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## PHONLAB PROJECT: COIMBRA – HARVARD. RETHINKING 20<sup>TH</sup>-CENTURY SCIENTIFIC CENTRES AND PERIPHERIES

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### ABSTRACT

The aim of PHONLAB is to conduct a case study of the Coimbra Experimental Phonetics Laboratory (1936-1979). Created by Portuguese phonetician Armando de Lacerda (1902-1984), the laboratory attracted scientists from leading universities such as Harvard, Cambridge and Bonn, who sought specialist training in the use of innovative laboratory research techniques. How is it that in a country regarded as being scientifically backward there was a laboratory with a reputation as the most advanced in Europe in the mid-20th century? We seek to produce a biography of the laboratory, documenting methods, instruments and providing recognition for its actors. This project will also contribute to the enhancement of a range of scientific sources that will later be made available at museums, and through publications and a digital experimental phonetics archive.

**Keywords:** Armando de Lacerda, Coimbra Phonetics Laboratory, Chromograph, PHONLAB.

### 1. INTRODUCTION

In this paper we present the PHONLAB project (2022.06811.PTDC). Funded by the [Portuguese] Foundation for Science and Technology, this research project takes place from January 2023 to December 2025. Its main objective is to reconstruct the historical and scientific importance of the Coimbra Phonetics Laboratory and its founder and head, Armando de Lacerda. This Portuguese phonetician coined the term 'coarticulation', along with Paul Menzerath. He was also an important member of the International Congresses of Phonetic Sciences. He actively participated at the 1st ICPhS (Amsterdam, 1932), where he presented the polychromograph, an innovative instrument that enabled the limitations of the kymograph, then predominantly used in the laboratories of experimental phonetics, overcome, and also the 3rd ICPhS (Ghent, 1938). At the 4th ICPhS (Helsinki, 1961) Lacerda became an honorary member of the Permanent Council for the

organization of International Congresses of Phonetic Sciences. After the closure of the Coimbra Phonetics Laboratory in 1979, the memory of the laboratory and its founder and head was consigned to oblivion, and we now aim to recuperate it.

### 2. WORK PLAN

The importance of experimental phonetics stands in stark contrast with the ignorance of its history. Unlike linguistics, which has a long historiographical tradition, the evolution of the understanding of the sounds of human speech has been assigned little importance by phoneticians and science historians, the evolution of its theories, techniques, instruments and institutions being virtually ignored, and many actors in the field forgotten. Focusing on the Coimbra Phonetics Laboratory, the aim of PHONLAB is to promote understanding of the development of experimental phonetics, and help connect it with the mainstream of history of science research. How is it that the laboratory attracted researchers from the world's scientific centres? Who were the scientists who underwent specialist training in experimental phonetics at Coimbra? What research did they carry out there and how did it affect their careers? What impact did the work of the laboratory have on society? What influence did the innovative techniques and instruments used there have in the field? The aim of PHONLAB is to provide an understanding of the scientific and social impact of the laboratory at the global level.

The relevance of this project also derives from the fact that numerous unique historical sources that document the work of this laboratory and portray the evolution of experimental phonetics throughout the 20th century are in a poor condition and may be lost. A range of documentary and material sources have been found at the University of Coimbra and a number of archives in Europe, the USA, South America, and Australia. Phoneticians who trained at the laboratory have been identified, and it is vital that their testimony be preserved. The analysis of these historical sources will enable us to understand the

nature and impact of scientific practices at the laboratory, and could serve as the basis for a comparison with studies of other laboratories in this field of knowledge.

By opening up new perspectives in the history of experimental phonetics in the 20th century, PHONLAB research will enrich historical narratives and contribute to the reassessment of traditional dichotomies such as that of the ‘creative centre’ versus the ‘passive periphery’. Rediscovering early developments in the field of experimental phonetics may have a positive impact on our current understanding of phonetics and potentially lead to new progress in the field.

### 2.1. Review of the literature

The few historical studies carried out in the field of experimental phonetics in recent years mainly consist of biographies of scientists and the description of historical scientific instruments [19], [13], [30], [2]. Also noteworthy are the papers published within the scope of the International Workshops on the History of Speech Communication Research [12], [22], [31], [32], [16]. Starting in 2015, these important meetings show that interest in this area of knowledge is recent. As a consequence, the important scientific standing of the Coimbra Phonetics Laboratory had been virtually forgotten until recently. The laboratory was important for the world community of phoneticians during the first half of the 20th century, which was discovered in exploratory studies conducted on the institution [15], [17]. Documenting the path followed by the laboratory enables the deepening of knowledge about the evolution of experimental phonetics in the 20th century and engagement with key current issues in the field of the history of science, such as the ‘global history of knowledge’, the circulation of knowledge, and scientific centres and peripheries [4], [23], [5], [26].

