



## The Spanish flu epidemic: a challenge to Bahian medicine

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### Abstract

The article describes the moment when the medical and health authorities of Bahia state (Brazil) faced the challenge of explaining an illness that was spreading with unexpected virulency through the world, provoking much uncertainty and controversy among the global academic and scientific community concerning the diagnosis and etiology of the disease. It analyzes the Bahian medical establishment's stance within these discussions and the scientific knowledge used by medics to explain the epidemic and to recommend therapeutic and prophylactic measures.

Keywords: medicine, epidemics, Spanish flu, public health, Bahia.

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The Spanish flu was the biggest and most devastating disease to have spread through the world in the 20<sup>th</sup> century – it infected more than 600 million people and killed between 20 and 40 million globally within a short period of time (Reid, Tautenberger, Fanning, 2001). The epidemic came in three waves – the first erupted in March 1918, presenting a fairly low mortality rate and consequently provoking little cause for alarm; the second, extremely virulent, spread across the world from August of the same year; the third, less virulent wave broke out in January 1919 and lasted in some areas until 1920 (Phillips, Killingray, 2003; Van Hartesveldt, 1993).

During the pandemic, scientists and medical and health authorities from various parts of the world searched for a response to the epidemic crisis. In the process, a body of knowledge that had apparently achieved a degree of stability was suddenly overturned, inaugurating a period of uncertainty, controversy, experimentation and negotiation as authorities strove to establish a diagnosis and a correct form of treatment for the disease in question.

In this article, I analyze the way in which the Bahian medical establishment engaged with the discussion concerning Spanish flu, as well as the body of scientific knowledge used by doctors to explain the epidemic, provide effective responses to the disease at individual and collective levels, persuade a wide range of social actors of the gravity of the situation and negotiate with them over the introduction of the measures needed to treat the disease and contain its spread.

As important channels of information on the debates raging through the medical community, the newspapers published in the Brazilian state of Bahia, along with the theses produced at the Faculty of Medicine of Bahia, provided me with key information on medical knowledge, technology and practice, and helped deepen my understanding of the process involved in defining the disease and the scientific knowledge used to explain it. The messages sent annually to the State Assembly by the Governor Moniz de Aragão tell us the official version of the facts. Comparing the information obtained from these sources with details from other primary and secondary sources, such as the literature produced on Bahia, works in the areas of the history of medicine, healthcare and diseases, along with narratives relating to Spanish flu in Brazil and the world as a whole, have helped deepen my analysis of the epidemic's impact on Bahia.

### **The knowledge accumulated during preceding epidemics**

Influenza has been known to humans since ancient times. History is filled with reports on the incidence of diseases whose characteristics match what we now identify as a flu epidemic – sudden appearance of acute and highly contagious respiratory illness, which lasts for a few weeks and disappears equally suddenly (Beveridge, 1977, p.25-26). In 412 BC, Hippocrates described the syndrome that we today recognize to be derived from the flu virus. Records exist of similar epidemics during the Middle Ages. They spread across the American continent from the 15<sup>th</sup> century onwards. Roy Porter (2004, p.27) suggests that flu was brought to the New World by the Europeans who transported it via contaminated pigs on board their ships. However, Valdez Aguilar (2002, p.40) claims that influenza already existed on

the American continent before the arrival of the Europeans. He cites accounts from Aztec chroniclers about the 'pestilential catarrh' that spread between 1450 and 1456, claiming many victims in the central part of the territory forming modern-day Mexico. However, Beveridge (1977, p.27-30) warns that the records prior to the 18<sup>th</sup> century are too patchy to enable a reliable historical reconstruction of flu pandemics. For Brazil, the records become more precise from the 19<sup>th</sup> century onwards.

Various flu pandemics struck during the 19<sup>th</sup> century. Between 1830 and 1833, a wave of flu swept the world, causing more devastation than the cholera epidemic that followed in 1832 (Mordant, 2005, p.25). In 1847-1848, another outbreak of flu spread across the planet, also reaching Brazil (Beveridge, 1977, p.29-30). In 1889, another pandemic wave originating in Europe spread throughout the entire world: India, Australia, North and South America, eventually reaching Brazil again in 1890.

In response to these successive pandemics, various 19<sup>th</sup> century scientists studied influenza closely and tried to explain its nature and determine its causes. In Bahia, end-of-course theses presented at the Faculty of Medicine discussed the theme, while lay or specialized journals reported on the investigations being conducted in hospitals and research institutes all over the world. The *Gazeta Médica da Bahia*, a journal published since 1866, kept the medical class informed about experiments, articles, classes and conferences on the topic provided in academic institutions and medical associations from various countries.<sup>1</sup>

Some of these articles contained accounts by the researchers themselves in which they revealed the various stages involved in their investigations. One of these texts states that O. Seifert had achieved some success in his research by examining secretions from the respiratory apparatus of patients with the aim of establishing a comparison test, examining and isolating micrococci in the blood and inoculating animals (O Microbio..., 1890). The investigative process conducted by Seifert provided valuable information for future bacteriological research, but the researcher was unable to isolate the microorganism in the blood of subjects with flu, nor was he able to prove the reproduction of the disease in the rabbits inoculated with the expectorate of people with flu.

In 1892, the *Gazeta* published the preliminary results of the experiment conducted by Richard Friedrich Johannes Pfeiffer (1858-1945), a student and later assistant of Koch at the Institute of Infectious Diseases in Berlin, Germany (Bacillo..., 1892). In 1891, Pfeiffer examined 31 cases of influenza, six of which were followed by autopsies. In all the cases examined he found a bacillus in the characteristic bronchial secretion, as well as in the peribronchial tissue and on the surface of the pleura. He also observed the absence of this bacillus in the bronchial catarrh produced in cases of pneumonia and tuberculosis. Following Koch's postulates, he inoculated different animals – monkeys, rabbits, guinea pigs, rats, pigeons and so on. This allowed him to ascertain that only the rabbits and monkeys contracted flu, but the experimental disease induced in animals was not conclusive as Koch claimed. Nonetheless, the results obtained with these animals led Pfeiffer to conclude that the pathogen – baptized *Haemophilus influenzae* – was the cause of flu, although he was unable to reproduce it in other lab animals.

In the same issue, the *Gazeta Médica da Bahia* published an article by Dr. S. Kitasato (1892), a member of Koch's team at the Institute of Infectious Diseases in Berlin, in which

Kitasato explained the method used to obtain “pure cultures of influenza bacilli.” Another small article published by the journal described the research being pursued by P. Cãnnon (1892), a physician from the Internal Medicine Section of the Moabit Municipal Hospital, also located in Berlin, who had tried to isolate the flu pathogen in the blood of those with the disease.

Publications like these helped inform Bahian medical doctors and scientists about the methods used in the most advanced bacteriological research laboratories to determine the etiological agent involved in influenza, even where the results were not always those expected.

Although those pursuing experimental medicine in Bahia at the end of the 19<sup>th</sup> century had already assimilated these methods and extolled the progress achieved thanks to the knowledge produced and validated in the laboratory, the hospital still represented the space par excellence not only for medical practice but also for advancing medical knowledge (Barreto, 2000).<sup>2</sup> The wards of Santa Isabel Hospital (also known as the Holy House of Mercy of Bahia) were the most important space for clinical and anatomopathological research.

For the doctors practicing medicine at the time, bedside observation and examination of the patient provided them with all the information needed to diagnose the disease by its effects, if not by its causes. To determine the nature of disease and establish the correct diagnosis and treatment, it was enough to question the patient in detail and undertake a systematic and rigorous clinical investigation, recording the organic signs and symptoms.

When flu was suspected, the clinical investigation adopted the following procedures: anamnesis (history of the symptoms based on the patient’s account); percussion and auscultation of the thoracic region; palpation of the abdomen (to perceive the volume and sensibility of an organ); observation of the functioning of the intestines and digestive tract; examination of the patient’s urine and bronchial secretions; auscultation of the heart; measurement of temperature and pulse; and observation of the patient’s general state: disposition, appetite, drowsiness, reflexes, muscle tone, etc. (Britto, 1895, p.260).

Doctors also made use of epidemiological criteria when establishing the diagnosis: they observed the distribution of the disease in the population, taking into consideration its prevalence during a particular period of the year, as well as the number of new cases (incidence). If the incidence increased, it was treated as an epidemic.<sup>3</sup>

In 1890 when ‘suspicious fevers’ started to be reported in Carlos Gomes Street in Salvador, physicians employed the methods of clinical and epidemiological research to make their diagnoses (Nina Rodrigues, 1891, p.550-552). Dr. Gustavo dos Santos was the first to detect the disease. After comparing the signs and symptoms presented by their patients with the flu cases observed in passengers of a packet ship coming from Hamburg and docked at Salvador, Santos concluded that the same disease was involved. Its rapid dissemination, spreading from the initial foci to crowded places and eventually the whole city, led the physician to surmise that this was the same epidemic disease that been spreading through Europe since 1889.

As happened years later during the 1918-1919 epidemic, there was no consensus about the diagnosis presented by Gustavo dos Santos. This led to a polemic among the city’s

doctors – while some corroborated Santos's opinion, others strove to deny the existence of any flu epidemic in Salvador. The latter group argued that it was merely “a catarrhal infection linked to the local conditions and general meteorological causes affecting a large of individuals simultaneously” (Nina Rodrigues, 1891, p.551). Others claimed that tilling of the urban soil was the cause of these endemic fevers that seasonally erupted in Bahia. Some suspected that the disease involved was dengue or that the latter was associated with influenza, due to the sporadic eruption of scarlatiniform or morbilliform rashes on those with the disease.<sup>4</sup>

The physician Raimundo Nina Rodrigues (1862-1906) had the chance to monitor a number of cases in the wards of the Santa Isabel Hospital. On this occasion, he conducted a study of the clinical symptoms, establishing their ‘affiliation’ to those of the epidemic then unfolding. The rapid dissemination of the disease through the city of Salvador, affecting entire streets and invading factories and workshops, led Nina Rodrigues to conclude that the disease was highly contagious and quick-spreading and that its incidence was not dependent on the influence of the weather or the seasons.

