

# Public health and tropical modernity: the combat against sleeping sickness in Portuguese Guinea, 1945-1974

*Saúde pública e modernidade tropical: o combate à doença do sono na Guiné Portuguesa, 1945-1974*

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## Abstract

Until the establishment of the “Commission for the study of and combat against sleeping sickness” (Missão de estudo e combate à doença do sono) in 1945, underfunded and understaffed health services had not been a priority for the colonial administration in Portuguese Guinea. The Commission not only implemented endemic disease control in the territory under the auspices of metropolitan institutions, but also provided preventive public healthcare to the local population. Its relative success in reducing the negative impact of Human African Trypanosomiasis turned the colony into an apparent model of tropical modernity. In the process, the local evolution of the disease was marginalized, despite the tacit but contested recognition by some health professionals of the role of popular healthcare.

Keywords: sleeping sickness; tropical and colonial medicine; public health; local practices; Portuguese Guinea.

## Resumo

*Os serviços de saúde que sofreram de uma crônica falta de recursos humanos e materiais nunca foram uma prioridade para a administração colonial na Guiné Portuguesa até a criação da Missão de Estudo e Combate à Doença do Sono em 1945. Além de introduzir o controle de doenças endêmicas sob a tutela de instituições metropolitanas, a Missão também providenciou cuidados preventivos de saúde pública para as populações locais. O sucesso relativo da redução do impacto nocivo da tripanossomíase africana parece ter transformado a colônia num modelo de modernidade tropical. Porém, as trajetórias locais da doença foram marginalizadas, apesar do reconhecimento tácito mas contestado por profissionais de saúde do papel de cuidados populares de saúde.*

Palavras-chave: *doença do sono; medicina tropical e colonial; saúde pública; práticas locais; Guiné Portuguesa.*

Portugal's renewed drive for empire building in the 1890s not only created conditions for the effective military and administrative occupation of Angola, Guinea and Mozambique by the late 1910s, but also for the extension of public – and private – health services to the newly occupied territories. With it came tropical medicine in the wake of the microbiological discoveries from the last quarter of the 1800s and the intervention of the School of Tropical Medicine (*Escola de Medicina Tropical*) in Lisbon, founded in 1902, in these and other colonies in Africa. Occurring almost simultaneously, the expansion of colonial administration in Africa in the early 1900s prompted the production of increasingly systematized data on these territories' ecology, habitat, peoples, etc. as "colonial science" reached the outposts of the empire. Claims regarding Portugal's pioneering role in global scientific and technological explorations were also meant to reinforce its contributions to progress in the sphere of tropical medicine (Thomaz, 2002, p.114-118). While narratives and flows of medical knowledge have been identified for certain parts of the former colonial empire such as Goa (Bastos, 2007), "Portuguese" Africa has yet to be explored in detail. So far, a few contributions have focused on the association between public health and disease control, e.g. regarding sleeping sickness in Angola and Mozambique (Shapiro, 1983; Dube, 2009). Some attention has lately been given to public health services and disease control in former colonies such as Portuguese Guinea (Havik, 2007, 2013) and to private services in Angola (Varanda, 2009). However, in comparison with other European colonial experiences in Africa, Portugal's former colonies have on the whole been rather neglected in this respect. These lacunae are partly associated with the fact that a considerable portion of Portuguese colonial archives from the twentieth century still await inventory and that the documentation is highly dispersed throughout the former empire. Although a history of the former *Escola de Medicina Tropical*, currently the *Instituto de Higiene e Medicina Tropical* in Lisbon has recently been published (Abranches, 2004), the evolution of Portuguese tropical medicine and its colonial and international ramifications are in urgent need of study.

Direct metropolitan intervention in African societies has been portrayed as a quest for a "political technology capable of controlling and transforming native societies" (L'Estoile, 2005, p.40). The "bioengineering" associated with it set the tone for the "scientific objectification of the African subject" (Vaughan, 2004, p.33-34) as Africa was turned into a "living laboratory" for research and experimentation with a view towards instrumentalizing knowledge for innovation and modernization (Tilley, 2011, p.5). One of the particular quests of the medical profession in Africa was "the pursuit of the secret of sleeping sickness" (Vaughan, 2004, p.37). The controversy over the identity of the organism causing the disease in humans (Maudlin, 2006, p.681) also played out between different Portuguese scientists in the early 1900s (Amaral, 2012). The role of Portuguese tropical medicine in Africa has been closely associated with pioneering trials with arsenic-based compounds such as atoxyl, developed by Paul Ehrlich, and advocacy for them in campaigns on the island of Príncipe (1906-1914) which resulted in the eradication of the vector in 1915. The results were nationally and internationally presented as a victory of Portuguese colonial science (Kopke, 1926, p.10), whilst downplaying the human and environmental costs of the eradication methods. Interventions in Angola (1901-1975), Mozambique (1910-1927, 1945-1975) and Guinea (1945-1974) were also used to demonstrate the modernity of the applied "science of the tropics" (Sarmiento, 1953; Colónia

de Moçambique, 1934, p.19-37; Costa, 1966) and its capacity for controlling diseases and vectors through systematic planning (Ferreira, jan.-mar. 1967), which was considered vital for Portugal's colonization efforts (Amaral, 2008, p.326).

This essay focuses on the “Missão de estudo e combate à doença do sono” (Commission for the study of and combat against sleeping sickness) in Portuguese Guinea (1945-1974). It addresses not only the issue of the prevention and cure of endemic diseases such as sleeping sickness, but also the broader question of public health in a colonial context. Despite its apparent success in terms of disease control, the Commission has, with very few exceptions (Shapiro, 1983, p.221-300) not been deemed to merit academic attention since it was disbanded in the mid 1970s following independence. The question is not only to what extent it was effective from the point of view of controlling an endemic disease, but also its broader impact on the provision of public healthcare to African communities. In this respect, the relationship between tropical medicine and colonial health services and their operation within the same territorial space is of interest. In addition, the issue of modernity raises the question of local, i.e. African medical practices and notions of illness, and whether they were taken into account by biomedical professionals. Finally, there is also the question of whether or not Portuguese Guinea represents a special case with respect to the combat against endemic diseases in Africa, also taking into account political factors associated with the colonial war (1963-1974).

### **Surveying sleeping sickness: preliminary results**

The extent of the sleeping sickness epidemic in sub-Saharan Africa gained clearer outlines during the early 1900s as tropical medicine advanced into the African countryside with colonization. Whereas *Trypanosoma brucei gambiense* was endemic in Western (from the Senegambia to Northern Angola) and West-Central Africa – including the Belgian and French Congo – *Trypanosoma brucei rhodesiense* was common in East Africa – from Southern Ethiopia to Northern Rhodesia and Mozambique, mainly attacking animals (Gilles, Ricossé, 1982, p.80). The T.b. *gambiense* parasite was discovered by Forde and Dutton in the Gambia in 1901 and the vector by Greig, Nabarro and Castellani in Uganda two years later; the T.b. *rhodesiense* species was identified in 1908 by Stephens and Fantham in Northern Rhodesia. The soaring death rate on the shores of Lake Victoria prompted authorities to intervene and take radical public health measures in order to stem the tide. Soon, forced evacuation, mass internments, quarantine and mass inoculation and surveillance campaigns were put in place in French, British, Belgian, Portuguese and German Africa (Duggan, 1971, p.483; Maudlin, 2006, p.680-681; Lyons, 1985, p.628-629; Ollivier, Legros, 2001, p.856; Bado, 1996, p.102-110, Hoppe, 2003, p.88-95; Eckart, 2002; Tantchou, 2007; Neill, 2012, p.102-164). They showed that T.b. *gambiense* was much more difficult to detect in humans than T.b. *rhodesiense* owing to its particular aetiology, necessitating blood tests and glandular puncture. Crucially, further research into sleeping sickness had been triggered by its discovery in Europeans, such as in the Gambia and Northern Rhodesia; a similar pattern would also be observed in Portuguese Guinea (PG).

Early observations in Angola in the 1870s and, as the disease spread eastwards, in Mozambique in the early 1900s, confirmed the presence of the parasite and the vector in the continental Portuguese Empire (Sarmiento, 1953, p.24; Colónia de Moçambique, 1934, p.25). The first known reference in PG to sleeping sickness was made in 1855 by the Cape Verdean director of the Bissau military hospital when enumerating the most common afflictions of the population in the port of Bissau (Hopffer, 2 abr. 1855). The two patients described at the time, who already demonstrated symptoms of an advanced stage of “hypnosis,” were being treated by djambakós, i.e. healers from “animist” groups established in the region (Ferreira, 1960, p.82) which indicated the existence of local perceptions about the disease and treatments for it. Public Health reporting from 1880-1900 referred to a total of 54 (unconfirmed) cases (Barreto, 1928, p.7; Ferreira, 1960, p.110), but was limited to a few towns under Portuguese jurisdiction such as Bolama, Bissau, Cacheu and Bafatá as the area beyond them was largely inaccessible to Portuguese authorities. A few reports highlighting local phytotherapeutic compounds and surgical interventions for sleeping sickness – also called numú in Guinean Creole, or *doença da pedra* in Portuguese – were produced from the 1870s (Havik, 2009; Barreto, 1928). In the late 1800s, a Guinean Catholic priest claimed that the intervention performed by Mandinga (Mande) healers, or murus, had cured fifty cases of mal de sono in his family (Barros, 1882, p.714).

