PART 2: NORTH ATLANTIC CABLE AND RADIO CIRCUITS - 1919 TO 1933

RADIO COMPETITION ENTERS THE FIELD

trans-Atlantic radio
telegraphy, 1901 - 1919

The World War (1914-1919) period laid the foundation of serious radio competition with the cable companies. Prior to that time, radio ship-to-shore services had been built up to considerable proportions, but overseas "wireless", as it was called, had had slow development. Marconi's initial trans-Atlantic experiments in 1901 [1] had led to the signing of a traffic agreement between Marconi's Wireless Telegraph Company Ltd., (Great Britain) and the American Marconi Company under which trans-Atlantic business might be transacted [2]. However not even after Western Union had contracted in 1911 with American Marconi [3] to collect and distribute all the latter's wireless traffic in the United States was any trans-Atlantic business done worthy of the name [4]. The volume was so small that the contract was cancelled by mutual consent after a few years [5]. The "spark" or "damped" method of transmission never afforded sufficient margin to enable the wireless to compete with the cables [6]. The Germans and French also established American correspondent stations at Sayville, Long Island, N Y, and Tuckerton, N J. [7], respectively; these were seized by the United States Government during the War [8].

[1] Marconi's own account is in the N Y Times of Dec 11, 1931. He first spanned the Atlantic from St John's, Nfld. on Dec 12 1901 but was forced by the Anglo monopoly to place his American station in Canada, where he found hospitality at Lewisburg, Glace Bay, N S, near North Sydney.

[2] Early history of American radio is summarized in HR 548 pp. 11 - 15 and 51 - 52.

[3] Mentioned by Carlton in S6, p. 1511. Also see Tribune, Mar. 2, 1934, Cartier.

[4 HR 548, p. 11. But HR 548, p. 36 says American Marconi never operated a commercial trans-Atlantic service; confirmed by Harbord.

[5 HR 548, pp. 345 - 347. McKisick says Western Union did not like Marconi's stock-jobbing methods.

[6 HR 548, p. 12, 14

[7] HR 548, pp. 345 - 347

[8] HR 548, pp. 12, 51. The Tuckerton station is now (1933) part of the RCA Communications plant, (Contract of sale in HR 548, pp. 345 - 347) and the Sayville station belongs to Mackay Radio, part of the I T & T system.

This situation was radically changed by the exploitation, in 1915, by the General Electric Company [1] of the Alexanderson alternator for radio transmitters, and by the A. T. & T. of the deForest [2] 3-element vacuum tube for receivers. In 1919 negotiations between General Electric and the British Marconi were called off at the behest of the United States Navy [3], and the Radio Corporation of America was formed [4] to take over the American Marconi [5]. RCA immediately made a service agreement with British Marconi for service between the United States, Great Britain and her Colonies and a non-interference contract covering Canadian Marconi's trans-Atlantic traffic [6]. In 1920 RCA opened its own branch offices and signed a contract with A. T. & T. for wires connecting offices and stations [7]. Lack of an adequate pick-up system however hampered its efforts [8], and two years later, RCA contracted exclusively with Postal Telegraph-Cable Company [9] to pick up and deliver at all points reached by its lines except where RCA had its own offices. The increase in the trans-Atlantic radio load was watched closely by Western Union [10], especially since radio was underselling cable rates [11].

[1] HR 548, p. 14

[2] HR 548, p. 12, 14

[3] HR 548, pp. 15 - 17

[4] HR 548, pp. 18 - 21. (Also examination of Owen D. Young, S6, pp 1081 - 1110, 1176 - 1186; and of Col. Manton-Davies, S6, pp. 1425 - 1429.

[5] Agreement in HR 548, pp. 118 - 122, dated Nov 20, 1919.

[6] Referred to in HR 548, p. 235

[7] Contract of Sept. 9, 1920. HR 548 pp. 308 - 312

[8] See Sarnoff on the importance of pick-up and delivery in holding a cable file. S6, p. 1240

[9] Contract of July 10, 1922 in HR 548, pp. 264 - 266. This did not include ship-to-shore on trans-Pacific. Expired about Jan. 1, 1928 and not renewed but carried on informally for a while without contract.

[10] At its Long Island laboratory, Water mill, NY. Carlton, S6, p. 1463

[11] Carlton, S6, pp. 1461 - 1462. For discussion of rates, see pp. 111 of this narrative.

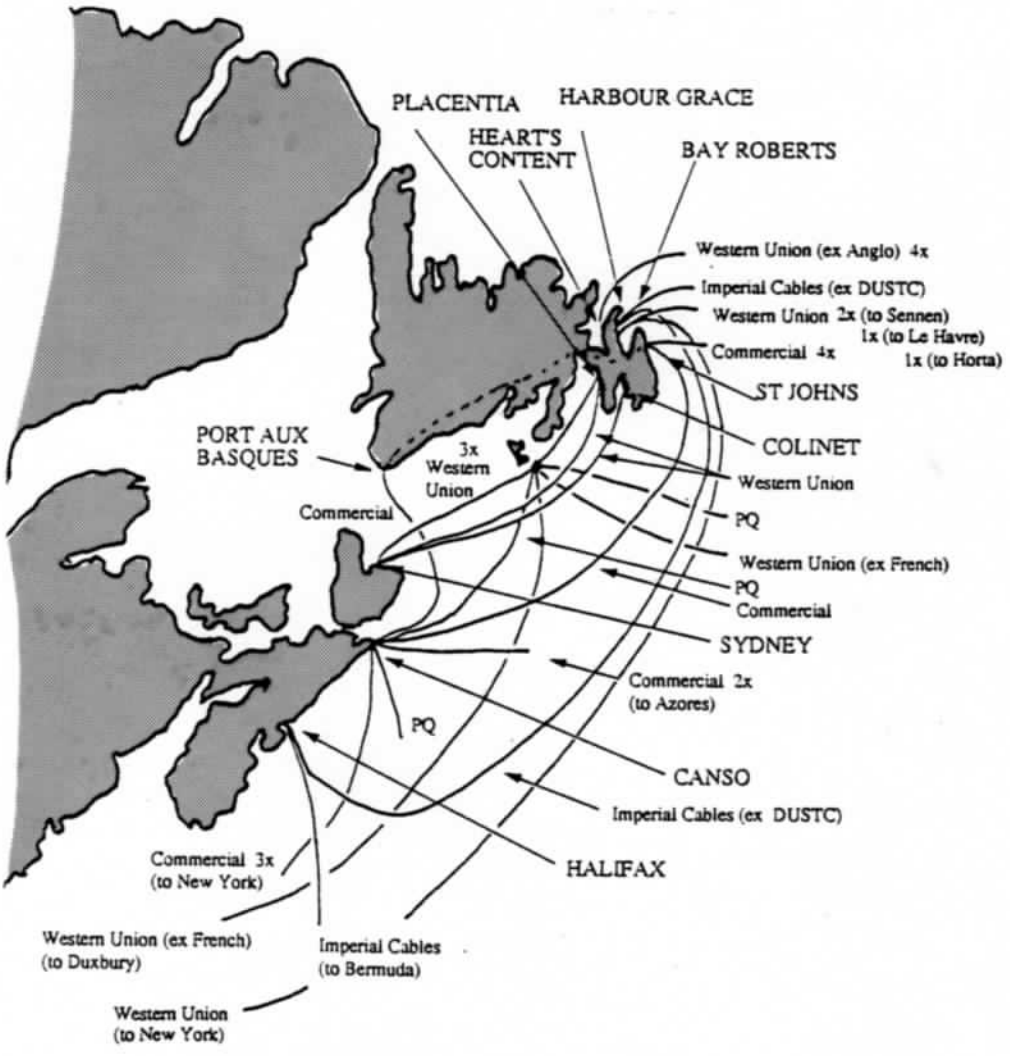
Nevertheless Western Union made no apparent moves [1] to work together with RCA or RCA Communications Inc., [2] in the Atlantic area until 1931 [3] when an exchange agreement was made covering United States trans-Atlantic traffic from all cities except those where RCA had offices (i.e. New York, Boston, Washington and San Francisco). In 1932 [4], arrangements were made for joint operation of certain RCA and Western Union branch offices in the cities named.

