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"About my love for Paraguay and the Guarani race:" the ideas and projects of the naturalist and botanist Moisés Santiago Bertoni (1857-1929)

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Abstract

This article depicts the trajectory of the Swiss naturalist and botanist Moisés Santiago Bertoni, who, unlike the classic travelers and naturalists, traveled to the Americas to found an agricultural colony (first in Argentina, and later in Paraguay). In addition to corresponding with intellectuals and international research centers, he devoted himself to the study of flora and the native populations, as well as writing articles and texts such as *La civilización guarani*. In his struggle to contradict the ideas held by intellectuals who supported positivist evolutionism and nineteenth-century liberalism, Bertoni made a solitary effort defending the superiority of the indigenous Guaraní people, and above all their hygiene and medicine, as both his biographers and critics attest.

Keywords: Moisés Santiago Bertoni (1857-1929); *La civilización guaraní* (book); medicine; nationalism; Latin America.

The man, his projects, and his ideas: "a dual mission, both scientific and patriotic"

The Swiss naturalist and botanist Moisés Santiago Bertoni (1857-1929)[1] immigrated to the Americas with the goal of establishing an agricultural colony; this initially took place in the province of Misiones, Argentina from 1884 to 1887, and then in Paraguay, from 1887 to 1929. His plan to found a self-sustaining colony based on progressive social and political theories became a reality after land was granted in a region ten kilometers from the border at Foz do Iguaçu, which would later become Puerto Bertoni. In this region of the Upper Paraná River, Bertoni dedicated himself to studies of the local fauna and flora as well as the native populations, since the colony was near an indigenous reserve home to the Mbyá Guaraní tribe.[2] These studies led him to later statements that the term civilization could be defined as "the development of agriculture as the base of material life, of morality as the base of psychic life, of arts as pleasure and relation, and of freedom and democracy as means of individual and collective dignity" (Bertoni, 1914, p.70-71).[3]

At Puerto Bertoni, he maintained a library containing more than 17 thousand texts,[4] experimental laboratories, and even a printing press (the Ex Sylvis press) and a post office from which he sent his work to scientific journals and libraries in several countries; this broader dissemination guaranteed him invitations to represent Paraguay in international scientific congresses.[5] During more than forty years he lived in Argentina and Paraguay, Bertoni strove to maintain contact with other scientists and with production coming from the major scientific research centers in Europe and the Americas.[6]

His more important works include *Almanaque agrícola paraguayo y agenda del agricultor* (1901), *Las plantas usuales del Paraguay* (1901), *Agenda y mentor agrícola*: o *guía del agricultor y del colono* (1926), articles published in *Revista de Agronomía* and *Anales Científicos Paraguayos*, his unfinished text entitled *Descripción física, econômica y social del Paraguay*, as well as the three volumes of *La civilización guaraní* (1922, 1927, 1954). Also notable are his lectures at events in Paraguay[7] and abroad, as well as his travel reports.[8]

Notable among these lectures are those given at the Colégio Nacional throughout 1913, as part of a context in which a group of Paraguayan intellectuals worked to construct "a 'national biography'... an organic vision of the nation that matured after a slow process of gestation and infancy, with the difficulties that all growth brings," through a compilation meant to be "an 'instructive and useful' commemorative project:" the *Álbum gráfico de la República de Paraguay: 100 años de vida independiente, 1811-1911*. This commemorative volume was intended to "summarize the statistical, commercial, and artistic [aspects] of Paraguay," including "its wealth, sociability, beauty, and progress in its business and industry" (Brezzo, 2010, p.197-200).[9] Bertoni's contribution in pursuing this goal can be seen in this passage from one of his lectures to the young students at the Colégio Nacional:

> 'Studying the nature of your own group in order to find defects and correct will always be the work of a very healthy patriotism.' But to achieve the goal of a truly free and independent homeland, this work will not be enough if, based on its origins, history and virtues, this group cannot energetically and unreservedly affirm its entity and its rights (cited in Baratti, Candolfi, 1999, p.162; emphasis added).

In another lecture Bertoni (1914, p.81) emphasized to the students how fruitful "the study of things from the past can be for your country" and the value that "scientific studies may have in solving the country's largest problems," justifying his use of the "Guaraní civilization" concept:

> I spoke of a 'Guaraní civilization,' and this seemed like news, and even caused a bit of surprise, ... because Indians are Indians, every Indian is a savage, and necessarily barbarian. 'This is the widespread concept, unfortunately. But it is not so... Here, clearly, there is a very common but generally incorrect criterion. We consider as civilized those people who have our own civilization, and barbarians those who have anything else' ... In addressing civilization, 'we can never consider ourselves the center of civilization, ... but rather consider civilization as something that tends to have many different appearances,' and that it will be, as it was, the contemporary possession of very distinct peoples and races (Bertoni, 1914, p.50-51; emphasis added).

Bertoni's stance in these lectures should consequently be linked to efforts by the nineteenth-century Paraguayan intelligentsia (particularly Enrique Solano López, Cecilio Báez, Blas Garay, Manuel Dominguez, Fulgencio Moreno, Ignacio Pane, and Juan O'Leary) to provide a response "on the causes of the [Paraguayan] War and its aftermath ... according to which Paraguayan society was assimilated with 'barbarism.'" Thus faced with the "accusation of barbarism, it was necessary to reclaim this past through history" (Brezzo, 2010, p.222). They were consequently "central to strengthening a reading of the identity of Paraguayan intellectuals on the occasion of the first centenary of independence celebration," to the extent that they "will present the Guaraní people as a civilization with achievements comparable to any other important civilization in history" (Telesca, 2010, p.160, 187).

Bertoni's *oeuvre* includes "original works on Guaraní geography and ethnography" located within "a historiography independent of the colonial chroniclers," which not only recognizes the Guaraní "as historical subjects," but also demonstrates "the elevated degree of civilization they had attained at the time of discovery," which is why they should be considered as "a mobilizing construction that connected perfectly with the historiography of the Centenary [of Independence]" (Brezzo, 2010, p.223). For this reason, Bertoni's lecture at the 20th International Congress of Americanists held in Rio de Janeiro in 1922 also deserves attention. His session was entitled "The future of the American race in Latin America," and strongly criticized the belief that indigenous peoples were heading toward complete extinction,[10] instead seeking to demonstrate the biological superiority[11] of the "forgotten and beautiful Guaraní race:"

> 'Many suppose that the indigenous race is moving towards its complete extinction; the idea that it will virtually disappear has been maintained and appears to still be so among a certain European public. A grave mistake! The American race lives, thrives, and has a great mission... in the future.' The blood that mixes, improves, does not disappear... And where will the center of civilization be? In the Americas, Europe, East Asia? No! Because the center will be the world. Latin America is providing the world with a beautiful example of the fusion of physical race into a great social race... And in this grand future all the prejudices of race will disappear, as they have already disappeared in this great and spiritual nation. I've said it! (Bertoni, 1924a, p.70-71; emphasis added).

