

Seamen, Surgeons and Empire: Spanish Naval Medical Reform and Mexican Medicine in the Late Colonial Period

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Como la curación, y asistencia de los Enfermos sea uno de los mas recomendables objetos que han merecido el cuidado del Rey, por lo que interesa su Real servicio, y por la piedad con que su Soberana clemencia propende siempre al desempeño de tan sagrada atención, sin perdonar gasto alguno, dirigido al restablecimiento de la salud que han perdido, dispuso S.M. se erigiesen en America Hospitales de cuenta de su Real Hacienda...'

(As the treatment and care of the ill is one of the most commendable objectives that has merited the attention of the King, in the interest of his royal service, and given his mercy and sovereign clemency that prevail always in the fulfilment of such sacred tasks, without sparing any expense to restore the lost health of the ill, H. M. ordered the erection of hospitals in North America to be funded by his Royal Treasury.)

The eighteenth-century reorganization of the Spanish navy brought important consequences to Mexico. Among them were the birth of the modern hospital and the formalization of surgical education. The transformation of the traditional hospital from a charitable institution run by the clergy to a specialized medical care centre staffed by professionals, began in Veracruz with the establishment of the Hospital de San Carlos. The formalization of surgical education centred on the Escuela de Cirugía founded in Mexico City. This article will analyze both as a direct result of the naval medical reform taking place in the mother country, while also exploring the factors contributing to this transition. Yet despite the efforts of the authorities, the results were questionable. While a lack of funding and the mysteries of disease transmission impeded a drastic improvement in the quality of care for another century, the infrastructure and concept of the modern hospital was in place.

The naval supremacy that Spain had enjoyed during the years of exploration and conquest had long since foundered and the number and quality of vessels reached its lowest point at the turn of the eighteenth century. To regain its place as a maritime power, Spain began to rebuild its navy. To this effect, in 1719 the new Bourbon monarch, Felipe V, appointed Jorge Patino, first as Intendant of the Navy and later as Minister of the Navy and

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the Indies. Patifio began his enormous task by overseeing the building of fifty-eight *navios* (warships) and nine frigates to protect trade lines and defend the key points in the Spanish Caribbean, as well as by founding the Spanish Marine Infantry with training centres at Cadiz and Barcelona. Patino's work was continued by his successor, Zenon de Somodevilla, Marqués de la Ensenada, who by 1746 became Minister of War, Navy, Finance and the Indies. Ensenada followed a more aggressive policy, increased the number of *navios*, improved their quality and organized much needed medical services.²

The authorities had long been aware of the ravages of disease on board the vessels as well as in American ports, especially in the Caribbean. As contemporary records show, most naval and military casualties were not caused by war but were the result of the dreaded "fevers," especially *vómito negro* (yellow fever). Aware of the urgent need to improve and expand existing medical facilities and to train the required personnel, the chief surgeon of the Cadiz Royal Naval Hospital, Juan de Lacomba, began to offer anatomical instruction to prospective naval surgeons.³ This modest beginning in Spain would lead to medical reform in New Spain. Reform was carried out in two different but simultaneous and complementary stages. First, the improvement of health care institutions began in Veracruz and signalled the slow transition from the medieval hospital based on the ideal of Christian charity to the modern medical care institution. Second, the formalization of surgical training was the consequence of the former, as the need for trained personnel resulted in the founding of the Mexican School of Surgery. Both stages reflect the trends of the time: increasing crown control over spheres previously reserved to the clergy, the establishment of royal supremacy over traditional privileges (such as those of universities and the medical board) and administrative centralization in the hands of naval and military authorities.

The choice of Veracruz to begin hospital standardization and centralization was hardly surprising. Since its establishment, Veracruz had been the principal port and a key commercial and strategic focus of New Spain. Its location, however, left much to be desired, and the city had to be relocated three times. The tropical climate of the Nueva Veracruz, as the port came to be known, varied only in winter, when dreaded strong winds known as *nortes* brought storms and cool winds that often delayed a fleet's departure. The oppressive heat and humidity, and the shallow rivers and surrounding marshes, combined to produce less than sanitary conditions, making the entire lowland area famous for its often lethal "putrid fevers."⁴ The severity of the situation and the growing number of sick and destitute people forced the authorities to seek a solution.