[1] Conversations pertaining to a merger between Western Union and RCA were held at intervals, 1928 - 1929. Carlton S6, pp. 1511- 1512

[2] By 1929 broadcasting and entertainment features of radio had grown to the extent that the Radio Corp. of America divided its organization into a number of separate companies including the Radiomarine Corp., with which Western Union conducts an exclusive ship-to-shore business and RCA Communications Inc., with which Western Union had an exclusive trans-Pacific contract but competes to most trans-Atlantic points. See RCA Annual Report for 1929.

[3] An exchange of letters covers this deal. The first was dated Sept. 22, 1931. See NY Times, Sept. 23 1931 and NY Herald Tribune of Sept. 27, 1931.

[4] Correspondence of Oct. 13 - 25, 1932. See N Y Evening Post, Oct. 28, 1932.



CABLES AROUND NEWFOUNDLAND AND NOVA SCOTIA (1928)

Other radio companies enter
the trans-Atlantic field.

Meanwhile, the Canadian Marconi had opened a short-wave [1] beam circuit [2] from Montreal to London; certain American newspapers had started a press circuit, chiefly for westward traffic, between Leafield and Halifax [3], N S; the Mackay companies with the Sayville station and the Federal Telegraph Company's patents and licenses [4] as a base had opened a ship-to-shore business in competition with RCA's Radiomarine Corporation and got an overseas foothold in Austria [5]; and the Liberia Radio Corporation, a subsidiary of the Goodyear Tyre and Rubber Company of Akron, Ohio had made a contract [6] with Western Union to carry United States-Liberian radio traffic.

[1] The discovery of the practicability of the short-wave spectrum was of prime importance to the radio companies in reducing their equipment costs. For a brief but comprehensive history summary of transmission from 12000 meters down to 3 meters, see article "Ultra Short-Wave Transmission" by C R Englund, Bell Laboratories Record, Nov. 1933, Vol XII, No. 3, pp. 66-71.

[2] Described in 1930 Blue Book, p. 145. Circuit started Oct. 25, 1926. (See S6, p. 692).

[3] The News Traffic Board Ltd., of Canada. For resume, see HR 548 p. 53. For detailed testimony: Pierson S6, 1646-1655; Winterbottom, S6, p. 2323: This project was succeeded in 1929 by Press Wireless which started as a domestic press radio association (NY Herald-Tribune July 10 & Sept. 13, 1929) and applied later for foreign wave-lengths. (Times, Apr. 5-6, 1933).

[4] Kolster, S6, pp. 1520 - 1521; Mackay, S6, pp. 1670, 1686; HR 546, pp. 51, 59, 116, 208 - 209.

[5] Contract announced in NY Times, Mar. 27, 1931. International Communication Review, July 1931, p. 4.

[6] Jan. 2, 1930, Contract. Exchange of traffic is at Akron, Ohio.

Split of traffic between
cable and radio, 1929

The net result of all these radio activities was reported by Carlton [1] in 1930 [2] as having caused a split in the total North Atlantic traffic as follows:

Carrier	Daily Messages	Percentages
Western Union Cables	22300	43.6
Commercial Cables	14900	29.2
French (PQ) Cables	3500	6.8
British Merger (Imperial) Cables	2500	4.9
British Merger (Empiradio) Beam	900	1.8
R C A - Marconi Radio Circuits		6.7
Other R C A No. Atlantic Radio		13.7

[1] S6, pp. 1464.

[2] The situation is fundamentally unchanged, 1933

The present American-European circuits of the Radio Corporation of America, plus two operated by Mackay Radio and Telegraph Corporation, are as follows:

Country	City of Operation	Notes and comments
Great Britain	London	Contract between R C A and Marconi's Wireless Telegraph Company now controlled by British Merger, Imperial and International Communications Ltd., dated Nov 21 1919; expires 1945 but automatically extended unless specifically terminated; split of tolls, 50/50 between two contractors. Circuit opened for traffic. References, HR 548, pp. 36, 52, 229. Competition - CCC, WU, PQ, ESN.
France	Paris	RCA - Radio France (quasi Govt); dated Oct 26, 1921; expires 1945; renewable; tolls not split but payouts pooled. Circuit opened Dec. 14, 1920. HR548, pp. 36, 55, 256, S3401, p. 339. Competition - CCC, WU, PQ, ESN
Holland	Amsterdam	RCA - Govt Holland. Circuit opened in 1923 (Water Mill Obsv.) Contract not pub. Ref. HR 548, p. 56. S6, p. 1298. Competition - WU (Amsterdam.) CCC (Rotterdam)
Belgium	Brussels	R C A - Govt Belgium. Circuit opened in Fall of 1927 (Water Mill obsv.) Contract not published Ref. S6, p. 1298.Traffic light, and Belgian station said to be on market, 1932 Competition - WU, ITALCABLE.
Spain	Madrid	R C A - Circuit opened in Summer of 1929 (Water Mill observatory). Contract not published Competition - ITAL (WU, CCC), DIR. SP.

Country	City of Operation	Notes and comments
Germany	Berlin	R C A - Transradio (quasi-Govt.) Contract, Oct. 22, 1921; expires 1937; renewable by contractors but excess of one over other split 2/3 - 1/3. Circuit opened Aug 1 1920. HR54S, pp. 36, 54, 249. S6, p. 1141. Competition - D A T (WU, CCC).
Italy	Rome	R C A - Italradio (quasi-Govt.) Circuit opened Aug 10 1923. Ref. HR548, pp. 36, 56. Contract not published. Competition - ITAL; also Mackay Radio at Vatican City.
Liberia	Monrovia	R C A - Circuit referred to, S6, p. 1298 but no particulars given. Obsv. 1933 show circuit practically unused. Competition - ESN, Akron Radio, Goodyear Tyre & Rubber Co. (see p. 44 of this work)
Norway	Oslo	R C A - Contract, Aug 28 1912; expires 1937; renewable by Govt.; split of tolls, 50% to each party. Circuit opened Mar 1 1920. References, HR548, pp. 36, 54, 245. S4301, Competition - Great Northern T.C.
Sweden	Gothenburg	R C A - Contract Aug 14, 1922; expires about 1947; automatic extension; split of tolls, 50/50%. Circuit opened in 1925 (Water Mill obsvn.) References, HR548, pp. 56, 297. Competition - Great Northern T.C.
Poland	Warsaw	R C A - Contract, Aug 1 1921; expires 1953; automatic extension; split of tolls, 50/50%. Circuit opened Oct 4 1923. References, HR548, pp. 36, 56, 260. Competition, nil.
Syria	Beirut	R C A - Circuit opened in October 1929. (Water Mill obsvn.) Contract not pub. Competition - ESN, Obsv. 1933 show circuit practically unused.