Two years later, defending himself against criticism by Cecilio Báez, a professor at the Universidad Nacional,[12] he published a small article in which he said:

> When I proposed to prove – albeit very briefly – the truth, "that the Guaraní had reached a relatively advanced degree of civilization and that, even today, certain groups retain a more or less *sui generis* civilization, but [one that is] comparatively advanced," some understood (despite general approval of my ideas) that this was merely my own private opinion, and that this opinion had no serious justification. "Nonetheless, no ethnographer, no Indian scholar has made a serious objection to 'my theory' so far, while several have supported and congratulated me for having supported it with determination" (Bertoni, 1924b, p.3-4; emphasis added).

In his fight against "national cretinism"[13] and against the positions taken by the supporters of Positivism, Bertoni formulated "criticisms targeting the theories which legitimized the racial superiority of whites and argued that the Guaraní culture should be taken as a model for creating a community beyond national borders" (Di Liscia, 2009, p.257). The professor and lawyer Cecilio Báez was a key figure in Paraguay's political and cultural development in the early twentieth century, and his thinking, which "is situated within Positivism" (Silvero, 2011, p.11), is expressed in his perception of the Guaraní, who according to him "were, however, deplorably backward at the time of their discovery. They lacked true industries, were not even familiar with them, and consequently [lacked] trade. They did not communicate among themselves, that is to say they did not even exchange ideas, making all progress impossible." Thus, the idea of progress which was so fundamental to the Positivists was, in his words, "absent from the life of the Guaraní," that "they were as morally insensitive as animals, did not know personal dignity, nor did they nurture any aspirations in their souls... [and] had not even been in contact with more advanced peoples to learn other usages and customs from and improve their conditions" (p.62-63).

We find in Bertoni's lectures and works the first references to "the Guaraní as someone superior" and to the Paraguayan race, "which though mestizo, [being] white *sui generis*, retains the best of the Spanish mingled with the indigenous peoples," as "a 'superior race,'" and also clearly establishing "the issue of the 'Paraguayan race' as a necessary explanation for the history of Paraguay" (Telesca, 2010, p.154).[14] Despite his commitment to respecting Guaraní culture amid the dissemination of theories involving degeneration and eugenics, his analyses of documentary sources and ethnographic observations were considered lax by other intellectuals at the time, which made him the target of harsh criticism and disrepute.[15] Bertoni (1927, p.11-12, 30-31; emphasis added) addressed his critics as follows:

> someone defined my work [*La civilization guaraní*] as biased. As if, in fact, all useful social work were not so. ... 'I am not flattered when I hear that this work is the product of my love for Paraguay and the Guaraní race. ... my love for the race or my love for the nation are the effect, not the cause of my studies. I indeed love the Guaraní and my adopted homeland.'

In 1928, a year before his death at age 72, Bertoni inventoried of his scientific activities, which was subsequently published in *Crítica Médica*. In this text, he noted that "it is very convenient to realize that this is not only personal observations or mere opinions, but rather

a set of ancient and modern data, very numerous and consistent, and of unquestionable value" (cited in Baratti, Candolfi, 1999, p.25). The inventory contains his experiments with medicinal plants, studies on the chemical composition of the soil and the best season for certain crops, clearly showing his perception that "everything is united in nature, and everything can influence everything in extremely complicated and very often unexpected inter-relationships" (p.741).

Beyond blaming "Europeans for hindering the development of the Guaraní and condemning useful customs and practices which objectively substantiated the degree of indigenous knowledge" (Di Liscia, 2009, p.259), Bertoni (1927, p.13) strove to emphasize the "physical nobility" of the Guaraní, their "elevated moral values... [and] their teachings to further advance pharmacology, medicine, botany, zoology, and many other disciplines." He also sought to contrast the "'true doctors' of Europe with the 'wise Guaranís' of Paraguay, whose knowledge made them skilled in recognizing plants and medicines," separating them from ties to "records of witchcraft or irrational behavior" (Di Liscia, 2009, p.261).

Next we shall address one of his most representative intellectual works, *La civilization guaraní*, with special emphasis on his ideas about Guaraní medicine and hygiene, linking them to the context of medical practice and public health in Paraguay in the latter decades of the nineteenth and early twentieth centuries.

"For young national physicians, *La civilización guaraní*"

The three published volumes of *La civilización guaraní* are only part of Bertoni's editorial plan, which called for 14 volumes. The first and the third were published by Ex Sylvis in 1922 and 1927, respectively, while the second volume was only published in 1954 (although the physician Andrés Barbero[16] proposed publication of this volume in 1929).

The first chapter of Volume I spans only four pages, reprinting passages of lectures given by Bertoni in 1913 at the invitation of Juan O'Leary at the Colegio Nacional de Segunda Enseñanza de la Asunción. The ideas he defended in these lectures (which were included in this chapter) included that:

> Specialists have rarely considered that we are often under powerful suggestion when we attach decisive importance to artistic monument 'without recalling that the culture of a people can be expressed as elevated and complete in other ways besides works of art and objects capable of defying time.' ... the famous botanist, ethnographer, and explorer Barboza Rodríguez had already raised part of this veil 'with respect to the botanical knowledge of the Guaraní.' ... we cannot neglect to recall the wise pronouncements by the eminent ethnographer Erland Nordenskiöld, who when speaking of the modern Guaraní, among whom he lived for quite some time, recognizes their 'remarkable culture, fine and gracious ways, high moral standard, rare virtues, artistic spirit, and far from vulgar knowledge.' ... And since there is nothing more difficult than uprooting preconceived ideas, on many occasions the extreme occurred, when a remarkable work or an extremely elevated idea was discovered, to attribute it *a priori* and instinctively to another group of people or a foreign influence, since from the outset the 'savage Guaraní' were not considered capable of such a thing (Bertoni, 1922, p.9, 10; emphasis added).

Volume III, which we shall examine, is entitled "Knowledge," and is divided into two books. The first is "Guaraní hygiene," containing 22 chapters and three sections: "Practical and scientific importance," "Other aspects of physical and sexual hygiene," and "Moral hygiene." The second book is dedicated to "Guaraní medicine" and comprises 22 chapters. In the first book of Volume III, which addresses the hygiene practiced by the Guaranís, Bertoni states that they took care to wash their hands before and after meals, followed by rinsing their mouths. He also reports that when preparing food, they washed several times and only touched food with clean hands, and wrapped foods in cornhusks or leaves in order to avoid touching them (Bertoni, 1927, p.41, 42). The body was washed more than once a day in the rivers, regardless of the season, and nails, hands, and feet also received special care.