Spaces which have traditionally been understood as being peripheral have recently been afforded increased importance in the history of science – above all Latin America – while Portugal has remained almost completely absent from the focus of international historiographers who argue in favour of the circulation of knowledge [9], [29], [1], [10], [24], [3], [6]. Recent historiographical works on the Coimbra Phonetics Laboratory [17], [15], [20] provide an innovative contribution not only in the field of Portuguese historiography but also at the international level. The laboratory attracted scientists from major universities abroad to study Portuguese and undergo specialist training in the use of innovative research techniques used at the laboratory. Evidence of such an arrangement, for the 19th century

and the first half of the 20th century, has hitherto only been found at traditional scientific centres such as the USA, Germany, France and the UK.

Therefore, the value of this project is twofold: first, the Coimbra Phonetics Laboratory, although located on the European periphery, attracted researchers from key institutions, such as the universities of Harvard, Cambridge, Bonn, Uppsala and the Sorbonne; and secondly, the aim is to gauge the impact of this training on their careers and its impact in terms of improvements made to research and teaching practices.

Following the discovery of a collection of some of the scientific instruments that belonged to the Coimbra Phonetics Laboratory in storage at the Coimbra Science Museum, it is also important that work be carried out to reconstruct their life-paths, which will provide an understanding if instruments such as the polychromograph and the chromographs developed by Lacerda from 1932 contributed to or anticipated current speech recognition and speech synthesis technology [11], [28], [21], [25], [18]. Taking into account that these instruments were used in linguistics studies, namely Portuguese and African dialectological studies, works associated with “linguistic variation” should also be considered besides mainstream literature on linguistics, enabling research on the Phonetics Laboratory to be contextualised within the framework of the scientific paradigms of linguistics [14], [7], [8].

### 2.2. Research plan and methods

This research project is subdivided into three smaller, interlinked projects:

1. History of experimental phonetics;
2. History of scientific institutions and the material culture of science;
3. Circulation of knowledge, scientific centres and peripheries.

These topics raise the following research questions:

- What is the role of the Coimbra Phonetics Laboratory's work in the development of experimental phonetics worldwide?
- What was the impact of the laboratory and its scientific production on society?
- What instruments were used at the laboratory and how were innovative techniques developed?
- How is it that in a country regarded as being scientifically backward there was a laboratory regarded as being the most advanced one of its kind in Europe in the mid-20th century?
- How did the laboratory manage to attract researchers from the world's scientific centres?

- Who were the scientists who sought specialist training in Experimental Phonetics at Coimbra?
- How was the internship experience of scientists from abroad at the Coimbra Phonetics Laboratory reflected in their academic careers and in subsequent improvements in teaching and research?
- What is the contribution of the laboratory to historiographical knowledge about scientific centres and peripheries?
- Will this case study enable traditional dichotomies such as that of creative centres versus passive peripheries to be reconceptualised and reassessed?
- Why was Lacerda, the laboratory director, a member of the "technical, ancillary and support staff" of the University of Coimbra (he was not a member of the teaching staff) and how this contributed to his historiographical invisibility? [27]

### 2.2.1. Methodology

This project will be based on an extensive review of the contemporary literature on the history of experimental phonetics, the history of scientific institutions and the material culture of science, and relations between scientific centres and peripheries, as well as the cross-referenced examination and analysis of a number of historical sources: journals, newspapers and periodicals from the era, correspondence, iconography, historical inventories of instruments and collections, reports of activities, trips and attendance of meetings, as well as oral testimony of phoneticians whose careers span the period under study. The use of this methodology will enable a solid scientific basis to be established for investigating the questions raised and delivering the outcomes expected.

### 2.2.2. Archives, libraries and testimony

The feasibility of PHONLAB is based on the fact that in 2017 the team members began to collect oral testimonies and items from the personal archives of phoneticians from the USA, Germany, Australia and Portugal. These oral testimonies, together with the many we seek to collect during the course of the project, will constitute historical sources providing the groundwork for the research to be conducted. The following archives have already been identified and the scanning of relevant documents is one of the tasks of this project: Coimbra Science Museum; the archives of the following universities: Coimbra, Lisbon, Harvard, Cambridge, Uppsala and São

Salvador da Bahia; Bell Labs Archives (New Jersey); the family archives of Paulo de Lacerda (Porto), Sheila Ackerlind (NY), Sue Nogueira (Rio de Janeiro), António Almeida (Cologne), Ana Zamora (Madrid) and Marika Hammarström (Melbourne). We also seek to analyse and make available in the experimental phonetics digital archive monographs and periodicals produced on the basis of experimental work carried out at the Coimbra Phonetics Laboratory (held at the Library of the Faculty of Arts of the University of Coimbra), and document the instruments used at the Coimbra Phonetics Laboratory (some of these have already been transferred to the storerooms of the Coimbra Science Museum and the University of Lisbon Phonetics Laboratory).