The first hospital, San Martín, was established in 1569 on the island of San Juan de Ulúa under the auspices of Viceroy Martín Enriquez. The friars of the Order of Charity, best known as *Hipólitos*, took the hospital under their care and provided succour for seamen, the King's slaves, soldiers and prisoners. Originally supported by public charities, San Martín was soon granted a financial subsidy and ten black slaves supported and clothed by the crown. In 1584, by orders of Viceroy Pedro Moya de Contreras, the hospital began to receive an annual income of 700 gold pesos from the *averia* revenue (500 to help cover daily expenses and 200 for medicines), that was later raised to 1000 pesos by Viceroy Conde de Monterrey.⁵ In 1614, the hospital was relocated to Nueva Veracruz and renamed San Juan de Montesclaros in honour of its benefactor, the Viceroy Conde de Montesclaros. The old hospital of San Martín was then turned into a small twelve-bed infirmary.

A royal *cédula* of 1679 extended the services of the newly founded hospital of Montesclaros to the royal and merchant marine and established a rudimentary and somewhat

confusing system of medical insurance to finance it.⁶ Vessels arriving with the annual fleet spent an average of eight months in the port and had to pay the hospital one peso per month for each crew member, while local merchantmen were to contribute a seaman's salary or *soldada* per crew member.⁷ Similarly, army personnel stationed at San Juan de Ulúa contributed one *real* a month from their salaries. These contributions entitled the crews to medical care during their stay in port. On the other hand, the Armada de Barlovento and the military personnel stationed at the *presidio* (fort) of Veracruz were charged four *reales* per month for each patient.⁸ Finally, the crown contributed 1 1/2 *reales* a day for the medical care of each sick prisoner and royal slave.⁹

In addition to the forced contributions of its beneficiaries, the hospital raised funds from plays and "licit games" offered in the enclosure adjacent to the hospital. The friars also depended on private donations in the form of cash, income from several rental properties left to the hospital by pious benefactors, and regular private donations by merchants and other local residents, such as the store owners, clock makers, merchants, tailors, carpenters, and scribes.¹⁰ Individual contributions varied from two *reales* to five *pesos* and amounted to approximately fifty-seven *pesos* per month."

Despite crown provisions, private donations, and the fund-raising efforts of the friars, the income of the hospital remained insufficient. As contemporary documents illustrate, royal grants were not paid punctually and often private and royal vessels left without paying their fees.¹² The situation grew worse as the seventeenth century progressed, the feared *vómito negro* became endemic, and demands on the hospital increased.

The eighteenth century brought important changes to Veracruz. Population growth and a flourishing economy were accompanied by the expansion of trade. Agricultural products such as sugar and cochineal found eager buyers in Europe, while the exports of the flourishing textile centres of Celaya, Cholula, Texcoco and Cuernavaca rose and made their way to Veracruz. Most important was the mining boom that characterized late colonial Mexico. Silver purchased the many important imports, such as German clocks and furniture, French mirrors and Italian glassware. The abolition of the fleet system in 1778 increased the port's commercial activity by attracting local and international merchants. As a result, Veracruz's permanent population increased from approximately 3000 before the middle of the seventeenth century to 8000 in 1742 and 16,000 in 1803.¹³ The port also accommodated a large floating population of seamen, immigrants, travellers, muleteers, and in the second half of the eighteenth century, army personnel. The number of transients varied according to economic trends and imperial politics dictated by the contentious international climate. The changing demographics were reflected in the number of admissions at San Juan de Montesclaros. In 1679, the hospital received 613 patients; from 1726 to 1730, the number rose to an annual average of over 1336 (or a total of 6682); and from 1790 to 1794, an annual average of 1711 cases were admitted. Nonetheless, the budget of San Juan de Montesclaros remained unchanged and, we may assume, the quality of care deteriorated.¹⁴

