EXPERIMENTAL PHONETICS ON DISPLAY: HERITAGE, SCIENCE, AND MEMORY AT THE UNIVERSITY OF COIMBRA FACULTY OF LETTERS

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Abstract: In 2025, the PHONLAB R&D project team will create a permanent exhibition at the University of Coimbra dedicated to the phonetician Armando de Lacerda (1902-1984) and the Experimental Phonetics Laboratory of the Faculty of Letters (1936-1979). The exhibition is the result of a joint effort by the Institute of Contemporary History, the Foundation for Science and Technology, the Rectory of the University of Coimbra, the Science Museum of the University of Coimbra, and the Faculty of Letters of Coimbra. This paper reports on the curatorial process and the scientific content that will be on display, organised into the following four sections: 1) Lacerda's pioneering work, 2) the work of the Coimbra phonetics laboratory, 3) the laboratory's collaborators, and 4) the creation of a sound archive of Portuguese regional varieties. The realisation of the exhibition presupposes a profound change in how the University of Coimbra perceives and promotes itself, as well as its scientific spaces and personnel. Due to open in November 2025 in the space formerly occupied by the phonetics laboratory at the Faculty of Letters — in a corridor to be named the Armando de Lacerda Wing — the exhibition will be permanent and bilingual, and will be open to the public free of charge. It is hoped that it will promote public interest in the history of experimental phonetics.

1 Introduction

In recent years, there has been a proliferation of scientific work on the phonetician Armando de Lacerda (1902–1984), and the Experimental Phonetics Laboratory at the University of Coimbra, which was founded by the Institute for High Culture and directed by Lacerda between 1936 and 1979 [1], [2], [3]. Interest in the subject has increased substantially within the international scientific community — *Lacerda 120. 5th International Workshop on the History of Speech Communication Research* (Porto, 2022) [4], and *Armando de Lacerda: A Pioneer of Experimental Phonetics* (Royal Swedish Academy of Sciences, 2023) [5], and with public funding from the PHONLAB project – *Phonetics Laboratory: Coimbra - Harvard. Rethinking 20th-century scientific centres and peripheries* (Foundation for Science and Technology) [6].

The PHONLAB project offers a fresh perspective on the Portuguese scientific landscape by combining research into the history of phonetics in Portugal with an in-depth examination of the Coimbra Experimental Phonetics Laboratory and the importance of preserving the institution's scientific and material heritage. The project forms part of the national endeavour to preserve and enhance scientific and technical heritage, in accordance with the directives and recommendations provided by national and international organisations, including the UNESCO National Commission [7]. At the same time, the project ensures the continuation of work begun in 2017 to recover the historical memory of a 'forgotten' space and scientific discipline, overlooked by the

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University of Coimbra. For example, in 2019 António Almeida (*1946), a disciple of Armando de Lacerda, tried to persuade the Faculty of Letters at the University of Coimbra to create a room in homage to his master — an initiative that was not realised.

Thus, one of the main objectives of the PHONLAB project is to organise a permanent exhibition at the Faculty of Letters of Coimbra – in the space formerly occupied by the Experimental Phonetics Laboratory – dedicated to the history of phonetics in Portugal, to the work of the Experimental Phonetics Laboratory and to the phonetician who ran it. This exhibition will take an approach that challenges the dichotomy of centres versus peripheries, based on the methodology of global history [1], [3].

The exhibition has been designed to achieve several of the objectives set out in the project's application process. These objectives include preserving and showcasing the material and immaterial heritage linked to the Experimental Phonetics Laboratory, which was previously spread across various reserves at the University of Coimbra. Another objective is to revive the memory of this scientific space and its protagonists by musealising instruments, archive documents, and oral testimonies into museum exhibits. This will be achieved by critically re-examining an often-overlooked scientific history [8].

This initiative is pertinent for a number of reasons. Firstly, it contributes to the conservation of scientific collections and makes them available to the public. On the other hand, it fulfils the commitment of higher education institutions to engage more with the community, upholding the principles of open science – namely citizen science, and enhancing the societal impact of science by promoting access to heritage as an educational, identity-forming and cultural resource. Furthermore, it contributes to the recognition and affirmation of scientific culture as an integral part of the Portuguese cultural history.

