Malaria and the Emergence of Rural Health in Argentina: An Analysis from the Perspective of International Interaction and Co-operation

ADRIANA ALVAREZ

Abstract. At the end of the 19th century, after having long neglected sanitary conditions in rural areas, Argentinean public health authorities began to recognize the need to combat malaria in the country’s northern provinces. The disease was proliferating among workers in the sugarcane and cotton industries, jeopardizing national and international economic interests. The crusade against malaria involved co-operation of the Argentinean, Brazilian, European, and US scientists, whose concerted efforts led to identification of the local characteristics of the disease and its mosquito vector. Argentina’s antimalaria campaigns also derived from international interactions, but 19th-century European models proved hard to supplant. This study illustrates how malaria was established as an issue of public concern in Argentina in the early 20th century, highlighting the disease’s socioeconomic dimensions and exploring the role of international sanitary co-operation in paving the way for the establishment of a rural hygiene discourse.

Résumé. À la fin du 19ème siècle, après avoir longtemps négligé les conditions sanitaires des secteurs ruraux, les autorités argentines de santé publique ont commencé à reconnaître la nécessité de combattre la malaria dans les provinces nordiques du pays. La maladie proliférait parmi les ouvriers des industries de canne à sucre et de coton, compromettant les intérêts économiques nationaux et internationaux. La croisade contre la malaria a impliqué la coopération de scientifiques argentin, brésiliens, européens et américains, qui ont concerté leurs efforts à l’identification des caractéristiques locales de la maladie et de son mous-
tique vecteur. Les campagnes anti-malaria de l'Argentine étaient également dérivées d'interactions internationales, mais les modèles européens du 19ème siècle se sont avérés difficiles à supplanter. Cette étude illustre comment la malaria a été établie comme enjeu public en Argentine au début du 20ème siècle, en mettant l'emphasis sur les dimensions socio-économiques de la maladie et en explorant le rôle de la coopération sanitaire internationale dans la préparation d'un terrain propice à l'établissement d'un discours d'hygiène rural.

Resumen. A finales del siglo XIX, después de haber descuidado las condiciones sanitarias en las áreas rurales, las autoridades de Salud Pública en Argentina comenzaron a reconocer la necesidad de combatir la malaria en las provincias del Norte. La enfermedad había proliferado entre los trabajadores rurales de la industria del algodón y la caña de azúcar, amenazando los intereses económicos de empresas nacionales e internacionales. La cruzada contra la malaria involucró la cooperación de científicos de la Argentina, Brasil, Europa y los Estados Unidos, quienes concentraros esfuerzos para identificar las características locales de la enfermedad y su mosquito vector. Las campañas antimalaria en Argentina también derivaron de la interacción internacional, cuando los modelos provistos desde Europa en el siglo XIX parecían difíciles de reemplazar. Este trabajo tratará de mostrar como la malaria se instaló como un tema de agenda pública en Argentina en los primeros años del siglo XX, enfocándonos en las dimensiones socioeconómicas y explorando el rol de la cooperación sanitaria internacional en el establecimiento de un discurso para la higiene rural.

INTRODUCTION

In the late 19th century, Argentina’s public health authorities—long focused on the threat of urban epidemics such as yellow fever and cholera—were suddenly awakened to disease problems in the rural hinterlands. Malaria, more than any other ailment, sparked political interest in the health of the northern provinces as a matter of national economic concern. Although malaria had long been a widespread problem in the northern regions, it was not a concern of national medical and public health authorities until the 20th century.

The newfound attention to rural malaria led to profound changes in the domestic sanitary agenda. But rural hygiene’s jump to the spotlight was not solely a function of national priorities. As we will see, international health agencies and foreign companies also took notice of the malaria problem, compelling Argentinean authorities to take rural sanitary conditions more seriously. In particular, growing influence of Brazilian science, together with the initiatives of the Rockefeller Foundation’s International Health Division, contributed to the development and subsequent reorientation of research on the autochthonous characteristics of the disease in northwest Argentina. Sanitary co-operation was also impelled by foreign companies in Argentina, which sought to reap profits from the investments they had made in sugar refineries and cotton fields.
The purpose of this paper is to analyze the ways in which local institutions and doctors interacted with international organizations and scientists in establishing and shaping malaria as an issue of public concern in Argentina during the first few decades of the 20th century. We will address the demographic, economic and social implications of malaria and explore the emergence and implications of the new rural hygiene discourse.

**LOCALIZING THE DISEASE: AN ECONOMIC PREROGATIVE**

Malaria, also known as *chucho* or *sleeping disease*, was not new to Argentinean territory; it was prevalent throughout Latin America since well before the Spanish conquest. In Argentina, a vast country whose regions exhibited stark sanitary contrasts, malaria’s greatest impact was in the northern provinces of Tucumán, Salta, Jujuy, Catamarca, and Santiago del Estero, as well as north of Córdoba and in the territories of Chaco, Formosa, La Rioja, and Corrientes.

Having neglected malaria at both national and regional levels until the early 20th century, governmental interest in the disease was sparked above all, by the economic impact of the disease: malaria incapacitated

---

thousands of workers and thus jeopardized the sugar industry, which was crucial to the economic stability of the north.

Sugarcane had long been cultivated and processed in rudimentary refineries in the provinces of Salta, Jujuy, and Catamarca. Beginning in the mid-19th century, the business of sugar led to a full-scale industrial reconfiguration of northwestern Argentina. The annual harvest-time migration rapidly expanded, congregating peasants from the Puna and the Calchaquí Valley, as well as gangs of labourers from Catamarca, Santiago del Estero, La Rioja and Córdoba). Sugar production experienced the most dramatic growth in Tucumán, starting in 1856. By 1880, it was estimated that sugar refineries in Tucumán relied on over 10,000 workers. In 1898, a special commission on agriculture set up by the National Congress reported that 70,000 men worked in sugarcane harvesting and refining in the area. By 1910, sugarcane harvest in Tucumán engaged between 50,000 and 60,000 workers, many of whom were joined by their wives and children, forming “floating populations around the factories.”