In 1749, the complaints of the commander of the warship *La Reyna* brought Veracruz to the attention of the authorities. Refusing to send his sick men to San Juan de Montesclaros, the commander forced local officials to open a provisional hospital. An enquiry was launched to calm tempers and satisfy egos, but royal officials were unwilling to address the main source of the problem, which was the lack of funding. An official recommendation clearly indicates that their motives were not based strictly on finances. As the Marqués de la Ensenada pointed out, the ministers of the king did not have control over

San Juan de Montesclaros' budget, adding that "it might be more convenient to establish another hospital." Ensenada ended by recommending that the friars of San Hipólito "be separated from the management of the hospital" and the hospital placed under direct government control.¹⁵ Political decisions, however, were subject to royal finances.

The crown continued to ignore the need to improve medical facilities until 1764, when the war against England forced the Veracruz authorities to accommodate the increased number of patients in two provisional hospitals.¹⁶ Two years later, a study on the possibility and desirability of improving San Juan de Montesclaros was sent to the king. It included a copy of Ensenada's 1751 recommendation and a cost estimate dating from 1730. The latter was based on the number of admissions in the last five years (1726-1730) and the minimum staff (calculated to be twelve friars) required to dispense proper care. The results underscored the dire situation of the hospital and its inadequacy to meet current needs. The report calculated a cost of 2790 *pesos* for the friars' meals and basic expenses (232 *pesos* and four *reales* each), 10,950 *pesos* for the patients' meals and medicines and 3742 *pesos* for personnel and other expenses, or a total of 17,482 *pesos*. As the hospital's combined revenue amounted to 6682 *pesos*, the report concluded that its income was insufficient and larger royal subsidies were imperative.¹⁷

A second, although more costly alternative, was the construction of a royal hospital. In 1766 the military engineer, Miguel de Santiesteban, presented a proposal for a new hospital building that would accommodate 500 patients. The price tag for such an ambitious project was 161,023 *pesos*, an amount the crown was either unable or unwilling to pay.¹⁸ Instead, the authorities continued to deal with the problem on an *ad hoc* basis. In 1764, when a serious yellow fever epidemic broke out in the port, the Hospital de Loreto (the only women's hospital in town) was requisitioned by the authorities. Despite the angry complaints of the friars, its forty-five female patients were moved and Loreto turned into a provisional military hospital with the name of San Joaquin, Maria y José.¹⁹ As the number of epidemic victims increased, patients were shuffled between hospitals when beds became available. Full to capacity, the provisional hospital was forced to send its surgical cases to the old hospital of San Juan de Montesclaros. The situation continued to deteriorate and two weeks later, with Loreto and San Juan de Montesclaros unable to receive any more epidemic victims, the authorities ordered the opening of a sixty-bed provisional ward in the hospital of Bethlem. If the epidemic continued, local officials were ordered to rent a private residence and establish yet another provisional hospital.²⁰ After the emergency subsided, the authorities yielded to the friars' pressure and reinstated the Hospital de Loreto to its original purpose, an institution for women. The provisional hospital of San Joaquin, Maria y José was then relocated to the back of the same building and became the first permanent military and naval hospital in Mexico, the Hospital de San Carlos.²¹ The old hospital of San Juan de Montesclaros, deprived of paying patients and harassed by the local authorities and the medical establishment, was left to serve prisoners, slaves and the destitute.²² In the end, its dismal conditions would justify its closure in 1804.