By observing the symptoms presented by the patients of Santa Isabel, Nina Rodrigues was able to identify the classical clinical forms of the disease: catarrhal (symptoms of laryngitis, tracheitis, bronchitis or bronchopneumonia); gastrointestinal (with febrile gastrointestinal catarrh, furry tongue, complete loss of appetite, nausea, vomiting, stomach cramps and diarrhoea); and nervous (feeling unwell, weariness and extreme fatigue, insomnia, headaches, facial neuralgias, strong aches, vertigo, etc.: symptoms associated with ‘catarrhal phenomena’) (Nina Rodrigues, 1891, p.552-553).<sup>5</sup> The clinical research conducted in this hospital and the information obtained from other doctors in the city led Nina Rodrigues to conclude that the influenza was mostly manifested in its catarrhal form.

Nina Rodrigues admitted that several times he was forced to readjust his diagnosis due to the variability of the signs and the diversity of the symptoms observed in the studied cases. The alterations in the symptoms presented by a patient who eventually died from the disease led the physician to undertake an autopsy on the corpse and study the lesions present in order to confirm the diagnosis.

In his doctoral thesis, entitled *A small contribution to the study of flu*, presented to the Faculty of Medicine of Bahia and published in 1900, Nicanor J. Ferreira discussed this question in detail. According to Ferreira, the diagnosis of flu was always hindered by the variability of the symptoms presented by patients. Some of the symptoms and even anomalies of influenza were shared by other illnesses, which further confused the epidemic profile. Ferreira listed the diseases whose symptoms were similar to those of flu: typhoid fever, due to the ‘sapping of the forces,’ the pulse rate and the ‘repeated coldness;’ rheumatism, due to the pains in the joints; smallpox, due to lumbar pain and intense fever; the onset of scarlet fever, which presents a runny nose, coughing or violent angina with skin rashes; and ‘dengue fever,’ which was distinguished from flu due to the strong but short-lived pain in the knees and the rash similar to scarlet fever or German measles, accompanied by an intense itching. Comparing gastrointestinal flu's symptoms with those of cholera, Ferreira noted their initial similarities but observed that any doubts disappeared as the two illnesses developed.

During his case study at Santa Isabel Hospital, Nina Rodrigues (1891) observed that both the evolution of the illness and its intensity varied. Although flu was not considered malign, its severity seemed to depend on individual conditions, as well as fortuitous complications and accidents that could take hold of the person with flu over the course of the illness. Another point clarified by the researchers and confirmed by the physician was the fact that flu could predispose its victims to serious illnesses, such as tuberculosis, or worsen morbid conditions and precipitate death when caught by individuals already suffering from heart disease, asthma and tuberculosis. Adults debilitated by previous illnesses, by an unruly lifestyle or by continuous exposure to unhealthy conditions could also succumb more easily to influenza. In some of the cases studied by Nina Rodrigues, flu combined to worsen the symptoms of cardiac lesions and pulmonary tuberculosis, hastening the death of the patients.

The investigation conducted by Nina Rodrigues showed, however, that some individuals – even older patients with a prior history of respiratory diseases – could be cured, while others in an excellent state of health would end up dying. In the latter case, death was often provoked by complications over the course of the illness.

The physician had observed this possibility when treating a young man, aged just 25 years and in good physical condition, who had not even had time to lose weight given the short lapse of time between catching the disease and his death. According to Nina Rodrigues, the patient's condition had progressively worsened after he failed to receive the necessary care while still at home. As a result, his illness evolved into a bronchopneumonia with suspected compromising of the cerebral meninges, eventually resulting in the patient's death.

The cases monitored by Nina Rodrigues demonstrated that flu “did not respect age, sex or race, manifesting itself with ... equal intensity in old people and children, in individuals of both sexes and in representatives of all the races” who made up the Bahian population (Nina Rodrigues, 1891, p.556). Other studies carried out at this time arrived at a similar conclusion: flu did not respect “age, sex, temperament, constitution or social condition” (Marques, 1890, p.355).

The investigation conducted by Nina Rodrigues was repeated by Alfredo Britto during the 1895 epidemic. During this period, Britto (1895) published in the *Gazeta Médica da Bahia* a detailed report of three cases accompanied by himself in the wards of Santa Isabel Hospital. One of the studied cases received special attention from the physician “by being eminently characteristic” and “worthy in itself of an entire diagnostic discussion,” since the case displayed “in its different phases, different localizations of the same infectious agent, thereby revealing its manifestly flu-like nature” (p.261). Like Nina Rodrigues, as well as the clinical observation, Britto also made use of anatomopathological examinations to confirm the diagnosis.

The results from the studies carried out by the two physicians in the wards of Santa Isabel Hospital matched those of research conducted in other areas of the world, especially those whose findings were published in the *Gazeta Médica da Bahia*. However, for Nina Rodrigues use of clinical observation in isolation provided an incomplete and superficial understanding of the facts, limiting medical practice (Nina Rodrigues, 1891, p.548). The physician regretted that the medicine practiced in Brazil was not ready to meet the demands



of the “medicine of the century,” which had already fully adopted “the safe track of the positive sciences, rich in experimental methods of undeniable value” (p.555).

This kind of discourse was common among physicians at the time. Recent studies point to the political nature of such criticism (Ferreira, 1993; Edler, 1992). Löwi (2006, p.18) argues that Brazilian physicians oscillated between the desire to ‘civilize’ Brazil by transplanting scientific knowledge and new technologies from the most advanced centres and the wish to produce its own original body of knowledge, which would enable them to work more closely with these scientific centres. The works published in the *Gazeta Medica da Bahia* and those presented at the Medical Society of the Hospitals of Bahia between the last two decades of the 19<sup>th</sup> century and the first decades of the next century showed that Bahian medical practitioners were more interested in tropical nosology and the variables intervening in the health-disease process (*Gazeta Medica da Bahia*, 1880-1920; SMHB, 21 June 1919).

During the period when Nina Rodrigues published his study on influenza, the members of the so-called Bahian Tropicalist School had already succeeded in “creating a medical tradition in Bahia, in harmony with the contemporary teachings of European experimental medicine” (Maio, 1995, p.229). In the second half of the 19<sup>th</sup> century, the research conducted by the group formed by Otto Edward Henry Wucherer, John Ligertwood Paterson and José Francisco da Silva Lima, later dubbed the Bahian Tropicalist School, helped reformulate Brazilian nosology through discoveries relating to ancylostomiasis, ainhum and filariasis, as well as fomenting the debate on beriberi, leprosy, tuberculosis and so on (Barreto, 2005; Edler, 2001).

Over the final decades of the 19<sup>th</sup> century, the Faculty of Medicine of Bahia possessed laboratories specializing in organic and biological chemistry, experimental physiology, medical physics and experimental therapeutics, as well as anatomy and pathology museums (Dicionário..., 2000). In 1897, Bahian medicine was already using the latest modern technology, including X-rays, discovered in Germany in 1895 by the physicist Wilhelm Conrad Roentgen. Alfredo Britto (1898, p.395-406), physician and professor of the Faculty of Medicine of Bahia, had brought a radioscopic apparatus from Europe and installed it at the Santa Isabel Hospital to help with surgical diagnoses.

Careful observation of the evolution of influenza, including its symptoms and signs, combined with pathological lesions, had helped identify flu as a separate disease even before bacteriology determined the specific agent involved.

On the other hand, Nina Rodrigues argued that although the results produced by bacteriology had not achieved unanimity, they represented important advances, whether in terms of a better understanding of the nosological individuality of the disease, the interpretation of its signs, or the requirements for its treatment (Nina Rodrigues, 1891, p.555).

### **The multiple perceptions of the disease**

When the flu epidemic emerged in 1918, it was spring in the northern hemisphere. Its origin remains controversial, but the first records of the disease appeared in the United States (Crosby, 1989). In March 1918 more than a thousand workers from the Ford Motor

Company in Detroit and many soldiers from the Camp Funston/Fort Riley military base in Kansas were hospitalized after presenting flu-like symptoms. However, in most cases the disease was benign – a cure was achieved three or four days after the first signs of illness.

Consequently, the American soldiers were soon ready to depart for war and were shipped to Europe unaware they were carrying the virus of an extremely serious disease. As soon as the American expeditionary forces landed on the French coast, the illness spread, attacking allies and Germans alike (Tognotti, 2003). A large portion of the army contingents and the populations of the countries embroiled in the conflict contracted the disease. This spring outbreak was not particularly aggressive. Those infected by flu complained of shivers and temperature rises, inconveniences that lasted for little more than three days, with patients recovering after a period of convalescence.

The low mortality rate meant that medical practitioners and health authorities in these countries were not overly concerned by the disease. The symptoms and signs suggested a benign illness seasonally affecting people in various parts of the world. The Porto Health Office declared that “although the bacteriological diagnosis could not be established,” the illness spreading through Europe was a “epidemic and mild flu” (*Diario da Bahia*, 26 September 1918, p.3).

However by the end of August the epidemic had assumed alarming proportions. There was a significant increase in the number of infected people, who presented a fairly severe clinical picture. Those hit by the epidemic almost never presented prodromic symptoms – the disease took hold rapidly with a big rise in temperature, fatigue, headaches, catarrh in the upper airways, coughing, light intolerance, aches, injected and swollen eyes, and sometimes neural and digestive disturbances (*Diario da Bahia*, 26 September 1918, p.3; 23 October 1918, p.2). The general signs of constant respiratory problems were followed by nervous disturbances and serious pleuropulmonary, digestive and/or cardiovascular complications (*Diario da Bahia*, 26 September 1918, p.3; *Diario de Noticias*, 5 October 1918, p.2). These complications appeared during the relapse, especially those affecting the respiratory system such as bronchopneumonia and pneumonia, as well as cardiac arrests, which led to death within a few days. According to physicians' accounts, the corpses of the victims presented “the bluish-white colour of the asphyxiated” (*Diario de Noticias*, 5 October 1918, p.2).

Most of the physicians were also impressed by the fact that the disease would revert in serious form in individuals who had apparently recovered, as if there were no element in their organism capable of triggering the biological process of immunization (Silva, 1 February 1919, p.44). The international medical community was not only perplexed and alarmed by the sudden appearance of the epidemic in the warmest season of the year (generally flu broke out in the coldest season), the incidence of flu among an unusual age group (it struck young adults)<sup>6</sup> and the variability and gravity of the symptoms presented by those suffering from the illness. The inconstancy of Pfeiffer's bacillus, as well as the occurrence of diverse microorganisms in the blood, secretions and body liquids of those suffering and dying from the disease, contradicted the hypothesis of a specific agent, generating controversies among medical practitioners and researchers.

