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**THE APPEARANCE OF BUBONIC PLAGUE IN OPORTO, 1899**

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Joao Martins e Silva<sup>1</sup>**Abstract**

A bubonic plague epidemic broke out in the Portuguese city of Oporto in June 1899. Six months later, when it had come to an end, 132 deaths along 320 patients had been recorded. Although it was a city with industrial activity and the precursor of several technological innovations, the hygienic and sanitary conditions of the population of Oporto at that time left a lot to be desired. These features certainly made it easier for the plague to spread, which was detected by unusual deaths in those residing in dilapidated and dirty houses by the river Douro. Ricardo Jorge (1858-1939), the municipal doctor at the time, did not hesitate in stating that the outbreak showed clinical, epidemiological and technological signs of bubonic plague. Civil authorities and the press played down the event for more than a month. Finally, by order of the Government, a wide cordon sanitaire was established around the city, to prevent the spread of the epidemic to the rest of the country. As this resolution was not welcomed by the population, traders, and medical associations, the Government was forced to remove the city siege. Ricardo Jorge, who discovered the cause of the disease and was the main individual promoting the sanitary measures carried out, decided to abandon Oporto and settle in Lisbon after being unfairly misunderstood and subject to persecution.

**Keywords**

Oporto; bubonic plague; epidemic; cordon sanitaire; sanitary measures

**Résumé**

Une épidémie de peste bubonique a éclaté dans la ville portugaise de Oporto en juin 1899. Six mois plus tard, une fois terminée, 132 décès et 320 patients ont été enregistrés. Bien que ce fût une ville avec une activité industrielle et le précurseur de plusieurs innovations technologiques, les conditions d'hygiène et d'hygiène de la population de Oporto à cette époque laissaient beaucoup à désirer. Ces caractéristiques ont certainement facilité la propagation de la peste, qui a été détectée par des décès inhabituels chez ceux résidant dans des maisons délabrées et sales au bord du fleuve Douro. Ricardo Jorge (1858-1939), alors médecin municipal, n'hésita pas à déclarer que l'épidémie montrait des signes cliniques, épidémiologiques et technologiques de peste bubonique. Les autorités civiles et la presse ont minimisé l'événement pendant plus d'un mois. Enfin, sur ordre du Gouvernement, un large cordon sanitaire a été établi autour de la ville, pour empêcher la propagation de l'épidémie dans le reste du pays. Cette résolution n'ayant pas été bien accueillie par la population, les commerçants et les associations médicales, le gouvernement a été contraint de lever le siège de la ville.

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Ricardo Jorge, qui a découvert la cause de la maladie et a été le principal promoteur des mesures sanitaires prises, a décidé d'abandonner Porto et de s'installer à Lisbonne après avoir été injustement mal compris et soumis à la persécution.

### **Mots clés**

Porto; peste bubonique; épidémie; cordon sanitaire; mesures sanitaires

### **Introduction**

In 1899, about 300 years after the last major epidemic in Oporto, an epidemic of plague broke out in this city. The source of the outbreak was never clarified, though it was listed as an expansion of the Third Pandemic, which had started in China in the middle of the 19<sup>th</sup> century. This pandemic, like the earlier ones, had as its infectious agent the bacterium <sup>(1-3)</sup>. The discovery of the infecting bacteria, as well as the infection vulnerability of rats and other small rodents, was attributed to Alexandre Yersin (1863-1943), then on duty at the Pasteur Institute in Hong Kong <sup>(4)</sup>. The process of disease transmission was unclear, the restriction of movement in countries where there were outbreaks of plague was recommended. Three years later, Paul-Louis Simond (1858-1947) identified the flea as the main vector of transmission of the plague from rats to men <sup>(5)</sup>. Until 1899, Oporto was the last European city to have been hit by bubonic plague. The existence of endemic foci in Asia and Africa through maritime and passenger intercommunication might be the focus of plausible contamination in Oporto <sup>(6)</sup>.

This essay focuses on the discovery, development, and the economic and social consequences of the epidemic, and highlights the decisive contribution made by Ricardo Jorge (1858-1939), at the time municipal doctor and professor of Hygiene and Forensic Medicine of the Medical Surgical School of Oporto in the diagnosis of plague in the implementation of local public health control measures.