This paper aims to present the exhibition to be inaugurated in 2025 at the University of Coimbra Faculty of Letters. It will describe the exhibition's structure, conceptual framework, and content, including the scientific research conducted by the laboratory, as well as the teaching, dissemination, and university outreach activities promoted by the laboratory's director and its specialised researchers.

The curatorial process sought to integrate the materiality of the scientific objects with the scientific and institutional narratives that give them meaning. These narratives are organised into four sections, each of which gives its name to one of the points presented in this paper: 1) Armando de Lacerda's pioneering work on coarticulation and chromography; 2) the University of Coimbra's Experimental Phonetics Laboratory; 3) the international scientific attraction of the Coimbra Phonetics Laboratory; and 4) the Sound Archive of Portuguese Regional Speeches. These sections provide cross-references between the materiality of the objects and instruments used in phonetic studies, and oral testimonies from former collaborators and students, as well as documents — textual, iconographic and audio — that have been recovered and preserved in the Experimental Phonetics Laboratory archive and other public and private archives. These include the Paulo de Lacerda Family Archive [8].

The work in progress has endeavoured to involve all of the project's partner institutions: the Institute of Contemporary History; the University of Évora; the University of Coimbra, through its Rectorate, Faculty of Letters, and Science Museum; the University of Porto; the University of Stockholm; and the University of Macau. The aim is to guarantee inter-institutional cooperation, which is fundamental to the international dissemination of the exhibition. The curatorship involves specialists from

different scientific fields, and the content is made accessible to diverse audiences through inclusive mediation strategies. The exhibition, which will be known as the 'Armando de Lacerda Wing', also has the support of the International Phonetic Association.

In a Europe where exhibitions on the history of experimental phonetics are scarce, the magnificent HAPS collection at the Technical University of Dresden is a notable exception [9], [10], [11]. With the inauguration of this permanent exhibition at the University of Coimbra, we also aim to encourage reflection on the history of experimental phonetics and stimulate public interest in speech studies.

2 Armando de Lacerda's pioneering work. Coarticulation and chromography

The first section of the exhibition showcases Armando de Lacerda's contributions to the development of experimental phonetics. As mentioned in [2: 5], Armando de Lacerda, founder and director of the Laboratory of Experimental Phonetics at the Faculty of Letters of the University of Coimbra, was a pioneer in the field of twentieth-century speech sciences. In 1932, while specialising in Germany in the new field of experimental phonetics, Lacerda invented the polychromograph, a type of inkjet oscillograph which overcame many of the limitations of kymography, the antiquated method which remained in use at experimental phonetics laboratories up until the mid-20th century. In 1933, in collaboration with the German phonetician Paul Menzerath (1883–1954), he developed the concept of coarticulation, which has played a major role in Phonetic theory ever since. Along with the recognition of Lacerda's pioneering role in the development of new inventions, this innovative work in the field of the study of the coarticulation and segmentation of speech sounds led to his achieving lasting international prestige.

The exhibition of the book *Koartikulation, Steuerung und Lautabgrenzung*, with which Menzerath and Lacerda formulated in 1933 the key concept of coarticulation (the influence of contiguous speech sounds on each other) is accompanied by a photograph of the instrument that allowed the authors to obtain the published conclusions: Lacerda's Oral Recording Labiograph, coupled to Menzerath's Kymograph, which was installed at the University of Bonn.

Regarding chromography, the polychromograph is documented, and photographs show its application at the University of Bonn's Institute of Phonetics in 1932 and 1933. Of particular note are the rare materials on display in this sector, such as photographs of Paul Menzerath and the Institute of Phonetics in Bonn, which was destroyed during the Second World War. On display are also chromograms and technical drawings of chromographs, as well as the programme for the 1st International Congress of Phonetic Sciences, at which Lacerda publicly presented this new instrument in 1932 (see Figure 1).