Ever since Richard Pfeiffer had announced the discovery of *Haemophilus influenzae* in 1892, the idea that ‘Pfeiffer's bacillus’ was the etiological agent responsible for the disease



had become virtually a consensus. Thereafter, the bacteriologists had limited themselves to verifying the occurrence of the microorganism in the secretions of the sick and in the respiratory apparatus of patients who died. Many researchers confirmed Pfeiffer's discovery, with some even claiming that influenza was always accompanied by Pfeiffer's bacillus, while others failed to obtain the same results or only partially confirmed them (Moses, 1918, p.681).

Brazil followed the tragedy from afar through reports that described the trajectory of the disease in Europe, published in the journals of various federal states. In August 1918, a small note published in the *Diario de Noticias* (7 August 1918, p.1) reported that the 'Spanish flu,' originating in Austria and Germany, was causing "terrible damage in Switzerland, killing entire families," whose funerals and burials were held at night, "with relatives banned from attending the burial."

News reports such as these moved the reading public, but until then Brazilians had considered themselves immune to a disease affecting the distant countries of Europe. However, the movement of troops during a period of warfare involving people from various parts of the world would soon shake this belief.

In the first half of September 1918, the Brazilian authorities divulged the information that Brazilians involved in the First World War, members of the Frontin and Nabuco Gouveia military-medical missions, after docking in Freetown, Sierra Leone, and in Dacar, Senegal, had been struck down by the flu devastating these African ports, even before they could participate in the combat operations of the allied forces (*Diario de Noticias*, 23 September 1918, p.1). After this event, Salvador's press began to give more prominence to reports on the topic.

The calamity that struck various corners of the world almost simultaneously threw the international medical community into disarray and medical science began to suspect that a new disease was responsible for the situation. The different names given to the disease in the different countries where it struck reflected this perception: the Americans called it 'three-day fever' or 'purple death,' while the French named it 'purulent bronchitis,' the Italians 'sandfly fever,' and the Germans were struck down by 'Flanders fever' or '*Blitzkatarrh*' (Crosby, 1989). In Spain, flu was called '*la dançarina*,' while in Portugal the disease was known as '*a pneumónica*.' In other countries it became called Spanish flu or influenza (*Diario de Noticias*, 23 September 1918, p.1).<sup>7</sup>

The local newspapers reproduced articles published in the international press in which the most renowned European physicians issued a range of explanations concerning the diseases and its causes. According to these reports, three schools of thought were prominent in the national and international community at the start of the pandemic crisis: the first believed that a flu had begun in benign form only to assume a more serious form, becoming lethal; the second school accepted the flu diagnosis, but remained puzzled over the anomalous circumstances and symptoms presented by the epidemic; finally, the third group rejected the diagnosis of flu from the outset: the disease was 'three-day fever' or 'pappataci (sandfly) fever,'<sup>8</sup> provoked by an invisible and filterable etiological agent like those responsible for dengue and yellow fever (*Diario de Noticias*, 1 October 1918, p.1).

For the Italian physician Ferdinando de Napoli, the disease in question was related to summer fevers and trench fever (*Diario da Bahia*, 23 October 1918, p.2). An article published

in the *British Medical Journal* and reproduced by the *Diario da Bahia* (26 September 1918, p.3) described the epidemic as ‘mysterious,’ caused by a “new strange disease.” The Director of Public Health of Portugal, Ricardo Jorge, argued in favour of the diagnosis of influenza (*Diario de Noticias*, 27 September 1918, p.2). At a conference held by the Portuguese Medical Association, Américo Pires de Lima, a professor at the University of Porto, emphasized that the symptoms presented by the epidemic had all the characteristics of a general infection (p.1). In his opinion, the only disease described in pathology to present a similar set of symptoms was flu or influenza. The Portuguese physician Antonio de Azevedo highlighted the abnormal circumstance and the singularity of the clinical characteristics presented by the unfolding epidemic. In Spain, doctors like Pittaluga and Grinda, members of the Royal Academy of Medicine, considered the diagnosis of flu incontestable. Grinda argued that the difference between the contemporary epidemic and the one of 1889-1890 was explained by the variability of the influenza agent, subject to natural evolution like all other living beings.

The diverging perceptions of the disease and the controversies that dominated the academies and research centres of the countries affected by the epidemic spilled into the pages of the newspapers: What was the ‘Spanish lady’? Was the current illness a ‘meteoric catarrhal fever,’ dengue fever, summer fever, trench fever, three-day fever, or was it simply seasonal influenza or flu, more virulent this time round? Was the disease as contagious as it appeared? If it was transmitted by direct contact, how had it broken out across the world almost simultaneously? What other mechanisms accelerated its transmission? What was the living etiological agent responsible for causing the affliction? Replying to these questions and thus establishing a precise diagnosis of the disease that afflicted the world population in 1918 was crucial to determining the measures for controlling and fighting it. Scientists and the medical and health authorities from the countries affected by the epidemic were compelled to name the disease and propose an explanatory framework for the set of signs involved. In the process, a body of knowledge that had apparently achieved a degree of stability was suddenly overturned, inaugurating a period of uncertainty, controversy, experimentation and negotiation as efforts were made to establish a diagnosis and a correct form of treatment for the disease in question.

### **Bacteria or virus? Different conceptions of the disease stir the medical world**

The lack of any consensus in the opinions of the European medical practitioners, who up to then had been dealing directly with the epidemic cases, confused the local physicians and provoked apprehension among other sectors of society. “Influenza? Spanish flu?” – nobody knew, claimed the journalist of the *Diario da Bahia* (3 October 1918, p.1), since the Directorate-General of Public Health of Bahia (DGSPB) had still not considered the problem or taken any measure in response to it. While awaiting an official statement, the newspapers continued to ask physicians for their answers to the illness afflicting the population.

Looking to offer the reading public ‘authorized opinions,’ the journalists turned to the most reputed physicians in Bahia, as the headline printed on the front page of *O Imparcial* records (Figure 1).

Still absorbing the initial impact of the epidemic, the interviewees proved to be fairly cautious in commenting on the topic. Most of them belonged to the Faculty of Medicine of Bahia and attended the vast clientele in prestigious private consultancies. Some also held the post of health inspectors for the Directorate-General of Public Health (DGSPB).

Among the interviewees, Frederico Koch discounted the hypothesis that the epidemic was caused by Spanish flu. Although emphasizing that he was unable to apprehend the full extent of the phenomenon, since the previous month (August) the physician had been treating people who had contracted the disease and ascertained that it was manifested in a benign form, as occurred seasonally in Bahia. As far as Koch was concerned, there was no reason for concern since, despite its contagiousness, flu was not as serious in the tropics as it was in the cold climates of Europe, for example (*O Imparcial*, 26 September 1918, p.1).

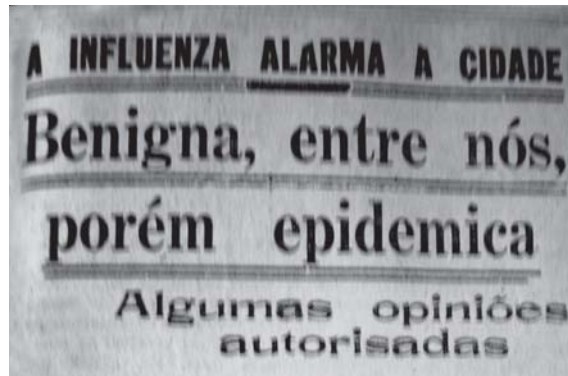


Figura 1: Headline in first page of *O Imparcial*/ (September 26, 1918, p.1)

All the indications are that the disease was already present in Bahia well before it was recorded by the press or the DGSPB. This hypothesis makes some sense given the intense movement of foreign shipping in the port of Salvador. The delay in recording the fact by the DGSPB perhaps stemmed from the period of incubation and transmission of the disease – a necessary interval for its first signs to become manifested in a significant number of people, drawing the attention of the relevant authorities. Moreover, the disease did not require compulsory notification, meaning the health authorities would only be advised in the case of an epidemic.

Questioned on the topic, the general practitioner Edgar Barros told the journalist from *O Imparcial* (26 September 1918, p.1) that he had attended numerous patients with the illness, both in his own clinic and at their homes. Given the large number of people infected (in less than two days, more than fifty people alone in his private clinic), the physician believed that it was another flu outbreak that, though not serious, had proven to be highly contagious. In order to reinforce this feature of the influenza, Barros made a point of mentioning that not even he had escaped the infection: he was running a fever at the time of the interview.

In the same report Martagão Gesteira, a physician and Professor of General Paediatric Medicine of the Faculty of Bahia, stated that the flu was more intense in places where a large number of people were gathered, such as military barracks and factories. The physician agreed with his peers concerning the nature of the disease: it was the typically benign flu that periodically spread through Bahia. However, intending to tranquilize the readers of *O Imparcial*, Martagão Gesteira added that flu was not usually fatal; the deaths observed among victims of the disease occurred when the latter presented some kind of organic weakness caused by previous illnesses.

At that time, those with a prominent role in society – especially individuals occupying public posts or belonging to renowned institutions – seemed to wish to avoid any unnecessary and somewhat risky exposure. These figures remained cautious about issuing any opinion since while they did not want to appear uninformed in front of their peers or public opinion, they were also afraid to formulate a hypothesis that would later be proven incorrect, undermining the competence they needed to display. Hence, the vast majority were reluctant to relate the illness affecting Salvador's population with the pandemic disease spreading through Europe; at the same time, they did not fail to classify it as the same benign flu that attacked the population during the coldest periods of the year.

As Professor of Clinical Medicine of the Faculty of Medicine of Bahia, Antonio do Prado Valladares was also interviewed by a reporter from the *Diario da Bahia* (3 October 1918, p.1). He declared that he was still unable to issue a definitive opinion concerning the epidemic as he had observed few sick people, but ventured the hypothesis that it was more serious than was being supposed. According to Prado Valladares, the illness was not related to 'meteoric catarrhal fever,' one of the names given to influenza. This conjecture was based on the frequency of the eruptive manifestations in the sick, very similar to those present in cases of dengue.

Prado Valladares suspected – albeit without much conviction – that the epidemic occurring in Bahia was the same disease propagating in Africa and Europe. Cautiously, since he lacked any precise knowledge of the morbid agent, the physician saw the question as a theme for research and recommended that those interested in investigating 'clinical things' should examine the issue closely (*Diario da Bahia*, 3 October 1918, p.1).

The Bahian physician and scientist Pacífico Pereira (Figure 3) had no doubts concerning the nature of the illness: it was flu or influenza. In his opinion, There was no other disease with the same power and speed of propagation. Easily transported by people and things, the flu germs had invaded all the countries through their maritime and terrestrial routes of communication (*Diario da Bahia*, 29 October 1918, p.1).