In West Africa, seen as a “hub” of infection also due to its particular ecosystem, other foci of sleeping sickness had already been identified in the Gambia and Senegal, in coastal ports such as St. Louis, Gorée and on the Petite Côte where it was detected in the 1860s and 1870s (Bado, 1996, p.39). Towards the end of the military campaigns (1890-1915) – which also took place during the “scramble” in the neighboring *Afrique Occidentale Française* (AOF) – medical reports stressed the need to study sleeping sickness in the colony. The abundant presence of vectors was associated with the region’s particular ecology, dissected by waterways and waterlogged areas such as the marshes and rice paddies that abounded in the coastal areas affected by flood tides. The widespread nature of visible symptoms (e.g. swollen cervical glands) – “Winterbottom’s sign” – led PG medical officials in 1913 to call – for the first time – for a scientific expedition to classify vectors and survey the distribution of both vectors and human (and animal) infection (Barreto, 1928, p.8). Appeals to that effect were made to Ayres Kopke at the School for Tropical Medicine (established in 1902) in Lisbon, along with requests for glossina specimens in order to confirm their presence in Guinea (Barreto, 1928, p.9); the first rudimentary microbiological laboratory was established in the capital, Bolama, in 1914.

The confirmed infection of a resident Portuguese civil servant prompted the first medical survey to be implemented in PG in 1926 on the question of sleeping sickness. The alarm it caused led authorities in Lisbon to decide upon a medical enquiry so as to determine the presence of sleeping sickness among individuals of the native population, which had already been identified as a natural reservoir of tropical diseases in a climate regarded as particularly threatening for Europeans (Havik, 2013, p.337-343). The survey followed recommendations by the international conference on sleeping sickness organized by the Health Committee of the League of Nations in London in 1925 (Kopke, 1926, p.13-14), with particular reference to Spanish and Portuguese territories (Shapiro, 1983, p.232). Its brief also included other endemic diseases such as malaria, leprosy and bilharzia in order to create a medical database

on the population, and inoculate the latter with the smallpox vaccine. It heralded the first microscopic identification of the presence in PG of *T.b. gambiense* and of the vector, *Glossina palpalis*. It also reported the first known records of (successful) treatment with arsenic-based compounds such novarsenobensol, atoxyl and triparsamida in the colony (Barreto, 1928, p.14-15). One of the reported cases, a Guinean of Fula (Fulbe) origin who had never left his area of residence, was used to support a tentative hypothesis of a focus of infection in the South, i.e. the Quínara and the Buba area. Despite the limited sample, the report concluded that sleeping sickness was endemic in the territory, while also taking into account the regional context in neighboring AOF colonies, i.e. Senegal and French Guinea, where research had been carried out since the early 1900s (Martin, 1906; Bouet, Roubaud, 1912; Roubaud, 1913). The most infected regions were located along the Senegal coast and the Gambia and the northern reaches of the Futa Djallon, close to PG's southern border (Roubaud, 1913, p.438; Bado, 1996, p.110-111). The report on PG also listed climatic and environmental factors, as well as inter-ethnic conflict, depopulation, the depauperization of the local population, migration and the particular insalubrity of the region, which would have negatively affected the immune systems of the resident population. In-field observations noted the large number of children with swollen cervical glands, many of whom showed the familiar scars of the surgical removal of these glands by local healers, a phenomenon requiring further investigation (Barreto, 1928, p.24).

The first research expedition sent to PG in 1932 by the Lisbon Escola de Medicina Tropical carried out an extensive research program during a six-month period, taking blood and glandular samples in 67 villages and detecting 18 cases of human African trypanosomiasis (HAT) (13 of them children between the ages of 8-14) as well as studying infected animals (Sequeira, 1935a). Research showed that four species of glossina were prevalent, i.e. *G. palpalis*, *G. longipalpis*, *G. sub-morsitans* and *G. fusca*, the first two being found all over the colony, especially in paddy rice fields, rice being the main staple crop in Guinea (see Figure 1). While cases were recorded using a mobile laboratory, tests revealed a relatively low incidence of the disease and confirmed detection at an early stage among children and adults. The report concluded that the disease was only "lightly endemic" and "apparently benign," with "irregular dissemination across the territory" (Sequeira, 1935a, p.11). It took into account the previous experiences of teams sent by the Escola de Medicina Tropical to study, locate and eradicate trypanosome on the island of Príncipe, where programs had been implemented between 1904 and 1913 (Amaral, 2008), and later in (Northern) Angola. The fact that the same author published a similar contribution in French illustrates the tentative incorporation of PG into international medical networks (Sequeira, 1935b). Following recommendations that colonial health services focus on combating the disease in frontier areas (Kopke, 1926 p.22), a convention was signed in 1932 with the French administration in Senegal on the exchange of health data and monitoring of migratory movements, with a view to implementing preventive measures in the case of epidemics such as yaws and yellow fever (Portugal, 1933).

Lamenting the precarious conditions in which medical services had to operate, the author proposed sending a team of specialists in tropical medicine to survey the region and employ modern drugs such as suramine, triparsamide and trypanarsyl to treat patients

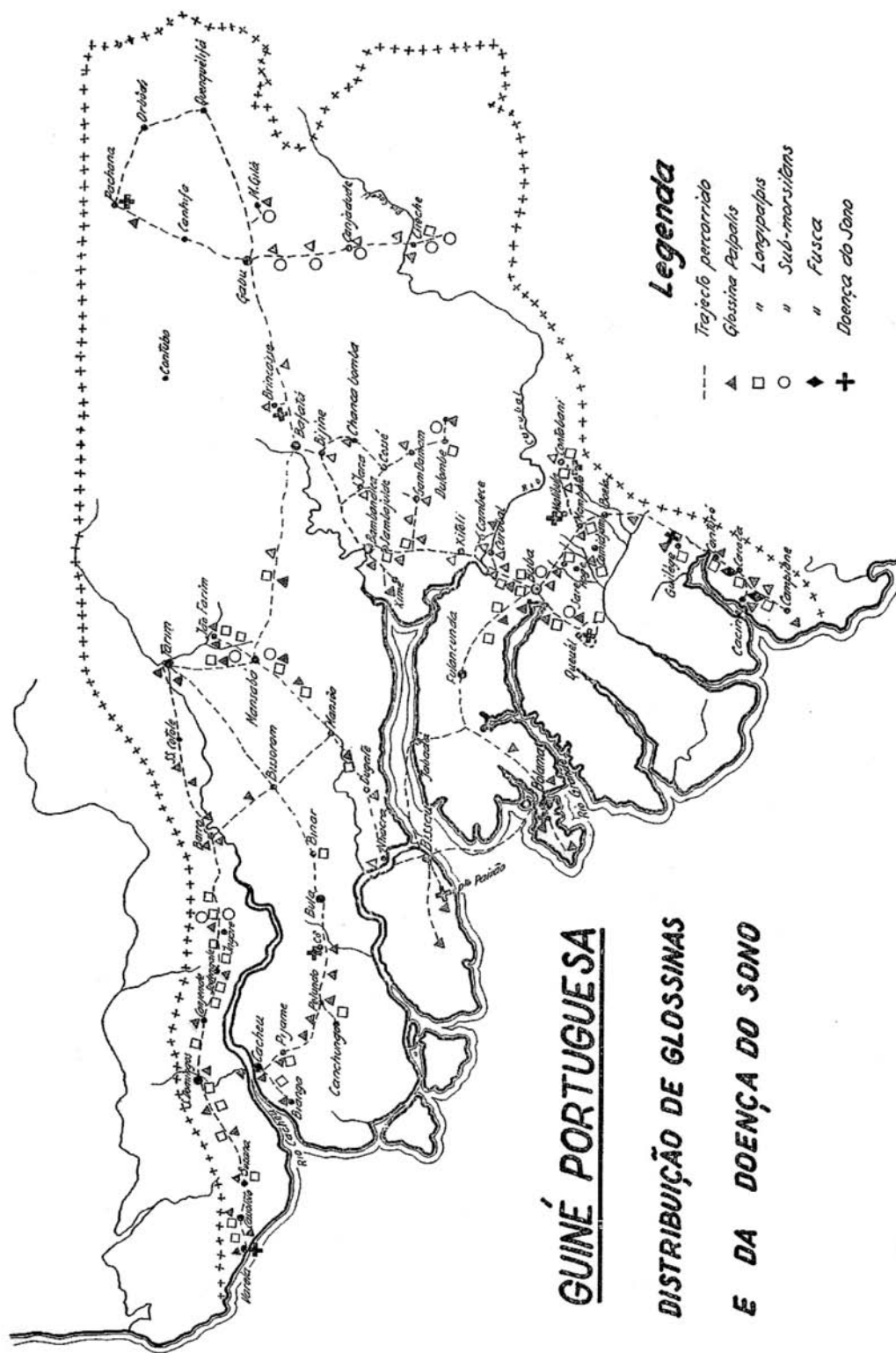


Figure 1: Distributions of glossinas and HAT in Portuguese Guinea, 1935 (Sequeira, 1935a, p.50)

