Telegraphs and an inventory of the territory of Brazil: the scientific work of the Rondon Commission (1907-1915)

Dominichi Miranda de Sá
Researcher and Professor of the Post-Graduate Program in History of the Sciences and Health / Casa de Oswaldo Cruz / Fundação Oswaldo Cruz, Rio de Janeiro, Brazil
dominichi@coc.fiocruz.b

Magali Romero Sá
Researcher and Professor of the Post-Graduate Program in History of the Sciences and Health / Casa de Oswaldo Cruz / Fundação Oswaldo Cruz, Rio de Janeiro, Brazil.
magali@coc.fiocruz.br

Nísia Trindade Lima
Researcher and Professor of the Post-Graduate Program in History of the Sciences and Health / Casa de Oswaldo Cruz / Fundação Oswaldo Cruz.
Av. Brasil 4366/6º
21040-361 – Rio de Janeiro, Brazil
lima@coc.fiocruz.br

Submitted for publication in August 2008.
Approved for publication in September 2008.

SÁ, Dominichi Miranda de; SÁ, Magali Romero; LIMA, Nísia Trindade. Telegraphs and an inventory of the territory of Brazil: the scientific work of the Rondon Commission (1907-1915). *História, Ciências, Saúde – Manguinhos*, Rio de Janeiro, v.15, n.3, p.779-811, jul.-set. 2008. Available at: http://www.scielo.br.

Abstract

In its work to build communication infrastructure, the Rondon Commission (1900-30) became well known for its contacts with indigenous societies. Little, however, has been written about the scientific research conducted by its members, that was inseparable from the recently inaugurated republican regime's goals of modernization, settlement, and integration of the interior with the rest of Brazil. The article analyzes the impact of the Commission's scientific work in areas like botany, geology, and zoology, as well as its impact on the new field of work thus opened to Brazilian researchers and naturalists, who took part in these exploratory journeys in ever greater numbers.

Keywords: telegraph, integration of interior territory and republic, Rondon Commission, scientific journeys, naturalist fieldwork.

The Telegraph and Territory in Brazil

> The enormity of Amazonia escapes us entirely; it can only be measured when divided up; its vastness, which must be diminished to be evaluated; the grandeur that can only reveal itself in tiny bits under microscopes and an infinity that plays out, little by little, slowly, indefinitely, tortuously. The Land is still mysterious. Its space is like Milton's space: it hides from itself. Its vastness nullifies itself, extinguishing itself, falling apart everywhere, dependent on the geometric inevitability of the curvature of the earth, or eluding the curious vistas with the treacherous report of its immutable aspects. Human intelligence would not spontaneously support the weight of that portentous reality. It will have to grow with it, adapting to it, to dominate it.
>
> (Cunha, 2000, p.17)

The writer Euclides da Cunha, appointed by the Brazilian government in 1904 to head the Alto Purus Reconnaisance Commission, which would set the boundaries of Brazil with Peru, made a series of sparse annotations that, unfinished, would give rise to his posthumous books *À margem da história* [On the Margin of History] (1909) and *Um paraíso perdido*: estudos amazônicos [A Lost Paradise: Amazon studies] (2000). In them, as both a reader of the journeys of foreign travelers and naturalists through those areas in the 18th and 19th centuries, and an exploring traveler *in loco* and author of seminal interpretations that would mark the Brazilian intellectual output concerning the Amazon, he refers to images of portions of northern Brazil: "depressing immensity", "desolation" in the form of "opulent disorder" and an endless jungle, torrential rivers, diseases and animals; "an inferno" in which man would work to enslave himself in the "the eternal pacing of a prisoner in a prison without walls'; and 'a world on the margin of history', in which the roads would be like "the tentacles of an immeasurable octopus", man an "impertinent intruder" and civilization "impossible" (Hardman, 2001, 2007).

Found chiefly in the records of the travelers that commanded or participated in the territorial exploration commissions organized by the Brazilian government during the republican regime – as, for example, the reports of the medical and scientific expeditions of the Instituto Oswaldo Cruz carried out in the first two decades of the 20th century (Lima, 1999; Schweickardt, Lima, Dec. 2007) – those images[1] demonstrate the juxtaposition of the attempts to carry out a systematic project and the Brazilian government's efforts to incorporate, occupy, modernize and populate Brazil's interior, with the widespread sensation that civilization there would not be an easy task.

Strictly speaking, incursions into the interior were initially sponsored by the Imperial Government, more specifically during the Second Reign, a period in which 'unity', a key word of the Brazilian Empire, imposed its efficacious administration and security, especially after the Paraguayan War (1864-1870). The conflict brought to the forefront the Court's enormous difficulties in communicating at any given time with either the south-central or northern part of the country (Maciel, 1998; Diacon, 2006). These incursions initially involved Brazilian army groups in charge of railroad and telegraph construction work,

the creation of a transportation and communications infrastructure between the provinces seeming at the time to be the most appropriate guarantee for linking disperse populations and physically integrating the country. As a result, in 1854, the D. Pedro II Railroad Company was created, whose central design, although unsuccessful, was linking the Empire's north and south, i.e. the Amazon and River Plate basins through a network that would connect railroads and waterways. (Domingues, 1995, p.162). To this end, the Empire constructed 10,969 km of telegraph lines between 1866 and 1886 and, in 1873, Rio de Janeiro was connected by telegraph with the provinces of Minas Gerais, Pernambuco, Bahia and Pará (Maciel, 1998, p.50).

To support these incursions to increase the connections and roads, both material and symbolic, between the provinces, the imperial government, through the Ministry of Agriculture, Commerce and Public Works (Macop), began to provide assistance and financial incentives to constitute scientific commissions led by naturalists initially affiliated with both the Instituto Histórico e Geográfico Brasileiro (IHGB) and the Museu Nacional (MN).[2] These commissions – such as, for example, the Scientific Exploration Commission (1856), the Imperial Geological Commission (1875), the Imperial Hydrographical Commission (1879) and the São Paulo Geographical and Geological Commission (1886) (Figueirôa, 1997; Domingues, 1995) – were created chiefly to suggest "material improvements" in the agricultural exploration of the provinces. They took it upon themselves to prepare maps of the natural conditions of the different localities that were traversed – from the inventory of plants, animals and soil studies to the navigability of the rivers and the frequency of the rainy seasons – in order to indicate the best areas for planting and even the products to be cultivated, as well as the routes most appropriate among those existing or still to be created for transporting them (Domingues, 1995, p.168, 172-174). Science, in this period, was at the forefront of projects to increase agriculture, emphasizing the studies of botany; a movement that made it an inseparable participant in the construction of land routes and the evaluation of waterways to facilitate commerce and the circulation of agricultural products. In this case, it was also concerned with the creation by 'Brazilians' of knowledge about 'Brazilian' nature; until then regarded as the exclusive province of foreign naturalists (Domingues, 1995, p.160-161; Sá, 2001).

The challenge of unifying Brazilian territory having been met during the imperial regime, the federal government during the early years of the Republic adopted "national integration' as its principal motto. In the new regime's plans, Mato Grosso, Goiás and Amazonas constituted the principal states to be 'integrated', since they continued to have large portions of land overlooked by previous exploration commissions and a very limited number of isolated people who had no contact with each other or the rest of the country. These regions had not been contemplated by the imperial telegraph circuit and, at the time, there were no roads or land links between these far flung outposts of Brazil and its coastal zones; reaching them required a long journey by water down southern Brazil, entering the River Plate and traveling northwest through Argentina, Uruguay and Paraguay to reach Mato Grosso (Maciel, 1998, p.52; Diacon, 2006, p.14, 31).

In building the republican regime, the telegraph came to be seen as the primary symbol of the "urgency in communications and exchanges" – together with the debates on

administrative centralization/decentralization, inherent to the federative regime then in effect (Maciel, 1998, p.54, 2001). It chiefly concerned modernization and improvement in communications, a task given to the Ministry of Industrial Affairs, Transportation and Public Works.[3] Its plan to penetrate the country, moving toward the northwest of Brazil, was officialized by Decree 22 of October 24, 1891. In this new configuration, the Ministry of War was included to participate in the work and a General Engineering Administration was created to aid in taking possession of the regions, administering the inhabitants, occupying and peopling the empty spaces and, above all, assisting in the recognition, demarcation, definitive establishment and defense of Brazil's borders, a military program of great importance to the War ministry. Supported by these two Ministries, the Republic's main mission was the interiorization of state authority (Diacon, 2006; Maciel, 1998; Lima, 1999). At that time, Brazil began to be seen as a space to be conquered and occupied (Moraes, 2002, p.94).

The republican scenario was truly complex. To the isolated regions of Goiás, Mato Grosso and Amazonas were soon added as Brazilian territory Acre, Purus and Juruá, regions incorporated at the beginning of the 20th century as a result of diplomatic agreements – an addition that at the time created the idea that Brazil's map was being redrawn (Menezes, August 1, 2006). And more: juxtaposed representations of these areas – such as those of forests, rivers, intermittent rain, a hot climate and omnipresent malaria; large extensions of opulent, fertile and abundant land to be cultivated, fabulous regions abundant in riches, perfect soil for agriculture, an ideal alternative to the exclusive extraction of rubber, and whose increased planting depended only on clearing the forest, occupation and peopling by 'productive farmers' and the creation of transportation means to move the production (Lacerda, 2006; Gutiérrez et al., 2003) – were frequent in the discussions at the Engineering Club at the turn of the 20th century, especially in the voice and pen of telegraph engineer, Francisco Bhering, one of the greatest advocates of extending the overland telegraph line to the north of Brazil. In his words, either the telegraph, "the precursor of progress" would reach the Amazon, extending the map of Brazil, or this northern stretch and its populations would end up separating and distancing themselves from the country (Maciel, 1998, p.99). The extension of the telegraph for communication and administration of those regions seemed to him a *sine qua non* condition for resuming the construction of the Madeira-Mamoré Railroad, which was once again discussed and defended at that time and whose construction would, in fact, take place between 1907 and 1912 (Hardman, 2005). It was not just a matter of establishing communications with the north of Brazil, but involved a much more extensive and comprehensive task: enclosing the country's main strategic points to enable integration and surveillance (Lima, Sá, August 2006, 2008).

Thus, in 1891, the Telegraph Line Construction Commission was created to link Goiás to Mato Grosso, under the leadership of Major Antonio Ernesto Gomes Carneiro. Its work continued until 1898. The commission in charge of constructing a telegraph line in Mato Grosso between Cuiabá and Corumbá was in operation between 1900 and 1906. Subordinated to both the War ministry (which furnished army engineering and construction sector officers educated in topography and telegraphy, as well as dozens of enlisted men for the heavy work of constructing telegraph poles and clearing the forest) and the Transportation ministry (which sent its civilians from the General Telegraph

Department, including inspectors, telegraph operators and linemen), the Goiás and Mato Grosso Commissions both had communications with the isolated regions on the borders with Paraguay and Bolivia as their main objective. More specifically, they were supposed to connect existing telegraph lines in Rio de Janeiro, São Paulo and Minas Gerais with those that would be constructed between Cuiabá and the Araguaia (Bigio, 1996; Maciel, 1998; Diacon, 2006). Civilization seemed to them to be a horizon.

Especially successful, highlighted by the activity of military officer Cândido Mariano Rondon[4] in executing the work, the Mato Grosso Commission gave rise to a new Commission in 1907, 'strategic' even in name, whose objectives and destiny were very grandiose, in keeping with the concept of the age itself: reaching the Amazon region by constructing telegraph lines through the middle of the forest, as well as inspecting Brazil's borders with Peru and Bolivia and – an official instruction – conducting a scientific inventory of the territory traversed.[5]

The constitution of the Strategic Telegraph Commission of Mato Grosso to Amazonas (CLTEMTA, 1907-1915) has been the subject of several Brazilian history works (Bigio, 1996, 2000; Maciel, 1998; Diacon, 2006) that are concerned with examining the importance of its activity in the early years of the Republic in the construction and conservation of telegraph networks for the communication, integration, surveillance and defense of Brazil's borders to the north. Their attitude characterizing it as a 'civilizing mission' undertaken by the Brazil state to incorporate the isolated interior of the country also must be highlighted (Lima, July 1998). Nevertheless, from the perspective of science historians, other activities of CLTEMTA – which, in fact, came to differentiate it from those that preceded it in the extension of the telegraph network to Goiás and Mato Grosso – also deserve attention. A ministerial directive mentioned in the official letter that created it[6], the scientific inventory of natural riches of the northern portion of the country was an absolute priority in the different travels of the members of the Strategic Telegraph Commission of Mato Grosso to Amazonas. To carry it out, a series of naturalists, chiefly from the Museu Nacional (hereafter also 'Museu') of Rio de Janeiro, joined them. Our hypothesis is that this specificity of CLTEMTA is explained by the concomitant subordination of its services to the Ministry of Transportation and Public Works, the Ministry of War and, a central change, the Ministry of Agriculture, Industry and Commerce (Maic). The alliance between science, increased agriculture and the surveying of roads for the circulation of agricultural production, which had marked the activities of Macop during the Empire (Domingues, 1995), was, from our point of view, updated, even though in a new context, by this republican effort to interiorize government authority in the direction of Mato Grosso and the Amazon. The tradition of the Agricultural ministry itself was decisive, in this case, for the centricity that the scientific activities would gain in CLTEMTA's different exploration trips.