According to Pacífico Pereira, since it was an infectious-contagious microbial disease, each attacked individual constituted a focus, spreading the germs proliferating in their nasal passages and oral cavity through the environment by coughing and sneezing. Hence he recommended frequent disinfections of the mouth and nose, not only to avoid a general infection of the organism, but also to hinder its propagation from the local infection via the channels of the skull and the middle ear. Pacífico Pereira added that caring for poor patients at home and disinfecting their dwellings represented far-reaching public health measures, since they helped extinguish the numerous foci of the disease found in impoverished areas. When the destitute died abandoned, they left the germs of the infection planted among those sharing their hovels, allowing the disease to become more virulent and contagious.

Antonio do Prado Valladares was not convinced that the disease was flu, or that it was caused by Pfeiffer's bacillus. Although he had not undertaken a detailed study of the subject, he challenged the belief that this bacillus was responsible for the current epidemic. For Prado Valladares, the hypothesis that Pfeiffer's bacillus was the agent responsible for



Figure 2: Prado Valladares (*Bahia Illustrada*, Rio de Janeiro, Year 2, n.3, Jan. 1918, p.11)



Figure 3: Pacifico Pereira (*Bahia Illustrada*, Rio de Janeiro, Year 2, n.3, Feb. 1918, p.11)

influenza would only be justifiable if the infected individual had maintained direct contact with “those sick with this illness.” However when someone was contaminated “who had never lived or worked near such patients ... this hypothesis could be discounted.” He also argued that ‘distal contagion’ occurred, the influenza germ would have to “migrate through the air against the adversities of excitation, luminosity, ultraviolet radiation and any other atmospheric condition that fortunately possesses a microbicidal nature.” In such cases, the physician believed that a vector had to be present, given that, “in the general opinion of bacteriologists, Pfeiffer’s microbe is extremely fragile and fails to offer any resistance even in a humid environment” (*Diario da Bahia*, 5 November 1918, p.1).

In support of his reasoning, Valladares added that “the false notion of direct transmission through the air” proposed by miasmatic medicine had been replaced by the “precise and confirmed concept of a transmitting host belonging in most cases to the world of the insects” (*Diario da Bahia*, 5 November 1918, p.1).<sup>9</sup> In his view, nobody was investigating or even accounting for the possibility of transmission by mosquitoes. Were this hypothesis to be proven, he recommended the following measures: “a) the rooms or wards occupied by flu patients should be made mosquito-proof; b) the disinfections undertaken in the buildings and ships should always include mosquito expurgation” (p.1). The physician concluded with the following words: “Also it would not be entirely nonsensical to launch immediately a full and complex campaign of exterminating the many mosquitoes of



every type infesting our country. Even were this of no avail in the defence against influenza, we would certainly profit from ridding ourselves of malaria, yellow fever, filariasis and perhaps leprosy and beriberi: a fearful cohort of plagues to be avoided ..." (p.1).

In the documentation consulted, there is no evidence that Prado Valladares developed any kind of research to validate his hypothesis. However, the stance adopted by these physicians was representative of the discussions that agitated the academic and scientific centres during the period.

Pacífico Pereira was not the only physician to claim that the epidemic in question was flu. This diagnosis was supported by physicians from various countries – the Bahian press gave prominence to those of the Porto Health Office and the Portuguese Director of Public Health, Ricardo Jorge, who believed the world was facing a flu epidemic. In Spain, the diagnosis of flu predominated in the discussions held in sessions of the Madrid Academy of Medicine, though its etiology remained polemical (*Diario da Bahia*, 26 September 1918, p.3). In France, the anatomopathologist Arnold Netter (17 May 1918, p.548) claimed that the flu epidemics of 1889-1890 and 1918 were both caused by Pfeiffer's bacillus.

Since the publication of Pfeiffer's discovery in 1892, many researchers had confirmed his findings, claiming that there was no influenza without this bacillus, yet many others were also unable to verify the discovery in their laboratories or only obtained a partial confirmation (Moses, 1918, p.681). In 1918, periodicals across the world announced that researchers from various countries had isolated Pfeiffer's bacillus in the victims of Spanish flu.

However, in October 1918, the local press reported that studies conducted in Bahia had failed to find Pfeiffer's bacillus (*Diario da Bahia*, 17 October 1918, p.1). Furthermore, the anatomopathological examinations revealed the existence of various kinds of anatomical lesions, which indicated the joint action of various microorganisms. The occurrence of different microorganisms in the blood, secretions and body liquids of patients and victims of the disease contradicted the belief that a specific agent was responsible for this morbid entity. The inconstancy of Pfeiffer's bacillus also caused unease in the medical community and fed the debate in the academic world.

Arnold Netter (1918, p.548-551) contended that the absence of Pfeiffer's bacillus in the autopsies conducted in flu victims was due to technical limitations.<sup>10</sup> Many of these claims, he argued, were related to autopsies conducted on people who had died from secondary infections. Netter emphasized that this was not the practice employed by more experienced observers from countries such as Spain, Italy, France, England and Germany, where the correctly applied technique indicated a single agent – Pfeiffer's bacillus.

From time to time, newspaper headlines announced that researchers had isolated the etiological agent responsible for flu. On October 22 1918, the front page of *O Imparcial* reported that the Italian physician R. Ciauri had discovered the influenza microbe. After an investigation conducted with patients carrying the illness held in the Contoe military hospital, they succeeded in isolating a bipolar bacillus, which they believed to be the specific agent of the disease (Silva, 1919, p.45). Like other researchers, Ciauri was pursuing a bacteria, not a virus (Tognotti, 2003, p.105). The note published in the Bahian newspaper emphasized the contradictions posed by this discovery (Figure 4).



Immediately after publication of this news item, the *Diario da Bahia* (23 October 1918, p.2) transcribed an article by Dr. Nicolau Ciancio, who pointed out the weak points in this discovery, highlighting the small amount of time Ciauri had used to discover the specific agent of the disease given the difficulties inherent to an investigative process of this scope. In order to determine whether a specific microorganism was responsible for causing a disease, the researcher had to obey a series of procedures. According to Nicolau Ciancio,

anyone who knows anything about microbiology is aware that generally a much longer period of time is needed than this to discover a microbe: one week at least for the clinical alarm to be raised; this is followed by questioning, ideas from various research studies, inoculations of laboratory animals, the deaths of the latter, autopsies, examination under the microscope and so on and so forth. And, even so, lucky is the researcher who discovers a new microbe.

Physicians like Prado Valladares postulated a different hypothesis: the etiological agent was a filterable and invisible virus found in the blood. This was the viewpoint held by Américo Pires de Lima during a lecture at the Portuguese Medical Association, extensively covered in a report published in the *Diario da Bahia* (26 September 1918, p.3). Pires de Lima emphasized that this proposal was supported by the verification that “the inoculation of blood, even filtered, from a sick patient in a healthy subject is followed by a characteristic attack.” The Portuguese physician highlighted the occurrence of sandfly fever during the dry season due to the appearance of phlebotomi that hated “cold, wind and humidity, which [explained] the climatic predilections of the epidemic” raging through Europe.

This hypothesis matched the proposal of another Portuguese physician and researcher, Carlos França, who had studied sandfly fever since the beginning of the 1910s and had presented a paper on the topic to the Société de Pathologie Exotique de Paris three years later, in 1912 (*Diario de Noticias*, 1 October 1918, p.1). When Spanish flu spread to Portugal, he compared its symptoms to those of the fever in question. He argued that the new disease was provoked by an invisible and filterable agent, like dengue and yellow fever, and was transmitted by the female of a mosquito species. To prove his hypothesis, França proceeded to reproduce the disease experimentally and collect the probable transmitter, sending specimens to the Bahian physician, Dr. Arthur Neiva, then a researcher at the Oswaldo Cruz Institute in Rio de Janeiro, who identified them as *Phlebotomus papatassi* (*Diario da Bahia*, 26 September 1918, p.3).

The supposition that the etiological agent of Spanish flu was transmitted by an insect, in particular by *Phlebotomus papatassi*, was contested by scientists and physicians from various countries. In Spain, Pittaluga rejected the possibility that three-day fever was involved, given that no example of *pappatasi* had been found in Madrid (*Diario da Bahia*, 26 September

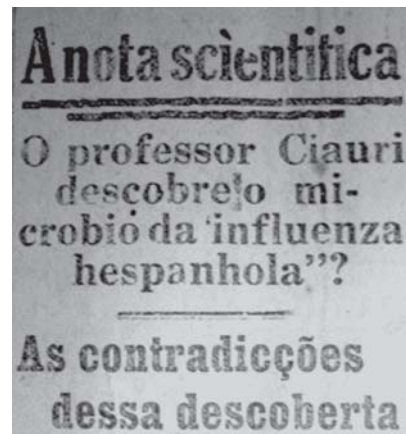


Figure 4: The influenza microbe  
(*O Imparcial*, 22 Oct. 1918, p.1)

1918, p.3). In Paris, Arnold Netter (17 May 1918, p.550) also contested this hypothesis with a similar argument: while *Phlebotomus* was found in Portugal, Spain, Italy and parts of France, it was not present in April, the period when the epidemic erupted.

In Brazil, Henrique Beaurepaire de Aragão, one of the most skilled protozoologists of his time, also opposed the idea of transmission by mosquito. According to him, both pandemic flu and the common cold were caused by a 'filterable virus' and belonged to the group of diseases that did not require intermediary hosts for their transmission (Fontenelle, 1919, p.48; Aragão, 1918, p.355).

The study of the category of pathogenic agents known as 'filterable' or 'ultramicroscopic viruses' began in the 1890s and gathered pace between 1904 and 1914 (Rosen, 1994; Benchimol, 1999; Porras Gallo, 1994).<sup>11</sup> According to Aragão (1918, p.353), nobody believed any longer that "bacteria properly speaking" were the etiological agents responsible for infectious-contagious diseases such as scarlet fever, smallpox, chickenpox, measles, infantile paralysis (polio) and foot-and-mouth disease. This scientist claimed that these diseases were caused by microbes very different to bacteria – they were provoked by spirochetes or viruses.