San Carlos' location left much to be desired. In a marshy area at the far end of the city, it was surrounded by "putrid waters," an ideal breeding ground for mosquitoes that must have made the hospital a source of infection. To make matters worse, the high wall that surrounded the port blocked the sea breeze that, according to contemporary medical belief, carried away the "noxious emanations." The building itself was in poor condition and required renovations to accommodate its patients. In 1779, only seven years after its opening,

its intendant, Pedro de Cossio, successfully petitioned Viceroy Martin de Mayorga for the necessary funding to make further improvements and build a much needed addition.²³ Two years after the completion of the work a much larger expansion was proposed to increase capacity to 1200 beds and provide convalescent wards for 132 men at a total cost of 164,776 pesos.²⁴ It is unclear whether the project was totally or even partially completed.

Topically organized in descending order of importance, with clear categories subdivided into minor points, San Carlos' regulations reflect the rational mind characteristic of Bourbon times and contrast with the one-page *Reglamento* of San Juan de Montesclaros. The document follows the pattern set by previous military and naval regulations, proof of the author's efforts to attain institutional standardization. In fact, the San Carlos *Reglamento* was an adaptation of the 1776 *Reglamento para el Gobierno Interior de los Hospitales Reales de Cuba*, written by Don Nicolas Joseph Rapun, Intendant General of the Real Armada and Treasure of Cuba, to "settle the differences between the royal officials and the friars that serve the Hospital de Bethlem" in Havana. As in Mexico, royal officials in Cuba had complained about the unsatisfactory medical services dispensed by the friars to military and naval patients and requested royal intervention.²⁵ Rapun's detailed regulations were printed by order of the crown and circulated to the other royal institutions in the Americas. In January of the following year, Viceroy Bucareli y Ursúa requested that Pedro de Cossio, Intendant of the Hospital of San Carlos, comment on the regulations and their applicability to the hospital he oversaw. Dutifully, Cossio complied. His handwritten regulations, signed on 24 March of the same year, offer a thorough description of the hospital's routine and administration, as well as a view of prevalent medical beliefs.²⁶ Cossio's manuscript also illustrates the growing gap between the friars' motives and the bureaucrats' expectations; between the traditional charitable institutions and the incipient modern hospital.

Cossio placed the hospital in the hands of a *contralor* (comptroller) whose full-time supervisory duties required him to reside in the hospital. The *contralor* was responsible for the smooth running of the hospital, including administration of the pantry, linen and other supplies and overseeing of hospital personnel. He was entrusted with a master key that he used to lock the building at night to prevent the staff from abandoning their shifts. He was assisted in his administrative duties by the *comisario de entradas*, who also kept patients' records with names, dates of admission, illnesses, relevant medical data, bed number and date of either discharge or death. After these important administrative posts, the regulations listed the responsibilities of the chaplain, who was assigned a secondary status to the administrators. His duties included celebrating masses, hearing confessions and comforting the sick, and giving priority to seriously ill patients. In such cases, medical personnel alerted the chaplain of the patient's serious condition by entering the word "sacraments" on his admission papers.²⁷ Thus, the *Reglamento* reflects the diminishing importance of the clergy in the modern institutions and the increasingly subordinate role of religion to medical science.

The regulations' emphasis on trained medical staff defines the exclusive purpose of the hospital as a medical-care institution. San Carlos employed three physicians chosen from among "those with [the] best credentials" in the city. Each physician was responsible for a third of the medical patients, whom he visited twice a day.²⁸ Medical practitioners also alternated full weekly shifts, remaining in the hospital overnight to deal with emergencies, the immediate care of new arrivals, the inspection of the medicines and their proper administration.²⁹

The surviving records of two of the physicians who served in San Carlos attest to the growing professionalization of hospital practitioners and the crucial role that naval medical reform played in the modernization of Mexican hospitals. Both practitioners were graduates of the Cadiz Surgical College and distinguished themselves for their excellent training, professional abilities and dedication. One was the naval surgeon Florencio Perez Camotto, who held the degree of Doctor in Medicine. Posted to Veracruz, Perez Camotto first served at San Carlos and later became physician of the port's General Hospital of San Sebastian.³⁰ His large personal library, which included the most recent scientific literature published in Europe and the United States, attests to his excellent medical training.³¹ Also employed by San Carlos was Dr. Francisco Hernandez. Licensed to practice medicine and surgery, Hernandez was appointed to San Carlos after nine years of service in Veracruz. His professional experience included appointments as naval surgeon at sea, as well as in North Africa, Cuba and New Spain, where he worked in various provisional hospitals. In 1789, Hernandez became the physician of San Juan de Montesclaros and was later appointed to San Carlos, where he served for at least eleven years.³²