Under the Strategic Telegraph Commission of Mato Grosso to Amazonas Commission, science, roads and communications penetrated the extreme north of the country together, and, in this conjunction, the view was persistent that the Amazon, in particular, would contain everything at once, the '*sertão*' (Brazilian term for 'backlands' or 'hinterlands') abandoned by public authorities and a 'landscape' destined to disappear; 'empty territory' to occupy, people and modernize; the 'border' to delimit and precisely define at the country's

extremes; the 'forest' and its animals, diseases and waterfall-riddled rivers; and, the principal focus of our interest in this article, the unprecedented 'field' for studies, research and scientific surveys. Civilization, in the records of the commission that would come to be known in the years ahead as the Rondon Commission[7], was the potential outcome.

In this article, we intend to examine the importance of the scientific activities within the scope of the Rondon Commission and their contribution to the institutionalization of different areas of knowledge. We also seek to demonstrate that the scientific activities had a strong affinity with the republican goals of exploring and peopling the land, both of which found a key player in the Ministry of Agriculture.[8]

The Scientific Activities of the Strategic Telegraph Commission of Mato Grosso to Amazonas

The expression Rondon Commission, a widely accepted term, customarily encompasses all of the travels and activities carried out by Brazilian soldiers of the army engineering and construction sector between 1900 and 1930, in other words, during: (1) execution of the work of the Mato Grosso Telegraph Commission (1900-1906) and CLTEMTA (1907-1915); (2) administration of the stations, conservation of the lines and the preparation of reports, with the results and records of the trips to Mato Grosso and the Amazon being systematized by the Commission's Central Office, headquartered in Rio de Janeiro; (3) consolidation of the Indian Protection and National Worker Location Service (SPILTN) within Maic; and, finally, (4) the conducting of the Border Inspection services, to which Cândido Mariano Rondon, the military commander of CLTEMTA, dedicated himself from 1927 to 1930. However, as we pointed out, we are interested only in the period when CLTEMTA existed, i.e., from 1907 to 1915, a period in which the Commission members undertook the scientific exploration of the territory, emphasizing knowledge of Brazil's geography.

Better known for its indigenous policy, made known in the publication of its first results in the 1910s and 1920's, and in the more recent studies of the subject (Biggio, 2000, 1996; Lima, 1995), and for originating the Indian Protection Service (or, as it was said at the time, for having made contact with Indians that were, until then, considered 'ferocious and anthropophagous' and systematically held responsible for the disappearance of previous explorers in the hinterlands of Mato Grosso), the Rondon Commission, from its beginnings, became celebrated in Brazil because it had achieved 'the peaceful incorporation into civilization' of diverse indigenous societies, protecting them at the same time from the extermination to which they were subject, due to violent contacts with the rubber workers of the Amazon region (Rondon Mission..., 2003). Nevertheless, it should be pointed out that many series of scientific works[9] were also undertaken during its different exploration trips and were, as we shall see, of great importance in such diverse areas as cartography, botany, geology, zoology, anthropology and the ethnography of the indigenous people of the hinterland. In the words of anthropologist Edgard Roquette-Pinto (1938), in the preface to the fourth edition of his book *Rondonia,* his field diary as a member of the Rondon Commission in 1912, "the construction of the telegraph line was the pretext. The activity of scientific exploration was everything".

The objective of this Commission was linking Rio de Janeiro to the territories of Amazonas, Acre (the region ceded to Brazil by Bolivia in the 1903 treaty), Alto Purus and Alto Juruá, on the border with Peru, going through the capital of Mato Grosso. The extreme points of the trunk line would be Cuiabá, Santo Antônio do Madeira, the initial construction point of the Madeira–Mamoré Railroad, and Manaus, in the Amazon region, which delimited what was then held to be the 'great hinterland of the Northwest (Bigio, 2000, Maciel, 1998). It was comprised basically of military men, including officers, inspectors and their adjutants, two doctors, two pharmacists and a photographer, as well as dozens of enlisted men to do the heavy work. To them were added civilian linemen and telegraph operators from the Ministry of Transportation, totaling some 150 people, who received different salaries. The Commission's budget, approved by the Transportation ministry, provided for the hiring of 'regional practitioners', i.e. civil inhabitants of the regions traveled through, including Indians, to function as guides, canoe rowers and helpers in clearing the forest and installing telegraph poles. (Maciel, 1998; Diacon, 2006).

As soon as they arrived at the locations selected for telegraph integration on their different trips, the Commission members followed rigid work stages: preliminary reconnaissance of the terrain, through measurements, demarcations and determination of azimuths for drawing up maps; organization of the encampments and plants, choosing the points through which the telegraph line would pass; opening of the trail by cutting down the forest; leveling the trails when irregular terrain was encountered; definition of the telegraph pole locations and projection of the direction the lines would take; extraction of wood to make the poles and digging the holes where the poles and their lightning rods and insulators would be placed. They then dealt with stringing the conductor wires, which, in turn, were connected to the Morse telegraph machine. With the installation concluded, they proceeded to the topographical surveys and geographic coordinates of the points where the telegraph lines had been installed. They also constructed small houses for installation of the stations. After the installation work was finished, they continued on with their camps and equipment to the next locations that would continue the trunk line that was intended to slice through the Amazon forest. (Maciel, 1998; Diacon, 2006).

The telegraph pole and line construction work connected Cuiabá to Santo Antônio do Madeira, the present city of Porto Velho, but did not reach Manaus. It lasted from 1907 to 1915 (when the Amazon region was reached) and, in the travels of this Commission, the cartographical and geographical surveying activities of the Brazilian territory intensified. The officers of the army's engineering and construction battalion were systematically joined by a series of naturalists learned in botany, cartography, geology, zoology and anthropology, chiefly from the Museu Nacional of Rio de Janeiro, for mapping and integration of the country's hinterland (Lima, Sá, August 2006). In a conference held in 1915, Rondon, a lieutenant colonel since 1908, assured that "scientific exploration of the territory and its incorporation into the civilized world (were).. converging elements of a sole objective". In his words,

> the work of reconnaissance and geographical determinations and the study of mineral riches, the constitution of the soil, the climate, the forests, the rivers, walked hand in hand *pari passu* with the work of constructing the telegraph line, laying out the penetrating roads, launching

> future population centers and installation of the first cultivations and cattle raising nucleuses (Rondon, 1916a).

Prominent among the works and conquests of the Commission are the discovery of rivers, the way through the North Range (the region we today know as the State of Rondônia), the correction of cartographical errors and the contact with and study of indigenous societies, highlighted by the Parecis and the Nambiquaras. One of the aspects most emphasized in the discourse of the Commission members, contained in their written reports, consisted of the knowledge of the Brazilian territory and its geographical irregularities provided by the trips they made. In a report entitled *Estudos e reconhecimentos* [*Studies and Reconnaissances*], Rondon highlighted:

> Whoever considers, on a geographical map, the enormous area of South America that constitutes Brazil, will be immediately irritated by the evident slowness of its population process and material development, often evidenced by the clear spots marked "unknown region". ...It is exactly in this territory ... that one sees the solitude extend its absolute reign over large regions, still as virgin as they were at the time of discovery...[10]

In this regard, one can also cite the case of the discovery of the Juruena River, also mentioned by Rondon himself: Rondon: "On the 24th [of August 1907] I left Brotas in order to discover the Juruena. I say discover because vague and old indications were all that existed about it: those found in the *´Cidade de Mato Grosso´* [City of Mato Grosso] by Taunay and some cartographical documents from colonial times of very little value " (Rondon, 1916a).

Another discovery that became famous was that of the Dúvida River, a tributary of the Madeira River put on the map of Brazil after the Roosevelt-Rondon Expedition, carried out between December 1913 and March 1914. The former American president recorded his participation in the scientific trip to the Amazon region, organized by the Commission and New York's American Museum of Natural History, in his book *In the Jungles of Brazil* (1943) (Lima, Sá, August 2006).

As can be seen, the activities of scientific exploration and the objectives, which they judged to be civilizing, of incorporating and peopling the territory were inseparable. In the words of Rondon himself, "clearing these hinterlands, making them productive, submitting them to our activities, bringing them closer to us, connecting the extremes cut off by them, taking advantage of their ferocity and their riches" was the same as "extending to the most recondite ends of this enormous land, the civilizing action of man".[11] It was intended that, along the pathways opened for the telegraph lines, villages and settlements would emerge for the due and effective occupation of that northern portion of Brazil's territory.[12]

When it was created, the Strategic Telegraph Commission of Mato Grosso to Amazonas reported to both the Ministry of War, to which the Brazilian army was subordinated, and the Ministry of Industry, Transportation and Public Works, whose guidelines and priorities determined the communications infrastructure works carried out in Brazil. With respect to the Ministry of War's plans for the Commission, according to the project formulated and suggested by the Engineering Club, which was based on the study of engineer Francisco

Bhering entitled "The Amazon Valley and its Telegraphic Communications"[13], Brazil's borders with Paraguay, Peru and Bolivia had to be reached by land and by means of a large telegraph network that would enable the central government to be in constant communication with those distant areas of the country. The idea was to transform the country's extreme limits into stationing posts for the military forces. The main points for military surveillance of the territory would be Porto Murtinho and Bela Vista on the border with Paraguay and Corumbá and Coimbra on the division with Bolivia (Rondon Mission..., 2003, p.34).

The Commission was equally subordinated to the Ministry of Industry, Transportation and Public Works' Department of Agricultural Affairs, Commerce and Public Works, led by engineer Miguel Calmon du Pin e Almeida from 1906 to 1909. At that time, there was no Ministry of Agriculture; Macop, created in 1860, had been extinguished with the Republic in 1891. This Department at the time represented the interests of the former ministry, which, during the Empire, vocalized the alliance between 'national progress', 'progress in the natural sciences', especially botany with its applied studies on plants and seeds, and 'progress in agriculture' (Domingues, 1995).

And, following the indications of that Department, the Commission was expected to carry out studies of the populations and natural riches of the regions of Mato Grosso and the Amazon to evaluate the soil potential of those regions for the cultivation of crops and diversification and modernization of the planting areas. Reading Calmon's instructions published in the March 1907 Official Gazette, we see that he had designated Rondon and his Commission to primarily "study the natural resources of the region traversed through" through geological, geographical, botanical and mineralogical explorations.[14] The reports of the trips, very documented and especially detailed, with an emphasis on mapping the extractive products of the region, were also an expression of these decisions of Minister Calmon in 1907 (Lima, Sá, August 2006, 2008).

The Commission's activities of a scientific nature only grew when it became equally subordinated to the Maic, (re)created in 1906, but effectively implemented in 1909 based on the former Department of Agricultural Affairs, Commerce and Public Works of the Ministry of Industry, Transportation and Public Works (Mendonça, 1997; Ribeiro, 2005; Bhering, 2008). In fact, the Commission continued to report to the Ministries of War and Transportation, but it had now also became subordinated to the Ministry of Agriculture, with the creation of the Indian Protection and National Worker Location Service (SPILTN) in 1910, also under the command of Cândido Mariano Rondon. This triple interposition in its work was justified, because, as a matter of State policy, the identification of "good cultivation land, suitable for farming, endowed with perfect conditions of salubrity, with springs or streams of potable water, served by easy means of communication and close to consumer markets"[15] was urgent for increasing the colonization and populace in areas of low demographic density. With juxtaposed members, from its director, Rondon, to the section heads, technical assistants and officers, whose salaries were calculated based on additional bonuses for working for two Maic bodies[16], CLTEMTA and SPILTN, performed complementary services in the same regions of Mato Grosso, Acre and the Amazon: in the work of topographical survey, reconnaissance, measuring, land demarcation and "road

construction". they were expected to distinguish the areas occupied by Indians (in which the cattle industry would slowly be introduced) from those in which 'Agricultural Centers' and their crops would be installed. From Maic's point of view, the subsistence and settling of the populations in those regions would only effectively take place through the expansion of agriculture.[17]

The triple ministerial interposition conferred on the Commission an even more 'utilitarian' view of knowledge. Thereafter, beginning in 1910, the participation of naturalists from the Museu Nacional, an institution that had also come under the jurisdiction of the Ministry of Agriculture at that time, became more systematic in its various trips. These naturalists would be in charge, "to the benefit of the national worker", of conducting 'various studies in different states, all tending toward the foundation of agricultural centers...The interior has to be cleared and peopled".[18] The scientific survey of the territory through the study of climates, rivers, plants, animals and the capacity of the land for agriculture, mining or livestock by CLTEMTA was inseparable from the diversification of production, modernization of agriculture, construction and identification of roadways to transport production and settling of labor in the interior, for which SPILTN and, in short, all of the different MAIC bodies were responsible, according to Decree 7,727 of December 9, which regulated reorganization of the ministry (Ribeiro, 2005, p.73-74). It reflected an emphasis on applied science, or, in other words, the need to put nature (understood as a natural resource) at the service of man was absolutely imperative.[19] (Domingues, 1995; Ribeiro, 2005; Lima, Sá, August 2006, 2008)

In this sense, the reports of the Strategic Telegraph Commission of Mato Grosso to Amazonas nicely illustrate the combination of the more immediate and 'pragmatic' objectives – of effecting integration of the hinterlands and exploration of the natural resources of the north of Brazil – and the concerns and work style typical of the naturalists: voluminous descriptions of flora and fauna specimens, detailed geographical and geological descriptions accompanied by exquisite printed pictures and a glossary of terms found in the languages of 20 indigenous nations.