### 2.2.3. Research team

The topics and methodology set out above will provide the basis for research, to be carried out by a transdisciplinary team composed of historians of science, phoneticians, linguists, heritage experts, librarians and audio-visual technicians. We plan to contract a junior doctoral researcher for a period of three years, supported by a research scholarship-holder with a master's degree (funded over 18 months). The scholarship-holder will organise and make available the information collected by the contracted researcher and other team members. Supervised by the PI, the scholarship-holder will be responsible for the producing of a catalogue and digital documents that will be made available in the experimental phonetics digital archive, one of the main outputs of this project. This catalogue includes collections of documents (such as letters, official documents and publications) and scientific instruments belonging to the Coimbra Phonetics Laboratory, as well as documentation from the Paulo de Lacerda family archive. The estate of Armando de Lacerda is held at the Paulo de Lacerda family archive in Porto. This catalogue will also contain documents from other scientific institutions and family archives (the aforementioned institutional and private archives). With the support of audiovisual technicians, an experimental phonetics digital archive will be set up, in which the catalogue, digital documents and interview recordings in connection with a number of figures associated with experimental phonetics during the period under analysis will be held and made available.

### 2.2.4. Outputs and dissemination

We aim to produce the following outputs:  
1) Experimental phonetics digital archive;

- 2) Peer-reviewed articles published in international journals;
- 3) The submission of a thematic issue to an international journal in response to an open call;
- 4) The holding of one workshop and one conference;
- 5) The publication of an international peer-reviewed monograph as a result of the workshop and conference held.

In order to share the experience of PHONLAB with the scientific community and the general public, we also plan to hold an exhibition at the University of Coimbra. This exhibition will feature a short film about the work of the Coimbra Phonetics Laboratory.

### 2.3. List of milestones

- 01.07.2023 – PHONLAB website.  
The setting up of the website is one of the key elements of PHONLAB's dissemination strategy. This will be available at the end of the first semester.
- 01.07.2024 – Catalogue of collections: documents, scientific instruments.  
The catalogue is one of PHONLAB's sustainability indicators, which is of decisive importance for the management of collections, the implementation of dissemination actions, and research work. The catalogue will provide the basis for the digital archive.
- 30.12.2024 – Experimental phonetics digital archive.  
The Digital Archive is one of PHONLAB's most important tasks and outputs. It will enable research to be carried out during and after the project by team members and other researchers.
- 10.01.2025 – Workshop.  
The dissemination of PHONLAB research findings. The experimental phonetics digital archive will be presented to the public. The project team and consultants will take part in the workshop, which will be open to the public and other stakeholders.
- 01.12.2025 – International and national outputs.  
Publication of scientific articles, the holding of an exhibition and dissemination targeted at the general public, an internationally-published book, and the holding of the project-end international conference.

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### 4. REFERENCES

- [1] Beigel, F., Gallardo, O., Bekerman, F. 2018. Institutional Expansion and Scientific Development in the Periphery: The Structural Heterogeneity of Argentina's Academic Field. *Minerva* 56, 305-331.
- [2] Collins, B., Mees, I. 1998. *The real Professor Higgins: the life and career of Daniel Jones*. Mouton de Gruyter.
- [3] Daston, L. 2015. At the Center and the Periphery: Joseph Pitton de Tournefort Botanizes in Crete. In: Arabatzis, T., Renn, J., Simões, A. (eds), *Relocating the History of Science: Essays in Honor of Kostas Gavroglu*. Springer, 85-98.
- [4] Drayton, R., Motadel, D. 2018. Discussion: the futures of global history. *Journal of Global History* 13(1), 1-21.
- [5] Gavroglu, K., Patiniotis, M., Papanelopoulou, F., Simões, A., Carneiro, A., Diogo, M. P., Bertomeu Sánchez, J. R., García Belmar, A., Nieto-Galan, A. 2008. Science and Technology in the European periphery: some historiographical reflections. *History of Science* 46, 153-175.
- [6] Gemelli, G. 2002. A Central Periphery: The Naples Stazione Zoologica as an Attractor. In: Schneider, W. (ed), *Rockefeller Philanthropy and Modern Biomedicine. International Initiatives from World War I to the Cold War*. Indiana University Press, 184-207.
- [7] Gonçalves, M. F. 2010. A Ortografia Nacional (1904) de Gonçalves Viana e as ideias ortográficas dos reformistas sul-americanos. *Eutomia. Revista de Literatura e Linguística* 3(2).
- [8] Gonçalves, M. F. 2020. A «Arte de Enfermeiros» (1741): aspetos do léxico relativo a doenças e remédios no século XVIII. *Revista Panace@ XXI*(52), 68-85.
- [9] Gootenberg, P. 2007. A Forgotten Case of 'Scientific Excellence on the Periphery': The Nationalist Cocaine Science of Alfredo Bignon, 1884-1887. *Comparative Studies in Society and History* 49(1), 202-232.
- [10] Hauswedell, T., Körner, A., Tiedau, U. (eds) 2019. *Re-Mapping Centre and Periphery. Asymmetrical Encounters in European and Global Contexts*. UCL.
- [11] Hoffmann, R. 2019. Nothing but a Lung, a Glottis, and a Mouth – The Long Way of Speech Synthesis. In: Pucher, M., Trouvain, J., Lozo, C. (eds), *Proceedings of the Third International Workshop on the HSCR*. TUDpress, 9-28.
- [12] Hoffmann, R., Trouvain, J. (eds) 2015. *Proceedings of the First International Workshop on the HSCR*. TUDpress.