Before the explosive growth of the sugar industry, malaria was circumscribed to the provinces of Tucumán, Salta and Jujuy. Over time, as roads and railways multiplied and temporary migration flourished, the disease spread to Catamarca, Santiago del Estero, Chaco, Formosa, the north of Córdoba, parts of La Rioja, and Corrientes. Tucumán was the first major region from which the disease spread, as many workers, lured by the prosperity of the sugarcane industry, traveled back and forth from southern provinces.

The north of Argentina was not only a magnet for workers, but also a breeding ground for malaria’s carrier species, the *Anopheles* mosquito. Unable to survive in sunlight, the mosquito seeks shelter in bushes, herbs and ponds. Due to constant and heavy rainfalls and a warm climate, the northern region had abundant swamps and thick plants favoured by the *Anopheles*. The ecological changes wrought by the sugar industry further exacerbated the malaria problem. In plowing the fields for planting of sugarcane, workers chopped down trees indiscriminately. Weeds proliferated along the plantations’ furrows, increasing the number of existing *Anopheles* habitats. As sugarcane plantations grew in size and more workers were attracted to the region, the number of people infected with malaria grew concomitantly.

National and regional authorities soon became nervous about the detrimental effects of the disease on the sugarcane labour market, since sugar was one of the most important crops in the northern economic circuit. Unlike other industries, it had managed to survive the apogee of the agricultural export model, which prioritized the trading of leather, meat and cereals. The spread of malaria to other regions was also facilitated, starting in the 1880s, by the proliferation of railways, which encouraged regional integration and advancement. In Tucumán, towns situated
along the railroad were rapidly invaded by the insects carrying malaria. On this point, Dr. Antonio Barbieri, Chief of the Malaria and Hookworm Section of the National Health Department, maintained that “the railroad must be deemed an occasional propagator of malaria, which represents a counterpoint to its role in social and economic progress.” The social and economic factors described here, together with concurrent medical breakthroughs, such as the advances in bacteriology and the advent of tropical medicine, reshaped the sanitary policies of early 20th-century Argentina.

MALARIA AND THE “MODERN ARGENTINA” SCHEME: POLITICAL CHANGE AND THE EMERGENCE OF A RURAL HYGIENIC DISCOURSE

The inclusion of malaria in the political agenda of the late 19th century coincided with the country’s process of modernization known as “Modern Argentina.” Drawing from positivist ideology influential in late 19th-century Buenos Aires, new governmental policies sought to foster progress while counteracting all potential obstacles. Thus, authorities embarked upon a campaign against stealthy enemies, such as the anarchist movement, which questioned the country’s political system, and the diseases threatening industries and commercial exchange.

Based upon the premise of national unity, the “Modern Argentina” project brought heightened attention to malaria as a national problem. Malaria soon came to be regarded as an “internal hazard” whose consequences extended far beyond provincial borders. New laws concerning malaria were passed in an attempt to circumvent the deficiencies of the Constitution of 1853, which delegated jurisdiction over medical care to the provinces. Eradication campaigns were enforced and financed by the State via the National Health Department (NHD), rather than at the provincial level.

Outside the prominent Litoral region, there were only isolated urban areas; the more remote provinces now sought to catch up with coastal cities, and major provincial capitals, such as San Miguel de Tucumán, Salta, and San Salvador de Jujuy, implemented modernization projects of their own. The anti-malaria programs included in these efforts were supported by a new crop of local doctors who had returned to their hometowns upon completion of their studies at the Faculty of Medicine of Buenos Aires. Influenced by the sanitary paradigm of late 19th-century Buenos Aires, this young generation of doctors brought the capital’s hygienic practices into the provinces. Among these were Eliseo Cantón, Garzón Maceda and Carlos Delfino, all of whom held high positions in the National Senate and the Chamber of Deputies at the same time as they served in various departments within the NHD. In the hinterlands,
the new sanitary model generally merged with local traditions, customs and scenarios, with occasional clashes as the number of outside doctors increased. In sum, Argentina’s rural hygiene discourse was born in an era dominated by urban ideas.

Whereas the main concerns in the cities revolved around infectious diseases such as cholera, yellow fever and tuberculosis, the provinces focused on a different set of “agricultural diseases.” Provincial authorities prioritized the maintenance of the labour force above all other problems, as workers were indispensable to the exploitation of sugar and, consequently, to regional incorporation into the “Modern Argentina” ideal. Only after national sanitary authorities recognized malaria as one of the main diseases afflicting sugarcane workers did the disease reach the national agenda.

This national attention was the culmination of a half century of efforts by doctors, who had become persuaded of the necessity of studying the problems of malaria—which for generations had formed part of the daily life of the inhabitants of Argentina’s north. In fact, lethargy and fatigue, typical symptoms of malaria, had long been considered characteristic of the northern man, who was deemed “lazy” or “idle.”

As a result of this research, ‘northern fatigue’ ceased to be considered a regional anthropological feature resulting from a hot climate or from indigenous traits (given the importance of aboriginal communities in the region); instead, it was acknowledged as the consequence of endemic malaria. As a result of this change in understanding, new demands were made on the state.

Like doctors involved in the public health reform of Brazil’s First Republic, local Argentinean doctors—many of whom were officials in the provincial governments and municipalities—called for technically oriented, centralized action on the part of the State. Significant changes in sanitary policy ensued, and in 1902, the First National Sanitary Conference was organized to look into malaria, “whose effects drain both individual and collective energies and may seriously damage the social and economic foundations of a vast portion of the Republic.” This national attention seemed justified; it was found that although malaria was mainly concentrated in rural areas, temporary labourers disseminated the ailment throughout the northern region, in rural and urban areas alike.