To these contributions were added the photographs and films generated by the Commission, especially after 1912 with the creation of its Cinematography and Photography Section, led by Major Luiz Thomaz Reis, which prepared, among others, the film *Ao Redor do Brasil* [Around Brazil]), an important record of the trips to the northwest of Brazil (Lima, Sá, August 2006, 2008).

The reports of the naturalists that participated on the Commission, who were especially conscientious, also present various insights that enable one to follow the difficult conditions in which they carried out these scientific exploration trips in Brazilian territory. They detailed the stages of the trips and the division of labor between the military, civilians and regional populace; the organization of cargo, animals, provisions and camps; the diversity of the troops' activities, divided into the different sections that separately took charge of reconnoitering the land, opening the trails, installing the poles and scientifically surveying the vicinity surrounding the telegraph network that cut through the jungle. Among the most frequent themes: mosquitoes and fevers in profusion; medicine that did not have the desired result; encounters with Indians, 'friendly' or 'bellicose'; members of the

Commission pierced with arrows, lost in the jungle, wounded by bullets fired by their own troops; sedition and indignation with compulsory enlistment for the ranks of the Commission,[20]; discipline imposed by corporal punishment and the rigid military discipline to which they were subjected, even the civilian members; a scarcity of food; doctors who got sick, the disappearance of countless members, the inability to find groups lost in the jungle. And besides opening the way through the Amazon forest and facing high indices of malaria in the region, during periods of intense heat and inclement storms, the members of the Rondon Commission also had to deal with innumerable problems in transporting food and scientific research instruments; baggage carried by burros and oxen, which generally could not bear the length and duration of the expeditions and the frequent capsizing of the canoes that transported them through the waterfall-riddled rivers that cut through the Amazon, often leading to the death of their companions and loss of the scientific material that had been collected. Due to the rigors of their travels, requests to leave the Commission were very frequent, by the naturalists, as well as the military themselves.[21] (Lima, Sá, August 2006, 2008)

Naturalists on the Rondon Commission: From the Museu Nacional to the Northwest of Brazil

The inclusion of naturalists on the Strategic Telegraph Commission of Mato Grosso to Amazonas not only met ministerial directives: it addressed the frequent demands submitted to his superiors by the then director of the Museu Nacional, João Batista de Lacerda.[22] Lacerda spared no effort to call the public authorities' attention to the difficult situation that the institution faced and, in 1905, pointed out as "an essential condition for the Museu's progress and scientific development" the re-establishment of the former position of traveling naturalist – created in the Empire under Ladislau Netto's direction (1876-1893), but eliminated with the Republic.[23] For Lacerda, field activities, which included the study and collection of scientific material, constituted one of the priority activities of a natural history institution. The director of the Museu complained of the failure to acquire new collections, even through donations, "which were becoming increasingly rare". In addition, due to budgetary limitations, many private collections could not be purchased and were sold to institutions overseas. Lacerda inserted his arguments for enlarging the museum in the project for constructing the nation, indicating that, "if we wish to make Brazil's hegemony undisputed in South America, we must also approach this policy from the point of view of the superiority of our intellectual resources and our institutes of teaching and science" (Lacerda, cited in Bicalho, 1946, p.34).

When the Museu Nacional was invited to participate on the Rondon Commission to inventory and study the fauna and flora of the region visited by the commission, as well as being the trustee for all of the natural history, archeology and ethnography material collected, Lacerda finally saw some of his demands met. In the report he presented to the Minister of Agriculture, Industry and Commerce in 1914[24], he emphasized that the institution had been revitalized by the substantial enrichment of its patrimony, thanks to collections obtained in regions that had not been visited by Brazilian researchers previously

or had never been explored at all. In the words of Alípio de Miranda Ribeiro, zoologist and one of the members of the commission, "the collections brought together during the Rondon Commission did more for the Museu Nacional in eight months than all that had been done in the institution's 100 years of existence" (Ribeiro, 1945). Such a view was corroborated by botanist Alberto José de Sampaio, who, in an evaluation made of the botanical collection put together by the Commission, commented, "It must be highlighted that, thanks to the entrance of the Rondon herbarium, the largest yet collected in the region worked by the Commission, the Museu Nacional's herbarium is the richest in the world in Mato Grosso flora..." (Sampaio, August 1917).

At the time, zoologist Alípio de Miranda Ribeiro (1874-1939) and the chief gardener of the Horto Botânico [Botanical Nursery], Frederico Carlos Hoehne, were chosen to participate on the commission. Engineer Cicero de Campos was seconded from the Geological and Mineralogical Service of Brazil.[25] Of the small team of naturalists from the Museu Nacional[26], Miranda Ribeiro, a *mineiro* (as those from the state of Minas Gerais are known colloquially) from Rio Preto, had the most appropriate profile to participate on the commission. A frequenter of the Museu Nacional since the time of Ladislau Netto, Miranda Ribeiro officially initiated his work at the institution in 1894 as an interim osteology preparer when Domingos Freire was in charge. Three years later, in 1897, he passed an exam to become an assistant naturalist[27]. Self-taught, he combined all the skills of a taxidermist, sketcher (including water color technique) and a keen observer, essential qualities for the collection and preparation of natural history objects. From 1899 until the year he was called to participate on the commission, he had published 21 works on the most varied zoological groups and, since 1907, had been developing one of his most relevant projects on the Brazilian fish fauna: *Fauna Braziliense – Peixes* [Brazilian Fauna – Fish], with tomes 1 and 2 already published.

In turn, Frederico Carlos Hoehne (1882-1959), hired by the Museu Nacional in 1907 to head its botanical nursery, received an invitation to join the Rondon Commission after working only a few months at the institution. The son of German immigrants, Hoehne was born in Juiz de Fora and raised in a rural area on the outskirts of the city. His initiation into botany came from his father, who was the owner of an orchid raising establishment. Hoehne familiarized himself with this botanical group at an early age. Self-taught like Miranda Ribeiro, Hoehne at eight years of age already had his own orchid collection, having also over the years put together a diversified collection of plants, even exchanging them with other researchers (Franco, Drummond, 2005). Only 25 years old, the young botanist was given an opportunity to participate in an outstanding venture that would propel him to the forefront of the Brazilian and international scientific community as a professional botanist. As pointed out by Franco and Drummond (2005, p.2), Hoehne's career combined intense field experience with the formation of plant collections, about which he produced numerous influential publications. He also administered research institutes in Brazil and participated in scientific community organizations.[28]

The three researchers left Rio de Janeiro for Mato Grosso on June 27, 1908, carrying in their baggage all the material needed to capture and preserve specimens, which included: lenses, a magnifying glass, a thermometer, screens, appropriate lamps, glassmaking

equipment, sketching material, tongs, probes, large copper containers for preserving fish, presses for botanical collections, a vice, glass tubes with stoppers, a pocket compass, a barometer, a sack for butterflies, fine screening, tweezers, glass tubes, fishing nets, shotguns, butterfly nets, boxes for preserving dipterous insects and others exclusively for mosquitoes, entomological pins, etc., as well as a bibliography specialized in the natural history of the region to be visited.[29]

The directive to preserve mosquitoes in separate boxes indicates the special attention this group of dipterans received at that time. Malaria was endemic in the region being traversed by the Rondon Commission and the disease that caused the most casualties among expedition members.[30] Since the discovery of the mosquito as vectors of malaria at the end of the 19th century, Brazilian researchers had dedicated themselves to the study and mapping of the possible species that transmitted the disease in Brazil. They also participated in an international network created by the British government to map the possible mosquito species vectors throughout the world.[31] Among the Brazilian participants were Adolpho Lutz, Oswaldo Cruz, Carlos Chagas, Arthur Neiva and Carlos Moreira, the last the only network researcher associated with the Museu Nacional and a zoologist on the Rondon Commission. In addition to mosquitoes, other dipterans were also pointed out as disease transmitters, thus making the collection of examples of this group very relevant for knowledge and mapping of the families and species that occurred in the region.

Miranda Ribeiro and his companions, Cícero de Campos and Frederico Hoehne, arrived at Corumbá on July 17, 1908, continuing on from there to São Luiz de Cáceres, which would be the departure point for the first research. Their instructions were to remain in Cáceres for the time needed to study the Paraguay River valley. Boats were placed at their disposal to facilitate the transportation and collection of material in the surroundings of Cáceres and the Jaurú River. Horses and burros were of little use for locomotion, being utilized only for cargo transportation. After having overcome the difficulties of assembling a support team with the local inhabitants, the researchers dedicated themselves to avidly collecting specimens of the most varied zoological and botanical groups, as well as fossils and mineralogy material.

Miranda Ribeiro then began to collect all of the zoological groups possible, from small and large size mammals (rodents, monkeys and bats), birds, reptiles and fish to different types of invertebrates, such as mollusks, crustaceans, insects (which, according to him, were being collected 'incontinently'), and vermin (whether parasitic or not). Birds, fish and amphibians were the groups that most attracted the researcher's attention. Others, such as crocodiles, were indicated for the importance of possible parasites that they might bear, as focuses of "dangerous hematozoons".[32] The carnivores and small rodents were the most difficult to observe and collect, which greatly frustrated the expedition's zoologist. This was because, of the more than 60 species of mice known in Brazil, all of the types were to be found deposited in collections outside the country.

Miranda Ribeiro was not simply a collector and preparer. His familiarity with the evolutionary theories of the age led him to postulate questions and observe the interrelationship of the animals with their environments, as well as making zoogeographical, ecological and biological observations about the specimens collected.

Even before reaching the region, one of the questions that concerned him had to do with the geographical distribution of its fish and the possible communication of the waters of the Jaurú with those of the Guaporé. He believed the river fauna of the Paraguay River communicated with those of the Amazon through the marshes at the source of the Guaporé, which he tried to prove through the fish species that he had collected.[33]

In the report that the researchers presented to Colonel Rondon in December 1908, the collection of zoological material encompassed some 730 species, represented by 1,543 samples, and the botanical some 350 species, represented by 1,023 examples. All of the material collected was sent to the Museu Nacional for further study.

At the time the naturalists arrived in Cáceres, Rondon was leading an expedition to the Juruena River, where he intended to set up permanent camp for the Commission. With him was the German geologist and ethnographer Karl Carnier. According to Rondon (Viveiros, 1969, p.263), as soon as he graduated, Carnier requested the German government to obtain from the Brazilian government permission for him to participate on the Commission. Having joined Rondon in 1908, Carnier spent the first weeks living with the expedition group in a state of utter fascination, having had the opportunity to visit a Nambiquara village with Rondon and, together with his Indian guide, 'braved thorny forests just to experience the sensation of penetrating it in the company of a savage' (Rondon, cited in Viveiros, 1969, p.146-147). Carnier, however, was unable to keep up the pace of Rondon's work for long. Exhausted and suffering from foot problems, he left the Commission in November 1908, settling in Montevideo, Uruguay. Carnier's report, written in German in December 1908, was translated into Portuguese by João Bruggemann and published by the Rondon Commission.[34]

During the next six months, Rondon reorganized and inspected the services entrusted to his assistants, while preparing at the same time a new expedition to leave Juruena en route to the Amazon on June 2, 1909. During the expedition organization period, the three naturalists continued their research and collection activities, as well as preparing themselves for the very stimulating incursion that would take them through the Amazon forest to the Madeira River, a completely inhospitable and still unexplored region. On May 21, 1909, Rondon arrived at the Juruena in the company of Lieutenant João Salustiano Lira and Doctor Joaquim Tanajura, where they encountered geologist Cícero de Campos, botanist Hoehne, pharmacist Benedito Canavarro and other participants of the expedition, They were joined three days later by zoologist Miranda Ribeiro, coming from Utiariti.

The strenuous conditions of survival in the jungle and fields of Mato Grosso produced a casualty among the small team of naturalists in their very first year of activities. Geologist Cícero de Campos, who had been collecting mineralogical and fossil material, fell sick and was unable to accompany the expedition to the Amazon. Rondon sent him back to Rio de Janeiro, but he died en route as soon as he arrived in Cáceres, succumbing to beriberi.

