Émile BAUDOT (1845–1903)
His life and his telegraph

PART 1: HIS LIFE

1.1. Early life

Émile Baudot (1845–1903) was born in Magneux, Haute-Marne, France, on 11 September 1845. His first names were, in this order, Jean, Maurice, Émile. He was the son of farmer Pierre Émile Baudot, who later became the mayor of Magneux. His only formal education was at his local primary school, after which he carried out agricultural work on his father's farm before joining the French Post & Telegraph Administration as an apprentice operator in 1869. After his training, he was appointed on 16 July 1870 at the Central Télégraphique de Paris (and a little later in Bordeaux). The telegraph service trained him in the Morse telegraph and also sent him on a four-month course of instruction on the Hughes printing telegraph system, which was later to inspire his own system. But the Franco-German war broke out on 18 July 1870 and he was appointed in a division of the "Télégraphie Militaire" in January 1871. The war ended, he was transferred to Paris where he resumed his duties in February 1872.

It was only after his entry into the Administration that, seduced by the scientific side of his new profession, he undertook to perfect his general education. He had everything to learn, mainly in electricity as well as in mechanics! He started as a '5th class employee' (4th class until July, 1873). But thanks to his endeavour and study work (mainly after his working hours) and the success of his system at that time he could be promoted to 'controller' (co-director) in 1880. Then he had the ambition to become an engineer. He prepared for the exam, successfully passed it, and was appointed inspector-engineer in 1882.

1.2. A bit about his telegraph (more in PART 2)

Baudot realised that with the few existing printing telegraphs of that period, the line is idle for most of the time, apart from the brief intervals when a character is transmitted. He devised one of the first applications of 'time-division multiplexing' in telegraphy. His invention made it possible to transmit several messages simultaneously.

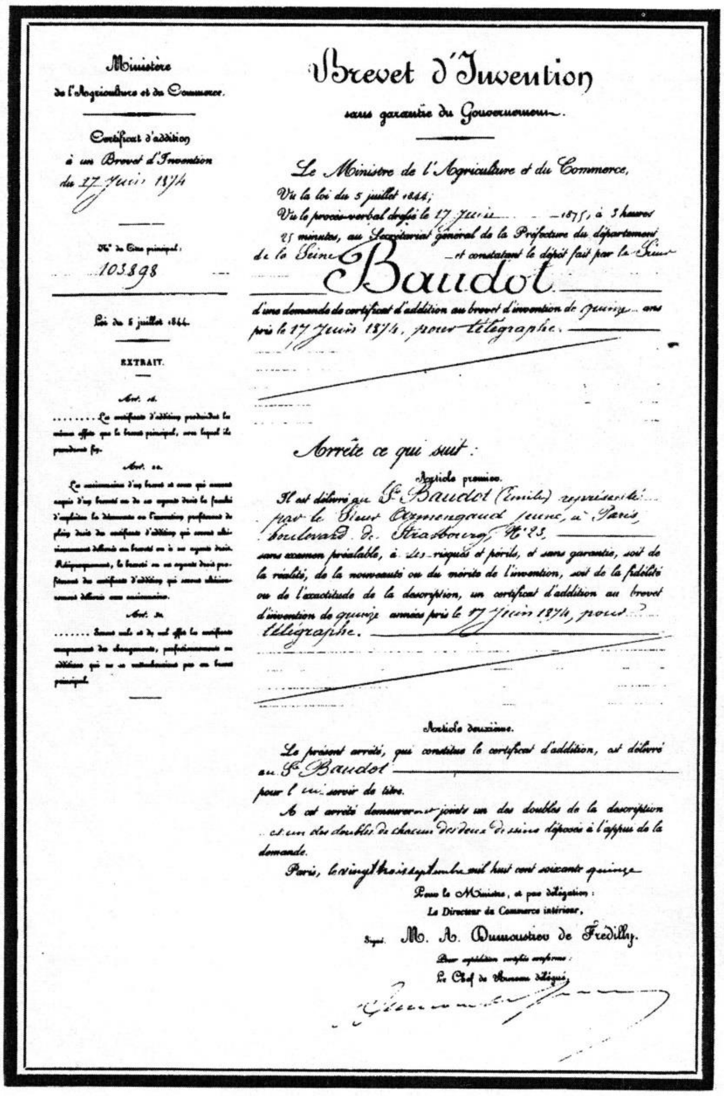
In October 1873, Baudot desiring at all costs to realize his apparatus and to see it working, proposed then to cede his invention to the Administration, on condition that they agreed to subsidize the making of it.

On 17 June 1874 he patented his first printing telegraph (Patent no. 103,898 "Système de Télégraphie Rapide"), in which the signals were translated automatically into typographic characters. Baudot's hardware had three main parts: the keyboard *(then with six keys but soon after the final version with five),* the distributor, and a paper tape receiver. It was based on a '5-unit' code, with equal 'on' and 'off' intervals, which allowed telegraph transmission of the Roman alphabet, punctuation and control signals. By 1874 or 1875 (various sources give different dates) he had also perfected the electromechanical hardware to transmit his code. His inventions were based on the printing mechanism from Hughes' instrument (British patent in 1855), a distributor invented by Bernard Meyer (in 1871), and the five-unit code devised by Carl Friedrich Gauss and Wilhelm Weber (in 1833). Baudot combined these, together with original ideas of his own, to produce a complete character-printing multiplex system.

The credit granted by the French postal and telegraph administration made it possible to construct prototypes for an experiment on line, which was undertaken on 15 December 1875 over a wire of 550 km. This resulted in the realization of a complete apparatus, allowing a fivefold transmission. And this then led to a second patent on 2 March 1876, under the title "Système d'appareil télégraphique multiple imprimeur".