### **Early signs of illness and sanitary measures**

On 4 July 1899, an Oporto trader alarmed by several deaths which had recently occurred on Fonte Taurina Street (a long filthy narrow road dating from the fourteenth century, running along the Douro river quay), sent a note to the municipal doctor, Ricardo Jorge, advising him of this occurrence. On the first observation, he found that the death certificates associated with those deaths which had been reported referred to banal causes of illness. After gathering local information on the incident, he discovered there were additional people sick with fever, some of them with axillary bubo. By confirming this information on the spot, he concluded that the situation was an epidemic focus for a serious disease, centred on that route <sup>(7)</sup>. He immediately notified the civil authorities of the situation, and the clinical director

of the Hospital de Santo António was required to isolate the examined patients urgently.



Figure 1-Graphic reproduction of the Hospital de Santo António. Author: Alberto. In: Manuel M. Rodrigues, "Hospital da Misericórdia do Oporto", *Occidente*, 7:243246, 1884. Courtesy: Hemeroteca Digital da Câmara Municipal de Lisboa.

<b>Table I</b>
<b>Health and information measures instituted by the Municipality of Oporto</b>
<p><u>1- Sanitary</u></p> <ul style="list-style-type: none"> <li>- Construction of public toilets for personal hygiene (free public baths);</li> <li>- Use of municipal disinfection station;</li> <li>- Use of hospitals and isolation centres for patients infected with plague;</li> <li>- Establishment of a public sanitation body for street cleaning, funeral pickets, disinfection, isolation, closure or fire disposal of uninhabitable or contaminated houses;</li> <li>- Extermination of rats (and fleas);</li> <li>- Administration of serum and vaccination against plague;</li> <li>- Autopsy of all suspected or confirmed cases</li> </ul> <p><u>2- Statistics bulletin, with daily information about the epidemic</u></p>

Sanitation and prophylactic measures were activated (Table I). House owners and tenants were coerced into cleaning contaminated housing, after repeated insistence, after this had been met with great reluctance. On 7 July some information in the press referred to disease and the measures taken, though without any mention of a possible epidemic.

The epidemic was reported to have started about a month previously in residents of three adjoining houses on Fonte Taurina Street, mostly shippers and their relatives from Galicia (Spain). The disease had progressed insidiously and gone unnoticed, having been confused with typhus or typhoid fever by different doctors <sup>(8)</sup>. The condition had generally evolved with fever, severe prostration, gastrointestinal changes and massive ganglion engorgement (buboes) in the armpits and groins.

Of the seventeen cases of which Ricardo Jorge was then aware, and had observed with the symptomatology and evolution that raised no doubt as to the nature of the disease, six had died. In addition, there were other patients who, because they had revealed suspicious symptoms or who simply known about by information from third parties, were awaiting further study. Thus, on 9 July, Ricardo Jorge was fully convinced that the clinical picture indicated bubonic plague. This information was reiterated in two reports sent (on 12 and 28 July) to the city authorities and the Government, along with a critical analysis of the living, working and social circumstances that had favoured the spread of the epidemic in the city <sup>(9)</sup>.



Figure 2-Patient with bubo in the left groin. Unidentified author. In: Paul-Louis Simond "La peste, ses causes et ses remèdes", Le Mouvement Thérapeutique et médical, N°6. Juin 1901. Courtesy: Institut Pasteur/Archives Paul-Louis Simond.

The sanitation problems detected in the city particularly affected a zone close to the river (known as “medieval Oporto”, such as the Sé, São Nicolau, Vitória and Miragaia quarters) where about 1/3 of the population of Oporto lived. This overcrowded zone was characterized by degraded housing, without minimum health and hygienic conditions<sup>(8,9)</sup>. Much of its inhabitants had been attracted to the city by the industrial development which had been recorded in Oporto since the second half of the nineteenth century, particularly in cotton textiles.

The growing expansion of this proletariat along with their families, coupled with the parallel real estate speculation of the landlords, led to a severe housing crisis and a virtual inability to lease by the poorest<sup>(10,11)</sup>. They were left to settle in degrading and filthy conditions, whether on floors or quarters of the old city, on slender three- and four-level buildings separated by narrow paths, known as “*colmeias*” or on lots of small single-storey or one-room dwellings, the “*ilhas*”, usually located at the back of middle-class homes<sup>(12,13)</sup>.

