

Petroleum: New Energy Perspectives for Brazil in 1922

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Abstract

The *Primeiro Congresso Brasileiro de Carvão e outros Combustíveis Nacionais* (first Brazilian Congress of Coal and other National Fuels) was held in 1922. The Congress embodied a broad discussion about the economic exploitation of coal in Brazil, the importance of bituminous shale, the use of alcohol as fuel, the studies on the occurrences and the investigations in progress on oil prospecting. Such strategic national resources for modernizing industrial projects, stimulated by World War I, had already been the objects of systematic research by geologists, engineers, and technicians of the Geographic and Geological Commission of São Paulo since the late nineteenth century. This article presents aspects of the papers and resolutions on oil in that Congress. It considers the Congress as an important mechanism to trace the conceptual frameworks related to discussions about the circulation of knowledge and technical and scientific practices regarding the exploitation of petroleum. The article argues that this Congress was one of the legitimizing strategies of the research and effective actions by the group of scientists and technicians associated

with the Geological and Mineralogical Survey of Brazil, in its dialogs with the State and business groups. These strategies were focused on strengthening the geological investigations regarding the energy resources of the country.

3.1 Introduction

The *Primeiro Congresso Brasileiro de Carvão e outros Combustíveis Nacionais* (first Brazilian Congress of Coal and other National Fuels) (SGMB 1924) was held in 1922, from the October 28th to November 8th in Rio de Janeiro, Brazil, and received very little attention in the vast historiography of oil and energy resources in the country. Following Rudwick (1972), this Congress was just an “episode”—albeit in this case a significant one—in the history of Geology and Oil in Brazil. This Congress, like other ones, can be understood as a representation, a specific moment that allows us to visualize who the researchers and technicians were, the state-of-the-art in the discussions and technical–scientific research in progress, the political, and economic interests at stake.

This Congress did not initiate a process and it was not an isolated initiative. Since the end of the nineteenth century, oil had already aroused the interest of international companies and of the technicians who worked in geology in the country, in the institutions and societies such as the *Museu Nacional* (National Museum); the

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Sociedade Auxiliadora da Indústria Nacional (Society for the Promotion of the National Industry); the *Escola Politécnica* (Polytechnic School) in Rio de Janeiro; the Ouro Preto School of Mines, in Minas Gerais; the *Comissão Geográfica e Geológica de São Paulo* (Geographical and Geological Commission of São Paulo); and now at the beginning of the twentieth century, the *Comissão de Estudos das Minas de Carvão de Pedra do Brasil* (Coal Commission), organized in 1904 and later incorporated into the *Serviço Geológico e Mineralógico do Brasil* (Geological and Mineralogical Survey of Brazil), organized in 1907. These institutions were the basis of Brazil's modernization processes (Dantes et al. 2011). The fundamental research role conducted by North American geologists in Brazil since that time, as well as the importance of the Geological and Mineralogical Survey of Brazil for the industrialization process of the country in the early twentieth century have been well discussed by Figueirôa (2007).

Until the first decades of the twentieth century, coal was still the main interest in terms of fossil fuels. The government, paying close attention to the costs of coal, iron and steel imports, and supported by nationalist professionals from the School of Mines, gathered in the Geological Survey, encouraged research on mineral and energy resources such as iron, manganese, coal, and oil. After World War I, the increase in fuel prices intensified the search for coal and oil also in Brazil.

But we should mention that in the early 1920s, Brazil was considered a region without oil. And research on oil was in the context of coal mining. The surveys that had been carried out since the end of the nineteenth century were focused on the demand for coal, but provided indications for the potential of bituminous shales and oil. So, this paper presents just a few aspects of the context of those years, mentions some aspects of the themes of the discussions on coal and alcohol, and points out the papers on oil presented by the Geological Survey technicians and resolutions on oil discussed in the Congress of Coal and other National Fuels.

