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Body maps: photography, science, and sensoriality

Abstract
This article focuses on discussing the uses of photography through two papers presented at the 1937 Congress of the Brazilian National Sung Language, by Edgar Roquette-Pinto and João Lellis Cardoso. The Congress, organized by Mário de Andrade, aimed to define and devise strategies to systematize pronunciations in the Brazilian Portuguese language. These presentations proposed using 'phonophotography' – or 'sound picture' – as a tool to decode and correct the 'flaws' of spoken/sung language in various regions in the country. Based on the experiences of the U.S. physicist Dayton Clarence Miller and the psychologist Carl Seashore, such papers represented, even naively, the eagerness to master instincts, which may be accessed via sound, through the visual field.

Keywords: Photography; Sound; Congress Of The Brazilian National Sung Language; Sensoriality.

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Mapas do corpo: fotografia, ciência e sensorialidade

Resumo
Este artigo tem como foco discutir os usos da fotografia a partir de dois trabalhos apresentados no Congresso da Língua Nacional Cantada de 1937, por Edgar Roquette-Pinto e João Lellis Cardoso. O Congresso, organizado por Mário de Andrade, tinha o objetivo definir e traçar estratégias para sistematizar as pronúncias do português brasileiro. As apresentações em questão propunham o uso da "fonofotografia" – ou "fotografia do som" – como ferramenta para decodificar e corrigir as "imperfeições" da língua falada/cantada em diversas regiões do país. Com base nas experiências do físico norte-americano Dayton Clarence Miller e do psicólogo Carl Seashore, tais trabalhos representavam, mesmo que de forma ingênua, a ânsia de dominar os instintos, passíveis de ser acessados pela via sonora, através do campo visual.

Palavras-chave: Fotografia; Som; Congresso da Língua Nacional Cantada; Sensorialidade.

I. Culture of images

Except for image and sound, which can be captured, we cannot move in time or space fragments of the perceived world through other senses, because there is no possible way to record touch, taste, and smell. In the case of recorded sound and photo snapshot, quite different relationships are established regarding functions and their association with the real world. Just remember how in everyday life we rarely grant to recording the status of testimony or document, since it not always reproduces the perspective of the person who hears (and records). We record interesting sounds, reminders, lectures, and conversations that contain useful information, ideas, voice tones of loved ones, songs, i.e. immaterial traces of our existence. With few exceptions (such as, for instance, record in a premeditated way some conversation that might incriminate

a person), we do not use such recordings as evidence. In turn, everyday use of photography works, most of the time, as evidence of what we are willing to remember and keen to show we have experienced. It is through visual traces, mainly, that we build our narratives about the place we occupy (or intend to occupy) in the world.

What might this excessive confidence in what can be seen, at the expense of what can be heard/felt, indicate? Such a privilege of the visual is not derived only from the narrative potential of image, because, although exploited or perceived this way to a lesser extent, sound is a powerful element to build a narrative. For centuries this question, formulated from various viewpoints, has drawn the attention of Western philosophers, intellectuals, and scientists, allegorizing the clash between reason and instincts by means of the opposition between visual objectivity and perceptual subjectivity when it comes to the other senses. Although we do not have a concise and synthetic answer to such a question, it provides us with precious clues about the sensory hierarchies built over the long haul and within the Western culture. Associating the act of seeing with the rational or scientific evidence, and the act of hearing/feeling with the fundamentally ambiguous and plural nature of perception, is a construct that precedes by centuries the birth of photography and this is, I believe, one of the key characteristics of the West: breaking with the ritual and scrutinizing reality through science and the ideal of civilization. Writing and image, in this context, have played leading roles.

II. Cultures of sound

1. For the Australian aborigines, it is sound that guides the practices of remembrance and world ordering. Diplomatic relations between different ethnic groups, narratives about the past, allocation of social functions: these are some of the functions linked to *songlines*.[1] The latter dynamically tell about the past, assigning meaning to the landscape and to the actions of gods and men in the world building process. It is through

[1] The *songlines* or *dreaming tracks* are Aboriginal songs delimiting the routes established by gods and entities and they assist in displacement and exploitation of territories. Singing is an instrument of knowledge, mapping, dialogue, and preservation of the world. Everything goes through the sound matrix: from reproduction to identification of the world, from living beings and things; from leadership skills to human and intercommunity relationships. For more information, see CHATWIN, 1996.

songs that people record the state of the original monuments (nature itself), so that they are preserved by men.[2] They have always been conveyed on an oral basis and grounded in the right to change in accordance with the dynamics of culture and the natural world.

2. In Europe, Romantic painters and, soon after, Modernist ones, bet on the sensory – non-narrative – power of sound and music to create images that precisely flee from the indicial relationship to reality. The painter Wassily Kandinsky, among many others, investigated numerous possibilities for visual enjoyment guided by listening criteria (ARNALDO, 2003), so that it could break with the objectivity and narrativity of painting ruled by mimesis. So, he sought to provide a sensory nature to the sense of sight, as if it had acted alone until then, in another dimension.

3. In Brazil, the modernists formulated an identity project for the country guided by sound. It consisted in developing artistic and intellectual syntheses inspired by songs, gestures, dances, and accents of the popular culture. In the latter, marked by African, Indian, and archaic European presence, there might be the substrate, inner and unique essence of the Brazilian identity. In order to shape this raw material, however, it was necessary to go through the sieve of visuality, by means of painting, literary essays, and intellectual writings (TÉO, 2012).

* * *

Out of these examples, it is worth keeping in mind three key pieces of information. The first, rather obvious, is the awareness that the emphasis on visuality is a feature of the Western civilization, and there are numerous ways to articulate and hierarchize senses in other cultures. The second concerns the search, within aesthetics (via philosophy and artistic movements), since Romanticism, for alternatives to objectivity through closeness to the music and sound realms as a whole. The third points to the limits of this alternative to objectivity, drawing attention to the political dimension of closeness between the sound and visual fields.

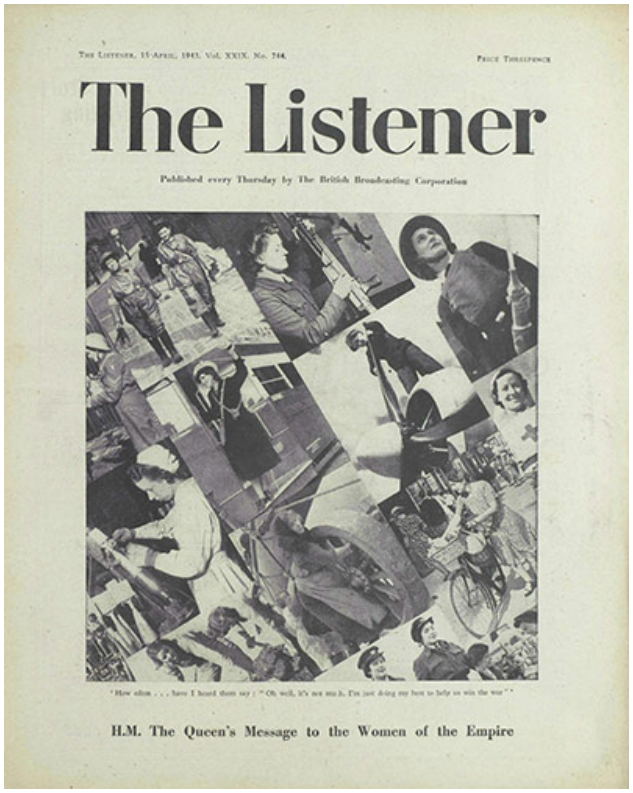
[2] In the Aboriginal culture, a human being should essentially be a protector of the natural world, changing it as little as possible and contributing to its operation. Hunting and gathering, to the detriment of agriculture, are therefore a part of a complex sociopolitical system guided by nature preservation and conservation.

III. Cartography of senses

The sound dimension has not been a material privileged only in the preparation of allegorical narratives – literary or visual – of Brazil. It also served as an auxiliary instrument in the pursuit of national order. Since the 1930s, themes such as the massive presence of immigrants (above all in southern Brazil), the danger of ethnic encystment, the spread of countercultures through urban popular music[3] have entered the discussions on culture in the country. In this scenario, choral singing, spoken language, and musicality became central themes in the midst of discussions and projects about the Brazilian identity. Education by the ear became – above all since the 1930s, when broadcasting already reached the farthest territories – a major issue (TÉO, 2007). On the one hand, the popularity of film spread visual patterns of fashion and behavior (CHARNEY, SCHWARTZ, 2004). On the other hand, popular music and soap operas populated the imagination of listeners with visual curiosity aroused by the mystery of the anonymous voices (CALABRE, 2004). Both the film and radio were used by State and private agencies as a means of political control and communication, articulating the visual and sound dimensions in order to draw public attention.