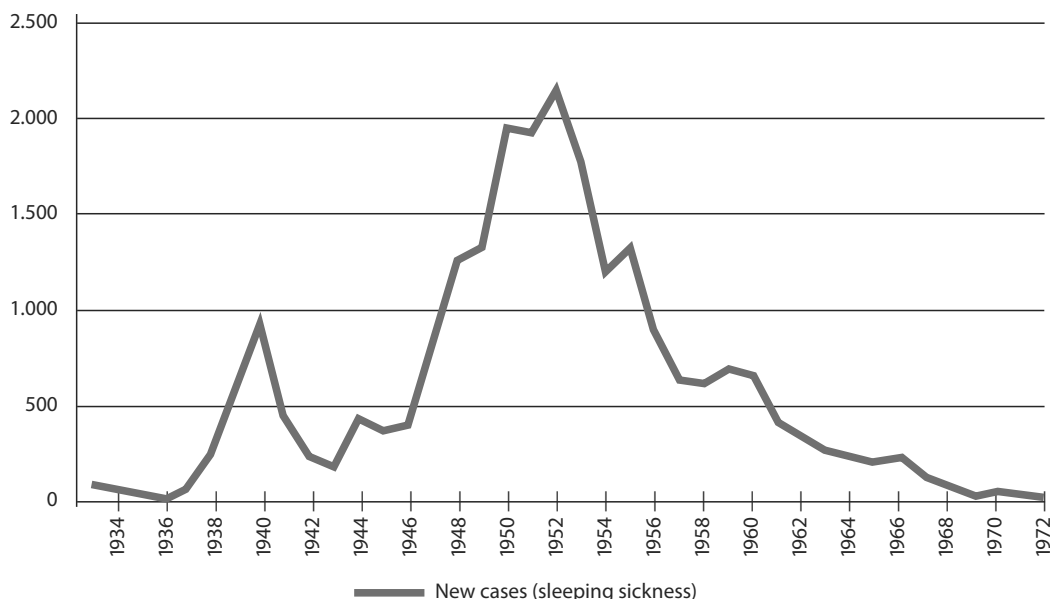
(Sequeira, 1935a, p.12). This specialist argued that a measure of social control needed to be exercised over the population, e.g. by means of health passports, but doubted the feasibility of mass “atoxylyzation” like that carried out in Angola between 1921 and 1929 (Sarmento, 1953, p.29-31; Shapiro, 1983, p.260-262), and proposed further research on disease control methodology (Sequeira, 1935a, p.13). The author suggested – like other health officials before him – that the HAT observed in the colony had peculiar characteristics owing to local interventions, i.e. the surgical removal of swollen cervical nodes by indigenous healers (Barreto, 1928, p.24; Pinto, 1929, p.89-93; Sequeira, 1935a p.19-22). This led the author to speculate on the possible occurrence of a serious epidemic in the past, establish correlations with the fact that the majority of detected cases showed signs of infection only in the early stages, and hypothesize that a significant number of patients treated by healers appeared to have been cured or acquired a degree of immunity (Sequeira, 1935a, p.23). The likelihood that patients in the terminal phase were kept hidden from public view – thereby impeding their registration and clinical observation – was reinforced by contacts with local chiefs and elders (i.e. from Fula communities), who are suspected of withholding information on those undergoing treatment by healers (Sequeira, 1935a, p.26).

Official reports in the 1930s show that Guinea suffered chronic shortages of doctors, equipment and medication, admitting that, as a result, HAT was among the pathologies without effective treatment (Viegas, 11 dez. 1934). Roman Catholic (Franciscan) missions complained that while native patients were loath to be treated at colonial healthcare clinics and sought assistance at mission clinics, colonial authorities refused to fund the mission’s work (Araújo, 1 jun. 1935). Barreto and Sequeira’s urgent advocacy for the establishment of an effective native healthcare organization in the colony translated into legislation that introduced it not from a public health perspective, but in accordance with a racially segregated form of assistance based upon economic (healthy African labour) and financial (paid by direct native taxes) rationales (Colónia da Guiné, 1933). Meanwhile, a new generation of medical specialists proposed the extension of healthcare to villages in the countryside, where doctors would act as “social agents” to detect pathologies then viewed by some as social ailments (Almeida, 1935, p.13). The principal innovation introduced in the 1930s was the building of bush-infirmaries – rather than bush-clinics – known as *tabancas-enfermarias* in reference to an African village or *tabanka*, composed of a rectangular pavilion and aligned, round huts within a rectangular perimeter. Taking their cue from similar examples in British and French Africa, five were built starting in 1933-1934 through the early 1940s, i.e. in Fulacunda in the South, in Canchungo in the North, in Farim in the North-East, in Bafatá in the East, and one in the Bijagós islands. Staffed with a (qualified) nurse, an auxiliary nurse and a guard, they were presented as a “perfect symbiosis” between the rural community and the urban hospital, giving “the native the illusion that he/she never left his/her hut” (Colónia da Guiné, 1933).

The negative impact of HAT on the African population was compared to that of smallpox, yaws, malaria and dysentery and directly associated with their lack of hygiene and lack of spatial mobility in terms of procuring health services (Viegas, 11 dez. 1934, p.169-170). Although the expansion of bush-infirmaries in combination with mobile medical teams was regarded by medical staff as the most effective solution for combating endemic diseases, their implementation was slow due to a lack of political priority and government funding. Reports

in the 1930s show a dramatic increase in recorded cases of sleeping sickness, from 63 in 1934 to 936 in 1940, as well as the mortality rate (Ferreira, 1961b, p.314-323), showing that its prevalence had been seriously underestimated. Treatment with tryparsamide and atoxyl, initiated in 1934, gradually became routine, although patients often abandoned treatment, possibly owing to the drug's side-effects. The need for mobile brigades, for quarantine, and for a cordon sanitaire along the colony's frontiers in order to reduce the influx of carriers, as well as the removal of villages from infested areas, was considered. While a decline in cases is noticeable from 1941 onwards – from 425 in 1941 to 184 in 1943 as a result of treatment with arsenic-based compounds – they increased again in 1944 (Ferreira, 1961b, p.324-327), in all likelihood owing to unreliable supply lines, lack of personnel and lack of inventory during World War II, but possibly also as a result of resistance to arsenic based drugs (see Graph 1a).

Graph 1a: Recorded cases of sleeping sickness (clinically confirmed)



Source: compiled by the author using Ferreira (1961b, p.315-334); Costa (1962, p.451-455; 1964, p. 226); and Correia (1972, p.707)

With the end of World War II came a third attempt to determine the presence and distribution of HAT sufferers in PG, again prompted by the infection of Europeans and the death of one in the early 1940s that caused a considerable stir in the colony. The re-baptized Institute of Tropical Medicine (Instituto de Medicina Tropical, IMT) was charged in 1935 with organizing an exploratory expedition that was sent to Guinea in 1944 with the task of gathering data on the disease, but also on yellow fever (the most recent epidemic having occurred in 1911-1912) and malaria, as well as to determine the blood groups of twenty three “Guinean tribes” (Azevedo, 1947, p.12-13). It visited 43 villages and towns in regions of “economic importance” over a period of two months, where they examined “tens of thousands of natives and collected blood samples of more than eight thousand” (Azevedo, 1947, p.13, p.23). It was found that the disease, although typically present among the



younger generations, was endemic – 61 infected individuals were found, mostly in the early stages – and widespread, but apparently “benign,” thus confirming previous reports. Field observations suggested that there might be a correlation between local conceptions of the *doença da pedra* and sleeping sickness, and the availability of treatment (i.e. the surgical removal of swollen cervical nodes) and the “benign” nature of the disease (Azevedo, 1947, p.20-22). The hypothesis that PG represented a special case due to the regional history of the disease, local notions of illness, healers’ interventions and patients’ “spontaneous cures” was put forward, requiring further research (Azevedo, 1947, p.27). The report proposed the establishment of a “permanent commission for the combat against and study of sleeping sickness,” a measure that the IMT had repeatedly advocated (Abranches, 2004, p.53).

### **Combating sleeping sickness and other endemic diseases**

The establishment of the Commission for the Study of and Combat against Sleeping Sickness in 1945 introduced a novel approach to the administration of healthcare in PG, i.e. associated with public health and preventive medicine. The program operated in the region between 1946 and 1974 and was staffed by tropical health professionals from the IMT in Lisbon. It was controlled by the metropolis, autonomous in financial and organizational terms, and well equipped and staffed by specialists in tropical medicine. It enjoyed notable advantages in the colonial setting, and was regarded with envy by Guinea’s existing health services.

Initially, the Commission was to focus exclusively on the detection, prevention and eradication of sleeping sickness in the colony. However, the lackluster state of colonial healthcare was such that the Commission’s staff was soon faced with the need to extend its services to encompass a broad gamut of endemic diseases. Colonial medical staff attempted to cope with the inoculation of Africans in the countryside against smallpox, while simultaneously carrying out surveys on common tropical pathologies such as malaria, bilharzia, trachoma and filariasis whenever possible (Fortuna, 22 Apr. 2012). However, the capacity of the *delegados de saúde* to visit patients in rural areas regularly was very limited owing to their clinical and administrative obligations, as well as the lack of effective means of transport (Ferreira, dez. 1949, p.598, 1953, p.102-103). Despite colonial authorities building about fifty rudimentary medical clinics (*postos de socorro*) and mobile brigades (*postos móveis*) in the countryside beginning in the mid 1940s, as well as a few rural hospitals (Roncon, 1952 p.384-387), understaffing and underfunding of existing colonial health services was chronic. Official reports also mentioned the alleged lack of interest on the part of the administration in correcting the situation and urgently requested governmental action (Silva, 30 jun. 1942, p.5, 20). Some health officials even admitted that they were often “unable to do better than the witch-doctor” (Sá, 30 jun. 1942 p.42, 44). While cases studied in towns were rare (Seixas, 1948), foreign observers commented that “patients infected with sleeping sickness were freely roaming the streets of Bissau,” suggesting that healthcare was far from adequate even in urban areas (Bogaers, 6 oct. 1946). At the same time, the first comprehensive ethnographic survey was carried out in 1946, providing information on “native health and hygiene,” healing practices, divination and phytotherapies. The data showed evidence of widespread recourse

to healers, i.e. djambakós and murus; however, scant reference was made to the *doença da pedra*, despite its commonly known symptoms and local forms of treatment. Given the administrative nature of the ethnographical work carried out in Guinea, the contribution of professional anthropologists to the ethnomedical study of healing and illness in African societies remained very limited during the colonial period (Havik, 2009, p.26-27).