Country	City of Operation	Notes and comments
Turkey	Ankara	R C A -Circuit opened in Jan 1928, (Water Mill obsv.) Contract not pub. Ref. S6, p. 1298. Competition - ESN Observation. 1933 show circuit practically unused.
Portugal	Lisbon	R C A - Circuit opened in Spring of 1928, (Water Mill obsv.) Contract not published. Ref. S6, p. 1298. Competition from ESN and ITAL.
Russia	Moscow	R C A -Circuit opened in Fall of 1930, (Water Mill obsv.) Contract not published. Competition - Great Northern T.C.
Czecho-slovakia	Prague	R C A -Circuit opened Dec 1, 1930.Contract not pub. Ref. N Y Herald-Tribune, Dec 2 1930. Competition - nil.
Switzerland	Berne	R C A -Circuit opened Winter of 1932, (Water Mill obsv.) Contract not published. Competition - British Marconi (W U)
Hungary	Budapest	Mackay R & T Co. -Circuit in operation prior to 1933; date of opening unknown. Contract not pub. Competition - nil.
Austria	Vienna	Mackay R & T Co. -Contract of Mar 27, 1931; not pub. Ref. Intl. Commn. Rvw., Jul 1931, p. 4. Competition - nil.

Post-War communications undergo
nationalistic development.

Consideration of the development of radio competition has diverted this narrative a bit from the cables themselves. We now return to the upheaval following the War period - an epoch that was characterized by a nationalistic consciousness that worked itself out in an attempt on the part of all leading countries to consolidate and augment their international communication lines. In the United States, it took the form of laying more cables, or bringing control of Western Union cables quite definitely to New York from London and in the formation of the Radio Corporation of America under quasi-governmental auspices [1]. In France, it took the form of diverting a seized German cable to the shores of France and in establishing Radio France. In Germany, it took the form of resuscitation of the Deutsch Atlantische Telegrafengesellschaft (DAT) and the formation of Transradio. In Italy, it led to the establishment of Italcable with a cable network reaching from the Mediterranean to Belgium on the North and to Buenos Aires on the South. And in England, it worked itself out in the All-Red Route idea, culminating in the formation, under Government auspices, of the British Merger company. It is of interest and importance to the understanding of the cable-radio situation at the present day to examine the background of the Merger [2].

[1] HR548, pp. 18 - 21. Cross-examination of Owen D Young, S6, pp. 1081 - 1110, 1176 - 1186; and of Col. Manton Davis, S6 pp. 1425 - 1429.

[2] In this narrative, French developments are taken up under that heading. German and Italian developments are covered under the Azores route. American developments are considered later in this section.

BRITAIN'S IMPERIAL CABLE - RADIO POLICIES

The British Colonial
attitude since 1902.

The All-Red Route
is visualised.

On account of her colonies, Britain has, from the beginning of cable history, fostered an imperial cable system. While she carried out her policy through the subsidy and regulation of privately owned cables, an iron hand was maintained through her control of landing licenses, to secure which, companies were obliged to satisfy the Government as to necessity and as to rates they intended to charge. In 1902, the Crown appointed a commission [1] to investigate matters [2] of cable policy and this commission, while it took the attitude [3] that public opinion had tended to over-rate the importance of all- British routes, did recommend [4] that every colony or naval base should be connected with the Mother Country by one cable touching only on British territory or the territory of some friendly neutral. In particular, the commission found that public sentiment supported a demand for an "All-Red" Route, including a connection of England with Australia via Canada in addition to the then existing route via Suez.

Coincidentally with the publication of the commission's report and also in 1902 the Pacific Cable Board, a quasi-Governmental body, completed the Vancouver (Bamfield Island) - Fanning Island - Fiji - New Zealand - Queenstown network to compete with the Eastern Extension Telegraph Company's lines via India and China. At Vancouver, until about 1909, PCB gave its eastward traffic to Canadian Pacific Railway's telegraphs, Great North Western and Western Union; after that date, PCB leased two wires from CPR from Vancouver to Canso, where connection was made with the Commercial. The latter, of course, never could be properly considered as a unit in an All-Red route.

[1] British 1902 Commission

[2] British 1902 Commission p. 14

[3] British 1902 Commission p. 15

[4] British 1902 Commission p. 42. see pp. 139 - 143 of this work for a discussion on military uses of cables.

Britain seizes and diverts
a German cable, 1914.

A couple of events transpired around 1920, however, to make it possible for the British to supply the missing Government-owned transatlantic link. First, was the circumstance of the cutting and diversion [1] of the old DAT Emden - Horta - New York cable (in 1914) and its eventual diversion for Penzance - Horta - Halifax use. This gave the GPO a single cable which, although all-British, touched on Portuguese soil at Horta, Azores, and one which, when interrupted, was protected by no fall-back. The second circumstance lending itself to the British was the experience which Western Union was having with the DUS following the lease of 1911. The lease contained a default clause, operative in Western Union's favour if the cable remained interrupted and unrepaired for more than 18 months. The cable was frequently interrupted [3] for long periods, and in 1920 the Western Union brought suit against DUS for breach of that clause of the contract. At the same time, however, Carlton suggested to the GPO that the situation afforded the British Government an opportunity to buy a second Imperial cable at a sacrifice price. Impetus was lent to the purchase by the running out of the contract held by the Anglo, whereby the GPO turned over to the Anglo all unordered traffic - traffic which would immediately become available to GPO to route over its new cables [4]. The deal was consummated [5]: in 1921 [6], DUS broke its lease to Western Union and sold its cable to the GPO. The Post Office was not yet ready to operate it so Western Union undertook its operations on short-term lease until July 1922 when it was finally turned over to the GPO.

[1] 1919. This history of the diversion of this cable is set forth more completely in the Azores Route section (see pp 78 onwards)

[2] Carlton, S4301, p. 118

[3] Culminating in interruption of Sept 22, 1917 (Accounting Department correspondence - Mills). Rental was reduced to one-half under terms of the lease, on Sept 22, 1918, and to nil on Mar 22, 1919, the date of final default. On Apr 25, 1919 (Claude Mills, Western Union) notice was given DUS that WU was cancelling the lease on account of their failure to repair the cable. On June 28 1919, DUS repaired the cable and WU operated it under a temporary arrangement substantially in accordance with the terms of the original lease. During this period DUS brought a suit against WU, but WU won.