SCIENTIFIC DEVELOPMENTS, LOCALLY AND INTERNATIONALLY

These new developments resonated with growing international attention to malaria. Local publications on malaria of this period suggest that the scientific gap between Argentina and the world powers was not significant. Indeed, by the late 19th and early 20th centuries, Argentina
was part of a group of relatively wealthy countries whose cultural and political elites were bound together. Argentinean bonds with Western Europe were particularly strong.\textsuperscript{16}

Argentinean medical elites kept up with European discoveries of microbial agents, vaccines, and sera, beginning with Gerhard Hansen’s identification of the leprosy bacillus in 1871-73 and continuing with the work of Louis Pasteur, Robert Koch, and others. Malaria researchers closely observed the relevant European developments: Charles Laveran’s identification of the malaria plasmodium in 1880 and decades of parasitological research by Italian and British imperial scientists.\textsuperscript{17}

Influenced by European models, early malaria research in Argentina concentrated on clinical aspects of the disease, establishing that the high prevalence of “intermittent fevers” was indeed a problem of malaria. Much of this late 19th- and early 20th-century research took place under the guise of doctoral theses of medical graduates, which emphasized the clinical follow-up of malaria patients and recorded different responses to specific treatments. Since the vector of the disease was assumed to conform exactly to the descriptions coming from the Italian school, local studies made no reference to the mosquito vector. The fact that Argentina had autochthonous mosquito species with distinguishing traits was obscured by this procedural omission. Instead malaria researchers strove to understand and combat the disease on the basis of clinical analyses of the patients’ blood. The underlying idea was that if all malaria patients were cured, the disease would be eradicated.

In 1902, Antonio Barbieri crystallized this line of thinking:

\begin{quote}
through the therapeutic use of the quinine cortex, it had been verified that Argentina was home to all the types of malaria fevers classified by Torti in the 17th century.... In 1880, when Ch. Laveran announced that an endoglobular parasite was etiologically significant in malaria, we could a priori think that the same parasite would be active in our chucho. Likewise, when Golgi pointed out that it was necessary to distinguish different species among these endoglobular parasites, they could have just as well been admitted a priori in Argentina....\textsuperscript{18}
\end{quote}

The first wave of research on malaria built upon the studies carried out by Eliseo Cantón\textsuperscript{19} starting in 1880, using medical geography to describe the regions affected by the disease. Later on, the works of Dr. Carlos Malbrán also proved influential. Not only did Malbrán discover the malaria parasite in Argentina, but he also expanded his laboratory research into the public sphere by promoting concrete anti-malaria actions—first, as president of the 1902 National Anti-Malaria Conference and, between 1910 and 1912, as a National Senator for Catamarca.

By 1900, the presence of Argentinean professionals in European medical circles had grown even stronger. Upon his return from his studies in
Italy, Eliseo Cantón began teaching his pupils the principles of the “Italian malaria school,” while other specialists helped to raise awareness of the etiology, diffusion and treatment of malaria in Argentinean territory, based on Italian ideas.

But around the same time, some Argentinean researchers began to pursue a more locally grounded path. In 1902, medical entomology studies conducted by Félix Lynch Arribálzaga (member of the National Academy of Sciences, whose mission was to explore and conduct research throughout the country) and Guillermo C. Paterson (founder of the Scientific Society of Jujuy) determined that the vector of malaria in Argentina was a mosquito species known as *Anopheles (A.)* *pseudopunctipennis*. During a 1902 malaria epidemic in Santiago del Estero, Juan Carlos Delfinò caught several *Anopheles* mosquitoes within private residences and verified their infectious nature. However, in making the results of his research public, he failed to correctly determine which *Anopheles* species the mosquitoes belonged to, although it was evident that they belonged to the *A. pseudopunctipennis* species.

Thereafter, local scholarship on malaria resulted from the interaction among European doctors and their Argentinean counterparts, who regularly visited various institutions throughout the western world. At this point, all that was known about malaria was that it existed across the continent and that the *A. pseudopunctipennis* species was its main vector. In the absence of more precise information, the protocol for controlling the disease remained an adaptation of the Italian anti-malaria program.

Renewed malaria awareness gave rise to the 1907 National Law of Defense against Malaria (law 5,195), which mandated the use of quinine to prevent infections, the installation of mosquito netting, the improvement of agricultural and hydraulic sanitation, and the destruction of larvae and mosquitoes in malarious areas. Launched in 1911 and 1912, the first anti-malaria campaigns focused on the elimination of swamps and weeded areas in rural zones. Health authorities also emphasized the construction of bridges, canals and drainage systems to properly channel waste water so as to prevent the formation of marshes. In addition, quinine was administered to individuals for both therapeutic and preventive purposes. These measures were complemented by blood tests taken in laboratories located in the cities of Salta, Jujuy, Catamarca and Tucumán, under the supervision of bacteriologists De Gregorio, Etcheverry, Vagni, and Biglieri.

The expansion of the sanitary mission into the rural world gave rise to a new representation of the person suffering from malaria:

“every individual evidenced terrible malaria symptoms, which becomes progressively worse as the railway extends throughout the region. There is an abundance of long, thin, yellowish and greenish faces suffering anguish; some people walk lazily, their skinny chests contrasting with their bulging stomachs....”
The image of the person infected with malaria was intimately linked to the poor material conditions of the rural world, marked by countless shacks and hovels and lacking the basic sanitary tools that might have impeded the proliferation of local vectors. As noted by official reports, people living in the region typically went about their daily chores bare-foot and naked to the waist, which increased the chances of infection. On account of their way of life, people suffering from malaria were deemed partially responsible for having contracted the disease. According to one sanitarian’s observation of Jujuy:

“the social rank of each individual also plays a role: peasants, illiterate foreigners and poor townspeople are the most frequent victims of malaria because they have no concern whatsoever for their personal hygiene.... Weak in soul and body, these individuals have no appreciation for the value of the most basic sanitary measures, and completely ignore the curative properties of quinine. They belong to a group that might be labeled ‘indolent malaria victims’, and do not seek medical assistance until their health problems reach extreme proportions.” 23

National authorities were particularly frustrated by rural attitudes to treatment. Most who suffered from malaria refused to take the quinine distributed by local sanitarians; others pretended to take it regularly only to sell the medication or exchange it for a variety of goods (mainly alcohol). 24 The government also failed in its attempts to promote the use of mosquito netting in doors and windows as most peasants customarily slept outdoors on summer nights.