The noisy urban modernity started demanding more of senses, especially the ear, confused by a plethora of stimuli. Thus, they created new challenges to the State agencies used to undertake visual actions of dialogue or control aimed at the masses. Media such as the British magazine *The Listener*, created in 1929 by the 1st general director of the BBC group, Lord Reith, were designed to provide a rather intellectualized counterpoint to the folksy nature of radio programming. The suggestive title of the weekly magazine is indicative of the attention that the sense of hearing – and the subject who hears himself – came to receive. This sense had to be educated, because through it the effect of modernity could be regulated. Ideal listeners would be those who, capable of overcoming the shallow nature of mass culture, knew – or were willing to learn – how to select appropriate content.

[3] On the subject of musical censorship in the 'Estado Novo,' see PARANHOS, 2002.



Cover of the magazine The Listener, 4/11/43. "HM The Queen's message to the women of the empire: the Queen broadcasts to the women of the empire 'I am proud of you' on 11 April 1943." The Listener Historical Archive, 1929-1991.

In Brazil, such issues took a very specific path, given the preponderance of the sound/musical universe in the attempts to define popular culture. In intellectual production, the sense of hearing was extremely representative to address the sensory universe as an identity motive. In visual, pictorial, and illustrative production, music worked as a connector between the modern and the national aspects. Artists and intellectuals sought in the sound reference the material to draft a defined image of Brazil.[4] This task has been taken seriously, becoming a constant issue in the production after the proclamation of the Republic, especially since the 1920s, with Modernism.

The institutionalization process of Modernism, which gradually seems to position itself as a *modern nationalism* with a strong political appeal, does not fail to take into account this sensory appeal – and especially auditory – of the artistic and intellectual

[4] I address some cases in my doctoral thesis (TÉO, 2012), among which stand out art criticism by Mário de Andrade, Gilberto Freyre, especially in *The Masters and the Slaves*, Graça Aranha (*The Marvelous Journey* and *An Aesthetics of Life*), in addition to painters Cândido Portinari, Emiliano Di Cavalcanti, Flávio de Carvalho, and José Ferraz de Almeida Júnior. All of them enter into intense dialogues with the sound field. Although quite distinct from each other, they indicate the recurrence and relevance of these crossings in the political-cultural practices back then.

formulations about the Brazilian cultural identity. On the contrary: it deepens the bond, bringing it, in some situations, to the paradoxical engagement with science, seeking to rationalize a dimension of culture that, initially, was opposed to such a process. Among the various actions of the Department of Culture of São Paulo and its Cultural Expansion Division, we may highlight the foundation of a choir – 'Coral Paulistano' –, the Public Discotheque, and the Phonetics Laboratory, coordinated by Mário de Andrade's student, Oneyda Alvarenga. In addition to forming committees such as the Folkloric Research Mission and the Society of Ethnography and Folklore, the Division also promoted several cultural and scientific events. Educational activities were carried out along with the playgrounds and sites focused on public entertainment, with a clear intent to "shape workers' children (migrants and immigrants) according to the control of public authorities for the establishment of a modern and civilized society" (NOGUEIRA, 2005, p.184). These actions often aimed to deter activities deemed inconvenient and encourage those that helped building the 'illustrated' ideal of the nation (PEREIRA, 2006, p. 110).

Adherence to such a model helped establishing the São Paulo state's ideal for a modern Brazil, as well as building a promising image of the country in the international arena. For such tasks, in 1937 the Department of Culture sent representatives to several conferences, both inside and outside the country, devoted to expose this 'Paulista' version of the Brazilian culture.[5] That same year, Mário de Andrade organized the First Congress of the Brazilian National Sung Language, held between July 7 and 14, less than four months before the coup initiating the 'Estado Novo' regime.[6] The wish to educate and systemize the pronunciations for the sake of uniformity of the Brazilian song was discussed during the eight days of the congress, which took place at the 'Teatro Municipal de São Paulo,' almost 15 years after the 'Semana de Arte Moderna.' And some

[5] Camargo Guarnieri was in the Second Afro-Brazilian Congress in Bahia, Brazil, which had Gilberto Freyre as one of its founders; Sérgio Milliet attended the Congress of the People; and Nicanor Miranda attended the International Folklore Congress, both in Paris, France. The latter presented studies by the Society of Ethnography and Folklore conducted especially for the event (BATISTA, 2004, p. 48). Milliet exposed the communication *São Paulo au microscope*, which included a statistical analysis of the city, by block, studying the distribution of children, migrants, foreigners (PEREIRA, 2006, p.111).

[6] Although initially Mário's relationship with the new regime is reticent, the event organized by him anticipates – and somehow exploits – some issues to be addressed by the Vargas administration over the subsequent years.

of the studies and proposals presented make clear the relevance of visuality as a possible field of translation and ordering of the sound realm, either musical, linguistic, or gestural.[7]

The publication of the Congress proceedings indicates the concern with the visual cataloging of the sensory production regarded as typically Brazilian, especially music and cooking. A series of 'folklore maps' is prepared and published, which contains the music and food events in the regions of the state of São Paulo, organized by the Society of Ethnography and Folklore and supported by the Department of Culture, under the auspices of Mário de Andrade.[8] The *Exposição de Iconografia Musical Brasileira* was also organized by the Department of Culture, having more than 2,000 documents produced by public institutions and collectors from Rio de Janeiro and Sao Paulo.[9] The record of this exhibition is incomplete, and it may be assumed that Mário himself has exposed a significant number of objects from his collection.[10]

Among the events having an artistic nature, stood out the presentation of 'Coral Paulistano.' Created in 1935, the choir, linked to the 'Teatro Municipal' and the Department of Culture, had a stable body of classical singers, who were carefully selected between September and December that year. Camargo Guarnieri was appointed as conductor. The vocal group debuted in March 1936, making a number of presentations, always focused on the dissemination of Brazilian music, restricted to the presentation of

[7] Herein we address only information about the Congress that are relevant concerning the problems of this paper. For a rather general approach on the event, see SERPA, 2000 and PEREIRA, 2006.

[8] Among the maps published in the Congress proceedings (1938), there are: 'Mapa de Danças populares: congada' and its phonetic variants (name variations – 'congada,' 'congado,' 'congo'); 'Mapa de Danças populares: caiapó' and its phonetic variants (name variations – 'caiapó,' 'caiapós,' 'caiapô'); 'Mapa de Danças populares: cururu or caruru'; 'Mapa de Danças populares: samba or batuque'; 'Mapa de Danças populares: cateretê or catira'; 'Mapa de Proibições alimentares: relativas à manga'; 'Mapa de Proibições alimentares: leite com frutas'; 'Mapa de Medicina popular: cura do terçol com anel'; 'Mapa de Zona estudada; Mapa das unidades territoriais.'

[9] Cf. *Anais do I Congresso da Língua Nacional Cantada*, 1938, p. 4.

[10] Musical treaties entered the show, such as old issues of works by Gioseffe Zarlino (1517-90), Italian music theorist who, besides the writings on counterpoint and tuning, also explored the relationship between color and sound; works by the composer and theorist Jean-Philippe Rameau (1683-1764) and his rival Jean-Jacques Rousseau; old issues by Jean de Léry containing Indian music, besides sheet music such as *Petite Sérénade*, op. 50, by Visconde de Taunay, under the pseudonym Flavio Elysio, which might be the first draft of the composition that was printed later on under the title *Souvenir de Petropolis*. Iconographic works were also exhibited, which registered, throughout the country's history, musical moments, such as *Serenata em São Paulo no Primeiro Império* (drawing, 22 x 17 cm), and *Congada* (*cortejo dos reis do Congo*) (gouache, 34 x 50 cm), both by Johann Moritz Rugendas.

musical compositions in Portuguese, Latin, or translations (PEREIRA, 2006, p. 109-10).[11] The vocal group also developed studies in search of a national tone, an ideal that was confused with the purpose of the event.