Soon after the first real online installation between Paris and Bordeaux was set up and tested on 12 November 1877. Two days later, the link was commissioned and the exploitation of it began with the transmission of a presidential telegram of 360 words, which was transmitted in less than three minutes. The two telegraphs used were made in the Dumoulin-Froment workshop in Paris.

Baudot’s apparatus was shown at the Paris Exposition Universelle (1878) and won him the Exposition's gold medal, as well as bringing his system to worldwide notice. In June 1880, a second installation was commissioned between Paris and Lyon.


Ministère de l'Agriculture et du Commerce.

Certificat d'addition à un Brevet d'Invention du 17 Juin 1874

N° du titre principal : 103898

Loi du 5 juillet 1844.

EXTRAIT.

Brevet d'Invention sans garantie du Gouvernement.

Le Ministre de l'Agriculture et du Commerce,

Vu la loi du 5 juillet 1844 ;

Vu le procès-verbal dressé le 17 Juin 1875, à 3 heures 25 minutes, au Secrétariat général de la Préfecture du département de la Seine et constatant le dépôt fait par le Sieur Baudot d'une demande de certificat d'addition au brevet d'invention de quinze ans pris le 17 Juin 1874, pour télégraphe.

Arrête ce qui suit :

Article premier.

Il est délivré au Sr Baudot (Emile) représenté par le Sieur Armengaud jeune, à Paris, boulevard de Strasbourg, N° 23, sans examen préalable, à ses risques et périls, et sans garantie, soit de la réalité, de la nouveauté ou du mérite de l'invention, soit de la fidélité ou de l'exactitude de la description, un certificat d'addition au brevet d'invention de quinze années pris le 17 Juin 1874, pour télégraphe.

Article deuxième.

Le présent arrêté, qui constitue le certificat d'addition, est délivré au Sr Baudot pour lui servir de titre.

A cet arrêté demeureront joints un des doubles de la description et un des doubles de chacun des deux dessins déposés à l'appui de la demande.

Paris, le vingt trois septembre mil huit cent soixante quinze

Pour le Ministre, et par délégation :

Le Directeur du Commerce intérieur,

Signé. M. A. Dumoustier de Fredilly.

Pour expédition conforme :

Le Chef de Bureau délégué,

Collection Historique des Télécommunications.

FIG.5. – Certificat d’addition au Brevet d’invention du 17 juin 1874 déposé le 17 juin 1875 par Baudot.

1.3. A couple of drawings of the earliest models

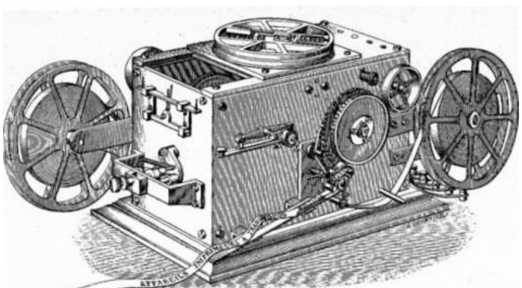


Fig. 39. — Récepteur double, avec combinateur mécanique à 10 voies.

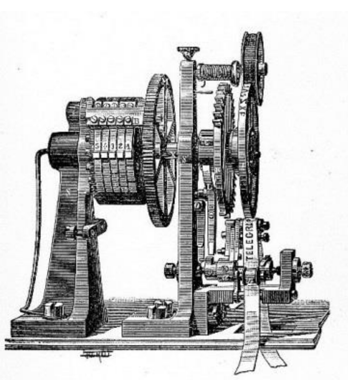


Fig. 37. — Combinateur et système imprimeur.

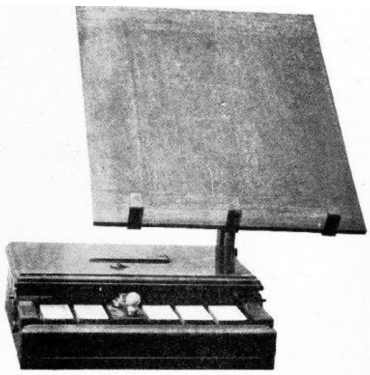


Fig. 38. — Manipulateur.

1.4. Mimault patent suit

In 1874, the French telegraph operator Louis Victor Mimault patented a telegraph system using five separate lines to transmit. After his patent was rejected by the Telegraph Administration, Mimault modified his device to incorporate features from the Meyer telegraph and obtained a new patent, which was also rejected. In the meantime, Baudot had patented his prototype telegraph a few weeks earlier. Mimault claimed priority of invention over Baudot and brought a patent suit against him in 1877. The 'Tribunal Civil de la Seine', which reviewed testimony from three experts unconnected with the Telegraph Administration, found in favour of Mimault and accorded him priority of invention of the Baudot code and ruled that Baudot's patents were simply improvements of Mimault's. Neither inventor was satisfied with this judgment, which was eventually rescinded with Mimault being ordered to pay all legal costs. Mimault became unnerved because of the decision, and after an incident where he shot at and wounded two students of the 'École Polytechnique' (charges for which were dropped), he demanded a special act to prolong the duration of his patents, also 100,000 Francs, and election to the 'Légion d'honneur'. A commission directed by Jules Raynaud (head of telegraph research) rejected his demands. Upon hearing the decision, Mimault shot and killed Raynaud, and was sentenced to 10 years forced labour and 20 years of exile.

1.5. His later career

After the first success of his system, Baudot was promoted to Controller in 1880, and was named Inspector-Engineer in 1882. In July 1887 he conducted successful tests on the Atlantic telegraph cable between Weston-super-Mare (UK) and Waterville (USA), operated by the "Commercial Cable Company", with a 'double' Baudot installed in duplex. The Baudot transmitters and receivers replaced the siphon recorder. And at the end of 1887 the line Paris-Rome (about 1,700 km), which had problems working with a Hughes type telegraph, was served by a 'double' Baudot. The first telegrams sent were those announcing the election of Mr. Carnot to the Presidency of the French Republic.