According to Bertoni (1927, p.237), few of the naturalists and foreign researchers had considered indigenous medicine or hygiene, and others did not have the necessary contact with the natives. This perception is very clear in the preface to Volume III, when in referring to "Guaraní hygiene" he states:

> Nobody thought that a people considered to be barbaric and even savage could be teachers of a science of capital importance for all mankind, and furthermore, one of the most modern sciences. ... 'effectively [referring to hygiene], these Guaranís were at the same level as the most cultured and careful among the Europeans' (Bertoni, 1927, p.14, 43; emphasis added).

Later, he says that the Guaraní horror of "excrement could not be exclusively due to the sensitivity of their sensory organs. ... It certainly also included knowledge about the danger it represented to public health" (Bertoni, 1927, p.47). He also adds that they adopted a

> complex sanitizing [procedure] involving application of annatto oil, with daily cleaning and rubbing this oil on the entire body. With a similar procedure, no microbe remained on the skin for longer than a few hours. By chasing away all mosquitoes and other insect pests they prevented infections caused by arthropods, which are so feared in all climates (Bertoni, 1927, p.152).

Bertoni (1927, p.154) also refers to "the juice of the *jenipapo* fruit" which is used "as a skin disinfectant in certain diseases, to the point that sometimes the entire body is painted," and "bitter wood" employed "to disinfect the skin and protect against the stings of mosquitoes and other insects, but generally against the former, which seems to be more active." He also highlights that "Boiled water is very correctly considered to preserve asepsis and disinfect ill surfaces" (Bertoni 1927, p.154). In the initial pages of the second book, Bertoni affirms that the work of the Dutch naturalist Wilhelm Piso was fundamental to his study on Guaraní medicine and that he also looked to him to identify the most common endemic diseases, such as smallpox and malaria. With regard to this last point, Bertoni states that keeping fires always lit, the custom of sleeping in hammocks, and applying annatto crushed in palm oil to the entire body [to repel mosquitoes] helped reduce the spread of this disease among the Guaraní.

At the end of Chapter XV, entitled "Disinfection," he describes the diseases that affected the Paraguayans:

> The hard work of the doctors we have seen so far noticeably decreased the influence that 'the endemic diseases, malaria, dengue, hookworm disease, leishmaniasis, yaws or alleged syphilis, filariasis, and others had on the overall state of health.' The records that can be inferred from the old memoirs leave the impression that these diseases, at the time that the Europeans arrived, were less common and of less consequence than [they are] at present, and perhaps much less so. Also the neglect of hygiene today is greater and more general in all of these countries (Bertoni, 1927, p.155; emphasis added).

This is why Bertoni emphasizes

> an extremely important characteristic of Guaraní hygiene. And the relationship between hygiene and medicine. ... even today, the general public attributes illnesses and short lifespan to all kinds of influences and not to the lack of hygiene. ... 'and hygiene has been a science for such a short time, since this was not taught in many universities during the last century. Just as absent or unclear, however, was the concept that hygiene could have a determining or decisive influence on the origin and development of diseases, and no more than half a century has passed in various European universities since passing the examination on hygiene was not required to graduate as a medical doctor' (Bertoni, 1927, p.220-221; emphasis added).

Bertoni also pointed out that "longevity fundamentally depends on nutrition, cleanliness, and joy. And this concept was strongly rooted in the mind of the Guaraní, as later will be seen" (Bertoni, 1927, p.19). Guaraní nutrition "results in everything according to the most recent dictates of science. It was mainly vegetarian, with restricted meat" (p.61). They cultivated cassava and potatoes, lived on young plants, herbs, leaves, and fruit; they did not use salt, waited for their food to cool, and ate slowly and quietly (p.106). These practices were also associated with the following rules: "festive encounters, peaceful sleep, and a good bed" (p.52).

As for medicinal plants, the Swiss botanist had already stated in his 1901 work that the Guaraní knew "the natural families ... Most of the terms acknowledged by science, and assigned each groups a fixed name, as in botany ... This is admirable and nothing like it is found in the European languages" (Bertoni, 1901, p.17). A few years later, he not only emphasized that "no people on earth provided medical science with so many medicinal plants as the Guaraní people" (cited in Baratti, Candolfi, 1999, p.65-66), but also asked:

> 'Can we also say that the Guaraní had no scientific knowledge and only confined themselves so the rough superstitions I mentioned? Obviously not.' I myself saw a large number of cases. And this is how I was able to prove that they correctly employed antiseptics, antipyretics, tonics, astringent, evacuants, blood depuratives, anti-hemorrhagics... 'And I was truly amazed at how people without literature, who transmit such knowledge from parents to children, from generation to generation, could reach such complicated and relatively perfect knowledge.' If the Guaraní had a true literature, it would be interesting; without it, for me this was wondrous (cited in Baratti, Candolfi, 1999, p.65-66; emphasis added).

In 1927, Bertoni (1927, p.144) asserts that "several volumes could be written along these lines without exhausting the topic. But the material was so vast, complex, and difficult that assuming to offer the public a relatively comprehensive manual of the medical flora of the

Guaraní lands would be somewhat premature." In the *Diccionario botánico latino-guaraní y guaraní-latino*, a work published posthumously in 1940, his admiration for indigenous taxonomy again emerges alongside his critique of western learning and his defense that "Guaraní botanical knowledge should act as a bridge between those who describe the plants and those who use them" (Bertoni, 1940, p.143).[17] And furthermore:

> The Guaraní had semiological knowledge necessary to define a primary diagnosis and apply the recommended treatment. They called anemia *mba'asy*; extreme weakness was *piru* or *pire hyru*; loss of physical strength was *kangy*, and tuberculosis was *mba'asy poli*. ... *pytuhê*, breathing; *pire raku'í*, mild fever; *akânundu*, fever with tachycardia; *tye rasy*, abdominal contractions; *tye ruguy*, dysentery; *py'a pereré*, tachycardia; *mba'asy kane'o rurupa*, heart failure, and other more current [words] distorted from the Spanish such as jaundice and various diseases which are not well identified, known as *pasmo* [astonishment] (cited in Romañach, Paz, 2011, p.37).

In Bertoni's view, a comparative study between the European medical knowledge of the fifteenth and sixteenth centuries and those of the Guaraní would undoubtedly conclude that the latter were much more advanced. He did not, however, neglect to warn that "the indigenous doctor will never tell all he knows, nor reveal all his procedures," because "he cautiously guards what is generally more interesting; and does this ... for a reason ... which is to preserve his own power or gift of healing" (Bertoni, 1927, p.236).