Camargo Guarnieri conducting 'Coral Paulistano',
a position he held between 1936 and 1938.
Collection Mário de Andrade. Brazilian Studies Institute (IEB-USP).

In his opening speech, Mário welcomes people by stressing the nature averse to the then current political tensions, reducing his scope to the realm of "knowledge and art."

> I do not know, gentlemen, if you are fully aware of the wonderful folly of our decision to get together in this Congress of the Brazilian National Sung Language. While politics growls out there, grounding absurd imperialisms, lively nationalisms, and a thousand facets, by means of which men hate each other; through the airy spaces, congresses are similar in the apparent folly of peace, knowledge, and art. There is the International Congress of Folklore, in Paris; the Congress of Cities and Powers, held in Brussels, the Congress of the Portuguese Expansion in the World, in Lisbon. And the Congress of the Brazilian National Sung Language, the first musical congress in Brazil, which right now opens its week of research and art, here, in the city of us all, São Paulo (CONGRESSO, 1938, p. 707).

The first words uttered by the organizer of this event to his guests coming from other cities convey, therefore, peace, welcoming intellectuals and artists from all over the country in the city of São Paulo, announced as a kind of capital of the national culture.

[11] For more information, see also SILVA, 2001.

However, reducing the significance of the Congress to the universe of singing, performance, and language in its aesthetic dimensions might mean ignoring some of its most important implications. The Congress was held as a part of a political project whose flagship was the Department of Culture. It is worth paying particular attention to the value assigned to the scientific and cultural meetings that proliferated back then. Such events were held around cultural themes, always linked to the universe of science, a connection that reveals an interventionist trend that characterized the State action at the time, both in Latin America and Europe. Elsewhere in the speech, Mário argues:

> When Bartolomeu de Gusmão flew for the first time, when Oswaldo Cruz sanitized Rio de Janeiro, when Euclides da Cunha described 'Os Sertões' or Carlos Gomes described the 'Fosca,' no blood fell to the ground and no men hated each other anymore. And, if by chance, at the perfect moments of humanity we seek Brazil and its true historical significance in the world, we never find it in the Paraguayan War or in 1889, but in Gusmão, Butantã, Castro Alves or São Francisco de São João d'El Rei (CONGRESSO , 1938, p. 708).

This conception of history is partly tuned to the ideal of "deep history" signed after the proclamation of the Republic by the generation of Sílvio Romero.[12] However, to the apparent displacement from the political field to the cultural field proposed by Romero in his *História da literatura brasileira*, the dimension of science is added, now assimilated and associated with the cultural and artistic production. Thus, Mário intended to include the Congress in the list of founding events of modern Brazil. To do this, he invited not only artists, critics, and intellectuals, but men of science who, somehow, might establish the link between the fields of culture and scientific research. And the idea

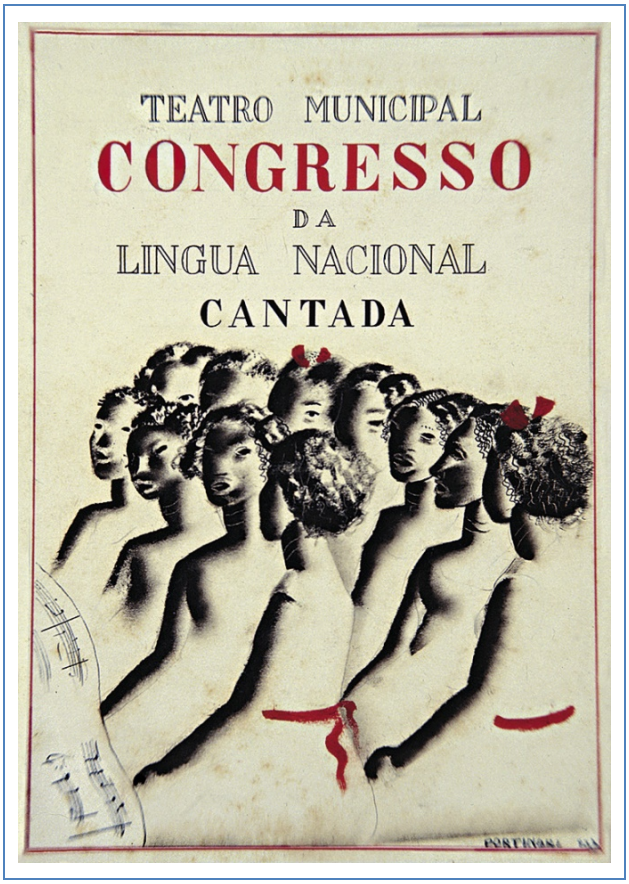
[12] The ideal of deep history advocated for the generation of Sílvio Romero was opposed to the heroic and factual history pointed out by the IHGB. In a scenario of republican assertion, they relied on popular culture as a privileged source for unveiling the national identity. Then, the study of sound manifestations among mestizo populations represented the building of national history, because the construction of a Brazilian temperament was associated with knowing it, as shown in the studies by Romero about poetry and folk song. The purity of the national might come from the racial mixture (ROMERO, 1977, p. 38), whose main locus would be the rural folk song, the fruit of 'natural' poetic invention – because non-standard – and creative gesture. The popular material becomes motive for a deep history, based on a republican ideal of bringing people closer to the State. This interest in the popular nature is eminently ethnographic, not aesthetic, as observed since the 1920s See TURIN, 2009.

of music as a connector between the colonial past and the modern present is reaffirmed by organizing the event.

The invitation to Cândido Portinari for providing the cover illustration of scheduling is meaningful, both due to the intent of adding status to the event and the implicit association – but fully understood by the painter – between the foundation of the country and the image of modern Brazil through the music class allegory. In the letter sent to the painter on April 30, 1937, Mário argues:

> How can a painter tell something in the Congress? Christ: the Congress will have several concerts during his week, at least three. Well, the programs should have a cover, a single cover, and I want it to be signed by the greatest painter and designer in Brazil: you. The size of the cover is what goes along. You can do what you want: blank and white drawing, colored drawing, watercolor, gouache, whatever you want. This cover must have this written information: *Teatro Municipal* (without 'h') and *Congresso da Língua Nacional Cantada*. And, besides, the drawing you want, an allusion to singing, choirs, folk singers, whatever you want in this genre (ANDRADE, 1995, p. 56-7).

The request is sneakily straightforward, delimiting a very specific thematic field, restricted to three elements, all of them considered in the final version by the painter: the act of singing, choir organization, and popular presence. The choir of mulatto women designed by Portinari clearly conveys the educative and homogenizing intent behind the research on sung language. The music class theme played a dual role to build the national identity: historic, sealed with the sign of the founding moment of tropical civilization, i.e. music lessons professed by the Jesuits in colonial missions; and modernizing, as it authorizes a new phase of the Republic ruled by organizing the country's cultural wealth through a deep relationship between aesthetics and science (TÉO, 2015). Making effective and solid this sound link between the colonial past and the modern Brazil, therefore, may be regarded as one of the main objectives of the event, which was inserted into a broader process of choosing, establishing, and organizing the country's cultural and artistic identity.



Cândido Portinari. Coro de mulatas (cover art of the Anais do Congresso da Língua Nacional Cantada), 1937. Gouache, nankin ink nib pen and brush/paper drawing (23.2 x 16.2cm (I) 25.6 x 18.4cm (S) (approximate). Brazilian Studies Institute of the USP, Collection Mário de Andrade, São Paulo.

The Congress brought together scholars of the Brazilian national language, especially phoneticists, theatrical actors, singers, singing teachers, musicians, and artists as a whole, journalists, social scientists, technicians from various areas, who presented works, discussed and reported in the national press. Among the papers presented there were studies ranging from attempts to characterize the specifics of the Portuguese language spoken in Brazil to technical studies exclusively aimed at providing scientific tools capable of assisting in the process of unification of accents throughout the national territory. Many communications took over the issues of language, music, and sensoriality in general. Two of them drew specific attention, which proposed, in a relatively unique way, an interesting dialogue between photography/film and the universe of sound. They offered, in a way, a formula to put into practice the cartography of senses proposed in the event. Let us look at some of its developments.

IV. Seeing sound, educating bodies

The texts to which I refer were presented by João Lellis Cardoso and Edgar Roquette-Pinto. Both cases bring the results of research aimed at translating the sound dimension into the visual one through photography and film, the latter ones understood not as tools of expression, but as parts of a scientific apparatus needed to control the urban chaos.