3.2 The Early 1920 Years

In December 1921, the Brazilian government under the direction of the engineer Ernesto Lopes da Fonseca Costa (1891–1952) organized the *Estação Experimental de Combustíveis e Minérios* (Experimental Station of Fuels and Ores), as a section of the Geological and Mineralogical Survey of Brazil. The Experimental Station was the initiative of the geologist engineer Luis Felipe Gonzaga de Campos (1856–1925), who studied at the Ouro Preto School of Mines and during that period, directed the Geological Survey.

This was the first technological institution created in the country, which exists until now as the *Instituto Nacional de Tecnologia* (National Institute of Technology), in Rio de Janeiro (Costa 1934). Its specific objective was the economic investigation of the energy resources—especially coal. But since its organization, this Experimental Station was already researching oil and had hired technicians to initiate studies on alcohol in combustion engines (Schwartzman and Castro 1985). In the early twentieth century, Brazil followed the innovations of the French industry for the use of alcohol and was among the first countries seeking for new markets for the extensive production of sugar cane, such as the development of biofuels. An International Exhibition of Alcohol Products and Equipment and a Congress on the Industrial Applications of Alcohol had been held in Rio de Janeiro in 1903. Since then, it was already recommended the implementation of an infrastructure for the production of bioethanol for vehicles in Brazil. During World War I, the use of alcohol in several equipment of government institutions became mandatory (Moreira and Goldemberg 2005).

Thus, some months after the creation of the Experimental Station, the Congress was held as an initiative of the technicians from the Experimental Station and the Geological Survey. This paper argues that the Congress was aimed at valuing the local technical capacity and sought support for the research on coal, alcohol, and especially oil that was already underway.

1922 was the year of the centennial celebrations of the Independence of Brazil from Portugal. The Congress of Coal and other National Fuels was held in a climate of growing nationalism and future prospects for the country's progress and development. In the first preparatory meetings for the Congress, the representative of the government, the engineer Miguel Calmon du Pin and Almeida (1879–1935) former Minister of Agriculture, then president of the Agriculture National Society and one of the organizers of the Centennial Congresses, recommended that the Congress of Coal should turn its attention to the possibilities of new sources of energy that would ensure the country's economic independence.

And at the first meeting, the proposal was that this Congress be added to the International Congress of Engineers, where all questions related to the profession and fuels would apply. The proposal was presented “as a suggestion from the United States” by the Brazilian ambassador in Washington following the initiative of Verne Le Roy Havens editor of the publication *Ingenieria Internacional* published in New York (Sampaio 1922). This publication promoted the International Congress of Engineers in conjunction with the South American Railway Conference, which now counted on the adhesion of several countries which would also take place, in the same context of the exhibition in the Independence Centennial commemoration (Pires 1922).

The organizing committee of the Congress of Coal and other National Fuels—which included many of the Geological Survey's technicians—immediately rejected the proposal. They argued that in an international congress with a very comprehensive program, it would be very difficult to address the specific issues related to the problems of national fossil fuels with the depth of details needed and the proposal of urgent measures for the development of national industries. Having a voice in a specific Congress was part of the professionalization strategies of the Geological Survey and the advancement of research on the country's energy resources. This caused strong clashes between those who

supported the Pan-American movements and those who were opposed to it, and who opposed the hegemony of the United States that was expanding in Latin America (Loguercio 2007). The newspapers highlighted these debates along with the highlights of the Congresses held during the Independence Centennial commemorations.

The Congress of Coal and other National Fuels was already inserted in a strategic planning perspective of some nationalist sectors aiming to achieve self-sufficiency in energy resources, the basis for the country's technological and industrial development. The initiative of the Congress was supported by emerging industrial sectors interested in new energy sources that depended mainly on the energy resources that the country imported at high costs, progressive military, and government sectors related to agriculture and transportation, especially Ildefonso Simões Lopes (1897–1904) then Minister of Agriculture, Industry and Commerce, who would later be the author of several protectionist laws for the exploitation of oil in the country (Peyerl 2017).

