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ARTICLE

The first teachers of natural sciences in the secondary school of São Paulo: a historical perspective (1880–1909)

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ABSTRACT

The purpose of this article was to approach the formation and professional performance of the first teachers of Natural Sciences in three public institutions of secondary education in São Paulo: the Gymnasio of São Paulo (*Ginásio de São Paulo*), the Gymnasio of Campinas (*Ginásio de Campinas*), and the Normal School of São Paulo (*Escola Normal de São Paulo*), between the years 1880 and 1909. For this, from a theoretical and methodological point of view, we resorted to micro history procedures, operating with scale games between the macro and the micro. Using sources such as minutes from teacher contest, letters from the São Paulo public administration, laws, regulations, journals, among others, it was possible to weave snippets of the experiences, individual trajectories, and networks of relationships of these subjects. As a result, this analysis allowed us to understand social logics in the constitution of the teaching staff of the three institutions, such as the recurrence in the hiring of pharmacists and doctors for expert and teachers of the chairs of *physics/chemistry* and *natural history*, in the defined period.

KEYWORDS

science teachers; high schools; natural sciences; micro history; networks.

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OS PRIMEIROS PROFESSORES DE CIÊNCIAS NATURAIS DAS ESCOLAS SECUNDÁRIAS PAULISTAS: UMA PERSPECTIVA HISTÓRICA (1880–1909)

RESUMO

O objetivo deste artigo é abordar a formação e a atuação profissional dos primeiros professores de ciências naturais em três instituições públicas paulistas de ensino secundário: o Ginásio da Capital, o Ginásio de Campinas e a Escola Normal de São Paulo, entre os anos 1880 e 1909. Para tanto, do ponto de vista teórico-metodológico, recorremos a procedimentos da micro-história, operando com jogos de escalas entre o macro e o micro. Usando fontes como atas de concurso de professores, ofícios da administração pública paulista, leis, regulamentos, revistas, entre outras, foi possível tecer retalhos das experiências, das trajetórias individuais e das redes de relações desses sujeitos. Como resultado, tal análise permitiu compreender lógicas sociais na constituição do corpo docente das três instituições, como a recorrência na contratação de farmacêuticos e médicos para lentes e mestres das cadeiras de *physica/chimica* e história natural, no período delimitado.

PALAVRAS-CHAVE

professores de ciências; escolas secundárias; ciências naturais; micro-história; redes.

LOS PRIMEROS PROFESORES DE CIENCIAS NATURALES EN LAS ESCUELAS SECUNDARIAS PAULISTAS: UNA PERSPECTIVA HISTÓRICA (1880–1909)

RESUMEN

El objetivo de este artículo es abordar la formación y el desempeño profesional de los primeros docentes de ciencias naturales en tres instituciones públicas de educación secundaria en São Paulo: el Ginásio da Capital (*Ginásio da Capital*), el Ginásio de Campinas (*Ginásio de Campinas*) y la Escola Normal de São Paulo (*Escola Normal de São Paulo*), entre los años 1880 y 1909. Para hacerlo, desde un punto de vista teórico-metodológico, recurrimos a procedimientos de microhistoria, operando con juegos de escala entre lo macro y lo micro. Utilizando fuentes como actas de concursos de docentes, cartas de la administración pública de São Paulo, leyes, reglamentos, revistas, entre otras, fue posible tejer experiencias, trayectorias individuales y redes de relaciones de estos sujetos. Como resultado, este análisis permitió comprender la lógica social en la constitución del profesorado de las tres instituciones, como la recurrencia en la contratación de farmacéuticos y médicos para lentes y maestros de las cátedras de física/química e historia natural, en el periodo definido.

PALABRAS CLAVE

docentes de ciencias; escuelas secundarias; ciencias naturales; microhistoria; redes.

INTRODUCTION

This article deals with training and professional performance of the first natural science teachers in three secondary education institutions in São Paulo: the Gymnasio of São Paulo (*Ginásio de São Paulo*), the Gymnasio of Campinas (*Ginásio de Campinas*), and the Normal School of São Paulo (*Escola Normal de São Paulo*), between the years 1880 and 1909. The initial temporal delimitation is justified because 1880 was the reopening year of the Normal School of São Paulo and, consequently, of the increase in investments with the construction of physical spaces, the acquisition of teaching objects, and the hiring of teachers to teach physics, chemistry, and natural history. The final delimitation was chosen because the documentation has indicated that there was a stabilization in these investments in the first decade of the 20th century.

In the last decades of the nineteenth century, the natural sciences gained a social prominence in Brazil as well as in other countries, either due to the spread of positivist ideas (Depaepe, 2000), which associated progress with science, or due to a new economic and cultural context marked by the occurrence of a technological revolution (Hobsbawm, 1988).

At that time, products such as the telephone, wireless telegraph, electric lighting, cinema, automobiles, among many others, which emerged as a result of the development of electromagnetism and the replacement of iron and steam by steel and turbines (Hobsbawm, 1988), brought science closer to everyday life, promoting more comfort in private life and other possibilities for social and cultural life. In addition, the synthesis of new materials, such as dyes and fertilizers, which enabled the production of various industrial products and the improvement of food production, contributed to the recognition of the importance of scientific knowledge and, consequently, the need for their schooling.

With that, scientific training was presented as a necessity not only in the formation of bachelors, but also in the formation of primary teachers. This process was not restricted to Brazil, but the circulation of these ideas in that country occurred in tension with an essentially agrarian society in which there was little demand for science.

However, despite this context, the natural sciences were introduced in the last decades of the 19th century in a more systematic way in the study programs of the secondary school in São Paulo, both in the normal school and in the gymnasiums. This movement will generate at least three significant changes in the school configuration: changes in the division of school time, changes in the distribution of school space, and changes in the characteristics of the formation of part of the school subjects.

As for the first aspect, in the different proposals of regulations and laws relating to secondary education, a new division of school time can be seen between the hours allocated to traditional classical education, focused on the areas of humanities and mathematics, preponderant in the formation of bachelors, and the workload of natural sciences. new arrangements in school dynamics and routine should be made to include the teaching of physics, chemistry, and natural history in the distribution of time[1].

1 Law No. 88 of September 8, 1892 calls the teaching fields as "subjects"; the Regulation of Gymnasiums (Decree No. 293 of May 22, 1895) uses the terms "subjects" and "disciplines" (article 3) and the expression "subjects [...] distributed among the following subjects" (article 4).

