

Fear of the sertão: malaria and the Rondon Commission (1907-1915)*

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Abstract

The article analyzes the relationships between disease, knowledge, and settlement of the Brazilian territory within the context of the Strategic Telegraph Commission from Mato Grosso to Amazonas, more famously known as the Rondon Commission. From 1907 to 1915, the commission traversed broad regions of what are now the states of Mato Grosso, Rondônia, and Amazonas as part of its endeavor to set up telegraph lines that would link these regions to the country's main cities. Over time, the malaria endemic to the places visited by the commission forced it to abandon some of its goals and delay achievement of others. The article focuses on how the disease impacted the work of the commission and highlights creation of a sanitary service intended primarily to control malaria.

Keywords: Rondon Commission; telegraph; territory; malaria; Brazil.

Starting in 1907¹, a group of Brazilian army officers and soldiers began traversing vast regions of what are now the Brazilian states of Mato Grosso, Rondônia, and Amazonas on a mission to extend telegraph lines to the far northwestern reaches of the country. These members of the army were joined by telegraphers and linemen on loan from Brazil's General Telegraph Office (Repartição Geral dos Telégrafos – RGT), civilians hired to do heavy labor, and, on occasion, by groups of indigenes; all told, this meant some three hundred to six hundred people were part of the Strategic Telegraph Commission from Mato Grosso to Amazonas (Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas – CLTEMTA), also known as the Rondon Commission.² Created under the Affonso Penna administration (1906-1909) and headed by Colonel Cândido Mariano da Silva Rondon (1865-1958)³, the Commission was one of the greatest efforts undertaken during the early decades of the Brazilian Republic to incorporate the 'northwestern sertões'⁴ into the rest of the country. The commission represented the acme of Rondon's lengthy presence on the public stage and is often mentioned in mythic narratives about the life and feats of this eminent figure in the history of Republican Brazil.⁵

The commission was charged with building a telegraph line from Cuiabá towards Santo Antônio do Madeira; from there it would continue to Manaus, crossing the territories of Acre (which Bolivia ceded to Brazil under a 1903 treaty), Alto Purus, and Alto Juruá, in the thick of the Amazon rainforest. Answering simultaneously to three ministries – War; Transportation and Public Works; and Agriculture – CLTEMTA was supposed to expand the country's communications infrastructure via telegraph lines, ensure secure possession of the country's northwestern regions, make contact with indigenous societies, conduct scientific surveys (botanical, zoological, anthropological, and geological), and inaugurate productive settlement of the region by creating small agricultural and livestock-raising communities in the vicinity of telegraph stations (Maciel, 1998; Diacon, 2006; Sá, Sá, Lima, 2008).

For reasons discussed later, CLTEMTA was forced to restrict the gamut of its duties over the years.⁶ Still, we find descriptions of the commission's 'feats' in a wide range of texts produced by its members, from activity reports, notebooks, and field diaries to scientific studies and public conferences. These documents underscore the moral qualities of the men engaged in the project as well as the tremendous complexity of their work. There is no lack of illustrative examples of the commission's work. Almost all reports are rife with accounts that bring to our attention the great distances covered during the commission's variety of expeditions and the wide range of hardships encountered during its myriad endeavors. Transport issues, problems with troop discipline, searing temperatures, constant rains, and attacks by indigenous groups were mentioned time and again in published reports and during conferences held by Rondon in Rio de Janeiro (1910 and 1915) and São Paulo (1910). These passages demonstrate how CLTEMTA members often depicted their commission as an epopee: the epic shaping of Brazil into one integral nation. Theirs was a quest to extend the Brazilian State into the country's interior as part of a movement to conquer Brazil's sertão regions.⁷

Brazilian historiography has explored CLTEMTA's achievements in northwestern Brazil from different perspectives. Some research focuses on Rondon's indigenist policies (Bigio,

2000); other studies emphasize how the notion of national integration was a compass for a wide series of commission activities (Maciel, 1998); and still others seek to understand the commission through the prism of Rondon's own history, the controversies in which he became involved, and the initiatives he took during his career (Diacon, 2006). Researchers from the history of the sciences have recently been drawn to studies by the naturalists who accompanied CLTEMTA's infrastructure works (Sá, Sá, Lima, 2008). Engineers and naturalists have written many volumes investigating the results of the commission's work in this region, including catalogues of botanical, geologic, and zoological specimens, glossaries of terms used by indigenous groups, surveys of waterways, and corrections to information on old maps. Yet little has been written about the prime obstacle encountered by the commission in its efforts to foster settlement of the northwestern sertões: the high incidence of disease in this region (Diacon, 2006; Caser, 2009). Disease hampered progress in installing the line, not rarely bringing it to a full stop, afflicting the men already there and discouraging those who were supposed to come settle the northwestern region of Brazil. While Rondon and other commission members sought to stress how migrants would benefit from nature in this region, the fears incited by disease had the opposite effect, reminding any who dare venture there that their fate might be death.

Given the impasse this created for the commission, the physicians who took part during its eight years of work came to play a major role. After all, it was up to them to control the region's diseases, reduce illnesses among CLTEMTA members, and diminish fears of the sertões so that the region could really be settled. These doctors had to swing the pendulum away from disease, fear, and failure and towards construction of the line, settlement of the territory, and successful accomplishment of commission goals.

This article explores the work of the commission's physicians and the creation of CLTEMTA's sanitary service, designed in an effort to control the diseases of Brazil's northwestern sertões – particularly malaria – and thus ensure the progress of these efforts. Yet establishment of the service was also a clear sign that these diseases were seen as true threats to plans to settle the sertões and the commission's commitment to extending the telegraph line.

Fear of disease

Right from the first arrival of CLTEMTA workers in Brazil's northwestern sertões, where they were sent to build a telegraph line to guarantee swift communication between those regions and the country's political center of Rio de Janeiro, until January 1, 1915 – the day the line was officially inaugurated – a number of diseases jeopardized the endeavor, sapping the energies of commission leaders and workers, thwarting progress every day, and often taking a toll in lives.

Reports on the commission's activities are plentiful, with 104 volumes published as part of the Rondon Commission series, 86 of which pertain solely to the period of CLTEMTA (Brasil, 1950). In these reports, almost all commission officers mentioned disease-related problems and offered their own assessments about the serious nature of the public health situation in some regions. This article will make clear the vital nature of the medical

observations made during all stages of the commission's work (general reconnaissance and exploration of the regions, construction of the telegraph line, trail blazing, and reconnaissance of the region's main rivers). The examples listed in these pages were chosen from among many others found in the documents under study. They deal with different phases of CLTEMTA's activities and show how diseases created complex challenges for each and every operation over the course of many years.

At one conference about the commission's research and exploration of the territory the line was to cross, Rondon himself devoted several enlightening paragraphs to a place of major import back then: Santo Antônio do Madeira, the end of the telegraph line and the town that would serve as the base of operations for construction of the Madeira-Mamoré railway, a project undertaken around the same time and place (Hardman, 2005). Rondon had this to say about the town:

I do not remember ever having seen such an ugly, sorrowful settlement.

Its population – comprising adventurers from all across the world, with a multitude of addictions, alcoholics – seems desirous of electing as its highest standard a disregard for hygiene and cleanliness. Trash piles up in the middle of the streets; cattle are slaughtered, skinned, and quartered for food right there; putrid odors come from all directions. Almost always rotted and unusable, staple goods are exorbitantly, ridiculously expensive. The main branch of commerce is alcohol.