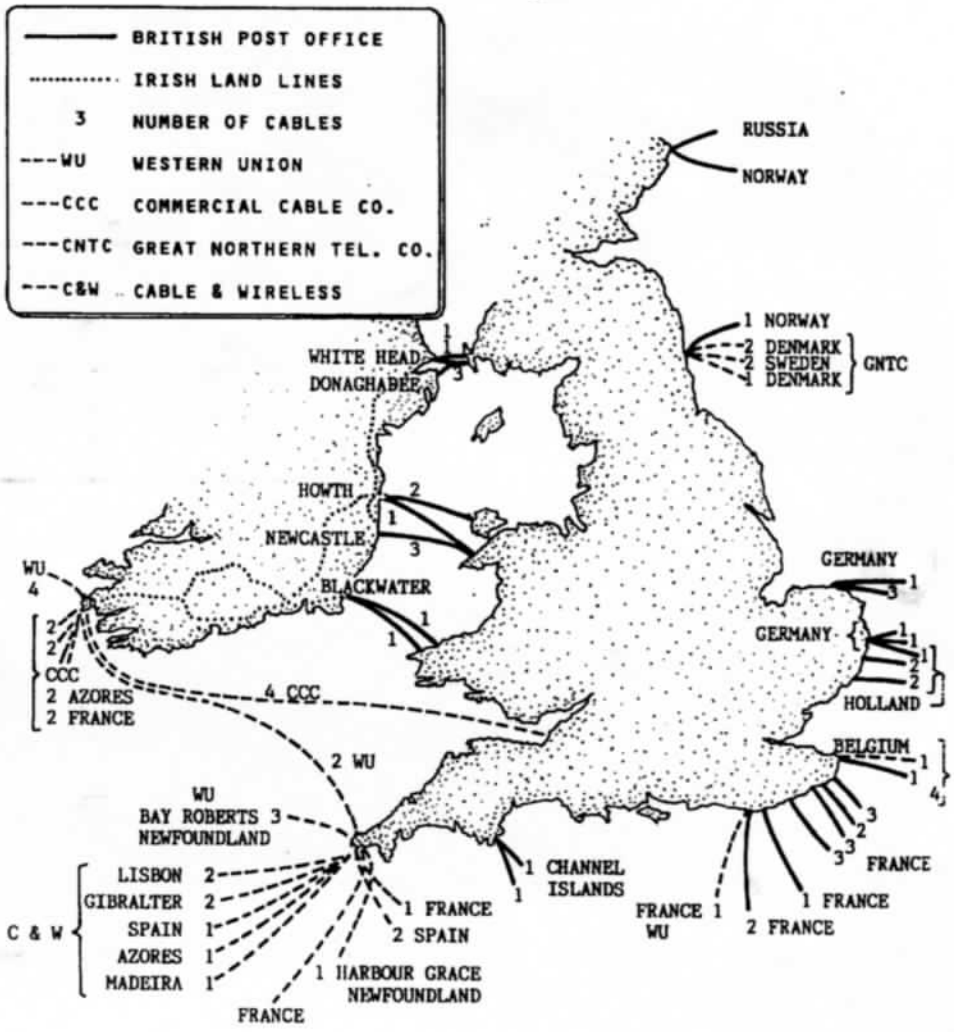
[4] Carlton, S6, p. 1466

[5] Contract and correspondence in Western Union's files, Nov. 1920 - June 1922. Carlton S4301, p. 118

[6] Dates from Mills

The Government diverted the European end from Ballinskelligs, Ireland, to Penzance in 1923, took over the office, quarters and instruments at Harbour Grace and the Halifax terminal was moved to the CPR office there and the former alliance with the Commercial was discontinued* . The All-Red system was strengthened in the Pacific in 1926 by the laying of high-speed cables parallel with the existing Vancouver - Australia cables [1].

[1] The P C B which had started out amid much head-shaking on the part of the Eastern, had built up a tremendous reserve between 1902 and 1926. This money, until spent on the New Pacific cables, was a threat to all the trans-Atlantic companies.



EUROPEAN CABLE NETWORK CIRCA 1935

(NOTE; THE GERMANY - AZORES CABLES HAVE BEEN OMITTED FOR CLARITY. THEY RAN FROM EMDEN THROUGH THE STRAITS OF DOVER TO THE AZORES)

* There was another event that may not have appeared obvious to the author at the time of writing. Twenty six counties of Ireland had become independent from Britain in 1922 and together they constituted the Irish Free State. The Treaty with Britain which brought this about was not welcomed by all and this resulted in the Irish Civil War of 1922-23. The republican forces, which did not accept the Treaty recognised the value of communications and put several of the cable stations out of action. Landlines were also severely disrupted. In view of the fact that the Empire required secure and dependable lines of communications which touched only the territory of friendly neutrals, it was imperative to divert the cable from Ballinskelligs cable. Nevertheless the station buildings were retained under the terms of the Treaty and were kept in repair on behalf of the GPO by the Irish Government's Department of Post and Telegraph. This situation remained in operation until the 1950s.

Consummation of the
All-Red Route.

GPO "Empiradio" competes with
All-Red "Imperial" and PCB.

Concurrent with the inauguration period of the All-Red cables, the British Marconi Co. worked with a long-wave station at Poldhu, to a station at Glace Bay, NS [1], near North Sydney, but little traffic was handled. Around 1927 however, Marconi developed the short-wave "beam" radio, and a station at Drummondville, Montreal, belonging to the Canadian Marconi Company was put in touch with corresponding stations in England and Australia with a good measure of success.

The British end of this link was handled by GPO and the circuit christened "Empiradio". With Imperial cables and Empiradio, the Post-Office had manoeuvred itself into the position where it was able to route unordered American traffic quite independently of anyone and everyone - of Marconi, RCA, PQ, Commercial and Western Union. Perhaps more important still, the GPO not only could, but openly did make war on the eastward and westward routes to Australasia. There was a tremendous uproar in British cable circles at this brand of competition, with the result that (reminiscently of 1902) the inevitable commission of enquiry was appointed, (this time the Imperial Wireless and Cable Conference).

A report was eventually rendered [2]. Decision was reached [3] to effect a giant merger, to consist of a holding company, Cables and Wireless and an operating company, Imperial and International Communications Ltd. (I & I C) [4], the holding company being directed by a board upon which Britain's various colonies should have representation and the operating company being governed by a board representative of the various absorbed cable and wireless interests involved.

[1] Marconi's own account is in the NY Times of Dec. 11, 1931. He first spanned the Atlantic from St Johns, Nfld. on Dec. 12, 1901, but was forced by the Anglo monopoly to place his American Station in Canada where he found hospitality at Lewisburg, Glace Bay, N S near North Sydney.

[2] The debate in Parliament is given at length in S6, pp. 690 - 842. A good account of the merger is given in the annual report of I & I C, June 1930

[3] The first preliminary steps were to merge Eastern and Marconi interests (May 3, 1928); next, to take Imperial, Empiradio and PCB into the scheme (NY Herald-Tribune, Apr. 10 1929); then to shift Imperial cable from the Post Office to Eastern's Electra House,London, and Empiradio beam from the Post Office to Marconi House (Sept. 29 1929) and finally to bring all the merged operating rooms together in Electra House. An ambitious program for a monumental building on the Thames was abandoned and the new building sold before being completed.

[3] The names of the constituent companies of the Merger were changed in May 1934; Cables and Wireless became Cable and Wireless (Holding) Limited. Imperial and International Communications became Cable and Wireless Limited. (Foreign Communications News, US Dept. Commerce, No. 187, May 11 1934).