Regarding spatial changes, schools should not only acquire new materials and objects for teaching natural sciences, but also adopt an architecture that includes new spaces such as a chemistry laboratory, a physics office, and a natural history museum. While humanities subjects were taught in classrooms, as spaces that characterized the school par excellence, scientific subjects, driven by the discourse on the intuitive method, started to demand the creation and functioning of new spaces in school architecture. Due to the significant investment in the organization of physics offices, chemistry laboratories, and natural history museums, it was decided here to approach professors in these areas.

On the third aspect, the school subjects, it is observed that the insertion of new professionals in the school universe — teachers of *physica/chimica* and natural history subjects — raises some questions. What training should these first natural science teachers have, given that there is no specific course to train them? From which social niches would they be recruited? It is these questions that this article will deal with, seeking to understand who these professionals are, what their academic backgrounds are and where the natural sciences teachers from the São Paulo secondary school worked, in addition to teaching.

For this purpose, minutes of teacher examinations, official letters, and correspondence from the São Paulo public administration, laws, regulations, magazines, teachers' time books, among others, are used as sources. The methodological procedure consists of tracing elements of the formation and performance of the first teachers of physics, chemistry, and natural history of the first three public secondary schools in São Paulo.

Thus, the objective of this article is not reduced to the characterization of a disciplinary community, as understood by Ivor Goodson (1993, 1995, 1997). More than starting from identities given a priori, the objective is to highlight the movement of subjects around a common demand that is the strengthening of knowledge of natural sciences in secondary education institutions.

From this perspective, the "disciplinary community" category is insufficient for what is intended because, as pointed out by Costa and Lopes (2016), there are at least three limits to the structural understanding that Goodson lends to this category. The first is that the disciplinary community would be formed only by professionals in the discipline. Here, although the focus of analysis is the teachers of the subjects, it is important to highlight other subjects and institutions that contributed to the construction of natural sciences as a school subject. The second is that curriculum policy is essentially driven by corporate issues and a third is that the performance of professionals in the discipline is conditioned to external factors.

The hypothesis supported here is that a group of subjects, as a rule, graduated from pharmacy and medicine courses, saw in the new disciplines, new possibilities of action, new job niches, favorable to the development of their careers.

Thus, based on different sources and scraps of information, an attempt was made to weave fragments of experiences that give access to logics that are social (Revel, 1998). It is not a matter of abandoning macroanalysis in favor of microanalysis. It is about bringing into play the internal and external dimensions, the text and the context, the general and the specific, the particular and the general, considering the chosen scale.

On the one hand, the intention of making use of microhistory to understand the training and professional performance of the first natural science teachers is not to build a profile or an identity, but to weave fragments of experiences that point to social logics in the selection and conformation of this faculty. On the other hand, the use of microhistory is also fertile to highlight the subjects' strategies and tactics, the use they make of time and opportunities, the moments of subjectivation, as understood by Certeau (1994), who participated in the production of meanings that aimed these disciplines.

This requires paying attention not only to the individual trajectory of each teacher, but considering, even if briefly, the subjects with whom they relate, the networks of relationships (Fuchs, 2007), other subjects and institutions that, in the period, are acting in the scope of natural sciences.

In this sense, this article dialogues with the work of Cabral (2016), in which the author presents a study on the implementation of the first gymnasio in São Paulo with a focus on the actions of teachers and principals in the construction of the curriculum, but seeks to analyze training and the professional performance of the first natural science teachers. In addition, this study also aimed to understand the network of relationships that existed between the teachers of public secondary schools in São Paulo, that is, the Normal School and the two Gymnasiums.

For this purpose, the text is divided into two parts. In the first, we will briefly discuss the institutions of secondary education in São Paulo, in the defined period. In the second, we will address the formation and social and professional performance of the first natural science teachers at Gymnasio of São Paulo, Gymnasio of Campinas, and Normal School of São Paulo.

SECONDARY EDUCATION INSTITUTIONS IN SÃO PAULO (1880 TO 1896)

In the reform of public instruction in 1892, article 17 of Law no. 88 establishes that "for secondary, scientific and literary education [sic], the Government shall create three gymnasiums for external students". In this article, it is possible to perceive new intentions for secondary education. First, the intention to create a serial secondary school to break with the fragmentation of single classes and split exams. The course in gymnasiums would have a duration of 6 years, the first four of which would be common for all students and the last two specific for scientific or literary studies (article 18) (São Paulo, 1892).

Second, the creation of a school that was no longer centered on humanities studies, on literary education, but that would give way to scientific education. It is not by chance that the study of natural sciences, physics and experimental chemistry and natural history is included in the program (article 19). Therefore, article 20 provides that "these gymnasiums will be provided with laboratories, offices, natural history collections, libraries, and all the material necessary for the teaching and practical work of the students" (São Paulo, 1892). According to article 5 of the regulation of

state gymnasiums (São Paulo, 1895), physics and chemistry would constitute the same subject, and natural history would only be studied from the 4th to the 6th year.

In addition to these points, this document also indicates the intention to create three gymnasiums in the same state, when the number of public secondary schools spread across the national territory was very small. Two years after the enactment of Law no. 88, the first public secondary school in São Paulo is created, Gymnasio of the Capital, installed in September 1894. For its operation, it would be necessary to recruit students and teachers.

The Gymnasio of Campinas was created in 1896 when the secondary school *Colégio Culto à Ciência*, founded in 1873 and whose activities were suspended between 1892 and 1896, was transferred to the public authorities to become the second gymnasiums in the state of São Paulo. As will be seen, during this period, referrals for the organization and structuring of science subjects were initiated, including the hiring of professors, in a process that developed until the middle of the first decade of the 20th century.

In the case of Normal School of São Paulo, there is a significant body of studies and research on this institution (Reis, 1994; Monarcha, 1999; Dias, 2002; Rocco *et al*., undated, among others). This bibliography informs that the school was reopened in 1880, with mixed classes and a program for three years of study, with five chairs, including *physica/chimica* and natural history. During this period, this institution received a significant investment from the São Paulo governments to set up the physics office, the chemistry laboratory, and the natural history museum.

In 1894, the Normal School started to function in a monumental building, built in Praça da República, with the purpose of giving visibility to the republican projects in education. Moving to the new building was followed by an increase in the duration of the course and the number of Chairs.

Decree No. 293 of May 22, 1895, which approves the Regulation of State Gymnasiums (Law No. 88, of September 8, 1892), established a division of the teaching staff into two groups: distinguished, tendered, lifelong and tenured professors (articles 64 and 65) and teachers or teaching assistants (articles 72 to 74), who, according to Nadai (1987, p. 99), were "hired for two years, not through public tender" and received half of the salary of Distinguished Professors. The author also recalls that professors would make up the Congregations of gymnasiums and could replace the director of the establishment, which did not apply to teachers.