Botanist Frederico Hoehne did not move on with the expedition, being charged with completing the survey of flora in the stretch from Juruena to Tapirapoã, following the trajectory of the telegraph line from the first point to Parecis. From Cáceres, he was ordered to return to Rio de Janeiro. Only zoologist Alípio de Miranda Ribeiro went on with the expedition to the Madeira River.

The expedition to the Amazon was comprised of 42 men, with the principal assistants being zoologist Alípio de Miranda Ribeiro, Doctor Joaquim Tanajura and lieutenants João Salustiano Lira, in charge of astronomical observation and vanguard services, Emanuel Silvestre de Amarante, entrusted with topographical surveys, Alencarliense Fernandes da Costa, commander of the supply convoy and Antônio Pirineus de Souza, battalion commander.

Rondon divided the expedition into three fronts: one would head north toward the upper Jaci-Paraná, where the operational base would be located, charged with the task of carrying out a rigorous survey of that river along the way. Another front would proceed through the Amazon to the source of the Madeira River, and the third, led by Rondon, would come south through the Amazon forest. Among the members of the contingent that accompanied Rondon were Miranda Ribeiro, Dr. J. Tanajura, and photographer Leduc.

The undertaking to which Miranda Ribeiro committed himself was a unique opportunity to clear a region of virgin Amazon forest, the ambition of every naturalist, especially with the support of the Commission entourage, accompanying Rondon when the first contacts were made with the indigenous tribes. There was no better opportunity for a collector of natural history to live life to the fullest in the tropics. Such romanticism, however, was slowly cooling off due to the harshness imposed by a savage environment. As narrated by Rondon (cited in Viveiros, 1969, p.294), within a few months the expedition had already found itself in an extremely precarious position, provisions were short, the expedition members reluctant to eat the food that they could hunt and gather, such as fish, game, honey and palm hearts. With the arrival of the rains in October, the situation worsened. The relentless insect attacks and fevers were assailing most of the expedition members. Without the support of the supply convoy, Rondon took a drastic approach by getting rid of the cargo animals, which were hindering and slowing down their march. He took only what was absolutely necessary, even discarding the natural history collections and photographic plates, among others. As a result, some of the material obtained at such sacrifice by Miranda Ribeiro in the arduous undertaking was left behind. The difficulties the members of the expedition experienced, mainly Miranda Ribeiro, who had responsibility for collecting, performing taxidermy, sketching and preserving the material collected, is conveyed in a description of the sacrifices imposed on those engaged in collection work in a tropical forest written by the Swedish botanist Gustaf Oskar Andersson Malme (1864-1937), who collected in the Mato Grosso region between 1892-1894 and 1901-1903,:

> Dozens of species of mosquitoes, *carapanã* (a large mosquito of the family Culicidae), flies, *pólvora* (Culicoidae), *lambe-olho* (Chloropidae), *frexeiro* (sic), horse flies, *pium* (a tiny type of mosquito), black flies, bees, wasps and even butterflies and moths are worthy of recording among the winged insects, while lice, small ticks, piranhas and other blood suckers attach themselves to the skin and help add to the torments of the man who, file in hand, gun on his shoulder and provisions on his back, travels through fields or penetrates the forest when the sun darts its rays and the temperature rises to 38 degrees [Celsius] and at times exceeds 40 degrees. Arriving tired at the tent or the hut improvised with *caetê* leaves or palm tree fronds, [he finds] the scanty food that never varies often less tempting than his hammock. Nevertheless, the material collected must be prepared and labeled squatting on the ground, which the insects consider to be a propitious time to attack the poor victim whose hands are occupied ...[35]

At the end of October, Miranda Ribeiro, Lieutenant Alencarliense and Doctor Tanajura continued on the Jamari with 14 sick people in a canoe constructed by Commission members to the confluence of the Jaci-Paraná with the Madeira. Rondon continued his march on foot, arriving at the bank of the Pardo River in December 1909. From there, in barge and launch, he descended the Jamari, arriving in Santo Antônio do Madeira on December 31.

During the months Rondon and Miranda Ribeiro lived together sharing the strenuous life and experiences of the expedition, they forged a bond of mutual admiration. When the expedition was dissolved, Rondon publicly thanked Alípio de Miranda Ribeiro "... for the competence and ardent dedication that he displayed in his work".[36]

After recuperating from the difficulties experienced during the expedition, Miranda Ribeiro began working on the material collected that had been sent to the Museu Nacional, separating the various groups and inviting Brazilian specialists to join him in the work.

Botanist Hoehne, who had remained in Juruena in June 1908, returned to Cáceres traveling through regions he had yet to explore, only arriving in Rio de Janeiro in November 1909. There, he began to organize the botanical collection, separating the material into groups and families, a task in which he was assisted by the Museu Nacional's botanist, Alberto José de Sampaio. In addition to dried specimens, Hoehne brought a collection of wood with 60 different samples and various fruits that were dried or preserved in alcohol, such material duly bearing their respective vulgar names and including relevant notes for their scientific classification. One of the important collections made by Hoehne refers to the plants the Nambiquaras used to prepare *eryva*, a poison that, according to information he obtained from the Parecis, they applied to their arrows for war and hunting. According to them, its toxic effect was identical to that of curare, employed by the Indians of the Amazon.[37]

In 1910, Hoehne published the first work containing information on the botanical material collected on the expeditions made from 1908 to 1909. In December of that year, he returned to Mato Grosso to continue the Commission's botanical work. Given the difficulty in hiring skilled assistants in the region, Hoehne asked Rondon if he could bring them from Rio. Authorized to take two people, he hired the brothers Hermano Kuhlmann (second class telegraph lineman) and João Geraldo Kuhlmann.[38] The first was placed in charge of taking care of the shelter and the troops and the second with helping in herborization services, etc.

To help his zoologist friend Alípio de Miranda Ribeiro, who was unable to continue with the Commission or send a taxidermist, Hoehne personally offered to handle the zoology collections and introduce Hermano Kuhlmann to the techniques of taxidermy in a few days. With his help, the volume of material collected increased significantly. Hoehne sent to Rio 12 bundles of material containing more than 500 specimens. In addition to the material he had collected, Hoehne acquired a collection of rare specimens (of an unspecified zoological group) from a local inhabitant who had been previously motivated by Miranda Ribeiro. According to Hoehne, "this collection of nine specimens of rare species...gathered by Mr. Jeronimo da Rocha in S. Luís de Cáceres was purchased for 80$000".[39]

During a period of 19 months, Hoehne and the Kuhlmann brothers herborized, collected zoological and ethnographical material, explored forests, fields and rivers of the Mato Grosso region and continued the expedition on the Juruena to the Tapajós. The expedition members reached the city of Santarém and from there continued to Belém, thus repeating the same course traveled 83 years before by Baron de Langsdorff's expedition in 1828.[40]

Hoehne and Kuhlmann were joined in the scientific works of the expedition that explored the Juruena, the main tributary of the Tapajós River, by Captain Manuel Teóphilo da Costa Pinheiro, responsible for the geographic survey and appointed by Rondon as chief of the expedition. First Lieutenant Doctor Murilo de Campos was put in charge of the sanitary service. While still in Mato Grosso, en route on the Juruena to its confluence with the Arinos River, Hoehne's expedition suffered its first reverse, when one of the boats had an accident in the falls upstream from the confluence with the Arinos River, losing a large part of its provisions, tools, arms and all of the botanical material collected until then.

Hoehne arrived back in Rio de Janeiro in April 1912, bringing in addition to the zoological and ethnological material, a botanical collection of more than one thousand species in a total of four thousand examples from the widely varied groups of regional flora. The ethnographic material included pieces from the Mundurucús and Apiacás tribes, which were duly forwarded to the ethnographer of the Museu Nacional, Edgard Roquette-Pinto.

Some months after his return to Rio de Janeiro, Hoehne was invited by Alípio de Miranda Ribeiro to head up the botanical office of the recently created Fishing Inspectorship of the Ministry of Agriculture. Conceived by Rear Admiral Frederico Villar (1875-1964) and Miranda Ribeiro, the project received the support of the then Minister of Agriculture, Pedro de Toledo (1873-1939), who, through the Decree of July 7, 1912, founded the Fishing Inspectorship under the aegis of the Ministry of Agriculture. Its leadership was given to Miranda Ribeiro.

Hoehne's activities in the Inspectorship included the study of aquatic plants and phytoplankton. Thus, when he was invited in 1913 to participate in another journey to Mato Grosso and the Amazon region accompanying Rondon, the study of microscopic algae was emphasized. Up to then only vascular plants had been collected, mainly phanerogams (Hoehne, 1914).

This new journey, which began in November 1913, was directly associated with the President of the United States of America, Theodore Roosevelt, who, when visiting Brazil that year to hold conferences, expressed a desire to explore the Brazilian hinterlands up to the Amazon. That intention was promptly supported by the Brazilian government through Lauro Müller, the Brazilian Foreign Minister, who summoned Rondon to accompany Roosevelt in the work. Rondon then suggested that they reconnoiter the Dúvida River, since they were not certain if it flowed into the Ji-Paraná or the Madeira.

Apart from Roosevelt's desire to hunt in the Brazilian jungles, it was agreed that the expedition would collect material for the American Museum of Natural History, which provided researchers George Cherrie and Leo Miller. Roosevelt was also accompanied by his son, engineer Kermit Roosevelt, who had been working on railroad and bridge construction in Brazil since 1912, and Father John Augustine Zahm (Diacon, 2006, p.48).

Rondon invited Hoehne and Miranda Ribeiro to participate on the commission and collect material for the Brazilian museum. Unable to participate, Miranda Ribeiro suggested taxidermists Arnaldo Blake de Sant'anna and Henrique Reinisch, who would work under Hoehne's guidance. The geological portion was entrusted to engineer Euzébio Paulo de Oliveira. Fernando Soledade, a public health doctor, selected by Lauro Müller, was sent exclusively to collect insects. Also making up part of the Brazilian contingent were Dr. Antônio José Cajazeira, an M.D., and a sketcher and photographer, Lieutenant Thomaz Reis.

The combination of the Brazilian and American scientific commissions ended up producing tensions, given the different treatment given to the Americans and the lack of provisions and support for the Brazilian contingent. On January 23, 1914, just two months and four days into the expedition, that situation resulted in the dismissal of the Brazilian naturalists and assistants (including the photographer), from the Commission, except for the geologist and taxidermist Reinisch, who would continue to collect zoological material.

In his 1914 report, Hoehne informed that, counting the days spent on traveling trip, they only had 32 days of effective work, staying very few days in each place. As a result, it was not possible to prepare the material as planned. Even so, he praised the help of the taxidermists, commenting that, despite the unexpected, they were able to gather together "diverse species of birds, fish and mammals, represented by more than 200 specimens, 66 tubes with fish, frogs and insects; 110 tubes with samples of phytoplanktons and zooplanktons, filamentous algae and other *aquilocos* (sic) microorganisms and more than 125 species of macroscopic plants preserved by desiccation and in liquid ..." (Hoehne, 1914).

While Rondon accompanied Roosevelt, a rescue commission awaited him and the American expedition members on the Dúvida River at the confluence of the Aripuanã and Castanho Rivers. Led by Lieutenant Antonio Pirineus de Sousa, this group included taxidermist Emil Stoll, in charge of collecting material for the Brazilian museum, and medical doctor Espiridião Gabino.[41]

As soon as his expedition with the Americans was finished, Rondon immediately returned to his duties with the Commission, which continued its service installing new stations on the Madeira and Jamari Rivers. Accompanied by taxidermist Emil Stoll[42], Rondon inaugurated during the next eight months five stations and constructed more than 372,235 meters of line. Thus, after years of great suffering, enduring the countless obstacles and surprises inherent to the geography and brute nature of the region traversed, Rondon finally completed the extension of the telegraph line from Cuiabá to Santo Antônio do Madeira in January 1915.

The scientific collections assembled during those years by researchers and collectors (see Table 1), as well as by Rondon and the lieutenants of the Commission were assembled at the Museu Nacional, where researchers from the institution and overseas began to work on them.

Table 1: Naturalists of the Rondon Commission

Principais Collectors	1908-1909	1910-1912	1913-1914	1914-1915	Assistants
Alípio de Miranda Ribeiro (zoologist)	X				
				X	Antenor Pires (taxidermist)
Antonio Pyrineus de Sousa (lieutenant)				X	
	X	X	X		Arnaldo Blake de Sant'Anna (taxidermist)
Frederico Carlos Hoehne (botanist)	X	X	X		
Carl Carnier (geologist)	X				
Cícero de Campos (geologist)	X				
			X	X	Emil Stolle (taxidermist)
Euzébio Oliveira e Moritz (geologist)		X	X		
Fernando Soledade (doctor and insect collector)			X		
	X	X	X		Henrique Reinish (taxidermist)
		X			Hermano Kuhlmann (taxidermist)
João Geraldo Kuhlmann (botanist)	X			X	

From the Northwest of Brazil to the Museu Nacional: The Scientific Collections of the Rondon Commission

The Taxonomic Studies of the Collections and their Dissemination

Between 1908 and 1916, some 8,837 botanical specimens, 5,637 zoological specimens, 42 geological, mineralogical and paleontological examples and 3,380 anthropological pieces found by the Rondon Commission were deposited in the Museu Nacional (Miranda Ribeiro, 1945, p.29; Mello-Leitão, 1941, p.285). All of the zoological material was entrusted to Alípio de Miranda Ribeiro, who had left the board of the Fish Institute and returned to his activities at the museum in 1913.