Health authorities thus felt compelled to implement educational measures in order to address the malaria situation. 25 Laveran himself had already postulated the need to have school teachers inform the masses about the causes of the disease. He also advocated the distribution of brochures describing prophylactic procedures and called for the administration of quinine to all railway workers and the use of wire netting to protect their houses. 26 Here Argentinean sanitarians were again influenced by an Italian campaign that relied on the concerted effort of public health specialists, engineers, farmers and teachers. 27

During the fourth Latin American Medical Congress held in 1909, Nicolás Lozano, president of the Argentinean Scientific Society, expressed the views of the national medical community: “Governmental action must be supported by classroom prophylactic education, capitalizing on mass media to reach all social strata. Popular commitment to the cause will only be guaranteed by demonstrating the efficacy of individual sanitation; otherwise, the masses’ ignorance and prejudices will destroy even the noblest initiatives. 28

The first anti-malaria measures were implemented in northern schools, where informational conferences were held and instructional materials were distributed. A manual published by the University of
Tucumán, directed to children attending schools in Tucumán, Salta, Jujuy, Santiago del Estero, and Córdoba, invited the “new generations” to do away with the “old ways” of their parents and grandparents, who had always coexisted with chucho and did not sufficiently fear the ailmament. This text also correlated malaria and poverty, graphically depicting their connection through bleak images of fatigue and misery. Despite these illustrations, the manual put forward a message of hope. Its cover portrayed the image of a child riding an Anopheles mosquito, as if he were a horsebreaker. The underlying purpose was to show that malaria could be defeated with accurate knowledge, ranging from the description of the infection and its individual consequences to the enumeration of preventive measures and techniques to destroy larvae and their breeding grounds. The manual also stressed the importance of using wire netting in doors and of taking quinine as the only means of becoming immune to malaria.

The pedagogical and medical call to action outlined in these materials marked the beginning of rural sanitation and the inculcation of hygienic habits in the poorer northern regions. Moreover, the anti-malaria campaign introduced formal medicine in a context governed by quackery and sorcery, which had proliferated not only due to rural ignorance and traditions, but also because few doctors had ever practiced in vast areas of the northern territory.
As rural sanitary institutions multiplied, more professionals were needed to staff them, in accordance with the organizational logics behind the 1907 National Anti-Malaria Law. Provincial Sanitation Councils (whose functions were analogous to those of the National Sanitation Department) and Municipal Public Assistance Offices (found only in major cities) collaborated actively in rendering new sanitary services to fight malaria and hookworm, which affected both patients and professionals in the remote northern clinics.

The new sanitary and anti-malaria services in the north soon became highly visible. The provinces of Tucumán, Salta and Jujuy created anti-malaria clinics to treat chucho victims for free. Anti-malaria campaign records showed that the number of people treated for malaria had increased from 31,892 in 1911 to 35,324 in 1912, 128,587 in 1913, and 175,875 in 1914. By 1912, the area counted on 4 regional directors, 19 resident doctors, 56 sanitary assistants, 16 hygiene helpers, 4 bacteriologists, 8 laboratory assistants and numerous secretaries.31

The tasks performed by regional clinics were complemented by the work of laboratories in the cities of Salta, Jujuy, Catamarca, and Tucumán, under the direction of qualified bacteriologists.32 In addition to research on malaria, these laboratories also conducted important studies on regional parasitology; indeed, the etiology of Chagas disease was largely uncovered thanks to the investigation carried out at laboratories in Salta.

Notwithstanding these developments, the initial sanitary efforts coincided with a dramatic increase in the identified cases of malaria rather than a decline. The new malaria policies failed due to three main reasons: first, although the European model adopted in Argentina had proven successful in urban areas within France and Italy, it was not suited to the geographical, social and climatic context of the northern regions; second, simultaneous to the malaria campaigns, demographic expansion in areas inhabited by the Anopheles mosquito resulted in increased contact between the vector and the human population; finally, the recruitment of doctors for the clinics in the area was extremely difficult, as evidenced by the numerous staff changes and resignations recorded during the first years of the campaign. Even high-ranking officials, such as regional inspectors, quickly abandoned their duties.33

The “crisis of the classical paradigm” of malaria control intensified in the following decades, and as a result, European strategies were progressively superseded by Latin-American approaches to malaria.

THE CRISIS OF THE CLASSICAL PARADIGM AND THE EMERGENCE OF METHODOLOGICAL ECLECTICISM

By the mid-1910s, Argentina’s anti-malaria efforts were undergoing significant change. Previously, factors such as the impact of the environment and the social context, which were characteristic of tropical medi-
cine, were marginalized by malariologists. But the problems with applying the “classical paradigm” to Argentina led researchers to replace European research techniques with a methodological eclecticism enabling the identification of the distinguishing features of malaria in Argentina.

In particular, the investigation conducted by Dr. Guillermo Paterson of the National Department of Health—which aimed at determining the type of vector carrying the disease—constituted a turning point in national research protocols. The formerly clinical focus of Argentinean malaria research, which had historically favoured the exclusive study of patients, now shifted to the mosquitoes disseminating the disease.

One of the main reasons for this transformation was likely the influence of a variety of discoveries made by Brazilian researchers, who had long captured scholarly and media attention in Argentina. What was going on in Brazil and what were the differences with Argentina? As in the Argentinean pampa, sanitation in Brazil for much of the 19th century was dominated by metropolitan discourses. Warm climate was widely believed to hinder cultural and scientific development. On this point, John Manuel Monteiro maintains that “evidently, what was at stake was the characterization of Brazil as a civilized country; or, at least, as a country capable of overcoming backwardness and contradictions so as to earn a place among the most advanced civilizations of the northern hemisphere.”

Sandra Capon points out that the thesis of racial and climatic pessimism was challenged in 1890, when doctor Pereira Barreto—an adherent of positivism—championed the need to carry out scientific research in Brazil, particularly that related to controlling and fighting epidemic diseases such as yellow fever. The development of this line of investigation was supported by the creation of the Sao Paulo and Rio de Janeiro Institutes, directed by Adolfo Lutz and Oswaldo Cruz, respectively, where a range of studies demonstrated that many of the diseases attributed to torrid climate were actually caused by specific agents.