3.3 The Congress of Coal and Other National Fuels: Technical and Economic Sessions

The Congress of Coal and other National Fuels was organized in three sessions: technical and economic focused on coal and alcohol and scientific issues, prioritizing coal, and especially oil.

Representatives of the national industrial sectors felt that it was right for Congress to discuss technical and scientific issues related to coal but believed that the technicians already knew how to use domestic coal and increase its efficiency. They emphasized that the economic session was the most important, the essence of the Congress. They believed that the fundamental objective of the Congress should be about coal consumption: processing, improvement of the maritime and rail transportation, and protectionist measures that would allow coal to intervene beneficially in the Brazilian economy. They believed that the country was completely unprepared for these purposes. They recognized that

scientific and technical work had already been developed by the Geological Survey and the Experimental Station. They also pointed out that as coal consumption increased, so too would the number of specialists and new solutions and technologies for its practical use in industry. Just the increased consumption would reduce the excessive import prices of foreign coal.¹

The coal deposits in the south of the country were already in operation, but since this was not of the best quality, the work of the technicians of the Geological Survey and of Experimental Station revolved on the need to encourage the search for coal in other regions, to establish technical standards for the use of metallurgical coke and research on the processing of domestic coal for industrial use.

And in fact, the work and resolutions of the technical and economic sessions dealt mainly with the importance of establishing protectionist measures for the commercialization and expansion of the uses of national coal in the industry. These resolutions included specific recommendations, such as the Central Railroad of Brazil should acquire locomotives adapted to the use of national coal. Once the coal quality in the southern Brazilian state of Santa Catarina was recognized, the Congress proposed setting up an industrial demonstration plant that covered coal processing, coke production, pig iron production, and preparation and steel lamination, to establish a thermoelectric power plant for the production of special alloys related to the studies of Ouro Preto Mining School, in Minas Gerais. The Congress also discussed the implementation of railroads linking the coal-producing centers in the south of the country to the iron ore deposits of Minas Gerais, in the center of the country; improvements in ports and cargo ships for the transport of coal; compulsory maximum use of national coal in the Navy; as well as customs taxation and taxes on the importation of foreign fuels (Almeida et al. 1922).

Several recommendations of the Congress took effect and one year after the Congress, the Government enacted laws to promote studies on the industrial use of coal, the foundation of industries of by-products of national coal such as benzoyls and tar, and replacement, total or partial, of foreign coal by the country, in the manufacture of gas lighting (Belolli et al. 2002).

The articles on alcohol focused on the technical and economic sections of the Congress, addressing the work program of the Experimental Station that conducted research to obtain homogenous and stable mixtures of alcohol and air, their combustion speeds and temperatures and their behavior in combustion engines. The resolutions of the Congress on alcohol insisted on the importance of teaching their manufacture for industrial applications, the creation of cooperatives for the organization of large distilleries equipped with fermenting, distilling, and denaturing plants, with tank wagons for distribution, storage and transport; beverage taxation; incentive for alcohol use in specially built devices and machines for the use of alcohol; use of government vehicles for ethanol; technical improvements to use alcohol as fuel (Almeida et al. 1922). The research initiatives that were carried out at Experimental Station were crowned with success and led to the feasibility of the first alcohol-based car in Brazil in 1925 (Távora 2011). In 1938, prioritizing the search for oil, the director of the Geological Survey (at that time Serviço de Fomento da Produção Mineral), Avelino Ignacio de Oliveira (1891–1970) considered that the production of sugar cane-based alcohol engine would always be limited. It also argued that the alcohol industry could only survive at the expense of rates that ultimately made imported gasoline more expensive, and argued that “it was a nationalist solution and not an economic solution” (Oliveira 1938, p. 10).