The hospital also employed a surgeon. Accompanied by an assistant, he made his rounds twice a day, the first at either 5:00 or 6:00 A . M . and the second at 2:00 P . M .³³ Only the surgeon performed major procedures, such as amputations, trepanations or removal of kidney stones. The surgical assistant, not qualified to execute any such major operations, was in charge of preparing the required surgical equipment for each operation, dressing wounds and dispensing first aid treatment in the absence of the surgeon.³⁴ As with San Carlos' physicians, its surgeons were well trained professionals with long military or naval careers. One was Juan de Puertas, a graduate of the Colegio de Cadiz, who worked as a substitute surgeon at San Juan de Montesclaros for twelve years before being appointed surgeon of San Carlos in 1772.³⁵ On his retirement, Puertas was replaced by Juan Bautista Crivelli, a graduate of both the Barcelona Surgical College and the medical faculty of the University of Toulouse. As with his colleagues, Crivelli seems to have kept abreast of current medical knowledge by importing the most recent publications.³⁶

The regulations required *practicantes menores* (medical interns) to assist practitioners. Nonetheless, San Carlos employed nurses because, according to its administrator, it was almost impossible to attract qualified hospital personnel to Veracruz. Cossio blamed this on the unhealthy climate and the high cost of living in the port but neglected to include other deterrents, such as the low salaries paid for the strenuous work and the high health risks involved in a hospital job. Thus, the hospital usually hired nurses who were competent in phlebotomy to perform minor procedures such as blistering, the application of enemas, poultices, mustard plasters, and other external cures. They also assisted the physicians' during their rounds, kept records of the patients' meals, medicines prescribed and respective bed numbers, distributed meals and medicines and maintained wards and beds in a clean state.³⁷

While the format of the *Reglamento* reflected the rationalism characteristic of the times, its content was based on the contemporary beliefs of disease, contagion and treatment taught at Spanish surgical colleges. The regulations contributed to the diffusion of current theories among local hospital personnel, ideas that were further reinforced by the surgeons working in Mexico who were familiar with current works on the relation between the environment and disease.³⁸ During the eighteenth century medical theorists began to distance themselves from traditional Hippocratic medicine in favour of nature. They saw diseases as

overlapping forces, the environment as their ultimate source, and air as their primary agent. Such views were summarized in 1752 by the British physician, Clifford Wintringham, who divided diseases into endemic - or those that "owe their Origin to some particular Qualities of the Climate, Air, Soil, Situation, Waters, and the like" - and epidemic, such as smallpox and most fevers. The latter, according to Wintringham, were "Contagious Diseases....capable of being communicated to us by the Air, or produced from the Effluvia of animal, vegetable, or mineral Substances floating in it." Seen as the ultimate cause of epidemics, air also became the means of transmission. A second cause of disease propagation was the stench caused by rotting matter, human or animal waste that was also transmitted through the air. Such beliefs explain the growing importance of sanitation (as understood at the time), the innovative insistence on cleanliness and the emphasis on ventilation and interment.³⁹