In November 1918, *A Tarde* (6 November 1918, p.2) published a short item entitled "In search of the 'Spanish lady' microbe," which reported that the researcher "Henrique Beaurepaire de Aragão, from the Oswaldo Cruz Institute, [claimed] to have found tiny microbes, which appear[ed] to him to be from the group of those produced by filterable viruses." Contrary to the hypothesis that flu was provoked by Pfeiffer's bacillus, Aragão (1918, p.354) argued that from both the clinical and epidemiological viewpoints, flu bore no similarity to a bacteria-provoked disease. According to Aragão, illnesses caused by filterable viruses presented a short period of incubation, as well as extremely high diffusibility and contagiousness. Another argument he raised was the strong intoxication observed in the organism of patients, responsible for weakening their defences and facilitating the occurrence of secondary infections, which comprised a clinical picture typical of a viral disease. Aragão claimed that the flu virus was secondarily associated with other microorganisms, such as Pfeiffer's bacillus, streptococci, staphylococci and pneumococci, which were infallibly encountered in the blood of sick patients (Fontenelle, 1919, p.48-49; Aragão, 1918, p.354-355).

During his investigation undertaken to determine the etiological agent of flu, Aragão (1918) managed to isolate tiny round bodies, probably a strongyloplasm similar to the smallpox virus, trachoma and avian epithelioma (p.355). However, he was not convinced that this was the pathogen responsible for the disease, although it was possible that future research would be able to determine the specific agent.

As well as Aragão, research into the disease's etiology was also conducted separately during the 1918-1919 pandemic at the Oswaldo Cruz Institute of Rio de Janeiro and at its branch in Minas Gerais by Artur Moses and the team formed by Aristides Marques da Cunha, Olympio da Fonseca Filho and Octavio de Magalhães (Moses, 1918, p.681-687; Fonseca Filho, 1974, p.59-60). Artur Moses carried out a variety of experiments on the sputum from patients at his private clinic and at the Pro-Matre Hospital in Rio de Janeiro, with the physician concluding that the pathogen responsible for influenza was a filterable

virus, although he had been unable to carry out tests on humans since the people consulted, fearful of the consequences, had refused to take part in the experiment (Moses, 1918). The research team formed by Aristides Marques da Cunha, Olympio da Fonseca Filho and Octavio de Magalhães demonstrated that the filtrates from the blood and phlegm of recently infected patients reproduced the disease in laboratory animals, concluding that Pfeiffer's bacillus was no more than a germ secondarily associated with the evolution of the illness (Aragão, 1918; Fonseca Filho, 1974, p.61).

Other researchers devoted themselves to investigating the etiology of influenza during the 1918-1919 pandemic: the French scientists Charles Nicolle and Charles Lebailly, from the Pasteur Institute in Tunisia, and Henri Violle and H. Selter in Germany, as well as T. Yamanouchi, S. Iwashima and K. Sakakami in Japan. These scientists also questioned whether flu was transmitted by a virus or a bacterium and demonstrated transmissibility by virus when they succeeded in reproducing flu in humans through inoculations from filtrates of bronchial and nasopharyngeal secretions (Fontenelle, 1919, p.49; Fonseca Filho, 1974, p.60; Tognotti, 2003, p.107). These kind of experiments boosted the evidence that the illness was caused by an invisible and filterable agent, a hypothesis already cogitated by Aléxis Carrel in 1910, Walter Kruse in 1914 and Foster between 1915 and 1916, after prior experiments similar to these (Moses, 1919, p.38; Porras Gallo, 1994, p.323-324). Moses analyzed cultures developed from the nasal mucus taken from patients suffering from acute runny nose and ascertained the presence of corpuscles similar to those of poliomyelitis. He was later able to reproduce the disease in humans using the filtered material collected in subcultures (Moses, 1919, p.38).

As far as can be observed, the effort to determine the etiological agent became a central problem that involved physicians and scientists from all parts of the world. Such discoveries, were they to be confirmed, would provide the medical profession with knowledge indispensable to fighting the pandemic.

However, Henrique Aragão (1918, p.354-355) believed that many of the microorganisms from the category of filterable viruses would never be identified due to their tiny size, since they would perhaps never be visualized. This prediction proved to be correct in terms of the etiological agent responsible for Spanish flu during the period when the pandemic occurred. Despite the investigations taking place in laboratories in various parts of the world, the discovery of the true viral cause would only occur at the end of the 1920, when a strain of the virus was isolated for the first time in pigs. And only in 1933 was a strain related to that found in the pigs successfully isolated in a human patient (Beveridge, 1977, p.4-5).<sup>12</sup>

Thus modern microbiology, which had been able to demonstrate that the external cause of many infectious-contagious diseases were specific microorganisms, proved unable to determine the etiological agent of the pandemic flu.

### **The clinical and sanitary tradition guides Bahian medicine**

While medicine failed to reach any consensus concerning its diagnosis, flu spread throughout Salvador. At the start of October, an article published in the newspaper *A Tarde* (5 October 1918, p.1) warned that the population of the state capital was at risk of

an epidemic that had been causing serious harm due to its virulence and its speed of propagation. According to the report, the epidemic's radius of contamination had expanded to the point of paralyzing factories and reducing the traffic on the Circular Line due to the large number of workers affected by the illness, which had proven to be highly contagious. According to the reporter, however benign the disease might appear, it was still striking. He doubted that it amounted to "a simple passing flu."

A news item published in the *Diario da Bahia* (3 October 1918, p.1) reported that the population was apprehensive about the "indisputably epidemic form" of the affliction whose "clinical nature" was unknown at that time. The reporter argued that its epidemiological profile was being wrongly confused with the disease that the ancients called 'peitorrêia' or 'catarrhal fever.' He argued that the clinical presentation of the latter differed completely from the disease that was currently affecting half or more of the population.

Since the 19<sup>th</sup> century the process of naming a set of signs and symptoms had become a central aspect of both social and medical thought. In our culture a disease does not exist as a social phenomenon until we agree that it exists – until it acquires a name (Rosenberg, 1992).<sup>13</sup> However, it is not easy to fit a disease into a simple definition: it appears as an immediate biological event that activates a repertoire of specific practices and verbal constructions and in this way reflects the institutional and intellectual history of medicine. Simultaneously, it enables the development and legitimization of public polices, helps shape social and individual identities, sanctions cultural values and structures doctor-patient interactions (Rosenberg, 1992).

For those threatened by the epidemic, it was emotionally easier to deal with the recognition that it involved a malign disease than that mysterious and unfathomable affliction. The afflicted person's search for an explanation for his or her drama, for advice that enables a cure for the affliction, can be traced back to the origins of medicine and the role of the medic (Rosenberg, 1992, p.310). The essential aspect of this role is the capacity to give a name to the patient's pain and discomfort.

As the disease's impact on daily life increased, the apprehensions and demands of society for a response from the Bahian authorities and medical establishment grew (*Diario da Bahia*, 3 October 1918, p.1). In the view of the press, the government was paralyzed: it was doing nothing except wait for the physicians to determine the disease's etiology. Although the pathogen responsible for the disease had not been defined, the press urged the government to take the necessary measures to combat it. An article published in the *Diario da Bahia* revealed the population's unease and impatiently insisted: "Spanish or Brazilian influenza, dengue fever, sandfly fever, whatever the illness afflicting us may be, it must be combated" (*Diario da Bahia*, 11 October 1918, p.1).

Despite the pressure from the press, the DGSPB, before adopting any measure, appointed a commission to study the epidemic. The professionals chosen – Frederico Koch, Dyonisio Pereira and Aristides Novis – were representative of the state's medical elite, enjoying considerable renown among their peers and Bahian society alike. As well as being members of the Health Inspectorate, a division subordinated to the DGSPB, they ran clinical practices and were professors of the local Faculty of Medicine. As health inspector for the 15<sup>th</sup>

district, Frederico Koch occupied the Chair of Pharmacology and Pharmaceutics from 1917 to 1919. Aristides Novis taught at the same institution and in 1919 assumed the chair of physiology, also acting as health inspector for the 7<sup>th</sup> district. Dyonisio Pereira was responsible for the 4<sup>th</sup> district.

The commission's objective was to investigate "the nature, spread and gravity of the illness" and present a report with the speed that the circumstances demanded (Koch, Pereira, Novis, 1918). The stance adopted by the authorities, as well as the criticisms and demands published in the press, tell us the extent to which the process of determining the disease had become important. The idea of the disease as a real *ontos*, a rationally organized principle, dominated the reasoning of the Bahian medical and health authorities and provided the basis for socially indispensable tasks such as diagnosis and prognosis, prophylaxis and therapeutic practice.

The 'Spanish lady' disembarked in Salvador during a period disrupted by political disputes, a financial crisis at state and municipal level, and strikes among teachers and workers. At the same time, rising prices, falling wages, unemployment and a housing crisis contributed to widen the spectre of poverty, fomenting the occurrence of poverty-related diseases, such as beriberi, and the action of other transmissible and infectious diseases, such as tuberculosis, smallpox, yellow fever, malaria and bubonic plague.

The continuing action of diseases deemed to be more dangerous than flu reduced the importance of the latter in the eyes of the local authorities. Although flu had always been present in Salvador's nosological statistics, the number of deaths arising from the illness since the 1895 epidemic was insignificant compared to the mortality rate caused by diseases like dysentery, malaria, plague, smallpox, yellow fever and above all tuberculosis. It is worth pointing out that during the period under study, the control of diseases such as smallpox and yellow fever was of special interest to both the federal and state governments, even though the means for combating them remained incipient.

Aware of this reality and the limitations faced by the public authorities, the groups opposing the state government, looking to advance their position in Bahian politics, exploited the outbreak of the flu epidemic to question the competence and suitability of the group in power and discuss a topic on the agenda of the national elites – public health as a sign of civilization and progress. On the other hand, the divergences and uncertainties concerning the disease's etiology and diagnosis, which raged through the world's scientific and academic worlds, occupied the pages of the Bahian newspapers. The media pressurized the relevant authorities to offer an explanation for the affliction and take the measures needed to contain the epidemic. In addition to the complexity that these elements added to the process of accepting and recognizing the epidemic, we also need to consider the time factor – flu was propagated at a speed inversely proportional to the time needed for society to absorb the fact and take the measures needed to control it.

The physicians who made up the commission were aware of the role that they represented in this context. Faced with an epidemic that was spreading with unusual speed and virulence, provoking fear among the public, and with the local political disputes and the disagreements among physicians and researchers, they needed to display a secure, competent and agile posture.