On 8 August 1890, over separate single-line connections between the three cities of Paris, Vannes and Lorient, he inaugurated the "cascaded" installations that have become so widespread since then. On 3 January 1894, he replaced the existing, and not well functioning, Hughes system on the underground connection from Paris to Bordeaux with a triple apparatus. And on 27 April 1894 he established, still over a single wire (return via the earth), communications between Paris-Bourse and Milan-Bourse and at the same time between Paris-Central and Milan-Central. On this occasion he invented the 're-transmitter'. In 1897 the Baudot system was improved by switching to punched tape, which was prepared offline like the Morse tape used with the 'Wheatstone' and 'Creed' systems. A tape reader, controlled by the Baudot distributor, then replaced the manual keyboard. The tape had five rows of holes for the code, with a sixth row of smaller holes for transporting the tape through the reader mechanism.

The Baudot telegraph system was employed progressively in France, and then was adopted in other countries, Italy being the first to introduce it in its inland service in 1887.

In 1890 the International Telegraph Conference of Paris modified the regulations in order to allow the use of the new apparatus in international connections.

The British Post Office adopted it for a simplex circuit between London and Paris during 1897, then used it for more general purposes from 1898. In 1895 it was adopted in Holland, in 1896 in Switzerland, in Austria and in Brazil in 1897, in Germany in 1900, in Russia in 1904, in British India in 1905, in Spain in 1906, in Belgium in 1909, in Argentina in 1912, in Romania in 1913, …

In England the Baudot apparatus was, amongst others, made by ELLIOTT Brothers Ltd, well into the 20th century (See [9])

In France the last Baudot telegraphs were withdrawn in 1958.

During this period of international expansion of the Baudot system, the apparatus evolved thanks to an engineer, Victor Cartier, who designed the more modern shapes (the 'plateau' of the distributor became already vertical in 1885). They were built in Paris by the Carpentier company.

1.6. His final years

Baudot married Marie Josephine Adelaide Langrognet on 15 January 1890. She died only three months later, on 9 April 1890.

Soon after starting work with the telegraph service, Baudot began to suffer physical discomfort and was frequently absent from work for this reason. His condition affected him for the rest of his life until he died on 28 March 1903, at Sceaux, Hauts-de-Seine, near Paris, at the age of 57.

We may say that he has had the rare pleasure of witnessing the generalization of his system at the international level. His fruitful work was not the result of a happy chance, but the consequence of obstinate work and persevering studies of a good intelligence. His name will remain associated with those of Morse, Hughes, Wheatstone and others, who, like him, have taken a step forward to civilization.

1.2. Some honours & decorations

* Decorations
1981 - Diploma of Honour from the International Electrical Exposition.
1882 - Gold Medal from the Société d'Encouragement pour l'Industrie Nationale (SEIN)
1889 - Ampère Medal from SEIN
1878 – Knight's Cross of the Légion d'honneur
1882 - Knight of the Order of Leopold (Belgium?)
1884 - Knight of the Order of Franz Joseph (Austria).
1891 - Cross of the Order of the Crown (Italy)
1898 - Promoted to Officer of the Légion d'honneur
1900 - Knight of the Order of Saints Maurice and Lazarus (Italy)
1901 - Knight of the Order of the Crown (Italy)

* A street in the 17th arrondissement of Paris was named after Baudot, but it no longer exists.

* And the French PTT have honoured him by giving their first cable repair ship his name: CS / HMS / CS ÉMILE BAUDOT. It was based at Le Havre and used for maintaining French coastal and Anglo-French cables. It was built in 1917 by Swan, Hunter & Wigham Richardson Ltd. Later on, it was taken over by the Royal Navy during WW2 and used for harbour defence work. It returned to the French PTT in 1945. Based at Brest, it was used to maintain the Anglo-French and French Atlantic cables. Finally, it was sold for scrap in 1962

Navire câblier "EMILE BAUDOT" MARIUS BAR PHOT. TOULON REPROD. INTERD

* In 1926 the International Telegraph Communications Advisory Committee of the International Telecommunication Union met in Berlin and immortalized Baudot by designating the "Baud" - shortened from his name - as the unit of the signalling rate. One baud (pronounced bawd) is indeed the unit of measurement for the signalling rate, i.e. the number of changes in the transmission media per second of a modulated signal. For slower speed transmission channels this equates to bits per second or bps. For higher speeds, multiple bits may be encoded in each modulation step. For example, a speed of 1200 baud may transmit 2400 bits per second if in each modulation step two bits (the 'dibits' 00, 01, 10,11) are grouped (4-phase modulation > CCITT recommendation V26). Hence it comes as no surprise that the term baud has slowly been replaced by the term bps or bit/s for expressing correctly the transmission speed.

* In 1949, the French Post Office issued a series of stamps with his portrait. By mistake, the year of his birth was given as 1848, not the correct 1845. The stamp was corrected and reprinted. However, the erroneous stamps still circulate among philatelists and have much greater value than the corrected types. The scan below (February 2019) shows the difference!...

1.9. Some later developments

* In the UK, the arrangements for duplexing the Baudot were perfected by a member of the Engineer-in-Chief's staff at the General Post Office, Mr. A. C. Booth (around 1910 I think). In [2] it is presented as the 'Booth-Baudot Duplex'.

* And thanks to an invention of a certain Mr. Picard, inspector of the French Administration, but also thanks to the flexibility of the Baudot system, a double transmission system across the Mediterranean (via a submarine cable) between Marseille and Algiers, a distance of 900 km, could be realised in 1898. So, the slow "siphon recorder" telegraphs could be replaced by the character-printing Baudot ones.