According to Nadai (1987, p. 101),

> the Distinguished Professor figure was, at the time, respected and privileged. This fact was bought due to the influx of a large number of candidates for the competitions and the fierce competition between them, mainly due to the intellectual and social prestige that was reserved for the winner. Several Distinguished Professor added to the teaching career, the exercise of political mandates.

Another attribution of the lenses was the elaboration of the State Gymnasiums Regiment and the teaching programs. According to Cabral (2008), Distinguished Professors constituted, in that context, a group with great prestige in São

Paulo society. In addition to professors, among the Distinguished Professors "there were deputies, professors from renowned private education institutions in the state of São Paulo, employees of the Interior Business Department, textbook writers and also professors from the Polytechnic School of São Paulo (*Escola Politécnica de São Paulo*)" (Cabral, 2008, p. 13).

In the next section, some characteristics of the selection processes of science Distinguished Professors for secondary schools will be analyzed, as well as who were the subjects involved, what were their social and professional relationships, and their academic backgrounds.

THE FIRST NATURAL SCIENCE TEACHERS IN SECONDARY SCHOOLS IN SÃO PAULO

THE GYMNASIO OF SÃO PAULO

The Gymnasio of São Paulo was installed on September 16th, 1894. In August of that same year, part of the teaching staff was appointed. However, the subjects of *physica/chimica* and natural history were only submitted to competition after installation in the Gymnasio. Considering that these subjects would only be taught from the fourth year onward, this may have been a criterion used to employ less urgency in the provision of these chairs.

In any case, on December 27th, 1894, "Edmundo Xavier was appointed to the 11th Chair in Physics and Chemistry" (Nadai, 1987, p. 70). Years later, Edmundo Xavier also joined the São Paulo School of Pharmacy (*Escola de Farmácia de São Paulo*) congregation, inaugurated in February 1899. At that institution, he was a professor of inorganic chemistry, mineralogy, and hydrology (Campos, 1954, p. 440).

In 1913, in the same building as the School of Pharmacy, the School of Medicine of São Paulo (*Faculdade de Medicina de São Paulo*) was installed. The inaugural lecture was given by Edmundo Xavier, who would become the faculty's future director (De Luca and De Luca, 2003). In the *Medicine Journal* (*Revista de Medicina*), he appears as Distinguished Professor in Organic Chemistry and Biology at the School of Medicine of São Paulo (Centro Acadêmico "Oswaldo Cruz", 1929).

Cabral (2008, p. 83) corroborates these data, when in his thesis he states that Edmundo Xavier "was also part of the faculty of the School of Pharmacy and Dentistry (*Escola de Farmácia e Odontologia*), in 1901, and of the School of Medicine of São Paulo, as of 1913, where he held the chair of Medical Physics". The author also highlights the place of social distinction occupied by the teachers of the Gymnasio of São Paulo, as observed in the National Gymnasio.

Although they were not selected, the training and performance of other competitors for Distinguished Professor of the chair of *physica/chimica* at the Gymnasio of São Paulo highlights what was expected of a Distinguished Professor of the aforementioned Chair, from a social and educational point of view. Once approved, Edmundo Xavier competed with José Frederico de Borba, Antonio José de Faria Tavares, and Francisco José C. de Castro.

Some of these people, such as José Frederico de Borba, would work a few years later at the Free School of Pharmacy (*Escola Livre de Farmácia*) in São Paulo. According to Campos (1954), this first Pharmacy course consisted of four years. At the end of the third year, the student would receive the title of pharmacist and, after the fourth-year exam, the bachelor's degree.

The framework presented by this author about the first professors of the Free School of Pharmacy is important as it allows us to see how subjects who, in the early 1890s, are working in public secondary schools in São Paulo, will become part of the teaching staff of that institution.

> 1st year: physics (José Eduardo de Macedo Soares); inorganic chemistry, mineralogy, and hydrology (Edmundo Xavier); botany — 1st part and notions of zoology (Christovam Buarque de Hollanda);
> 2nd year: organic and biological chemistry (Pedro Baptista de Andrade); zoology, notions of anatomy and physiology (Odilon Goulart); botany, especially Brazilian (Alberto Löefgren);
> 3rd year: analytical and toxicological chemistry (José Frederico de Borba); theoretical and practical pharmacy (João Florentino Meira de Vasconcelos); medical subjects and notions of therapy (Victor Pereira Godinho);
> 4th year (baccalaureate): industrial chemistry with application to pharmacy (Luiz Manuel Pinto de Queiroz); hygiene and bacteriology elements (Arthur Vieira de Mendonça); history and pharmaceutical legislation (Antonio Amâncio Pereira de Carvalho) (our emphasis). (Campos, 1954, p. 440)

Among the highlighted names, José Eduardo de Macedo Soares was also a professor of physics and chemistry at the Normal School of São Paulo, as will be seen below. Edmundo Xavier was chosen in the first competition to fill the position of physics and chemistry lecturer at the Gymnasio of São Paulo. José Frederico de Borba, competed with Edmundo Xavier and, although he was not selected, he had a strong presence in the Pharmacy area.

In addition to being a teacher, José Frederico da Borba was active in the professional field. According to Alves (2011), this subject was one of those present at the first meeting of pharmacists that aimed to create the Paulista Pharmaceutical Society (*Sociedade Farmacêutica Paulista*). In the composition of the Society's first board of directors, in December 1894, José Eduardo de Macedo Soares was elected as president and Frederico de Borba, 2nd secretary. The following year, in 1895, Frederico de Borba would become a member of the editorial board of the *Pharmaceutical Journal* (*Revista Farmacêutica*), the Society's official organ.

As can be seen, those people who are competing for Distinguished Professor vacancies in secondary schools, work at the Free School of Pharmacy and participate in the São Paulo Pharmaceutical Society. The networks of relationships (Fuchs, 2007) that the candidates establish in these other spaces collaborate for the selection in the competitive processes.

The training and performance of the members of the examination boards who selected these first teachers signal the transit and circulation of subjects con-

sidered capable of making such decisions. The president of the panel that selected Edmundo Xavier was Dr. Francisco Ferreira Ramos, professor at the Polytechnic School of São Paulo. The other members of the panel were Henrique Schaumann and Urbano Vasconcelos (Nadai, 1987).