The Engineering historian in Brazil, da Telles (1982) had already called attention to the need for further studies on this Congress on Coal. He believed the Congress was one of the most relevant events in the country’s history of technological development and was upset by how his propositions about alcohol were only resumed

¹Brazilian Congress on Coal. O Journal. Rio de Janeiro, Saturday 25 February 1922. Year 1922/Edition 00952 <http://memoria.bn.br> Access 03/08/2018.

much later, after the oil crisis of the 1970s. Years later, the alcohol-engine production would become an economical solution. After the 1980s, Brazil began to produce alcohol-fueled cars. The Fiat 147 was the first alcohol-powered car in 1978.

3.4 The Congress of Coal and Other National Fuels: Scientific Sessions on Oil

The Geological Survey technicians, organizers of the Congress, were particularly interested in the scientific session of the Congress to publicize and obtain support for the geological researches that were carried out in the country especially for oil. Fifty-six papers were presented at the Congress. In addition to the Geological Survey technicians, professors from the National Museum and Polytechnic School from Rio de Janeiro and the Ouro Preto School of Mines, Minas Gerais also participated in the meeting sessions. The Geological Survey technicians evaluated twenty-four papers and submitted nineteen papers in the scientific sessions of the Congress. All participants were important members of the geological community in the country (SGMB 1924).

In almost all the works presented there was some mention to the possibilities of oil occurrence. The articles presented followed the work strategy proposed by Euzébio Paulo de Oliveira (1883–1939). Euzébio de Oliveira was a prominent figure in the history of oil in Brazil. He was the acting director of the Geological Survey at the time of the Congress and was the effective director from 1925 until 1933. He was also the author of several papers presented at the Congress. Since 1915, Euzébio de Oliveira was in charge of the general direction of the petroleum research activities in the Geological Survey. The idea of a systematic survey operation in some parts of the country had been established for better knowledge-based information on the coal basins and better orientation for petroleum researches. In the first bulletin of the 1918

Geological Survey, published in 1920, Euzébio de Oliveira delimited the most promising sedimentary areas for the existence of oil in the country in three oil provinces: *Bacia do Paraná* (Paraná basin)—“Gondwana Province”: São Paulo, Paraná, Santa Catarina, Rio Grande do Sul, and Mato Grosso do Sul); *Bacia do Amazonas* (Amazon basin) and Atlantic (coastal area from the northeast to the region of Campos, Rio de Janeiro) (Oliveira 1920). Some comments on some of the papers presented at the Congress, below, provide a general idea of the oil-related works developed in the Geological Survey at that time.

– The Paraná Basin

Euzébio de Oliveira begins his article “*Probabilidades da existência do petróleo no Brasil, de acordo com as teorias sobre sua origem*” (Probabilities of the existence of oil in Brazil according to theories about its origin) (Oliveira 1924d), firmly grounded in Engler and Hofer’s theory of organic origin of oil (Peyerl and Figueirôa 2016). In this paper, the author returned to his criticism already presented in previous works (Oliveira 1915), contrary to the statements of the North American geologist Israel Charles White (1848–1927), known as a coal specialist, who had been hired by the Brazilian government to coordinate the Coal Commission in 1904. Francisco de Paula de Oliveira (1857–1935), a mining engineer and coal specialist, and one of the former directors of the National Museum of Rio de Janeiro, Euzébio de Oliveira’s father, had held the position of engineer of the Coal Commission, and the son, Euzébio de Oliveira, was very familiar with the geology of the region.

The “White Report,” known as the final report of the work of the Coal Commission laid the foundations for the geological knowledge of the southern regions of the country, not only for coal but also for the mapping of Gondwana in those regions. The paleontological studies allowed more evidence of the correspondence of these lands to the Karroo Formation of Africa. The Report also established what is considered to

date as the basis of the stratigraphy of the Paraná basin (White 1908; Lopes 2015).

