

ATTACHMENT

By René Salvador. A short History of French Trans-Atlantic Telegraph Cables from French viewpoint, in Instrumentation and Measurement Society Newsletter, Spring 1995 Issue.

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The first underwater cable linking Brest, Saint-Pierre and Cape Cod was commissioned by the Société du Câble Transatlantique Français in 1869.

The cable was manufactured by the Telegraph Construction and Maintenance Company and laid by the Great Eastern assisted by a number of auxiliary vessels. France's first submarine cable operator was, however, taken over by the Anglo-American Telegraph Company in 1873..

In 1879, Mr. Pouyer-Quertier founded a new firm, Compagnie Française du Télégraphe de Paris à New-York, and commissioned a new cable linking Brest to Saint-Pierre with extensions to both Cape Cod, Massachusetts, and Cape Breton, Newfoundland. The firm soon became known as "PQ", after the founder's initials. The nickname was so popular that for many years, the British and continental Europeans referred to all French companies operating trans-Atlantic cables as PQ.

In 1880, the company added an extension from Brest to Porthcurnnow in Cornwall to pick up traffic from London. A little later, to avoid head-on competition, PQ signed a revenue-sharing agreement with the Anglo- American group.

In 1895, at Pouyer-Quertier's instigation, Compagnie Française du Télégraphe de Paris à New-York merged with Société Française des Câbles Télégraphiques, which retained the nickname PQ in France and became totally independent of the British and American companies. On the American side, the company was known as the French Telegraph Cable Company, or FTCC.

One of the first things the new company did was to lay a new cable from Brest to Cape Cod.

Manufactured in Calais, France, by Société Industrielle des Téléphones (SIT), it took four expeditions by the French cableship François Arago during 1897-98 to lay. At 3173 nautical miles, it was the longest telegraph cable ever laid. The cable core weighed 300/180 kg/NM (i.e., 300kg, of copper conductor and 180 kg of guttapercha insulation per nautical mile). For deepwater sections, the core was protected by steel armor comprising 24 wires each 2 mil in diameter. The cable was particularly subject to twisting and kinking, making it difficult to handle and lay

The first cable linking Brest to Saint-Pierre and Cape Cod, which landed at Duxbury, Massachusetts, was abandoned in 1893. In 1899, an extension was laid from Cape Cod to Coney Island, New York.

The PQ network comprised :

- The Brest - Saint-Pierre - Cape Cod Cable laid in 1879.
- The Brest - Cape Cod cable laid in 1898 and known as the "Le Direct". - The Brest - Porthcurnow extension laid in 1880.
- The Cape Cod - New York extension laid in 1899.

In 1891, the US terminals were grouped together at the cable station at Orleans Cove, now the French Cable Station Museum.

On the French side, the first cable (laid in 1869) came ashore on a beach below the lighthouse at Le Minou on the north side of the entrance to the narrows leading from the open sea to Brest harbor. Starting in 1879,

efforts were made to find a landing point further away from Brest. A small inlet at Deolen, 17 km west of Brest, proved ideal. Since then, all French trans-Atlantic cables have landed at Deolen. To avoid the long detour around Ouessant Island, extensions to Porthcurnow landed at Brignogan to the north.

At the end of the First World War, the German cable linking Emden, Fayal (in the Azores) and New York was assigned to France. This was rerouted to Deolen in 1920 and its operation

entrusted to PQ. To give London access to three trans-Atlantic cables, a second extension was laid between Porthcurnow and Brignogan in 1918.

In 1929, the Brest - Saint-Pierre - Cape Cod cable was damaged by a submarine earthquake south of the Newfoundland Grand Banks and had to be abandoned.

Until 1925, there was no terminal station as such at Deolen, just a small building some 200 meters above the landing point. Here the Submarine cables were joined to a buried landline running 17 km to the main post office in Brest. The building also contained measuring equipment to monitor the submarine cables and locate faults on the sea end. The cables from Porthcurnow to Brignogan ran to a similar building then by buried landline to the Brest post office.