Lacerda invented chromography in response to his criticism of the kymograph. Consequently, several of Lacerda's publications on chromography and kymography criticism are available on a digital device. This section also covers other periods in the life and scientific work of the Portuguese phonetician, including his stay at the University of Salvador – in Brazil – from 1956 to 1957. It also covers his time as a researcher and lecturer at the University of Wisconsin–Madison and Queens College of the City University of New York in the 1960s.

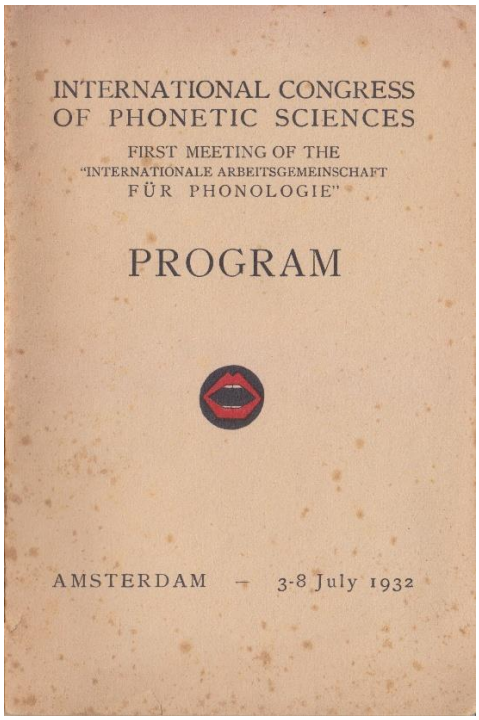

Figure 1. Programme of the First International Congress of Phonetic Sciences (Amsterdam, 1932). Source: Arquivo Familiar Paulo de Lacerda.

3 The University of Coimbra Experimental Phonetics Laboratory

This section is dedicated to the Laboratory of Experimental Phonetics in Coimbra, which was founded in 1936 with the primary objective of conducting scientific research into the Portuguese language. During the mid-20th century, various members of the international scientific community considered it to be the most advanced experimental phonetics laboratory in Europe [1]. The laboratory's acquisition of Lacerda's innovative chromograph was fundamental to this perception. For this reason, the decision was made to exhibit the chromograph to the public. It is probably the only surviving copy, as a similar instrument installed at the University of Salvador in 1956–57 was destroyed by fire [12].

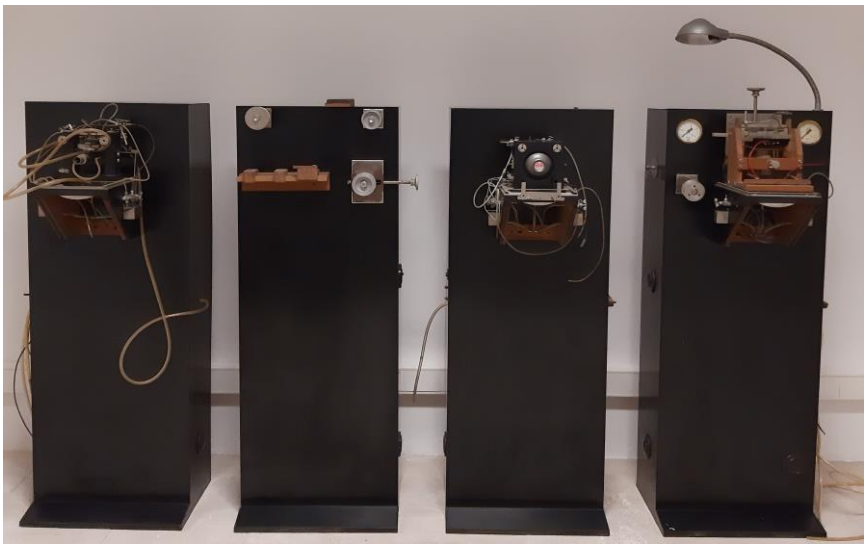

Figure 2. Lacerda's chromograph. Source: Museu da Ciência da Universidade de Coimbra.