In these dark, smoky, foul-smelling neighbourhoods, humans sometimes cohabited in the small ground-floor space with domestic animals. Lacking any water supply and sanitation facilities, these dwellings provided all the conditions to host outbreaks of disease, in particular tuberculosis and plague<sup>(13-17)</sup>.

Although there had been no official statement regarding the aetiology of the epidemic, rumours were rife in the city and in certain elements of the press that it was bubonic plague. Although this had not been confirmed, this was a source of great surprise leading to inevitable insecurity and panic in a population aware of the successive seasonal or occasional, and often deadly, epidemics that had devastated the city during the nineteenth century<sup>(17-18)</sup>.

The fact that the epidemic had not come unobtrusively, without the signals that the collective memory conveyed of the devastating plague pandemics of the medieval past, preceded by rat and other rodent epizootics, explained that neither the general population nor some doctors accepted the clinical diagnosis advocated by Ricardo Jorge.

By raising doubts about the nature of the disease, the source of the epidemic was unknown. If maritime, it would have come by sea from Asia. However, the eastern goods that had entered Oporto since 15 May had arrived from northern European countries, where there were no signs of the disease, and had remained there for months before being transported to Portugal.

Likewise, there was no news that vessels from India, China or other regions had docked in Oporto<sup>(19)</sup>. However, although with some credible opposition, the possibility of the epidemic having spread through the cargo of the *City of Cork* ship, which often made its way to Oporto from other European posts, was insistently disseminated<sup>(20-22)</sup>.

On its previous voyage, that ship had left London on 13 May and arrived in Oporto coming from Newport on 5 June<sup>(23)</sup>.

## Confirmation of the plague diagnosis

There was an urgency to identify the disease-causing microorganism quickly, but all attempts to isolate the contaminant that had been tested by Ricardo Jorge proved unsuccessful. The scant number of patients registered in the first weeks of July gave him hope that the epidemic was over; however, about two weeks later, it would break out in the centre and highest points of Oporto, mostly in relatively clean, hygienic housing or shops. However, the affected patients were usually servants and clerks, poor people with a difficult life, and rarely their employers <sup>(24)</sup>.

Finally, on 8 August, from the pus collected from one patient's bubo, Ricardo Jorge was able to isolate the bacterium *Yersinia pestis* <sup>(25)</sup>, confirmed two days later by Professor Câmara Pestana in another sample of the same patient.

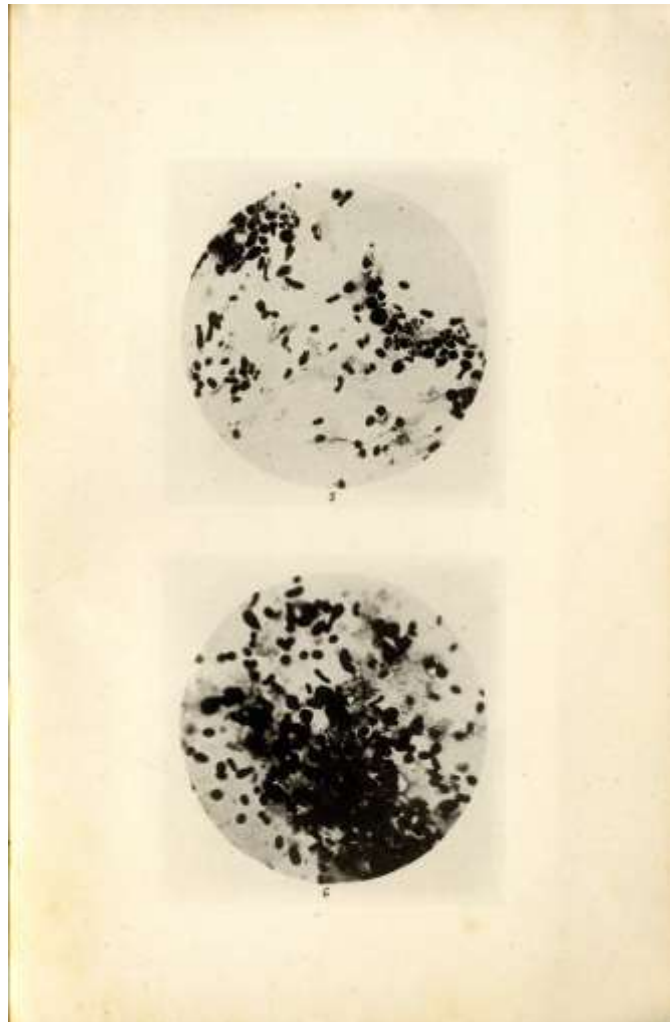


Figure 3-Microscopic observations of the plague bacillus identified by Professor Ricardo Jorge (1899).  
Author: António Plácido da Costa. Courtesy: Museu de História da Medicina "Maximiano Lemos" da Faculdade de Medicina da Universidade do Porto.