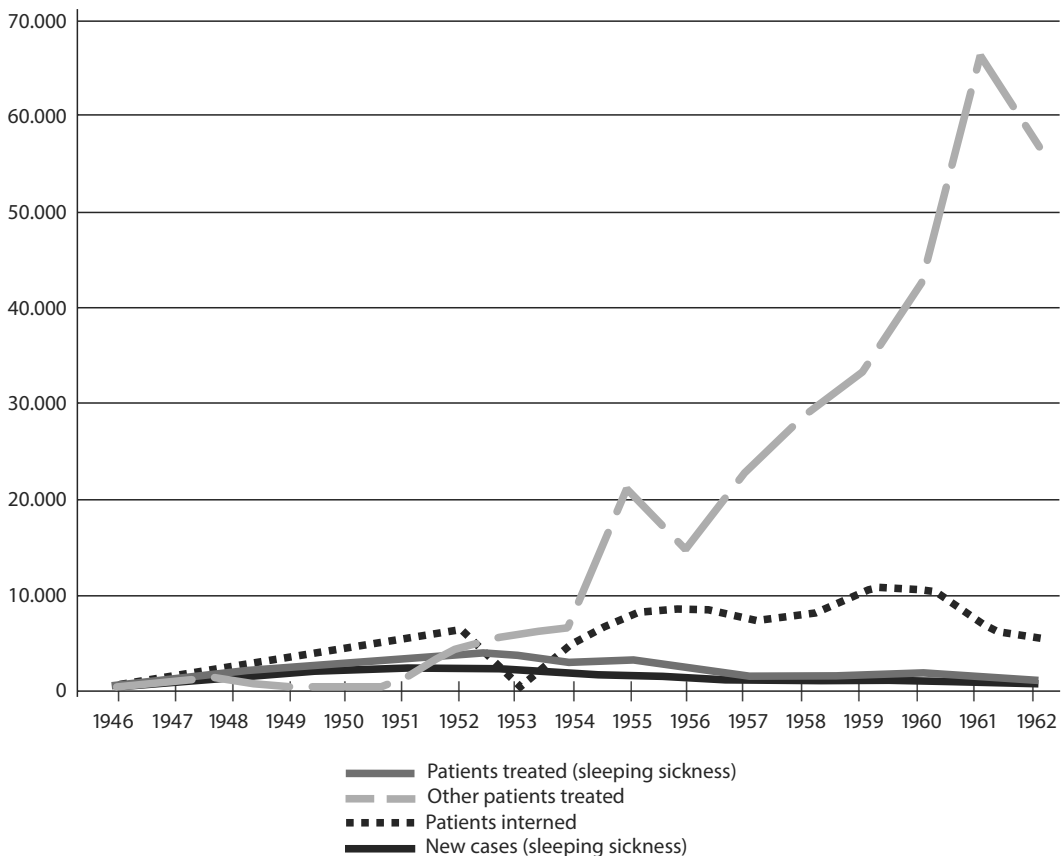
The Commission's main brief was to carry out population surveys and censuses, provide prophylaxis, treat infected patients and control both human and animal vectors. One of its objectives was to set up analysis laboratories and permanent clinics throughout the territory and implementing a system of mobile healthcare brigades (Ferreira, 1947, p.363-364). The colony was divided into five sectors that did not coincide with administrative districts, unlike the existing *circunscrições sanitárias* or health districts. The Commission enthusiastically adopted the concept of the *tabanca-enfermaria*, completely renovating the existing network and building new infirmaries more akin to rural clinics in order to cover the entire territory. Most of the old infirmaries – five in total that had been built until the early 1940s – had fallen into disuse and ruin, or served as “motels” for native families; only one was still operational in 1942. By the early 1950s, a total of 14 *tabancas-enfermarias* had been built or refurbished, with a bed capacity of approximately one thousand giving the Commission considerable support. The largest were composed of over thirty huts for clinical observation, a medical clinic, and residences for doctors and nurses.

The Commission's reports stress the fact that by systematically visiting all *tabancas* or villages in a given sector, it managed to cover entire areas which the regular health services had neglected (Ferreira, 1947, p.373-374). During its first year, staff carried out almost sixteen thousand observations, identifying 404 individuals suffering from the illness (approx. 3% of the total population observed). Early reports soon revealed certain problems, such as the lack of resources which caused its personnel to first focus on urban centers, and the high mobility of the population, which allowed many Africans to “escape” the net without being tested (Ferreira, 1947, p.366-367). The exemption of HAT patients from paying the hut tax in 1946 showed that colonial authorities recognized the debilitating nature of the disease and the need for incentives. Despite regular complaints about the lack of resources and the increasing number of patients the Commission had to cope with (Ferreira, dez. 1949, p.555), by 1948 staff was already treating more than seventy thousand “indigenous” inhabitants. By 1952 these numbers had risen to over 320,000, representing a twenty-fold increase compared to 1946 and 64% of the total population. As a result of greater spatial coverage and improved record keeping, the number of recorded HAT cases had also risen significantly, from 404 in 1946 to 1272 in 1948 and 2169 in 1952 (see Graph 1b).

Preliminary findings showed that HAT was a more serious endemic disease than originally thought due to its widespread dissemination throughout the colony and the higher than expected numbers of newly infected patients. In contrast, in Angola, infection of humans was largely restricted to the Northern part of the territory – along the banks of the Zaire, Quanza and Bengo Rivers, and most notably between the San Salvador do Congo and Dondo regions. In Mozambique, where the major threat was to animals, low endemic human foci were located mostly in the North, in the Cabo Delgado, Niassa and Tete regions, while other parasites and vectors dominated both there and in Angola, e.g. T.b. *rhodesiense*

and *G. morsitans* (Ferreira, 1947, p.372; Pinto, 1954, p.453-454; Azevedo, 1967, p.12-16). Discussing clinical cases, medical personnel conceded that there were two types of patients: those identified with trypanosomes, and those with alterations of the nervous system, which formed the majority. The latter condition indicated the fact that sleeping sickness was not only endemic but also long established in the region, and had evolved over time, thus partially confirming the hypothesis put forward by Sequeira (1935a). The methods used in the Belgian Congo to eradicate sleeping sickness and other endemic diseases (Burke, 1971; Lyons, 1985, 1992) served as a model for intervention in PG, instead of those implemented by Jamot in the French Afrique Equatoriale Francaise (AEF) (Ferreira, dez. 1949, p.595). But the establishment of the Service Général Autonome de la Maladie du Sommeil in French Africa in 1939 was an important precedent that Portuguese authorities could not ignore, as well as the conclusions of the Brazzaville Inter-African Conference on vectors and trypanosomes in 1948 (Ferreira et al., 1949). In addition to studying sleeping sickness, by the late 1940s the Commission's research facilities were also looking into other endemic diseases such as ancylostomiasis, dracunculiasis, filariasis and leprosy (Ferreira, dez. 1949, p.591). Providing "full medical assistance to natives in the countryside" was a priority for an "organization

Graph 1b: Commission for the Combat of Sleeping Sickness, 1946-1962



Source: compiled by the author using Ferreira (dez. 1949, p.585-588, 589; 1961b, p.314-328); Pinto (1954, p.443; 1958, p.440-441, 453); Costa (1962, p.226, 241, 247); and Correia (1972, p.707)

attending to basic necessities,” rather than merely acting as a service for tropical diseases (Ferreira, dez. 1949, p.593-594). Indeed, as regular health services were patently unable to pay regular visits to villages in their respective districts, the Commission had been “obliged” to build healthcare clinics in order to treat the large number of patients seeking assistance at the bush-infirmaries and relieve the pressures on the latter (Ferreira, dez. 1949, p.559). Health officials also recognized the importance of extending care to treating diseases other than trypanosomiasis, “because they provided the Commission with considerable prestige in indigenous communities, and encouraged them to collaborate with the [mobile] teams”. As a result, the “health conditions of the population had improved significantly, above all given the fact that healthcare had been extended to natives who lived far from hospitals and clinics ... in the most remote parts of the province” (Pinto, 1954, p.443).

The author of a metropolitan inspection ordered by the Colonial Ministry – himself a well-known physician and anthropologist – concluded that after working in the field for three years, “despite limited funding, [the Commission] was the best medical research and assistance organization” in PG (Almeida, maio 1949). He was surprised to discover that medical clinics or postos sanitários in the countryside were entirely at the mercy of district administrators “who paid nurses’ salaries, and purchased most of the prescribed drugs, despite the fact that they had no authority over medical personnel” (Almeida, maio 1949). These clinics were mostly staffed by unqualified helpers or serventes called “assistant nurses,” whose assistance was thought to do more harm than good. Although diagnoses made by local auxiliary staff in healthcare clinics were not included in medical statistics, these reports showed that they were fundamental to the provision of healthcare in the countryside.