1. Regarding the first, João Lellis Cardoso, we know very little. He was a professor at the Dramatic and Musical Conservatory of São Paulo during the 1930s. He graduated in Political and Social Sciences, teaching courses in the field of Anthropology at the School of Sociology and Politics of São Paulo, with an emphasis on themes related to language. He also provided consulting services to the IDORT, the Institute for Rational Organization of Work.[13] For the journal of this agency, he wrote several articles focused on the psychology of music and its roles in everyday rationalization, above all in the workers' context.[14]

The *Revista do IDORT* was created in 1932. Published on a monthly basis, the journal had intellectuals and technicians from various areas as contributors – music, engineering, health, social sciences, psychology, with a strong emphasis on psychometric studies – both national and international authors. The themes addressed were varied, but with a clear emphasis on rationalizing senses, i.e. forms of production optimization for the body through rational control of external stimuli and space. In one of its early issues, there is a text with no author mentioned dealing with the importance of music to get a better use of attention in factory work. The short piece of writing, which is based on an article published by the British magazine *Business* in November 1931, advocates the use of music

[13] Through the marks left by the 1929 crisis in the national economy, and in São Paulo more specifically, a number of weaknesses were diagnosed in the Brazilian economic structure, then associated with poor organization and lack of efficient production control. The IDORT, founded in June 1931 in São Paulo, came to meet this new demand for production optimization by means of rational techniques for organization and discipline, following the rationalist fever in force since the 1910s. In short, it was a "society of studies and action," aimed at "better use of every human effort used in any of the many manifestations of modern activity," not only in industry, but also "in trade and agriculture, in public administration, in science itself and in intellectual work" (*Revista do IDORT*, n. 1, janeiro de 1932, p. 1).

[14] In addition to the publications in the *Revista do IDORT*, he published two articles in the *Revista do Arquivo Municipal*: one on phonality and hearing, starting from studies by the U.S. physicist Dayton Clarence Miller, in 1941; another, decades later, in 1980, devoted to the history of noise in São Paulo.

compositions – especially those with prominent pace, such as the marches – in industrial environments where repeated activities were carried out by the hands of men and women. Pace might be able not only to improve concentration, but to stimulate synchronized gestures and, as a consequence, more efficient ones.[15]

Dozens of other studies published by the journal addressed similar themes, not just about music, but about the importance of a rational use of light and color to create stimulating environments, systematize culinary regimes, or the need for an aesthetic and rational organization of spaces in factories, offices, schools, and even on the streets,[16] many of them full of graphics, display tables, calculations, formulas, and slogans like "The control board tells it all" (*Revista do IDORT*, n. 41, maio de 1935, p. 112), associating the rationalization of everyday life with a rather harmonious and stable modernity. Studies on individual skills were also conducted through tests of muscle sensitivity, motion, visual capabilities, and personality, establishing ideal patterns of weight, height, or temperament for each job.[17] There is a clear proposition of unity between the world of social science, art, and politics and the world of science, economics, and labor. There are several texts devoted to establishing such convergences. One of them closes the issue 32 of the journal (August 1934). Entitled "Ciências e Artes," it addresses the closeness between the two fields as a symptom of modern life:

> Science is no longer the organization of human experience; in turn, art is no longer just the suffering that produces beauty (...). It was pedagogy, given the need to draw a student's attention, who first mixed arts and sciences (...). The same spirit that animated pedagogy in carrying out this work, today animates advertising. The processes are quite similar and the purposes very close. While one uses art to disseminate scientific

[15] Referring to the example of a cigar factory in London, the author reports what seems to be the early days of ambient music: "The firm installed speakers in all offices purely aimed at mechanical execution jobs. A gramophone located at the office of the working hours record sheet overseer provides the music. The overseer operates the device and plays the music, at certain intervals. The music genre chosen consists of marches, etc., i.e. it has a strictly rhythmic nature. In the course of the day, people listen to four half-hour programs. Of course, it is possible to adjust the pace of execution, something which leads the observer to verify that the workers' hands move according to the melody's compass. Performance improved and errors have disappeared, so to speak" (*Revista do IDORT*, n. 7, julho de 1932, p. 21).

[16] See, among others, "A racionalização das ruas" (n. 28, abril de 1934); "Inquérito sobre condições de iluminação nos lugares de trabalho de São Paulo" (n. 33, setembro de 1934); "A iluminação nas fábricas têxteis" (n. 18 e 21, junho e setembro de 1933); "A importância da boa iluminação" (n. 10-2, outubro, novembro e dezembro de 1932); "Luz: a melhor ferramenta do operário" (n. 17, maio de 1933); and "A racionalização da cozinha na Suécia" (n. 22, outubro de 1933).

[17] See "Teste de sensibilidade muscular" and "A capacidade visual na indústria" (n. 32, agosto de 1934); and "Estudos de movimento" (n. 33 e 34, setembro e outubro de 1934).

> knowledge, the other also resorts to artistic expressions (...) to promote practical knowledge, immediately useful to the citizen. Pedagogy conveys culture, illuminates. Advertising, by benefiting each individual, encourages industry and trade, it leads the plants to work day and night and a mob of employees hired by trade and transport earn just enough to live.

The penetration of science and art in everyday life worked as a way to implement models to optimize time, space, and individual skills. Not only the worker, but also the consumer became a target of these new actions that, by linking pedagogy and advertising, sought to shape the consumption and production practices, optimizing them the most according to profit and economic expansion ideals inspired by the U.S. model. In this scenario, social sciences played a major role. Not coincidentally, the Free School of Sociology and Politics (ELSP) was created by a group of entrepreneurs in 1933, positioning the state of São Paulo not as a source of political conflict anymore, but as a stimulus to an "intellectual and scientific revolution" capable of changing the Brazilians' economic and social conceptions.

Still in 1933, the *Revista do IDORT* published a text entitled "A contribuição das ciências sociais para a reconstrução econômica" (n. 22, outubro de 1933), associating social research with the new management science, which might be the main trends responsible for the future of the industry. The Institute received in its facilities, with some regularity, professors from the University of São Paulo, organizing conferences of interest to the business world. Music, in this scenario, occupied a relevant place, either through issues related to the new roles of broadcasting[18] or due to its emergence as an educative element at school. Concerning the latter, Lellis Cardoso, who then taught at the Dramatic and Musical Conservatory of São Paulo, wrote some articles. In one of them, entitled "A psicologia da música e a sua aplicação no meio escolar" (n. 43, julho de 1935), he deals with the potential of music class as an artistic development factor and as an aid to discipline the body and develop individual character. Lellis Cardoso proposes a scientific analysis of students' musical perception since the early grades, mapping out their skills and promoting proper development of the body, character, temperament, etc.

[18] See, among others, the summary of the lecture by Paul Vanorden Shaw, professor at the USP, delivered on August 30, 1937, on the role played by the radio in advertising ("O rádio e a propaganda". In: *Revista do IDORT*, n. 70, outubro de 1937).

The study continues in the n. 47 of the Revista (novembro de 1935), which addresses physiological issues, needed for a clearer understanding of the "sensory phenomena of hearing psychology" (p. 244). In this article, the author mentions the usefulness of devices to measure listening capacity. These tests should be conducted at schools, improving and expanding the educative role of music. The school choral society, devised by Heitor Villa-Lobos and gradually implemented across the country, might be the ideal environment for developing this educative project, which aimed at selecting for educational and professional purposes.

> Through this selection, we can know the reach of a student's psychological capabilities and, consequently, whether this student promises something in terms of musical education; or whether he is able to pursue certain professions. The students selected may reveal their musical personality through the psychological profile. In this profile, we can enjoy the individuals' musical skills as we appreciate the aspects of a face in a photograph (REVISTA DO IDORT, n. 47, novembro de 1935, p.246).

Following this line of studies, the communication by Lellis Cardoso at the First Congress of the Brazilian National Sung Language, entitled "A fonofotografia e a fonética," introduces the technique, which consisted of a visual translation of sound impulses through devices aimed at the "scientific study of sound and speech, and also the measuring the capacities encompassed by voice" (*CONGRESSO,* 1938, p. 515). Cardoso takes as a reference the studies conducted in U.S. universities, especially the works by Carl E. Seashore, an author read also by Mário de Andrade,[19] and the physicist Dayton Clarence Miller, who was devoted to the study and invention of tools needed for the translation of sound into the horizon of visuality.