In short, after having seen this unfortunate village, no children at all living there, one understands that only by some miracle would it not suffer the appalling mortality for which it is famed; unfairly generalized, it is this reputation that for many years has paralyzed the movement to conquer the banks of the Madeira, [settling it with] honest, hard-working people, able to benefit from the inestimable wealth of this soil (Rondon, 1919, p.75-76).⁸

On top of the atrocious public health situation in this and other towns, villages, and settlements along or near the route of the telegraph line, the sicknesses that befell commission members were another problem that jeopardized works progress – and, not rarely, dramatically so. Once again, Rondon himself gives us an idea of the proportion of the problem, this time during the blazing of trails and laying of telegraph lines. He warns the country how much effort will be required to achieve the commission's goal. The following long citation serves not only to emphasize the practical and symbolic importance of the episode Rondon narrates here but also to present arguments in favor of opening roads and telegraph lines in the sertões of northwestern Brazil:

Following completion of the great Reconnaissance of 1909, and after exploring the resources of which we could avail ourselves at the Madeira and inquiring about the salubrity of the region, I decided, in order to accelerate the completion of our work, to simultaneously undertake work from Santo Antônio on down, towards Alto Jamari, to meet up with the main line. Thus, in April 1910, I created the section assigned to this work, under the name "Northern Section." Major Agostinho Raymundo Gomes de Castro was appointed its head; he chose his aides and marched with them to their destination in May, spending the month of July in Manaus on administrative organization; he continued on to Santo Antônio in July, initiating works in August.

He was so unfortunate, however, that the following month almost all his staff were unable to work. He and Lieutenant Clementino Paraná, commander of the contingent, were the first to fall ill, despite their exemplary energy in organizing and executing these works.

Location work could only resume in November; construction itself remained at a standstill for lack of soldiers. A public tender had to be held to open a large trail, only six kilometers of which had been initiated by the contingent of soldiers, starting from the Henrique Dias camp on the Madeira–Mamoré railway.

Despite this initial near-disaster, I insist construction there be continued immediately. Following the example of the Madeira–Mamoré, we must not be discouraged by the apparent inclemency of the climate in the upper Madeira; extreme hardiness, perseverance, and great energy will be needed to conquer and tame it. Without these physical and moral traits, we will be able to achieve nothing in that region, which we will only be able to change and render adaptable to human life through much and great audacity.

We will have to spend some money to overcome natural obstacles, but once the region has undergone modifications, it will offer a major contribution towards paying off these public expenditures by allowing its inhabitants to engage in more profitable experiments and initiatives thanks to a territory more adaptable to industrious activities.

The expenditures we make in order to penetrate into these vast lands represent a loan against the future, this is true; but the payment of interest is guaranteed and at usurious rates.

There is no other process we could employ to achieve settlement of our Central Brazil ... for it represents the future bread basket of Earth (Rondon, s.d.-b, p.17-18).

The incident narrated here by Rondon was of substantial import to the commission. After all, construction of an entire section of the telegraph line came to a halt at its most decisive phase because of the high rate of illness among officers and workers. The men with the Northern Section working on construction of the main line, under the command of Major Agostinho Raymundo Gomes de Castro, could only tolerate a month at the place mentioned by Rondon; they managed to lay only six kilometers of telegraph line, although they were supposed to build kilometers and kilometers, which would eventually meet up with the Southern Section at some point along the way. The joining of the two sections would mark the completion of construction works and the inauguration of communication by telegraph throughout the region traversed by the line. Disease made this meeting more difficult than Rondon could have imagined at first.

Second Lieutenant Otávio Felix Ferreira e Silva was the military engineer in charge of the expedition to explore and survey the Jamari River, which included team members Afonso Henrique de Magalhães, photographer; Luiz da França Souto Maior, pharmacist; Manfredo dos Reis Maciel, day-laborer; and 12 infantry soldiers (Ferreira e Silva, 1920, p.6). Ferreira e Silva also recorded the presence of diseases in the regions he passed through. According to him, in the Jamari valley area:

In terms of mortality, the harshest diseases are malarial in nature. There have been several cases of beriberi, tuberculosis, and dysentery.

Given their widespread morbidity, illnesses of the digestive tract are more salient, the most common including enterocolitis, enteritis, and diarrhea, although their percentage rate is low.

Impaludism⁹ takes the greatest number of lives on the Jamari and its most common form of presentation is quartan fever, followed by persistent and masked fevers, which have no fatal consequences.

Many cases of malarial polyneuritis have been taken for beriberi. A number of physicians (including Major Gouvêa Freire) believe there is an affinity between impaludism and beriberi, while some associate this illness with an animal epizote.

There is also a very small percentage of illnesses of the eye, croup, tetanus, cancers, meningitis, congestions, hemorrhages, mental alienation, epilepsy, arteriosclerosis, aneurysms, nephritis, Bright's disease, rheumatism, erysipelas, scrofulosis, elephantiasis, and gangrene.

Likewise common are jaundice, eczemas, other skin ailments, dry leprosy, and ulcers on the legs.

Among the various intra- and extra-local causes for the appearance of malarial diseases, rheumatism, dyspepsia, and dermatoses along the course of the Jamari, we should mention the following: living on the river in lowland areas that are readily invaded by floodwaters and subject to heat during low waters, with organic matter from plants and animals thus exposed to putrid fermentation; the constant fog and mists on extremely humid nights, and the water that residents fetch from *igarapés* [narrow, navigable rivers] or lakes, which contain many plants and which drop steadily in level through evaporation; the poor quality, insufficient quantity, and sometimes total dearth of indispensable food debilitates and predisposes [the organism] to contracting diseases.

Working the whole day long in the water and on waterlogged land likewise contributes to this picture. ...

Those on their way to settle on the Jamari, as on all rivers of the Amazon Basin, are transported under poor conditions, which are random, temporary, and thus remediable, but contribute to increasing both impaludism and beriberi.

Add to this series of depressing, pernicious circumstances the absence of physicians and field hospitals and it is easy to imagine the fate of these throngs of men, women, and children if there is an outbreak of paludism or beriberi in the midst of this infected environment in which they travel.

The region is unhealthy, as indicated by the various causes mentioned, yet we must also add to these the negligence, imprudence, and lack of diligence on the part of those responsible for so many lives that have been sacrificed in settling the river.

On the Jamari, it is rare to find elderly people; the only ones we encountered were the old men Bufo and Basílio.

The expedition lost the day-laborer Manfredo dos Reis Maciel and the soldier José Ferreira do Nascimento, both of whom fell victim to impaludism.

Everyone suffered intermittent fevers that were in part combated, but they returned extremely debilitated from Jatuarana, where the survey had to be suspended due to the absolute lack of good health.

Ferreira e Silva has left us with a survey of the main diseases in the vicinity of the Jamari River and even suggested some of their causes and – albeit timidly – possible solutions. What first catches our eye is the broad spectrum of diseases he names and also how seriously they affected the expedition: all 16 members caught malaria, two of whom died, and work had to be interrupted before it was finished “due to the absolute lack of good

health” on the part of the men. Once again, disease appears as a stumbling block for the commission, abruptly curtailing planned work.

If Santo Antônio do Madeira was a town without children, the entire Jamari River region was a place without any elderly. One way or another, without childhood or without old age, this was life in a place where men seemed unable to realize their full potential. Diseases were more than just a threat; they seemed to represent a roadblock to the settlement of Brazil’s northwestern sertões.