* I also want to mention here a certain Mr. Charles Verdan, who gave the Baudot the ability to extend the range of connections using automatic retransmission over wireless. He obtained an initial patent in 1924 and the first connections were set up between France and Tunisia (1927) and between France and Morocco (1928).

* Automatic Baudot working was introduced (at around 1930 I think) on a number of national and international circuits. This arrangement allowed the speed of the distributor to be increased from 180 to 210 or more revolutions a minute, to give a working speed of 35 words a minute, or more, on each channel. For transmission the keyboard was replaced by an automatic transmitter (known as the 'Transmitter Multiplex No. 1' in the UK), the signals from which are controlled by a perforated tape prepared by means of a keyboard perforator. Reception was carried out under the same conditions as in manual working, and the only necessary alteration to the receiver was an adjustment to suit the increased speed of working.

1.10. About manufacturing

In previous articles often the inventor had his own manufacturing capabilities. Examples include Werner Siemens, Lars Ericsson, Louis Breguet, Gustav Hassler and others. This was not the case with Emile Baudot (and neither with David Hughes). In the 19th century Paris was well known for its skilled pioneers in the construction of electrical apparatus. So, fortunately, Baudot, Hughes and others could rely on famous and well-appreciated instrument makers. Moreover, several of those had established fruitful relationships with leading French scientists of the time. I will present here some of them that manufactured the telegraphs that were invented by Baudot (and Hughes). For more information on French scientific Instrument makers I warmly recommend [4].

Gustave FROMENT

Of the companies that made the Baudot telegraphs in France, that of Gustave (Paul) Froment (1815-1865) was one of the most distinguished and skilled Parisian instrument makers of the mid-nineteenth century. His name is, amongst others, connected with the development and production of early electric motors. He was the maker of the pendulum used by Léon Foucault to demonstrate the rotation of the earth and he was involved with Armand Fizeau in making the 'toothed wheel' apparatus for measuring the speed of light.
Froment's contribution to the electric telegraph was very important. He personally invented a dial telegraph and improved several ancillary devices such as electromagnets, relays, electric bells, commutators, switches, etc. He also improved and constructed the giant 'pantelegraph' of Giovanni Caselli (which can be considered as the ancestor of the telefax). One of the apparatus which was constructed by Froment was the printing telegraph invented by Prof. David Hughes. He modified and improved this complicated device (see my article on Professor David Hughes).

P. DUMOULIN

P. Dumoulin was the son-in-law and collaborator of Gustave Froment. The company passed into his hands after Gustave's death in 1865 and was named **'Dumoulin-Froment'**. He continued the family tradition and expanded the activity of the workshop. In 1878 the firm employed 35 workers and 5 apprentices. And as we have seen already in chapter 1.2, the two first of Emile Baudot's telegraphs were made in the Dumoulin-Froment workshop in Paris.
(It seems to be impossible to find any bibliographical information concerning Demoulin; even his Christian name is obscure…)

L. DOIGNON

In 1890 Dumoulin-Froment became associated with L. Doignon, who took ownership of the firm in 1894, when Dumoulin retired. Around 1903 the company **'Doignon, successeur de Dumoulin-Froment'** moved to Malakoff, a few kilometres from Paris, where he continued its activities until about the Second World War.

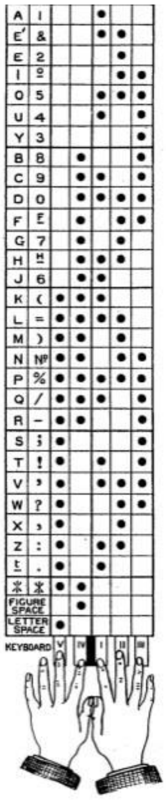
Jules CARPENTIER

In 1873 Jules Carpentier (1851-1921) completed his engineering studies at the prestigious 'École Polytechnique'. Apart from Gustave Froment, he was probably the first important French instrument maker with an academic education. He succeeded Heinrich Ruhmkorff (1803–1877) after having bought his workshop. Indeed, after Ruhmkorff's death, his workshop was to be sold at auction. Carpentier decided to participate in it. Luckily, nobody else tried to buy the old company, enabling him to acquire it for a ridiculously low price, probably because it was on the edge of bankruptcy. Carpentier had to introduce several radical changes into the production of instruments. Until then every specialist had to make an instrument from the beginning to its finish. He introduced the subdivision of the tasks into constructing new machine tools, making precise technical drawings, introducing the concept of interchangeable parts and a 'bureau d'étude', etc. One of his many successful products was the famous moving coil galvanometer, which he developed in close collaboration with Marcel Deprez and Arsène d'Arsonval. In the field of telegraphy, the role played by the **'Ateliers Ruhmkorff-Carpentier'** was very important. They perfected and produced the Baudot apparatus of which thousands were sold. Most of the Baudot telegraphs that are still around are signed 'J. CARPENTIER – PARIS'. In the early years of the 1900s, Carpentier worked very close together with Captain Gustave Ferrié, the well-known French pioneer of wireless technology.
Carpentier was elected to the 'Académie des Sciences' in 1907. His election to this elitist institute represented, in fact, the official stamp of approval of him by the French scientific community. His successful life came to a sudden end on 26 June 1921 when he died in a car accident.

PART 2: ABOUT HIS TELEGRAPH

2.1. The principle

The working process of a Baudot system is extremely complicated and goes far beyond the scope of this article (and of my knowledge, I must admit). Several books were written, describing in every detail how this system works. P. Mercy needed in his reference book [3] not less than 474 pages and 220 figures in order to explain it all in detail. That can only enhance the respect that we should have for the self-made man, Émile Baudot, who created this wonder! See possibly [1] for a bit more in-depth (but still very simplified) technical description of the operation of a Baudot system.