The commission decided to conduct a clinical investigation in a number of Salvador's public and private corporations and institutions where people were agglomerated – barracks, factories, asylums, schools, boarding schools and so on. After examining more than five hundred patients, the physicians concluded that a new disease was not involved, though it was frightening due to the “novelty or the effects” (Koch, Pereira, Novis 1918, p.150). It was flu or influenza “periodically observed in Bahia with its customary benignity,” although it was developing during that period “with a morbid radius of much greater scope” (p.151).

The physicians making up the commission were aware of the complexity involved in identifying a specific microorganism as the cause of a disease, a task which would require the researcher to fulfil a series of time-consuming demands and procedures. As well as the various difficulties involved in completing all the stages and procedures needed for this kind of scientific investigation, time was something the physicians did not possess. They believed that the studies conducted up to then in the world's most prestigious scientific research centres answered the key questions concerning the disease's etiology, pathogeny, symptomatology and so on. Hence they had no doubts concerning the pathogen with which they were dealing – *Haemophilus influenzae* – discovered by Pfeiffer in 1892 and repeatedly confirmed by renowned scientists. This had also been the option taken by the medical and health authorities of various other countries where the flu had broken out.

The medical commission observed that in Bahia the flu was manifested in its most common clinical form – respiratory – sometimes with mild gastrointestinal disturbances. The disease took hold quickly and generally those affected presented a temperature rise from 38° to 40°C, inflammation of the upper airways, myalgia, headaches and weariness. These symptoms could worsen, but under treatment they would fade, tending to disappear in three or four days.

The physicians also made use of epidemiological criteria – they observed the distribution of the disease in the population and considered its prevalence during a particular part of the year, evaluating the number of new cases. As the incidence had increased, they concluded that an epidemic was unfolding.

For the medical commission, the dissemination of the disease across the city was due to the flu's extreme contagiousness and capacity to spread. These characteristics were favoured during this period by the “overcrowding of various collective habitations, which thereby constituted clear foci for irradiation of the epidemic” (Koch, Pereira, Novis 1918, p.151). The team of investigators also considered the instability of the meteorological conditions to be an important factor – sudden changes of temperature, atmospheric pressure and humidity predisposed the organism to the pathogen's effect.

Although studies had established that the flu outbreak was not dependent on the influence of the weather or the seasons, it was known that determined temperature and humidity conditions favoured the proliferation of the pathogen – low temperatures, relatively high humidity, or a combination of both, helped propagate the infection (Phillips, Killingray, 2003, p.5). Based on this premise, the medical commission claimed that the disease would not assume “another, virulent nature” in Bahia, given that its climate was “inappropriate to the disastrous exploits of Pfeiffer's diplobacillus” (Koch, Pereira, Novis, 1918, p.153).



The physicians making up the commission were highly experienced professionals and based themselves on theories already well-established in the scientific and academic world. Even so, on issuing their report, they made a point of emphasizing that both the diagnosis and the prognosis were grounded on the clinical evidence they were able to assemble in the short space of time demanded by the circumstances. The proviso was justified since while on one hand the capacity to distinguish, define and name a set of signs and symptoms legitimizes the curing practice and the status achieved by the medical practitioner, on the other it constrains the latter, not only because of the circumstantial nature of this knowledge, but also because of the adjustments that continually need to be made to the diagnosis and the guidelines for treatment (Rosenberg, 2002, p.253).

Despite the perplexity caused by the virulence of a disease that until then had manifested in a benign form, public opinion was reluctant to doubt the capacity of these men of science to unveil the mystery surrounding the causal agent of flu. Although they criticized the slowness of the process, given that this was a life and death issue, the Bahian press took pains to emphasize: "It should not be thought, however, that we are capable of doubting the skills and proven competence of these illustrious physicians ... who have taken on the task of conducting the clinical studies on the epidemic" (*Diario da Bahia*, 3 October 1918, p.1).

According to Álvaro de Carvalho (1916), during this period Bahia had already seen "a progressive evolution of clinical practice, beginning with training and the broadening of its fundamental physical-chemical base, both in terms of funds for diagnostic research and for curative procedures" (p.213). Clinical practice absorbed everything that came its way: doctors made use of thermometers, microscopes, laryngoscopes and ophthalmoscopes in their diagnoses, as well as blood and urine exams and other means of testing and analysis, while also making use of bacteriological and experimental investigations (Lopes Piñero, 1985, p.111). To this end, it contributed to the academic training of medical professionals, who from their first years at the Faculty of Medicine of Bahia began practical classes in the wards of hospitals and the annexed laboratories where they conducted the examinations for the clinical cases under study (Carvalho, 1916, p.218). These cases were presented to medical associations, discussed among peers and then published in specialized periodicals, thereby disseminating the knowledge produced during the period.

When the 'Spanish lady' struck Bahia, the state was already home to the Oswaldo Cruz Institute of Bahia, dedicated to bacteriological research, microbiology and parasitology (Moniz de Aragão, 1920, p.116). According to the account of State Governor Moniz de Aragão, in 1918 "156 different microscopic and bacteriological examinations [were conducted] to elucidate diagnoses," meeting the requests not only from physicians working for the public health system, but also from other doctors (Moniz de Aragão, 1919, p.64).

Anatomopathological investigation was another common practice among Bahia's physicians. During the epidemic, Mario Andrea dos Santos, a state health inspector and Professor of Anatomy and Pathological Physiology at the Faculty of Medicine, examined the lungs of seven people killed by flu. The physician concluded that the alterations found in the respiratory apparatus of the victims had resulted from the inflammatory process observed in bronchopneumonia and pneumonia, which confirmed the

macroscopic examinations conducted at the Nina Rodrigues Institute (*Diario de Noticias*, 26 October 1918, p.1).<sup>14</sup> However, such exams contributed little or nothing to elucidating the pathogen responsible for the disease. Both the results obtained through autopsy on the corpses of the ‘Spanished’ and those derived from bacteriological analyses indicated other avenues, though these already carried the seeds of doubt with them.

Nonetheless, as we have seen, the Bahian physicians were well aware that the flu was highly contagious and propagated rapidly. They knew that infected individuals became disseminating agents by expelling contaminated sputum or spittle into the environment (*Diario da Bahia*, 29 October 1918, p.1). During this period, the notion had already been acquired that many diseases were propagated by direct contagion. According to the physicians and professor of the Faculty of Medicine of Bahia, Gonçalo Moniz (1921, p.371)<sup>15</sup>:

These ... disease-inducing germs ... can live in the external environment only with difficulty and for a short time. Consequently, the principal foci of the agents producing infectious diseases and the natural habitats and environments for cultivating these microorganisms are men themselves, the sick, the convalescent or the healthy carriers of these animate beings. Thus in a residence containing a person suffering from any of these diseases in acute, chronic or vectorial form, the disease will be more easily transmitted and the number of people infected will be greater the more promiscuity there is between the same.

Thus the commission appointed to study the epidemic unfolding in Bahia suggested that the places or events where people were brought into close proximity should become a target of medical attention and sanitary action – places of leisure, theatres, cinemas, markets, lifts, trams, churches and temples, boarding schools, barracks and so on needed to be systematically disinfected; the streets would have to be constantly irrigated to prevent dust from irritating the airways; and meetings would be discouraged (Koch, Pereira, Novis, 1918, p.153). Spaces of social conviviality, such as places for leisure or religious meetings, or work and residential environments, including collective housing – doss-houses, rest houses, asylums, boarding schools, hostels and hotels, etc. – were seen as important foci for the propagation of the disease.

As mentioned earlier, the physicians attributed the speed with which the epidemic spread through Salvador to overcrowded accommodations, a phenomenon that had grown considerably during the decade in question (Koch, Pereira, Novis, 1918, p.152). According to reports printed in the newspapers, the city had been transformed into a hospital with whole blocks invaded by the flu. A news item published in *O Imparcial* (16 October 1918, p.1), for example, reported that there was not a single house in Salvador which the affliction had not penetrated with some degree of virulence.

Along with these general prophylactic measures, the commission’s members also recommended that people should take care of their own personal hygiene: they should avoid crowded and confined spaces and, as a precaution, use disinfectants in their upper airways. They prescribed “applications of vaseline containing menthol or gomenol in the nostrils and gargle with phenosalyl or oxygenated water” (Koch, Pereira, Novis, 1918, p.153).

The medical and health authorities, however, recognized the relative impotence of the recommended actions. The protective and restrictive measures had little or no effect. The disease would propagate even if all social and commercial relations were prohibited, a ban

practically impossible to enforce in a port city whose economy was based on trade in exports and imports. The physicians argued, however, that although the recommended actions “would not stifle the affliction,” they would contain its development due to the relative protection they offered (Koch, Pereira, Novis, 1918, p.153).

### **Final considerations**

When the Spanish flu epidemic struck, national and international political and economic pressures meant that diseases such as plague, smallpox, cholera and yellow fever occupied a central place on the agenda of the local authorities in detriment to flu – a disease considered benign by Bahia’s medical and health institutions. Hence when asked to explain the affliction that spread through Salvador in epidemic form from the first weeks of September 1918, the medical establishment strove to calm the population and minimize the risks, reinforcing the idea that this was a familiar and benign illness.

However, the lack of agreement in the opinions of European physicians, who had been dealing directly with the epidemic cases, in relation to the nature, causes and mechanisms of the pathogen in question caused perplexity among local physicians and the public in general. Moreover, it reinforced the disposition among the health authorities to name a team of physicians to investigate the disease and offer an informed opinion on the matter. This measure seemed prudent, even it contributed to delaying the decision making.

Amid the political disputes and divergences agitating the international academic and scientific world, the professionals appointed to investigate the epidemic disease needed to display confidence, competence and adroitness to the wider public, establishing not only the diagnosis but also the prophylactic and therapeutic measures. They were aware of the considerable visibility given by the press to the event, especially those sections of the media opposing the government. On the other hand, they knew they had little time to investigate the disease compared to the speed with which the epidemic was propagating in Bahia.

Guided by a well-established Bahian clinical and sanitary tradition, the commission decided to focus on the clinical and epidemiological investigation. After a study conducted in various collective workplaces and residences, it concluded that the disease spreading through Salvador was flu or influenza, already clinically described in studies accumulated over the course of previous epidemics. Having produced the diagnosis, they considered the problem of the etiology resolved – the pathogen responsible for the flu was Pfeiffer’s bacillus.

Aware of the flu’s contagiousness, they recommended the adoption of various individual and collective hygienic practices that could help reduce the lifespan of the pathogen and limit its dissemination. Though recognizing the specific causality of the disease, they considered that the material conditions of existence were also important factors in the resistance of the human organism to infections.