As mentioned earlier, reports like these are manifold in commission member reports. Although the way in which these diseases presented may not always have been as dramatic as described in the cited passages, we invariably find them listed among the hardships encountered by a wide variety of expeditions. One example is Captain Manoel Teófilo da Costa Pinheiro’s report on the exploration of the Jaci-Paraná River, where he writes that “the Jaci-Paraná is very unhealthy and paludous. Rare was the day when two or three men were not ill. Fortunately, the impaludism always presented in its most simple, benign form, known amongst rubber-tappers as *maleita* or *sezão*” (Costa Pinheiro, 1910, p.24-25).

Captain Costa Pinheiro received orders to explore the Jaci-Paraná and establish a base camp there for the third exploration and reconnaissance expedition led by Rondon, which left Juruena in June 1909, heading towards the Madeira River. The two groups failed to meet because a mistake on the region’s maps led Rondon to confuse the Jamari and Ji-Paraná or Machado river basins. However, the head of the commission stated that this officer:

had established camp there and was stoically awaiting the men from the South, resisting bouts of impaludism, together with Lieutenant Amílcar Botelho de Magalhães.

These fevers struck the entirety of the expeditionary column; considering the absence of physicians, those who were gravely ill received orders to retreat, so that by this time only one-third of the original troops remained (Rondon, 1919, p.76).

Disease therefore presented an ongoing challenge for the commission in its goal to settle the northwestern sertões. If CLTEMTA was to fulfill its assignment, it could not afford to overlook this problem. Much to the contrary, the commission would have to devise strategies that reined in diseases and their impact on the progress of the venture.

While the men most directly involved in this task were commission physicians, disease was inarguably an issue of interest not only to them. Indeed, it was a central problem affecting all of CLTEMTA, since the project of making the northwestern sertões an integral part of the nation depended upon its solution. None of the texts cited so far were written by doctors but by military engineers who held leadership posts with the commission – foremost among them Rondon himself – and who demonstrated expressed concern over the constant diseases hampering river exploration and construction of the telegraph line.

While it was everyone’s problem, commission doctors focused more directly on it, pondering its causes and putting forward proposals on how to cope with it. The next section will examine how these figures dealt with the diseases present throughout all phases of the commission’s work. We will see how the causes of these menacing diseases were explained, which of the illnesses occurred more frequently (particularly malaria), and what strategies were enforced in the effort to control them.

Malaria: disease of Brazil's northwestern sertões

In *Picturing tropical nature*, Nancy Stepan (2001) explores modern representations of tropical nature, starting with the late-eighteenth-century studies of naturalist Alexander von Humboldt and continuing through to Roberto Burle-Max's modernist gardens, designed in the mid-twentieth century. Stepan points out that the category tropical nature, as we understand it today, was shaped by three areas of knowledge: natural history, the human sciences (mainly anthropology), and medicine. These areas correspond roughly to three fundamental components into which the tropics are divided: tropical places (characterized by hot climates but above all by their status as colonies or countries dependent upon Europe's key metropolises), tropical people (dark-skinned, sickly, poor people), and tropical diseases (basically those transmitted by vectors).

Like Alexander von Humboldt, Alfred Russel Wallace, Louiz Agassiz, William James, Patrick Manson, and Roberto Burle-Max – figures examined in Stepan's book – CLTEMTA likewise 'invented' its own tropical nature: the northwestern sertões. Forging links between hot climates, the presence – better put, the omnipresence – of tropical diseases and their vectors, and semi-civilized, wretched, sickly people, the many reports written by commission members molded what would be the tropical character of a region which now runs from northwestern Mato Grosso to southwestern Amazonas, crossing the entire state of Rondônia.

CLTEMTA modeled its own understanding of what lent the northwestern sertões their tropical nature, using as its points of reference the three areas of knowledge that Stepan (2001) identifies as lying at the origin of the modern notion of tropical medicine. Naturalists sent by the National Museum collected botanical, animal, and mineralogical specimens; anthropologists from the same institute studied the physical make-up, vocabulary, and customs of indigenous peoples; and physicians investigated the life styles of the rubber-tappers and other regional residents, as well as the main diseases. The places, people, and diseases of Brazil's northwestern sertões were objects of research for the commission, which, in a monumental 86-volume work, invented its northwestern sertões and assigned them the label 'tropical.' Within this panorama, medical surveys warrant special attention, for as Stepan herself has stated, even prior to the emergence of tropical medicine, the medicine of 'hot climates' had earned the physician a role as one of the most important investigators of the tropics.

This link between climate and disease in fact predates tropical medicine. In nineteenth-century studies of medical climatology and geography, for example, climate and geography were considered the main determinants of diseases around the world, and assessing local singularities was the only way to understand the diseases peculiar to each place.

CLTEMTA's various physicians did not offer any monocausal explanations for the incidence of diseases in the regions they traveled. To the contrary, one of their main concerns was to demystify the idea that climate was a unique, definitive impediment to the productive occupation of the northwestern sertões. Although climate was not eliminated outright from explanations of the scenario of diseases in the regions under study, neither was it cast as the sole determinant of the infeasibility of human occupation of these places

but as merely one of the factors indirectly responsible for this challenge, reflecting the occurrence of certain diseases, like malaria.

This view of climate is typical of tropical medicine, a discipline that emerged at the turn of the twentieth century and was institutionalized with the establishment of the Liverpool School of Tropical Diseases, London School of Tropical Medicine, and Hamburg's Institut für Shiffs- und Tropenkrankheiten (Institute for Maritime and Tropical Diseases), founded in 1898, 1899, and 1900, respectively. This new field of medicine was especially important in Brazil, where in the early years of the twentieth century, scientists began combining microbiological analyses with natural history and entomology research in their studies on malaria, yellow fever, the plague, and other diseases, in particular scientists from the Oswaldo Cruz Institute (Caponi, 2002, 2003; Benchimol, Sá, 2005; Sá, 2005, 2008; Benchimol, Silva, 2008; Kropf, 2009).

The following physicians worked with CLTEMTA: Armando Calazans, from March 11, 1907 to July 20, 1908 (Botelho de Magalhães, 1919); Manoel Antonio de Andrade, from March 11 to December, 1907 (CLTEMTA, s.d.-b, p.17); Joaquim Rabello, from July 6 to December 31, 1908 (Calazans, s.d.); Joaquim Tanajura, from April 1909 through inauguration of the telegraph line) (Botelho de Magalhães, 1919); Paulo Fernandes dos Santos, from June 26, 1909 to December 31, 1910 (Botelho de Magalhães, 1919); Murillo de Campos, from May-November, 1910 to September-December, 1911 (Campos, 1913, p.220); José Antonio Cajazeira, from January 21, 1914 through inauguration of the line (Botelho de Magalhães, 1919); João Florentino Meira de Faria, around 1914 (Meira de Faria, 1916); Fernando Soledade (Rondon, 1916); Esperidião Gabino; Serapião; and Alberto Moore. They were assisted by pharmacists who sometimes did the jobs of doctors. Second Lieutenant Manoel Lopes Versosa, Benedicto Canavarro, Luiz de França Souto Maior, and Antônio Pereira de Andrade served as pharmacists with CLTEMTA.

Most of the commission physicians were from different branches of the military. Armando Calazans was a first lieutenant with the army, as were Manoel Antonio de Andrade, Joaquim Rabello, Murillo de Campos; João Florentino Meira de Faria and José Antonio Cajazeira were captains in the army; Paulo Fernandes dos Santos was an officer with the Armada; and Joaquim Tanajura was a member of the sanitary team on the Federal District's police force. We were unable to obtain information on the backgrounds of the other physicians (Fernando Soledade, Esperidião Gabino, Serapião, and Alberto Moore).