Contemporary theories also shaped the physical plant of the hospital. The wards that housed internal medicine or epidemic victims were to be located on the upper floor to avoid their "miasmas" from spreading contagion to other patients. Going against current theories, the old hospital of San Juan de Montesclaros placed its epidemic cases on the ground floor, where "the multitude of patients prevented the renovation of the atmosphere," and its inhalation resulted in contagion. Inspecting practitioners were particularly shocked at the "filthy and enclosed wards that seem dark prison cells" and lacked ventilation. The second floor was not much better. Its limited ventilation "was received from the cemetery that emanated putrid and cadaverous exhalations."⁴⁰ The idea of burial sites as foci of infection was not new in the eighteenth century, but environmentalists emphasized the dangers of keeping corpses interred within the city and promoted their removal to a "safe location" outside the city. Contemporaries considered burials in churches especially dangerous since vaults were repeatedly reopened, thus allowing noxious vapours to escape.⁴¹ To avoid such situations, the authorities forced the friars of San Juan de Montesclaros to close the adjacent cemetery and relocate it beyond the city walls.

Following similar ideological trends, up to 1777 San Carlos was still unable to offer its patients *panaceas* (mercury treatments) on a regular basis. As its administrator explained, practitioners had refused to offer this popular treatment for syphilis because the hospital lacked the required "size and distribution." Thus, the *panacea* was only administered when the physician insisted on it and in an area set aside for such purpose. The problem lay in the "frequent baths" the patient was to have before the mercury applications. Tubs had to be brought into the wards and spilled water dampened the ground, putting other patients at risk. The ill effects from the wet floors were compounded by "the evaporation, vitiated by the mercury, that infests and affects the other patients that have some remnants of venereal humours."⁴²

When ventilation was insufficient to disperse the harmful odours and effusions, hospital authorities had to resort to a chemical treatment of the wards. Simmering vinegar, burning sulphur, tar, tobacco or even gunpowder were recommended to counteract noxious smells.⁴³ In San Carlos, windows were kept open most of the time but in the early afternoon wards were treated with *sahumerios* (burning lavender or other aromatics) because during the time of the siesta "the vapours caused by respiration, insensible transpiration, saliva, urine and other excrements, and the variation of their salts acquire the highest putrefaction." The *sahumerios* "counteracted the action of the salts" and allowed the patients to "perceive the most pure vapours," thus avoiding more illnesses. "As is well known," Cossio added,

"there is a reciprocal commerce between leaving creatures and the atmosphere...[who] receive the same they exhale."⁴⁴

From this medical perspective, the closure of the old hospital of San Juan de Montesclaros was completely justified. The four naval surgeons inspecting the institution agreed that the hospital was "a deposit and reservoir of propagation and seed of the prevalent epidemics" that made it a danger to public health.⁴⁵ An inventory found its furniture "deteriorated" and "impregnated with corruption because of the pestilent stench it emanated." Even one month after its patients had been transferred to another institution, the practitioners felt its wards continued to emanate a "pestilent and insufferable odour that left no doubt of the malignant impregnation they behold and of the great damage that it can cause as it is located, against all regulations of good order and sanitation, in the centre of the city." Furthermore, the "putrid and cadaverous exhalations" from the cemetery contaminated the air, and the "atmosphere" of the hospital was compared to a "malignant focus" that irradiated contagion in all directions and would cause malignant fevers to anybody exposed to it. The physicians believed it was impossible to "renovate" and proposed to demolish the hospital as well as its church "to avoid its infection from reaching any other destination."⁴⁶

Although the causes and transmission of disease were still unknown, many of the new requirements were beneficial. Probably most important was the concern with hygiene, something that was conspicuously absent in previous years. The regulations drawn up for San Carlos insisted on the need to keep beds and wards clean and opposed army cots that could not be cleaned regularly and that resulted in corruption and "fomented...all kinds of impure insects that increase the patient's discomfort."⁴⁷ Unfortunately, lack of funding and other realities made compliance with regulations impossible. Nonetheless, the establishment of San Carlos as a medical care institution with its administrative organization, its employment of qualified personnel, and its emphasis on hygiene were important steps towards the long-term improvement of institutional medical care.