In other words, the task of scientists in Brazil no longer entailed demonstrating that Brazil had the same diseases as Europe with the same bacteriological agents. Scientific researchers became engaged in observing the peculiarities of certain diseases transmitted by vectors specific to particular regions. Study of these unknown species required close observation of characteristics such as habitat, anatomical and physiological features, and behavioural patterns.

Brazil’s new research attracted much attention, as it provided a new way of understanding local diseases. In Argentina, the bibliographical references of doctoral theses reflected the impact of the Brazilian school. Carlos Chagas’s 1906 “Profilaxia do impaludismo” (Prophylaxis of Malaria) was cited in 1908 by Doctor Pedro García, a former disciple of Celli and Laveran. Dr. García alluded to Chagas’s work with his emphasis on the importance of knowledge of mosquito vectors for the devel-
opment of modern prophylactic methods; after enumerating the species of *Anopheles* found in Argentina, he described the malaria parasite in great detail.43

Similarly José Penna,44 who was president of the NHD (1910-16) and a pioneer of the anti-malaria campaigns in Argentina, published a series of articles and books on malaria which referenced the works of Oswaldo Cruz and Adolfo Lutz. Lutz pursued a parasitological angle: the meticulous classification of insects and the study of their dissemination patterns throughout Brazil. Jaime Benchimol argues that Lutz “was a versatile scientist with considerable experience not only in clinical and bacteriological matters, but also in helminthology and other disciplines which would eventually form part of the so-called tropical medicine.”45

The Brazilian influence upon Argentina’s change in scientific approach was signified by the appointment of entomologist Arthur Neiva, from the Oswaldo Cruz Institute, to work in the parasitology and protozoology sections of Argentina’s National Institute of Bacteriology (1915-16). Neiva’s research provided valuable information on the ecology of the dangerous *Anopheles* species,46 of which little was known in Argentina. Neiva claimed that effective prophylaxis must begin with “knowing the biology of these insects…whose destruction will usually depend upon the recognition of their biological traits, which differ greatly even among similar species…and that the measures taken against European species prove useless in fighting Latin-American species.47

Still, Argentina did not fully adopt the tropical medicine model, as a variety of features and practices of the classical model persisted. This incomplete transitional process led to a further increase of malaria cases throughout the 1910s and the 1920s.

THE CONSOLIDATION OF MALARIA AS A MATTER OF PUBLIC CONCERN

As the 20th century progressed, the detrimental effects of malaria had an impact not only on sugar-based regions but also on the cotton industry, which was being revivied by US investment. In the period of prosperity following World War I, the growing dominance of US finance gradually replaced British foreign investment in Argentina. As part of this interest, the Ministry of Agriculture, with the support of US experts, supervised the expansion of the cotton industry with farmers and outside technical specialists working side by side.48 Starting in 1923, cotton manufacturing experienced a dramatic growth in the northeast, especially in the Chaco, as well as in northwestern provinces such as Tucumán, Salta, and Jujuy. Local production grew dramatically, satisfying both domestic and export demands.

The co-ordinated action of US investment firms, the Ministry of Agriculture and Argentine textile manufacturers in 1920 brought about
numerous changes; producers participating in farming co-operatives took on a more scientific approach to cotton production, and the establishment of experimental agricultural stations allowed for technical information to reach rural areas. These parties scrutinized labour patterns and restructured the labour force in an attempt to avoid the high cost of hiring additional temporary workers. Both the Ministry of Agriculture and US experts maintained that malaria severely hindered government efforts to counteract labour scarcity. Workers’ movements in Tucumán supported this view, and at protests they denounced the poor working and sanitary conditions of sugarcane labourers.49

Labour scarcity was actually the result of even more complex phenomena than migration and production patterns: low natality lay at the heart of the problem. As indices of premature death and miscarriage in malaria victims rose, birthrates dropped, worrying the country’s political and intellectual elites. Malaria specialist and medical official Eliseo Cantón, concerned that the north’s modernizing project was at stake, argued that “the infant mortality rate, which in Salta has actually grown higher than the birthrate, jeopardizes civilizing efforts in the provinces affected by malaria.”50

In the city of Buenos Aires, which was also experiencing a falling birthrate, this change was attributed to the diffusion of contraceptive practices, a function of the incorporation of women into the labour market.51 Moreover, the effect of declining birthrates was attenuated by the implementation of extensive maternal and child health measures, which had helped to lower infant mortality rates. In the northern hinterlands, however, the combination of low natality and high infant mortality, resulting from malaria and misery, brought about depopulation. Eliseo Cantón explained, “We are aware of the fact that there are multiple causes bringing about premature death and abortion, but we are certain that malaria is the main one. Mothers weakened by malaria give birth to feeble children, whose hereditary anemia and frail organisms render them unable to survive the infection or even typical infancy diseases.”52 Although the causes of the decline in birthrates were different in the capital and in the provinces, anxiety about “racial degeneration” was shared throughout the country. In Buenos Aires this played out in terms of the “undesirable” immigrant, who was perceived to carry madness, social delinquency, and subversion into the population; in the north, the problem of racial debility was not blamed on external influences, but rather on native fevers. As such, malaria’s importance as a demographic, economic and social problem mounted in the 1920s. With the aim of reorienting the crusade against malaria, research laboratories began to collect as much data as possible on the behaviour of the *A. Pseudopunctipennis* mosquito. Their main objective was now to fight the vector more efficiently53 in order to save the nation.
Around the same time, a new actor entered Argentina’s anti-malaria scene: the Rockefeller Foundation’s International Health Division. An agreement reached by the Argentinean government and the Foundation in 1925 resulted in the creation of the Practical Anti-Malaria Studies Section within the NHD, with Rockefeller officer Nelson Davis appointed honorary director. These new efforts generated great interest among the scientific community, as evidenced by the reception of research findings at the conferences held by the Argentinean Society of Northern Regional Pathology, founded in Jujuy in 1926 by microbiologist and NHD official Salvador Mazza (a bacteriologist who had graduated from the National University of Buenos Aires and had studied at the Pasteur Institute in Tunisia with Charles Nicolle), and the Argentinean Center for Regional Pathological Studies, created in 1928. At these meetings, malaria was discussed from various perspectives, including the impact of the co-operation between local and American doctors through participation of the Rockefeller Foundation (RF), and a range of studies on the behavior of the vector, a marked change in focus from the previous decade.  