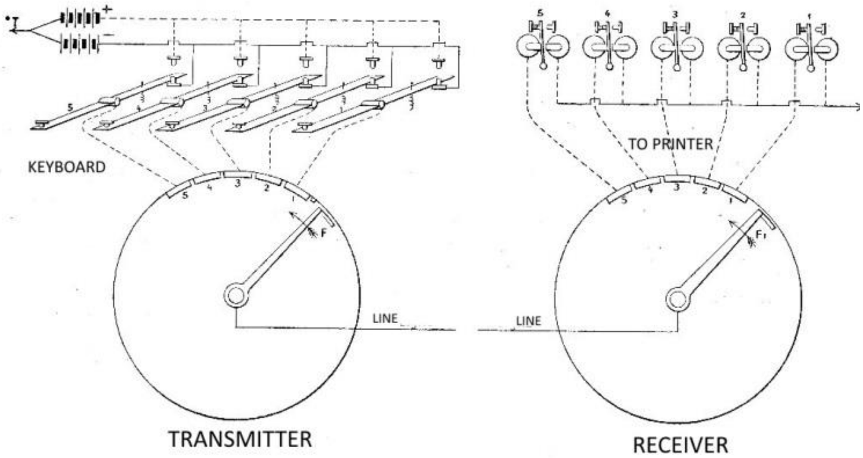


The system consists of:

(a.) One or, most often, more **keyboards** (the transmitters).

Each keyboard had just five piano-type keys, operated with two fingers of the left hand and three fingers of the right hand. It seemed that the optimal arrangement was to employ the **five-unit code.** Five keys could make 32-1 (the 'rest' position) = 31 different usable combinations. Two of them were used to shift from letters to figures and vice versa, making 2 x 29 = 58 working signals possible. Once a key had been pressed, they were locked down until the rotating arm of the distributor passes over the five 'segments' that are connected to that particular keyboard. In rest position the key is linked to the negative pole of the battery ('space'), and to the positive pole when pushed down ('mark'). So, each character is determined by the position of the five keys. Nowadays we would call them 'bits'; here 5 bits (either a + or a – polarity) per character. The shaded circles indicate which keys are to be depressed. The depression of one of the keys of the keyboard simply connects the corresponding segment to the positive pole of a local battery.

(b) A circular **distributor** at each side of the line



Distributors are employed to allow the use of the '**Time Division Multiplex'** principle, which gives each of a number of operators in succession the exclusive use of the telegraph line for a short time during recurring periods. The distributor is the vital organ in a multiplex system, since it is designed to maintain the essential correspondence between each transmitter and its corresponding receiver. The rotating arms (also named trailer, spindle, shaft) carry the revolving arms. These bear metallic brushes that sweep over the surface of the segmented rings. The number of arms (channels) provided for by a distributor depends upon the number of keyboards. In turn, this number is determined by the typical transmission capacity of the line. But the most general arrangement provides for four keyboards and this is called a 'quadruple' system. The upper limitation is related largely to the length of the line, since the received impulses are weaker on long lines and therefore the segments are required to be larger. The revolving brush, made of thin soft metal wires, scans the above-mentioned segments (receiving their polarity from the local battery via the keyboard) and transfers the negative or positive current to the receiver. A similar scanning system runs on the receiver side, synchronously and in phase, and transfers the positive or negative current pulses to the receivers. This takes place so rapidly that when the five 'bits' of each of the 4 characters (i.e. of the 4 different transmitting keyboards) are scanned in the first revolution, the sensing system is ready again in time on the first transmitter to scan the second character, etc. For the users, it is as if they have the line entirely to themselves. The operators had to be well trained; not only to know the code, but he also had to maintain the correct rhythm (2 characters per second). The cadence for this was usually provided automatically by an acoustic signal. The distributor has several concentric rings on the outside (see the images), each ring playing a typical role. They make the connections with the keyboard and the receiving relays, with the line and the batteries; they are used for the 'cadence' process, the speed correction process and so on.

(c.) The character **printing receiver**

As said before, the receiver was also connected to a distributor. The signals (the 5 'bits') coming from the telegraph line were temporarily stored on a set of five electromagnets, before being decoded to print the corresponding character on paper tape. Observing the mechanics of the receiver in greater detail shows that many principles from the Baudot receiver were based on the ones of the (much earlier) Hughes telegraph.

Characteristics

Accurate operation of this system depended on the distributor at the transmitting end remaining in synchronization with the one at the receiving end and operators sending characters only when the contacts passed over their allocated sector. This could be achieved at a speed of 30 words per minute by strictly observing the audible "cadence" of rhythm of the system, whereby the distributor gave the operator the use of the line. Initially the gears from both of the distributors (one at each end of the line) were driven by weights (as in old clocks) and later on by an electric motor. Note that machines driven by weights were initially provided with an electrical motor only for rewinding the weight when it was down. A Baudot "double" simplex set, operating one channel in each direction at 30 words per minute per channel, gives a somewhat greater output than a Morse duplex; whilst a 'quadruple' set will do practically double the work, and so forth. And, very important, with a Baudot system the different channels were working over a single circuit!