Asked about the possibilities of petroleum in the regions especially studied in the south of the country, Charles White considered “that the sedimentary beds of the Brazilian Permian, once held some petroleum is attested by the evidence of the *Iraty* black shale which gives off the characteristic odor of this substance from São Paulo to Rio Grande do Sul.” Charles White, in his final work report, did not rule out the possibility of the occurrence of oil in other regions of the country which he did not know, but believed that “the result of the deep drilling at *Iraty*, which is distant from any known outcrop of igneous rocks, confirms this conclusion, that it is useless to expect petroleum deposits of any considerable quantity anywhere in South Brazil” (White 1908, p. 245).

The technicians of the Geological Survey disagreed. They followed the geological orientations of the North American Orville Derby (1851–1915)—former director of the São Paulo Geological Commission (1886–1905) and first director of the Geological Survey (1907–1915), and Euzébio de Oliveira’s works. Since 1915, Euzébio de Oliveira drew attention to oil drilling in southern Brazil. This was based on the Permian and Triassic ages of the sedimentary rocks and the geological conditions of the vast region: “porous sedimentary rocks, arranged in gentle anticlines, of weak relief and sufficiently impermeable cover to avoid the flow of oil” (Oliveira 1915, p. 116). The following years they even insisted on the possibility of oil occurrence in the south of the country. From the beginning of the activities of the Geological Survey until 1933, there were only 38 drillings in the region, although this was the region where most surveys were carried out during that period (21 in São Paulo, 12 in Paraná and 5 in Santa Catarina).

As the bituminous shales from the *Iraty* Formation, in the Paraná Basin, were considered a promising source for petroleum, at the Congress, Othon Henry Leonardos (1899–1977)—another well-known engineer in geology in Brazil, then an employee of the Geological Survey—

presented a paper on his research on tertiary bituminous shales of the north of São Paulo state; Euzébio de Oliveira presented another paper with more details on the geology of the bituminous shales from the *Iraty* Formation (Oliveira 1924a), and other authors presented papers on the petroleum potentialities of other bituminous shales of other regions of the country.

Furthermore, 1922 was an extremely productive year for research in the state of São Paulo and Paraná, in southern Brazil. The survey did not find oil but confirmed the existence of natural gas in the regions of the cities of São Pedro de Piracicaba in the state of São Paulo and of Marechal Mallet in the state of Paraná, which until then was unknown in the country. Samples of oil rocks where oil and gas were found were also exhibited at the Centennial International Exhibition (Brazil 1922), where the Congress was held, to further disseminate the success of the explorations carried out by the Geological Survey.

– The Amazon Basin

Following the strategy of the ongoing research in the Geological Survey in the three regions of the country, there was no shortage of studies in the Congress on the possibility of coal and oil in the Amazon valley. Since the nineteenth century, Orville Derby had conducted studies on the Amazonian carboniferous fauna (Derby 1877, 1894). Once in charge of the Geological Survey Derby proposed conducting research and surveys related to coal in this largely unknown geological region.

In the Congress, two papers on coal were presented by the technicians of the Geological Survey, one on lignite (known in Alto Solimões, Amazon, since 1861), and other on oil in the Amazon region. Campos (1924) followed Suess, attributing marine origin to the carboniferous deposits of the Amazon. He relied on numerous comparisons of the geology of the Amazon with other regions of occurrence of coal measures in the world, under the marine layers of the Upper Carboniferous, to consider that the possibility of

coal in the Amazon was promising, contrary the opinion of the other well-known American geologist John Casper Branner (1850–1922).

Branner had extensively worked in Brazil and had recently published the geological map of Brazil. In his text on the Brazilian Geological Map, Branner considered that although it was expected to find coal in the Amazonian Upper Carboniferous, such deposits had not yet been located, since these layers were identified as being of marine origin, there was no possibility of finding coal there (Branner 1919). Gonzaga de Campos argued the need for more research in terms of the extension of the region and primarily the urgency of more drillings, since only these could clarify the complex geological structure of the region.

