonehouse, having entered into a joint scheme and supplied the site for the power station, no private or public lighting had been installed by the summer of 1902; and worse still the residents were complaining about the black smoke from the chimney.

The Amalgamation of the Three Towns

This came about in October 1914, although it had been vigorously resisted by Devonport and resented for many years. By this time the capacity of Prince Rock had reached 3,150kW and Newport Street 2,800kW. But inevitably the systems were to remain separate for several years. Additional plant at Newport Street was to consist of rotary convertors fed from Prince Rock. Generation at Devonport ceased in March 1929 and Newport Street remained a DC Convertor substation. It was not until 1937 that conversion to A.C. was completed for all consumers and by then the tramways had been reduced to just a few routes.

Devonport Dockyard Generating Station

Although essentially a "private" station, this was a substantial undertaking built in 1906. By 1910 the plant capacity was 3,400kW and was eventually to reach 19,850kW. Originally it was direct current, which was standard for HM ships; but in 1926 the Dockyard distribution system was converted to alternating current and was subsequently linked to the Grid. It was instrumental in supplying vital services in Plymouth during the Second World War, when the Prince Rock Station was severely damaged, causing it to be shut down and be disconnected from the Grid. The Dockyard Station was finally closed in March 1961.

The Growth of the System between the Wars

Wartime placed severe restrictions on all undertakings; the Board of Trade urged interconnections and joint working wherever possible to improve efficiency and save fuel. But the Plymouth Corporation had to continue to operate the two power stations and systems

separately, since they could not be interlinked. The tramways constituted the major part of the load, and there was little increase in the street lighting, although there was a 25% increase in the number of private consumers.

In the 20 years between the Wars, most houses were connected up and the ever increasing demand necessitated several additional generators at Prince Rock and rotary convertors at Newport Street. In 1932 a 15,000 kW Metro-Vickers turbo-alternator was brought on stream, which increased the total capacity of the Station to 36,850kW. By that time, all of the original reciprocating engines and their associated generators had been removed.

Under the proposals of the Electricity (Supply) Act 1926, Plymouth was chosen as one of the selected stations to supply the new National Grid. Although it was not until 1935, with the exception of the Grid in the South West, that Prince Rock could come under the control of the Central Electricity Board and so assume its new role. Thus during the 1930's the expansion was dictated not just by the local needs, but also by the requirements of its future role in the National Grid.

With the considerable extension of the distribution network, the installation of the new large generators, and in particular with the connection to the Grid, the 1930's saw the Department making strenuous efforts to attract new consumers. Indeed during those years virtually all the remaining properties were connected to the system, even though for many people, the use of electricity did not extend beyond lighting. Consumers needed to be shown the considerable benefits of using electricity in the various household tasks. A showroom was opened in 1931; there were cookery demonstrations, an all-electric house was put on show to the public, electric cookers and other apparatus were made available for hire at low rates, as well as a "Hire Purchase Wiring Scheme".

The Department kept up a high profile with the extensive summer illuminations on the Hoe and at Devonport Park. All the principal features were floodlit, especially the newly constructed swimming pool at Tinside. The magnificent spectacle attracted thousands of visitors.

The Second World War

In the 1930's as war clouds began to appear, the management of the Electricity Works began to give serious considerations to the maintenance of electricity supplies under air raid conditions. In these preparations, the Department was ably led by Mr. H. Midgley, who had been appointed City Engineer in July 1934 on retirement of Mr. O'Kell. Mr. Midgley had been previously Chief Assistant to the Liverpool City Electrical Engineer.

The result of these preparations was that when war broke out, the Plymouth Undertaking was ready for enemy bombing, which began in the middle of 1940. Despite the heavy and prolonged air-raids, supplies were generally maintained throughout the war. The one major incident was the complete destruction of the main switchgear at Prince Rock on 13th January 1941, which disconnected the system from its own generators and the Grid. Fortunately the Dockyard Generating Station was able to supply essential services. With tremendous efforts a connection was made with the Grid, and most consumers were supplied within 3 days, and virtually everyone within a week. Most citizens were much more inconvenienced by the cessation of gas supplies for six weeks. One tramway route was re-installed from Peverell to Old Town Street, but it was finally closed on 29th September 1945.

Post War and Nationalisation

As the War came to an end everyone rejoiced in the return of the street lighting, including gas lamps, which were still being installed. Early in 1946 the Central Electricity Board directed the Plymouth Undertaking to extend its facilities by the erection of a new power station to contain two 30 megawatt turbo-alternators (subsequently increased to three) to be ready by 1951. But with the nationalisation of the electricity supply industry on 1st April 1948, the story of Plymouth Electricity as a Corporation enterprise came to an end. The planning, building and operation of the new station (Plymouth B) was taken over by the British Electricity Authority as well as the operation of the old station (Plymouth A). The rest of the undertaking was absorbed by the South Western Electricity Board. Plymouth B was further extended by three 30 MW sets commissioned in 1960.

The importance of the Plymouth Undertaking and Mr. Midgley's high standing in the industry was recognised by his appointments as Deputy Chairman of SWEB and Ald. H.J. Perry to the eight man, South Western Electricity Board. Ald Perry was also Chairman of the South Western Electricity Consultative Council, which was set up to represent to the Board the interests of the consumers.

Finale

The uneconomic Plymouth A Station was closed in 1974 and demolished soon after; Plymouth B itself came to the end of its useful life and was put into reserve in 1981 and demolished in 1992. The Newport Street building survived until 1990 minus chimney (removed in 1930), but the memorial stone has been preserved. The Dockyard building was demolished in the 1980's to make way for a frequency changing station fed from the Grid. Thus since 1981 Plymouth has been entirely reliant on the Grid. However there are plans to build a 1010 MW CCGT station at Plympton, just outside the City boundary.