In Brest, messages were transferred manually from the trans-Atlantic cables to the lines to London and Paris. The receiver was a device known as an ink siphon recorder. The operator read the tape produced by the siphon recorder and copied it on a typewriter. The typewritten message was then passed to the telegraph operator connected to Paris via the French Telegraph Network operated by Baudot or to London via Porthcurnow. At first, transmission over the submarine cables was by operators using handkey senders. Later punched tape and automatic senders offered a more uniform transmission rate.

In 1922, PQ decided to centralize submarine cable operations at Deolen. The new station, built on the site of the former cable hut, was commissioned in 1925. It was superbly situated. The Superintendent's house was on higher ground offering magnificent views over the Iroise Sea, the local name for the approaches to the narrows leading to Brest harbor.

The new station featured more modern equipment and direct connections between the submarine cables and the telegraph network linking Deolen to PQ's Paris office via the Deolen-Brignogan landline and Portcurnow. By this time, the latest receiving equipment at each end of the trans-Atlantic cables was the Heurtley magnifier (a type of hot-wire amplifier). This produced a signal strong enough to drive a regenerator which, as the name implies, accurately regenerated each dot, dash or space in the correct sequence.

Incoming signals from London or Paris for transmission over the trans-Atlantic cables went directly to a regenerator which acted as an automatic sender transmitting at as steady 450 centers holes per minute for "Le Direct". Given the cable's length (and the fact that transmission speed is inversely proportional to square of the cable's length) this was a remarkable achievement. It compared very favourably indeed with the Brest- Fayal cable which was only half as long, yet operated at just 660 center holes per minute.

The new equipment at Deolen also made it possible to upgrade Le Direct from simplex to duplex operation (i.e., simultaneous transmission in both directions). The received signals being very weak, duplex operation required a bridge arrangement which, in turn, called for an "artificial cable" to balance the actual submarine cable. The cable's RLC characteristics were duplicated using "Muirhead boxes." A 1450-F cable required an artificial cable comprising 60 to 70 Muirhead boxes. The new equipment was installed in a very large room in the station's basement. Mr. Bernard, the superintendent, became very adept at quickly readjusting the artificial cable each time repairs were made at sea.

In June 1940, the German army occupied Brest. The Brest - Cape Cod, Brest - Fayal and Brest - Porthcurnow cables immediately ceased operation. The German forces did not, however, damage any of the submarine cables in the Brest area. Further out to sea, the British cut them and attempted to divert them to the British Isles for their own use. Throughout the German occupation of France, the German army exercised strict control to ensure that none of the cable equipment was used for clandestine activities. On the other hand, nothing was destroyed or removed. The Brest cable plant was placed under the control of a highly skilled German officer with specialist knowledge of underwater cables.

Brest and Deolen were liberated on 3 September 1944 after a 40-day siege, including heavy shelling and bombing; but the cable station was intact and, thanks largely to the courage and efficiency of Superintendent Bernard, the Germans left without destroying this important resource. As a result, the station itself was ready to operate almost at once.

By 1945, the Brest - Fayal - New York link had resumed service after having been repaired by British cables. To improve the connection with London, one of the Brignogan - Porthcurnow cables was rerouted to Deolen via a submarine extension in 1947. It took much longer to repair "Le Direct" as it was broken and damaged in many places including at least three at depths between 4,000 and 5,000 meters. Repair work was undertaken by the Pierre Picard. Built in France in 1913 and operated by PQ as the Edouard Jeramec, she had been sold to all America Cables in 1929. In 1946 she was repurchased by the French PTT administration and renamed the Pierre Picard. Work began on the western side of the Atlantic. The Pierre Picard left Le Havre in January 1949 and began repairing the shallow-water section (down to 200 m) on the continental shelf off Cape Cod and out to about 200 nautical miles. Ten or more breaks were repaired in this section including one very close to the Orleans Cove shore-end. In May 1949, a new shore-end was laid.