It should be noted that these commission physicians seemed quite familiar with tropical medicine¹⁰, as reflected in their numerous citations of work by Brazilian and foreign doctors from the field in their reports, especially about malaria, which was the disease that brought CLTEMTA the biggest losses as well as headaches and was also the paradigmatic model of tropical illness. Doctors Murillo de Campos, Joaquim Tanajura, and Antonio Cajazeira – authors of the longest and most important medical reports by commission physicians – cited Englishmen Patrick Manson and Ronald Ross as well as Italians Amico Bignami, Giovanni Baptista Grassi, and Giuseppe Bastianelli, who had worked to uncover the means of malaria transmission in birds and humans, respectively; they also cited research on aspects of this same disease by Arthur Neiva at the Oswaldo Cruz Institute.

In general terms, the advent of tropical medicine heralded the solidification of a way of understanding certain diseases from a broad, diversified perspective that blended natural history, zoology, entomology, and medical practice with Pasteurian microbiology (Caponi, 2002, 2003; Benchimol, Sá, 2005; Sá, 2005, 2008; Benchimol, Silva, 2008; Kropf, 2009). Tropical medicine's bio-geographical eye was particularly attentive to relations among living beings (which included the microorganisms that caused disease, the vectors that transmitted these microorganisms, and the men who tried to control these relations through sanitary and social initiatives) as well as to relations between living beings and the climate and geography of the places where they lived, as it endeavored to understand the dynamics tying all these threads together.

Grounded in research from the field of tropical medicine, physicians began referring to the 'environment' as a complex chain of interrelations involving a diversity of living beings (disease vectors playing a central role), geography, climate, humidity, and average temperature in a given place. This stance differs markedly from that found in the cited studies on medical climatology and geography, where climate and geography are seen as determinants of each region's nosological profile. For them, living beings and their interrelations did not figure in as part of the environment, interpreted solely as the product of a straightforward combination of climate and geography.

In their effort to understand the presence of malaria in the northwestern sertões, CLTEMTA physicians relied on this bio-geographical perspective, characteristic of tropical medicine. Their initial tendency was to deny that geography and climate – particularly the latter – could in themselves produce disease. Yet these same factors were seen as creating the conditions that allowed the causal agents of the disease to exist (i.e., the protozoan *Plasmodium falciparum* or *P. vivax*) and, more importantly, enabled the reproduction of its main vectors: mosquitoes of the genus *Anopheles*.

So the regional conditions favorable to completion of the life cycle of the *Plasmodium* were considered the culprit responsible for the existence of malaria. Physicians observed a populace already contaminated by the protozoan, which constituted a type of reservoir for *Plasmodium* as well as for *Anopheles mosquitoes* (the intermediary host and transmitter of this parasite); they also encountered men who had just arrived to work the rubber trees, the Madeira–Mamoré railway, or with CLTEMTA, some of whom had never been contaminated by the protozoan and thus had no resistance at all to the disease. The environment was thus extremely favorable to malaria, which attacked practically all the men who ventured into those parts, to a greater or less lethal degree.

Malaria was diagnosed through clinical examination by determining a patient's degree of splenomegaly (enlargement of the spleen) and through blood tests; the latter, however, could not always be performed, since most of the expeditions had no microscopic instruments. In addition to examining CLTEMTA members, commission doctors also examined the soldiers and *regionais*¹¹ who came forward (depending upon each doctor's opinion about a person's health, the patient could be refused or accepted), as well as the rubber-tappers and residents of the settlements of the northwestern sertões.

In the opinion of these physicians, the latex gatherers and other inhabitants of these sertões were primarily to blame for the high number of cases in the region, because, as

stated earlier, they were natural reservoirs for the protozoan that caused the disease. Doctor Joaquim Tanajura (s.d., p.36) had this to say about rubber-tappers:

As regards hygiene, he lives his life haphazardly, and the influence of the moral enfeeblement that crushes his vitality comes on top of great superstitious ignorance ... He blazes into the woods without prior adaptation, isolates himself in disorderly housing, takes inadequate nourishment, abuses alcohol, overdoes in his work, spends long durations of time in swamps, and eventually falls ill, whereby this picture is transformed into one of pain and affliction, without the aid of science and often times without recourse to medicine which might serve as a balsam, his organism gradually weakening until the trials of death. Here it is not the climate that enfeebles; it is man who kills himself.

Poverty, nutritional deficiencies, and poor working conditions made these men easy prey to disease and, because they were contaminated with *Plasmodium*, a menace to general good health where they lived. When all this was considered in conjunction with regional geography and climate (primarily, temperature, humidity, and rainfall), the physicians were up against circumstances entirely favorable to the reproduction of the *Anopheles mosquitoes* that transmitted *Plasmodium*. Average annual temperatures and humidity were high and rainfall, constant (Cajazeira, 1914, p.131-133).

In geographic terms, the northwestern sertões straddled the borders of South America's two largest river basins, the Prata and the Amazonas; the land lay higher where it was an extension of Brazil's Central Plateau, while lower altitudes prevailed in the river basins. The entire region was intersected by the rivers of the two basins. While plantlife on *chapadas* (plateaus) consisted of fields or savannahs, it comprised forests or woods in the Amazon basin and the headwaters of the rivers traversing the region (Campos, 1913).

Steady rains falling year round, with a heavier season from November through April, together with the region's large number of rivers prompted the formation of pools of standing water along stretches of the path of the telegraph line. So the sites of construction were propitious to the reproduction of malaria-transmitting mosquitoes.

Another factor that helped spread the illness was the arrival of new workers, many of whom had never had contact with the disease. Assigned to build the line, take part in reconnaissance, and survey the coordinates of the region's main riverbeds, these men were constantly moving about the sertões. While the physicians' task was to try to control contamination rates among these men, a review of commission reports makes it clear that many caught malaria and thereby became traveling reservoirs of *P. vivax* and *P. falciparum*, responsible for the milder and more severe forms of the disease, respectively. Almost all the tables recording the diseases that struck members of CLTEMTA indicate that the top-ranking disease was malaria, which afflicted a larger number of soldiers, personnel from the General Telegraph Office, and Brazilian army officers.¹² According to the "Mapa nosológico dos doentes tratados na Enfermaria da 1ª Seção da Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas, desde 13 de maio de 1907 a 27 de fevereiro de 1908" (Nosological map of patients treated at the Infirmary of Section 1 of the Strategic Telegraph Commission from Mato Grosso to Amazonas, from May 13, 1907 to February 27, 1908), written by Doctor Armando Calazans, 81 of the 372 patients admitted to the infirmary presenting with some type of problem had malaria. According to the "Relação das pessoas

pertencentes à turma de exploração do rio Machado, que foram examinadas e medicadas de 25 de outubro a 30 de novembro de 1909” (List of persons belonging to the group exploring the Machado River who were examined and medicated from October 25 through November 30, 1909), written by Doctor Joaquim Tanajura, eight of the 11 examined had malaria. Lastly, according to the “Relação dos doentes examinados e tratados no mês de janeiro, pertencentes à turma dirigida pelo tenente-coronel Candido Mariano da Silva Rondon e que explorou o rio Pardo via Jamari-Madeira (List of patients examined and treated in the month of January, belonging to the group commanded by Lieutenant Colonel Cândido Mariano da Silva Rondon and who explored the Pardo River via Jamari-Madeira), likewise written by Tanajura, all 14 of those examined were suffering from malaria.