Another instrument from the Coimbra Phonetics Laboratory that has been identified in the reserves of the Science Museum of the University of Coimbra and is now on

display is the polychromograph. This is a unique specimen. Alongside the instruments created by Lacerda, there is also an organ that was used in the laboratory's classroom and audition room. Other items include shelves for discs, mouthpieces for the chromograph, a translator of sound configurations into light configurations, and a pitch measuring apparatus. This instrument, used at the Coimbra Experimental Phonetics Laboratory, was built by Constanz Schneider, a laboratory mechanic from Hamburg, who met Armando de Lacerda during his specialist training at the Hamburg Phonetics Laboratory in 1930 and 1931.

As mentioned in [8], it is important to emphasise that the PHONLAB project made it possible to identify, clean, and catalogue all these instruments and objects. The inventory files produced are held by the University of Coimbra Science Museum. “They are also available online on the project website, enabling researchers all over the world to access the information published and providing them with the opportunity to contribute towards its development” [8: 180], [6].

During its existence, the laboratory was housed in two different locations. Initially, it was based in the building of the former Faculty of Letters of Coimbra. In 1951, it moved to new headquarters that were built from scratch as part of a major national public works plan carried out by the Estado Novo (1933-1974). This project was part of the development of the new ‘University City’ of Coimbra – Cidade Universitária de Coimbra, which is now a UNESCO World Heritage Site. Visitors can see the laboratory's first facilities and equipment in the glass photographs of the old Faculty of Letters. A plan for the laboratory shows the facilities of the new faculty and identifies all the rooms that make up the laboratory. Photos of each of the ten rooms that have existed since 1951 are shown, allowing one to see the phonetics laboratory in more detail, including the reading room, the director's office, the phonotheque and archive of graphic documents, the sound archive of Portuguese regional dialects, the microphonic capture chamber for recording sound, the rooms for laboratory work, the room for classifying and analysing sound recordings, the classroom and the audition room.

As the establishment of the Coimbra Phonetics Laboratory involved lengthy negotiations between Lacerda, the University of Coimbra, and the Junta de Educação Nacional (1929–1936) — the first Portuguese institution to plan and fund scientific research, which supported Lacerda's specialisation in Germany from 1930 to 1933 — it was agreed that the exhibition should feature some of the official documentation exchanged between these parties. The aim is to highlight both the interest in introducing experimental phonetics in Portugal and the difficulties that marked its realisation.

4 The international scientific attraction of the Coimbra Phonetics Laboratory

The international prestige of Armando de Lacerda, and the facilities and equipment of the Experimental Phonetics Laboratory explain why, during its existence between 1936 and 1979, the laboratory attracted scientists from universities such as Harvard, Paris, Cambridge, Bonn, Texas, Toulouse, Milan, São Salvador da Bahia, Madrid, Accra, Uppsala, Oslo, Rio de Janeiro, Barcelona, São Paulo, and Edinburgh. These scientists researched and specialised in the innovative phonetic research tools and methods developed by Lacerda. Upon returning to their home institutions, they implemented the techniques, methods, and teachings that they had learned under the supervision of the Portuguese phonetician. This occurred in institutions spanning various countries and continents, ranging from Harvard University, in the USA, to the Federal University of Salvador da Bahia, in Brazil [3].

This section of the exhibition is aimed at the collaborators of the Coimbra Phonetics Laboratory. The development of an interactive map enables visitors to visualise the origins of the phoneticians who came to Coimbra to work at the laboratory. Providing additional information on each of the individuals involved, the map allows visitors to deepen their knowledge of the scientists in question by offering details such as their scientific affiliation, country of origin, length of internship, and the name of the funding organisation.

Papers published by several collaborators of the Coimbra Phonetics Laboratory will be on display, some of which are dedicated to Lacerda. There will be also photographs, letters, and newspaper cuttings that document their presence and activity at the laboratory. This part of the exhibition features names such as Göran Hammarström (1922–2019), Peter Strevens (1922–1989), Francis M. Rogers (1914–1989), María Josefa Canellada (1912–1995), and Antoni Badia Margarit (1920–2014), to name a few.