The construction and organization of hospitals to care for the King's men formed only one part of the intended reform. As a larger number of better trained practitioners was needed to staff the royal institutions, hospital reform could not proceed without the reorganization of surgical education. The daunting task of organizing surgical education fell to the Catalonian surgeon Pedro Virgili, an able and well recognized practitioner with a long record of service to the King. After a few years service in the army, Virgili joined the navy to assist Juan de Lacomba, the famous surgeon of the Cadiz hospital. He was later appointed chief surgeon of the Armada de Barlovento's squadron, serving for ten years in the Caribbean. This decade gave him first-hand experience of the medical and surgical needs of life at sea and the demands on the naval surgeon. In 1748 Virgili, by now First Surgeon of the Navy, petitioned the crown to establish a surgical school attached to the Cadiz hospital in order to alleviate the shortage of naval surgeons. The crown enthusiastically approved Virgili's timely proposal, which included a programme that combined theoretical knowledge and practical experience with an emphasis on anatomy. Full-time staff and formal examinations ensured the required academic level, while the school's location gave the students ample opportunity for first-hand experience. Requirements for admission included literacy, knowledge of arithmetic and, in order to raise social standards, *limpieza desangre* (proof of "blood purity" or pure Spanish ancestry).

The Real Colegio de Cadiz opened its doors in 1750 and was soon endowed with its own building, anatomical theatre, library and botanical garden. The crown's preference for

modern, state-controlled institutions over the traditional universities became obvious in 1757, when the Colegio won the right to grant its students the degree of Latin Surgeon (up to this year, only universities could grant this degree) and then obtained permission to license its own graduates without further examination. Formal surgical training was raised to the same level as university education and the Colegio made independent from the *Protomedicato*. The Cadiz College expanded its program to four years and added humanities to its courses. Admission requirements were raised accordingly and applicants were required to have a background in mathematics and natural science (geometry as well as experimental and modern physics), and a knowledge of Latin and logic. To encourage its most promising students, the institution granted a few scholarships to famous medical centres such as Montpellier, Paris, Leyden and Bologna. The Royal Colegio further improved its reputation by becoming a focus of scientific activity through the organization of frequent *actos* or debates that offered students, professors and scientists the opportunity to present their latest research.⁴⁸

Prompted by the success of the Cadiz institution, the crown approved the creation of a new surgical school in Barcelona to cater to the needs of the army. Standardization of surgical education followed when the King approved the new statutes that established identical curricula in both institutions. Yet despite the authorities' best efforts, the Cadiz and Barcelona colleges were insufficient to satisfy the medical needs of the empire; educational reform would have to reach Spain's colonies.⁴⁹

In Mexico, local surgeons were also eager for educational reform and professional improvement. In 1763 Antonio Arroyo, administrator of the Royal Indian Hospital in Mexico, petitioned to establish an anatomical amphitheatre to perform regular dissections like those practised in the Hospital Real of Madrid. Arroyo believed that, in addition to the training of medical and surgical students, the Indian Hospital amphitheatre would promote medicine by helping to understand "the epidemics that originate among the Indians." After some hesitation, Madrid endorsed Arroyo's idea and went further: instead of the proposed amphitheatre staffed by the hospital's surgeons, the crown ordered the establishment of a Real Escuela de Cirugia in Mexico patterned after the Cadiz and Barcelona Colleges. The aim of the new institution would be to create a pool of surgeons to cater to the needs of army and navy personnel.⁵⁰ The two faculty members that were to provide the necessary instruction would be appointed and paid by the crown, while the remaining expenses would be covered by the Royal Indian Hospital. The first appointments fell to Andrés Montaner y Virgili (Pedro Virgili's nephew) for the post of master professor of surgery (*director y catedrático*) and on Manuel Moreno for dissector, assistant and substitute. Montaner y Virgili, a graduate of the Barcelona College and a first-class naval surgeon would receive a salary of 1000 *pesos* a year while Moreno, a graduate and the rector of the Colegio de Cadiz, would be paid 500 *pesos*. The posts of master professor and dissector of the School were later joined to those of chief surgeon and second surgeon of the Royal Indian Hospital, respectively, and their salaries increased accordingly by 500 and 300 *pesos*.⁵¹

