Father Landell de Moura

Radio Broadcasting Pioneer

FABIO S. FLOSI
UNICAMP – University of Campinas, State of São Paulo
Faculty of Electrical Engineering
P.O. Box 1063, Barueri, SP 06455-972
BRAZIL
e-mail: fabioflosi@hotmail.com

Roberto Landell de Moura (1861-1928) was a Brazilian priest and a scientist. At the end of the 19th century he carried out experiments to transmit the human voice over long distances and without the aid of wires or cables. On the occasion of Landell's 150th birth anniversary, the Brazilian Posts & Telegraphs Enterprise (ECT, *Empresa Brasileira de Correios e Telágrafos*) issued a commemorative stamp and a special first day cancellation. This paper presents a brief biography of Landell de Moura, his main invention and several issues related to the stamp release [1].

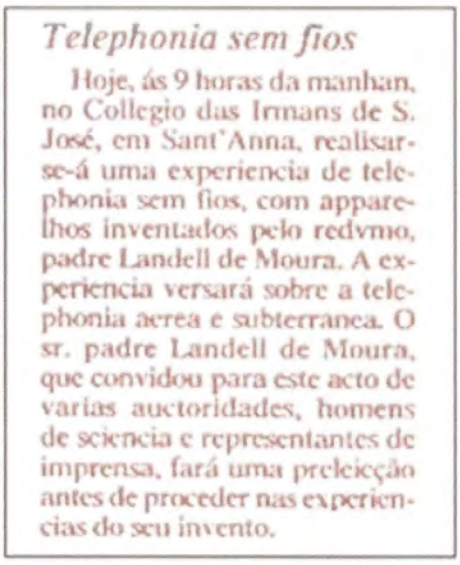
1. Landell de Moura and his experiments

He was born on January 21st, 1861, in the city of Porto Alegre, State of Rio Grande do Sul, in the South of Brazil. Since he had a vocation for an ecclesiastical career, and this was also the wish of his parents, young Roberto travelled to Rome, Italy. He studied Theology and was ordained priest in 1886, when he conducted his first mass.

He also studied Physics and Chemistry at the Gregorian University, in Rome. While in Europe, Landell de Moura had a chance to learn about what was the latest in terms of research in the area of Applied Electricity. Back in Brazil in late December of 1886, *Father* Landell de Moura dedicated himself to both his priestly activities and scientific investigations.

Some historians say that between the years 1893 and 1894 Father Landell began his first experiments. Unfortunately, reliable information to conclusively document this early work is lacking. On the other hand, what is very well documented is the public demonstration that he made on Sunday, July 16th, 1899, in the city of São Paulo, SP (**Figure 1**). On June 3rd, 1900, again in the city of São Paulo, Father Landell made more public experiments on his wireless equipment. Reports of this event show that he was able reach over a distance of approximately 8 km with the transmission of voice messages. And on June 10th, 1900, this public demonstration was reported in the newspaper "*Jornal do Commercio*" from Rio de Janeiro. It was witnessed by members

of the press, by persons of high social position and by Mr. P. C. P. Lupton, who was the British government Consul in São Paulo at that time.



Telephonia sem fios

Hoje, ás 9 horas da manhan, no Collegio das Irmans de S. José, em Sant'Anna, realisar-se-á uma experiencia de telephonia sem fios, com apparelhos inventados pelo revmo. padre Landell de Moura. A experiencia versará sobre a telephonia aerea e subterranea. O sr. padre Landell de Moura, que convidou para este acto de varias auctoridades, homens de sciencia e representantes de imprensa, fará uma preleicção antes de proceder nas experiencias do seu invento.

Figure 1. Note published in the newspaper "O Estado de São Paulo" on Sunday, July 16th, 1899 (it preserves the spelling for that time): "Wireless Telephony — Today, at 9 AM, in the College of the Sisters of St. Joseph, in Santana, there will be a wireless telephony demonstration with the equipment invented by the Reverend Father Landell de Moura. The experience will focus on the aerial and underground telephony. Mr. Father Landell de Moura, who has invited to this act various authorities, men of science and representatives of the press, will give a lecture before proceeding on the experiences of his invention.