In 1927, Nelson Davis, director of the Practical Studies Section of the Anti-Malaria Commission of the NHD, pointed out that nothing was known about the dispersion patterns of the malarious mosquitoes. RF representative E. R. Rickard collaborated with local scientists and pioneered a study on the dispersion range of the *A. pseudopunctipennis* in the north of Argentina. The study was eventually completed by the deputy director of the Practical Studies Section within the Anti-malaria Commission, who determined that “in the north of Argentina, the *A. pseudopunctipennis* species returns to its nest after stinging an individual in order to deposit its eggs.” He then added, “We have captured *pseudopunctipennis* specimens 1,800 meters away from their nests, which means that they are spreading into neighboring populations…. These mosquitoes are certainly dangerous, as they already carry the disease.”

In contrast to the situation in Europe, the migration of *Anopheles* mosquitoes to previously malaria-free areas in Argentina was not exclusively the result of internal migration or the expansion of the railroad, but also due to the dispersion patterns of local species. Moreover, *Anopheles* specimens and cases of malaria were detected in areas greater than 3,000 meters above sea level, especially in La Quiaca in the province of Jujuy. This constituted a rare local peculiarity, as European schools had no record of the presence of *Anopheles* mosquitoes in mountainous areas.

In the late 1920s Mazza and E. R. Rickard of the RF’s International Health Division began to investigate the relation between the spread of malaria and rice fields, believed to be major breeding grounds for anopheline larvae. Rice crops required intensive irrigation followed by a week-long period of water stagnation, after which fields were drained and weeds were removed. This process took place during November
and was repeated until the cotton harvest season in April. As drainage was never complete and rice fields were divided by rickety embankments, marshes proliferated enabling mosquitoes to breed easily. Although rice growing was condemned by different groups throughout the country Mazza and Rickard showed that:

“the anopheline larvae species found in the ricefields belonged to the Nys-sorhynchus group, especially to the *A. albataris* and the *A. tarsimaculatus* varieties. There is no evidence that these species play a major role in the transmission of malaria in the north of Argentina.... The presence of the *A. pseudopunctipennis* species, the main vector, in homes and the spread of the disease throughout the region, is evidently due to sources in the areas surrounding the ricefields, and not the ricefields themselves.... The suspension of the rice would increase rather than decrease the diffusion of malaria, as the population would be deprived of an activity which guarantees improved economic conditions.”

Other studies focused on the mosquito’s stinging habits, as well as on the links marsh (malarial) fever and other symptoms. However, in terms of the consolidation of scholarly knowledge of malaria in Argentina, no line of research was as significant as that of the studies of the dispersion patterns and habitats of local insects.

These new discoveries led to stern rebukes of the Italian school’s model of malaria control. Prevailing protocols in the analysis and treatment of malaria were critically evaluated:

quinine is not absolutely efficient...it usually does not prevent infection; rather, it conceals or eases its effects.... Although it represents an excellent resource for military troops, semi-militarized masses, prisons, schools, shelters, or even small communities where regular administration can be supervised and guaranteed by a professional staff...it is of doubtful efficacy in the context of large populations spread throughout vast areas, as is the case in our northern provinces.

The new research also reflected deep skepticism of the plans formulated by the government and the Argentinean scientific community for the complete eradication of malaria via the sterilization of the blood of all malaria victims and subsequent elimination of the parasite so that the vector mosquitoes would no longer become infected when biting humans. Given how scattered the Argentinean population was, together with their lack of education and resistance to new practices, such a radical, prolonged scheme of activities would be difficult to implement.

At the same time different sectors called for a change in the way quinine was administered. The NHD claimed that quinine should be delivered directly to the patients, without the intermediary of local authorities whose abilities were questioned. Since none of the anti-malaria methods implemented up to that point had proven efficient on their own, a new tendency emerged which advocated “that an anti-malaria plan must embrace a number of different measures which should be jointly or suc-
cessively implemented, so that it is not possible to separate or dispense with them.”

This proposal for a malaria campaign, presented at the 3rd National Medical Congress in 1926, also called for the “complete biological study of the parasites causing, and the insects transmitting, the disease throughout the country.” Such a study had already been launched by the NHD, but the proposal suggested a particular focus on the distribution and habits of the vector and parasite, as well as cited the need for the immediate creation of the Tropical Medicine and Sanitation Institute, which the NHD had projected during the presidency of Gregorio Araoz Alfaro (1918, 1923-28, 1930-31).

These new proposals coincided with a time of great international scientific interaction. Professor Peter Mühlens, subtropical pathology specialist at the Hamburg Institute, and Professor Charles Nicolle, of the Pasteur Institute, were hired by the Argentinean government to survey the infected areas in the northern provinces. The Rockefeller Foundation was actively collaborating with anti-malaria efforts in Tucumán and other areas, sending entomology expert Dr. Shannon to join Argentinean specialists in their study of the behavioural and biological peculiarities of the local Anopheles species. In addition, US sanitary engineer Oscar Pickel, who had assisted renowned Colonel William Crawford Gorgas in the sanitary campaign in Panama, was appointed chief sanitary engineer of the NHD. Then, in 1913, the NHD hired Austrian Professor Rudolf Krauss, who was a member of the Viena Serotherapeutic Institute, as the inspector-general of Argentina’s national laboratories.