Regarding Urbano Vasconcelos, it was not possible to obtain relevant information for what is discussed in this article. As for Henrique Schaumann, he was born in Campinas in 1856 and, like his father, Philip Gustav Schaumann, and his grandfather, he was a pharmacist trained in Germany. Gustav Schaumann moved to Brazil in 1853, settling in Campinas and, in 1858, acquired a grocery store on Rua São Bento, in the city of São Paulo. Later, in the same place, he founded the *Botica Ao Veado d'Ouro* pharmacy. The name comes from the golden deer that existed on his family's coat of arms (Gogarten, 1958).

The father sent his son to study in Germany at the age of eleven. Henrique Schaumann graduated as a pharmacist, studied natural sciences, chemistry, and physics at the *Universität Göttingen*, becoming a doctor in 1879. In that same year, he returned to Brazil and took over the management of the family business, *Botica Ao Veado d'Ouro*. The pharmacy enjoyed great prestige in São Paulo society at the time (Gogarten, 1958). At the beginning of the 20th century, Henrique Schaumann became a member of the Society of Tropical Medicine and Hygiene, in London, and through that Society published some works on beriberi (Schaumann, 1911). This competition for the *physica/chimica* chair draws attention to an aspect that would be repeated in other selection processes, that is, the strong presence of pharmacists and physicians in the area of science education.

Another subject that held a competition was natural history. The panel for the selection of Distinguished Professors for the chair of natural history consisted of "Orville Duby [sic] (president), Canuto Ribeiro do Val, and Eduardo Augusto de Oliveira" (Nadai, 1987, p. 69). According to Mahl (2012), Orville Adalbert Derby had geology as his specific area of competence, but his scientific production reveals a diversity of interests, such as history, ethnography, and geography.

He graduated in geology at Cornell University (United States) in 1873, having completed his doctoral thesis the following year, using the knowledge gained from his participation in two Morgan expeditions, which he had been part of, along with Charles Frederic Hartt, between the years 1870 and 1871. "In December 1875, once again at the invitation of Hartt, Orville Derby returns to Brazil for the third time, now integrating the newly installed Geological Commission of the Empire" (Mahl, 2012, p. 308).

According to the same author, in 1885, the government of the São Paulo province asked Derby to draw up a geological exploration plan for the São Paulo province. As a result of his scientific expeditions through Brazil, together with other scientists, he formed a considerable collection of fossils and carried out numerous studies in geology and paleontology.

> In 1886, under his leadership, the Geographical and Geological Commission of São Paulo [CGGSP] was officially installed [...] In order to make this immense material public, Derby proposed to the government the creation of the

> CGGSP museum, which eventually gave rise to the Paulista Museum. The first director of the museum was the zoologist Friedrich Albrecht Von Ihering, who arrived in São Paulo at the suggestion of Derby himself, in 1893, to assume the direction of the Commission's zoology section. Acting for the development of natural sciences in São Paulo, Derby also helped, along with Francisco Ramos de Azevedo and Swedish botanist Alberto Lofgren, in the creation of the Botanical Garden, which would later give rise to the São Paulo Forestry Institute. (Mahl, 2012, p. 310-311)

In 1894, when he was invited to compose the selection panel of the natural history lens at the Gymnasio of São Paulo, he was also part of the group that founded the Historical and Geographical Institute of São Paulo (*Instituto Histórico e Geográfico de São Paulo*), which would begin its activities that same year. The other member of the panel, Canuto do Val, was a professor of zoology, notions of anatomy and physiology at the Free School of Pharmacy of São Paulo (*Escola Livre de Farmácia de São Paulo*) (Alves, 2011) and also a professor of natural history at the Normal School of São Paulo, since 1892, as can be seen in the last part of this text.

The third member of the panel was Eduardo Augusto de Oliveira. This man appears in the newspaper *A Nação: Jornal Politico, Commercial e Litterario do Rio de Janeiro* (The Nation: Political, Commercial and Literary newspaper of Rio de Janeiro) (1884) as a captain-lieutenant commander of the navy. In 1875, the Ministry of the Empire named him Knight of the order of São Bento de Aviz (*A Nação*..., 1875). In 1888, the Ceará newspaper *Constitutição* reported that the bachelor Eduardo Augusto de Oliveira was appointed secretary of the province of Maranhão (*Constitutição*, 1888, p. 2).

From what has been investigated so far, Eduardo Augusto was a bachelor who had a career in the Brazilian Navy. This idea is reinforced in volume VII of the special volume of the First International Congress of American History, held by the Brazilian Historical and Geographical Institute, published in 1922. In this document, Eduardo Augusto de Oliveira appears as one of the officers who participated as 1st lieutenant in the war of Paraguay (*Revista do Instituto Histórico e Geográfico Brasileiro*, 1925, p. 477).

These three subjects, who made up the contest panel, selected José Cândido de Souza for the natural history Chair at the Gymnasio of São Paulo, although he was the only one enrolled in the contest. It is known from the Souza Dias and Rezende Barbosa family memoirs that professor José Cândido de Souza comes from the city of Machado, Minas Gerais, lost his father at age 12 and his mother at age 18. According to Barbosa (1998), heir to half of his parents' farm, "he sold what he had, freed the slaves — he was a convinced abolitionist — and left São Paulo, where he completed his basic studies with difficulty" (Barbosa, 1998, p. 20).

José Cândido moved to Rio de Janeiro "where he attended the Medicine course until the fifth year" (Barbosa, 1998, p. 20). Due to an illness, he was unable to complete the course and

> he decided to restart his studies in Europe, going into different areas. For ten years he took several courses and carried out as many studies in Botany and Natural Sciences [...] at the University of Montpellier, in addition to having been a student of Louis Pasteur on a vacation course at the University of Paris. (Barbosa, 1998, p. 21)

It is not known when he returned to Brazil, but in 1894 he took up the chair of natural history at the Gymnasio of São Paulo, where he remained for over 30 years. In 1960, Decree No. 37,883 gives the Gymnasio Estadual Sumaré, in the capital, the name José Cândido de Souza State Gymnasio. The justification was that

> among the numerous São Paulo teachers, who so commended themselves to public esteem for their dedication to the teaching cause and for their unblemished conduct, the venerable educator José Cândido de Souza, appointed in 1894, Natural History Distinguished Professors from the former Gymnasio of São Paulo, today *Colégio São Paulo*, whose direction he also exercised in 1929, retiring in 1931. (São Paulo, 1960)

It was not possible to circumscribe the role of professor José Cândido in other institutions, but he had a long career at the Gymnasio of São Paulo, where he remained until his retirement in 1931.