The Society of Medicine and Surgery of Oporto, presented with the evidence, took away the doubts of the most sceptical who thus supported the diagnosis.

Subsequent inoculation of these cultures on rats and guinea pigs proved to be very virulent and deadly. The method of bacterial collection was progressively diversified, in buboes (in vivo) or all types of human ganglia and viscera (by autopsy), in the blood of humans with septicaemia and ganglia of infected animals (cats and rats) <sup>(26)</sup>. The detailed information obtained from these results was only provided to the official bodies in a report dated 17 August. By the end of this month, 54 plague cases had been detected, resulting in 23 deaths (42.5% mortality rate).

One month later, these values rose to 120 patients, with 41 deaths (34.1% mortality). It was hypothesised that there were further undiagnosed cases (about 1/5 of the total reported by September 29), either because they showed an irrelevant clinical picture, or died without medical care or had not been notified. <sup>(27)</sup>. Overall, the percentage of deaths from the plague was much lower than that of other causes in the same period <sup>(28)</sup>. The epidemic turned out an attenuated form of the disease.

Bruised by the doubts that had beset his countrymen and the contradictions and scant support of local authorities and the Government with regard to the epidemic, it seemed to Ricardo Jorge that the diagnosis would have to be corroborated by foreign experts who were familiar with the disease. Given this, the Pasteur Institute, with extensive experience in the research and preparation of plague sera and vaccines, was invited to send a medical mission from that institution.

Between August and November, besides the French mission, many doctors arrived in Oporto to study and follow the evolution of the epidemic, most of them sent by their governments or institutions, namely from Spain, Germany, Russia, Italy, Norway, Sweden, Great Britain, and The United States of America.

While in Oporto, those doctors were able to collect and culture plague bacteria on available samples, and to compare their results with the original *Yersinia pestis* specimen, which had been isolated in the Ricardo Jorge laboratory, and with that following by the French team. The identification among the various samples was total, thus confirming the previous diagnosis (clinical, epidemiological and bacteriological) advocated by Ricardo Jorge <sup>(29-31)</sup>.

### **Official confirmation of the plague epidemic in Oporto**

After the first reports received from Ricardo Jorge indicating the existence of an outbreak of an epidemic in Oporto, and the lack of availability of further hospital admittance at the Hospital de Santo António, the Government decided to support some of the health measures already promoted or requested by the Oporto County, namely the adaptation and activation of a tent hospital for the isolation and treatment of plague patients, together with other measures, including means of transporting the sick, sanitation of the city, sanitary inspection, disinfection services, compliance with

current public health and legal provisions, demolition or upgrading of buildings as well as buildings harmful to public hygiene. Precautions against the epidemic were extended to all districts of the country, hoping to prevent the spread of the epidemic (32).



Figure 4-Incineration by firefighters of houses contaminated by the plague, in an "island" of Oporto. Author: Aurélio da Paz dos Reis. Courtesy: Centro Português de Fotografia.



Figure 5-Municipal disinfection service car with a special corporation of fire brigade disinfecting mattresses with disinfectant spray as they are removed from the vehicle. [MS.02952]. Author: Guedes. Courtesy: Museu de Saúde- Instituto Nacional de Saúde Doutor Ricardo Jorge.





Figure 6-Photograph of patient being transported in an animal-drawn carriage by five salvation corps staff [MS.02950]. Author: Guedes. Courtesy: Museu de Saúde- Instituto Nacional de Saúde Doutor Ricardo Jorge.

Concern about the public health problems occurring in Oporto, and the potential risk of their spreading throughout national territory had led the Government to demand that all civilian governors in the country strictly comply with sanitary provisions. However, certain elements of the national and foreign press were critical of the situation in Oporto <sup>(33-35)</sup>.