The Argentinean government also reviewed its policies regarding its involvement in international associations. Since its founding conference in 1902, the Panamerican Sanitary Bureau had never had an Argentinean representative at its conferences. But in 1924, during the seventh Panamerican Sanitary Conference, held in La Habana, Cuba, not only did Argentina participate in the debates, it had lengthy and significant interventions. Delegate Gregorio A. Alfaro discussed the innovations of the NHD and local anti-malaria policies, eliciting a very positive response. The most original Argentinean contribution was the sanitary wagon. Equipped with a small laboratory, disinfection and rodent control technology, sera, vaccines, a projector, and a radiotelephone, these health wagons travelled throughout the railroad system staging public demonstrations of hygienic practices and distributing anti-malaria booklets delivered.

Despite this recognition, in the 1920s the communication between science and politics was not as fluid as it had been in the previous decade. New concepts emerging in laboratories were not immediately implemented in the anti-malaria campaigns, which developed according to models of “hydraulic improvement” and “human improvement.” In
other words, similar to the process described by Nancy Stepan for Brazil until the late 1930s, despite important changes from a research perspective, in practice there was continued predominance of the European or Italian approach to malaria.\textsuperscript{69}

Even so, the RF actively contributed to the construction of a new institutional framework for rural sanitation in Argentina, just as they had in other Latin American countries.\textsuperscript{70} Indeed, regardless of the rise and fall of malaria control efforts, the creation of an institutional network devoted entirely to dealing with rural malaria represented the greatest accomplishment of the time.

CONCLUSIONS AND AFTERTHOUGHT

As seen throughout this paper, Argentina’s late-in-coming preoccupation with malaria was framed by factors of both domestic and foreign origin. By the late 19th century, Argentina had developed close cultural and scientific ties with Europe. Having established itself as one of the most prosperous countries in Latin America and claiming similar social and
sanitary preoccupations to those in Europe, the Argentinean government neglected autochthonous diseases until the early 20th century, when their diffusion threatened foreign investments and jeopardized economic growth.

The need to deal with the malaria problem gave rise to an institutional framework aimed at providing public health and medical care to the inhabitants of the country’s forlorn northern regions. Between 1900 and 1920, (rural) malaria earned a place within the Argentinean medical and public health agenda, which up to that point had been dominated by the “urban question.” This paradigmatic change coincided, on one hand, with the influence of prominent Brazilian exponents of the so-called ‘tropical medicine’ school and the consolidation of scholarly knowledge of malaria in Argentina and, on the other, with the advent of largely American, technically oriented anti-malaria programs.

The first two decades of the 20th century were characterized by major breakthroughs made by local and foreign malaria specialists. The dialectical relationship between the national and international medical communities resulted in the introduction of new concepts and techniques pertinent to the epidemiological cycle of malaria. Innovative diagnostic and therapeutic methods were brought into Argentina by both local doctors who had trained in European institutions and foreign scientists invited to the country.

The development of scholarly knowledge of malaria and the public health policies to combat the disease passed through different stages. First, Argentina assimilated the tenets of the classical school, revealing a gap between laboratory research and the actual manifestation of the disease in Latin America. In the 1920s, a period of international co-operation began, enabling experts to determine the autochthonous characteristics of malaria in the north of Argentina. Both scientists and authorities believed the anti-malaria measures adopted in the 1920s were the right ones. Judging by the statistics, the war against malaria was being won: the number of malaria victims decreased from 3,842 in the 1911-20 period to 2,656 between the years 1921 and 1930.

Despite this apparent progress, however, hopes of vanquishing malaria in the 1920s soon faded away. In 1933, a fresh outbreak of the disease struck Argentina with unprecedented intensity. The failure to enforce anti-malaria policies may be explained by the absence of a productive dialogue between scientists and politicians and by the delays in implementing laboratory-based breakthroughs in ongoing anti-malaria campaigns. The campaigns remained governed by the parameters of “bonifica hidráulica” (drainage improvements) and “bonifica humana” (human improvements) long after new discoveries made these approaches obsolete. Notwithstanding the dynamism of the scientific community, malaria doctors lost their leverage in the political arena, where clientelist poli-
cies and personal networking played a central role. As such, the political agenda of the 1930s—evidenced by stagnating malaria budgets—contemplated no changes in the anti-malaria campaigns.

The country’s international involvement faced a parallel set of difficulties: by the 1920s Argentina became one of the most important participants in the malaria discussions held at the Pan American Sanitary Conferences, and it established such close links with the Pan American Sanitary Bureau that all subsequent anti-malaria campaigns were coordinated with the Bureau’s specialists. But the country refused to participate in League of Nations meetings despite the mutual interests of local experts and the League of Nations Health Organization’s Malaria Commission. Ironically, malaria’s rise to Argentina’s national public health agenda in the early 20th century, while rooted in scientific innovation and national-international interactions, ultimately failed to modernize the nation’s malaria approach and limited the influence of these interactions both at home and abroad.

NOTES

1 Also known in Argentina as *chucho* and intermittent fever, malaria is transmitted by the *Anopheles* mosquito. The disease cycle begins with the bite of an infected mosquito, which transmits numerous minute parasites from the vector’s salivary glands into the victim’s bloodstream. After a few days of incubation, typical malaria symptoms, such as high fever, shivering, and weakness appear, eventually prostrating the person. These symptoms reappear periodically. Mosquitoes are infected from biting humans with malaria.

2 Numerous international organizations were founded in the 20th century to promote health and well-being. In spite of the attention to these agencies in the international scholarly literature, historians of Argentina have not seriously studied their local actions or the historical processes in which they participated. Among the studies dealing with malaria and other eradication campaigns are: John Farley, “The International Health Division of the Rockefeller Foundation: the Russell Years, 1920-1934,” in Paul Weindling, ed., *International Health Organisations and Movements, 1918-1939* (Cambridge: University Press, 1995): 203-22; Marcos Cueto, “Los ciclos de erradicación: La Fundación Rockefeller y la salud pública latinoamericana, 1918-1940,” in Marcos Cueto, *Salud, cultura y sociedad en América Latina* (Lima: IEP, 1996); and E. Rodriguez, R. Ballester, E. Perdiguer, R. Medina y J. Molero., *La acción médico social contra el paludismo en la España metropolitana y colonial del siglo XX* (Madrid: CSIC, 2003).