The first deepwater break, south of Halifax, Nova Scotia, was not due to natural causes. In 1941, the British had decided to use the Brest-Cape Cod cable to provide an additional link between Halifax and Porthcurnow. The western derivation had to be abandoned due to the threat posed by German U-boats. When the Pierre Picard arrived on the scene in 1949, neither the PQ management nor the French PTT administration was aware of what had happened. During a stopover in Halifax, the officers of the Pierre Picard had the immense good fortune to meet those of the Cyrius Field. Just before they were scheduled to set sail, the officer of the Pierre Picard learned what they needed to know, making their task considerably easier than it would other side have been.

The Pierre Picard returned to Brest in September 1949 after completing all necessary repairs between Cape Cod and a point in the mid-Atlantic north of the Azores. Much work remained, however. The author remembers this eight month expedition particularly well. Up to 35 days were spent at sea between ports. As a young engineer, I assisted Mr Mangon who had been a senior cable engineer with PQ before the war. It took two more summer expeditions to finish the job. Given the cable's susceptibility to twisting and kinking and the weather in North Atlantic, summer was the only season deep-sea repairs could be undertaken with a fair chance of success. Only in 1962 did "Le Direct" return to service.

In 1945, the Compagnie Française des Câbles Télégraphiques closed down. The French government asked the country's other cable operator, Compagnie des Câbles Sud-Américains, popularly known as "Sudam" to take over PQ's trans-Atlantic cables. The company continued to be known as FTCC in the United States, and as PQ in France and Britain. Customers in both European capitals had long been accustomed to writing "via PQ" on their telegrams to America. The French PTT administration operated two other cables from Brest; one to Casablanca, Morocco, the other to Dakar, Senegal. Both came ashore at the lighthouse at Le Minou, the landing point for the first Brest-Saint Pierre cable laid in 1869. Before the war, both were connected to buried landlines running to the terminal equipment at Brest's central post office. With the post office destroyed during the siege of 1944 and the new one unable to accommodate the cable terminals, they were transferred to Deolen. For a time, the PTT administration and Sudam shared the Deolen station, the former occupying the first floor, Sudam the second. In 1952, the PTT transferred the operation of its African cables to Sudam and the Deolen station was once again under the management of a single organization.

In engineering and operational terms, the basic principles were the same as they had been before the war. Regeneration and direct retransmission, element by element, to London and Paris, and direct transmission of signals over the submarine cables after regeneration. The main improvement in the immediate post-war period was a device to relay the recorded signal to a normal harmonic telegraph channel on the landline network.

Le Direct was abandoned in 1959. In France, 1959 proved a big year for submarine cable in central. Two major events marked the end of an era and the beginning of a new one. First, Compagnie des Câbles Sud- Américains became Compagnie Française de Câbles sous-marins et de Radio, or FCR. Second, the TAT 2 trans-Atlantic telephone cable was commissioned to take

over from the TAT I cable laid in 1956. FCR obtained rights to operate telegraph circuits using the TAT 2 cable enabling it to expand its activities as a "record carrier". FCR also went on to become a driving force behind French participation in the development of modern submarine telephone cables.

The Deolen station remained operational until 1962 when the Brest - Fayal - New York cable was abandoned, after which, FCR sold the land and building. The equipment was removed and dispersed, most of it being destroyed. Fortunately, a few items were saved, including two Heurtley magnifiers. One of these is to be seen at the PleumeurBodou telecommunications museum in Brittany, the other is part of the historic telecommunications collection in Paris. Other surviving items are displayed by various organizations and at FCR's head office in central Paris.

It is a pity that Deolen in Brittany was not made into a museum similar to that at Orleans, Massachusetts. On the other hand, thanks to the efforts of everyone associated with the French Cable Station Museum project, the world now has access to the heritage of some 60 years of service provided by Le Direct and FTCC, or, as we say in France, PQ. During those 60 years, the Orleans station was an important link in the saga of submarine telecommunications that began with the first cable between England and France in 1851 and today includes a world-encircling network of fibre-optic cables. Since the introduction of fibre optics, submarine cables are again one of the most efficient ways of moving information between continents.

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