Composition of Imperial and International Communications*

The Imperial cables and Empiradio were thrown into the hopper, along with British Marconi, the Eastern, the Western, the Eastern Extension, Europe and Azores, Europe and South America, West Coast of America Telegraph Company, the Indo European Company and Department, and the Pacific Cable Board, in fact, all of England's international communications except the cables and the radio telegraph and telephone to the Continent and the overseas radio telephone, which were retained by GPO.

A radio man was given reins with which to attempt to control the trajectory of this chariot and at least for a while a Pender (the third of the line) fiddled an accompaniment to someone else's driving [1].

In order to bolster up the All-Red route, (after the dust had settled somewhat) I & I C made an agreement with Canadian Marconi for the latter, using the name of Canadian Communications Company [2], to operate the Newfoundland and Canadian terminals of the Merger's Imperial cables. These cables have since been greatly improved in working, manned by staff used interchangeably with the Eastern and its associated cable companies; the Imperial's landlines in Canada have also been put in good shape working together and paralleled by Empiradio. Imperial is giving a good account of itself. To meet the competition, Commercial - CPR has tightened up on its service between London and Montreal via New York, as has Western Union - Anglo, also [3].

Competition for Canadian traffic to Britain.

The GPO favours Imperial cables for unordered traffic but gives Empiradio its share [4]; Marconi gets all unordered traffic to the United States. Operations of all three trans-Atlantic Merger routes are centred in a remodelled Electra House, London. Together the traffic constitutes a minor part of all trans-Atlantic traffic, 72.8% being in the hands of Western Union and Commercial. It is too early to say what the future will bring forth in the fight between British and Americans for control of this business; a wide difference of opinion has recently been expressed by leading experts [5].

[1] But in the latter part of 1933, upon F.G. Kellaway's death, J.C. Denison-Pender took charge of I & I C.

[2] Contract referred to in annual report of I & I C, June 1930.

[3] For the history of Western Union and Anglo in Canada, see pp. 59 of this narrative.

[4] British Post Office Guide, quoted in by Winterbottom, S6, pp. 1438 - 1439.

[5] Carlton S6, pp. 1464 - 1465, 1480 - 1482, thinks its organization is too unwieldy for it to constitute a serious menace to US privately owned companies. Behn & Harbord, S6, 2105.

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* Peter Wright (*Spycatcher*, Heinemann, Australia, 1987) recalling his father's career gives a somewhat bitter account of these events from the radio point of view.

AMERICAN DEVELOPMENTS SINCE THE WAR

While British transatlantic cable interests have, since the War, been putting their trust in the co-ordination of radio and cables, as has just been explained, American radio and cable interests have been "going it alone" for the most part, putting their energies rather into the technical development and physical expansion of their respective plants than into their unification [1]. We have already touched upon the advances made by American radio interests through utilization of new technical knowledge. A similar engineering advance, in which Americans took no small part, practically revolutionized cable operating technique in the decade following the war. Relays, magnifiers and especially regenerators, made the direct working of cables through repeater-stations possible, and there was amazing activity on the part of cable companies to rearrange their short sections so as to afford greater speed and flexibility of operation.

Western Union connections between Ireland and London.

One of the first links affected was Western Union's London - Valentia connections [2] which had been nothing to brag about since Mackay laid his Waterville - Weston cables in 1885, and which had become involved in the Irish Political upheaval that brought forth the Irish Free State in 1921. The Anglo, from the beginning, had leased Irish overhead landlines from the GPO connecting with GPO submarine cables across the Irish Sea. The landlines were never very satisfactory as to continuity, and in the face of the War emergency, proved entirely inadequate with stoppages of hours between interruptions and restorations. In 1918, Western Union laid No 1 VA-PZ section between its Valentia and Penzance stations, and followed it up with No 2 in 1920. Irish independence, proclaimed by Dail Eireann in 1919 was followed by English "Black and Tan" military occupation and guerilla warfare until 1921 [3], during the course of which the overland circuits were reduced to a state of chaos.

[1] For history of development of cable apparatus up to and including the regenerative repeater, see pp. 96 - 102 of this narrative.

[2] The Commercial already had good connections between Waterville and London via Weston-Super-Mare and Bristol, 1885, 1901 and 1905. See German portion of Azores section, pp. 78 - 84 of this narrative.

[3] The order in which full regenerator equipment was installed on WU cables was: 3PZ (1910 cable) Jan. 1922, (250 1.p.m); 4VA (1894 cable), Nov. 1922; 1PZ (1881 cable) and 2PZ (1882 cable), Dec. 1922; 1VA (1874 cable), Jan. 1923; 3VA (1880 cable) June 1923 (to North Sydney). The American Terminus was the Hammel, Long Island cable station. Rotary repeaters were installed there in May 1926 and thereafter the American terminus was the New York Cable office, 40 Broad Street.

The Valentia station was occupied by censors, raided by guerillas, and finally the instrument room was wrecked by soldiers in 1922 [1]. In 1923, Western Union completed its present Valentia - Penzance plant with a bicore cable [2] and the four Hearts Content - Valentia cables were soon afterwards worked through from Hammel or New York to London and vice versa [3].

New American short
sections, 1920 - 1923.

On the American side of the ocean, Western Union, in 1920, laid the short section known as the "McKissick Cable" between St Pierre and Placentia, Newfoundland, and in 1921 another short section between North Sydney and Hearts Content. The Canso and Duxbury stations, which had been closed in July 1918, were reopened in May 1923, the Duxbury - St Pierre cable having been cut into Censo in 1922.

Coincidentally with the introduction of regenerators, Commercial Cable Company laid its 1923 "Jumbo" [4] - the heaviest core trans-Atlantic cable laid up to that time - from Far Rockaway, NY, to Canso, Horta and Waterville, with legs to Weston and Le Havre.

[1] But the superintendent, W J Richards, joined short section to long and thus maintained communication between Hearts Content and Penzance. This event is not to be confused with the wrecking of Valentia Station by disgruntled ex-employees in June 19 1922* .

[2] The lease of the last London-Valentia overland was terminated on Nov. 7 1923.

[3] The division of Ireland into the southern Irish Free State and Northern Ireland necessitated a change in the historic custom of handling all Irish traffic via Valentia and Cork; Irish Free State traffic is now handled via Valentia and Killarney (Irish Free State Post Office) and Northern Ireland via London, Liverpool and Belfast Office opened by Western Union.

[4] The Jumbo is worked (1935) two-channel recorder code(3-element, 225 1.p.m per channel) eastward, New York to Commercial's Shorters Court branch; Westward, 2 channel recorder, 250 1.p.m per channel, one channel from Shorters Court, the other from Commercial's London Office

* There may difficulty reconciling these facts. The Editor's father-in-law was present at the station when these events occured and reports that there were strong republican (anti-Treaty) sympathies amongst several of the staff. The Station diary at Heart's Content (now lodged in the Provincial Archives in St Johns) give details of the damage done by the local irregulars early in the summer of 1922. Later, when the civil war was at its height all stations were put out of action. It would appear from the records that the occupation of the Valentia Station on 10 August was a very sudden event. Soldiers of the Free State army arrived by sea on 24 August. Nevertheless the IRA used a motor boat to dredge for cables and on 29 August 1922 succeeded in cutting one wire. See pp 139, 140

Commercial's Jumbo and the Western
Union Permalloy cables, 1923 - 1928.