In the text presented by Lellis Cardoso, one of the main objectives is seeking a "perfect orchestral organization."[20] Sound optimization might be a part of an educational

[19] There is in his library, now under the tutelage of the Brazilian Studies Institute (IEB) of the University of São Paulo, a copy of *The psychology of musical talent*, by Carl Seashore, 1919 edition.

[20] "It is common to find poorly recorded phonograph records, and this is inherent, most of the times, to the acoustic phenomena resulting from the vocal sound with the instrumental sound in face of disk speed. We noticed the bad effect caused by the influence of the choral mass on the instruments and vice versa; the bad combination of vowels and consonants resulting in noise after recording the disc; the tone of sounds not appropriate to certain vowels; words that once sung are fractionated by tonal fusion" (*CONGRESSO,* 1938, p. 522).

project, exposed in other texts written by the author, linked to the scenario of the choral society established over the country at that time. The phonophotography technique was introduced as an instrument needed to a kind of "subcutaneous orchestration," in which both sound production and reception are meaningful. So, it might be helpful, from the *psychometric* viewpoint, "to eliminate the noise of the factories, the streets, which the employee so much and produces fatigue" (*CONGRESSO*, 1938, p. 523); and also in the systematization of pronunciation by defining its pace and accent. The latter issue would have a major impact on the body, transferring to it the same signs of order and discipline needed for sound harmonization in a choir.

> Pace in the word means the flow of movement subject to a measurement, it rules body movement in harmonious adjustment, providing a sense of power, ease, and grace. Rhythmic movements in prose and verse have a physiological basis, which is characterized by the alternation of tension and relaxation of the vocal cords. When sound is produced this alternation takes place in the larynx (*CONGRESSO,* 1938, p. 526).

Writing and poetic expression would be, this way, a reflection of "synchronism of the body movement with the speech pace" (*CONGRESSO*, 1938, p. 527). This concern with reactions to sound experiences read through the body is key in the text by Lellis Cardoso. The reception and impulses generated by hearing certain songs, urban noise, accents, tones and timbres were issues that needed to draw particular attention. According to the author,

> (...) a person, with a sphygmograph [device that measures arterial vibrations] adapted to the throat or any other part of the speech mechanism, is listening to a song. The instrument has a lever that, once well-adjusted, marks the musical time that the patient hears. That is, when this individual listens to music, without realizing it, is influenced by pace, whose markings are provided by the sphygmograph. The actual movements may be, for instance: marking with the foot, head, arm. It is also usual to mark time with the throat and tongue muscles or the larger muscles of the thigh, the forearm. Some people, to mark the time, completely tilts the body, because such an attitude is an extreme form of coordinated action of all the body's muscles in reaction to time. These major movements, with incipient movements, are generally somewhat unconscious, as we may mark the time with any part of the body, unaware of this (*CONGRESSO,* 1938, p. 546-7).

Time becomes pace of life, which allows us to apprehend the body, through gesture, the outer soundscape. Mapping such reactions might be a key step in the search – explicit in the choral singing project – for disciplined bodies. Although preserving the questions that occupied him for about two years in the IDORT publications, a more effective emphasis on the body takes shape in the text by Cardoso presented in the Congress. And the inclusion of studies by Dayton Clarence Miller is meaningful, because phonophotography as a tool seemed to make possible the materialization of some issues raised in the local context.

2. The author of the second text, Edgar Roquette-Pinto (1884-1954), was a well-known figure in the national political, cultural, and scientific circles.[21] He lived in Rio de Janeiro and, more closely connected to the universe of science, Roquette-Pinto remained at a distance of Modernism, although he has established a relationship with much of its central figures. He corresponded with many of them, especially Mário de Andrade, who sent him a number of questions related to Indian anthropology in the period during which he directed the Museu Nacional (1926-35).[22] It was within this period, around 1926, that the anthropologist began his research related to the Indian and Brazilian phonetics, which aroused the interest of Mário de Andrade, expressed in several letters sent to the then director of the Museu Nacional. His scientistic perspective, linked to positivism, had as a goal offering an alternative to the romantic idealization of the Brazilian nature and men, "it consisted (...) to replace the image of Peri, (...) of Alencar, by the scientific knowledge of Indian peoples and Brazilian individuals from the backlands" (LIMA; SÁ, 2008, p. 72). This also happened with music, which should no longer be only a national motive to become an object of scientific analysis. For this task – the recording of gestures and songs – he used image to a large extent – drawing and photography first, then film, as well as outlandish machinery. He expressed, over his years of work, a full conviction

[21] A coroner by training, he worked in several areas, moving from science to anthropology, from novel writing to technological dissemination. He became known for his key role in the implementation and development of broadcasting in the country and for his work at the Brazilian National Institute of Educational Cinema (INCE), an institution he directed since its founding in 1932 until 1947. He is also recognized due to his activities as a science teacher and disseminator in Brazil (see LIMA and SÁ, 2008).

[22] A part of this correspondence is in Roquette-Pinto foundation, along with the collection of the Academia Brasileira de Letras. The collection of the Brazilian Studies Institute of the USP also has some records of the correspondence between the two intellectuals.

that design and image constituted an "attentive observation exercise and useful knowledge to educate the Brazilian people," who were perceived by him as "lacking patience and discipline" (LIMA; SÁ, 2008, p.272).

In addition to taking notes and shooting photos, Roquette-Pinto also recorded and filmed the narration of legends, the singing of ' cantigas,' the preparation of cassava, the weaving and spinning works. He often lamented the disregard for the forms of visual record as learning practices and, as editor of the *Revista Nacional de Educação*, published between 1932 and 1934, he organized regular columns devoted to teach primary notions of drawing and photography (LIMA; SÁ, 2008, p.272). The visual translation of elements of the popular culture was an issue for Roquette-Pinto since 1910, when he traveled along with Rondon to northern Brazil. As a result, *Rondônia*, a work published in 1916, was lavishly illustrated, constituting a "document of gestures, human beings, and objects that the author wanted to record" (LIMA; SÁ, 2008, p. 272). The civilizing education doubly depended on the universe of image: as a universal record, without the spatial and cultural barriers of the book; and as an example, providing the line to be followed in the search for a strong civilization, because it was homogeneous.

The brief communication by Roquette-Pinto in the 1937 Congress resumes a part of the studies on Brazilian phonetics, started in 1926 in his laboratory at Museu Nacional. Initially, the technique used consisted in taking "numerous graphs with words and phrases spoken by individuals from various regions of the country and some Portuguese individuals," which were registered in a smoky paper.[23] The studies were resumed when he became director of the Brazilian National Institute of Educational Cinema (INCE), in 1936 (a position he held until 1947), where he was faced with the issue of providing "sub-standard" movies (16mm) with sound, something which encouraged him to investigate possible ways of visual record of the voice sound. The technique used at that time is already significantly more developed, allowing hearing, in the projection apparatus, the words recorded in the film through oscillograph. According to Roquette-Pinto:

[23] The recording device was an electromagnetic oscillograph, which had an introducer stylet, vibrating according to the vibrations received from a microphone, via a three-valve b. f. amplifier. Time was marked by a tuning fork, in hundredths of a second (*Anais*, 1937: 697-8).

> This circumstance, of course, ensures rigorous research. My equipment consists of: microphone, amplifier, constant drive recorder – (24 frames per second), about 11 meters of film per minute. Instead of placing the oscillograph vibrations on the edge of the film, as it usually happens in bands for display, I decided to take almost the entire width of the film and fully register the light beam vibrations. The oscillograph I use is electromagnetic. The soft iron needle, inside the coil receiving the current variations from the microphone, is within the field of a permanent magnet. At the tip of the needle, a small mirror sends the film the light beam received from a rectilinear filament lamp. In front of the film, there is a cylindrical lens, which by means of astigmatism further elongates the beam, providing the film with clearly visible lines. As the lines obtained reach the edge of the film, the figures resulting from the operation provide, on the projector, in front of the photoelectric cell, the corresponding sounds. *Through my technique I can, thus, clearly see the figures of voice vibrations and, when it is needed, I can hear what the drawings say* [emphasis added] (*CONGRESSO,* 1938, p. 697-8).