In summary, the Distinguished Professors that attended the Gymnasio of São Paulo's science areas, as a rule, were subjects who had contact with physics, chemistry, and natural history in courses such as pharmacy and medicine. Their academic backgrounds were closer to scientific theories and laboratory practices than to the ongoing discussions about education in the late nineteenth century, which may have interfered with the selection of contents and the development of pedagogical practices in the teaching of natural sciences in the secondary school of São Paulo.

THE GYMNASIO OF CAMPINAS

In 1896, the secondary school *Colégio Culto à Ciência*, which had been founded in 1873 by a group of farmers, merchants, and intellectuals from Campinas, São Paulo (Moraes, 2006), was transferred to the public power to be the second official gymnasium in the state of São Paulo, under the name of Gymnasio of Campinas.

During this period, this institution began a process of organization of chairs in accordance with what the congregation of the National Gymnasio of Rio de Janeiro (*Ginásio Nacional do Rio de Janeiro*) defined and the regulation of gymnasiums of the state of São Paulo (São Paulo, 1895). For the chairs of *physica/chimica* and natural history, professor José Pinto de Moura.

This professor, who was born in Maranhão and graduated in Pharmacy from the School of Medicine of Bahia in 1887, according to Diez, Souza and Negrão (2009), was hired by the State Government to work at the Agronomy Institute in 1894 and developed Chemistry activities at that institution until at least 1896. In 1898, he was appointed to the Gymnasio of Campinas, where he remained

until March 1900. In 1899, he acquired a pharmacy that was advertised in the *Almanaque Histórico e Estatístico de Campinas* (Historical and Statistical Almanac of Campinas) as follows:

> POPULAR PHARMACY
> Owner and Director, Bachelor J. Pinto de Moura (pharmacist, former chemist at the State laboratories, professor of physics, chemistry, and natural history of the Gymnasio of Campinas, etc.)
> *Rua Barão de Jaguará, 30*.
> (Centro de Ciências, Letras e Artes, 1899)

Some of the characteristics of this professor's professional life would be repeated by the other *physica/chimica* and natural history Distinguished Professors who would join this school in the coming years: training in pharmacy, the ability to teach different knowledge from their main training, the circulation between regions and participation in other scientific institutions.

After José Pinto de Moura left, the chair was, provisionally, in charge of Gustavo Enge. Although this teacher has remained in this role for a very short time, he reflects a characteristic movement of that context. Gustavo Enge was the 7th chair of geography, cosmography, and Brazilian history, but he was also appointed to the chair of *physica/chimica*. The same happened with professor Abílio Álvaro Muller from the chair of physichology and logic, who was assigned to the chair of natural history (Cason, 2019) until the hiring of effective professors for these chairs.

The two professors — Gustavo Enge and Abílio Álvaro Muller — circulated to other scientific and social entities in the city of Campinas. The first appears on the board of the masonic store *Masônica Independência Lodge* as "first watchman" in 1906/1907 and as "venerable master" in 1909/1910 (Loja Maçônica Independência, 2020). In addition, his name also appears in the first issue of the journal of the Center for Science, Letters, and Arts (*Centro de Ciências, Letras e Artes* — CCLA) in the Mathematics and Astronomy Commission (Centro de Ciências, Letras e Artes, 2020).

The latter was part of the board of directors of the *Masônica Independência Lodge* from 1899 to 1913 and of the CCLA's Geography, History, and Demography Commission. CCLA was founded on October 31st, 1901, in Campinas, São Paulo, by professors, scientists, and artists with the objective of discussing and promoting artistic and scientific activities and was configured as a space for discussion and promotion of science and arts. Several scientists from the Agronomic Institute (*Instituto Agronômico*) and professors from the Gymnasio of Campinas participated both on the board of directors and on the auxiliary commissions.

After the two professors had passed quickly through the *chymica/physica* and natural history subjects, public tenders were opened for the hiring of permanent professors. Among the Distinguished Professors of the *physica/chimica* subjects are Manoel Agostinho Lourenço, who taught this subject between 1901 and 1909. There is little information about this professor, except that he was a native of Gôa — Portuguese Indies — and was a member of the Auxiliary Commission of

Physica, *Chimica*, and Mineralogy from CCLA together with two chemists from Agronomic Institute.

In 1909, professor Anibal Freitas entered the Gymnasio of Campinas to teach the chair of *physica/chimica*. He remained in that position until 1929, when he was appointed director of that same school. Anibal Freitas was also a pharmacist and prepared three subjects in the pharmacy course, including organic chemistry and biology by Pedro Batista de Andrade (1848–1937), one of the founders of the School of Pharmacy at *Universidade de São Paulo*. Like José Pinto de Moura, he also worked as a pharmacist.

After José Pinto de Moura left, the chair of natural history was occupied by Abílio Álvaro Muller (1900–?), Francisco de Paula Magalhães Gomes (1901–1905), Francisco Furtado Mendes Vianna (1906–1915), and Paulo Paulo Luiz Décourt (1915–1934), according to Cason (2019).

Distinguished Professor Francisco de Paula Magalhães Gomes was born in the city of Ouro Preto, in Minas Gerais, and studied at the School of Pharmacy in that city. He then graduated in Medicine in Rio de Janeiro (Academia Mineira de Medicina, 2020) and, in 1901, took up the chair of natural history at the Gymnasio of Campinas and the CCLA General Secretariat. That year his name also appeared on the Botany commission of that institution. He left school in 1905 to return to his hometown.

In 1906 Francisco Furtado Mendes Vianna was approved for this chair. Although he took up the chair of natural history, this teacher was notable for his works dedicated to reading and literacy, with several publications dedicated to reading for children and calligraphy, among other topics (Oriani, 2015). This is an exception to the trend of pharmaceutical training and a curiosity, since his specialty was not the sciences, although he was apparently considered an excellent professor in this area.

In 1915, professor Paulo Luiz Décourt was hired for the Chairs of Natural History and Notions of Anthropology. This professor was born in Campinas and had been a student at the Gymnasio of Campinas at the beginning of the 20th century, then studied Pharmacy at the School of Medicine of Rio de Janeiro. He held the position at the Gymnasio of Campinas until 1934, when "he was removed to exercise the same position at the Gymnasio of São Paulo" (Cason, 2019, p. 100).