SIMPLEX: in one direction over 1 wire

DUPLEX: simultaneous transmission and receiving over 1 wire

DOUBLE: two operators at each side over 1 wire

QUADRUPLEX: four operators at each side over 1 wire

2.2. Images of the apparatus

The family

Another keyboard and another distributor

The five electromagnets of the printer receiver

Some other printing receivers

A receiver driven by an ‘old’ electric motor and a distributor driven by a ‘modern’ electric motor

Showing some manufacturers' names

Detail of Russian model, showing the Cyrillic characters (not in my collection)

PLANT 21

COMMUNICATIONS

MINISTRY

N° 336 1947

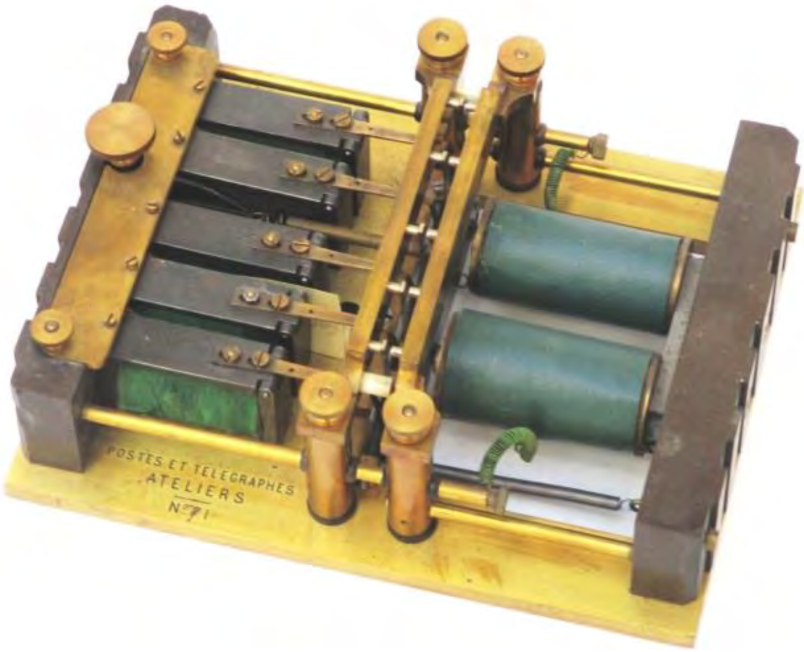
2.3 About some auxiliary apparatus

1. Multiple switch
The two photos show on the right two rows of each 6 connectors. One row or the other can be connected to the single row of six connectors at the other side. The drawings show clearly how the switch operates. These switches were used only in very special circumstances.

2. Baudot relay
The strength of the current that is sent over a wire diminishes with the distance. At a certain distance the current will be too weak to allow the electromagnets of the receiver do their job. And insulation problems of the wires cause the same effect. Baudot therefore developed a very specific type of relay to solve this problem. It belongs to the "polarised relay" category. Much earlier Prof. David Hughes did the same for his 'piano' or keyboard-printing telegraph but the construction of Baudot was completely different. These types of relay are very sensitive and can, as such, respond to much lower received currents. So, in fact a weak current is able to trigger the relay, which in turn send a much greater current to the five magnets of the receiver, using a well-loaded local battery for it.
In the UK also the P.O. pattern standard relay "B" (also a polarised relay) was used to perform the same task (right-hand photo)

3. Re-transmitter

The length of line which can be worked direct depends upon the characteristics of the circuit. Direct working is (thanks to the Baudot relay) possible over say 1,500 km. for a typical copper telegraph wire (this was accomplished in India, for several years). Such an arrangement, however, necessitates the employment of a large battery, which might give rise to induction on adjacent circuits. It is better therefore to divide long lines into two sections and to install a 'repeater'. Therefore, the Baudot "Re-transmitter" was invented. The signals received on the line at the intermediate location can then be re-transmitted over the other section of the line, powered by fresh battery current in the usual way. Moreover, connections can be so arranged that a terminal station (A) can work through a re-transmitter station (B) to TWO other stations (C) and (D). In other words (B) becomes a 'junction' or 'forking' station.



ELLIOTT BROTHERS (LONDON), LIMITED.