The technique employed by Roquette-Pinto basically consists of registering sound vibrations that move the needle in the oscillograph, while recording the sound itself. So, it could be used, in the identification and unification of regional pronunciations, in harmonization and standardization of sound combinations, either instrumental or vocal, all through a reading – whose criteria seemingly had not been defined, yet – of the physical dimension of sound through its visual translation, which should provide the most reliable translation of the sensory and linguistic expressions by the Brazilian men.

Roquette-Pinto, as it seems, has expressed interest in sharing such studies with Mário de Andrade. Manuel Bandeira, in correspondence with the latter, draws his friend's attention, probably at the request of Roquette-Pinto himself, to read the text he sent to the Congress. He refers to the fact that the anthropologist had called many times to Mário looking to borrow some discs (probably those produced in the Projeto Arquivo da Palavra[24]) to take copies of the process he had created (ANDRADE, 2000, p. 638-9). There are no answer by Mário, nor any comment on the research by Roquette-Pinto or Lellys Cardoso. It is known, finally, that both were invited to participate in the event by the

[24] A project headed by Mário and Oneyda Alvarenga, with recording of voices and accents from various regions and social groups as a part of the folk research undertaken by the Department of Culture that will be included in the Public Discotheque collection.

Department of Culture, something which denotes, in short, some interest in their research.

Almost nothing of the texts published in the annals of the Congress, referring to these studies, has been preserved. In the case of Roquette-Pinto, neither the Museu Nacional nor the INCE or his foundation along with the Academia Brasileira de Letras (ABL) have records on the subject, something which hinders a more accurate verification. There is, indeed, a huge proximity between the methods of Roquette-Pinto and Lellis Cardoso and the studies by the physicist Dayton Clarence Miller, especially if we consider the association, made by all three of them, between visual translation and scientific explanation. I would like to explore these issues in more depth.

V. Photography, science, everyday life

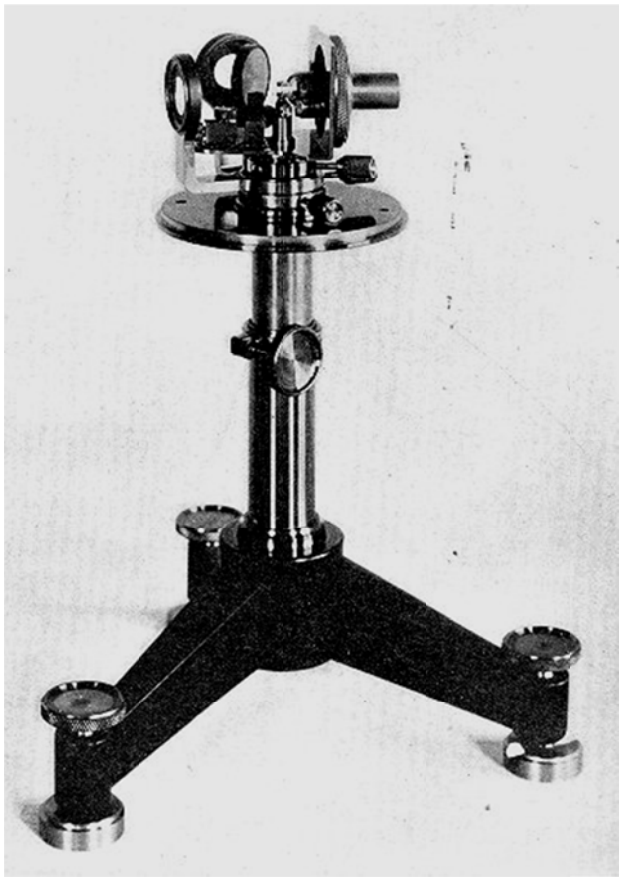
The growing space occupied by film and photography in the early years of the 20th century created the need to know and see absences before the eyes. Faraway places through documentary films, forms of life through microscopic projections, the human body through X-ray, and so on. Scientific and cultural discoveries brought into the world of vision what was previously only imaginable. It is in this scenario that research was conducted by the U.S. physicist Dayton Clarence Miller (1866-1941).[25] Mathematician, physicist, and educator, linked to the Case School of Applied Science in Cleveland, Ohio, for much of his life (1890-1936), Miller became known first due to his work with X-rays.[26] Collector of flutes and composer at his free time, he soon brought the fascination from the sound universe to his professional life. He even drew flutes and conducted advising acoustic studies, contributing to the acoustic architecture of relevant buildings in the United States, including there the acoustic design of the Severance Hall in Cleveland. He

[25] The data presented herein are the result of a survey conducted in the collections of the Rockefeller Institute (Department of Physics) at the Case Western Reserve University (Cleveland – Ohio) and the Library of Congress (Washington – DC), funded by the FAPESP. I thank Professor William Fickinger (CWRU) for his crucial tips, the long talks about Miller's work, and the unrestricted access to the physicist's collection, kept by him.

[26] Fascinated by the discovery of Konrad von Roentgen,, creator of the X-ray machine in 1895, Miller improved the invention and developed his own machine, and he was the pioneer to produce a full X-ray of the human body, his own body in the case, in 1896.

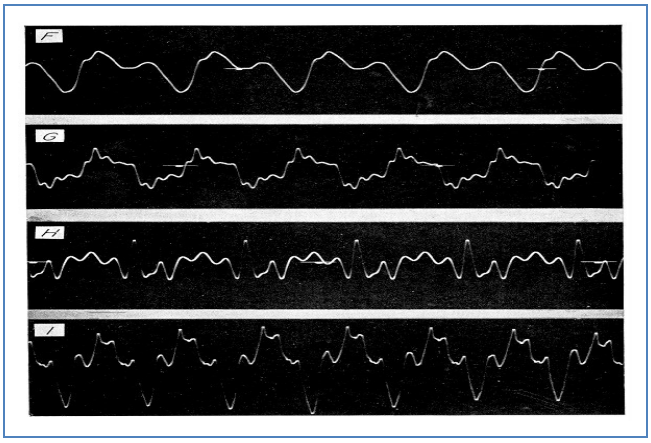
also delivered numerous lectures demonstrating his sound translation method by phonophotography within and outside the United States.[27]

The instrument created by Miller for such a task, the *phonodeik* (1908) – in Greek, *showing sound* – enabled the visualization of sound waves by using lights reflected on a small mirror attached to a mica diaphragm – a stone also used in gramophones –, which vibrated when receiving sound through a horn, and it could vary in size and material. Miller produced images of various sounds: flutes and other wind instruments, violins, pianos, bells, human voice, firearms. By using these images, he sought ways to analyze and assess the sound quality and properties and the instruments that produced it.



Phonodeik, instrument created by Dayton Clarence Miller, used to "shoot photos of sounds." The device was used to capture a wide variety of sounds on film. It was also used during World War I to measure duration and pressure of the waves emitted by weapons of various calibers, seeking to discover their psychological effects on soldiers.

[27] His work as a physical left little reason to be remembered. His most important journey, related to the existence of the *ether-drift*, seeking to challenge the recent discoveries by the young Albert Einstein, was unsuccessful. Perhaps the greatest mark left by the physicist has even been the precious collection of flutes, with almost two thousand instruments and thousands of books, documents, photographs, and rare iconography, and now a part of the Library of Congress's collection in Washington, DC. For more information on D. C. Miller, see FICKINGER, 2011.



Phonodeik: Flute, Clarinet, Oboe, and saxophone. The figure shows the wave shapes of each instrument playing the note C (256 Hz).