In addition to researching the region’s nosological picture and working to prevent and control malaria as well as other diseases afflicting commission members and the local population, some CLTEMTA physicians collected insects. Doctors Antonio Cajazeira and Murillo de Campos compiled collections that were later examined by Adolpho Ducke, naturalist with the Emílio Goeldi Paraense Museum, and by Oswaldo Cruz Institute researchers Henrique de Beaurepaire Aragão and Adolpho Lutz, who published volumes on zoology as part of the Rondon Commission’s series (Aragão, 1916; Lutz, 1912).

When CLTEMTA physicians gazed out over the northwestern sertões, what they saw was an environment more favorable to the living and breeding of *Plasmodium* and *Anopheles* mosquitoes than to the living and breeding of humans. The balance between these three groups of living beings tended towards the first two in detriment of the last. Thus, in the eyes of commission physicians, in the sertões of northwestern Brazil man was both an intruder in the midst of a hostile natural environment as well as a hostage of malaria and easy prey to the disease.

Creation of CLTEMTA’s Sanitary Service: an attempt to control malaria

Right from the outset of exploration expeditions into the territory, prior to the actual placement of telegraph lines, members of the commission paid a heavy toll to malaria. In a major report on the research and reconnaissance expeditions conducted in that region between 1907 and 1909, it is once again Rondon himself who tells us that:

Finally, since the 28th [of April of 1908] the fever has not left me, returning every night; I’ve already finished off a bottle of *exanofeles*, and two of coffee with quinine, with no appreciable results.

The village of Mathias [Tolairy, a Pareci Indian who helped the commission during some expeditions] was a site of all types of paludism. This sickness swept across the entire sertão this year, from Parecis, where it was heavy, to Juruena, where it has raged since November of last year. A number of soldiers, Lieutenant Commander Ferreira, and one civilian fell victim there (Rondon, s.d.-a, p.186-187).

If some episodes of illness among members of the commission were especially dramatic, crippling progress on works, others reveal important aspects of medical work inside CLTEMTA. In addition to the incident involving the head of the commission, who was forced by illness to spend almost all of 1910 in Rio de Janeiro, two other events merit our

attention: the retreat from the town of Mato Grosso and Doctor Joaquim Tanajura's 45-mile trip in July 1909 to treat an arrow wound received by a soldier known as Pequeno.

The first of these episodes took place in February 1908, when rains intensified in the region after inauguration of the telegraph station in the town of Mato Grosso. Worried about the many pools of standing water where *Anopheles* malaria transmitters could multiply, Rondon ordered the immediate retreat of the expeditioners to São Luís de Cáceres, in hopes of keeping the disease from attacking. According to the head of the commission: "It was urgently necessary to remove personnel from the paludous location during this month in which it is common to hear the town's residents say that not a single 'pintado' [a type of hardy fish] that appears hereabouts at this time fails to fall ill with the fever" (Rondon, s.d.-b, p.22). His tactic, however, met with failure. Of the 228 people who abandoned the town of Mato Grosso, only 24 reached Cáceres in good health; of the 204 who fell ill, six died along the way (Rondon, s.d.-b; CLTEMTA, 2003).

The other episode involved Doctor Joaquim Tanajura, who Todd Diacon (2006, p.65-66) called "the busiest physician in all Brazil during the winter and spring of 1909." It occurred following a Nambiquara attack against a transport column carrying supplies meant for a group of expeditioners under Rondon's command. A commission soldier by the name of Rosendo – known to all as Pequeno – was wounded during the attack. When Doctor Tanajura reached the locale after a 45-mile ride on horseback, he found that the soldier's serious chest wound had been aggravated by the treatments administered by the men who sought to help him. Doctor Tanajura managed to save Pequeno by combining frequent antiseptic washes with morphine injections to relieve the pain (Rondon, 1919, p.51; Diacon, 2006, p.65-66).

If we examine these two events with a careful eye, we find elements that help us better understand certain aspects of the Rondon Commission. The abandonment of the town of Mato Grosso was its first major clash with malaria, which was to prove the great obstacle to occupation of the northwestern sertões from February 1908 on. It is worth noting that the term Rondon and his colleagues used in referring to the episode was precisely 'retreat' and not 'relocation.' In military jargon, relocation is not as highly charged, implying simply that troops will be repositioned; a retreat, however, carries with it the connotation of a forced march in the face of imminent defeat in order to cut losses. This retreat from the town of Mato Grosso implied that CLTEMTA recognized it had been defeated by malaria. Furthermore, it can be said that the operation failed, given the huge number of men who fell ill compared with the number still healthy at the end: of all who took part in the operation, 90% versus 10%.

This traumatic retreat evinced the fact that malaria would prove the main disease faced by CLTEMTA during construction of the line, infecting a large share of the men on the expeditions over the years – civilians, officers, and soldiers alike. As pointed out earlier, in some cases malaria did not only kill; it also left men unfit for work or at best reduced their productivity, slowing progress on construction of the telegraph line. All said and done, malaria was to leave its mark on CLTEMTA's activities. Following the retreat from the town of Mato Grosso, the feeling of danger and fear of the northwestern sertões became a basic fact of life for the commission members traveling through the region.

Doctor Tanajura's lengthy medical journey of July 2, 1909 helps us understand an important aspect of CLTEMTA: the work of the physicians involved in this endeavor. At least until mid-1909 – the time of Tanajura's trip – commission physicians had to redouble their efforts in order to attend to all the sick men working the various shifts. CLTEMTA was created on March 4, 1907 (*Instruções...*, 1907) under a decree issued by the Ministry of Industry, Roads, and Public Works, reproduced in part in Rondon's long report on the commission's studies and reconnaissance work. According to this decree, initially only two physicians (First Lieutenants Armando Calazans and Manoel Antonio de Andrade) and two pharmacists (Second Lieutenants Manoel Lopes Versosa and Benedicto Canavarro) would be responsible for the state of health of three hundred workers scattered among the various commission crews in the northwestern sertões (Rondon, s.d.-a). They had few assistants and precarious facilities for treating patients or storing medical and sanitary material. In his report, Doctor Manoel Antonio de Andrade, who was part of the second construction section (responsible for the main line from Cuiaba to Santo Antônio do Madeira), stated that his section's health service comprised one physician, one pharmacist, and one male nurse; he added: "A tortoise tent serves as our infirmary; it has a capacity for 16 soldiers and for our medical-surgical field hospital, which is provided by the military's chemical and pharmaceutical laboratory and by the army's supply of sanitary material; it is set up in a tent with a double cover" (CLTEMTA, s.d.-b, p.18). Both the infirmary and the medical-surgical field hospital (a mobile unit outfitted with medicine and surgical material)¹³ operated out of provisional facilities, and the doctor had only two assistants to help him with his duties. This was the status of the commission's second construction section, which had a doctor devoted full time to its care, despite the problems mentioned earlier.

In 1907, the year addressed in Manoel Antonio de Andrade's report, CLTEMTA had not only a second construction section but also two large crews of workers: one on the first section, assigned to building the telegraph branch from São Luís de Cáceres to the town of Mato Grosso, and the other involved in expeditions of 'studies and reconnaissance,' under the charge of Rondon; at the same time, it had only one more physician, Doctor Armando Calazans. So there was an insufficient number of commission physicians vis-à-vis the numbers of poorly equipped and poorly nourished workers taking part in the expeditions traversing regions of endemic malaria.