RE-TRANSMITTER, SILENT TYPE—*continued.*

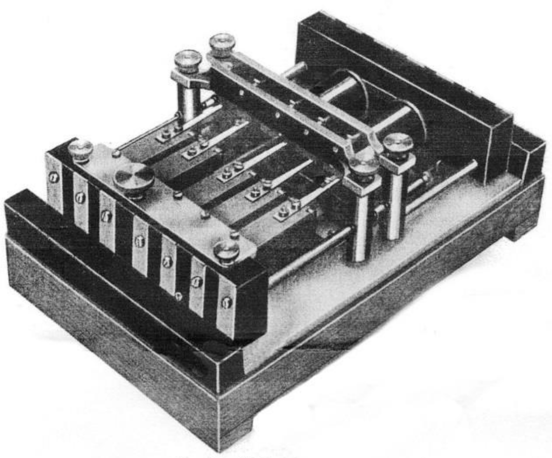
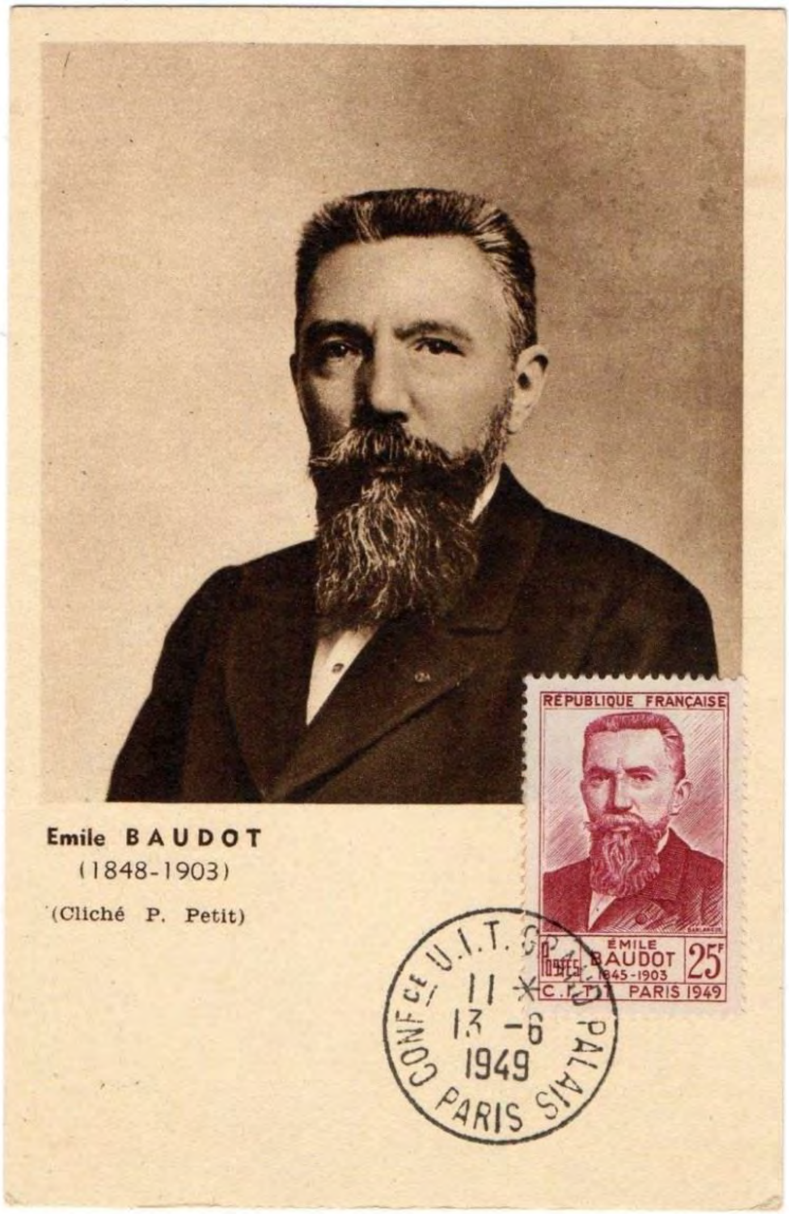
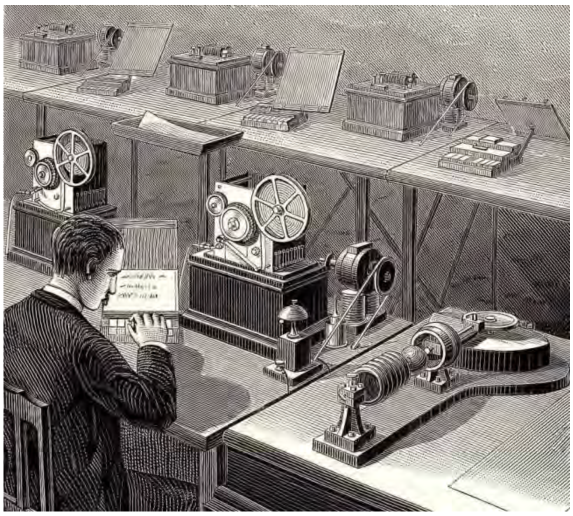


FIG. 34. With cove

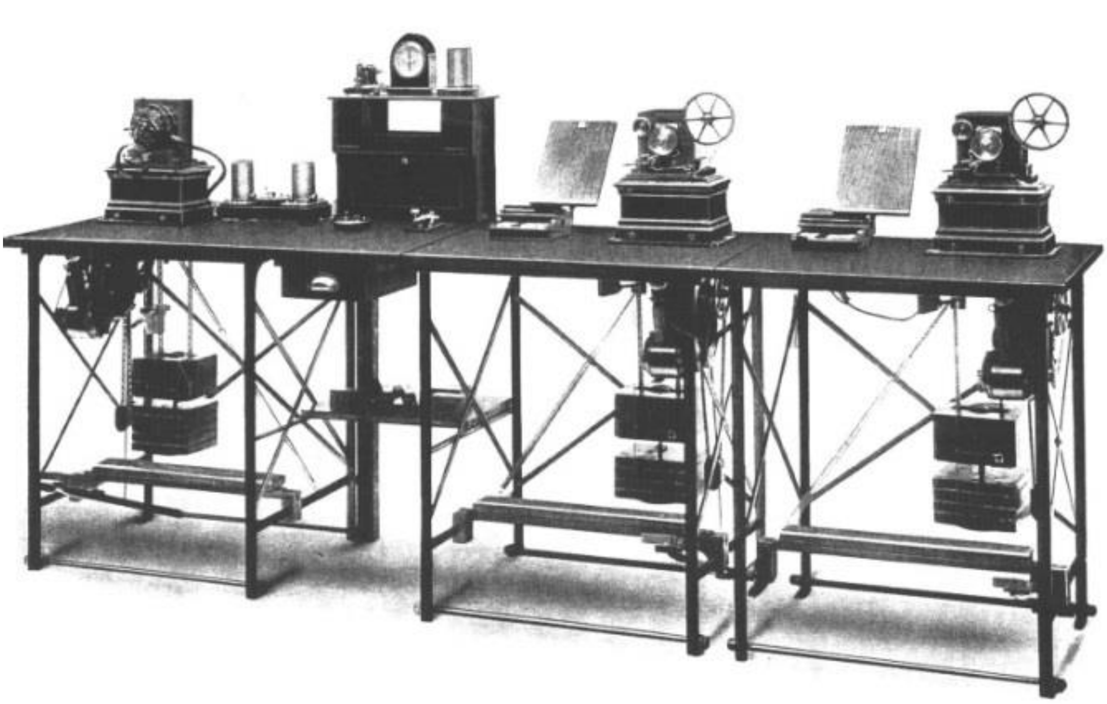
2.4. Various images



100 YEAR
RADIOELECTRRONIC
ENLIGHTENMENT
IN RUSSIA



La Salle de Réception des Télégrammes/ Français



ELLIOTT BROTHERS (LONDON), LIMITED.

FIG. 37. **Baudot Simplex "Double."**

AU BUREAU CENTRAL DES TÉLÉGRAPHES A PARIS — La grande salle des « Français ». — Voir l'article, page [illegible].