The possibility of oil in the Amazon valley was defended by the geologist from the Geological Survey, Mathias Gonsalves de Oliveira Roxo (1885–1954). His paper presented at the Congress reclaimed the geological history of the Amazon region, considering the Amazon valley as a vast syncline of slow and gentle uplift. The valley had been occupied by the sea in the Silurian and Devonian periods and by a shallow and smaller sea along the Carboniferous. The sea also occupied vast Amazonian areas in the Tertiary, but with no communication with the Pacific given the rise of the Andes, constituting a vast gulf, which sedimentation would gradually cover. It was based on the geological history of the region, studies by the technicians of the Geological Survey, and the “fossil wealth” of the successive periods, already analyzed by the well-known American paleontologist John Mason Clarke (1857–1925). Mathias Roxo’s article recognized that well-conducted drilling in the areas of Tertiary brackish-water deposits would find oil, especially in the south of the states of Amazonas and Acre (Lower Amazon) (Roxo 1924b).

– The Atlantic Coast areas

The papers presented at the Congress about the Atlantic Coast areas focused on the research and

surveys that were being carried out in the states of Alagoas, Sergipe, Bahia, and Rio de Janeiro.

It was in the Experimental Station that the oil proportions in these rocks and other samples obtained in these locations were specifically being analyzed. The regions of Graça Torta and Riacho Doce, a few kilometers from Maceió, capital of the state of Alagoas in the northeast of the country, the most important deposits of oil-rich bituminous shales were located, already surveyed by the Geological Survey.

In his paper presented in the Congress “*Folhelhos betuminosos da costa do Brasil*” (Bituminous Shales of the Brazilian Coast) Euzébio de Oliveira gave continuity to his first studies of the region since 1918, updating data of the chemical analysis of the collected samples (Oliveira 1924b). From those studies, the author started from the well-known assumption that there was no oil in bituminous shales, but rather its generating substance—hydrocarbons. He explained that chemical processes and in-depth heat generation, generally associated with eruptive rocks, could result in the formation of oil. Although there were no eruptive rocks in these regions, the author assumed that a set of existing geological fractures and joints showed that the heat from the friction of the rocks could have formed oil in the shales, even in small quantities. When subjected to atmospheric action, the petroleum formed lost its volatile components, generating the asphalt found in these regions of fractures. It was, therefore, vital to also intensify research in these areas.

Chemical analyses performed by technicians of the Experimental Station on samples collected in the mapping of peat occurrences at different locations in the state of Sergipe, indicated the presence of oil percentages, considered promising for further research. The presence of combustible substances similar to those already known in the peat of Maraú, Bahia, were presented to encourage the continuity of work in these regions (Alvin and Dutra 1924).

Articles on the progress of drillings in the region of Maraú and in other regions of the coast of Bahia were also presented. Since the

nineteenth century, the Maraú region had been exploited for coal, peat, and bituminous shale for domestic use. The progress of the candle and soap factories from the oil exploration in Maraú also presented the “Marahú Petroleum Works” by Brazil, in the Louisiana Purchase Exposition in 1904 (Aguiar 1904, p. 26). The Maraú region had been studied by Derby and other geologists, and the works of Gonzaga de Campos had already demonstrated, based on fossiliferous studies, that the geological history of the Maraú basin formations was associated with that of the Sergipe basin. The main interest in the region was the deposits of the *Barreiras* Formation, where besides deposits of monazitic sands, there were tertiary deposits of bituminous rocks that Derby had named marahunite, identified as a kind of boghead coal, formed by the accumulation of algae. The occurrence of these materials, the sedimentary rocks characteristics, and the geological structure of these basins allowed to suppose the existence of deep oil deposits (Oliveira 1924c). Given the prospects of finding oil especially at depths of calcareous rocks in the region, new drillings continued to be carried out by the Geological Survey. It would be on the coast of Bahia that the first commercial oil exploration deposits were found in 1939 in the region of Lobato.