Doctor Tanajura's July 2, 1909 trip tells us that there had apparently been no major change to the status quo up to that date. CLTEMTA physicians continued to stretch themselves as best they could to attend to ailing, wounded men in locales lying distant from each other, relying on the help of a few assistants and precarious medical facilities. If we add to this how heavily malaria impacted the commission's work – as exemplified in the retreat from the town of Mato Grosso – we can conclude that the commission was not adequately equipped to deal with either the rather frequent work accidents at camps or construction sites nor to control the main diseases found in the northwestern sertões, right from the commencement of work until at least September 1909, when Tanajura undertook another lengthy trip to treat a soldier who wounded himself while cleaning his Winchester and died despite emergency surgery by the doctor, with the aid of commission

zoologist Alípio de Miranda Ribeiro (Rondon, 1919, p.59; Diacon, 2006, p.66). The result was serious losses, both in lives and also in the pace of work, as many jobs could not be completed on schedule.

This picture illustrates the precarious status of the army's health services back then, incapable of ensuring minimum operating conditions for this important commission charged with taking telegraph lines to the far reaches of the fatherland. As predicted in the early days of the twentieth century by João de Medeiros Mallet, Minister of War from 1898 to 1902 (McCann, 2007, p.105), the army's medical services in a campaign situation would be so precarious as to be fatal, and CLTEMTA members felt this in their very skin. Awareness of the modest nature of CLTEMTA's organized medical services and the realization that malaria presented a colossal challenge to progress on these works led to the creation of a sanitary service devoted solely to the commission. These two points stand out as key concerns in the "Instruções para o Serviço Sanitário das Seções do Norte e do Sul" (Instructions for the sanitary service for the Northern and Southern Sections), published on May 22, 1910. According to the document, this sanitary service would have an infrastructure suitable for treating the diseases of the northwestern sertões, especially malaria, which was to be controlled through both preventive measurements and healing the sick.

The first lines of the document present succinct instructions on organization of the new service:

The sanitary service will be under the responsibility of two physicians, who will rotate between the infirmary (at Santo Antônio do Madeira for the Northern Section and at Serra do Norte for the Southern Section) and telegraph line construction works.

This rotation will occur every three months, as determined by these instructions, which should be strictly followed.

For these purposes, the sanitary service will provide prophylactic measures against paludism and the treatment of patients at the infirmary (at Santo Antônio or Serra do Norte), each one operating autonomously, under the responsibility of one of the doctors (CLTEMTA, s.d.-b, p.109).

This brief excerpt from the instructions for CLTEMTA's sanitary service lets us identify two of the document's main concerns: controlling malaria through preventive measures and optimizing physicians' activities. Another of the document's overriding concerns becomes evident when we add to this the fact that the three sections of the document are entitled "Da profilaxia contra o paludismo" (On the prevention of paludism), "Da enfermaria" (On the infirmary), and "Da instalação da enfermaria" (On setting up the infirmary): to wit, improving the commission's medical and hospital infrastructure. In 1910, the commission's sanitary service was organized around these three mainstays.

The section "On the prevention of paludism" lists six express recommendations for controlling the scourge: strict oversight of food consumed by expedition members; "the categorical prohibition of the use of alcohol"; systematic use of mosquito netting by all commission personnel; "daily quinization of all personnel, at a dose of 50 or 30 centigrams of quinine salt, at the discretion of the physician, distributed during meals, with strict oversight of this process by the physician or a most trustworthy assistant of his"; "strict observance of hygiene measures at the camp"; drainage of land, filling in pools of water,

and destruction of mosquito larva when the doctor deems such procedures necessary; and, lastly, Sunday lectures on hygiene to the workers, at the discretion of the physician assigned to construction works (CLTEMTA, s.d.-b, p.109-110). In addition, it was recommended that anyone with malaria be isolated prior to being moved to the commission infirmary (where they would remain in isolation until further order) and that blood samples be taken from anyone suspected of having malaria and sent to the infirmary for microscopic examination.

The end of this same item on prevention lays out the composition of the team charged with controlling malaria on commission expeditions: one physician, one pharmacist responsible for preparing and distributing medications, “one army nurse charged with general prescription of medicine prescribed to the sick,” one “assistant army nurse,” and, lastly, “five workers, including a muleteer, entrusted with the services of this section, encompassing preparation of the area chosen for isolation of the camp’s ill, draining of the soil as needed, destruction of larvae, filling in of standing waters, etc.” This tallied a nine people crew headed by a physician, who in turn had the assistance of a pharmacist. The entire staff was to accompany the physician on his three-month rotation between construction camps and infirmaries (CLTEMTA, s.d.-b, p.110-111).

The second item (“On the infirmary”) deals with the organization of medical work at the commission’s new infirmaries. The personnel in charge of work at these infirmaries should be the same as those accompanying the physician in malaria prevention efforts on expeditions, with a minor redistribution of duties. In addition to the physician and pharmacist, the members of the infirmary’s medical team would include “two nurses [rotating] on the job,” “four laborers for general services in the infirmary,” and a cook (CLTEMTA, s.d.-b, p.112). Once again, a nine-member team would be headed by a physician and a pharmacist, just like the crew that oversaw malaria prevention at the construction camps, but in this case the muleteer would become a cook and the other four men, who drained soil, destroyed mosquito larvae, and so on, would take care of general work around the infirmary.

The item also specifies the duties to be carried out by physicians while at the infirmaries:

- a) general oversight of general prevention services against paludism and the treatment of the ill sent to the construction camp and any others with the commission, either on the job or traveling through the place where the infirmary has been set up;
- b) strict enforcement of hygiene measures at the site of the infirmary, especially measures involving paludism prevention;
- c) microscopic examination of the blood of all patients, whenever this is possible, to assure diagnostic clarification of the observed cases;
- d) application of appropriate treatment, in consonance with clinical criteria, registering indispensable observations about patients on their charts so these may be recorded in a special book;
- e) strict oversight of the diets administered to patients, to guarantee that they are of the highest quality;
- f) strict oversight of the prescription of medicine prescribed personally or by a most trustworthy assistant;

- g) daily, systematic examination of all paludism patients in critical condition, especially those with lesions on the liver or spleen;
- h) precise and faithful compliance with the instructions of the sanitary service, ensuring that all assistants comply faithfully and thoroughly with these instructions (CLTEMTA, s.d.-b, p.112).

Two aspects of these recommendations strike us at once: first, the repeated concern with malaria, which is patent in three of the recommendations (the first, second, and seventh), and second, the intention of organizing the work of commission physicians so as to optimize it. These two features appear hand in hand; in other words, these instructions are aimed at optimizing the work of commission physicians by focusing on malaria control. The guideline is straightforward: the prime role of CLTEMTA physicians should be to control malaria through preventive measures and to treat the ill, both when the latter were accompanying expeditions into the sertões and when confined to the infirmaries; for the commission, the services of these professionals would be more efficacious and productive if aimed fundamentally at controlling this disease.

The third and final item (“On setting up the infirmary”) offers instructions on how to actually set up the commission infirmaries. These facilities, built of masonry, should be located in an appropriate spot, as chosen by the physician, preferably on higher ground and away from any possible reservoirs of *Anopheles* mosquitoes, “following the same style as their counterparts in paludous areas.” They should include:

- a) a room for treating officers;
- b) a room for treating paludous patients;
- c) a room for treating patients suffering from intercurrent diseases;
- d) a room for patients who have undergone surgery;
- e) an office for the physician;
- f) an operating room;
- g) a room for the pharmacy.

In addition to these, rooms must be available for a kitchen, pantry, bathroom, and water-closets (CLTEMTA, s.d.-b, p.113).