2. Wave Transmitter — Landell's main invention

To transmit the human voice through space Landell used electromagnetic waves (or radio waves). To produce the carrier wave, he utilized a spark-gap generator with a Ruhmkorff coil and two metallic spheres in order to create radio waves. To modulate the carrier he invented a kind of electro-mechanical microphone that he called a "phonetic switch". Essentially, it consisted of a diaphragm coupled to a pair of electrical contacts inside a resonant chamber (**Figure 2**).

The acoustic waves produced by a person speaking into the phonetic switch caused a vibration of the diaphragm at the same rate of the human voice. Then, the opening and closing of the contacts caused DC current pulses to flow (from a battery) through the primary winding of the Ruhmkorff coil. The final result was that the signal radiated by the antenna consisted of a series of radio frequency (RF) pulses flowing at an audio frequency (AF) rate. Nowadays, the modulation process invented by Landell de Moura is known as **A**mplitude **M**odulation or **AM**.

On February 9th, 1903, Father Landell de Moura, then in New York City, applied for a patent on his main invention. On October 11th, 1904, the U.S. patent #771917 was awarded to him for the wave transmitter.

Figure 2. Replica of Landell's *Wave Transmitter*: It was assembled and tested (May 23rd, 2004) by Marco A. C. Moura, a researcher from Porto Alegre (photo courtesy of M. A. C. Moura – Porto Alegre, Brazil). On the left side the Ruhmkorff coil and the metallic spheres (spark-gap generator) could be seen. In the right side there is the phonetic switch (tube and resonant chamber).

3. The stamp in honor of Father Landell de Moura

The drawing was created using an image (bust) of Father Landell to assemble a picture that was complemented with digital artwork to reconstruct the real situation (**Figure 3**). The shades of sepia, the gold colored border, and the manuscript typeface used take us back to the end of the 19th century. Photography and computer graphics techniques were used, too.

The stamp was issued on January 21st, 2011, with launching ceremonies in three different places:

- Porto Alegre (RS) — the birthplace of Father Landell. It was in this city where he did his first studies.
- Campinas (SP) — here, for some time, Landell was a vicar. In this city the "Research & Development Center of Telebrás", whose building is known as "Roberto Landell de Moura R&D Center", is located.
- Brasilia (DF) – where is located the national headquarters of the "Brazilian Amateur Radio League" — LABRE (*Liga de Amadores Brasileiros de Rádio Emissão*). Just to remember, Landell de Moura is the patron of the Brazilian ham radio operators (**Figure 4**).

Figure 3. In this stamp the priest is speaking on the microphone of the wave transmitter. In the background there is a reproduction of the 1904 U.S. patent (right side) and the schematic diagram of the equipment (left side). On the bottom left hand corner it is shown a radio wave modulated in amplitude (AM waveform), representing the process invented by the scientist. The face value ("1º Porte Carta Comercial") is the first class rate for a commercial letter.

Figure 4. The launching ceremony that took place in Brasilia (DF): Mrs. Lydia M. Hurovich Neiva (stamp designer of ECT) and José Furian Filho (Commercial Director of ECT) with the file containing the leaflet and an obliterated stamp (Photo courtesy of Carlos M. de Souza - PT2CSM - LABRE).

4. The first day cancellations

For each city where the stamp was launched there was a different first day cancellation. The only difference between those postmarks is the name of the city (**Figures 5 & 6**). The postmark shows Father Landell handling the microphone. The wave transmitter resonant chamber is depicted towards the top right corner and an AM waveform is illustrated on the lower left. Surrounding these design elements there is the following text (English translation):

> *"150 years of birth of Father Landell de Moura – Post Offices – Porto Alegre – RS – January 21st, 2011 – First Day of Circulation".*

Figure 5. The first day cancellation issued in Porto Alegre (RS) together the stamp. For details, see item # 4 in the text.

Figure 6. Registered/economy letter sent from Porto Alegre (Brazil) to Bangkok (Thailand) on January 21st, 2011. Addressee was not found. Cover returned to sender (February 25th, 2011 - on the back side) with the cancellations RETOUR–SUSPENSION DE SERVICE (RETURN–SUSPENSION OF SERVICE).