The physicians making up the commission were members of the DGSPB and were familiar with the living and health conditions of the poorest sections of the local population. The precarious housing conditions, exhausting work loads, poor diet and daily hygiene

habits were all everyday issues for the physicians involved. Aware that these and other factors contributed to the incidence and propagation of illnesses such as flu and to the emergence of complications during the course of the disease, they argued for the adoption of public health measures focused on the poorest sectors of Bahian society who were unable to provide for their own treatment, as well as proposing that the public health service should concentrate on the places where people lived or mingled in closer proximity.

Hence, as we can see, the actions of the Bahian physicians was not only conditioned by the epidemic crisis in itself, but also by the professional, sociocultural and political context in which they were inserted.

## NOTES

<sup>1</sup> Created in 1866 at the initiative of the physicians making up the initial core of the Bahian Tropicalist School – Wucherer, Paterson and Silva Lima –, the *Gazeta Médica da Bahia* played an important role in divulging medical knowledge and technology. On the topic of flu, the findings of clinical and bacteriological research and the courses and lectures given on the subject over the period in question were published in the following issues of the periodical: *Gazeta Médica da Bahia*, n.21, 1890, p.334-338; p.354-373; p.433-434; n.22, 1891, p.548-557; n.23, 1892, p.92; p.425-427; p.459-461; n.27, 1895, p.234-237/257-272; n.27, 1896, p.325-329 (cf. Sant’Anna, Teixeira, 1984).

<sup>2</sup> Edler (2002, p.359) argues that 19<sup>th</sup> century academic medicine was marked by the dispute between three distinct sociocognitive schools of thought: the anatomoclinical school, whose institutional space was the hospital; medical topography, linked to statistical methods and hence pejoratively called study medicine; and experimental medicine, based in the laboratory.

<sup>3</sup> Porras Gallo (1994, p.297-332) suggests that clinical and epidemiological criteria had dominated the diagnosis of flu since the 18<sup>th</sup> century when it acquired existence as a morbid species. The author cites the ‘diagnostic grounds’ of the Spanish physician Codina during the eruption of the 1918-1919 pandemic in Madrid: “general etiology, form in which the process starts, diffusibility of the disease, clinical features, localization, course followed and termination.”

<sup>4</sup> The question of the similarities and/or differences between flu and dengue became a theme of many debates, articles and studies, lasting until the 1918-1919 pandemic.

<sup>5</sup> Although this was the usual classification at the time, there were other forms, as the physician and professor of the Coimbra Faculty of Medicine, Epiphânio Marques (1890, p.359), tells us: inflammatory, nervous and bilious; abdominal, thoracic and encephalic; convulsive; syncopal; haemoptoic; delirious; eruptive; paralytic; epileptic; rheumatismal; with three further gradations: light, common and serious. Also see Britto 1895, p.260.

<sup>6</sup> It was commonly accepted that flu mostly killed elderly people, giving rise to the popular name ‘limpa-velhos’ (roughly: ‘clearer-of-the-elderly’). Contradicting this thesis, the 1918-1919 flu was benign among old people – most became cured – and severe among individuals aged between 15 and 40 years (cf. Silva, p.44).

<sup>7</sup> When the flu broke out in Spain, the news was widely reported by the Spanish and world press and the authorities quickly recognized its existence (Porras Gallo, 1997, p.71-72). The same did not take place in the other European countries where the disease broke out. Differently to Spain, these countries were involved in the First World War and their press were focused on the conflict, as well as being heavily censured (Echeverri Dávila, 1993). Hence since Spain was the first country to give the alarm, it appeared to everyone that the epidemic had originated there. From then on it became known as ‘Spanish flu.’ At the time, Pacífico Pereira stated to the *Diário da Bahia* (29 October 1918, p.1) that the name derived from “Spain’s neutrality in the great world conflagration,” which had provided flu with easier access to the Iberian peninsula “from where it left to invade Africa, Brazil and probably the whole of South America.”

<sup>8</sup> A disease caused by an invisible and filterable agent, like that of dengue or yellow fever, which was transmitted through the bite of the female of the mosquito species *Phlebotomus papatasi* (*Diário de Notícias*, 1 October 1918, p.1).

<sup>9</sup> Since the final years of the 19<sup>th</sup> century, various research studies had shown or had investigated the possibility of diseases being transmitted by insects, either in mechanical form or as intermediary hosts for

microorganisms, including those then described as viruses invisible to optical microscopes and capable of passing through filters that retained the smallest bacteria (Benchimol, 1999, p.396; Porras Gallo, 1994, p.323).

<sup>10</sup> Netter had succeeded in isolating the bacillus in 16 out of every 26 times in which he had examined the expectorate; in 5 out of every 7 times in which he had observed the contents of the bronchi in autopsies; 4 out of every 8 times in pulmonary liquid taken while the patient was still alive; 2 out of every 12 times in haemocultures; and 1 out of every 10 times in the purulent liquid flowing from the pleura (Netter, 17 May 1918, p.548).

<sup>11</sup> Prowazek and Lipschütz, using a delicate technique, managed to isolate the virus from the category of the chlamydozoa and strongyloplasms (Aragão, 1918, p.353). For their part, Noguchi and Flexener succeeded in cultivating the agents of poliomyelitis and trachoma.

<sup>2</sup> Richard E. Shope, from the Rockefeller Institute of Comparative Pathology in Princeton, New Jersey, successfully demonstrated that the virus could be transmitted between pigs through filtered material. Shope's work gained fame in England was taken up by Wilson Smith, Christopher Howard Andrews and P.P. Laidlaw from the National Institute for Medical Research in London. These researchers conducted similar experiments with weasels: they inoculated them with material filtered from secretions take from the trachea of people infected during the human influenza epidemic of 1933, and managed to reproduce the illness in these animals (Beveridge, 1977, p.5-9).

<sup>3</sup> According to Porter (2004, p.100), studies conducted by Laënnec, Pierre Louis and others in the first half of the 19<sup>th</sup> century helped to consolidate the concept that illnesses were specific entities, 'real things.' Rosenberg (1992, p.306) claims that the access to healthcare is structured around the building of legitimacy within a consensual diagnosis. Concepts of disease imply the constraining and legitimizing of individual behaviours and public policies.

<sup>14</sup> The Nina Rodrigues Medical-Legal Institute (IMLNR) was created in 1906 by Oscar Freire and was so named in a homage given by the Meeting of the Faculty of Medicine of Bahia to the Professor of Legal Medicine, Raimundo Nina Rodrigues, who died that same year at the age of 44. The IMLNR functioned for more than sixty years next to building of this traditional school, at the time located at the Terreiro de Jesus. In December 1911 a decree ordered the reorganization of the official legal reports service, making Oscar Freire the first director of the IMLNR. The Institute's responsibilities included the forensic reports on the deceased – tanatology (necropsy and exhumation), identification of corpses and physical anthropology, as well as the realization of complementary examinations of interest as legal proof (cf. Souza, 2007).

<sup>15</sup> Gonçalo Moniz (28 January 1870-1 June 1939) was considered by his peers to be one of the greatest exponents of medicine based on experimentally-derived etiological knowledge. He became a professor of the Faculty of Medicine in 1895, presenting a qualification thesis entitled *On disease immunity (a general study)*. He then inaugurated a career focused on studies in the field of microbiology. In 1899 he set up and ran the Office of Bacteriological Analyses and Research of Bahia. He published various studies on the bubonic plague and tuberculosis. During the Spanish flu epidemic, Gonçalo Moniz was the head of the Office of the Interior, Justice and Public Instruction, subordinated to the DGSPB (cf. Souza, 1949, p.192-193; Souza 2007).

## REFERENCES

- ARAGÃO, Henrique de B.  
A proposito da gripe. *Brazil-Medico*, Rio de Janeiro, ano 32, n.45, p.353-356. 9 November 1918.
- BACILLO...  
Bacillo da influenza. *Gazeta Medica da Bahia*, Salvador, n.23, p.73-76. 1892.
- BARRETO, Maria Renilda N.  
*A medicina luso-brasileira: instituições, médicos e populações enfermas em Salvador e Lisboa (1808-1851)*. 2005. Tese (Doutorado em História das Ciências da Saúde) – Casa de Oswaldo Cruz, Fundação Oswaldo Cruz, Rio de Janeiro. 2005.
- BARRETO, Maria Renilda N.  
*Nascer na Bahia do século XIX – Salvador (1832-1889)*. Dissertação (Mestrado em História) – Faculdade de Filosofia e Ciências Humanas, Universidade Federal da Bahia, Salvador. 2000.
- BENCHIMOL, Jaime Larry.  
*Dos micróbios aos mosquitos: febre amarela e a revolução pasteuriana no Brasil*. Rio de Janeiro: Fiocruz; UFRJ. 1999.