On 17 August the Government officially announced the existence of a bubonic plague epidemic in Oporto <sup>(36)</sup>. Subsequently, a set of restrictions on the city's communication with the outside were imposed, namely: (a) Suppression of excursion trains, fairs, pilgrimages and other gatherings that led to the entry or exit of holidaymakers in or from the city of Oporto; (b) Medical inspection of all train passengers and staff leaving Oporto; anyone with suspicious symptoms of plague was prevented from travelling; (c) Travellers' luggage and goods were disinfected on departure from Oporto; goods which did not have such treatment were carried by sea; (e) Passengers in transit carried a bulletin containing the results of such inspections; (d) Passengers in transit had a guide containing the results of the inspections to present at the destination.; (e) Passengers and train staff had to report to the medical inspection within nine days of arrival; the inspection was carried out in Lisbon by the health sub-delegate and, in the remaining destinies, by the municipal party doctor; (f) Passengers with suspected signs of illness were referred for isolation in hospital facilities, lazarettos or wards, as available locally; g) The responsible for

any place of accommodation would have to report daily to the police the origin of all individuals who settled there;

(h) Violators of the previous provision were subject to penalties of qualified disobedience and a fine, and, when found in contravention, immediately arrested, until they tried.

About a week later, the Government decreed the isolation of the city of Oporto by military forces. The project which had been approved consisted of a large terrestrial and marine cordon, which was officially active between 27 August and the end of December 1899 <sup>(37)</sup>.

In order to ensure public defence against the epidemic, it was established that people, luggage and goods coming from Oporto could only leave the cordon at predetermined locations. Plans were set in motion to install a lazaretto for the prior quarantine and disinfection of those who wanted to leave the city. Those violating the rules which had been laid down were subject to fines and imprisonment of three to six months, even without being charged.

About a month later it became clear that the carriages taking the passengers coming from Oporto had to be identified abroad. Passengers could disembark only at the stations stated in their bulletins. Those who reported or captured passengers who had avoided health inspection were rewarded. Concealment of patients with plague or those suspected of the disease was also punished. The population was instructed on individual and domestic defence against bubonic plague, and were issued notices and preventive legal texts for transportation, hospitalization and disinfestation, which in the following months added financial support for sanitation works in several cities in the Kingdom.

### **Reaction of Oporto institutions and population to the sanitary cordon**

Admittedly, much of the illiterate population and most of the disadvantaged classes reacted in response to their living difficulties and with little knowledge of the cause. However, a part of the more enlightened and economically savvy public also doubted the seriousness of the situation, or contested the sanitary measures imposed <sup>(38)</sup>.

Moreover, the inhabitants, and in particular trade and industry associations, seemed more concerned with the economic consequences of the blockade than with the course and spread of the epidemic <sup>(39, 40)</sup>. The city was being deprived by all kinds of necessary goods, including food, and was also prevented from exporting local products, especially to the north of the country and abroad. Faced with this situation, most of the representatives of commerce, industry and city owners held a first large meeting on 25 August near the Stock Exchange building, to assess the economic effects caused by the isolation of the city <sup>(40)</sup>. This type of meeting was repeated almost daily in the following weeks. Their resulting conclusions, sent by telegram to the civil authorities of the district and Government, and complaints about the progressive worsening of the situation, called for precise, sensible and effective

instructions regarding the movement of passengers and goods out of the city. The president of the Government would usually give reassuring answers regarding the forthcoming resolution of the claims submitted, but these did not soon materialise.

Following this governmental attitude, the commerce commission, as well as the mayor, resigned on 1 September, and three days later the city's industrialists had shut down the factories and trade and industry strikes followed. The redundancies following the closure of shops and factories, plus the famine, fear of the future and the depression that set in among those most affected by these decisions, led to the natural worsening of the social situation <sup>(41, 42, 43)</sup>.

On the same day, it had determined the installation of the sanitary cordon, the Government appointed a medical commission that, sent from Lisbon, was in charge of presenting a report on the type of disease existing in Oporto, sanitary conditions in the city and the effectiveness of the measures provided in the meantime, for their improvement, and advice on any changes to be made in defence of public health <sup>(44, 45)</sup>. In other words, it seemed that the Government wanted to postpone the necessary solutions.