5. First Day Covers and maximum cards

A number of FDCs and commemorative maximum cards honoring Father Landell de Moura were issued independently by stamp dealers and/or philatelists are not considered to be official items. Three different envelopes, each one bearing the cancellation of the city where the stamp was released, were produced by Filatelia 77 (www.filatelia77.com.br) (**Figure 7**).

Figure 7. This FDC reproduces a painting showing Father Landell de Moura (photo courtesy of the Telecom researcher C. A. Fazano – www.fazano.pro.br). The text underneath the picture says (English translation): 150 years of the birth of Father Landell de Moura – 1st Day of Circulation. The cancellation is from Campinas, SP (January 21st, 2011).

Two maximum cards were also prepared by the philatelist J. A. Correia da Silva, from Curitiba, PR (www.selosefilatelia.com). The first one uses as illustration the photo of the bust of Father Landell de Moura (**Figure 8**). The second maximum card bears a photo of the replica of the wave transmitter (**Figure 2**), which was assembled and tested by the researcher of Porto Alegre (RS), M. A. C. de Moura.

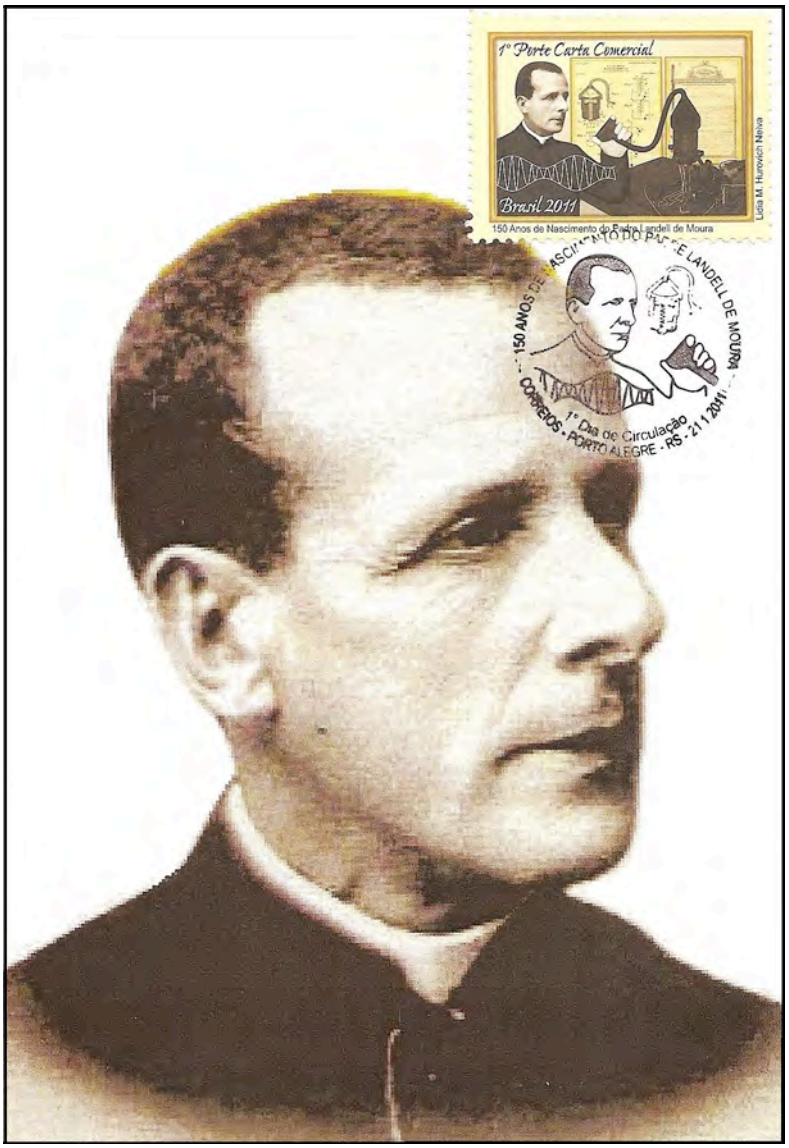


Figure 8. This maximum card shows the photo of the wave transmitter's replica. It has a first day cancellation (January 21st, 2011) from Porto Alegre, RS. This item respects the triple coincidence according to the FIP rules for maximaphily exhibitions: illustration, stamp and cancellation (place and date).