On the topic of academic training for doctors in Paraguay, it is important to remember that the Universidad Nacional de Asunción (with its faculties of law, social sciences, and medicine) was only founded in 1890, three years after Bertoni arrived in the country; its first dean was the Spanish professor Ramón Zubizarreta. The lack of Paraguayan professionals to act as department chairs in the university led to acceptance of foreign teachers and encouraged potential physicians to train at the University of Buenos Aires. The difficulties (both financial and political) which the medical school encountered led it to close soon after its establishment, and it was only reopened in 1898 with a significant number of foreign instructors, such as Justo Pastor Duarte (Uruguay), Patricio Brenan (Argentina), Victor Mariotti and José Caldarera (Italy), and Juan Daniel Anisits (Hungary).

Only in 1894, during the administration of president Juan B. Egusquiza, was the Hospital de Caridade (San Vicente de Paulo) opened to replace the Hospital Viejo (Hospital Potrero), which was transferred to the Sisters of St. Vincent de Paul, who were present in Paraguay since 1880. Nationalized in 1915, it became the Hospital Nacional; in 1927 it was renamed the Hospital de Clínicas. Both chroniclers as well as the press in the latter decades of the nineteenth century and early twentieth century described difficulties accessing the Hospital de Caridade, its precarious condition, and a lack of surgical instruments.

Health structure in late nineteenth-century Paraguay was virtually nonexistent, limited to one government department, the Municipal Medical Office. The capital city of Asunción had forty thousand inhabitants, but no drinking water supply or sewage service. A year after the medical school reopened, in 1899, the city experienced an epidemic of bubonic plague, along with the consequences of the precarious sanitary and public health structure. The following year, in January of 1900, the creation of a National Health Council was approved. This body was comprised of physicians and pharmacists working in the city of

Asunción, and was charged with drafting the norms to regulate the practice of medicine and related areas in Paraguay, and particularly the first outline of a health administration for the country.

The period spanning 1900 to 1912 was marked by ongoing political tensions due to partisan disagreements and disputes and economic crises, along with successive coups, armed uprisings, and substitutions of the Paraguayan president. Not even the centennial independence celebrations were organized, thanks to the climate of political and economic instability; this eventually led to the closure of the medical school in 1912 because of a lack of students, and impacted the already precarious infrastructure at the Hospital de Caridade. This institution (as the Hospital Nacional) was only expanded after 1915 and the creation of the National Public Assistance Agency and the Committee on National Public Assistance and Charity, "a municipal distribution of medical care and medication administration" (Romañach, Paz, 2011, p.224).

The National Health Council was reformulated in 1915, with the determination that exclusively preventative initiatives fell under the purview of the newly created National Department of Health. These two agencies would be merged two years later into the Department of Health and Public Assistance, which lasted until the creation of the Ministry of Health in 1936. It should be remembered that in the 1910s, Paraguay also experienced the consequences of the global economic crisis sparked by World War I (1914-1918), which inevitably affected the Hospital Nacional and the country's already fragile health situation, which was described by the physician Cándido Vasconcellos (quoted in Viola, 2011, p.57):

> the *botica* – the pharmacy – of the Hospital Nacional can only be compared with the humblest one in the countryside. At times it lacked alcohol, iodine tincture, guaiacol, glycerin. When a patient needs saline, it must be requested from Public Assistance, because the Hospital Nacional never has it. The number of pharmacists who prepare the prescriptions should be increased because of the delays patients face. The nurses leave much to be desired, they do not know how to take temperatures, give injections, perform massages etc. Their services are reduced to emptying basins and washing them poorly, they also do a bad job sweeping the floor. When one is needed, you need to shout to call them.

The Brazilian physician Adolfo Lutz, on a trip to Paraguay in 1918 accompanied by two other physicians, Heráclides de Souza Araújo and Olympio da Fonseca Filho, also described what he found in Asunción:

> The Paraguayan capital has more than 100,000 inhabitants, and forty doctors work there, including some foreigners. ... There is electric light, but no running water. The population uses rainwater for drinking. The city has no telephones. ... Asuncion has a Colégio Nacional and a university whose medical school closed nine years ago because of a lack of students, they say. Many of the doctors in Asuncion studied and received their degrees in Buenos Aires, and some in Europe (Lutz, Araújo, Fonseca Filho, 1918).

In his diaries, Lutz made a point of stressing the concern and commitment of the Director of Public Hygiene, the physician Andrés Barbero, as well as Doctor Migone, the director of the Hospital Nacional, with regard to overcoming the country's serious public

health problems, "with special attention to the bubonic plague [patients] ... those who have leishmaniasis[18] ... and a campaign against malaria and hookworm" (Lutz, Araujo, Fonseca Filho, 1918).[19] He also did not neglect to emphasize that Paraguay was home to foci of Chagas disease, malaria, amoebic and bacterial dysentery, leprosy, and syphilis, and that the worms were endemic due to the constant heat and humidity, the "lowland forests, and the floodplains" (Lutz, Araujo, Fonseca Filho, 1918).

These records confirm that the concerns of Brazilian and Paraguayan sanitarians during the early decades of the twentieth century revolved around infectious, bacterial, and parasitic diseases. To contain these illnesses more effectively and provide qualified care to the sick, during the term of president Eligio Ayala the Paraguayan government allocated resources to hire foreign doctors and teachers, "particularly French, to raise the level of medical training" (Netto, 1981, p.143); this did not stop Germans, Italians, and a Brazilian (the physician Edgar Roquette-Pinto)[20] from teaching at the school of medicine in Asunción. Yet the continuity of many of these initiatives was compromised by difficulties caused by the confrontation between conservatives (*colorados*) and liberals, which became known as the Civil War (1922-1923).

However, we also must consider that sick Paraguayans continued to depend on healers, herbalists, pharmacists, and midwives who offered their expertise in the healing arts, which approached those acquired by medical school graduates.[21] Because these providers did not have instruments that could confirm diagnoses[22], they essentially depended on observation, and relied on procedures which combined the popular pharmacopoeia with the precepts of medicine which in many ways was still pre-Pasteurian. According to Romañach and Paz (2011, p.269-270), "At the beginning of the twentieth century, in the existing *boticas* medications were prepared according to a doctor's prescription. Only in the mid-1920s did a few industrialized medications begin to be imported. ... Until 1930, the country only imported ready-made medications."

It seems plausible to assume that Bertoni, because of his work in public posts (first at the Escuela Nacional de Agricultura, and subsequently in the Dirección de Agricultura) and his contacts, both friendly and professional, with Paraguayan politicians, intellectuals, and physicians (such as Juan Daniel Anisits, Juan O'Leary, Rodolfo Ritter, Edgar Roquette-Pinto, and Andrés Barbero), had closely experienced or had access to information about the conditions of medical practice and public health in Asunción and other Paraguayan cities during the late nineteenth and early twentieth centuries. We can also assume that in Puerto Bertoni, he was able to experience the health conditions that characterized both urban and rural areas of Paraguay on a daily basis, along with the illnesses that indiscriminately affected the peasants in the region, the Guaraní who worked in the colony's plantations, and his family members.[23]

We should also remember that because he held posts connected to agricultural management in 1913, Bertoni certainly interacted closely with Andrés Barbero, who at the time led the "the directorship of the Banco Agrícola" and later the Council on Agriculture and Industry (Romañach, Paz, 2011, p.288). Years later, Barbero took over as director of the National Department of Health and oversaw "excavation of 1,500 wells for drinking water and construction of 37,500 hygienic latrines," as well as a campaign against hookworm

(Romañach, Paz, 2011, p.286). Regardless of the contacts made by the public offices he held, Barbero certainly encountered Bertoni's work, particularly on Guaraní medicine and hygiene, which seems to justify his proposal as president of the Scientific Society of Paraguay to publish Volume II of *La civilización guarani*, (Bertoni, 1957), in 1929.