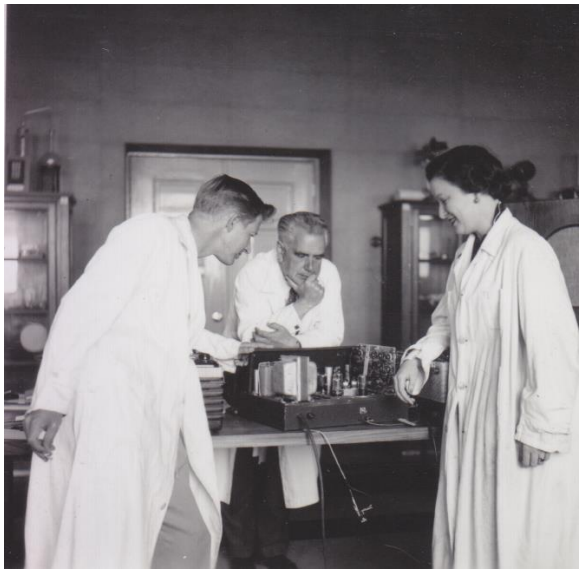

Figure 3. Peter Strevens (left), Armando de Lacerda, and Sue Nogueira at the Coimbra Phonetics Laboratory in the 1950s. Source: Arquivo Familiar Paulo de Lacerda.

The aim of this section is for visitors to realise how young researchers, after a prolonged presence in Coimbra's Experimental Phonetics Laboratory, developed important academic careers at leading universities. The concern to show how research schools were created in other parts of the world from the Coimbra laboratory resulted in the emphasis on the case study of São Salvador da Bahia (Brazil), where Armando de Lacerda and his disciple Nelson Rossi (1927-2014) set up the first experimental phonetics laboratory in South America in 1956-1957. This laboratory was equipped with chromographs, and supported the production of the first linguistic atlas of Brazil [12]. Another noteworthy figure in this section is António Almeida, the Portuguese disciple whom Lacerda hoped would succeed him as director of the laboratory after his retirement in 1972.

For some of these Coimbra Phonetics Laboratory collaborators, this exhibition reinforces the memory that still persists in some institutions. In other cases, however, this exhibition is a place that recovers and preserves the memory of the existence and activity of important linguists and phoneticians who have fallen into oblivion over time.

5 Sound archive of Portuguese regional varieties, 1950s

The exhibition concludes with one of the Coimbra Phonetics Laboratory's key projects: the creation of the sound archive of Portuguese regional dialects. This project,

developed in the early fifties, involved the engagement of a range of individuals who were well-respected in the local area: teachers, doctors, priests, local landowners and archaeologists were some of the figures involved who helped laboratory researchers to select speakers, topics of conversation and recording venues.

Figure 4. In the photograph, from right to left, are Joaquim Roque, a teacher, Berta Lacerda and Armando de Lacerda in a street in Barrancos, in Portugal's Alentejo region, 1950s. Source: Arquivo Familiar Paulo de Lacerda.

> "The appearance of scientists equipped with instruments for observing and recording sounds descending on the far-flung towns and villages of Portugal caused some surprise and anxiety among the local inhabitants, but the presence of Berta, Lacerda's wife and collaborator, created a climate of trust among women and children, who agreed to her recording their speech. The essential presence of a female collaborator and the aid of local intermediaries enabled "Notes on speakers" and photographs to be added to the sound archive, thus documenting rural Portugal of the 1950s [1: 115]".

This section highlights notes and photographs of rural workers, accompanied by woodcuts, and newspaper articles from Portuguese and foreign publications reporting on this sound archive.

As this exhibition focuses on the history of experimental phonetics, sound is an essential element. As mentioned in [8], all the reels belonging to the Coimbra Phonetics Laboratory that were found had previously been digitised at the Institute of Phonetics at Stockholm University. Throughout the exhibition, and particularly in the final section, visitors will have the opportunity to listen to recordings of Portuguese phonetics courses for foreigners taught by Armando de Lacerda via sound points. These historical sources have been supplemented by testimonies from former disciples and students of the Portuguese phonetician. The aim is to provide a first-hand account of what it was like to work and learn in this experimental phonetics laboratory.

6 Funding

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