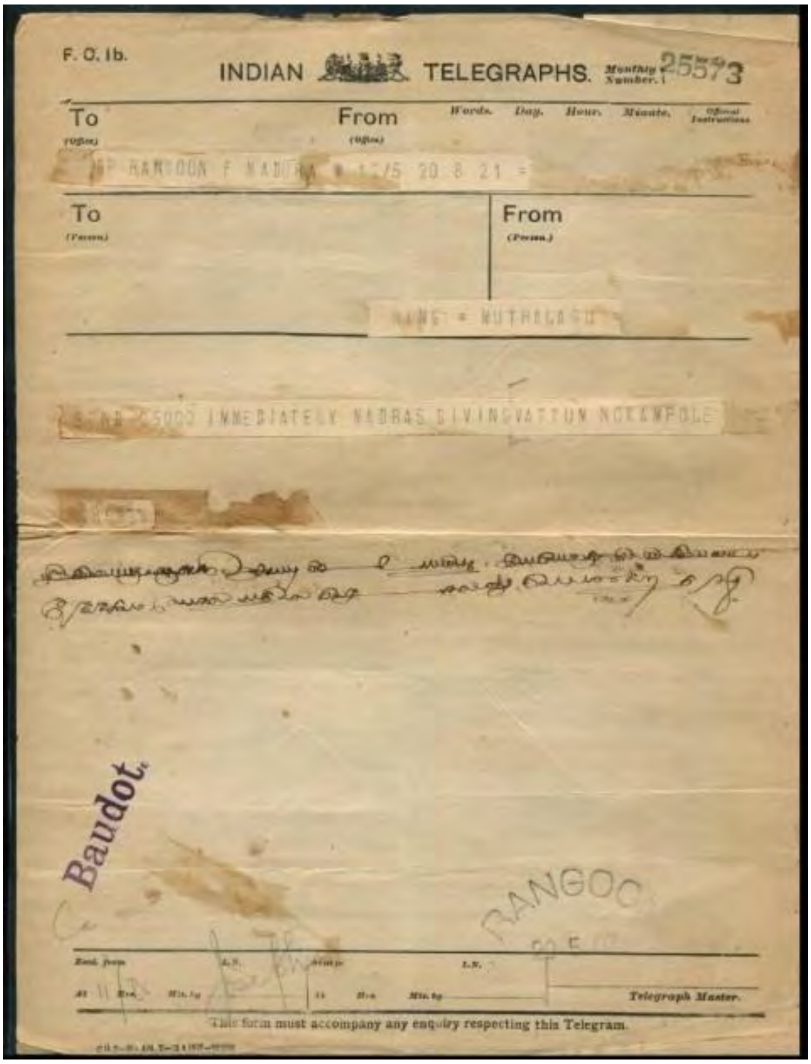

BPM Série Telégrafo 7/81
Telégrafo Baudot duplo
Fabricante: J. Carpentier, Paris
Usado em Portugal a partir de 1920
Double Télégraphe Baudot
Fabricant: J. Carpentier, Paris
En usage au Portugal dès 1920
Double Baudot Telegraph
Maker: J. Carpentier, Paris
In service in Portugal since 1920
EDIÇÃO DO MUSEU DOS CORREIOS E TELECOMUNICAÇÕES DE PORTUGAL
ESCREVA O CÓDIGO POSTAL NAS ZONAS SOMBREADAS
ENDEREÇO


CHOCOLAT GUÉRIN-BOUTRON
77_Télégraphe imprimant de Baudot.


REPUBLIQUE DU DAHOMEY
100F
POSTES
DISTRIBUTEUR DU TÉLÉGRAPHE BAUDOT
TELEPHONE SYSTEME ADER
1865-CENTENAIRE-1965
DE L'UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS


Emile
BAUDOT
TELECARTE 50

The “end product”: a Baudot telegram as it was delivered to the recipient (not in my collection).



F. O. Ib.

INDIAN TELEGRAPHS. Monthly Number. 25573

To (Office) From (Office) Words. Day. Hour. Minute. Official Instructions

RANGOON F MADURA 20 8 21 =

To (Person) From (Person)

MUTHALAGU

IMMEDIATELY MADRAS

Baudot.

RANGOO

This form must accompany any enquiry respecting this Telegram.

Telegraph Master.

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[1] BAUDOT MULTIPLEX TYPE-PRINTING; Post Office Engineering Department; London 1919. xx pages.

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[5] COURS DE TELEGRAPHIE BAUDOT. M.L. BALON ; 1931- 2me éd. ; 'handwritten printing'; 368 pages.

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[9] THE BAUDOT MULTIPLEX TYPEPRINTING TELEGRAPH. ELLIOTT BROTHERS Ltd. CATALOGUE 440; May 1921; 60 pages.

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**See also my second book "Het Internet van de 19-de Eeuw" (The Internet of the 19-th Century) of 2012, 434 pages in Dutch > but with 650 images 'in an international language'.*

***Remark**: As always, the photos shown in my articles are all from apparatus that are/or have been in my own collection, unless otherwise stated.*

THANK YOU

Mr. Thierry Lemesle: For having given the authorisation to take information out of the above-mentioned great article written by his late father Raymond, with whom I have had interesting e-mail exchanges over the years.

Mr. Paulo Brenni: For having given the authorisation to take information out of his above-mentioned articles. Mr. Brenni, a good friend of mine, is an outstanding and well-known world authority regarding scientific instruments.

Mr. Andrew Emmerson: For having corrected my 'Flemish English'**…** Andy, another good friend, and whom I very much respect, is the President of the 'Telecommunications Heritage Group in the U.K. The main focus of the THG is on telephony.

Fons VANDEN BERGHEN
HALLE (B) in March 2019