6. The leaflet

A full-color leaflet with four pages, measuring 11 x 22 cm, was issued together with the stamp and the first day cancellations (**Figure 9**). The text is in Portuguese and English, and the contents of the folder is as follows: Landell's brief biography; technical details of the stamp; how the stamp was conceived.

Orders can be submitted to:

Distance Sales Office
Av. Presidente Vargas 3077 – 23º andar
Zip Code 20210-973
Rio de Janeiro, RJ
Brazil.

E-mail: centralvendas@correios.com.br.
Website: www.correios.com.br.

7. Marconi, Popov, Fessenden and Landell de Moura

The scientist **Guglielmo Marconi** (1874-1937) in Italy (1895) had succeeded in transmitting and receiving a telegraphic message (a series of dots and dashes, like a Morse code) at an approximate distance of 2 km. To do that, he utilized radio waves. Marconi is wrongly known as the "inventor" of the radio broadcast. But what he really experimented with was a radiotelegraphic transmission (wireless telegraphy) and not the transmission of voice without wires (or radio telephony).

The Russian scientist **Aleksandr S. Popov** (1859-1905) is also wrongly proclaimed as the "inventor" of the radio. In 1895, in Russia, Popov had succeeded in transmitting coded signals over a distance of 5 km using an elevated wire (a lightning conductor) as the receiving antenna. Like Marconi, Popov didn't experiment with voice transmissions.

The Canadian scientist **Reginald A. Fessenden** (1866-1932) was one of the first persons to be able to transmit speech through radio waves. This fact occurred at Cobb Island, Maryland (MD), USA, on December 23rd, 1900, between aerials spaced apart by 1 mile (1.6 km). The transmitter was powered by a spark-gap generator. On the night of December 24, 1906 (Christmas Eve), from Brant Rock, Massachusetts (MA), USA, Fessenden transmitted a short radio program (voice and music). A second program

was broadcast from the same location, on New Year's Eve, on December 31st, 1906. On both experiments, the scientist got an improved transmission by the use of a continuous-wave alternator to generate a pure sine wave as the carrier.

As was stated in the beginning, on July 16, 1899, **Father Landell** made a public demonstration of radiotelephony in the city of São Paulo. It was, therefore, about a year and a half before the first experiment of Fessenden (December 23, 1900). So, for all these reasons, it could be stated that Father Landell de Moura was a radio broadcasting pioneer.

8. Final considerations

When he returned from the USA, both Landell's ecclesiastical superiors and Brazilian Government didn't support his work. Authorities of that time didn't share his scientific vision. Father Landell never found someone interested in buying his patents and/or manufacturing the equipment he had invented. Once the deadlines for his U.S. patents expired, they fell into the public domain. Certainly they served as a source of inspiration for other scientists of that time, around the world! Nonetheless, Landell's scientific work has justifiably given to him an important place in the history of the wireless telephony. He was a man ahead of his time.

Father Landell died anonymously in his hometown on June 30th, 1928. His life story has been told in several books published in Brazil [2-4] and one in Germany. From all his documents, what was possible to preserve have been collected at the "Historical and Geographical Institute of Rio Grande do Sul" (IHGRGS, *Instituto Histórico e Geográfico do Rio Grande do Sul*), in Porto Alegre, Brazil.

9. References

[1] *Landell de Moura Memorial* is a website with plenty of information (most of it in Portuguese): www.memoriallandelldemoura.com.br.

[2] Almeida, Hamilton *"The other side of Telecommunications – The saga of Father Landell"*; Sulina Publishing, Porto Alegre, RS; 1st edition, 1983, 151 pp [in Portuguese].

[3] Almeida, Hamilton *"Father Landell de Moura – A hero without glory"*; Record Publishing, Rio de Janeiro, RJ; 1st edition, 2006, 319 pp [in Portuguese]. ISBN: 85-01-07260-5.

[4] Fornari, Ernani *"The Incredible Father Landell de Moura"*; Army Library Publishing, Rio de Janeiro, RJ; 2nd edition, 1984, 158 pp [in Portuguese]. ISBN: 85-7011-082-0.