This was the commission’s way of trying to create the most appropriate spaces for treating the ill, including a specific place where those with malaria would be isolated from all others. If we compare these facilities with the “tortoise tent with a capacity for 16 soldiers” (CLTEMTA, s.d.-b, p.18), which according to Doctor Manoel Antonio de Andrade served as a commission infirmary in 1907, and if we also take into account the information that the number of physician assistants rose from two (one pharmacist and a nurse) to eight, it is not hard to detect CLTEMTA’s increased concern with the medical and hospital infrastructure used to treat the ill.

We have no precise comparative data on the cases of illness before and after creation of CLTEMTA’s sanitary service nor do we have any figures suggesting its impact on the results of treatment received by the patients in the hands of these physicians; we therefore can not affirm that this increased concern actually redounded in better sanitary conditions

for the commission. The fact of the matter is, to judge by available figures (see Table 1) and by the reports found in texts by physicians and other commission officers, we can conclude that prior to inauguration of the line between Cuiaba and Santo Antônio do Madeira, disease continued to have a significant impact on work conducted in the northwestern sertões. At one of his conferences on the Roosevelt-Rondon Expedition of 1914, Rondon stated that:

It had been 59 days since we had left the bridge of the telegraph line, with our seven-canoe flotilla plowing through the waters of a river whose name [Dúvida, i.e., Doubt] summed up all the uncertainties derived from the mystery of its course and the unknown region through which it passed. In that period we covered 686,360 meters, the first 276,000 of which were so harsh and hostile that we had to struggle 48 days in a row to overcome them, without letting ourselves be crushed by fatigue, nor by the painful anguish which embittered our hearts and at brief moments overwhelmed our souls as we contemplated the unfathomable Fatality of things in our lives.

We were reaching the end of this arduous journey, almost all of us ill and robbed of all strength (Rondon, 1916, p.106-107).¹⁴

In other words, in 1914, four years after the introduction of CLTEMTA's sanitary service, diseases were still taking the lives of many men participating in the expeditions across the northwestern sertões. One of the ill was none other than President Roosevelt, who in the company of his son Kermit joined the Roosevelt-Rondon Scientific Expedition, whose feats included exploration of the Dúvida River, later renamed the Roosevelt. The former president in fact faced a life-threatening situation, for despite his careful preventive treatment with quinine, he caught malaria and was quite debilitated by the disease. Other members of the expedition had to take special precautions in transporting him on long stretches of their journey (Cajazeira, 1914).

Even prior to this, in his report on exploration and reconnaissance expeditions conducted from 1907 through 1909, Rondon expressed great concern over how disease was affecting the commission's work. As we read in the excerpt below, the head of the commission believed malaria and beriberi represented bigger problems than transportation difficulties or contact with indigenes, which was not always friendly:

Beriberi and paludism continue to represent the main obstacle to our activities in the sertões where we work, because we have managed to ward off the other two hindrances—transportation and Indians: one with money and the other with kindness, patience, and suffering.

By late 1910, the number of deaths registered on the main line had reached 86; along the town of Mato Grosso's branch line, the figure was nine (Rondon, s.d.-b, p.91).

The documents under study did not contain information enough for us to ascertain the precise extent to which sanitary service procedures were actually adopted by commission physicians nor to evaluate how much their routine changed following publication of the sanitary service instructions. We do at least know that the number of working doctors held practically steady, since the instructions stipulate that the sanitary service should be under the responsibility of two physicians, who would rotate between construction camps

and infirmaries. If we compare death statistics from the years before and after creation of the sanitary service, we see that deaths did not drop but instead rose following 1910, as shown in Table 1:

Table 1: CLTEMTA deaths per year

Year	Number of deaths
1907	7
1908	9
1909	15
1910	15
1911	24
1912	8
1913	39
1914	70

Source: CLTEMTA, s.d.-a.

We neither can nor should place our full trust in these data, considering that a simple comparison of the number of deaths among commission members through 1910 as shown in Table 1 with the data presented in Rondon's cited report indicates a substantial disparity. While the table indicates 46 deaths through 1910, Rondon states the figure was 95. Nevertheless, this number is still smaller than the 141 deaths recorded on this same table between 1911 and 1914.

In all reports by CLTEMTA physicians (including therein reports written both before and after creation of the sanitary service), malaria was always the key player. If we bear this in mind, we can conclude that concern over this disease was a constant throughout the commission's eight years of work, demanding the ongoing attention of the physicians who helped moved this endeavor forward.

What this tells us is that despite what was stipulated in sanitary service instructions, the latter did not completely fulfill its purpose, and malaria remained entrenched among commission workers and officers until completion of construction of the telegraph line on the first day of 1915. Of course the disease did not disappear on that date, but it would be less a roadblock to construction works (which had, after all, ended) or to exploration works and more a kind of phantom that would forever haunt the employees at the General Telegraph Office, urged to expect a development boom that they would never see.

Final considerations

The construction of telegraph lines and stations by CLTEMTA between 1907 and 1915 was part of an ambitious Republican project, which also encompassed the defense of Brazil's borders, contact with indigenous societies, scientific surveys, and, first and foremost, the productive occupation of a large share of the country's territory, which commission members called the northwestern sertões. The commission, however, ran into countless obstacles to the fulfillment of these goals, including transportation over very rough terrain and in a virtually unexplored region, steady rains interspersed with periods of relentless

heat, and, lastly, malaria – the expedition’s gravest affliction – which delayed and at times even brought works to a halt.

The need to get malaria under control, to optimize medical services, and to improve the expedition’s medical and hospital infrastructure prompted the creation of the commission’s sanitary service. Its inauguration signaled the moment when doctors and their work became seen as key components in the success of the endeavor led by Rondon. Furthermore, CLTEMTA physicians consequently expanded their activities and interventions, with a greater number of men assigned to their service, which meant fewer men devoted to construction work per se; they were thus able to put into practice measures that included daily, compulsory quininization of all commission personnel – the fourth instruction for malaria prevention – and were required to do a physical exam on all workers prior to their hiring (CLTEMTA, s.d.-b, p.113).