Western Union countered with the 1924 permalloy [1], New York to Horta direct, meeting Italcable's 1924 [2] to Malaga, Spain and Anzio (Rome) Italy, and DAT's 1926 [3] permalloy to Emden, Germany. In 1928 Western Union laid the first duplexed loaded cable between Bay Roberts and Horta [4] thus completing a Hammel - Bay Roberts - Horta traffic triangle.

The fastest loaded cable of all was Western Union's 1926 New York - Bay Roberts - Penzance simplex which is good for 2400 letters per minute, printer- operated, as contrasted with about 550 1.p.m, simplex, printer-operated, the best of Western Union's non-loaded cables; and with an estimated 1000 1 p m, simplex, printer, for Commercial's Jumbo. WU's 1926 was worked recorder for a short time, then a temporary, standard 4-channel multiplex (one-way) printer outfit was installed and worked for several years at speeds up to 400 letters per minute, per channel, or 1600 l.p.m for the circuit.

Western Union's
high-speed 1926 cable.

On September 2 1932, after eight months of trials with new thyratron tube equipment at Bay Roberts and Penzance, the permanent 8-channel equipment with full monitor-printer at the repeaters and with instantaneous manual turn-around switching apparatus was put into traffic at 300 1.p.m per channel, or a total of 2400 1.p.m for the circuit. It is now (1933) worked with two channels through from New York to Shorters Court (Stock Exchange Office) [5], London; one channel through New York to Amsterdam; one channel from Montreal to London; two New York - London stock channels and two New York - London utility channels. It has enormous capacity for disposing of bulk traffic. The permalloy continuously loaded cable may be seen, second only to the regenerative repeater, as being the most important technical development in cables since the introduction of duplex working.

[1] See pp. 103 of this narrative.

[2] See pp. 85 -88 of this narrative.

[3] See pp. 90 -92 of this narrative.

[4] See pp. 103 of this narrative.

[5] Shorters Court office of Western Union was opened on Sept. 23 1929, to serve the after-market curb market in American stocks.

Miscellaneous changes in
cable layout, 1927 - 1933.

In 1927, the Anglo (Western Union) 1910 cable was cut off Penzance and the European end diverted to Havre, the cable being put in New York - Paris service [1]*. In 1928, Western Union, following the lead of Commercial, Eastern and other companies, installed Pernot-Rich** apparatus [2] at North Sydney and Heart's Content in order to derive a superimposed circuit between those points on the Canso - North Sydney - Heart's Content physical cable. In 1928 [3], Commercial and Western Union collaborated to lay an underground cable quadrilateral between Far Rockaway (Commercial), Hammel (Western) and the Broad Street headquarters of the two companies in New York, half the circuits of each company being regularly assigned to conductors in each side, for protective purposes.

Western Union, from its early days, made itself a factor in Canada, consolidating absorbed companies there in its own name, particularly in Montreal, in British Columbia and in the Maritime Provinces of New Brunswick, Nova Scotia and Prince Edward Island, and making traffic arrangements with other telegraph and railroad companies, especially the Great North Western [4]. The Anglo also maintained an office in Canada from the early days of the 1873 Pool, leasing wires, entirely in Canada between Montreal and North Sydney from Western Union and its affiliated companies.

[1] See French section of this narrative, p. 66 for the reason for this.

[2] Assigned to feed 1PZ at 160 1.p.m 3-element signals on Sept. 18 1928. Carrier frequencies 55 and 65 cycles, east and west respectively, and two values of rms current and zero to line. Abandoned Oct. 1933 to save royalties.

[3] Undergrounds finished Oct. 25 1928. Contract of Jan. 1 1929.

[4] S6, p. 505.

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* The diversion of cables was covered in the Anglo-Irish Treaty which led to the formation of the Irish Free State. Irish Cabinet papers which are lodged in Dublin Castle indicate that the British Government were strongly opposed to this diversion, presumably because there would no longer be an opportunity to browse through US-French traffic in transit.

** The Pernot-Rich system was an early form of carrier wave transmission. The normal traffic was sent by reversals as before. However its amplitude was modulated by a high frequency signal which carried messages. On short routes where there was not much attenuation, it was thought that this might obviate the need for further cables. Newfoundland was also charging a cable landing tax and Western Union thought that such a system might reduce their liability. As can be seen from reference [2] above, they were not successful in this respect.

The Anglo and Western Union in Canada, 1873 - 1919.

In 1915 [1], Western Union withdrew from Montreal [2], leaving the field to its ally, Great North Western, to divide with its competitor the Canadian Pacific Railways, allied with Postal Telegraph. At the same time (1915), the Western Union, while retaining its offices, lines and business in the Maritime Provinces, announced [1] its intention of selling them to GNW, the latter company being ambitious to build up competition in Canada on a nationwide scale with the CPR. These intentions were, for one reason or another, held in abeyance until 1919 but meanwhile, still in 1915, the offices of Anglo and GNW in Montreal were combined. Morse and multiplex printer circuits were operated between Western Union at North Sydney, NS, and Anglo - GNW (later CNT) at Montreal until 1924 when North Sydney, having been deprived by through cable operation between New York and London of its last remaining transatlantic cable terminal, ceased manual relaying.

Western Union sells its domestic business in Canada, 1929.

On August 15 1924, Western Union, under the Anglo name, separated its traffic quarters in Montreal from CNT, and thereafter worked a recorder circuit to New York. A 2-channel multiplex replaced the recorder in 1931 and on June 15 1931, one channel of it was repeatered to one of the four (later, eight) channels of the permalloy cable, giving Montreal a direct eastward outlet to London. In 1929, the old (1915) scheme of having Western Union leave Canada as a domestic telegraph concern was taken up again in earnest, and on July 1 1922 in accordance with an agreement and bill of sale dated January 4 1929, the landline [3] property, business and employees of Western Union in the Provinces were transferred to the Canadian National Railway Company [4]. Western Union retained its overland aerial cable feeder wires, repeater and test stations and the cable stations at Canso and North Sydney. This arrangement marked the final retirement of Western Union from the Canadian domestic telegraph picture [5].

[1] Contract of Jan. 1 1915 between WU, GNW and Canadian Northern. The GNW was bought out by Canadian National Railway's telegraphs (CNT).

[2] The contract provided for an interchange of domestic and cable business between US, Canada and Europe.