Miranda Ribeiro was put in charge of studying the Commission's vertebrates, more specifically the mammals, fish, birds and amphibians. The reptiles and invertebrates were sent to Brazilian specialists for classification.

In 1912, the first scientific results came out concerning the zoological material collected. In serial installments of the "Strategic Telegraph Commission of Mato Grosso to Amazonas", Miranda Ribeiro initiated his series of publications on the fish, analyzing four of the families collected, describing new genuses and species. That same year, the first and only work on the dipterans collected on the expedition came out. Adolpho Lutz, researcher of the Instituto Oswaldo Cruz, published a work about tabanid flies, describing seven new species. In this work, Lutz highlighted the importance of the collection that he had studied and the "special interest" that the nearly 70 examples aroused, since most of them had been gathered in unexplored locales.

The following year, Carlos Moreira, at the time a researcher at the Museu Nacional, published a study on the crustaceans collected by Miranda Ribeiro during the Rondon Commission.[43] In it, Moreira dealt with, among other groups, the copepod parasites collected on fish of the region traversed, even describing a new species, named *Talaus ribeiroi,* in honor of Miranda Ribeiro.

In 1914, three other works by Miranda Ribeiro were published in the Commission's series. One on fish, continuing his research on this group, and another on mammals, in which he included studies on simians, Felidae, Cervidae and Canidae, among others. In this work, in addition to taxonomic and morphological descriptions, Miranda Ribeiro included observations about the zoogeography of the region. In a third work, he touched on the zoological results of the Roosevelt-Rondon expedition and described the locations of the collection and the respective collectors, including a preliminary list of the zoological and local groups collected, which included mammals, birds, insects, reptiles, fish and anthropoids.

Hermann von Ihering, director of the Museu Paulista, identified the collection of land and fresh water mollusks, publishing the results of his work in 1915 in one of the Commission's installments. According to that researcher, the small collection assembled by the Commission had contributed to the knowledge of fauna in the interior of Brazil (Ihering, 1915).

Both the entomological and ornithological material of the Commission received little attention from researchers. Regarding insects, only two works were published: one by Adolpho Lutz on dipterans, as mentioned above, and the other on bees (Himenoptera) in 1916, by the naturalist Adolpho Ducke, of the Museu Paraense Emílio Goeldi. That same year, Henrique de Beaurepaire Aragão, researcher of the Instituto Oswaldo Cruz, published the results of his investigation on the tick collection. Based on the material collected, Aragão emphasized the prevalence of certain species in the region, such as the star tick (*Amblyomma cajennense)*, causer of spotted fever and responsible for so much of the discomfort experienced by the expedition members.[44]

In 1916, conferences were held on the Rondon Commission and the Museu Nacional, sponsored by Miranda Ribeiro. During them, a balance sheet of the collections assembled in the museum and the works published up to then was divulged. Miranda Ribeiro further highlighted the favorable overseas responses to the works published by the Commission, mainly among specialists of the groups studied.

Between 1918 and 1920, Miranda Ribeiro completed his studies on the Commission fish, publishing his work on the Cichlidae in 1918 and the Characinidae, in 1920. In 1919, he published his only work on birds, in partnership with Euclides da Costa Soares. Dealing only with the Psittacidae (parrots), Miranda Ribeiro and Costa Soares listed the 28 species collected, emphasizing the relevance of the material collected for the institution, since most of the examples that the Museu Nacional had in its patrimony lacked provenance.

The final zoological publication concerning the Commission's collection dealt with the snakes of Mato Grosso, a work written by Afrânio do Amaral. This researcher registered his surprise at coming across a collection of "such abundant and valuable" material,

which included 90 examples of about 50 species, three of which he identified as new.

Many groups obtained by the Commission were not studied for lack of specialists. Others were published in various periodicals, as was the case of the helminths, whose results were published by Lauro Travassos in the *Revista da Sociedade Brasileira de Ciências* in 1919. Perhaps because they had arrived poorly preserved and lacking in abundance, they had not merited exclusive publication in the series published by the Commission. In 1919, Miranda Ribeiro also published in the periodical of the Museu Paulista a work on the deer in Brazil that related to the Rondon Commission, including commentaries about other species found in museums in Brazil and overseas.

Botanical Collection

The botanical material was published in 13 installments by the Commission, a series that began in 1910, with subsequent publications between 1912 and 1923. Frederico Carlos Hoehne, João Geraldo Kuhlmann and the head of the botanical section of the Museu Nacional, Alberto José de Sampaio, authored these serial publications of the Commission. Sampaio contributed in 1916 and 1917, publishing on the pteridophyta and lauraceae. At the same time, as the result of a series of conferences held by the Museu Nacional in honor of the Rondon Commission, Sampaio published material on the flora of Mato Grosso in the Archives of the Museu Nacional. The orchids and gramineous plants were studied by Hoehne and Kuhlmann.

Unlike the zoological material, which was examined and published by Brazilian specialists, various foreign specialists participated in the study of the botanical material, due to the diversity of flora in the region visited, which yielded a large number of species, together with the fact that, at that time, there were no specialists in Brazil for most of the groups collected. A specialized bibliography was also lacking, as was type material for comparison in the herbariums of the Brazilian museums. Entrusted with organizing the botanical material, Hoehne, concerned about publishing the results of such an important undertaking, decided to send the material overseas to be studied by specialists.

The 82 tubes of algae he pioneered in collecting in the Mato Grosso region were sent to Sweden for study by O. Borge. The results were published in a periodical edited by the Swedish Royal Academy of Natural Sciences. The abundance of genuses (57) and species (240) contained in the vials sent to Borge had so impressed Hoehne that he made a point of transcribing some of the Swedish scientist's work in a 1951 publication on plants gathered by the Rondon Commission. According to him, all of the material sent to the Swedish specialist consisted of duplicates, slides having been made of the algae samples sent.

The Berlin Museum and Botanical Garden received the largest volume (in number) of Rondon Commission botanical material for identification. More than ten families of vascular plants were sent to researchers of that institution. Hoehne had great sympathy and respect for the German botanists, mainly for their tradition in works on vegetal taxonomy and phytogeography, a tradition that, in Brazil, dated back to the middle of the 19th century with the work initiated by von Martius on the *Flora Brasiliensis*. Another reference that oriented the botanical works at that time was the monumental work edited

by the German botanist Heinrich Gustav Adolf Engler on the plant kingdom (*Das Pflanzenreich 'Regni Vegetabilis'*).

In addition to Berlin, Hoehne engaged a researcher in Switzerland, another in London and three in the United States, emphasizing, in a work published in 1951: "the rivalry among the foreign specialists was considerable and would have been even greater if two world wars had not interrupted their work, which we had to lament after 1914 and the more recent of which involved considerable losses to the study of the large collections that had been entrusted to German, Austrian Swedish and English specialists ..." (p.7-8).

In 1917, Hoehne was invited by Arthur Neiva, then director of the São Paulo Sanitary Service, to organize a medicinal plant cultivation and acclimatization nursery in that state. From there, Hoehne went on to consolidate his career as a botanist in institutions located in São Paulo, working in the Instituto Butantan, the Instituto Biológico and the Instituto Botânico do Estado (Franco, Drummond, 2005, p.3). From São Paulo, he conducted and managed the botanical work using the Rondon Commission material, exchanging information with foreign researchers and following the results in specialized publications. Part of the Rondon herbarium was in his possession until the end of 1945, when it was delivered to the Museu Nacional and incorporated into the general collection of that institution's Botanical Department.

The botanical collection formed by the Rondon Commission, in Hoehne's opinion, was the most important and only one that, given its representativity, could be considered as a basis for organizing a catalogue on the flora of Mato Grosso (Hoehne, 1914, p.10).

Geological and Mineralogical Collection

The mineralogical collection was studied by the head of the Museu Nacional's Mineralogy and Geology Service, Alberto Betim Paes Leme, and published by the Strategic Telegraph Commission of Mato Grosso to Amazonas in Appendix n.5 (no date). In this work, Paes Leme based his interpretation on the report left by geologist Cícero de Campos, who had died in Cáceres, and the small number of rock examples (42) collected that reached his hands at the Museu Nacional. Using this material, Paes Leme reconstituted the itinerary traversed by the deceased geologist and conducted a petrographical and geological study. Nothing is known, however, of the collection activities of geologist Euzébio de Oliveira, who accompanied Rondon after the death of Cícero de Campos.

Final Considerations

The construction work of the Brazilian telegraph network was intimately involved with public policies to integrate the country's different regions, expand the areas inhabited and cultivate crops, especially after the republican regime replaced the empire. In the works carried out, chiefly between 1907 and 1915, by the Strategic Telegraph Commission of Mato Grosso to Amazonas, better known as the Rondon Commission, 'integration, 'colonization' and 'increment' of agriculture were aspects completely inseparable from the 'scientific inventory' of the natural riches of Brazil's interior. Under the tutelage of the Ministry of War, the Ministry of Transportation and the Ministry of Agriculture and

basically composed of military personnel from the army's engineering and construction battalion, the Commission was created to construct and conserve telegraph poles and stations as well as to inspect Brazil's borders, but, in its different trips and expeditions, scientific survey of the natural resources was also a priority and a systematic activity. In their scientific inventory of the territory, they were chiefly guided by the instructions of the Agriculture ministry, whose emphasis on applied science in crops was a tradition followed since the Empire. In the Republic, the survey of natural resources seemed even more relevant, since it also concerned, as a matter of public policy, modernization and diversification of the areas planted. The greatest expression of the prominence given to the relationship between science and agriculture on the Commission was the growing inclusion and collaboration of a series of naturalists, chiefly from the Museu Nacional, in the various exploration trips to the north of Brazil. And given their own interests, institutional and professional, the naturalists of the Museu Nacional responded to the ministerial demands and immersed themselves in the Amazon forest to survey, study and research new species, both animal and plant.

The naturalists who participated on the Rondon Commission, in addition to collecting, classifying and cataloguing the material gathered, wrote detailed scientific reports, addressed conferences and published many informative texts on the trips and their results during the decades of 1910 and 1920, chiefly regarding the new species identified. Prominent among them were Alípio de Miranda Ribeiro, Arnaldo Blake Santana and José Geraldo Kuhlmann in zoology, Cícero de Campos and Euzébio de Oliveira in mineralogy and geology, Edgard Roquette-Pinto in anthropology and Frederico Carlos Hoehne and João Geraldo Kuhlmann in botany.

The Museu Nacional was the institution whose patrimony was most enriched by the scientific survey activities carried out by the Rondon Commission. Data presented in the previously mentioned 1916 conferences by one of the principal zoologists of that institution and a member of the Commission, Alípio de Miranda Ribeiro, contain interesting information. Miranda Ribeiro insisted on highlighting that the scientific work of the Commission was not limited to adding to the Museu's collections; its reports contained, for example, discoveries and copious descriptions of new species of animals, plants and vegetal medicinal substances, fresh water fish and algae and their respective figures or images, as he said, "beautifully executed", or in photographs, "many of them taken for the first time in their natural state". In his opinion, the scientific lesson given by the Rondon Commission was the best response to poet Olavo Bilac, who had affirmed that the Museu Nacional was a "stagnant" institution (Ribeiro, 1945, Lima, Sá, August 2006).

Miranda Ribeiro guaranteed that the Commission's scientific activities signified an extraordinary opportunity for scientists engaged in field work. Up to then, the stereotype of the naturalist was that of a learned German or Swede, austere, detached from other aspects of life, rarely an every day Brazilian, an image that the fiction of Brazilian writer Machado de Assis drew so well in his *Lição de Botany* [Botany Lesson]. One of Miranda Ribeiro's quotes, taken from the conferences, clearly expresses that fact: "Once, going to Rio Novo, I was introduced by chance to a professor of the Ouro Preto Mining School. The person who introduced us, pharmacist Francisco de Paula Leopoldino de Araújo ...

said: 'So and so, naturalist', upon which the professor retorted, scandalized – 'With that face? A naturalist?' And he turned his back to me without so much as a by your leave...." (Ribeiro, 1945, p.71).