Once the mission had been accomplished, the commission presented a report of what it had observed to the Government. It also proposed a set of measures, namely, reduction of the cordon to facilitate medical inspection; (b) Locating medical posts on the way out; (c) Restoration of trains, together with medical inspection and disinfection of passenger baggage, goods and foodstuffs from Oporto; (c) Installation of a disinfection station in the port of Leixões and (d) The abolition of quarantine in the other national seaports for the goods sent there <sup>(46)</sup>.

These proposals, fully supported by the Lisbon Society of Medical Sciences and the Oporto Commercial and Industrial Associations, were ignored by the Government that, after hearing the Consultative Health Advisory Board, decided to maintain the sanitary cordon, in line with previous facts. This attitude caused great indignation on the part of the medical profession of Oporto and the referred commission, the reason why, in a telegram sent to the King, he was invited to visit and to verify the uselessness of that measure, and to undertake the resignation of the that Health Board. Other individuals and medical societies also pronounced negatively on the exaggerated rigour or the actual implementation of the sanitary cordon <sup>(47-49)</sup>.

### **Sanitary cordon failure**

The Government's decision to isolate the city of Oporto during the period of the epidemic had been made with the intention of preventing the spread of the plague to the rest of the country. These attempts would soon be thwarted after four months of the cordon.

In addition to weak compliance by the population with the institution of sanitary measures, several factors contributed to the failure of the sanitary cordon. On the one

hand, the carelessness and/or insubordination of certain technical and civic personnel responsible for executing and enforcing sanitary precautions systematically challenged the preventive intentions established <sup>(50)</sup>. The sanitary cordon, which was set up on 23 August, took about ten days to install, so that between 20 000 and 40 000 (out of 180 000) of the Oporto population would have been able to get ahead of the plague and also perhaps food shortages and popular riots. They drove away from the city by road or rail, which provided access in unchecked areas <sup>(51-53)</sup>. However, even after it was established, the sanitary cordon was quite permeable, so the occurrence of new plague cases in September, outside the cordon limits, namely in Barcelos, Braga, Guimarães, Santo Tirso, in some villages of the Douro, and along the Oporto-Lisbon railway, raised concern for an epidemic with unforeseen dimensions <sup>(54)</sup>. All communications between the Portuguese coastal and islands ports had been interrupted <sup>(55)</sup>. The cordon proved ineffective and counterproductive. Members of the foreign medical expert missions present in Portugal also firmly rejected the application of the sanitary cordon, which supported the position of the sanitary commission sent to Oporto, that of the medical scientific societies of Oporto and Lisbon, and supported the complaints by the Oporto press, traders and industry associations <sup>(56, 57)</sup>.

Perhaps decisive for the popular rejection of the cordon has been the news, reported by the periodical press, about the International Sanitary Conferences on the methods of containing major epidemics. At the 10th Conference in Venice, 1897, scientific consensus had been reached as to the nature of the infecting agent, the participation of small rodents in its spread, and the uselessness of sanitary cordons and lazarettos <sup>(58)</sup>.

Pressured by the chorus of protests against such an economic and social debacle, the Government decided to prepare a lighter set of reforms to be implemented as soon as possible. To achieve this objective, it appointed an inspector for the health services of Oporto, whose mission was to combat and prevent the spread of the plague, to map out better coordination (until then distributed between the municipal services and the civil governor of that city) and to centralise the fight against the plague <sup>(59)</sup>. This governmental resolve was supported by major investment, and was considered a good omen for an indispensable and urgent sanitary reform of the city and for the replacement of the cordon by a system of inspection and disinfection of people and luggage <sup>(60-62)</sup>.

Changes were emerging, albeit somewhat slowly. Between early September and the following two months, the list of goods banned from being exported from Oporto was substantially reduced <sup>(63)</sup>, compulsory hospitalization of patients was replaced by isolation in their homes (perhaps coinciding with the further spread of the epidemic) <sup>(64)</sup>, and in early November the sanitary cordon was replaced by patrolled inspection posts, plus a set of measures recommended by national and international societies and commissions, in accordance with the needs of the city's commercial and industrial

institutions <sup>(65, 66)</sup>. Furthermore, merchants sought to avoid the isolation and damage of the city <sup>(67-69)</sup>.