In 1956 the Commission obtained permanent status, the “Permanent commission for the study of and combat against sleeping sickness and other endemic diseases” (Missão permanente de combate à doença do sono e outras endemias) with increased funding, personnel and equipment, thereby enhancing its assistance and research capacity. The IMT’s board had insisted since the mid 1940s that Portugal should establish permanent infrastructures in its colonies, emulating the French “Institut Pasteur model” (Abranches, 2004, p.53). Importantly, the Commission saw its brief broadened to include other endemic diseases, a formal recognition of the gradual extension of medical care to the native population as a whole. The Commission’s teams also conducted anti-malaria campaigns in the capital and on the island of Bissau (Biombo) from 1954 onwards, spraying houses and huts with DDT, distributing mosquito nets and quinine-based prophylaxis (Costa, Meira, 1962). Equipped with a staff of eighty, including nine full-time doctors, each of the five sectors then had trained medical staff, in addition to nurses and laboratory technicians, assistants, guards, drivers and (motorized) transport. In 1956, the Commission was operating sixteen tabancas-enfermarias with a bed capacity of 14 hundred. Not only did it work closely with its colleagues in the neighboring AOF, it also obtained the recognition of the World Health Organization (WHO) and the International Committee for Research into Trypanosomiasis (Pinto, 1958, p.437), making a sustained effort to present its findings at international forums and thereby enhance the reputation of Portuguese tropical medicine (Shapiro, 1983, p.245-247). Its services now included treatment and research into the most common tropical diseases such as yaws, malaria, hookworm, bilharzia and leprosy. While HAT was still treated with

arsenic-based compounds such as triparsamida (also used for the treatment of syphilis) and arsobal (i.e. malarsoprol or Mel B) used for advanced cases (Pinto, 1954, p.446), clinical tests with pentamidine (discovered in 1939) – which would come to be widely used as a chemoprophylaxis – had been initiated in Guinea in 1948 (Ferreira, 1961a, p.576, 578).

The main glossina foci were along the main rivers (Cacheu, Mansoa, Geba, Corubal, Cumbidja and Cacine) and along the Rio Grande inlet, while the highest trypanosome infection indices were recorded for the Bijagós islands, the island of Bissau, the São Domingos area (in the North) and the upper reaches of the Geba River in the Northeast (Ferreira, dez. 1949, p.583; Ferreira, 1961a, p.591; see Figure 2). In terms of ethnic distribution, the highest infection rates were found among the Pepel (of the island of Bissau), Mandinga, Manjaco and Fula groups (Ferreira, dez. 1949, p.580). However, by the early 1950s the incidence of recorded infections among the Pepel, Manjaco, Fula and Balanta communities had risen (Pinto, 1954, p.466); these trends are not, however, explained in reports. The data also show a low infection rate for mestizos – mostly Cape Verdean Creoles – and Europeans rarely caught the disease (Ferreira, 1961a, p.601). Although the number of new patients steadily diminished from 1952 onwards, especially among the most affected groups such as the Fula, Manjaco, Pepel and Mandinga (Ferreira, 1951, p.601), by the early 1960s the most significant new cases were found among the Balanta, the colony's principal ethnic group (approx. 160 thousand in 1960) specialized in paddy rice farming. The Fula/Fulbe groups (approx. 108 thousand in 1960) living in the dryer savannah regions in the East were singled out on account of their nomadic, pastoral traditions and the combat against the infection of their large cattle herds. The HAT circulation index in one of the most infested areas, Farim, near the border with Senegal, fell significantly from 0.68 in 1954 to 0.06 in 1962, bringing it in line with the colony's overall average of 0.07 (Costa, 1964, p.243). This was mainly the result of bi-annual inspections, which in areas of greater glossina prevalence became tri-annual from 1953 onwards. Following a visit to PG in 1960, the British consul in Dakar commented that, owing to the Commission's inputs, "sleeping sickness, which used to be endemic, has already been largely overcome" (Watson, May 31, 1960). A report by the WHO Expert Committee on Sleeping Sickness acknowledged the existence of systematic case finding and treatment, as well as strict surveillance and control of the human population, although it lamented the lack of inputs in animal disease control (WHO, 1962, p.16); infection levels were low across the colony's borders in neighboring Senegal and Guinea (p.14, 17).

Endeavoring to maintain a high level of mobility, patients were visited in their villages and treated for endemic diseases and the most common ailments. Between 1947 and 1956, the number of villages visited annually increased from about 750 to over three thousand (Ferreira, 1961a, p.596; see Graph 2). In 1956, the Commission's rural medical assistance teams visited 3,113 villages and treated more than thirty thousand patients, 1,923 suffering from HAT (Pinto, 1958, p.441); at the same time, the colonial health services saw almost sixty thousand patients, hospitalizing approx. 4,500 (Andrade, 1966, p.14). At the peak of its activity in 1961, the Commission operated 25 bush infirmaries, with a total of 5,006 patients hospitalized for quarantine, screening and treatment purposes (Costa, 1964, p.237-238; see Figure 3). Coverage of the population had increased from 70% in 1956 to over 100% in 1962, implying that returning (e)migrants and inhabitants from neighboring countries were

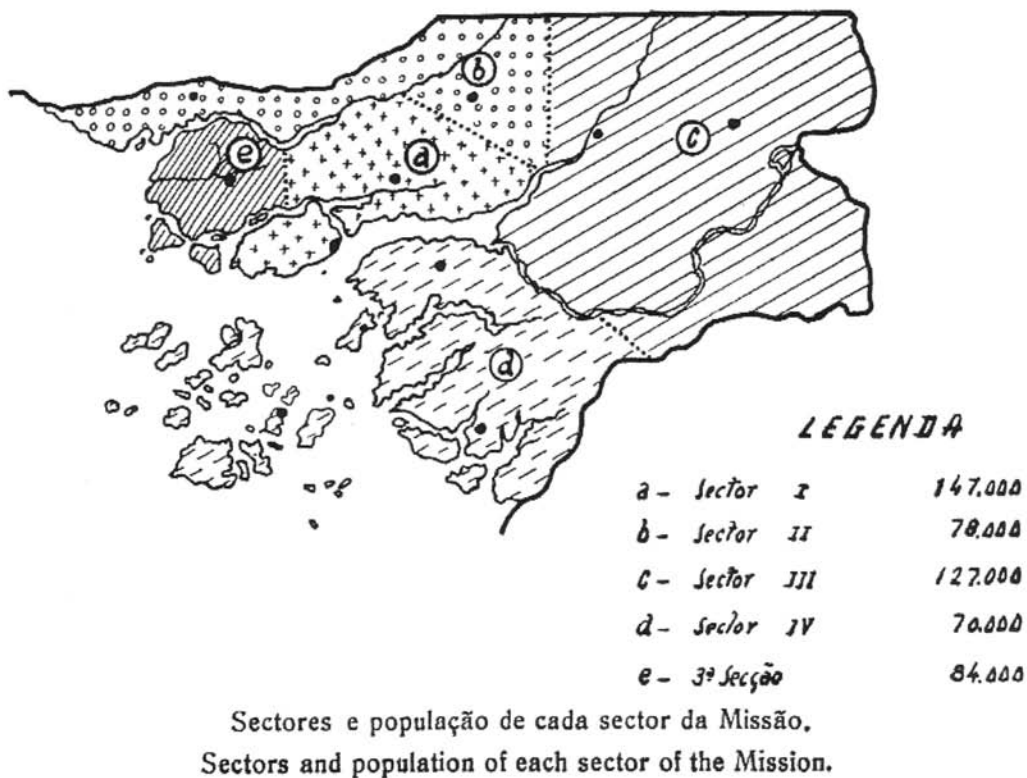
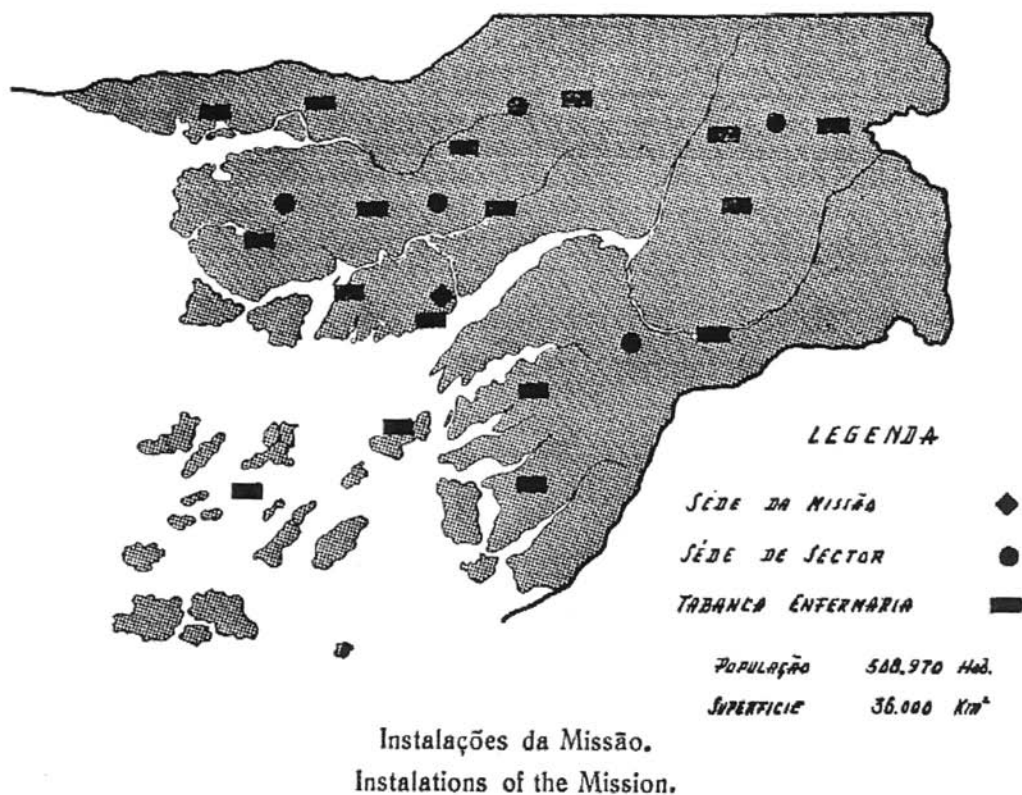
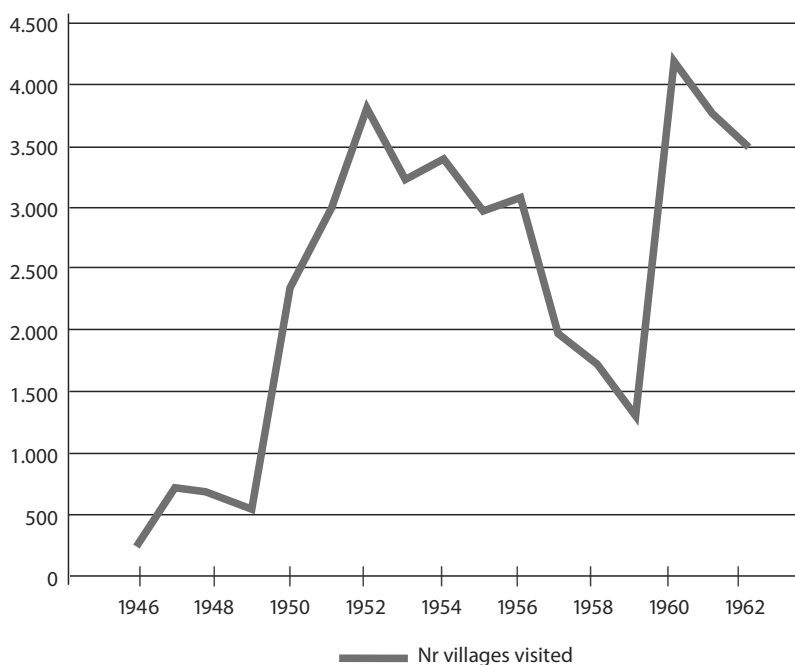