The precariousness of hospital care, academic training for doctors, and the supply of medications combined with predominantly foreign influence (mainly French and Italian) and difficulties arising from epidemics, constant political and partisan conflicts causing instability and budget constraints, as well as the results of international conflicts such as World War I to at least partially explain the critiques of Paraguayan medicine.

Respect for and defense of Guaraní knowledge related to hygiene and food as well as their curative practices therefore seem to have found support not only in Bertoni's research and theories, but also in his observations of the harsh reality experienced by the Paraguayans and his firm intention to help alleviate or contain the precarious state of hygiene and public health in Paraguay. To this end, "the appeal is to the resources of the 'natural' in order to ensure better chances of survival in a hostile environment" (Di Liscia, 2009, p.257).

At the beginning of Chapter XV in the second volume (entitled "General Considerations on Guaraní Medicine and what is currently occurring in our rural populations. What the country could offer to scientific medicine"), Bertoni (1927, p.140; emphasis added) states that:

> 'Every doctor who escapes from the hustle and bustle of the cities by going to the fields and farms to work will marvel to see how our natural wealth is used as medical materials, and if we were to make a list of plants that are employed by indigenous physicians and healers, we would be shocked by the high number it would reach.' ... we could not, however, exclude many plants which despite being toxic are truly active, as agents worthy of inclusion in a scientific study of medications.

In this way, according to Bertoni, it was up to the Paraguayan doctors to recognize that:

> Before other civilized peoples, the Guaraní were familiar with the concept of genus in botany and zoology, a concept that requires a very fine spirit of observation ... and exceptional faculty for abstraction and synthesis, qualities that the popular masses in Europe have not yet attained, despite a century and a half of teaching and scientific and philosophical stimulus that they have received in many different ways. ... 'In folk medicine, in the medical tradition preserved by healers and indigenous doctors, there is a valuable body of practical knowledge which can serve as a base to begin constructing the beautiful edifice of a national body of medicine that would be at the same level as current progress in medicine. ... European and foreign doctors in general could, through such research, enrich global medicine, to which the Guaraní have already made remarkable contributions, directly or indirectly. But I principally speak to the young national doctors, assured that some of them will see a dual mission in similar studies, both scientific and patriotic' (Bertoni, 1927, p.141-143; emphasis added).

In Chapter XVIII, Bertoni (1927, p.161) adds that: "It is especially the great and unlimited task of our doctors to methodically study the plants used by indigenous doctors and healers so that they can be known, for the sake of science and of the country." He continues, recommending that the government reflect on the effects of the fact

> 'that all the scientific teaching comes from cold or temperate countries. Our physicians were trained directly or indirectly by European teachers, and when they pursued advanced training, they went to Europe. The texts are European, the student's reference books, the physician's library, and finally all suggestions.' In this, as in all the other things, Paraguay is a tropical and subtropical country, without relations with other countries that have the same conditions. Everything comes from countries with a different climate, different nature, different flora, especially, as well as different genera and very different social elements. ... Other unfavorable conditions we have ... 'are mainly the lack of a national herbarium ..., scarcity of doctors in the interior of the country, and especially in the remote regions ... and finally ... the exaggerated prevention against healers. What's more – among the educated people of our capital – all healers are impostors, more or less quacks, and always greatly ignorant. This is a serious mistake' (Bertoni, 1927, p.162-163; emphasis added).

As a result, adoption of a native pharmacopoeia would be "a more practical solution ... because neither the technical conditions nor the human resources are available." In this way, Guaraní medicine could be not only "an option based on circumstantial choice, due to our own specific needs and shortcomings," but also "a cultural choice, where the advantages of another health system are posited for the consideration of western culture, as well as an ethics on nature and the body which is substantially different from our own" (Di Liscia, 2009, p.257).

When addressing the "young national doctors," Bertoni recommends they flee "from the hustle and bustle of the cities" and go "to the fields and farms to work," paying attention to folk medicine and especially the medical tradition preserved by indigenous healers, which he believed was fundamental to develop a "national body of medicine that would be at the same level as current progress in medicine" (Bertoni, 1927, p.140-141). Studies on the flora, extending to "European doctors, and foreigners in general" were to be seen as "a dual mission… both scientific and patriotic" (Bertoni, 1927, p.143), showing not only his defense of Guaraní "civilization" but also his nationalist posture in relation to Paraguay.

Final considerations

Since his death, "wise Bertoni" has been surrounded by a mystique stemming from the "numerous aspects of his personality ... his multi-form and enormous scientific production ... his contradictory political demonstrations, as well as the singularities of his everyday life, and finally, the social and scientific networks woven around him and his family" (Di Liscia, 2009, p.249).[24] Many of his biographers have called attention to the "most obscure facets of his character," to his "paternalistic authoritarianism marked by unreasonable ambitions" reflected in his extensive production, "written in several languages in a wide array of disciplines" (Di Liscia, 2009, p.249). As a result, according to Baratti and Candolfi (2009, p.283), it is necessary to avoid "the understandable temptation to idealize him without considering his complexity and non-linear relation to society and to the ideologies of his time." The Swiss naturalist and botanist, according to these authors, was "an excessive and multi-form character who became involved with the most contradictory ideas and passions of his time," and undertook a "titanic experiment

in emigration, colonization, and research, studied and carried out with energy and stubbornness" (Baratti, Candolfi, 2009, p.283).

According to the anthropologist Bartomeu Melià, Bertoni "had a considerable influence on the ethnographic ideology of the early decades of the twentieth century," despite his "discourse of poetic exaltation," which can be observed in some of his studies. (Melià, Saul, Muraro, 1987, p.59). Analysis by the historians Justo Pastor Benítez (1955), Efraim Cardozo (1959), and Miguel Bartolomé (1978), as well as the anthropologist Branislava Susnik (1965), found that Bertoni's theories and especially the ethnographic data he collected were considered a true "ethnological delirium" (Baratti, 2002-2003, p.46). For Cardozo, Bertoni's intellectual production was "the first attempt to build a Guaraní historiography" (cited in Melià, Saul, Muraro, 1987, p.59), because it represents "the first attempt at ethnological construction of the Guaraní where history, geography, ethnography and linguistics converge, but documentation [usually Jesuit works] is often taken to exaggerated conclusions and the ethnographic evidence is proven insufficient." The Paraguayan anthropologist Miguel Chase-Sardi (1990, p.95) in turn argues that Bertoni's conclusions were mainly derived from his reading ("with deforming lenses and from an impressive bibliography") rather than field study, since despite his rigorous empirical studies of the natural sciences he "was swept along by a romanticism that eventually made his studies useless to Paraguayan anthropology."