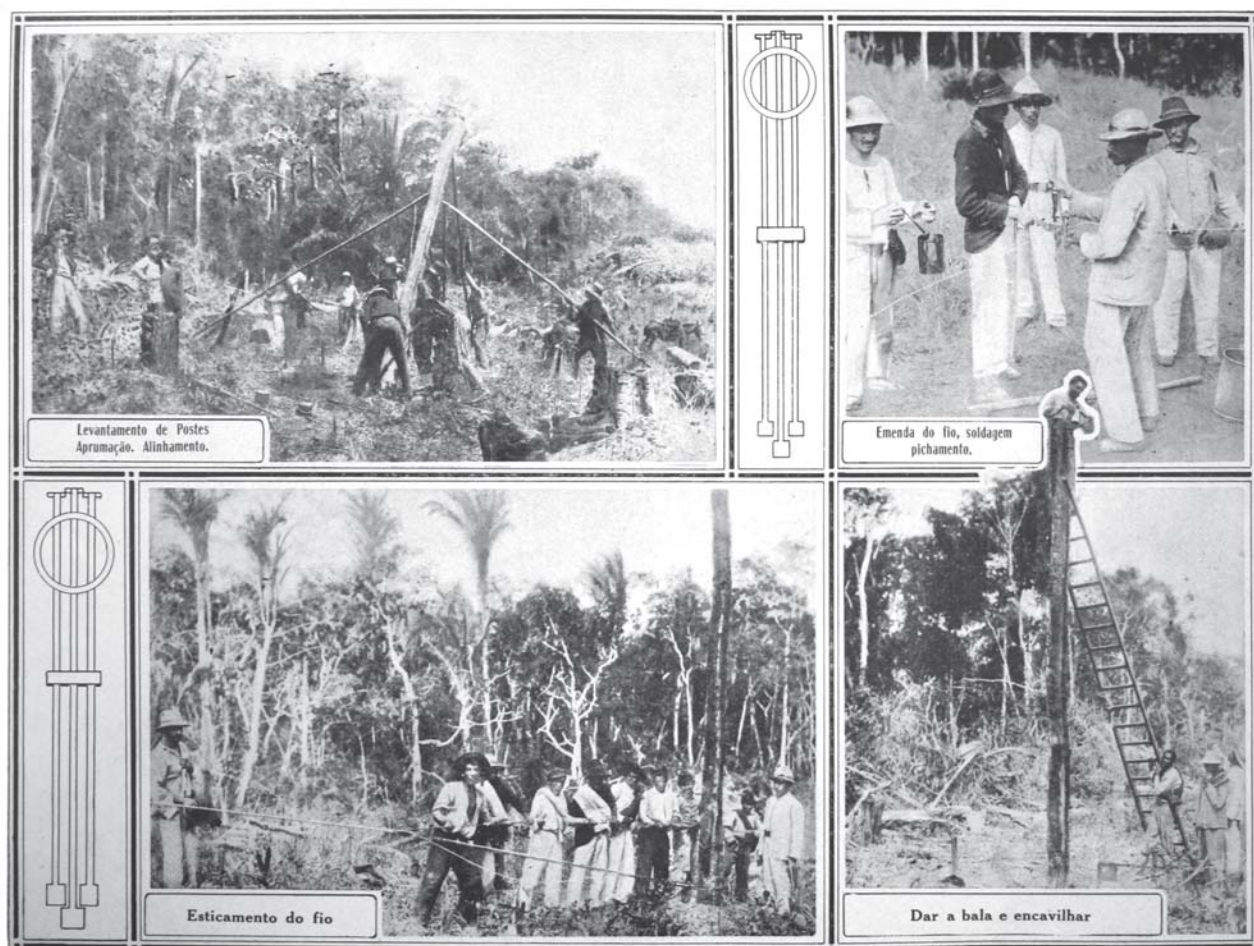


Figure 1: “Fases da construção da linha” (Stages of line construction; Rondon, s.d.-b, estampa 12). Captions: upper left, “Levantamento de postes” (Setting poles); lower left, “Esticamento do fio” (Stretching the wire); upper right, “Emenda do fio, soldagem, pichamento” (Splicing, welding, and sheathing wire); lower right, “Dar a bala e encavilhar” (Fitting poles with insulators)



Figure 2: "Abertura do picadão na margem direita do rio Paraguai" (Opening right-of-way along the right bank of the Paraguay River; Rondon, s.d.-b, estampa 6)



Figure 3: "Trecho do picadão através da mata, vendo-se ao centro a faixa destocada para estrada de rodagem" (Stretch of right-of-way through the woods, with center section graded for the roadway; Rondon, s.d.-b, estampa 30).



Figure 5: "Uma rua de Santo Antônio do Madeira" (Street in Santo Antônio do Madeira; Ferreira e Silva, 1920)



Figure 6: Juruena Station. Photograph, José Louro (Lasmar, 2008, p.80, fotografia 51)

NOTAS

* This article is a modified version of the second chapter of the master's thesis of Arthur Torres Caser, *O medo do sertão: doenças e ocupação do território na Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas (1907-1915)*, whose advisor is Dominichi Miranda de Sá (Caser, 2009).

¹ The Strategic Telegraph Commission from Mato Grosso to Amazonas (Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas) was created on March 4, 1907, under an administrative decree (*portaria*) signed by Miguel Calmon Du Pin e Almeida, Minister of Transportation, Industry, and Public Works (Viação, Indústria e Obras Públicas), who appointed Cândido Rondon to head the new commission. On March 11, Rondon appointed the remaining members of the Commission. See Rondon, s.d.-a.

² All endeavors carried out by Rondon in the hinterlands of Brazil during his 50-year-long military career (1889-1939) are generally encompassed under the umbrella term Rondon Commission. Some of these activities include construction of telegraph lines from Mato Grosso to Goiás, when Rondon served as aide to Major Gomes Carneiro (1892-1898); construction of telegraph lines between Rio de Janeiro and Mato Grosso (1900-1906), headed by Rondon himself; the achievements of CLTEMTA (1907-1915), which he likewise headed, including the activities of the Roosevelt-Rondon Scientific Expedition (Expedição Científica Roosevelt-Rondon; 1913-1914); mapping of the state of Mato Grosso (1918); and the inspection of Brazil's borders (1927-1930). This article focuses solely on the work of the Strategic Telegraph Commission from Mato Grosso to Amazonas (Comissão de Linhas Telegráficas Estratégicas de Mato Grosso ao Amazonas), or CLTEMTA for short (Mar. 4, 1907-Jan. 1, 1915). For further information on telegraph commissions prior to 1907, see Maciel, 1998; Diacon, 2006; Sá, Sá, Lima, 2008.

³ When the Commission was first created, Rondon was still a major. He was promoted to lieutenant-colonel on August 5, 1908, and to colonel on April 3, 1912 (Fé de ofício..., s.d.).

⁴ Rondon and other members of the Commission use this term at various moments to refer to the northwestern area of the state of Mato Grosso and to the southwest of Amazonas, regions through which they traveled. See, for example, the first volume published by CLTEMTA, where the term is used repeatedly (Rondon, s.d.-a).

⁵ On the construction of Rondon as a mythological figure, see Botelho de Magalhães, 1919.

⁶ The telegraph only got as far as Santo Antônio do Madeira. The commission gained renown for its contacts with indigenous societies, and the scientific surveys conducted by its members made fundamental contributions towards recognizing the work of Brazilian naturalists and enriching collections at Brazil's scientific institutions, above all, the Museu Nacional. For further information, see Maciel, 1998; Diacon, 2006; Sá, Sá, Lima, 2008.

⁷ In the early twentieth century, the Brazilian Portuguese term *sertões* occupied the same semantic field as the expression *espaços vazios* (empty spaces), along with the words *incorporação*, *progresso*, *civilização*, and *conquista* (Lima, 1999).

⁸ In this and other citations of texts from Portuguese, a free translation has been provided.

⁹ Malaria was often called *impaludismo* or *paludismo* in CLTEMTA documents and in the era's medical texts.

¹⁰ No specific reference to these physicians' training was found in our research of CLTEMTA material. We can, however, state that like all physicians trained from the late nineteenth through the early twentieth centuries at the Rio de Janeiro Faculty of Medicine (Faculdade de Medicina do Rio de Janeiro) or at the Bahia Faculty of Medicine (Faculdade de Medicina da Bahia), their education combined different traditions of thought within the field. Further on this, see Edler, 1999.

¹¹ *Praticantes regionais* (local trainees) were civilians who lived in these regions, including Indians, and who served as guides, canoers, and assistants in the cutting of trees and installation of telegraph posts.

¹² An exception here is the table presented by Doctor Murillo de Campos (1913, p.221), which ranks beriberi in front of malaria as the most common disease among men examined by him, which included Indians (Pareci and Nambiquara), rubber-tappers, and CLTEMTA workers.

¹³ According to Julio César Schweickardt (2009, p.265), in the state of Amazonas "it was common practice to send floating field hospitals into the interior with medicine, to provide care to people living there, especially during epidemics." CLTEMTA's medical-surgical field hospital was not set up on a boat but in a tent.

¹⁴ This excerpt is from the second conference.

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