Figure 2: Commission infrastructures/sectors and population per sector, 1958 (Pinto, 1958, p.436)

seeking treatment; in the meantime, the number of patients treated in bush infirmaries and by mobile teams had risen by 450% (Costa, 1964, p.241, 247). The main pathologies treated were malaria, scabies, conjunctivitis, bronchitis, rheumatism, mycosis and gonorrhea, as well as anaemia and flesh wounds. By that time, the number of new HAT cases had fallen to just over four hundred a year, while recorded cases of other parasitic diseases such as ancylostomiasis showed a fivefold increase between 1956 and 1962 (Costa, 1964, p.246; see Graph 3).

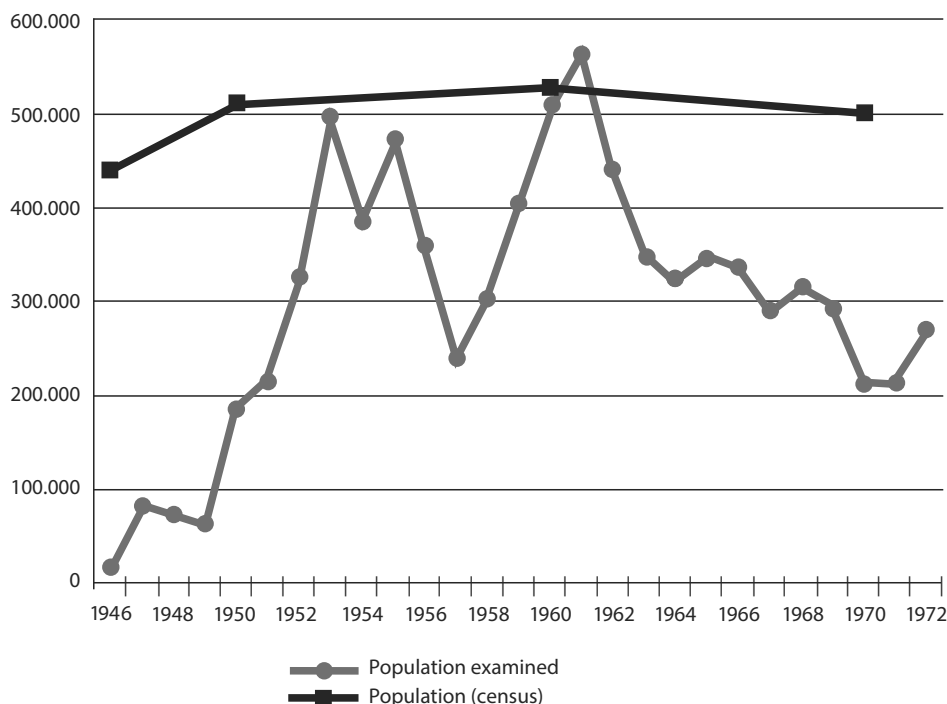
During the 1960s the Commission began to suffer from a lack of medical personnel and was unable to cover all (six) sectors with qualified staff. One of the main causes was the outbreak of armed conflict in 1963 when the nationalist movement Partido Africano para a Independência da Guiné e Cabo Verde (PAIGC) initiated a military offensive against the Portuguese colonial administration. The conflict, which would last until 1974 when Guinea Bissau became an independent state, would progressively spread from the South to the North and East, with the support of newly independent neighbors, i.e. Guinea-Conakry (1958) and later Senegal (1960). As the movement gradually penetrated the countryside and created “liberated zones,” it put into place a network of healthcare clinics and bush-infirmaries (PAIGC, 1974). The locations of these conflict zones, close to the borders with Guinea and Senegal, in areas where HAT had been most prevalent, appears to be associated with a rise in new cases in the mid 1960s. The conflict also led to the establishment of Portuguese military medical teams and improvised bush infirmaries in garrisons in the countryside, equipped to provide first aid to those wounded in battle and distribute prophylaxis for malaria and other diseases, while also treating the local population. Owing to the conflict, the flux of inhabitants to

Graph 2: Villages visited by Commission's mobile brigades



Source: compiled by the author using Ferreira (1961a, p.596); and Costa (1964, p.225)

Graph 3: Population examined by Commission, 1946-1972



Source: compiled by the author using *Província...* (1959, p. 15-18); Correia (1972, p.707)

medical census and inspection locations diminished as the hold of the administration over “its subjects” was challenged, and at the same time large scale migrations and population exodus to Senegal and Guinea-Conakry took place, increasing the risk of transmission. The focus of rural colonial medical assistance shifted to the east, i.e. to areas mainly inhabited by Fulbe groups remaining loyal to colonial authorities, as well as becoming increasingly circumscribed to the vicinities of regional capitals and the area surrounding the capital Bissau. The apparent lack of cooperation from neighboring ex-colonies on health issues, above all Guinea-Conakry, limited the efficacy of the Commission’s campaigns (Correia, 1972, p.711-712). The lowest recorded prevalence of 24 newly infected patients in the early 1970s is unreliable as it only represents part of the picture. The main foci of new infections were now located in areas in the North bordering on the Casamance region of Senegal, subject to great migratory fluxes during the war and principally inhabited by the Felupe/Djola, who had traditionally been wary of colonial authority and vaccination campaigns.