Today his arguments sound naive and overly ideological, but the importance of his intellectual production to the cultural and political history of Paraguay is almost inversely proportional to its scientific value. Through his lectures and works, Bertoni contributed to the birth of a nationalist-indigenist generation (Bareiro Saguier, 1990; Baratti, 2002-2003) which revered the indigenous element as the essence of the Paraguayan national identity. As a result, he became the target of fierce criticism from positivist liberal intellectuals who saw the Indian as a weight on society, to the extent that "they applied positivist evolutionism to consecrate the inferiority of the Indians in relation to whites" (Bareiro Saguier, 1990, p.115). Bertoni, however, worked to bring the Guaraní religion closer to Catholicism, "accepting and implicitly justifying the task of cultural suppression performed by Catholic missionaries" (p.116), which indicated a certain contradiction in relation to his defense of the idealized vision of "the beautiful Guaraní race."

Aware of the "effects of western transformations" and endowed with "a different sensitivity in relation to the knowledge of indigenous societies," Bertoni "incorporates the Guaraní and makes them his ... instead of making an imperialist appropriation of his surroundings that discards the previous experience, dehumanizing and denying it" (Di Liscia, 2009, p.263).

Even though the travel reports, research, articles, and lectures of Moisés Santiago Bertoni were written and circulated between the last decade of the nineteenth and first half of the twentieth centuries, they seem to have anticipated recent discussions within the framework of the new history of medicine and health around "action by local actors, including indigenous peoples and people of African descent in the global movement of materials, ideas, and medical practices" (Cueto, Palmer, 2016, p.20). They stand alongside other works by scholars of the history of science, which consider "the monodirectionality and dichotomy implicit in

previous models [to be] insufficient, emphasizing the notions of cultural diffusion, center-periphery, or scientific imperialism as elements for analysis" (Cueto, Palmer, 2016, p.20).

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NOTES

[1] Bertoni studied the legal, physical, and natural sciences at the Universities of Geneva and Zurich, and like other scientists who came to the Americas in the nineteenth century, he was attracted by the possibility of carrying out research in the extensive territories there. During an era when encyclopedism began to give way to specialization, he devoted himself to studying "everything from the frequency of rainfall to the customs of the natives there. He also made incursions into linguistics, led by his interest in indigenous languages" (Baratti, 2002-2003, p.43).

[2] From the beginning, the Mbyá were part of the agricultural activities in the colony, and also acted as informants in the countless scientific projects that Bertoni undertook and especially in the collection expeditions he made in the region. His recognition of the important role played by indigenous peoples is clear in this passage, in which he says that for a naturalist the "human element" was fundamental, namely the "good and intelligent peasants, as well as the few and poorly understood independent Guaraní. Both were very useful in assisting the naturalist in his quest" (Bertoni, 1901, p.4).

[3] For this and other citations of texts from other languages, a free translation has been provided.

[4] The collection, which consists of 17,372 objects, is currently under the care of the Centro Cultural de la República – El Cabildo in Asunción, Paraguay. Authors found in Bertoni's library included Jean de Lery, André Thevet, Wilhelm Piso, Fernão Cardim, Ives D'Evreux, Pero de Magalhães Gândavo, Couto de Magalhães, Alexander von Humboldt, Johann Rudolf Rennger, Élisée Reclus, Sílvio Romero, Francisco Adolfo de Varnhagen, Telêmaco Borba, Afrânio Peixoto, Erland Nordenskiöld, Hermann von Ihering, and José Ingenieros. See also Ramella, Ramella-Miquel (1985).

[5] Despite the working discipline and commitment of Bertoni and his family in researching, drafting, printing, and binding the articles and works produced by the Ex Sylvis press, authors such as Di Liscia (2009) and Baratti, Candolfi (2009, p.272) assert that "Moisés was not always able to be on the same level as his academic colleagues or specialists," and that "isolation, communication problems, and the economic difficulties of the colony did not help him to integrate into the international scientific community."

[6] In his record of a journey to Brazil in 1922, in addition to references to anthropological studies that were being conducted in Argentina, Mexico, Guatemala, and Ecuador, Bertoni revealed his knowledge of Brazilian intellectual production in the area of anthropology, highlighting published studies about ethnology in the *Anais da Biblioteca Nacional* and *Revista do Instituto Histórico e Geográfico Brasileiro*.

[7] At the beginning of the twentieth century, Paraguay experienced, "in contrast to political instability, social unrest, and economic stagnation, a moment of remarkable cultural activity, which was visible in the establishment of cultural associations and publications spanning different fields of study. ... a group of intellectuals made strides to show society that life – especially the past – was beautiful. The first expression of cultural revival was the 1876 establishment of the Colegio Nacional de Asunción, the first center of higher education opened in the post-war period. ... the questions about the past soon became the predominant topic of lectures, speeches, and other activities carried out by the institution, which in all cases utilized one point of reference, a precise indicator of the themes which were consecrated by this intellectual elite" (Brezzo, 2011, p.30-35).

[8] Notable among these is Relación sucinta de un viaje de estudios al Brasil (Bertoni, 1924a).

[9] According to Brezzo (2011, p.120; emphasis in the original): "The cultural moment between the immediate post-war period and the Centennial should be seen from the viewpoint of the consequences of the war in all areas of the Paraguayan reality, including the cultural. It is in this sense that 1911 was a moment

full of nationalist responsibilities whose extremes are 'reconstruction' and, under the growing influx of nationalism, 'historic repair.'"

[10] It should be remembered that the concept of indigenous degeneration was present in eighteenth- and nineteenth-century discussions, arising in anthropological and archaeological interpretations of native populations. According to Noelli and Ferreira (2007, p.1240-1243): "Diffusionism almost always attributed an origin outside the Americas to the indigenous populations. Since Humboldt, an Asian origin has been suggested for indigenous Americans, and in the case of South America this hypothesis was more or less consensual. Throughout the eighteenth and nineteenth centuries, scientists from Latin America who were concerned with the pre-Hispanic past corroborated this idea. This explains the initial theories about the emergence of civilizations in the Andes and the American highlands," in accordance with the classifications arising from an environmentally determinist perspective. The authors continue, stating that "in the Amazon region, in the midst of the crags of the forest, the Indians would have degenerated. The region would not be conducive to the formation of centralized states and civilizations. The few groups that did become civilized succeeded in this thanks to contacts with the Andean populations or those which developed in Mexico and Mesoamerica."

