

Edouard Estaunié, Electrical Engineer, Novelist and Teacher, the man who coined the term *Telecommunications*

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Abstract— In this paper, we describe how the term *telecommunications* and its related concepts were introduced. We first recall that this term was coined in 1904 by Edouard Estaunié who was a French writer, known for his novels of character, and also by profession an engineer. We then explain why and how this neologism was coined. Finally we briefly consider past and present definitions of *telecommunications*.

I. INTRODUCTION

There is a remarkable coincidence between the simultaneous birth of electronics and of the word *telecommunication*: in 1904, John Ambrose Fleming invented the electronic diode establishing electronics, while Edouard Estaunié coined *télécommunication*. The purpose of this paper is to detail this last event and some following effects.

II. ESTAUNIÉ AS AN ELECTRICAL ENGINEER

Edouard Estaunié [1,2,3,4] was born in Dijon (France) in 1862. His father was a brilliant engineer, having graduated from *Ecole Polytechnique* the very best of the elite French *grandes écoles*. However, Estaunié's father passed away at the age of 32, before the birth of his son. Edouard Estaunié will be given the same Christian name as his father. As a child and pre-graduate, he attended catholic schools and colleges run by the *Jésuites* first in Dijon, and then in Paris.

He graduated in 1884 from *Ecole Polytechnique* and became *ingénieur des télégraphes* in 1886. Collaborating with another engineer (E. Brylinski), he designed and built an apparatus for the measurement of electric currents in telephone lines. For this invention, they obtained a bronze medal at the 1889 Universal Exhibition in Paris (organized for the first centenary of the French Revolution, exhibition for which the Eiffel Tower was built). Visiting the exhibition, Thomas Edison (whose 493 inventions were on display at the

exhibition!) declared that this apparatus was the only object worth to be shown.

In 1901 Edouard Estaunié, nominated by Alexandre Millerand, Minister of Post and Telegraph (future President of French Republic) succeeded Leon Thévenin (whose name is associated with the famous theorem on equivalent generator for analysis of linear electric systems) as director of the *Ecole Professionnelle des Postes et Télégraphes*. He then played a significant role in the development of this Institute.

As a first measure, he dismissed 21 professors out of a total of 23! He inaugurated a series of lectures or talks given by such well-known figures as Henri Poincaré, Paul Langevin or Pierre Curie. During his first five lectures, Henri Poincaré developed an original solution for the differential equation known as *telegraph equation*. Pierre Curie gave the first presentation in Paris about the newly discovered Radium.

Edouard Estaunié even introduced general culture and foreign languages classes, himself taking his students to the Louvre on Sunday mornings. He was responsible for developing the Institute to the level of a top University, which it is still today (in 1943 the Institute received its current name: *Ecole Nationale Supérieure des Télécommunications*).

In 1901, as a new director, Edouard Estaunié had unsuccessfully looked for teachers in charge of the courses on telegraph and telephone apparatus. As will be explained below, he took finally himself the responsibility of those lessons. This decision will have the dramatic effect of establishing the new expression *télécommunications*.

In 1905, he left the school, and became *directeur du Matériel et de la construction des Postes et Télégraphes*. Then in 1909, he became directeur of *Exploitation téléphonique*. In 1910, he organized in Paris the International Conference of Postal and Telegraph Administrations. During this conference, he discouraged German representatives from asking for the transfer to Berlin of electrical standards located in Sèvres [3]. In 1911, he resigned to be able to work full-time on the writing of novels.

However, during WWI, he is again on duty as an officer (*lieutenant-colonel*) of military telegraphy. First detached to the British Army in Flanders, he is, after 1918, in charge of reorganizing the *Postes et Télégraphes* in Alsace-Lorraine province after its return to the French Republic.

He married in 1916, but will have no child. He retired at the age of 57 in 1919, once again to concentrate on literature.

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III. ESTAUNIE AS A NOVELIST

Edouard Estaunié published his first novel *Un simple* in 1891: only 30 issues of this first edition will be sold! In 1908 he will be awarded *Le prix de la Vie Heureuse* (today *Prix Femina*): his career as a first rank writer known for his novels of character was then launched [16]. In [5], his main novels and essays are listed.

However, well before this award, connoisseurs even outside France, already knew him. As an anecdotal example, as early as in the very beginning of the XXth century, during his first deportation, Leon Trotsky [6] was writing book reviews for *Vostotchnoi Obozreni* (East Review) published in Irkutsk. These reviews happened to be about Nietzsche, Maupassant, Gorki and Estaunié [7]. Trotsky was therefore considering Estaunié's books worth a paper like the production of other prominent writers.