In addition to professors, there was also the physics and chemistry teacher Eugênio Bulcão, who was among the school's staff until the mid-1930s. Like several teachers, Eugênio Bulcão also appears among the members of the CCLA. At the beginning of the 20th century, Eugênio Bulcão was on the CCLA Zoology commission along with Adolpho Kempel from the Agronomic Institute and Fidelis dos Reis of the 2nd Agricultural District of the state of São Paulo (Centro de Ciências Letras e Artes, 2020). This character signed the school's inventories as *pharco*, indicating that he was also a pharmacist.

As mentioned before, the performance of many of these subjects has some common characteristics. First, circulation both in different regions and in different educational, cultural, and scientific institutions. With a few exceptions, such as those of Anibal Freitas, Paulo Décourt, and teacher Eugênio Bulcão, who stayed at the school for 30 years or more, other professors had quicker passages through the Gymnasio of Campinas.

Second, although there have been professors trained in different areas of knowledge, what predominated among the professors of *chymica/physica* and natural history was training in pharmacy. This fact reinforces the idea that there were networks of relationships (Fuchs, 2007) that were articulated around various social spaces, including schools, which may have contributed to the formation of a school culture for science subjects in São Paulo schools.

THE NORMAL SCHOOL OF SÃO PAULO

The presence of these subjects in the Normal School's program of studies, as well as the administrative and pedagogical effort to create new spaces in the school structure aimed at teaching physics, chemistry, and natural history, shows that not only gymnasiums, but also training schools of elementary teachers, *i.e.* regular schools, started to have significant investments in these areas. When the Normal School of São Paulo reopened in 1880, Paulo Bourroul was hired for the 5th chair, of French and notions of physics and chemistry.

Coming from France, the Bourroul family had some of its members working in the field of pharmacy and medicine. Celestino and Camilo Bourroul arrived in Rio de Janeiro in 1839 and soon moved to São Paulo, where Camilo, Paulo Bourroul's father, would undertake an important business, *Pharmacia Paulistana* (Viotti, 2000; Bivar, 2007).

Born in 1855, Paulo Bourroul graduated in Medicine in Belgium and, in 1879, returned to Brazil. His son, also called Celestino Bourroul, became an important and well-known physician in Brazil. Celestino was supervised by Adolfo Lutz at the School of Medicine of Salvador (*Faculdade de Medicina de Salvador*), developed a research in Europe, and worked at the School of Medicine (*Faculdade de Medicina*) of *Universidade de São Paulo*.

Paulo Bourroul, in addition to his private clinic, worked at the Sanitary Service in São Paulo under Cesário Motta's management, a period in which he contributed strongly to the fight against yellow fever and to the preventive vaccination campaign against smallpox (Rocco *et al.*, undated). As a professor of physics and chemistry at the Normal School of São Paulo and, later, as a director of the same institution, he will have a fundamental role in the acquisition of materials for the intuitive teaching of these subjects, as well as for the assembly of the institution's library. (Dias, 2002; Pestana, 2011).

In 1882, Paulo Bourroul not only remained a professor of physics and chemistry, but also assumed the position of director of the Normal School of São Paulo. He taught Chemistry and its applications at the School of Arts and Crafts of São Paulo (*Liceu de Artes e Ofício de São Paulo*), where teachers from the Normal School also worked (Dias, 2002). Still, according to Dias (2002, p. 149),

> Dr. Paulo Bourroul bought a laboratory similar to those of the Normal Schools in France, and as of the 6 *contos de réis*[2] he had taken for this purpose, there was

2 Réis: currency in Brazil from 1500 (with the invasion of the Portuguese) until 1942, when the Brazilian financial system began to be organized.

> something left. He used the remainder to purchase about 200 volumes for the start of the current library. Even so, he could still return to the treasury a balance of more than 600$000 *réis*. It is noteworthy that Dr. Paulo Bourroul had made his trip on a common leave. Instead of the commission he was entitled to for the service rendered, he had a discount corresponding to the period of his leave.

The citation indicates questions about the professor's academic and family background, as well as the relationship networks that led to the purchase of materials for the Normal School. In terms of family formation, the Bourroul family is characterized by its dedication to pharmacy and medicine. It is the training in medicine that, in that context, will give legitimacy for Paulo Bourroul to take on the disciplines of physics and chemistry. From the point of view of networks of relationships, Paulo Bourroul has close contact with public administrators in São Paulo and with French companies, which allowed him to purchase books and materials for teaching natural sciences.

Paulo Bourroul remained at the Normal School until 1884, when he resigned to take up another job, as a doctor at the Ipanema Iron Factory (*Fábrica de Ferro do Ipanema*). He is replaced for a period of seven months by the physician Aristides Franco de Meirelles. In the meantime, according to Dias (2002), "the chair was split into two: the 5th Chair of Physica and Chimica and the newly created 6th Chair of French Language and Grammar".

Carlos Müller, Cypriano José de Carvalho and Aristides Franco de Meirelles (Dias, 2002) competed for the 5th Chair. Carlos Müller was an industrial chemist and Aristides Franco de Meirelles a physician. Cypriano José de Carvalho, engineer and committed positivist, was approved; however, according to Dias (2002), the constant conflicts with the directors of the Normal School made him request his resignation in 1888.

Once again the 5th Chair was submitted to competition. Candidates for the vacancy were pharmacist Francisco Silverio Gomes dos Reis, pharmacist José Eduardo de Macedo Soares, civil engineer Pedro Barreto Galvão, Theodoro Antunes Maciel, pharmacist Antonio Ribeiro da Silva Braga, and Dr. Ascendino Angelo dos Reis.

Regarding the subjects who made up the panel, it is noteworthy that, unlike the panels at the Gymnasio of São Paulo, for example, there were no specialists in physics and chemistry on the panel at the Normal School. The name that most related to the natural sciences was the Government delegate, Luiz Felippe Gonzaga e Campos. He was a naturalist, geologist and actively participated in the Geographical and Geological Commission (*Comissão Geográfica e Geológica* — CGG) of Brazil together with Albert Loefgren and Orville Adalbert Derby (Arquivo Público do Estado de São Paulo, 1886–1889).

The others were: the director of the Normal School at the time, canon Manuel Vicente da Silva, with a degree in theology; father Camilo Passalacqua was professor of the 4th chair of pedagogy, methodology and religion; Dr. Carlos Reis, was professor of the 1st chair of national language and literature, and Tiburtino Mondin Pestana, was another representative of the Government.

Among those enrolled, Dr. Pedro Barreto Galvão was ranked in 1st place and, in 2nd place, in the same way, Mr. Francisco Silverio Gomes dos Reis and José Eduardo de Macedo Soares.