By the late 1960s, as a result of logistical problems, lack of staff and funding, the Commission’s medical assistance centered on communities in and around the capital Bissau, and in district capitals such as Mansoa, Bula, Teixeira Pinto (currently Canchungo), Bolama, Bubaque (on the Bijagós islands), Bafatá and Nova Lamego, currently Gabú (Correia, 1972, p.720). During the conflict a number of tabankas-enfermarias were closed and abandoned, especially in the south, i.e. in Fulacunda, Buba, Buba, Bedanda, Catió and Cacine, where the PAIGC’s campaigns had had a decisive impact. Owing to the aldeamento policy pursued by

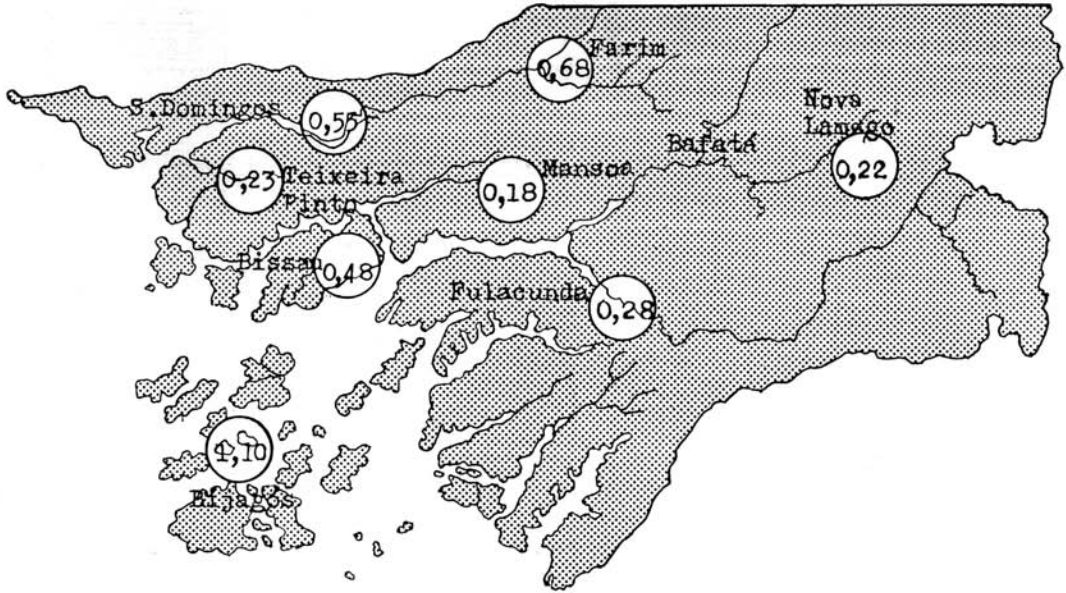


COSTA, F. Coutinho da — *Relatório anual de 1962*

EVOLUÇÃO DOS ÍNDICES DE VIRUS EM CIRCULAÇÃO

Ano de 1954

I. V. C. geral = 0,32 %



Ano de 1962

I. V. C. geral = 0,07 %

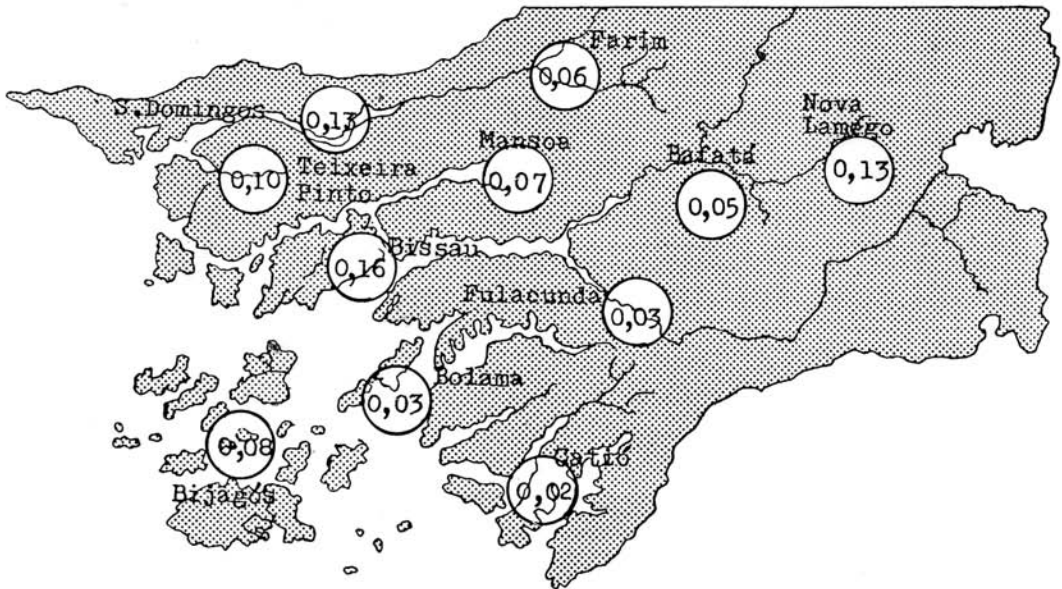


Figure 3: Evolution of HAT circulation index, 1954-1962 (Costa, 1964, p.243)

military authorities, relocating communities to areas under Portuguese control, the efficacy of colonial medical assistance was much greater there. Indeed, the forced move of entire villages close to the roads, away from forested areas – and the destruction of the latter – was quoted as a factor in the significant reduction of infection by glossinas on the island of Bissau (Correia, 1970, p.261). In the mid 1960s the Commission adapted its strategy using the method of regular mass chemo-prophylaxis with pentamidina – and the taking of blood samples – every six months in accessible, endemic areas and every nine months in surrounding areas (Lecuona, 1967, p.54-57). By the end of 1965 the population covered by the Commission had already dropped to three fifths of the total as the nationalist forces gained ground. Although the total number of villages visited by mobile teams had dropped (to 720), along with the total number of patients observed (to 270,250 in 1972), inoculation campaigns against tuberculosis, tetanus and smallpox continued to be carried out in certain areas with the support of the Fundação Calouste Gulbenkian (Lecuona, 1967, p.61-62). Malaria prophylaxis was also distributed, in addition to DDT spraying in certain areas, but largely limited to the island of Bissau. By 1972, however, most qualified personnel had abandoned the Commission, and of the five medical staff in 1962, only one was actually working onsite. Its last reports show that the armed conflict had severely impaired the efficacy of the organization, which had once provided preventive and curative medical healthcare as well as rural medical assistance to most Guineans (Correia, 1972, p.703).

### **Final considerations**

The establishment of the Commission for the Study of and Combat against Sleeping Sickness in 1945 was part of a post-war effort by the autocratic Estado Novo regime towards the modernization of its colonies. It also reflected internal reforms meant to prepare the Instituto de Medicina Tropical in Lisbon for its renewed brief regarding endemic disease control in Portugal's empire (Abranches, 2004, p.48-49), in order to bring it in line with its sister institutions in Britain, France and Belgium. At the same time, the Estado Novo regime expressed a view of empire which portrayed medical doctors as "the heroes of this great humanitarian and civilizing quest" within a framework that considered "the health of the negro the predominant concern in colonial administration" (Monteiro, 1942, p.54). The fact that the Commission – which was initially seen as a temporary project – would become the principal provider of indigenous healthcare was not envisaged by metropolitan decision makers. Its initial experience shows that its limited brief was not understood locally and was questioned by African populations (Ferreira, mar. 1951, p.7). Thus, the shift that occurred in the 1950s, when its brief was extended to cover all endemic diseases, was principally due to the lack of health-related infrastructures, the particular interpretation of its role by the Commission's medical staff, and a reflection of the demands of African communities. The penetration of the countryside by its mobile brigades, originally pioneered in the AOF and AEF in the 1910s and 1920s, and the building of healthcare clinics and bush-infirmaries in the countryside, challenged the existing rural-urban divide in terms of healthcare, while providing innovative public services which reached rural communities. Its apparent success can be measured by its coverage of most of the colony's population by the mid 1950s and the

vast range of pathologies its staff treated. The contrasts between existing coverage and the serious limitations and inadequacies of colonial health services in an indigenato setting therefore became more than evident. Indeed, colonial health officials publicly admitted that the “medical occupation” of the colony had only effectively begun in 1945 (Roncon, 1952, p.384). Not surprisingly, a colonial inspection report concluded by the early 1950s that “[regular] medical assistance to the population was insufficient,” that health services were seriously understaffed, and that the available medical personnel were “very badly remunerated” and working “to the limits of their physical and mental resistance”. The same report concluded that the Commission was “well equipped and managed” but that it “did not engage in general practice” (Silveira, 30 jun. 1951, p.47). This appears to reinforce the idea put forward by tropical health professionals that planned modern programs to combat endemic diseases with direct metropolitan backing, rather than mere “sanitary campaigns,” (Ferreira, jan.-mar. 1967, p.65-66) were far superior to anything that colonial services could muster, suggesting a distinct hierarchy between scientific tropical medicine and colonial medicine.

Although health services were presented as a Portuguese colonial “tool for control” of African societies (Shapiro, 1983, p.16), the chronic lack of resources and the tense relations between administrative and medical staff, tended to reduce the efficacy of this strategy. As awareness grew after World War II that the health of native Africans was a matter of “public” concern – a stance strongly influenced by the WHO – efforts to improve facilities were made. The commissions against sleeping sickness became the spearheads of this policy shift towards tropical and preventive medicine. As Lyons (1985, p.629, 1992, p.102) and others have shown for other territories, colonial health services and the notion of public health largely developed and accelerated as a result of the combat against the disease. The available data clearly confirm this hypothesis in the case of PG (Roncon, 1952, p.384). Until the 1940s, colonial medical staff was often viewed by civil administrators as a potential “fifth column” that invaded “their” territory and responsibilities, competed for resources, and whose focus on the well-being of natives was, in their eyes, somewhat suspect.