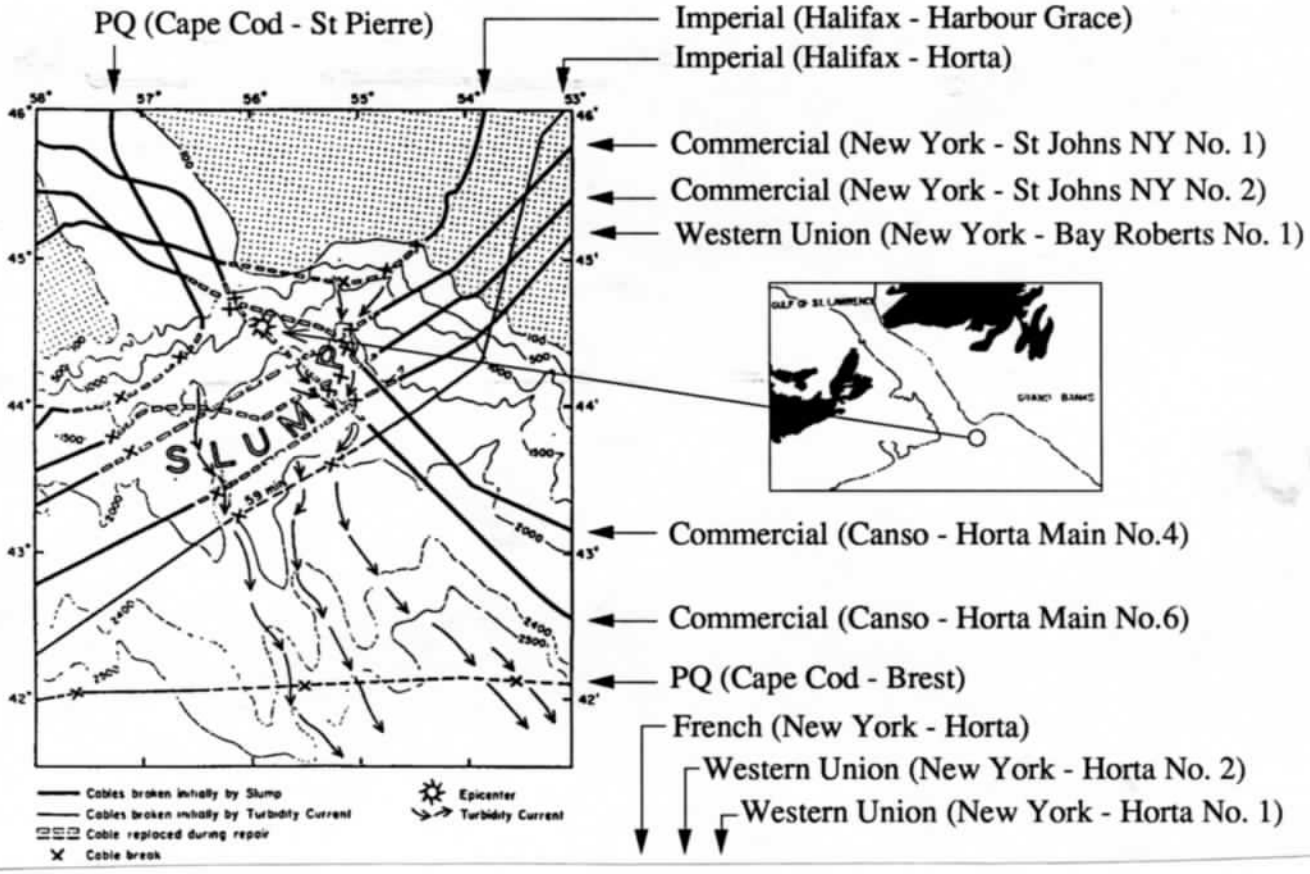
[3] Including Anglo cable property situated in New Brunswick and Prince Edward Island leased by W U.

[4] Contract in the files. Also supplementary contracts of July 1 1929 and Oct. 14 1930, involving Inter-colonial Railway telegraph lines and line testing and maintenance by WU for CNT.

[5] The Western Union had previously sold its British Columbia property to Canadian National.

The submarine earthquake
of 1929.

On Nov. 18 1929, a submarine earthquake with epicenter southwest of Canso, NS interrupted 13 of the 21 transatlantic cables within a period of 12 hours and caused damage that was not fully repaired for months*. Cross-connections between Western Union and Commercial at St Johns, Nfld. and Waterville - Valentia, IFS made it possible to make up two emergency cables which, with the regular plant remaining, helped both cable companies to retain their files against radio competition.



* There was an awareness that seismic activity could interrupt communications (*Sub-Oceanic Changes*, J. Milne, Geog. Journal **2**, 261, (1897)) but this event took all by surprise. Seven cableships (Dominia, John W. Mackey, Lord Kelvin, Cambria, Edouard Jeremec, All America and Cyrus Field) worked in atrocious conditions but had not completed the repairs until mid March 1930.

These events were to have a consequence which was not appreciated at the time. The cable companies had charts giving the precise locations of their cables before the earthquake and they also had precise details of the time of failure. In recent years marine geologists have been able to use this data to test their models of turbidites (see B.C. Heezen and M. Ewing, *Turbidity Currents and Submarine Slumps and the Grand Banks Earthquake*, American J. Sci, **250**, 849 -873 (1952) and B.C. Heezen, and C.L. Drake, *Grand Banks Slump* Am. Assoc. Petrol. Geol., **48**, 221 - 223, (1964))

Formation of International
Telephone and Telegraph Corporation.

The International Telephone and Telegraph Corporation* was incorporated [1] in 1920 and until 1927 was engaged in the exploitation of telephone operation and manufactures in Puerto Rico, Cuba, Spain, Mexico, Austria, Hungary and South America. In 1925, it acquired the International Western Electric's foreign sales and manufacturing organization, changing its name to International Standard Electric Corporation and making of it a subsidiary** . In 1927, I.T. & T. made a major move in acquiring All America Cables Inc., [2] and in 1928 formed the Postal Telegraph and Cable Corporation to acquire [3] the Postal Telegraph- Cable Company, the Commercial Cable Company and the Mackay Radio and Telegraph Company, with Clarence H. Mackay, son of the founder of the Postal-Commercial interests, thereafter taking orders from the Behn brothers+ (Sosthenes and Hernand) [4] - guiding spirits of I.T. & T.

[1] A more complete history of I.T. & T. can be found in that company's annual report of 1930++ . See also footnote 1 on next page .

[2] See p. 62 of this history for details of that company

[3] Mar. 20, 1928.

[4] Hernand Behn, died Oct 7 1933. Obituary, in International System News, Oct/Nov. 1933 p 1, gives a brief statement of Behn's organization of Behn Bros. (Puerto Rico, 1904), Porto Rico Telephone Company, Cuban Telephone Company (Cuba 1916), and I.T. & T. (New York, 1920).

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* Perhaps better known today as ITT

** Anti-trust action had forced Western Electric to divest itself of its international arm. Sosthenes Behn, supported by Morgan's Bank bought this up. The sale included the British firm, Standard Telephones and Cables (STC), which remained part of ITT until recent times. The cable manufacturing arm of STC acquired a major part of the Telegraph Construction & Maintenance Co (Telcon) in the 1950s and with it much of their archives relating to cable laying activities mentioned in ISC's narrative.

\+ According to M. Freedland (*A Salute to Irving Berlin*, W.H. Allen, London 1986, P.147) Clarence Mackay was paid in ITT shares. He had been busy using his money to aquire art treasures when Wall Street crashed. He sold his shares along with everyone else. The Behns bought back their shares cheap. At almost the same time Mackay was faced with a massive bill for unpaid taxes and being unable to realise his collections at a realistic market value, was reckoned to have lost more than anyone else in the Crash. His daughter, Ellin, had previously married Irving Berlin against his wishes (she pre-deceased Berlin by little more than a year.)