- BEVERIDGE, W.I.B.  
*Influenza: the last great plague*. London: Heinemann. 1977.
- BRITTO, Alfredo.  
Contribuição para o estudo da 'gripe-influenza' em 1985. *Gazeta Médica da Bahia*, Salvador, n.27, p.234-237, 257-272. 1895.
- CANON, P.  
Sobre um microorganismo no sangue dos doentes de influenza". *Gazeta Médica da Bahia*, Salvador, n.23, p.459-461. 1892.
- CARVALHO, Álvaro de.  
Aspecto atual da clínica na Bahia. *Gazeta Médica da Bahia*, Salvador, n.48, p.213. 1916.
- CROSBY, Alfred W.  
*America's forgotten pandemic: the influenza of 1918*. Cambridge: Cambridge University Press. [1989].
- CUNHA, Aristides et al.  
Estudos experimentais sobre a influenza pandêmica. *Brazil-Medico*, Anno XXXII, n. 48, p. 377-378, 1918.
- DICIONÁRIO...  
*Dicionário histórico-biográfico das ciências da saúde no Brasil (1832-1930)*. Rio de Janeiro: Casa de Oswaldo Cruz/Fundação Oswaldo Cruz. Available at: <http://www.dichistoriasaude.coc.fiocruz.br>. Accessed on 17.03.2007. [2000].
- ECHEVERRI D'ÁVILA, B.  
*La gripe española: la pandemia de 1918-1919*. Madrid: Siglo XXI. 1993.
- EDLER, Flávio Coelho.  
A Escola Tropicalista Baiana: um mito de origem da medicina Tropical no Brasil. *História, Ciências e Saúde – Manguinhos*, Rio de Janeiro, v.9, n.2, p.357-385. May-August. 2002.
- EDLER, Flávio Coelho.  
A medicina acadêmica imperial e as ciências naturais. In: Heizer, Alda; Videira, Antonio Augusto Passos (Org.). *Ciência, civilização e império nos trópicos*. Rio de Janeiro: Access. p.97-122. 2001.
- EDLER, Flávio Coelho.  
*As reformas do ensino médico e a profissionalização da medicina na Corte do Rio de Janeiro (1854/1884)*. Dissertação (Mestrado em História Social) – Universidade de São Paulo, São Paulo. 1992.
- FERREIRA, Luiz Otávio.  
Das doutrinas à experimentação: rumos e metamorfoses da medicina no século XIX. *Revista da SBHC*, Rio de Janeiro, n.10, p.43-52. 1993.
- FERREIRA, Nicanor José.  
*Ligeira contribuição para o estudo da gripe*. Tese inaugural apresentada à Faculdade de Medicina da Bahia. Salvador: Typographia d'Estandarte Catholico. 1900.
- FONSECA FILHO, Olympio da.  
*A Escola de Manguinhos: contribuição para o estudo do desenvolvimento da medicina experimental no Brasil*. T.2: Oswaldo Cruz monumental histórica. São Paulo: [n.n.]. 1974.
- FONTENELLE, J. P.  
A epidemia de influenza maligna. *Saude. Bimensário de Hygiene e de Assuntos Economicos e Sociaes. Órgão da Liga Pro-Saneamento do Brazil*. Rio de Janeiro, v.2, p.46-63. January-February 1919.
- FORMAS...  
Formas clínicas da gripe infectuosa. *Gazeta Médica da Bahia*, Salvador, n.21, p.334-434. 1890.
- INFLUENZA.  
*Gazeta Médica da Bahia*, Salvador, n.23, p.92. 1892.
- KITASATO, S.  
Sobre o bacillo da influenza e o modo de cultivar. *Gazeta Médica da Bahia*, Salvador, n.23, p.425-427. 1892.
- KOCH, Frederico; PEREIRA, Dionísio; NOVIS, Aristides.  
A epidemia de gripe: parecer da comissão nomeada pelo Diretor da saúde Publica da Bahia. *Gazeta Médica da Bahia*, Salvador, n.50, p.150-153. 1918.
- LIMA, C.  
Meningite cérebro espinhal epidêmica ou gripe?. *Gazeta Médica da Bahia*, Salvador, n.27, p.325-329. 1896.
- LÓPEZ PIÑERO, José M.  
*Ciencia y enfermedad en el siglo XIX*. Barcelona: Ediciones Península. 1985.
- LÖWY, Ilana.  
*Vírus, mosquitos e modernidade: a febre amarela no Brasil entre ciência e política*. Rio de Janeiro: Ed. Fiocruz. 2006.
- MAIO, Marcos Chor.  
A medicina de Nina Rodrigues: análise de uma trajetória científica. *Cadernos de Saúde Pública*, Rio de Janeiro, v.11, n.2, p.226-237. April-June 1995.
- MARQUES, Epiphanio.  
Gripe e febre dengue. *Gazeta Médica da Bahia*, Salvador, n.21, p.354-373. 1890.
- MONIZ DE ARAGÃO, Antônio Ferrão.  
*Mensagem apresentada à Assembléia Geral Legislativa do Estado da Bahia na abertura da 1ª*



- sessão ordinária da 1ª legislatura*. Bahia: n.n. 1919.
- MONIZ DE ARAGÃO, Antônio Ferrão. *Exposição apresentada pelo dr. Antônio Ferrão Moniz de Aragão ao passar o governo da Bahia ao seu sucessor, o Exmo. Sr. dr J.J. Seabra empossado nesse dia no cargo de governador do estado no quadriênio de 1920 a 1924*. Salvador: n.n. 1920.
- MONIZ, Gonçalo. *Relatório*. Salvador: Imprensa Oficial do Estado. 1921.
- MORDANT, Pierre. La grippe espagnole, 1918-1919: la plus grande pandémie du XX<sup>e</sup> siècle. *Info Respiration*, Paris, n.69, p.25-28, October 2005.
- MOSES, Arthur. Bacteriologia da gripe. *Brazil-Medico*, Rio de Janeiro, ano 32, n.5, p.37-39. 1<sup>st</sup> February 1919.
- MOSES, Arthur. Exposição dos resultados de estudos sobre a etiologia da gripe. *Boletim da Academia de Medicina*, Rio de Janeiro, Sessão de 21 de novembro de 1918, p.681-686. 1918.
- NETTER, Arnold. L'épidémie d'influenza de 1918. *Revue D'Hygiène et de Police Sanitaire/Bulletins de la Soc. Méd. des Hôp. de Paris*, Paris, p.543-553. 17 May 1918.
- NINA RODRIGUES, Raimundo. A epidemia de influenza na Bahia em 1890. *Gazeta Medica da Bahia*, Salvador, n.22, p.548-557. 1891.
- O MICROBIO... O micróbio da influenza. *Gazeta Medica da Bahia*, Salvador, n.21, p.334-358. 1890.
- PHILLIPS, Howard; KILLINGRAY, David (Ed). *The Spanish influenza pandemic of 1918-19: new perspectives*. London: Routledge. 2003.
- PORRAS GALLO, Maria Isabel. *Um reto para la sociedad madrileña: la epidemia de gripe de 1918-19*. Madrid: Editorial Complutense. 1997.
- PORRAS GALLO, Maria Isabel. *Uma ciudad em crisis: la epidemia de gripe de 1918-1919 em Madrid*. Tesis Doctoral – Departamento de Salud Pública e Historia de la Ciencia, Facultad de Medicina, Universidad Complutense de Madrid, Madrid. 1994.
- PORTER, Roy. *Das tripas coração*. Rio de Janeiro: Record. 2004.
- REID, Ann H.; TAUBENBERGER, J.K.; FANNING, Thomas G. The 1918 Spanish influenza: integrating history and biology. *Microbes and Infection*, n.3, p.81-87. Avaiable at: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6VPN-42D82SG-9&\\_user=683565&\\_rdoc=1&\\_fmt=&\\_orig=search&\\_sort=d&view=c&\\_acct=C000036698&\\_version=1&\\_urlVersion=0&\\_userid=683565&md5=2ac334e517b5f47e334e75f7494fa5e5](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VPN-42D82SG-9&_user=683565&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000036698&_version=1&_urlVersion=0&_userid=683565&md5=2ac334e517b5f47e334e75f7494fa5e5). Accessed on: 17 March 2007. 2001.
- ROSEN, George. *Uma história da saúde pública*. São Paulo: Unesp/Abrasco. 1994.
- ROSENBERG, Charles E. The tyranny of diagnosis: specific entities and individual experience. *The Milbank Quarterly*, Oxford, v.80, n.2, p.237-260. 2002.
- ROSENBERG, Charles E. *Explaining epidemics and other studies in the History of Medicine*. Cambridge: Cambridge University Press. 1992.
- SANT'ANNA, Eurydice; TEIXEIRA, Rodolfo. *Gazeta Médica da Bahia: índice cumulativo 1866/1976*. v.1. Salvador: Ed. UFBA. 1984.
- SILVA, Ribeiro da. Gripe pandêmica e gripe nostras. *Brazil-Medico*, Rio de Janeiro, ano 33, p.44-45. 1<sup>st</sup> February 1919.
- SMHB. Sociedade Medica dos Hospitais da Bahia. Relação dos trabalhos apresentados e discutidos no anno de 1918. *Brazil-Medico*, Rio de Janeiro, ano 33, p.25. 21<sup>st</sup> June 1919.
- SOUZA, Antonio Loureiro de. *Baianos ilustres, 1564-1925*. Salvador: Tipografia Beneditina, 1949.
- SOUZA, Christiane M. Cruz de. *A gripe espanhola na Bahia: saúde, política e medicina em tempos de epidemia*. Tese (Doutorado em História das Ciências da Saúde), Casa de Oswaldo Cruz, Fundação Oswaldo Cruz, Rio de Janeiro. 2007.
- TOGNOTTI, Eugenia. Scientific triumphalism and learning from facts: bacteriology and the 'spanish flu' challenge of 1918. *Journal of the Society for the Social History of Medicine*, v.16, n.1, p.97-110. Available at: <http://shm.oxfordjournals.org/cgi/reprint/16/1/97>. Accessed on: 21<sup>st</sup> May 2006. 2003.
- VALDEZ AGUILAR, Rafael. Pandemia de gripe: Sinaloa, 1918-1919. *Elementos*, n.47, p.37-43. Available at: [www.elementos.buap.mx/num47/htm/37.htm](http://www.elementos.buap.mx/num47/htm/37.htm). Accessed on: 13 October 2006. 2002.
- VAN HARTESVELDT, Fred R. (Ed.). *The 1918-1919 pandemic of influenza: the urban impact in the western world*. New York: The Edwin Mellen Press. 1993.

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#### PERIODICALS CONSULTED

*A Tarde*. Salvador. Jan-Dec 1918; Jan-Dec 1919.

*Bahia Illustrada*. Rio de Janeiro, v.2, n.2-12. Jan-Nov 1918.

*Boletim da Academia Nacional de Medicina*. Rio de Janeiro. 1918-1919.

*Brazil-Medico*. Rio de Janeiro. 1918-1919.

*Gazeta Medica da Bahia*. Salvador. 1880-1920.

*Diario da Bahia*. Salvador. – Jan-Dec 1918; Jan-Dec 1919; Jan-Dec 1920.

*Diario de Noticias*. Salvador. – Jan-Dec 1918; Jan-Dec 1919; Jan-Dec 1920.

*O Democrata*. Salvador. – Jan-Dec 1918; Jan-Dec 1919; Jan-Dec 1920.

*O Imparcial*. Salvador. May-Dec 1918; Jan-Dec 1919; Jan-Apr and Jul-Dec 1920.

*O Jornal de Noticias*. Salvador. Jan-Dec 1918; Jan-Dec 1919; Jan-Apr and Jul-Dec 1920.

*Boletim da Academia Nacional de Medicina*. Rio de Janeiro. 1918-1919.

*Saúde: bi-mensário de hygiene e de assuntos economicos e sociaes. Orgão da Liga Pro-Saneamento do Brazil*. Rio de Janeiro, v.2, Jan-Feb 1919.

*Revue D'Hygiène et de Police Sanitaire/Bulletins de la Soc. Méd. des Hôp. de Paris*. Paris. 1918.