- [13] Kemp, J. 2001. The development of phonetics from the late 18th to the late 19th century. In: Auroux, S. (ed), *History of the language sciences*, vol. 2. Walter de Gruyter, 1468-1479.
- [14] Kohler, K. 2017. *Communicative Functions and Linguistic Forms in Speech Interaction*. Cambridge University Press.
- [15] Lopes, Q. 2023. *The global periphery: Armando de Lacerda and the Coimbra Experimental Phonetics Laboratory (1936-1979)*. Center for History of Science of the Royal Swedish Academy of Sciences.
- [16] Lopes, Q., Ashby, M., Braun, A. (eds) 2022. *Lacerda 120. Proceedings of the Fifth International Workshop on the HSCR*. TUDpress.
- [17] Lopes, Q., Pereira, E. 2019. Armando de Lacerda and Experimental Phonetics in the inter-war period: scientific innovation and circulation between Portugal, Germany and Harvard. In: Pucher, M., Trouvain, J., Lozo, C. (eds), *Proceedings of the Third International Workshop on the HSCR*. TUDpress, 95-104.
- [18] Lourenço, M., Gessner, S. 2014. Documenting Collections: Cornerstones for More History of Science in Museums. *Sci. & Educ.* 23, 727-745.
- [19] Mehnert, D. 2012. *Historische phonetische Geräte: Katalog der historischen akustisch-phonetischen Sammlung (HAPS) der Technischen Universität Dresden*. TUDpress.
- [20] Nunes, M. F. 2020. Duas Culturas?! O caso do Laboratório de Fonética de Armando de Lacerda. In: Gonçalves, M. E., Brandão, T. (coords), *Diálogos Intergeracionais. A conversa sobre Ciência, Cultura, Política científica*. Centro Nacional de Cultura.
- [21] Pisoni, D. 1986. A Brief Overview of Speech Synthesis and Recognition Technologies. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 1326-1330.
- [22] Pucher, M., Trouvain, J., Lozo, C. (eds) 2019. *Proceedings of the Third International Workshop on the HSCR*. TUDpress.
- [23] Raj, K. 2013. Beyond Postcolonialism ... and Postpositivism. Circulation and the Global History of Science. *Isis* 104, 337-347.
- [24] Roberts, L. 2009. Situating Science in Global History: Local Exchanges and Networks of Circulation. *Itinerario* 33(1), 9-30.
- [25] Rogers, F. M. 1992. *Internationalism and the Three Portugals: the Memoirs of Francis Millet Rogers*. Peter Lang.
- [26] Secord, J. 2004. Knowledge in Transit. *Isis* 95(4), 654-672.
- [27] Shapin, S. 1989. The Invisible Technician. *American Scientist* 77, 554-563.
- [28] Taylor, P. 2009. *Text-to-Speech Synthesis*. Cambridge University Press.
- [29] Thurner, M. 2015. Historical Theory Through a Peruvian Looking Glass. *History and Theory* 54(4), 27-45.
- [30] Tillmann, H. G. 2006. Experimental and instrumental phonetics: History. In: Brown, K. (ed), *Encyclopedia of Language & Linguistics*. Elsevier, 374-389.
- [31] Vainio, M., Šimko, J., Aulanko, R. (eds) 2017. *Proceedings of the Second International Workshop on the HSCR*. TUDpress.
- [32] Volín, J., Šturm, P. (eds) 2021. *Proceedings of the Fourth International Workshop on the HSCR*. TUDpress.