[11] According to Di Liscia (2009, p.258-259): "By applying the principles of climatic determinism, Bertoni defended the superiority of the Guaraní [as being] better adapted to the harsh environmental conditions than foreigners. For this reason, he based [his ideas] on the usual anthropometric studies [which were] sanctioned by several scientific contemporaries (like Paul Broca and Cesare Lombroso), to name only those most recognized in France and Italy, considering that both facial angle and the brachycephalic cranial shape allowed this certain superiority in an objective manner, while the darker skin color should have been dismissed for not having any biological influence."

[12] Cecilio Báez, "one of the most outstanding intellectual references and virtually indisputable" in Paraguay in the first decades of the twentieth century, said that "Paraguay is a [nation of] people 'cretinized' by centuries of despotism and demoralized by thirty years of bad government. Five years of titanic struggle might reinvigorate their dormant fibers from the opium of despotism. For this reason, the Paraguayan people expressed civic qualities in the elections, because of the end of the war; but the dissolution of the chambers has come back to kill the nascent public spirit and so the people continue to be similar to cretins, beings without desire or discernment." As we can see, "it was not only the past, but also the present situation which led Báez to these intense statements; that is to say, the 'cretinized' people were the result of despotism by the Francias and Lópezes, but also of 30 years of *colorado* government" (Brezzo, 2011, p.80-85; enphasis in the original).

[13] For the supporters of "national cretinism" in Paraguay, "the miserable historical experience produced a degenerate outcome. ... Since according to this theory the Paraguayan race was a calamity, it needed to be improved with European blood. ... the Americans were, rationally speaking, a disaster" (cited in Baratti, Candolfi, 1999, p.160).

[14] As the historian Ignacio Telesca (2010, p.158; emphasis in the original) observed, in his first lecture Bertoni "referred to the geological issues and the population of the continent to conclude with one phrase that would give his audience the desire to carry on: '... and finally, a Guaraní nation that was a true civilization in its time, and even more so, *sui generis*.'" In his second, "the most extensive (8 August), he reflected on the proto-history of Paraguay, on the race, and on the Guaraní people. ... He began to describe the Guaraní civilization ... the lack of art, even though they had two forms of writing, and its virtues: oratory ... astronomical knowledge, botany and zoology ... But this civilization would be 'unpardonably imperfect if not rounded out by religious knowledge' of the highest level, which abounds among the Guaraní people. But we find the most remarkable progress in social, political, and economic governance."

[15] According to Javier Numan Caballero Merlo (2011, p.120-121), in turn based on Heisecke (1965), the works of Bertoni, along with those of Guido Boggiani, Fulgencio R. Moreno, Ignacio Pane, and Manuel Domínguez, make up what was known as the pre-sociological stage, typified by the following characteristics: "dominant orientation of a natural philosophy and the physical environment as a prized object ... [and] observation as a method and mechanism of validating knowledge."

[16] Andrés Barbero was among the first class of pharmacists to graduate from the Paraguay School of Pharmacy. In 1904, he was among the first graduating class of medical school at the Universidad Nacional de Asunción, and later became the director of public health, focusing on measures for rural prophylaxis (Romañach, Paz, 2011).

[17] For Di Liscia (2009, p.250), the practice of scientific naming adopted by Bertoni forged "a different taxonomy, that paid tribute to the Guaraní more than the ordering of Linnaeus and De Candolle. This

classification implied a different register for other aspects, such as assessments of the body, health, and even a moral alternative to the Western bourgeoisie."

[18] Leishmaniasis was "a very frequent illness in the jungle areas. As early as 1913, Migone had recorded that occasionally, 70% to 80% of the yerba mate pickers or foremen who worked within the forests sickened, which halted work in the mate and wood factories in Alto Paraná, Caaguazu, and Jejuí" (Romañach, Paz, 2011, p.266).

[19] The first campaign against malaria was conceived by Andrés Barbero in 1917, and was carried out by the Consejo Nacional de la Hígiene starting in 1920. In 1924, the American physician Frederick Lowe Soper (under the auspices of the Rockefeller Foundation) began a campaign to eradicate malaria in Paraguay, which lasted until 1928 (Romañach, Paz, 2011).

[20] In his research on anthropological types in Brazil, and approaching the ideas Bertoni defended, Edgar Roquette-Pinto (1884-1954) argued that Brazilian racial mixing had not produced degenerate or inferior "racial types." In his opinion, the Brazilian mulatto population was healthy and eugenic, refuting the traditional racial stigmas produced by scientists and travelers of the nineteenth century as well as sectors of the twentieth-century Brazilian intellectual elite (Romañach, Paz, 2011).

[21] The significant growth in healers (*curandeiros*) in the 1920s in Paraguay was especially the product of high costs for private medicine and difficulties accessing the Hospital Nacional. The inauguration of a regional hospital (Hospital Regional de San Pedro) in August 1919 sought to reverse this situation; its staff not only worked at the institution but made expeditions to the yerba mate harvesting regions in order to combat malaria (Romañach, Paz, 2011).

[22] According to the physician Manuel Riveros (1982), "At that time X-rays had not yet arrived in Paraguay," and the sphygmomanometer, invented in the late nineteenth century, took some time to diffuse throughout the medical class. In the 1920s, "anesthesia was beginning ... in 1928 we saw for the first time a Foregger anesthesia device; for anesthesia with gas, cyclopropane, and ether ... Transfusion was an even rarer and more complicated procedure" (Romañach, Paz, 2011, p.280-281). It should also be noted that only after the arrival of the French medical mission in 1926 were some measures for asepsis during surgical procedures adopted, such as handwashing and using sterile gloves and gowns.

[23] Bertoni lost two of his sons from illnesses contracted in Puerto Bertoni. He himself died in 1929 of malaria.

[24] Baratti and Candolfi (2009, p.283) state that the fascinating history of Bertoni and the colony he established in Paraguay should be analyzed from "their problematic everyday dimensions, both human and material," marked by broken promises from Paraguayan officials, crises stemming from recurrent climatic phenomena, the destruction of his herbaria, and the deaths of his sons.

REFERENCES

BARATTI, Danilo.
Moisés Santiago Bertoni y la generación nacionalista-indigenista paraguaya. *Bulletin Societé Suisse des Americanistes*, v.66-67, p.41-48. 2002-2003.

BARATTI, Danilo; CANDOLFI, Patricia.
Puerto Bertoni: realidad y "utopización" de una colonia paraguaya. In: Oleaga, Marisa González; Bohoslavsky, Ernesto (Comp.). *El hilo rojo*: palabras y prácticas de utopía en América Latina. Buenos Aires: Paidós. p. 267-286. 2009.