## Press intervention

In a common movement of ignorance and ill will, which started in the areas of Oporto most affected by the epidemic, the population refused to report patients, to transport them to isolation and hospital treatment, and to participate in disinfection measures <sup>(70, 71)</sup>.

It is plausible that the revolt of Oporto population was heightened by certain more aggressive elements of the local periodical press, which, since mid-August, had not spared governmental authorities, and continued to minimise or disbelieve the existence of a plague epidemic in the city <sup>(72-74)</sup>. This position, often biased and pessimistic on the part of some press, created an atmosphere of revolt among the population, as it connected the epidemic with "a disease" caused by the poor hygiene of working-class neighbourhoods and by the daily inclusion in its pages of the total number of inpatients and deaths, and the number of companies closed and workers made redundant.

From another perspective, the representatives and population of Oporto refused to accept the impositions of the Portuguese town, which they accused of being conservative and centralizing <sup>(75, 76)</sup>.

Meanwhile, the press suggested that the Government intended to publicly restrict the plague to the city of Oporto, so as not to damage Lisbon and the rest of the country's communication and trade with other international markets <sup>(77)</sup>. On the other hand, the cordon imposed on Oporto was defended in the editorials of certain elements of the Lisbon press, which invoked the good of the country and opposed local and partisan interests, and governmental uncertainties and compromises <sup>(78)</sup>. This type of positioning by certain newspapers in both cities would eventually spill over into reckless, iniquitous, mutual accusations.

On 6 September, the Portuguese Industrial Association, in addition to requesting the easing of the measures imposed on Oporto by the Government, took the opportunity to protest the false news published by certain newspapers of that city, which attributed the sanitary measures decreed to pressures made by traders which would benefit from the loss of Oporto markets <sup>(79)</sup>. Likewise, the Oporto Society of Medicine and Surgery disagreed with the style and content of the news published at the time by the local press, as it contributed to the "madness of the public" <sup>(80)</sup>. For its part, the Association of Portuguese Doctors advised the public not to be alarmed by the news in the newspapers <sup>(81)</sup>.

Faced with this situation, the Government decided to sanction those responsible for the dissemination of "false news about the plague epidemic or which challenged the measures taken to combat it, which delegitimised public authorities and which

insulted their agents". Magazines or newspapers that disregarded the points mentioned were to be suspended for as long as it seemed convenient and, if this were repeated, would be suppressed <sup>(82)</sup>.

Only one of the newspapers was punished on the grounds that it created even more confusion and controversy in the city by publishing an interview with the newly-returned former Portuguese health director of Macao, allegedly experienced in the fight against frequent epidemics of plague in that territory <sup>(83, 84)</sup>.

In this interview, and in later public statements and in a book, that doctor devalued the situation, understanding that it could not be an epidemic but an endemic, given the low patient mortality. He also doubted that the laboratories in Oporto were capable of accurate bacteriological diagnosis, and added criticism to local and governmental authorities for the harshness and ineffectiveness of the measures they had instigated <sup>(85, 86)</sup>. Such statements gained him great popularity among the institutions and individuals of Oporto who opposed the nature of the disease and the sanitary measures imposed by the municipal doctor and the Government <sup>(87, 88)</sup>. On the other hand, those unfortunate comments were widely criticised by most of the national medical class and by foreign doctors present in Oporto <sup>(89, 90)</sup>.

### **International repercussions of the Oporto plague**

The knowledge of the above-mentioned breaches, the public contestation and disrespect for the measures recommended by the Board of Health, and other negative aspects related to the way in which the prevention and fight against the disease evolved, crossed borders. As soon as the Government officially communicated that there was a plague in Oporto to foreign governments, the exports it sent via the pier in Leixões (to various European and American markets to which they were usually shipped) were substantially affected. Brazil (from 11 July), Spain, Greece and Denmark, for example, imposed quarantine on all maritime transport arriving from Portugal, while Norway and Egypt restricted it only to that coming from Oporto, while others limited themselves to following the resolutions of the Venice Congress (e.g. Austria, Belgium) or establishing health precautions (e.g. Germany, France, Italy, Russia and Sweden) <sup>(91)</sup>.