Prominent among the naturalists who accompanied the Commission's travels was botanist Frederico Carlos Hoehne, who, more or less as the crow flies, journeyed through 7,350 km of Mato Grosso's fields and forests to collect botanical material and phytophysiognomical observations. About the work, Hoehne himself would comment years later in the publication *Índice Bibliográfico e Numérico das Plantas Colhidas pela Comissão Rondon* [Bibliographical and Numerical Index of the Plants Collected by the Rondon Commission] (1951):

> in order for us to evaluate what the study of the flora of Mato Grosso represents for the economy of the Country, we will have to consider that it is the heart of South America and, moreover, so vast that we could comfortably cut from its surface equivalents to reconstitute ... Germany, France and Italy and still have sufficient scraps to obtain the surface areas of a Portugal and a Holland without using everything! So large is Mato Grosso with its one million six hundred thousand square kilometers that, providing the optimal edaphological, topographical and climatic conditions that it does, it could be made ready to contain and nurture 750,000,000 inhabitants. ... The Pantanal, prepared for agriculture, would sustain everybody.

The work of the Rondon Commission also had a notable influence on the formation of new generations of Brazilian anthropologists, among whom we highlight names such as Edgar Roquette-Pinto and, later, Darcy Ribeiro.

Nevertheless, the intention to incorporate, populate and modernize the distant hinterlands of the northwest, the main purpose of its civilizing project, was not effectively achieved by the Commission. Use of the telegraph was severely challenged with the technological development of wireless telegraphy that began in the 1920s. The scientific surveys of the Commission, as well as the relevance of the zoological and botanical collections assembled, and the impact they had for knowledge of the fauna, flora, phytogeography and zoogeography of the regions traversed, took decades to be organized, published and known. We have, for example, the works of Hoehne on the phytophysiognomy of Mato Grosso, only published in 1923 – in which he analyzed the main synecological characteristics of the Mato Grosso mountain range and its differentiation from the scrublands of the northeast – and that of Hoehne and Kuhlmann, only published in 1951, on the plants collected by the Rondon Commission. In it they researched and analyzed all of the botanical material collected and studied by Brazilian and foreign specialists. Both were and still are fundamental for students of the flora and phytogeography of the region. The effort undertaken by the botanists of the Rondon expedition to publish a bibliographical and numerical index of the plants collected during the Rondon expedition was, in Hoehne's words (1951, p.10) "a work that was imposed and had to be carried out, whatever it might cost, to demonstrate something that had until then gone unnoticed by those who study the flora of the Country ... the [contribution] of the Rondon Commission stands out as the most important and only one that can be taken as the foundation for the organization of a catalogue of what had been inventoried".

However, some lacunas remained in the work of the two botanists due to the difficulty of separating the material collected by the Commission that, at the time, had been incorporated into the General Herbarium of the Museu Nacional, trustee of the collections assembled by the Rondon expedition.

With respect to zoology, despite the expressive number of examples collected and the importance of these collections for the Museu Nacional, as enumerated and highlighted by Miranda Ribeiro in the conferences held at the Museu Nacional in 1916, many examples have yet to be studied, mainly due to the lack of specialists in Brazilian institutions. Miranda Ribeiro, responsible for the study of the zoological groups collected, had the arduous task of separating and identifying the different specimens collected by the expedition that required identification. A complex activity, not only because of the volume and complexity of the material collected, but also and mainly because the Museu Nacional did not have a team to help him to the extent he would have liked. At the time, the zoological section consisted of the head (Hermillo Bourguy Macedo de Mendonça), his deputy (Alípio de Miranda Ribeiro), two preparers (Anthero Ferreira and Pedro Peixoto Velho) and a modeler (Armando Magalhães Corrêa) (Ribeiro, 1945; Lobo, 1921). Moreover, Miranda Ribeiro was thoroughly immersed in the preparation of a catalogue on Brazilian ichthyiological fauna. In this ambiance, the different zoological groups collected were studied as they were identified and sent to specialists or studied by Miranda Ribeiro himself. Unlike Hoehne, who sent some of the botanical groups to be identified by specialists in Germany, Switzerland, Sweden, Holland, the United States, etc., Miranda Ribeiro preferred to wait for the right time for him to personally take the still unidentified zoological material to specialists overseas, plans that were interrupted by the deflagration of the 1st World War (Miranda Ribeiro, 1914).

Despite the existing difficulties, the Commission's scientific surveys contributed, as many of its members observed in articles, conferences and books, to enrich the collection of Brazilian institutions, as we have seen in the case of the Museu Nacional. Although they were also decisive for recognizing and crediting the work of Brazilian naturalists, they chiefly contributed to expand the knowledge of vast areas of Brazil's interior.

It should be noted, in fact, that in the science history field in Latin America, all indications are that the Rondon Commission brought together unparalleled conditions. In general, the few works dedicated to analyzing the creation of a communications infrastructure in the last decades of the 19th century and the first decades of the 20th highlight the importance of the roads and telegraphs as a preliminary condition for the field work of the scientists in different areas of knowledge. In the case of the Rondon Commission, scientific exploration was part of its mandate, in other words it was also strategic and, as a result, conducted concomitantly. Thus, we can complement the points most emphasized by the literature on the Rondon Commission by affirming that its scientific activities, having been carried out in strict consonance with the telegraph line construction services, demarcation of the borders, and increasing the occupation and peopling of the north of Brazil, were thought to be, at the time, equally important components in the construction of a National State in Brazil.

ACKNOWLEDGEMENTS

The authors thank Ingrid Fonseca Casazza, scientific initiation scholarship student of the Fundação Oswaldo Cruz/Institutional Program for Scientific Initiation Scholarships /National Scientific and Technological Development Board (Fiocruz/Pibic/CNPq) program and research assistants Tamara Rangel Vieira, Luís Octavio Gomes de Souza and Ludmila Gama Pereira, paid with the help of the Institutional Project Support Program with the Participation of Recent Doctoral Graduates/University Level Personnel Improvement Coordination (Prodoc/Capes), for the help in gathering and researching document sources. We also thank the employees of the Historical Archives of the Museu Nacional/UFRJ and the Technical Reserve of the Historical Archives of the Museu do Exército /Forte de Copacabana, especially Vânia Edith E. C. Ferreira Cardoso and Solange da Silva Aguiar, for access to the reports, communications, official letters, decrees and correspondence of the Rondon Commission.

NOTES

[1] Important references, among Brazilian scholars, thanks to the renown achieved by Cunha after publishing *Os sertões* [Rebellion in the Backlands] in 1902.

[2] The creation of the position of traveling naturalist at the MN dates from this period.

[3] Report of the Ministry of Industrial Affairs, Transportation and Public Works, 1892-1893. Available on http://brazil.crl.edu/bsd/bsd/u2260/000009.html; acessed on March 26, 2008.

[4] Cândido Mariano da Silva Rondon (1865-1958), frequently remembered as the 'father of communications in Brazil', 'pathbreaker and civilizer of the hinterlands', a native of Mato Grosso from a family of limited resources and an orphan, like other young people, he found in a military career prospects for a professional future in a country with limited possibilities for social mobility. A student of the Escola Militar da Praia Vermelha do Rio de Janeiro, he became a military engineer with a bachelor's degree in mathematics and phsycial and natural sciences in 1890. At the Escola Militar, he was also taught astronomy and mechanics and adhered to the positivism that would guide several of his positions, such as the beneficial and useful vision of science and the protectionist and guardianship outlook in dealing with the indigenous question. His activities in the construction of the telegraph lines, according to him the "probes of progress", go back to the start of his career as an officer of the Military Engineering Corp. Still during the Empire, the army battalion of engineers had been working since the 1880s on the construction of railroads and telegraph lines. With the Republic, the Telegraph Line Construction Commission was created to connect Mato Grosso with Goiás, and Rondon began to work on this commission in 1891. His work continued until 1898 and from 1900 to 1906, Rondon continued to participate in the construction of the telegraph line from Cuiabá to Corumbá. In 1907, in the Afonso Pena government, Rondon assumed what would be one of the most outstanding missions of his biography and certainly the one that made him famous: command of the Strategic Telegraph Commission of Mato Grosso to Amazonas. The work carried out by this Commission, especially contact with indigenous societies, achieved such fame that it was rebaptized with his name as an informal honor. By the end of the Commission's work in 1915, Rondon had received the Livingstone Award from the New York Geographical Society, being recognized as the foremost explorer of tropical lands. Mato Grosso had 4,502 km of telegraph lines and its members had accomplished a task that would be considered a veritable 'epopéia', the survey of an area of 50,000 km between the Juruena and Madeira rivers. In subsequent years, among other awards and honors in Brazil and abroad, Rondon, a general since 1919 and a marshal after 1955, was nominated for the Nobel Peace Prize more than once. He undertook many other missions up to his death in 1958; inspection of the Brazilian borders from the Guianas to Argentina from 1927 to 1930, conservation of the telegraph lines and, in the Vargas government, head of Combined Brazil/Peru/Colombia Commission to resolves border disputes between those countries. In his long career, perhaps the activities for which he was best known were those performed for the Inidan Protection Service (SPI) (Lima, Sá, 2006).

[5] Instructions that were expected to guide the head of the Strategic Telegraph Commission of Mato Grosso to Amazonas, organized as per letter b of nº XXI of Art. 35 of Law 1,617, dated December 30, 1906 Government Decisions no.19 – on March 4, 1907. It approves the instructions for the Strategic Telegraph Commission of Mato Grosso to Amazonas service.

[6] Idem.

[7] Despite the common use of this expression, its authorship is unknown.

[8] One can infer the proactivism of this ministry in the actions to integrate and 'penetrate' the national territory and "open the most distint jungles to penetration" (p.XX) through a reading of the 1909-1910 Maic general report, available on http://brazil.crl.edu/bsd/bsd/u2000/000008.html, p.XVIII, XX, XXII, XXV, XXVI; accessed on March 26, 2008.

[9] Maciel (1998) and Diacon (2006) refer to them, giving them credit, even though they were not contral to their analyses.

[10] Report presented to the General Telegraph Board and the General Engineering Division of the War Department by Colonel Cândido Mariano da Silva Rondon (head of the Commission): 1st volume – Studies and Reconnaissances, no date, p.5-6.

[11] Idem, p.6.

[12] Idem, p.23.

[13] Idem, p.9.

[14] Instructions that were expected to guide the head of the Strategic Telegraph Commission of Mato Grosso to Amazonas, organized in accordance with letter b of no. XXI of Art. 35 of Law 1,617 of December 30, 1906. Decisions of the Government no. 19 – on March 4, 1907. It approves the instructions for the Strategic Telegraph Commission of Mato Grosso to Amazonas service.

[15] Decree 9,214 of December 15, 1911 approves the regulation of the Indian Protection and National Worker Location Service. Cf. Bhering, 2008, p.85.

[16] Decree 9,214 of December 15, 1911, Título III: Organization of the Services - Chapter I: Distribution of the Work; Chapter II: Personnel; Chapter III: Duties of the Employees; Salary table to which Art. 85 of this regulation refers. http://www6.senado.gov.br/legislacao/ListaPublicacoes.action?id=53816; accessed on September 10, 2008.

[17] Idem, Title II - Chapter I: Location of the National Workers and Chapter II: Installation of the Agricultural Centers.

[18] Maic Report of 1911-1912, p.116-117. Available at http://brazil.crl.edu/bsd/bsd/u2002/000198.html; accessed on September 10, 2008.

[19] With precisely this justification bodies were transferred and remodeled and new services created in the first years of this ministry's existence. Transferred: the Museu Nacional, the Jardim Botânico do Rio de Janeiro, the Escola de Minas de Ouro Preto, the General Board of Statistics, the General Population Service Board and the Geological and Mineralogical Service of Brazil. Remodeled: the National Observatory. New: SPILTN, the Meteorology and Astronomy Board, the Inspection, Statistics and Agricultural Defense Service Board, the Veterinary Service Board, the Superior School of Agriculture and Veterinary Medicine, the Marine Biology Station, the Agricultural Chemical Central Station, the Fish Inspectorate and the Rubber Protection Superintendency. For more information see Ribeiro, 2005 and Bhering, 2008.

[20] That is how military enlistment functioned, at least until 1915, when the universal lottery and obligatory enlistment were instituted (Maciel, 1998).

[21] The daily life of the Commission will not be explored here, having been the subject of thorough analysis and description in Maciel, 1998 and Diacon, 2006.

[22] According to Rondon, the government wished to strengthen and consolidate the incorporation into Brazilian of the Territories of Acre, Purus and Juruá, and it was the desire of President Afonso Pena that 'taking possession' of this region and its incorporation into the civilized world should take place together with scientific knowledge of the territory... (Rondon, no date, cited in Viveiros, 1969, p.221).

[23] Lacerda further pointed out the need to hire skilled people, national or foreign, with remuneration consistent with the position and dedicated exclusively to scientific investigations. Lacerda's demands for the Museum appear in the *Fastos do Museu Nacional* [*Chronicles of the National Museum*], a book written by him in 1905, and ennumerated by his daughter, Magdalena de Lacerda Bicalho, in a 1946 article "A personalidade de João Batista de Lacerda", p.34.