Just in 1909, less than a year after the invention of the *phonodeik*, newspapers throughout the United States were reporting the discovery by Miller and they suggested unusual uses for the machine. Miller himself, skillful popularizer of his work, found ways to draw attention of the public, newspapers, and the scientific field, thus multiplying the lectures delivered in almost all U.S. states, as well as in Canada and in some European countries. Such uses ranged from applicability to the manufacture of instruments and acoustical engineering to actions with a fully folksy nature. An article entitled "Kisses by mail" provides us with a good example:

> "Great strides should be made in osculautology within the next year. Not only can the canned kisses of loved ones be preserved, but by means of an instrument known as the *phonodeik*, the invention of Professor Dayton C. Miller, of Case School, which records sound waves with instantaneous photography, the sound of the kisses as well. By the same means the words inevitably accompanying a kiss: 'I love you', or 'You are the only girl (or boy) I ever loved', may be photographed and interred with the little dab of rouge – all that is mortal of a kiss. Then some night when you are fat and forty, or old and gray, you may put the record on the phonograph, and whilst your dimming eyes gaze at the love records of your life, hear the familiar cadences of some loved voice saying 'them [sic] fatal words' again. Pretty sentiment, what?" (*The Cleveland Leader*, 31/3/1912).[28]

[28] "Grandes avanços devem ser feitos na osculatologia [relativo ao verbo oscular, sinônimo de beijar] no próximo ano. Não só podem os beijos gravados de entes queridos serem preservados, mas por meio de um instrumento conhecido como *phonodeik*, invenção do Professor Dayton C. Miller, da Case School, que registra as ondas sonoras com a fotografia instantânea, o som dos beijos também. Da mesma forma, as palavras que inevitavelmente acompanham um beijo: "eu te amo" ou "Você é a única menina (ou menino) que amei", podem ser fotografadas e enterradas com um pequeno toque de rouge - tudo o que é mortal de um beijo. Então, uma noite, quando você já for um quarentão gordo, ou velho e grisalho, poderá colocar o disco no fonógrafo e, enquanto seus olhos cansados fitam os registros do amor de sua vida,

Miller traveled for years delivering lectures to popularize and demonstrate on a scientific basis the *phonodeik*, with audiences ranging from 50 to 3,000 listeners. The most varied headlines went through the main U.S. periodicals announcing the novelty and suggesting the progressive lack of limits to the achievements of science: "Can photograph sound, he says" (*Evening Mail*, NY, 25/5/1909), "Case professor flashes photos of human voice" (*New York Sun*, 26/5/1909), "Human voice is visible to eye" (*Cleveland Plain Dealer*, 5/1909), "Audiences sees pictures of applause" (*Pittsburgh Gazette Times*, 5/1/1912), "Sound waves make a big hit" (*Stevens Institute of Technology*, 22/2/1912).[29]

Despite the not significant developments of Miller's invention in scientific and technological terms, the *phonodeik* found space in the midst of a crowd thirsty for novelties, proud to be present at a revolutionary moment in the science field, whose impact on the average citizen's daily life was becoming increasingly evident. The increasing speed of overlapping scientific findings, a fact that today is a mere truism, represented, a century ago, a revolution, creating a fascination around the new technologies and the endless possibilities opened by them. The *phonodeik* gave flow not only to such a horizon of expectations. It brought to the same stage two dimensions of human expression that were now combined, then opposed: sound and visual. The first, regarded as representative of the life of senses, instincts, connected to the most pure human expression, musical creation. The second, a tool of observation and scrutiny of reality, assisted science and symbolized reason. Bringing the universe of sound to the world of visuality meant unveiling it, entering it into a situation of control, domination. A symptom of such exchanges is the text published more than two decades after the appearance of the *phonodeik*, in 1931, by the *Evening Journal* from Wilmington (Delaware, USA), entitled "Science of sound as great industry now." The editor opens the text suggesting: "The ears of the future probably will be as well trained as now the eyes are." Subsequently, who argues is the expert in acoustics William Braid White:

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ouvir as cadências familiares da voz da amada dizendo as palavras fatais novamente. Sentimento bonito, hein?". Tradução do autor.

[29] In the hemerotheca of the Rockfeller Institute (CWRU – Cleveland – Ohio), the full collection of reports on the theme organized by Miller himself is preserved.

> Fifteen years ago, acoustics, or the science of sound, was an inactive branch of physics. A few eminent workers like Dayton C. Miller were doing fine work in it, but neither they nor anyone else then could have suspected that their studies would soon become the center of a roaring activity. Yet this is just what has happened. The science of sound ought not perhaps to be too quiet; and at any rate it is today quite as noisy and as exciting as anyone could possibly desire. No branch of physical science is today of greater importance or is occupying the attention of a larger number of trained workers. What is the reason? Radio! Broadcasting and sound-picture making have become vast industries, calling for a great and increasing quantity of highly trained scientific instrument workers, and a vast amount of new apparatus, most of which was not even in existence fifteen years ago, and none of which had ever been seen outside the few acoustic laboratories then in existence (*Evening Journal, 22/6/1931*).[30]

The sudden preponderance of the universe of sound might result from two crucial causes: the prominence of the ear in the broadcasting era and the film industry. Both called for a more detailed understanding of the world of sound, implying its visual translation. The sound invasion imposed by a new amount of information that came through the ear – and not only by sight anymore – generated new needs, prompting unprecedented questions, in terms of technology and science as a whole. At the same time that new mechanisms were created to improve the broadcasting technique, soundtracks for movies, or music discs, systematic studies on noise were promoted in the USA and Europe in order to eliminate unnecessary noise by measuring loudness and possible effects on human beings. And new markets opened, as the newspapers announced. So, knowing the auditory rationale of the masses became important and, more than that, providing them with patterns of cultural consumption. The development of new resources for studying sound took place to a large extent by optical and

[30] "Quinze anos atrás, a acústica, ou a ciência do som, era um ramo inativo da física. Alguns trabalhadores eminentes como Dayton C. Miller estavam fazendo um excelente trabalho nele, mas nem eles nem qualquer outra pessoa, então, poderia ter suspeitado que seus estudos em breve se tornariam o centro de uma atividade em alta. No entanto, é isso que aconteceu. A ciência do som não pode ser muito silenciosa; e hoje é tão barulhenta e emocionante quanto qualquer um poderia desejar. Nenhum ramo da física hoje tem maior importância ou está ocupando a atenção de um número maior de pesquisadores treinados. Qual é a razão? Rádio! A radiodifusão e a fotografia do som tornaram-se grandes indústrias, apelando a uma grande e crescente quantidade de operadores de instrumentos científicos altamente treinados, e uma grande quantidade de novos aparelhos, a maioria dos quais ainda não existia quinze anos atrás, e nenhum dos quais já havia sido visto fora dos poucos laboratórios acústicos então existentes". Tradução do autor.

oscillographic methods, i.e. through visual representations of sound waves. In the midst of this set of changes, Mr. White warned:

> Today our civilization is still far more eye-keen that [*sic*] is ear-keen. But sound is coming into her [*sic*] own, and the developments now taking place in the science of sound, acoustics, lead one to hope that the ears of the future will be as well trained as now the eyes are. If this is really comes [*sic*] about, as I think it will, the world will be a far more pleasant and harmonious place of residence twenty-five years from now than it now is (*Evening Journal*, 22/6/1931).[31]

The idea of a civilization driven not only by the sense of sight, but also by hearing demanded an association between the two senses, and the first is a model in the evolutionary process of the second. Vision might be, therefore, the basis of the scrutinizing eye of the world of senses, following the eye-driven Western tradition, in which the ability to see is confused with cognition (see JENKS, 1995. p.1; MCLUHAN, 2005). It is worth noticing there is a paradox between the relationship *visual/sound* as it was proposed since the late 18th century, which was perpetuated from Romanticism to Modernism, where music, due to its anti-objectivity, should be a model for the visual and narrative arts as a whole; and the *visual/sound* as it is described above, in which, in contrast, it is visuality that should serve as a model in the development of the sensory life represented by the universe of sound.

The connection between modern, technological, world and expanded consumer horizons shaped a new look on the body. Although perceived in the key of sensoriality, as a consumer of sensory stimuli, the body also represented the possibility of optimizing the forces engaged in producing, controlling, and predicting the consumer's gesture. The use of Miller's research was different, as I tried to briefly point out. However, perhaps it was the appropriation of his method by field of anthropology, specifically ethnology, the main responsible for its use in the First Congress of the Brazilian National Sung Language. In

[31] "Hoje nossa civilização ainda muito mais é visual do que auditiva. Mas o som está ganhando território próprio, e os desenvolvimentos ocorrendo agora na ciência do som, a acústica, despertam a esperança de que os ouvidos do futuro serão tão bem treinados como agora são os olhos. Se isso for realmente acontecer, como eu acho que vai, o mundo será um lugar muito mais agradável e harmonioso para viver daqui a vinte e cinco anos do que é agora". Tradução do autor.

the United States, the Bureau of American Ethnology[32] had been promoting archaeological and ethnological studies throughout the country, and the Indian music was the prime target of such research. In 1920, the ethnographer and ethnomusicologist Frances Densmore uses the phonophotography method (*tone photographs*) devised by Miller. There are in her book on the music of the *Ute* (DENSMORE, 1922), an ethnic group which populated the current state of Utah, in the United States, graphs and analysis obtained by using the *phonodeik*. Mário de Andrade had some works by the U.S. anthropologist. And it is quite likely that Roquette-Pinto and Cardoso also had contact with her work, a fact which may have inspired such research to be carried out. The interest in phonophotography in Brazil seems to have been restricted to the Congress and the purposes linked to it, creating significant deviations with regard to the results of research here and there. In the correspondence between the physicist Dayton C. Miller and the psychologist Carl Seashore, the two methodological pillars of João Lellis Cardoso's research, the latter is mentioned. According to Seashore, Cardoso might be appropriating issues and concepts that had already been overcome in his work: "It is astonishing how enthusiastically he treats a number of things which are decidedly out of date. I refer, of course, to my part" (Letter from C. Seashore to D. C. Miller, 10.29.1938, Library of Congress).