Other papers discussed the possibility of oil and the recommendation to carry out further drillings in the *Baixada Fluminense* in Macaé, Rio de Janeiro coast, and in the region of Campos, Rio de Janeiro. These areas are currently one of the main offshore oil-producing areas in the country.

Mathias Roxo studied the fossiliferous deposits in this region of flat ocean beaches, from Macaé to Cabo de São Tomé, where the sea was relatively shallow. In the surveys conducted, he found marine mollusks of the genus “*Ostrea*,” thirty meters deep in the city of Campos, indicating that, undoubtedly, in the past, this location had been occupied by the sea. His work was based on the surveys performed, on fossiliferous evidence, and on information from the Navy about the existence of submerged stretches of the coastal gneisses mountains (*Serra do Mar*). In

the author’s opinion these submerged areas could, I quote “make up a deep-seated syncline where vast quantities of organic debris from marine animals could have been deposited, representing favorable oil formation environments” (Roxo 1924a, p. 58). Years later, his work was retaken to again be recommended, now as geophysical studies in the region (Lamego 1944).

Horace Elbert Williams, a North American geologist at the Geological Survey, also presented his work on the plains of Campos and on oil. In September 1921, Horace Williams published an article in the Brazilian Business newspaper about the possibility of oil in the Campos region of Rio de Janeiro. The title he gave to his article “The Paraíba Embayment as Possible Oil Field” was published with the flashy title of “Campos Brasil’s Tampico,” as a reference to the famous oil region of Mexico. This article was considered the first more informed suggestion about the possibility of oil occurrence in the region. In his article, Williams associated the geology of the Campos region with those of the important oil region of Tampico, Mexico. He assumed the continuity of Cretaceous and Tertiary formations submerged in the continental shelf along the coast. It was one of the first works of this period to present a general synthesis about the geology of the coastal strip from Rio de Janeiro to the state of Pernambuco, associating the sedimentary stratigraphy of northern Rio de Janeiro with the Tertiary and Cretaceous formations of Bahia. He also proposed that a dozen drillings should be carried out to verify the existence of oil or gas in those regions (Williams 1921).

In addition to these studies, Alberto Ribeiro Lamego stated again in the 1940s that although the general tectonics of the coast had not yet been outlined, the retreat of the continental margin had left unattainable deposits of oil along the platform, which the geologist could not predict—at least at that moment with the scarce data available (Lamego 1944). At that time, the surveys in the Campos region were land-based, but the geological knowledge of the region that would continue to expand in the following years already showed the possibility of offshore oil, which

would later become one of the largest offshore oil-producing regions in Brazil.

The first resolutions of the Congress were related to petroleum research and to the support for the studies of the Geological Survey and continuity of coal drilling and the need for further oil drilling in the Tertiary of the Amazon. And the other resolutions of the scientific session referred to intensifying the research in each of the areas of the country with already identified oil potential, Sergipe, Bahia, Campos (northeast), São Paulo, and Paraná (south of the country). The emphasis focused on “the research and support for the continuity of the investigations in the vast extensions in which the bituminous shale of the Iraty Formation in Paraná occurs that could be a very important oil production source” (Almeida et al. 1922, p. 12). The resolutions also recommended that financial resources be made available for fieldwork and geological studies in the lesser-known regions of the country.

The works presented by the geologists of the first generation of Brazilian professionals discussed the status of knowledge on the geological studies of the territory. They argued, based on their own experiences in the field, against or in favor the existing works, mostly the result of the contributions of the American geologists who worked here.