A different picture emerges of regular medical services after 1945, with an increase in the number of medical personnel from 12 in 1952 to 28 in 1970 – only eight of them stationed in the countryside – and 186 nurses operating 50 healthcare clinics and 24 rural maternity wards in 1970. However, by the late 1960s the Portuguese Armed Forces had 120 health clinics in the countryside operated by twenty trained general practitioners and specialists, and a hundred nurses who also carried out surveys and vaccination campaigns (Martins, 1992, p.127; Supintrep, 1970, p.68-72). As a result, civil and military medical services overlapped, operating in the same areas, mainly on the island of Bissau and in parts of the North and East (Martins, 1992, p.128-129). In the meantime, the PAIGC had put in place a network of 117 healthcare clinics and five district hospitals in the areas under its control. By 1972 it had incorporated 335 nurses (fully trained and auxiliary, and first aid assistants) and ten (Guinean) medical doctors into its ranks (PAIGC, 1974, p.6). From 1970 onwards mobile health brigades became active in the liberated areas, implementing preventive care by means of screening (for filariasis, ancylostomiasis, onchocercosis, schistosomiasis, etc.), malaria prophylaxis and vaccination campaigns against cholera, tetanus, diphtheria, polio and smallpox (PAIGC, 1974, p.3-10). Thus, by the mid 1960s five different biomedical health

services were operating in the colony: the colonial services, the sleeping sickness program, the Roman Catholic Missions, the Armed Forces, and the PAIGC. They provided an unusual degree of coverage – often overlapping and complementary in terms of coverage and care – for local communities entangled in a violent conflict. The health services in the independent states of Senegal and Guinea (Conakry) should also be included here, as they also treated uprooted populations.

Thus, the work of the Commission actually created favorable conditions for channelling more human and material inputs into public healthcare in rural areas, which in contrast to Angola or Mozambique effectively included the whole colony. The rapid expansion of the network of rural clinics allowed for the observation and treatment of a large number of patients for a variety of endemic diseases including HAT, while the Commission also operated specific programs for the combat against and eradication of vectors. Under the aegis of the WHO, its medical staff also established ties with similar programs and health services in the neighboring AOF, while maintaining close ties with international forums such as the WHO's Regional Office in Brazzaville and the International Scientific Committee on Sleeping Sickness. It also built up a local research capacity with fixed and mobile laboratories – which produced data onsite on large numbers of patients – whose services were also available to and employed by colonial health services. The statistics it produced appear to confirm the notable success that the Commission achieved by the early 1960s with regard to the combat against HAT in PG, although the results in PG were regarded as “good” and not as “spectacular” as those achieved in Northern Angola (Azevedo, 1974, p.584). But the Commission's inputs cannot only be measured as a function of its statistical performance with respect to trypanosomiasis, but should also take into consideration other endemic diseases and the qualitative dimensions of control efforts.

With unprecedented access to the population of an entire colony, in the process it was transformed into a “living laboratory” (Tilley, 2011, p.169-216) for biomedical research, including the testing of new drugs on African communities in order to solve “micro-biological puzzles” (Neill, 2012, p.165), but also to test programs for control over indigenous the population (Shapiro, 1983, p.270). In the process, the Commission enhanced Portugal's status as a “modern” colonial power and a producer of scientific knowledge in and on the tropics, making the combat against trypanosomiasis “one of the proving grounds of Portuguese colonialism” (Shapiro, 1983, p.228). However, the vertical aspects of the program, including mass-screening, prophylaxis and treatment that by definition was designed to affect the whole population (Ferreira, jan.-mar. 1967, p.63), depended on close cooperation with colonial authorities, above all with the *chefes de posto* (Pinto, dez. 1947, p.794). These officials in turn relied on appointed indigenous chiefs and on administrative guards in a colony where officialdom enjoyed a rather questionable reputation (Havik, 2010, p.43-50), thus inexorably drawing the Commission into the conflict. The paradigm shift in the approach to the disease, influenced by the WHO and advancing research in the 1950s and 1960s, associating it with poverty, under-development and a lack of knowledge (Neves, 1967, p.182) – a view which the anti-colonial opposition adhered to with regard to a broad range of endemic diseases – does not appear to have been adopted by the Commission. Since early research on the evolution of the disease in Africa, ecological and social change had been recognized as factors

contributing to its spread across the continent and with greater emphasis from the 1930s onwards (Maudlin, 2006, p.687). Although reports by the Commission's staff admitted a lack of "complete knowledge" of the African environment (Ferreira, 1953, p.103) and recognized the relevance of socio-economic and cultural factors in understanding epidemiological patterns (Ferreira, jan.-mar. 1967, p.65), such studies were not carried out or published. In addition to the role of medical specialists, the role of local assistants and nursing personnel, which would have been relevant for the Commission's relations with local communities, was largely ignored in reports. Despite its staff's marked concern with the provision of public healthcare to Africans and occasional expressions of empathy with their patients, its faith in modern biomedical methods of disease control was such that the relevance of local notions of illness and practices were downplayed or simply ignored. Alas, health professionals' discourse demonstrated a dismissive attitude towards Africans' "atavism, customs and superstitions" acknowledging that they showed "passive resistance" to biomedical interventions (Ferreira, 1951, p.353). This is despite the fact that medical reports had linked *numú* or *doença da pedra* with HAT from the second half of the 1800s and had put forward hypotheses on the special characteristics of the disease's history in the region (Barreto, 1928, p.24-25; Sequeira, 1935a, p.29-31; Azevedo, 1947, p.27). References to the disease's historical evolution in the region in early surveys (Barreto, 1928, p.22-27; Sequeira, 1935a, p.29-30) and recommendations for further research were not followed up on. Pursuing this angle would have been relevant for understanding the impact of ecological changes, famines, migrations and armed conflict on the spread of endemic diseases (Berrang-Ford, Lundine, Breau, 2011). No evidence has been found that the Commission's staff took note of contemporary ethno-medical research carried out in PG from the 1940s (Costa, 1945; Almeida, 1952) nor of publications on Western Africa which referred to the common surgical removal of cervical nodes from Senegal to the Ivory Coast (Harley, 1941, p.261). Affecting physical as well as mental health, the disease straddled different realms of medicine associated with local concepts of "hot" and "cold" illnesses, particularly relevant in an African context (Feierman, Janzen, 1992). Local communities' tendency to "hide" patients from view in an advanced stage of HAT points towards an acute awareness of the possible "spiritual" dimensions of the disease as well as of the question of stigmatization. This may help explain why little research appears to have been carried out on patients in an advanced stage of sleeping sickness, contrasting with efforts in the neighboring AOF (e.g. Collomb, Nansot, 1959).

Given that in the course of armed conflict, healthcare and disease control became an element of competition between colonial authorities, the armed forces and liberation movements, their different strategies and priorities are particularly relevant for an understanding of disease control in this period. Similarly, the transition to independence of AOF countries such as Senegal and Guinea-Conakry had an impact on cross-border medical cooperation and networks of health professionals in the region. In view of the political ramifications of the program in the Portuguese colonial context, the association between public health, disease control and decolonization (Shapiro, 1983, p.244) is worth exploring in more detail. The longer term impact of conflict and the post-independence period in Guinea Bissau on popular attitudes towards endemic diseases in general and HAT in particular also needs to be considered beyond limited vector studies (Badjana, 2004). Further archival and

field research will therefore be needed in order to explore a number of threads with respect to disease control in a region that has long been troubled by the dearth of effective public healthcare and where indigenous perceptions of disease and local healing methods continue to play a crucial role.

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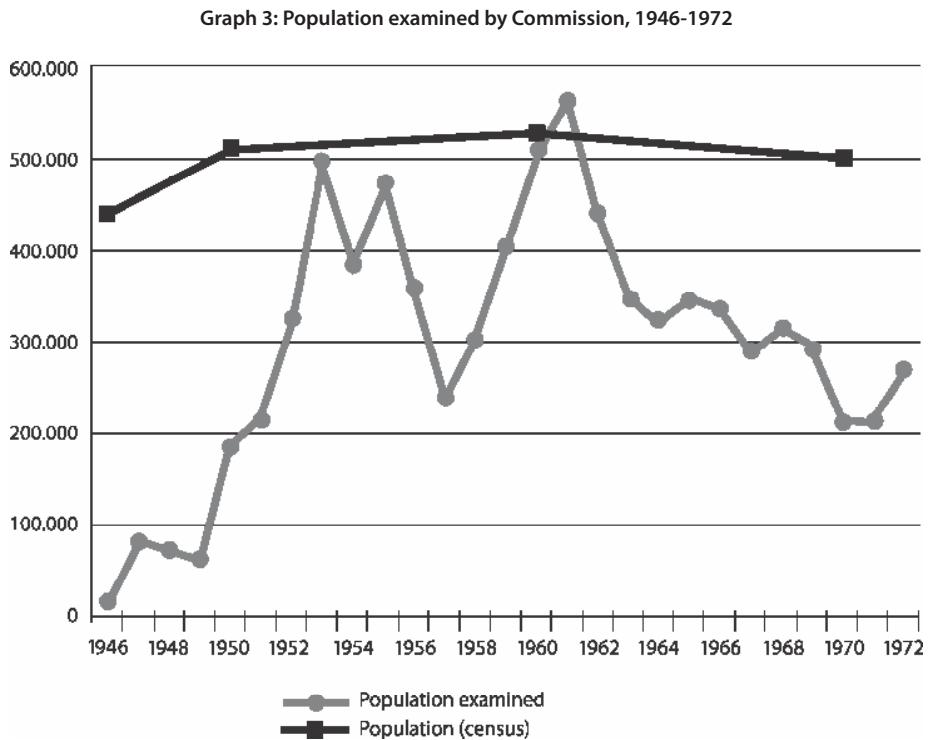
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## ERRATA

The article "Public health and tropical modernity: the combat against sleeping sickness in Portuguese Guinea, 1945-1974", by Philip Jan Havik, published in volume 21, issue 2, Apr.-Jun-2014, presented Graph 3 with a wrong image. We apologize Mr. Havik and the readers for our mistake, and provide the corrected image:



Source: compiled by the author using *Provincia...* (1959, p. 15-18); Correia (1972, p.707)