Probably neither Seashore nor Miller were aware of the discussions and projects that inspired intellectuals, artists, and scientists here. And there are no news about the uses of the phonophotography technique similar to those proposed in the Congress by Lellis Cardoso or Roquette-Pinto in the U.S. territory. Reading their communications, coupled with an overview of the context in which they were situated, and knowledge on some of the references used, allows us to glimpse the outlines of a project aimed to control and discipline popular cultures. Instruments such as the *phonodeik* might help deploying topics such as the unification of accents and language, productive optimization in the industrial sector, musical culture improvement, and selection of the optimal elements to establish a national sound identity.

[32] Created in 1879 for the purpose of transferring files and records related to U.S. Indians from the Department of the Interior to the Smithsonian Institution.

Unlike the U.S. case, in which research on the Indian music was not connected in a visceral way to the issue of national identity, following the European pattern of interest in 'otherness' – the search for the exotic –, the ethnographic work in Brazil was combined to the cultural policies undertaken by the intelligentsia and the State. The case of the texts presented by Roquette-Pinto and Lellis Cardoso in the Congress is indicative of a strong presence of the sound matrix in the Brazilian culture – as professed by Gilberto Freyre, Mário de Andrade, among others –, assuming sensoriality as a modern science issue, whose interest is not only ethnographic, but above all political and cultural. Such studies should serve as instruments in developing measures to control and educate the body and the senses, strongholds of the people's expressive capacity. They react, in a certain way, to the autonomy achieved by the sound dimension in modernity, proposing its submission to the visual language, understood, as shown by the use of Miller's research, from a mathematical, scrutinizing, perspective. The photographic translation of sound (Miller, 1916), or even of bodily impressions of the musical experience (Seashore), constitutes the starting point for analyzing skills and sensory and perceptual limitations. The prominence of music in developing the Brazilian identity, understood within a sensorial rationale of the tropical civilization, should be dominated, mapped, and unified, providing the contours of a great nation, because it was put together by the guts.

VI. Politics of senses

Initially taken as an instrument of aesthetic updating, the world of sound is now also the target of cultural policies with a homogenizing purpose. This process no longer implied the learning of vision with references to other senses, above all hearing – just as it was professed by modern artists such as Kandinsky (ARNALDO, 2003), Klee (DÜCHTING, 2004), Matisse (HUGHES, 1991; MATISSE, 1992), among others – but the synthesis, or rather the reduction of these sensory materials to the visual domain. Anyway, the experiences of Miller and Seashore and those of Roquette-Pinto and Lellis Cardoso go beyond the scope of allegory, to which some artistic experiences of modernism were restricted, leading to the universe of action dialogues between vision and sound.

The issue of integration between senses or renewal of pictorial visuality must be understood, in this context, as a political tool. Able to provide answers to the dilemmas of progress and the questions of identity related to ethnic and cultural miscegenation, it served for different purposes, establishing plural sensory hierarchies, adapted to the needs of place and time. To deal with such meanings, the term intersensoriality is surely more appropriate than the concept of *synesthesia*, because it does not imply, as suggested by David Howes, a state of harmony or equality – either sensory or social, consisting of the present hierarchies in each cultural context (HOWES, 2005, p. 10).

Although it is hard to identify the existence of any direct impact of the research by Roquette-Pinto and Cardoso on the visual or literary production of the time, we may suggest a certain affinity between their origin and the change in the treatment of body and the notions of architecture and aesthetic balance in the work of some painters who were active before, during, and after the Estado Novo.[33] These studies had, in fact, a limited impact. Barely commented and, as it seems, abandoned after the 1937 Congress, they did not have any practical or scientific implication of major proportions. They become relevant, however, as indicating the relevant space occupied by a 'sensorialist culture' amid the policies – whether State-related or not – aimed at achieving an identity project. The term 'sensorialism' emerges as an ideology guided by the appeal to senses, forging sensory hierarchies of interest to its fulfillment (TÉO, 2012). In this scenario, sound and vision rise as salient categories to outline practices and projects aimed at shaping the Brazilian culture and men and women within that period. In this regard, sources that address these two dimensions can offer unique responses to problems that have marked the work of artists, intellectuals, and politicians at that time, above all concerning the constitution of a national identity – aesthetic, cultural, and political.

Discussing the place of visual in the Brazilian cultural policies around 1930 through these two seemingly unimportant works helps us to expose some of the possible practical implications of such 'theories of Brazil.' The 1937 Congress – and the

[33] The case of Portinari is an exemple in this regard. A more detailed analysis of some of his works (especially those ordered by institutions) points out the paradox created between his impressions and experiences of the Brazilian culture and music and the adaptations needed for his professional constitution, which was tied, at that time, to State-funded orders (TÉO, 2015).

environment that shaped it – may be seen as a symbol of overcoming, by Modernism in the 1930s, the paradox pointed out by Mônica Pimenta Velloso, between the *modern-science* and the *modern-aesthetics*, which marks the look of the Brazilian intelligentsia, since the late Empire, at modernity. These differences drove disputes between professionals of science and men of letters. The first ones defined themselves as "fighters, defenders of the nation's scientific progress," while accusing their colleagues of "staying away from the country's most immediate problems." The group associating the concept of modern to that of aesthetics, "reinforcing the routes of subjectivity, opposes the shortsighted and utilitarian thinking patterns" of the first ones (VELLOSO, 1996, p. 38). This dilemma dissolves to shape a political agreement that encompasses art and science for the benefit of the said national construction. The work by Gustavo Capanema in the years just seeks to strengthen this agreement. The discussions about the (non-)monument to Brazilian men in Palácio Capanema, for instance, are clear indications of the interest of the Minister and the State to connect scientific justifications and aesthetic monuments to the task announced by his ministry: educate Brazilian men (PINTO JÚNIOR, 2007).

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The emphasis assigned to the senses of sight and hearing in this article was not built, as the reader may have noticed, by means of a thorough analysis of visual and sound documents. It is the result, on the other hand, of an attempt to 'cartograph them,' by locating their territories, their routes, their mobility and dynamics within the big political and sensory map for the period and space covered. In this regard, debates about the ontology of photography or sound are less interesting, focusing on the bond that a document has with its reference. On the other hand, the practical use of these traces is noteworthy, it is capable of causing displacement (in terms of space and meaning) of its reference and, above all, providing significant evidence of the links between the senses, and between the sensorium and the world of politics. Therefore, it is worth considering, photography's role in "remodeling an entire territory in which signs and images, effectively separated from a reference, circulate and proliferate" (CRARY, 1990, p. 13), creating ways of seeing and expectations concerning the visual record that sometimes go

beyond the very universe of visuality, as shown by the attention to the experiments by Dayton Clarence Miller, for instance.

The alleged ability to reproduce fragments of the world experienced through photography was, over the past century, and it is still, in a significantly expanded way, one of the main platforms on which we relate, as observers, to the past. We register the present becoming the past in order not to lose it, freezing it to bring it back to life with the generous help of memory. Although there seems to be great continuity and stability in this historical relationship with the photographic medium, such a relationship contains several regimes of visuality, and numerous ways to position the sense of sight on maps of perception of the world. I tried to explore in this article a very specific facet, which brings up an also particular conception of the role and potential of visual elements in the field of politics. In this scenario, the photographic support is a part of a history of the senses, helping to shape, if not new sensory hierarchies, at least new forms and structures of relationship between the senses. From this perspective, the images of sound, visually unattractive, gain great importance, since they are relevant symptoms of this dynamic universe constituting the intersensorial relationships.

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