Pedro Barreto Galvão was an engineer graduated from the Polytechnic School of Rio de Janeiro. He also served as a professor at the Normal School of the Empire and as a trainer of experimental *physica* at the Polytechnic School (*Escola Polytechnica*) from August 1883 to May 1889. He was also a founding professor at the School of Agriculture and Veterinary Medicine (*Escola de Agricultura e Medicina Veterinária*), currently *Universidade Federal Rural do Rio de Janeiro* in 1910, being a replacement for Distinguished Professor of *physica*[3].

However, the president of the province of São Paulo, in 1889, nominated the second place, José Eduardo de Macedo Soares, which caused indignation in the press, which accused the president of the province of sponsorship and nomination of a position for political interest. Macedo Soares worked as a physics and chemistry teacher at Normal School of São Paulo for about 30 years. Born in Maricá (Rio de Janeiro), Macedo Soares studied pharmacy at the School of Medicine of Rio de Janeiro (*Faculdade de Medicina do Rio de Janeiro*). He moved to São Paulo in 1881, opening the Popular Pharmacy in one of the most important shopping streets in the city at the time, *Rua 15 de Novembro* (Rocco *et al.*, undated).

After passing the competition, he leaves the trade, Popular Pharmacy, to dedicate himself to various businesses related to education. In addition to teaching physics and chemistry at the Normal School, in 1901, he inaugurated the Gymnasio Macedo Soares as a preparatory course for the entrance exams to higher education (Rocco *et al.*, undated). As well as the exam boards, the hiring of colleagues from the Normal School to be teachers in their school points to networks of relationships (Fuchs, 2007) woven by these subjects as a means and way of occupying social spaces and maintaining positions in the growing market of the public school.

Such networks are also evident in the creation of the São Paulo Pharmaceutical Society, in 1894 (Alves, 2011), of which Macedo Soares was the first president, as mentioned above. It is this Society that, in 1898, founded the Free School of Pharmacy, in which Macedo Soares was a professor of Physics and also its director, between 1911 and 1913 (Rocco *et al.*, undated).

If, in 1883, Paulo Bourroul played an important role in the acquisition of the first objects and materials for assembling the physics office and chemistry laboratory at the Normal School, in 1894, Macedo Soares would make a similar contribution by donating objects to increase those spaces.

In a correspondence addressed to the Secretary of the State for Interior Affairs, Cesário Motta Junior, the director of the Normal School, Gabriel Prestes, presents a list of the objects donated by Macedo Soares to the institution.

> A 1 1/2 by 8 1/2 camera; with all accessories, such as chassis, presses, short plate holders, etc. A complete Bandet Hydrometer; 24 views for magic lantern; 2

3 Available at: https://www.geni.com/people/In%C3%A1cio-da-Cunha-Galv%C3%A3o/6000000025848254065. Accessed on: July 17, 2020.

> photo tracts; 1 electric lamp; 1 large box of reagents; Beakers, balloons, beakers for analyzing pipettes, chemically pure reactive pipette holders and tubes for analysis. (Acervo Histórico Caetano de Campos, 1893–1895)

It is possible that such donation is justified for at least two reasons. The first has to do with closing the Popular Pharmacy so that some of the objects used there were no longer needed. The other is that Macedo Soares was a traveler, that is, like many teachers and educators in the 19th century, he traveled to Europe and the United States to study teaching methods, especially intuitive teaching, visit schools, school museums, and acquire teaching materials.

During this period, Macedo Soares became a reference consultant for other physics and chemistry teachers and directors of other normal and complementary schools and school groups regarding the devices and objects necessary for the intuitive teaching of those subjects. He even made the budgets, and in 1895, he informed the director of Public Instruction of the State of São Paulo that: "since I have a direct relationship with some houses in Europe, I can take care of the supply at the quoted prices" (Acervo Histórico Caetano de Campos, 1893–1895).

It is noticed that the networks of relationships formed by these teachers were local, but also crossed borders. Some were immigrants or children of immigrants, others had studied at European universities, still others were travelers. It was no different with the first professor of natural history at the Normal School, Dr. Canuto Ribeiro do Val.

Canuto do Val, like Macedo Soares, Edmundo Xavier, and José Frederico Borba, was part of the first group of teachers to teach at the Free School of Pharmacy. Canuto do Val gives name to a street in the city of São Paulo, in the Santa Cecília neighborhood. According to the São Paulo Street Dictionary,

> Canuto Ribeiro do Val was born in Brussels, Belgium, in 1867, where his parents Manuel Ribeiro do Val and Josefina Ribeiro do Val were farmers in the state of Rio de Janeiro. He returned to Brazil when he was 5 years old, going to live with his family in the city of Vassouras. He graduated in 1886 from the School of Medicine of Rio de Janeiro. He later went to live in Paraibuna (SP), where he held several positions, including that of police chief. In 1890 he moved to São Paulo where he set up his practice and from then on was one of the most respected clinicians of his time. He was a professor at the School of Dentistry and Pharmacy, of which he was one of the founders. He died in São Paulo on 04/28/1909. (Prefeitura de São Paulo, s./d.)

Also a graduate of the School of Medicine of Rio de Janeiro, Canuto do Val would play a crucial role in setting up the Natural History Museum of the Normal School of São Paulo. In the "Journal of practical and theoretical courses", of the School of Medicine of Rio de Janeiro, in 1887, there is a list of theses presented at the institution in 1886. Among them, the thesis by Canuto Ribeiro do Val, in the medical and therapeutic area, entitled Digitalis its physiological and therapeutic action. With this, it is known that he, since a student, had already shown an interest in the study of plants and their therapeutic functions.

As can be seen in the Report of the Director of the Normal School,

> all the specimens in the Museum were duly classified by the distinguished professor of the Chair of Natural History, Dr. Canuto do Val, and so that the collections are always kept classified, I had a special inventory and classification book made for the Museum, which unfortunately does not get ready this year. (Acervo Histórico Caetano de Campos, 1894, p. 15)

Although the book has not been finished and is still unknown, the rigorous classification of species in the Natural History Museum of the Normal School of São Paulo, carried out by Canuto do Val, is presented in the aforementioned Director's Report. The purpose of setting up the Museum, expressed in the aforementioned Report, is the development of concrete teaching so that future teachers could "orient their teaching according to the principles of the intuitive method" (Acervo Histórico Caetano de Campos, 1894, p. 15).