[24] Museu Nacional. Report of the work done during 1914, presented to the Minister of Agriculture, Industry and Commerce by João Batista de Lacerda, p.4. Historical Archive of the Museu Nacional.

[25] At the end of 1906, Orville Derby received the invitation from Miguel Calmon Du Pin e Almeida, then Minister of Industry, Transportation and Public Works, to organize the Geological and Mineralogical Service of Brazil, created by Decree 6,323 of January 10, 1907 to conduct the scientific study of Brazil's geological and mineralogical structure for the purposes of practical application. To make up the team,

Derby appointed as first engineers Miguel Arrojado Ribeiro Lisboa, Francisco de Paula Oliveira and Luiz Felipe Gonzaga de Campos, and as second engineers, Carlos Moreira and Cícero de Campos. (Cf. http://www.dichistoriasaude.coc.fiocruz.br/iah/P/verbetes/derbyorv.htm.).

[26] At the time, in addition to Miranda Ribeiro, Carlos Moreira and Hermillo Bourguy Macedo de Mendonça belonged to the Zoology Section. See Lacerda, 1905.

[27] With extinction of the position of naturalist in 1899, Miranda Ribeiro was appointed secretary that same year, a position he occupied until 1910, when, by decree of President Nilo Peçanha, he became a substitute at the Zoology Section (Kretz, 1942, p.5-6).

[28] A son of Germans, Hoehne was born in the city of Juiz de Fora, Minas Gerais. Self-taught, he dedicated his entire life to botany, mainly the study of orchids, becoming one of the greatest specialists in Brazil and abroad. In 1917 he went to São Paulo to work in the Botany Section of the Instituto Butantan. From 1938 to 1941, he was director-superintendent of the State Botany Department and in 1942 became the first director of the Instituto de Botânica, remaining in that position until 1952. He published some 117 scientific works, 478 articles in newspapers and magazines, sponsored innumerable talks, conferences and courses in the various areas of botany and edited four children's books. See Franco, Drumond, 2005.

[29] Offícial Letter of June 26, 1908 of the director of the Museu Nacional, João Batista de Lacerda, "observing that these objects will be in the care of museum employee, Alípio de Miranda Ribeiro, commissioned by the Ministry of Transportation and considering that the works of the commissioned employee will revert to the benefit of the museum, I authorize the delivery under his responsibility". Historical Archive of the Museu Nacional.

[30] Rondon and almost all of the expedition members were attacked by malaria. The high fever, fatigue, nausea, headaches and lack of appetite undermined the already so severely sacrified Commission members. Many died and other, such as Rondon himself, experienced frequent attacks of the disease. Besides malaria, the expedition members suffered from smallpox, pneumonia and beriberi, among others.

[31] Concerning the subject, see Benchimol, Sá, 2005, 2006.

[32] The Emydosaurios merited attention because of the parasites they carried: "If it is verified that they are just so many more focuses of dangerous hematozoons, as Koch says the Crocodiles are, the no little antipathy felt toward them by the human species deserves to be increased...".

[33] See the report presented to the General Telegraph Board and the General Engineering Division of the War Department by Colonel Cândido Mariano da Silva Rondon (head of the Commission): 1st volume – Studies and Reconnaissances, no date.

[34] Carnier, Carl (1909). Observaçóes Geologicas-Geographicas e Ethnographicas sobre a Viagem de Exploração de Cuyabá á Serra do Norte, Passando por S. Luiz de Cáceres, translated from the German by João Bruggemann. Strategic Telegraph Commission of Mato Grosso to Amazonas, Publication 23, Appendix nº 5 (Natural History, Geology). Rio de Janeiro: Papelaria Luiz Macedo.

[35] Bibliogrpahical and numerical index of the plants collected by the Rondon Commission or the Strategic Telegraph Commission of Mato Grosso to Amazonas, from 1908 to 1923 by botanists F. C. Hoehne and J. G. Kulhmann and others, encompassing the material studied and published up to now, some indeterminate, as well as those still in the hands of the Museu Nacional of Rio de Janeiro and of foreign specialists.Organized by F. C. Hoehne (director of the Botany Institute). Department of Agriculture, São Paulo – Brazil.

[36] Report of the work carried out during 1908 by Alípio de Miranda Ribeiro (as zoologist of the Strategic Telegraph Commission of Mato Grosso to Amazonas) led by Army Lieutenant Colonel Dr. Candido Mariano da Silva Rondon (author's revision) – São Luiz de Cáceres – State of Mato Grosso on December 31, 1908. Rio de Janeiro, 1916, p.323-349.

[37] Report of the work and trips carried out during the course of 1909 by F.C. Hoehne, botanist of the Strategic Telegraph Commission of Mato Grosso to Amazonas, presented to Army Lieutenant Colonel Dr. Candido Mariano da Silva Rondon, D. D. Commission Chief. Rio de Janeiro, Jan. 1910 (p.31-54).

[38] João Geraldo Kuhlmann (1882-1958) was born in Blumenau, Santa Catarina. Of German descent, he became famous as a great botanical collector, working for several Brazilian institutions. Between 1944 and 1951 he was the director of the Jardim Botânico do Rio de Janeiro, dying in 1958. (Cf. http://pt.wikipedia.org/wiki/Jo%C3%A3o_Geraldo_Kuhlmann).

[39] Report of the 2nd trip to the State of Mato Grosso presented to Coronel Dr. Candido Mariano da Silva Rondon by F. C. Hoehne – assistant botanist of the Strategic Telegraph Commission of Mato Grosso to Amazonas from December 3, 1910 to April 24, 1913.

[40] Langsdorff, vice-consul of Russia in Rio de Janeiro and a naturalist. In an expedition financed by the Czar of Russia through the Mato Grosso to Amazonas region, he traveled the Arinos, Juruena, Tapajós and Amazonas rivers to Belém do Pará. See *Diários de Langsdorff*. Rio de Janeiro: Editora Fiocruz. 1997, v.3.

[41] Roosevelt-Rondon Report: From Corumbá to Palmeiras – Acquisition of zoological specimens/from Palmeiras to Rio Cuiabá/ from Cuiabá to S. Luiz de Cáceres/ Rescue Team on the Aripuanã River.

[42] Miranda Ribeiro cites another taxidermist, the preparer Antenor Pires, who accompanied Lieutenant Pirineus de Sousa on the Paranatinga River between 1914-1915.

[43] Carlos Moreira first published the results of his work in 1912 in volume 25 of the *Mémoires de la Société Zoologique de France*.

[44] Zoonose, which can accidentally infect humans through the bite of an infected louse. Caused by the bacteria *Ricketisiarickettsii*, for infection to occur in humans, the louse must be attached for at least four to six hours. Contamination can also occur through lesions in the skin from crushing the louse. (Cf. http://www.sucen.sp.gov.br/doencas/f_maculosa/texto_febre_maculosa_pro.)

SOURCES AND REFERENCES

Primary Sources

Scientific reports of the CLTEMTA (Historical Archives of the Museu do Exército /Forte de Copacabana):

A.J. Sampaio

CLTEMTA – Publication n° 33 – Appendix n° 5 – Natural History – Botany – part VII – Pteridophytas. By A. J. Sampaio (Professor of Botany at the Museu Nacional) – author's revision. Rio de Janeiro – 1916.

Natural History - Botany - part X - Lauráceas de Mato Grosso e Duas Novas Espécies do Amazonas, by A. J. Sampaio, Professor of Botany at the Museu Nacional – it contains 15 pages and 13 photolithographical pages of plants taken in nature, in addition to the text, in folio – August 1917, Rio de Janeiro.

Adolpho Lutz.

CLTEMTA – Appendix n° 5 – Natural History – Zoology – Tabanids. By Dr. Adolpho Lutz. Rio de Janeiro, 1912.

Afrânio do Amaral

CLTEMTA (Publication n° 84) – Appendix 5 – Natural History – Zoology (Ophidians of Mato Grosso - contribution II for knowledge of the snakes of Brazil). By Afrânio do Amaral. São Paulo, no date.

Alberto Betim Paes Leme.

CLTEMTA– Appendix n° 5 – Natural History – Mineralogy and Geology. By Dr. Alberto Betim Paes Leme. Rio de Janeiro, no date.

Alípio de Miranda Ribeiro.

CLTEMTA – Appendix n° 5 – Natural History – Zoology (Loricariidae, Callichthyidae, Doradidae and Trichomycteridae). By Alípio de Miranda Ribeiro. Rio de Janeiro, September 1912.

CLTEMTA – Appendix n° 5 – Natural History – Zoology (Pimelodidae, Trachycorystidae, Cetopsidae, Bunocephalidae, Auchenipteridae and Hypophthalmidae). By Alípio Miranda Ribeiro. Rio de Janeiro, February 1914.

Expedição Científica Roosevelt-Rondon– Publication n° 53 of CLTEMTA – Natural History – Zoology – Appendix n° 4 of the Roosevelt-Rondon Expedition – Zoological results of the Expedition by Alípio de Miranda Ribeiro (September 1914).

CLTEMTA – Appendix n° 5 – Natural History – Zoology – Cebidae; Hapalidae; Vespertilionidae; Emballonuridade; Phyllostomatidae; Felidae; Mustelidae; Canidae; Procyonidae; Tapyridae; Suidae; Cervidae; Sciuridae; Muridae; Octodontidae; Coenduidae; Dasyproctidae; Caviidae and Leporidae; Platanistidae; Bradynodidae; Myrmecophagidae; Dasypodidae;

Didelphyidae. By Alípio de Miranda Ribeiro. Rio de Janeiro, May 1914.

CLTEMTA – Publication n° 27 – Appendix n° 4 – Report of the work performed during 1908 by Alípio de Miranda Ribeiro as zoologist of the CLTEMTA, led by Army Lieutenant Colonel Dr. Candido Mariano da Silva Rondon. Author's revision. São Luiz de Cáceres, State of Mato Grosso on December 31, 1908. Rio de Janeiro, 1916.

CLTEMTA (Publication n° 46) – Appendix n° 5 – Natural History – Zoology (Cichlidae). By Alípio de Miranda Ribeiro (Author's revision). Rio de Janeiro, 1918.

CLTEMTA (Publication n° 58) – Appendix n° 5 – Natural History – Zoology – Peixes (excl. Characinidae). By Alípio de Miranda Ribeiro (Author's revision). Rio de Janeiro, 1920.

CLTEMTA (Publication n° 63) – Appendix n° 5 – Natural History – Zoology (Psittacidae). By Alípio de Miranda Ribeiro and Euclides da Costa Soares. Rio de Janeiro, 1920.

Cândido Mariano da Silva Rondon

Report presented to the General Management of the Telegraphs and the General Engineering Division of the War Department by Colonel Cândido Mariano da Silva Rondon (Commission head): 1st volume – *Estudos e Reconhecimentos*, no date

CLTEMTA. Appendix n° 5 – Publication n° 2 – Natural History – Ethnography. Author: Colonel Candido Mariano da Silva Rondon (Commission head), no date

Second partial report – 1911-1912 – presented to the General Management of the Telegraphs by the chief engineer of the CLTEMTA to Colonel Candido Mariano da Silva Rondon (typed).

Carl Carnier

CLTEMTA – Appendix n° 5 – Natural History – Geology – Geological Observations – Geographical and Ethnographical on the exploration trip from Cuiabá to Serra do Norte, passing through São Luiz de Cáceres by geologist Carl Carnier and translated from German to Portuguese by 2nd class lineman João Brueggeman – 1909.

Carlos Moreira

CLTEMTA – Appendix n° 5 – Natural History – Zoology – Crustaceans. By Carlos Moreira. Rio de Janeiro, September 1913.

Euzébio Paulo de Oliveira

CLTEMTA – Appendix n° 1 – Geology – Report presented to Engineering Colonel Candido Mariano da Silva Rondon, head of the Brazilian Commission by mining engineer Euzébio Paulo de Oliveira (Expedition geologist). Rio de Janeiro, 1915.

Frederico Carlos Hoehne.

Report of the Juruena and Tapajós River Expedition presented by F. C. Hoehne – botanist of the CLTEMTA, no date

CLTEMTA - Publication n° 62 – Appendix n° 5 – Natural History – Botany – part IX – Bromeliaceas and Orchidaceas by F. C. Hoehne, no date

Report of the 2nd trip to the State of Mato Grosso presented to Colonel Dr. Candido Mariano da Silva Rondon by F. C. Hoehne – assistant botantist of the CLTEMTA on December 3, 1910. April 24, 1913.

Expedição Científica Roosevelt-Rondon - Appendix n° 2 / Botany. Report presented to Colonel Dr. Candido Mariano da Silva Rondon, head of the Brazilian Commission. By F. C. Hoehne (Expedition Botanist). Rio de Janeiro, November 1914.