++ Anthony Sampson (*The Sovereign State*, Hodder & Stoughton 1973) gives a more modern and more/less (depending on viewpoint) biased account of the company

Together with All America, this combination of absorbed companies had several of the necessary elements to make a strong bid for international traffic and they made the most of them: the backing of J.P. Morgan (II)* a profitable telephone manufacturing business; the experience of Mackay and his advisers in the international cable field; patents in radio acquired by Mackay from the Federal Telegraph Company [1]; the Postal landlines for cable-radio pick-up and delivery which, though operated at a loss, was a potential competitor for 80% of Western Union's landline traffic and for all its cable business [2]; the solvent Commercial Cable Company firmly established in England, France and elsewhere; the flourishing All America Cables, entrenched in South America and flaunting its American origin and Pan-American sympathies from the housetops; and a strong corps of telegraph, cable and telephone engineers, partly recruited from the Bell Telephone System and from Western Union.

I.T. & T. proceeded to adopt an aggressive advertising policy; to build a large headquarters building in the middle of the New York financial district, housing all of its "record communication" units except Postal; to install a system of automatic printer tie-lines with their principal customers and to use contracts with the Bell System and the Standard Oil gasoline service stations to overcome Western Union's advantage of national coverage through its multiplicity of telegraph offices in railroad stations.

[1] Early history of Federal, recitals by Ellery W. Stone, S6, pp. 1519-1525. Mackay, S6, p 1670.

[2] Carlton, S6 p 1472.

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* John Pierpont Morgan (1837 -1913) (see H.L. Satterlee, *J. Pierpont Morgan; an intimate biography*, Macmillan, New York 1939) had spent some of his youth in the Azores and was aquainted with the principle families on Fayal who were to influence cable landings at Horta, indeed in 1864 he went into a merchant banking partnership as Dabney, Morgan & Co. In 1871 this became Drexel, Morgan & Co. Today, we know of Morgan Grenfell Bankers. In 1906, in the company of George Ward, General Manager of Commercial Cable Co., he sent the first message to Clarence Mackay from Horta over that Company's newly landed cable.

Development of
Mackay Radio.

In the radio telegraph field, beginning with the Sayville, N Y station [1] and ship-to-shore service, and with the Pacific Coast overland radio stations of the Federal Telegraph Company, I.T. & T. expanded to include ship-to-shore stations [2] at Rockland, Me., and West Palm Beach, Fla., and radio circuits [3] from New York to San Francisco, Budapest, Vienna, Vatican City, Camaguey (Cuba), Bermuda, Bogota, Lima and Buenos Aires, and from San Francisco to Honolulu, Manila and Shanghai.

[1] See p. 41 of this narrative

[2] I.T. & T. Annual Report for 1930

[3] List in an advertisement in NY Herald-Tribune, May 31 1933. Bermuda circuit still in testing stage (May 30 1933). Starting dates compiled by McKisick:

Copenhagen	Sept	16	1933
Tokyo	Nov.	14	1934 (N Y Amer.)
Honolulu	May	15	1929
Lima	Dec.	11	1929
Manila	Dec.	1	1930
B'Aires	Dec.	15	1930
Camaguey	Apr.	9	1931
Vienna	Apr.	11	1931
Bogota	Aug.	1	1931
Budapest	Jul.	30	1932
Vatican City	Jan.	24	1933
Shanghai	May	18	1933

Proposed merger between I.T. & T.
and RCA Communications.

In spite of I.T. & T.'s holdings in Mackay Radio, it seemed to the Behns in 1929 that the exclusive agreements of RCA with foreign governments would serve to exclude I.T. & T. from giving a co-ordinated cable-radio service for many years. Western Union had already unsuccessfully tried to reach a concord with RCA in 1928. In 1929 [1], however, I.T. & T. and RCA Communications arrived at such a concord, to become effective if and when the anti-monopoly policies of the Congress [2] were repealed or modified. At first, there was reason to believe that Congress would vacate its historic position on the matter, but after a struggle that began in earnest but tapered off in a desultory way after two years [3], the idea was definitely abandoned.

The I.T. & T. - RCA combination is the one which most nearly reached fruition with the past few years but two others have been talked about that are of larger moment.

[1] Announced in the NY Herald-Tribune of Mar. 29 1929, and in the NY Times of Mar 30 1929.

[2] This narrative, pp 33, 127, 179 for details of the Sherman Anti-Trust Act. pp 64, 128 for details of the White Radio Act.

[3] The NY Herald-Tribune of Apr. 10 1929 gave the first indication that the scheme might hit a snag. During the hearings on S6, in December 1929 and January 1930, Carlton hit body blows at the necessity of the project in meeting foreign competition. The US Bar Association put its o.k. on the scheme as reported in the NY Times of July 22 1930, but there has been considerable sniping by the Hearst's interests at the $90,000,000 purchase price demand by Young of RCA, and agreed to by I.T. & T.. As the economic depression of 1930 grew deeper, the price began to look more and more out of line and finally, a joint public announcement by both companies (see NY Times of Mar. 6 1931, and 1930 Annual Report of I.T. & T.) said the deal was off.

Rumoured mergers involving
Western Union, A.T. & T. and Postal.

One is a WU - A.T. & T. consolidation for which Gifford says that the time is not ripe [1] and to which Carlton has said he is personally opposed [2], in spite of his conviction that eventually it will materialize. The other is a Western Union-Postal-Commercial merger, said to be one of the dreams of the Behn brothers. Behn bought out Mackay with the objective of offering the Postal landlines to Western Union in exchange for Western Union cables to add to the Commercial, All America, Mackay Radio and possibly R C A Communications* [3]. An offer of that kind, insuring monopoly to both parties, Carlton is said to have refused [4]. Since that time, (1927) there have been frequent revivals of the merger rumours [5] but up to the present, (late 1933) there have been no actual arrangements announced. To date, the United States stands firm on the competitive system as it applies to telegraphs and cables.

[1] S6, p. 1497

[2] Carlton says not a dollar of Western Union in A.T. & T. etc. S6, p. 1497

[3] No authority is cited

[4] Carlton, in S6, p. 1472 says the WU-Postal merger idea dates back to 1920 but does not meet with his idea of the public benefits of competition in telegraphy.

[5] On April 13 1932, Carlton told WU stockholders, "Whether Western Union is destined to stand alone as a corporation as it has for the past 76 years I cannot tell ... we must be prepared for a change when business comes back". The New York Herald-Tribune in its issues of April 14, 1932 and Apr. 15 1932 interpreted this to mean that a physical merger with Postal Telegraph was imminent; this Mr Carlton denied through the N Y Evening Post of Apr. 14 1932. Early in June 1938 there was heavy buying of WU and Postal stock in the market on the rumour that the Attorney General was about to invoke the Anti-Trust Act.

* According to the Dictionary of American Biography Suppl 2 (Charles Scribner's Sons, New York, 1958, p415) the Postal Telegraph & Cable Corp. went into receivership in 1935. Mackay's associated companies did likewise in 1938 and in 1943 Mackay's landlines were merged with Western Union