For the organization of the Museum, Canuto do Val relied on materials donated by the State Museum and the Geographical and Geological Commission of São Paulo. However, the director reports that "I noticed very sensitive faults in the organization of the Museum right away, which I tried to remedy by having them come from Pariz [...]" (Acervo Histórico Caetano de Campos, 1894, p. 15). Next, the director informs that the order was placed at the Maison Deyrolle, in Paris, through Etienne Collet, for a total value of 3,250 francs. It is possible that the insufficiency of the material for the composition of the Natural History Museum was pointed out by Canuto do Val, as a specialist in the area.

What can be said is that, in the three public institutions of secondary education in São Paulo, investments were made for the implementation of natural sciences, starting in the last decades of the 19th century. Such investments included the construction/creation of new teaching environments in the school space, the acquisition of new objects that were not part of the schools' routine and the hiring of those who would be the first natural science teachers in public secondary schools in São Paulo.

From the discussions undertaken here, it can be argued that the selection and hiring of these first teachers can be better understood based on the study of the trajectory of these subjects. This is because the study of the training and professional performance of these professors allows us to understand that their hiring cannot be dissociated from the networks of relationships constituted by these subjects who, as a rule, are trained by the faculties of medicine, engineering, and pharmacy and are working in the same spaces as, for example, the Pharmaceutical Society of São Paulo, the Free School of Pharmacy, the pharmaceutical trade, and the public and private secondary schools in São Paulo.

LAST REMARKS

This article aimed to analyze the training and performance of the first natural science teachers in three public secondary schools in São Paulo. Understanding where these subjects were formed, which social cadres were recruited, which forma-

tion(s) contributed to them being selected by the examination boards as the most suitable candidates for teaching physics, chemistry, and natural history are some of the questions that animated the reflection undertaken.

From a theoretical-methodological point of view, the approach was developed from a micro-history perspective (Revel, 1998) and hence the operation with a game of scales between the macro and the micro. In the scale games constructed here, the macro can be understood as the hegemony of the natural sciences in the 19th century and its insertion in the teaching programs of primary and secondary schools. The micro can be recognized in the trajectories of the studied subjects. It was intended to build the macro through the micro without seeking to explain historical phenomena in causes attributed to a macro-structural dimension that would configure phenomena on a micro scale.

In the understanding of Ginzburg (1989, p. 178), "micro-historical analysis [...], moving on a reduced scale, allows in many cases a reconstitution of the unthinkable experience in other types of historiography". This movement favored the analysis of social experiences from individual trajectories. However, it is important to emphasize the challenge of tracking the trajectories of individuals in their multiple relationships due, above all, to the scarcity of sources about the subjects of education.

For this reason, also, works like this one contribute to a broader understanding of the subjects of the school and of secondary schooling in São Paulo. The trajectories of these teachers cannot be understood disconnected from the concrete conditions in which they are inserted. These trajectories bring out the multiplicity of experiences, the plurality of reference contexts, the relationship of individual experience with class and everyday life (Revel, 1998).

Thus, it can be said that, as a result of this article, that the analysis of the trajectories, training and performance of the first natural science teachers in public secondary schools in São Paulo allowed us to understand some broader social logics in the constitution of this teaching staff. Among them, the prevalence in the hiring of pharmacists and doctors for Distinguished Professors and teachers of the chairs of *physica/chimica* and natural history.

One element that can help to better understand this option is the absence of bachelor's degrees in chemistry or physics, while there was a certain availability of pharmacists. Such availability, in turn, can be explained by the reform proposed by the Rio de Janeiro School of Medicine in the 1870s by the then minister Carlos Leôncio de Carvalho.

The reform proposals, which only began to be implemented in 1880, included the annexation of a School of Pharmacy to the Schools of Medicine (Brasil, 1879), whose teaching program included the study of physics, mineral chemistry, mineralogy, chemistry organic, botany, zoology, materia medica and therapeutics, toxicology, pharmacology, and practical pharmacy.

In that same decade, the new statutes of the School of Medicine (Brasil, 1884) were implemented, which generally followed Leôncio de Carvalho's proposal to provide practical and free teaching. These statutes would implement three courses attached to the Medical and Surgical Sciences, one of which was the pharmacy course (Brasil, 1879).

In the same direction, after the proclamation of the Republic, the Decree No. 1,270 of January 10, 1891, established that the schools of medicine in Rio de Janeiro and Bahia were renamed School of Medicine and Pharmacy. To achieve the objective set out in article 6, of practical teaching, article 14 of Decree No. 1,270 (article 14) provided that there should be 15 laboratories incorporated into the faculty, including one for analytical chemistry and toxicology, one for inorganic chemistry, one for organic biological chemistry and one for physics. On the other hand, Article 15 determined that each college had a museum with collections necessary for the instruction of students (Brasil, 1891).

Thus, in addition to a favorable environment for carrying out laboratory practices, there was a reasonable workload in chemistry and some training in physics. In the understanding of public administrators and/or public examination boards, many of them made up of professionals from the fields of pharmacy, medicine and engineering, this training enabled subjects from these courses to take up teaching activities in secondary education in the disciplines of physics, chemistry and natural history. With the training obtained at the faculties, the pharmacist and the doctor were competent to teach theoretical classes and were also familiar with practical activities in cabinets and laboratories.

Given the above, it can be said that the first teachers of physics, chemistry, and natural history, hired by public secondary schools in São Paulo, in the turn of the 19th to the 20th century, were, in general, influential subjects (Cabral, 2008), whose families already had other members with consolidated performance in these areas and had no economic barriers to sending their children to study in Europe.

Often, they had some political projection, command of other languages, and an experience abroad. The skill that some showed to acquire modern materials for the chemistry laboratory, physics office, and natural history museum in Europe or at European commercial houses are signs of the traffic and social places occupied by these subjects. In addition, locally, they had already formed networks of relationships (Fuchs, 2007) with other subjects in their respective areas, either because they graduated from the same college or because they circulated in the same social and professional spaces.

The explanation of the subjects' trajectory doesn't lend itself to the construction of a priori identities that would justify a common profile of these teachers. More than that, what is evident are the different ways in which professionals from pharmacy and medicine courses saw the creation of these disciplines in public secondary schools as a new and advantageous field of work, both economically and socially.

Finally, considering that the program for the study of physics, chemistry, and natural history should be designed by the Distinguished Professors of the respective Chairs, it remains a question for future research to discuss how the academic training of these teachers configured ways of doing and knowing in the disciplines of sciences both in the choices of content and in pedagogical practices. In other words, for the continuity of the investigation, what is asked is how much this tradition (culture) participated in the conformation of school subjects in science.

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