CLTEMTA – Appendix n° 5 / Natural History - Botany - part VI – Addition for Alismataceas and Butomaceas of Part IV, Triuridaceas, Palmeiras, Cyclantaceas, Rapateaceas, addition for Amaryllidaceas of Parts I and V and for Burmanniaceas, Aizoaceas, Caryophyllaceas, addition for the Nymphaeaceas of Part IV, Ranunculaceas, Papaveraceas, Capparidaceas, Droceraceas, Oxalidaceas, Humiriaceas, Burseraceas, Meliaceas, Vochyseaceas, Rhamnaceas, Vitaceas, Ochnaceas, Caryocaraceas, Bixaceas, Cochlospermaceas, Turneraceas, Loasaceas, Cactaceas, Halorhagidaceas, Araliaceas Umbelliferas, Ericaceas, Theophraslaceas, Myrsinaceas, Plumbaginaceas, Ebenaceas, Loganeaceas, Gentianaceas, Apocynaceas, Hydroplyllaceas, Pedaliaceas, Campanulaceas and Martiniaceas. By F. C. Hoehne. Rio de Janeiro, September 1915.

CLTEMTA – Publication n° 28 – Appendix n° 4 – Report of the botanical work and travels carried out during 1908 and 1909 presented to Lieutenant Colonel of Engineering Candido Mariano da Silva Rondon – head of the commission – by F. C. Hoehne – author's revision. Rio de Janeiro – 1916.

CLTEMTA (Publication n° 38) – Monograph of the Asclepiadaceas Brasileiras – Report and

description of the Brazilian Asclepiadaceas found in the various herbariums of Brazil. By F. C. Hoehne. Rio de Janeiro, August 1916.

CLTEMTA – Publication n° 45 – Appendix n° 5 – Natural History – Botany (part VIII) – Leguminosae by F. C. Hoehne (presented in January 1917). 1919.

CLTEMTA (Publication n° 74) – Appendix n° 5 – Natural History – Botany (part XII) – Contribution to the knowledge of the leguminosae of Rondonia (Appendix to part VIII). By F. C. Hoehne. São Paulo, 1922 (presented for printing in 6 -1922).

Fitofisionomia do Estado de Mato-Grosso e ligeiras notas a respeito da composição e distribuição da sua flora. By F.C. Hoehne (chief of the Botany Section of the Museu Paulista and the Rondon Commission) – Preliminary Study (accompanied by a map presented on the occasion of the First Centennial of Brazilian Independence). São Paulo, 1923.

Henrique de Beaurepaire Aragão

CLTEMTA – Publication n° 36 – Appendix n° 5 – Zoology – Ixodidas – by Dr. Henrique de Beaurepaire Aragão (Assistant of the Instituto Oswaldo Cruz) – author's revision. Rio de Janeiro, 1916.

Hermann Von Ihering

CLTEMTA – Appendix n° 5 – Mollusks. By professor Dr. Hermann Von Ihering. Rio de Janeiro, 1915.

J. Geraldo Kuhlmann

Publication n° 67 – Appendix n° 5 – Botany – part XI – Gramineae (1st installment). By J. Geraldo Kuhlmann. Rio de Janeiro, March 3, 1922.

CLTEMTA – Publication n° 83 – Appendix n° 5 – Botany – part XIII – Contribution to the knowledge of a new species of Lentibulariaceae, by João Geraldo Kuhlmann – April 1923.

Bibliographical References

BENCHIMOL, Jaime L.; SÁ, Magali Romero. Adolpho Lutz e a entomologia médica (apresentação histórica). In: Benchimol , Jaime L.; Sá, Magali Romero (Org.). *Adolpho Lutz*: complete works, v.2, n.3. Rio de Janeiro: Editora Fiocruz. p.1-272. 2006.

BENCHIMOL, Jaime Larry; SÁ, Magali Romero. Insetos, humanos e doenças: Adolpho Lutz e a medicina tropical/Insects, people, and disease. Adolpho Lutz and tropical medicine. In: Benchimol, Jaime Larry; Sá, Magali Romero (Org.). *Adolpho Lutz*: complete works, v.2, book 1. Rio de Janeiro: Fiocruz. p.43-244 (Portuguese); 245-457 (English). 2005.

BHERING, Marcos Jungman. *Positivismo e modernização*: políticas e institutos científicos de agricultura no Brasil (1909-1935). Dissertation (Masters) – Post-graduate program in the History of the Sciences and Health at the Casa de Oswaldo Cruz/Fiocruz. Rio de Janeiro. 2008.

BICALHO, Magdalena de Lacerda. A personalidade de João Batista de Lacerda. In: *João Batista de Lacerda*: comemoração do centenário de nascimento, 1846-1946. Rio de Janeiro: Museu Nacional. 1946.

BIGIO, Elias dos Santos. *Cândido Rondon*: a integração nacional. Rio de Janeiro: Contraponto/Petrobras. 2000.

BIGIO, Elias dos Santos. *Linhas telegráficas e integração de povos indígenas*: as estratégias políticas de Rondon. Dissertation (Masters) – Universidade de Brasília. 1996.

CUNHA, Euclides da. *Um paraíso perdido*: reunião de ensaios amazônicos. Brasília: Senado Federal. 2000.

DIACON, Todd A. *Rondon*: o marechal da floresta. São Paulo: Companhia das Letras. 2006.

DIÁRIOS... *Diários de Langsdorff*. v.3. Rio de Janeiro: Ed. Fiocruz. 1997.

DOMINGUES, Heloisa Maria Bertol. *Ciência, um caso de política*: as relações entre as ciências naturais e agricultura no Brasil Império. Tese (Doutorado) – College of Philosophy, Science and Letters, Universidade de São Paulo, São Paulo. 1995.

ENGLER, Heinrich Gustav Adolf (Ed.). *Das Pflanzenreich*: Regni vegetabilis conspectus. 107v. Leipzig: Wilhelm Engelmann. 1900-1953.

FIGUEIRÔA, Silvia. *As ciências geológicas no Brasil*: uma história social e institucional, 1875-1934. São Paulo: Hucitec. 1997.

FRANCO, José Luiz de Andrade; DRUMMOND, José Augusto.
Frederico Carlos Hoehne: a atualidade de um pioneiro no campo da proteção à natureza no Brasil. *Ambiente & Sociedade*, Campinas, v.8, n.1, p.141-166. 2005.

GUTIÉRREZ, Horacio; NAXARA, Marcia Regina C.; LOPES, Maria Aparecida de S. (Org.). *Fronteiras*: paisagens, personagens, identidades. Franca: Universidade Estadual Paulista/São Paulo: Olho D´Água. 2003.

HARDMAN, Francisco Foot.
Amazônia como voragem da história: impasses de uma representação literária. *Estudos de Literatura Brasileira Contemporânea*, Brasília, v.15, p.207-221. 2007.

HARDMAN, Francisco Foot.
Trem-fantasma: a ferrovia Madeira-Mamoré e a modernidade na selva. São Paulo: Companhia das Letras. 2005.

HARDMAN, Francisco Foot.
A vingança da Hiléia: os sertões amazônicos de Euclides. *Tempo Brasileiro*, Rio de Janeiro, v.144, n.144, p.29-61. 2001.

HOEHNE, Frederico Carlos; KUHLMANN, J.G.
Índice bibliográfico e numérico das plantas colhidas pela Comissão Rondon. São Paulo: Department of Agriculture. 1951.

HOEHNE, Frederico Carlos.
Flora Brasílica. Fasc. 2, v.25,n.2. Department of Botany of the São Paulo Department of Agriculture, Industry and Commerce, São Paulo. 1940.

KRETZ, José.
Alípio de Miranda Ribeiro (conferência biográfica). São Paulo: Imprensa Oficial do Estado. 1942.

LACERDA, Franciane Gama.
Entre o sertão e a floresta: natureza, cultura e experiências sociais de migrantes cearenses na Amazônia (1889-1916). *Revista Brasileira de História*, São Paulo, v.26, n.51, p.197-225. 2006.

LACERDA, João Batista de.
Fastos do Museu Nacional do Rio de Janeiro. Rio de Janeiro: Imprensa Nacional. 1905.

LIMA, Antonio Carlos de Souza.
Um grande cerco de paz: poder tutelar, indianidade e formação do Estado no Brasil. Petrópolis: Vozes. 1995.

LIMA, Nísia Trindade.
Um sertão chamado Brasil. Rio de Janeiro: Revan; Iuperj; Ucam. 1999.

LIMA, Nísia Trindade.
Missões civilizatórias da República e interpretação do Brasil. *História, Ciências, Saúde – Manguinhos*, Rio de Janeiro, v.5, supl., July 1998.

LIMA, Nísia Trindade; SÁ, Dominichi Miranda de.
Science and territory in Brazil: the Strategic Telegraph Commission of Mato Grosso to Amazonas (1907-1930). *Minerva. Review of Science, Learning and Policy*, London. In the preface. 2008.

LIMA, Nísia Trindade; SÁ, Dominichi Miranda de.
No rastro do desconhecido. *Revista de História da Biblioteca Nacional*, Rio de Janeiro, v.11, p.18-23. August 2006.

LOBO, Bruno.
O Museu Nacional durante o ano de 1920. Rio de Janeiro: Imprensa Nacional. 1921.

MACIEL, Laura Antunes.
Cultura e tecnologia: a constituição do serviço telegráfico no Brasil. *Revista Brasileira de História*. São Paulo, v.21, n.41, p.127-144. 2001.

MACIEL, Laura Antunes.
A nação por um fio: caminhos, práticas e imagens da Comissão Rondon. São Paulo: Educ; Fapesp. 1998.

MELLO-LEITÃO, C.
História das expedições científicas no Brasil. São Paulo: Companhia Editora Nacional. 1941.

MENDONÇA, Sonia. R. de .
O ruralismo brasileiro. 1.ed. São Paulo: Hucitec. 1997.

MENEZES, Maria Lucia P.
A noção geográfica de país na República Velha: tratados e limites do Brasil. *Scripta Nova*, Barcelona. Disponível em: http://www.ub.es/geocrit/sn/sn-218-20.htm. August 1, 2006.

MISSÃO RONDON...
Missão Rondon: apontamentos sobre os trabalhos realizados pela Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas sob a direção do Coronel de Engenharia Cândido Mariano da Silva Rondon, de 1907 a 1915. Brasília: Senado Federal, Conselho Editorial. 2003.

MORAES, Antonio Carlos Robert.
Território e história no Brasil. São Paulo: Annablume. 2002.

RIBEIRO, Alípio de Miranda.
A Comissão Rondon e o Museu Nacional. Rio de Janeiro: Ministério da Agricultura. 1945.

RIBEIRO, Rafael Winter.
A invenção da diversidade: construção do Estado e diversificação territorial no Brasil (1889-1930). Thesis (Doctorate) – Department of Geography of the Universidade Federal do Rio de Janeiro, Rio de Janeiro. 2005.

ROQUETTE-PINTO, Edgard.
Rondonia. 4. ed. São Paulo: Companhia Editora Nacional. 1938.

RONDON, Cândido Mariano da Silva.
Índios do Brasil. v.1: Do Centro ao Noroeste e Sul de Mato-Grosso. Rio de Janeiro: National Indian Protection Board; Ministry of Agriculture. (Publication n.97). 1946.

RONDON, Cândido Mariano da Silva.
Rumo ao Oeste: conferência realizada pelo general Rondon no D.I.P. em 30-IX-40 e discursos do Dr. Ivan Lins e do general Rondon, pronunciados na Associação Brasileira de Educação. Rio de Janeiro: Biblioteca Militar, 1942.

RONDON, Cândido Mariano da Silva.
Conferências: Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas. Rio de Janeiro: Typographia do Jornal do Commercio. 1922.

RONDON, Cândido Mariano da Silva.
Conferências de 1915 (English version of Publication no. 4 by R. G. Reidy and Ed. Murray). Rio de Janeiro: Tipografia Leuzinger. 1916a.

RONDON, Cândido Mariano da Silva.
Missão Rondon: apontamentos sobre os trabalhos. Rio de Janeiro: Typographia do Jornal do Commercio. 1916b.

SÁ, Magali Romero.
O botânico e o mecenas: João Barbosa Rodrigues e a ciência no Brasil na segunda metade do século XIX. *História, Ciências, Saúde – Manguinhos*, Rio de Janeiro, v.8, supl., p.899-924. 2001.

SCHWEICKARDT, Júlio César; LIMA, Nísia Trindade.
Os cientistas brasileiros visitam a Amazônia: as viagens científicas de Oswaldo Cruz e Carlos Chagas (1910-1913). *História, Ciências, Saúde – Manguinhos*, Rio de Janeiro, v.14, supl., p.15-50. Dec. 2007.

TRAVASSOS, Lauro.
Um novo tipo de acantocefalo. *Revista da Sociedade Brasileira de Sciencias*, Rio de Janeiro, n. 3, 1919.

VIVEIROS, Esther.
Rondon conta sua vida. Rio de Janeiro: Livraria São José. 1958.