Edouard Estaunié was elected in 1923 to the *Académie Française*. The *Académie Française* was founded by Cardinal de Richelieu, and formally established by royal letters patent from King Louis XIV in 1635. The Academy, limited to forty members has the task of acting as an official authority on the French language. A member is elected to a specific seat for life.

Edouard Estaunié was elected to seat 24, previously seat, among others, of Jean-Baptiste Colbert (minister of finance under King Louis XIV), Jean de la Fontaine (poet), Pierre de Marivaux (novelist). Estaunié's friend Henri Poincaré (mathematician, astronomer, engineer and philosopher) had been himself elected to seat 24 before his early death in 1912. This seat is today (2008) that of Max Gallo (historian and essayist). Although many French Scientists have been elected to the Academy, undoubtedly Edouard Estaunié was himself elected as a novelist.

At the end of his life, illness prevented him from writing and from attending meetings at *Académie Française*. However, he managed to be present to vote in favour of Charles Maurras (major French royalist writer), who was elected in 1938.

IV. A NEW WORD: TELECOMMUNICATIONS

As already mentioned, while director of the *Ecole Professionnelle des Postes et Télégraphes*, Edouard Estaunié took the responsibility of a course of lectures on telephone and telegraph apparatus. The two fields, telephone and telegraph, had always been considered as separate disciplines, but Edouard Estaunié got rapidly the feeling that time had come to combine these two fields, which he considered both mature enough and part of the same discipline. He then decided to publish in 1904 his lecture notes in the book *Traité Pratique de Télécommunication Electrique (Télégraphie, Téléphonie)* [8].

Télécommunication was thought by Edouard Estaunié as a new discipline, embracing telegraph and telephone together

with radio communications, despite the fact that the novel technique of wireless telegraphy was not much discussed in the above book (three pages on a total of 670). Surprisingly, Edouard Estaunié was reluctant to coin the new term: "I have been forced to add a new word to an already too rich glossary". Nevertheless, this small action will have an ever-expanding reach.

Important to mention is that a few years before, in his first electrical engineering book published in 1895 [15] he noted that electricity was the most recent science, in regular use for ten years only, which glossary was worth an improvement and a normalization.

He built the new word *télécommunication* from Greek *τελε* (*télé*) "far", and Latin *communicare* 'to make contact'.

Télé was introduced in French during the XVIIth century with *télescope*, and then used to forge *télégraph* [9] and *telephone* [10] in the late XVIIIth.

Communicare itself had been used in French in various forms, including *communication*, since the XIVth. While in use in French for a long time, the vocable *communication* is then (1904) a newcomer in the field of wire line and wireless transmission. In that field, the term will demonstrate a flourishing use, culminating during the second half of the XXth century, with the advent of cybernetics and information theory. Interestingly, Estaunié proposed there a neologism, with no already established meaning in everyday vocabulary, therefore avoiding any misunderstanding. This is not often the case today in high-tech area, where the use of already well-established words may be a source of confusion. We will come back to this point in section V.

In 1932, the 13th International Telegraphic Conference and the 3rd International Radiotelegraphic Conference were held together in Madrid. There, the new term *Télécommunication* was chosen to properly reflect the full scope of the Union's responsibilities, which by this time covered all forms of wire line and wireless communication. Consequently, the *International Telegraph Union* (created at the Paris conference in 1865) decided to change the name of the Union to *International Telecommunication Union* (ITU), which came into effect on the 1st of January 1934 [11].

Edouard Estaunié had defined *télécommunication(s)* as 'remote transmission of thought through electricity' [18]. At the Madrid Conference, the ITU official definition of *Télécommunication* was 'any communication, either by telegraph or telephone, of signs, signals, writings, images and sounds of any nature, by wire, radio or other system or processes of electric or visual (semaphore) signalling' [12].

This definition was later slightly modified by ITU [11]: 'any transmission, emission, or reception, of signs, signals, writings, images, sounds, or intelligence of any nature by wire, radioelectricity, visual or other electromagnetic systems'. This last definition, while nearly identical to the first one, fortunately avoids defining *telecommunications* by referring to the word *communication*, and stresses the importance of transmission.

One last interesting recent definition is that of the US Federal Communications Commission (in the 2004 FFC Telecom Act): '*telecommunications* means the transmission, between or among points specified by the user, of information

of the user's choosing, without change in the form or content of the information as sent and received'. It is worth mentioning that this definition is not technology specific and once again stresses the transmission issue.

V. DIFFUSION OF THE NEOLOGISM *TELECOMMUNICATIONS*

In the November 1903 issue of *l'Electricien* [13], a review was published based on a preprint of Estaunié's book. The reviewer strongly approved the combination of telegraph and telephone techniques into a single approach. Moreover, he warned the reader that the title of the book (introducing the neologism) had to be readily accepted because this neologism was imperiously needed. This was certainly a true assessment, and as soon as in 1907, the International Telegraphic Union gave a first definition of the new term close to the definition to be later given in 1932.