It became known that the English Government, as soon as it became aware of the official confirmation of the plague epidemic in Oporto, gave instructions for their ships departing from Southampton not to call at this city <sup>(92)</sup>. At the end of September, US authorities prescribed compulsory disinfection control for all articles coming from any port in Portugal. The Government of Spain decided to provide restrictions on all traffic of persons and goods across the common land border <sup>(93-95)</sup>. Passengers (including many Spanish holidaymakers who frequented Portuguese beaches) were subject to medical inspection and disinfection at the borders between the two countries, and the entry of those with apparent signs of plague was prohibited <sup>(96, 97)</sup>.

## **Serum and vaccine prevention and therapy**

The early results obtained by Yersin with an antiserum were very positive <sup>(98)</sup>, despite his subsequent studies and those of other researchers proving contradictory <sup>(99, 100)</sup>. When the French delegation of the Pasteur Institute arrived in Oporto on 3 September with instructions to assess the curative and preventive value of the anti-pest serum, only two patients with very modest doses had been inoculated, one of whom had died <sup>(101)</sup>.

Ricardo Jorge decided to propose a scientific evaluation of the preventive and curative efficacy of serums and vaccines then available against the disease, which was immediately authorised by the appointment of an international commission made up of some of the doctors present in Oporto <sup>(102, 103, 104)</sup>. In the light of the results of its various trials, this committee gave immediate consent to the use of anti-pest serum on all patients admitted thereafter to Bomfim Hospital <sup>(105,106)</sup>.

During the aftermath of the catastrophe, it was found that of the 320 patients registered between June 1899 and February 1901, 132 succumbed, including Professor Câmara Pestana (1863-1899) <sup>(107)</sup>. His death on 15 November 1899 was felt with regret at home and abroad, and he received multiple honours <sup>(108, 109, 110-112)</sup>.

At the end of 1899, the press reported the epidemic in Oporto had declined since November, and the emergence of cases of the disease in Lisbon. In the early 1900s, the disease became rare and the last patient was admitted to the Bomfim Hospital on 16 January <sup>(113, 114)</sup>.

## **Ricardo Jorge and the reorganisation of the Public Health system**

As the social situation worsened or was not compensated for by concrete solutions for a worsening epidemic, virtually any event that interfered with the life of the population, especially the poor, served as a pretext for almost daily riots. The popular mood, hitherto more directed toward challenging government decisions, eventually concentrated on growing defamation, discrediting, persecution and even personal aggression against the health authorities seeking to isolate and treat it.

There were unbelievable situations of persecution and even stoning of sanitation and hearse personnel (sometimes required to perform their duties under cover of the night and in different journeys), police escorts and disinfection cars, and hospital gatekeepers <sup>(115, 116-120)</sup>.

Protesters believed that the plague was brought or spread by the doctors themselves, which made it difficult to accept and/or enforce established health measures. Thus, the main targets of popular rage became the national and also the foreign doctors, who fought against the epidemic. All were held responsible for having diagnosed or corroborated the existence of a disease which no one wanted to believe or accept, and therefore rejected the sanitary measures imposed, which were considered inconvenient by all <sup>(121- 124)</sup>.

**Table II**  
**Manifestations of non-compliance and revolt regarding the  
sanitary procedures instituted**

- (a) Escape from disinfection;
- (b) Refusal of vaccination, treatment and hospitalization;
- (c) Rejection of isolation of family members in contact with patients and belongings;
- (d) Concealment of plagued patients;
- (e) Attempted burial of plague dead without prior medical certificate;
- (f) Stoning of health personnel and their homes.

Ricardo Jorge, considered the main target of the contestation, was even accused of malevolence (the popular insinuation should be recalled that he spread plague rats at night in the gutters, with the intention of poisoning the city's water supply), was assailed in the streets and threatened with lynching, and there was a serious life-threatening situation when a mob approached him and his family at his residence, and they were saved through intervention of the Municipal Police cavalry <sup>(125)</sup>.

The threatening situation to which he had been subjected, particularly since the establishment of the sanitary cordon (a measure which he had indeed always opposed), led to Ricardo Jorge moving to Lisbon on 15 October 1899 <sup>(126)</sup>.

The sanitary needs evidenced in the fight against the epidemic called for an urgent reorganization of the public health system, which had started to be planned by that doctor while at the head of the Oporto Public Health Services, and was later implemented when in Lisbon, as General Health inspector <sup>(127, 128)</sup>.

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