3 The term *chucho* comes from the quechua word *chujcho*—quechua is the language spoken by the indigenous groups belonging to the Incan Empire. More on the etymology of the term can be found in Marcos Cueto, “Identidad regional y malaria en el Perú del Siglo XX,” in *El Regreso de las epidemias. Salud y Sociedad en el Perú del Siglo XX* (Lima: IEP, 1997).


Argentina was experiencing major demographic growth in this period, mainly through massive immigration. In 1869, 1895 and 1914 respectively, the population went from 1,736,490 to 3,956,060 and 7,885,237. The distribution of the populace between urban and rural areas also changed. Urbanites amounted to 28% of the population in 1869, and 52% in 1914. Over the same period, the population of Buenos Aires increased from 181,838 to 1,575,814 people. This data was gathered from the 1895 Second National General Census (Buenos Aires: Taller Tipográfico de la Penitenciaria Nacional, 1898) and the 1914 Third National General Census (Buenos Aires: Talleres Gráficos de Rosso y Cía., 1916).


13 National Archives, Department of the Interior, 1902; file #1292.

14 National Archives, Department of the Interior, 1915; file #832.

15 Marcos Cueto, Excelencia científica en la periferia. Actividades científicas y actividad biomédica en el Perú (Lima: Grade Concytec, 1989) p. 29.

16 Pablo Kreimer, “¿Una modernidad periférica? La cuestión científica, entre el universalismo y el contexto,” in Diana Obregón, ed., Culturas científicas y saberes locales (Bogotá: Ces Universidad Nacional de Bogotá, 2000), p. 185.

17 While doing blood tests on a patient in 1880, Charles Laveran discovered the specific malaria parasite, thus inaugurating a new line of research. The Italian school, featuring luminaries such as Golgi, Marchiafava, Bignami, Dionisio, and Celli, followed this new trend and embarked upon a parasitological classification. British concerns with malaria in its colonies generated further research: Patrick Manson in 1898 drew upon several works of the previous decade and elaborated a tropical disease model, defined by the link between parasite and vector. These studies would enable Ronald Ross to determine the role placed by the mosquitoes in bird malaria, which earned him the 1902 Nobel Prize. Some years later, Italian specialist Grassi specified the role of the Anopheles mosquito in the transmission of the disease among human beings.

18 Juan Carlos Delfino, Las diversas especies de Hemopinídeos palúdicos de la República Argentina (Buenos Aires: Imprenta Coni, 1902).

19 Eliseo Cantón, El paludismo y su geografía médica en la República Argentina (Buenos Aires: La Universidad, Buenos Aires, 1891); Cantón, El parásito de las fiebres palustres. Profilaxia y nuevos métodos para curar el chucho. (Buenos Aires: La Universidad, 1894); and Cantón, Estudio sobre el paludismo en la Provincia de Tucumán (Buenos Aires: Facultad de Medicina Universidad de Buenos Aires, 1886).
22 Juan Bialet Massé, Informe sobre el estado de la clase obrera en 1904 (Buenos Aires: Reeditado Hispamérica, 1986), p. 79.
25 Diario La Prensa, 7 April 1915, p. 12.
29 Luis Silvetti Peña, Chucho, malaria o paludismo sus causas y profilaxis. Publicación dedicada a los niños de las escuelas de Tucumán, Salta, Jujuy, Santiago y Córdoba (Tucumán: 1914 brochure).
30 Authorities in the capital were not just concerned about the north of Argentina. These actions were carried out within the framework of the General Prevention Program, whose goal was to create a number of disinfection stations in strategic points throughout the country. Diario La Prensa, 15 April 1914, p. 9.
33 National Archives, Department of the Interior, 1912, file #700; National Archives, Department of the Interior, 1912, file #865.
34 Laín Entralgo, Historia de la Medicina (Barcelona: 1975).
35 These changes must be considered within a larger context. During Dr. José Penna’s presidency of the NHD, national sanitary conditions had improved according to public opinion, although infectious, endemic and epidemic diseases still dominated the scene. National media claimed that these figures, alongside the work carried out by the Bacteriology Institute, directed by Dr. Grauss, evidenced progress. Diario La Prensa, 1 January 1916, p. 6.
37 Consider, for instance, the article published in Diario La Prensa on 1 November 1918, p. 8, which summarized a series of reports published by the newspaper over the previous few months.
41 Caponi, Trópicos, microbios y vectores, p. 122.


46 This issue has been further developed in Adriana Alvarez, *De los miasmas a los mosquitos. La evolución del conocimiento sobre la “cuestión palúdica” en la Argentina.*


48 Donna J. Guy and El Rey Algodón, Los Estados Unidos, la Argentina y el desarrollo de la industria algodonera argentina (Arizona: The University of Arizona, 1999).


51 More on this topic can be found in Dora Barrancos, “Moral sexual, sexualidad y mujeres trabajadoras en el periodo de entreguerras,” in Fernando Devoto and Marta Madero, *Historia de la vida privada en la Argentina. La Argentina entre multitudes y soledades. De los años treinta a la actualidad* (Buenos Aires: Ed. Taurus, 1999), p. 199-225.


54 National Archives, Department of the Interior, 1925, file #19927.

55 Dr. Davis pioneered a section devoted to the study of the *Anopheles* species. One of his most prestigious works nationwide was “Consideraciones sobre la lucha antipalúdica dirigidas contra los anófeles adultos,” in *Tercera Reunión de la Sociedad Argentina de Patología Regional del Norte, Tucumán* (1927), p. 721-29.


64 Proyecto de campaña contra el paludismo. Tercer Congreso Nacional de Medicina (Buenos Aires: Revista de Asociación Médica Argentina, 1926).


66 National Archives, Department of the Interior, 1927, file #454.

67 This designation was aimed at unifying the procedures in different institutions, so that laboratories could produce reports of each region in an attempt to eventually co-ordinate a rational, scientific prophylaxis program. National Archives, Department of the Interior, 1924, file #21926.