However, this encouraging start was not followed by a rapid diffusion of the new term and associated concept. Considering the *Revue Générale de l'Electricité*, at this time one of the leading French publications in the area of Electrical Engineering (Henri Poincaré was a member of its editorial board), and as far as we know, the word *télécommunications* does not appear in the contents before 1924 [14]. Other isolated appearances take place in 1925 (an article by E. Brylinski, Estaunié's former collaborator), 1930, 1932... that is quite seldom. Moreover, remembering that the contents of the issues were organised in sections, in January 1927, the *Télégraph / Téléphone* section is renamed *Communications à Distance* (Remote Communications)! More important, the four subsections do not change (*télégraphie*, *téléphonie*, *radiotélégraphie*, *radiotéléphonie*) ignoring any unification of the concepts, probably still strongly influenced by the implementation technical issues.

As another example of this slow diffusion in usages of the new concept, on the other side of the Atlantic, Frank Jewett, founder of Bell Labs in 1925, in an address to the National Academy of Sciences in 1935, was forced to explain: 'We are prone to think and, what is worse, to act in terms of telegraphy, telephony, radio broadcasting, telephotography, or television, as though they were things apart. When they are merely variant parts of a common applied science. One and all, they depend on the functioning and utility of the transmission to a distance of some form of electrical energy whose proper manipulation makes possible substantially instantaneous transfer of intelligence' [19].

On a more practical aspect, it is worth mentioning that, probably because it is shorter, *communications* is today a strong competitor of *telecommunications*. The browser IEEE Xplore® indicates only one mention of telecommunication(s) in paper titles of IEEE publications for the years 1950 to 1955, to be compared to 35 appearances of communication(s). The ratio is only slightly better today with 839 and 6684 occurrences respectively for the years 1996-2000. There is however probably a risk associated with the use of *communication*, as the word is not a neologism itself, and may be a source of confusion. This has probably been the case with inappropriate applications of the *Theory of Communications* (which soon became *Theory of Information*) of Claude

Shannon, despite the fact that in his 1948 paper [17], Shannon warned that the semantic aspects of communication were irrelevant to the engineering problem. This theory would be still (may be) a tool for telecommunication engineering only, if the prefix *tele* had been used. More generally, omitting the *tele* part of the word *telecommunications* implies forgiving the transmission aspect of the process, that is the transport of information.

Finally, it is nevertheless worth to mention that *télécommunication* has been widely accepted as it in most languages: French and English, but also (among others) Dutch (*telecommunicatie*), Italian (*Telecomunicazione*), Portuguese (*telecomunicação*), Romanian (*telecomunica,ti*), Spanish (*telecomunicaciones*), Swedish (*telekommunikation*), with very limited exceptions such as in German (*Fernverbindung*).

To conclude, it must be said that French administration of *Postes, Télégraphe et Téléphones* changed its name for *Postes et Télécommunications* as late as in 1960!

VI. CONCLUSION

Language is a means of communicating ideas and feelings by the use of conventional symbols. When the symbols are transmitted only inside the brain, we are thinking in language. Language is therefore (often) a tool to think, and it may be considered that Estaunié's contribution to technical vocabulary, far from being anecdotal only, has helped shaping a new domain and developing unifying theories.

Moreover, it is probably important to mention that a man who simultaneously was an engineer, a novelist and a teacher coined the term *Télécommunication*.

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The summarized table of contents is as follows (the book is 670 pages long):
Notions préliminaires, généralités sur les courants, Première partie – étude des organes constitutifs d'une télécommunication électrique (Chapitre I Production d'énergie électrique Chapitre II Transformation de l'énergie électrique Chapitre III Transmetteurs Chapitre IV Récepteurs Chapitre V Application des principes précédents à l'étude des appareils télégraphiques usuels Chapitre VI Rendement des appareils) Deuxième partie – organisation des bureaux (Chapitre I Organes de protection Chapitre II Organes de permutation Chapitre III Organes d'essai Chapitre IV Montage des bureaux téléphoniques Chapitre V Montage des bureaux télégraphiques Chapitre VI Installations de mesure).

- [9] *Télégraphe* was coined by French engineers Claude and Ignace Chappe in 1793.
- [10] *Telephon* was coined by German G. Huth in 1796 within a pure acoustical context.
- [11] Du sémaphore au satellite. ITU. Geneva (1965).
- [12] The official language of the conference was French, and therefore the official definition was in French. French is still today the reference language of ITU
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