And as we have already stated, the articles presented consolidated the strategic planning of the Geological Survey and the Congress was in a favorable context, in which sectors of government and industry were then seeking to formulate a strategic development program for diversified, competitive, and self-sustaining energy sources. Some bibliography also states that the strategic planning for oil in the country begins at the end of the 1930s, with the creation of the Conselho Nacional de Petróleo (National Petroleum Council) and the commercial production of petroleum in the country. However, the works of the Geological Survey presented at this Congress clearly show that the challenge in those years was to set goals, to plan, and to develop medium- and long-term programs involving public and private sectors, to invest in the research of energy

resources and development and not only in the 1930s. That is why at this Congress, the emphasis was not only on coal, but particularly on oil and also alcohol.

The presented papers and the conclusions of the Congress insisted on the need to carry out intense deep drillings in order to prove the evidence of superficial oil and to discuss the best methods to make them viable. But to conduct drilling, the equipment and technicians capable of operating the imported machines would remain the greatest difficulties of the Geological Survey in the years to come (Peyerl 2017).

The Geological Survey continued to obtain government support, including in 1925 when Euzébio Paulo de Oliveira became the effective director, when new researchers were hired and geological studies were intensified in the country. In 1926, in a speech commemorating the 50th anniversary of the Ouro Preto School and Mines, where the majority of the Geological Service technicians had graduated from, director Euzébio Paula de Oliveira was optimistic about the surveys conducted in the city of São Pedro de Piracicaba in the state of São Paulo, where small quantities of oil had been extracted from a well. He stated that five years ago, very few people could have imagined the possibility of oil and gas occurrences in Brazil. With the positive results being found by the persistent work of the Geological Survey, he warned that it was now up to the government to guarantee ownership of these resources to the country so that they would not fall into the hands of fortune-hunters (Oliveira 1926).

Oil research continued, but in a limited manner, given the precariousness of the equipment and the technicians trained to operate them. The surveys continued to be carried out across the country. Most were carried out in the south, mostly in São Paulo, with no confirmation of oil (Figueirôa 1997). This would generate many problems for the Geological Survey. But, such surveys were justified if we consider the extension of the Paraná Basin; that Santa Catarina was the main coal-producing region; that gas had been found in Paraná; and that the State of São Paulo was the main industrial center of the

country and one of the most well-known areas from the geological point of view, given the work of the Geographical and Geological Commission since 1886.

3.5 Final Considerations

The 1930s would usher in another period for the history of oil in Brazil (Dias and Quaglino 1993). Controversies over the rights of nationals or foreigners over oil exploration to be discovered remained and intensified not only in the 1930s but also in current days. Calling attention to this Congress, this paper wanted to highlight the fact that research on Brazilian petroleum was already part of the strategic planning of the Geological and Mineralogical Survey of Brazilian technicians and of the industrial and government sectors that were not always on top of the decisions made in that period. The Geological Survey technicians were aware of the need for long-term planning for geological research even if many were frustrated by the decisions. However, the studies developed were fundamental to establish, despite all the precariousness, the basic planning of the geological petroleum research in the Brazilian territory.

In another context, after leaving the Geological Survey, which in 1933 was expanded to become (first as General Directorate) the *Departamento Nacional da Produção Mineral* (National Department of Mineral Production), Euzébio de Oliveira accepted the responsibility for the years in which the oil drilling services were under his direction. He stated in the preface of his book *História da Pesquisa de Petróleo no Brasil* (History of Oil Research in Brazil) that “the results obtained in the discovery of oil in commercial quantities and new coal fields had been very disappointing” (Oliveira 1940, p. 4). But it is his own work that demonstrates how fundamental the perseverance on the geological research of the Brazilian territory really was, which despite all the precariousness of the time, already indicated the regions that would be confirmed as the most promising for the exploration of oil in the country.

In 1939, the discovery of oil in Lobato, in Bahia, 50 km from a drilling conducted in 1926, completely changed the panorama of petroleum research in the country. And it would be the Experimental Station, in 1939, that would carry out the chemical analyses that proved the quality of the first oil samples obtained.

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