BARATTI, Danilo; CANDOLFI, Patricia.
Vida y obra del sabio Bertoni: Moisés Santiago Bertoni (1857-1929), un naturalista suizo en Paraguay. Assunción: Helvetas. 1999.

BAREIRO SAGUIER, Rubén.
De nuestras lenguas y otros discursos. Asunción: Centro de Estudios Antropológicos/Universidad Católica Nuestra Señora de Asunción. 1990.

BARTOLOMÉ, Miguel Alberto.
La situación de los Guaraní (Mby'a) de Misiones (Argentina). In: Roa Bastos, Augusto (Comp.). *Las culturas condenadas*. México: Siglo XXI. p.86-111. 1978.

BENÍTEZ, Justo Pastor.
Formación social del pueblo paraguayo. Asunción: América-Sapucai. 1955.

BERTONI, Moisés Santiago.
La civilización guaraní, parte II: religión y moral: la religión guaraní, la moral guaraní, psicología. Asunción: Iberoamericana. 1954.

BERTONI, Moisés Santiago.
Diccionario botánico latino-guaraní y guaraní-latino con un glosario de vocablos y elementos de la nomenclatura botánica. Asunción: Editorial Guaraní. 1940.

BERTONI, Moisés Santiago.
La civilización guaraní, parte III: etnografía. Conocimientos: la higiene guaraní, su importancia científica y práctica. La medicina guaraní: conocimientos científicos. Puerto Bertoni: Ex Sylvis. 1927.

BERTONI, Moisés Santiago.
Relación sucinta de un viaje de estudios al Brasil, en ocasión del Congresso Internacional de los Americanistas, del Centenario de la Independencia del Brasil y de la Exposición Universal (del 11 de agosto al 26 de noviembre 1922). *Anales Científicos Paraguayos*, t.3, n.2 (Antropología). Puerto Bertoni: Ex Sylvis. 1924a.

BERTONI, Moisés Santiago.
La civilización guaraní: el testimonio de una nación, todavia en ser: el juicio de un gran especialista. Los Chiriguanos emigrados del Alto Paraná Paraguayo, a principios del siglo XVI. Puerto Bertoni: Ex Sylvis. 1924b.

BERTONI, Moisés Santiago.
La civilización guaraní, parte I: etnología: origen, extensión y cultura de la raza Karaí-Guaraní y proto-história de los guaraníes. Puerto Bertoni: Ex Sylvis. 1922.

BERTONI, Moisés Santiago.
Resumen de prehistoria y protohistoria de los países guaraníes. *Conferencias dadas en el Colegio Nacional de Segunda Enseñanza de la Asunción los días 26 de julio, 8 y 21 de agosto de 1913*. Asunción: Juan E. O'Leary Editor. 1914.

BERTONI, Moisés Santiago.
Las plantas usuales del Paraguay y países limítrofes: características, propiedades y aplicaciones. Asunción: Establecimiento Gráfico M. Brosso. 1901.

BREZZO, Liliana.
Paraguay a comienzos del siglo XX (1900-1930). Montevideo: Ministerio de Educación y Cultura. 2011.

BREZZO, Liliana.
"Reparar la Nación": discursos históricos y responsabilidades nacionalistas en Paraguay. *Historia Mexicana*, v.60, n.1, p.197-242. 2010.

CABALLERO MERLO, Javier Numan.
Cien años de desarrollo de la sociología en Paraguay en el año de su bicentenario: del rezago histórico institucional en el pasado a la debilidad contemporánea. *Revista Internacional de Investigación en Ciencias Sociales*, v.7, n.2, p.119-160. 2011.

CARDOZO, Efraim.
El Paraguay colonial: las raíces de la nacionalidad. Asunción: Nizza. 1959.

CHASE-SARDI, Miguel.
El derecho consuetudinário indígena y su bibliografía antropológica en el Paraguay. Asunción: Ceaduc. 1990.

CUETO, Marcos; PALMER, Steven.
Medicina e saúde pública na América Latina: uma história. Rio de Janeiro: Editora Fiocruz. 2016.

DI LISCIA, María Silvia.
Utopías científicas: Moisés Bertoni y el Paraguay guaraní. In: Oleaga, Marisa González; Bohoslavsky, Ernesto (Comp.). *El hilo rojo*: palabras y prácticas de utopía en América Latina. Buenos Aires: Paidós. p. 249-265. 2009.

LUTZ, Adolpho; ARAÚJO, Heráclides de Souza; FONSECA FILHO, Olympio da.
Viagem científica no Rio Paraná e a Assunción com volta por Buenos Aires, Montevideo e Rio Grande, de janeiro até março de 1918: breve relação de viagem, extraída dos diários dos drs. Lutz e Araújo. *Memórias do Instituto Oswaldo Cruz*, v.10, n.2, p.104-173. 1918.

MELIÀ, Bartomeu; SAUL, Marcos Vinicios de Almeida; MURARO, Valmir Francisco.
O guarani: uma bibliografia etnológica. Santo Ângelo: Fundação Missioneira de Ensino Superior. 1987.

NETTO, Juan S.
Medio siglo de cirugía en el Hospital de Clínicas. 1930-1980. *Anales de la Facultad de Ciencias Médicas de la Universidad Nacional de Asunción*, v.13, n.1, p.129-163. 1981.

NOELLI, Francisco Silva; FERREIRA, Lúcio Menezes.
A persistência da teoria da degeneração indígena e do colonialismo nos fundamentos da arqueologia brasileira. *História, Ciências, Saúde – Manguinhos*, v.14, n.4, p.1239-1264. 2007.

RAMELLA Lorenzo; RAMELLA-MIQUEL, Yeni.
Biobibliografía de Moises Santiago Bertoni: el hombre de ciencia visto por los demás. Genève: Editions des Conservatoire et Jardin Botaniques de la Ville de Genève (Flora del Paraguay, serie especial, n.2). 1985.

RIVEROS, Manuel.
Pasado y presente de la cirugía. *Anales de la Facultad de Ciencias Médicas de la Universidad Nacional de Asunción*, v.14, n.1-2, p.327-345. 1982.

ROMAÑACH, Alfredo Boccia; PAZ, Alfredo Boccia.
Historia de la medicina en el Paraguay. Asunción: Servilibro. 2011.

SILVERO, José Manuel.
Cecilio Báez. Assunción: El Lector. 2011.

SUSNIK, Branislava.
El índio colonial del Paraguay, v.1: el guaraní colonial. Asunción: Museo Etnográfico Andres Barbero. 1965.

TELESCA, Ignacio.
Paraguay en el centenario: la creación de la nación mestiza. *Historia Mexicana*, v.60, n.1, p.137-195. 2010.

VIOLA, Alfredo.
Eligio Ayala: presidente constitucional, 1924-1928. Asunción: Servilibro. 2011.