When Montaner retired in 1778, Moreno was promoted to first surgeon and, after a long period of indecision, the crown chose Antonio Serrano to fill the vacancy of second surgeon and dissector left open by Moreno's promotion. Serrano, who would later become chief surgeon, was also a graduate of the Cadiz College and had been its rector before being appointed to the Mexican school. Hard-working and conscientious, Serrano would prove an

excellent choice, as his dedication and long years of service would produce a large number of qualified surgeons and improve the standards of the profession in Mexico.⁵²

The first class of the Escuela de Cirugia met in 1769, shortly after the arrival of Montaner y Virgili and Moreno, and anatomical demonstrations began officially on 3 February 1770 in a hospital room set aside by the hospital's administrator, Antonio Arroyo. The curriculum of the Mexican institution was patterned after that of the Spanish colleges. During the first year, students attended courses in anatomy, experimental physics and general pathology. The anatomy course, taught by the physician of the Royal Indian Hospital, was illustrated with wooden or wax anatomical figures and complemented by dissections in which students took active roles. In the pathology class the future surgeons learned how to recognize and define the various illnesses that, following Boerhaave's teachings, were classified according to their differences, causes, signs, symptoms and "accidents."

During the second year, students were introduced to hygiene, surgical pathology and physiology. Hygiene taught the student how to maintain health, to avoid sickness and to enjoy a long life by the "moderate use" of air, food, work, tranquillity, sleep (and lack of it), passions and evacuated or retained excretions. An excess or "bad quality" of any of these factors was believed to affect the desired balance. Pathology gave the student the theoretical background to link symptoms and causes to treatment, while physiology taught him "the functions, movements and changes" of the various organs. During the next two years, the students learned chemistry, botany, "the art of bandages" and surgical procedures, complemented by operations on cadavers.⁵³

Despite their similarities in curriculum and regulations, the Mexican Escuela de Cirugia differed from the Spanish surgical colleges in some significant respects.⁵⁴ The Spanish colegios were institutions attached to either naval or military hospitals, controlled directly by the army and navy and independent from the jurisdiction of the *Protomedicato*. The Mexican school was attached to and supported by the Royal Indian Hospital; its graduates were not military or naval surgeons (although most joined voluntarily) and more important, the Escuela continued to be under the jurisdiction of the *Protomedicato*. Nonetheless, its faculty, as in the case of the Spanish colegios, was comprised of Spanish military and naval surgeons appointed by the crown. The central authorities ensured that the Mexican Surgical School remained in a subordinate position to the Spanish institutions. Throughout its life, the Escuela's faculty was formed by only two *catedráticos* (as opposed to the larger faculties of the Spanish institutions) and its potential was undermined by the increasingly shaky financial situation of the Royal Indian Hospital on which it depended. The Escuela was never granted the status of colegio that the Spanish institutions enjoyed nor was it allowed to examine and license its graduates. Its function remained the preparation of the staff necessary to complement and serve under a core of peninsular military and naval practitioners.

In spite of the Escuela's shortcomings - inadequate funding, limited faculty and capacity - surgical training in Mexico improved. Each candidate had to complete a total of eight years training (four years of courses and four of internship) before he could graduate and obtain a license from the *Protomedicato*. From 1810 to 1819, the Escuela was responsible for the full training of eighty practitioners and the partial training of many more who were unable to complete the program.⁵⁵ Furthermore, the Escuela offered its graduates professional legitimacy and the chance for socio-economic mobility. The contribution of the Surgical School to the professionalization of surgery is best illustrated by the career of José

Miguel Munoz, a graduate who at the turn of the century had earned an excellent reputation as an ophthalmologic surgeon.

Munoz came from a relatively humble family. At twelve, his father's death forced him to seek employment in a small shop repairing umbrellas. Four years later, after his mother died, José Miguel became a barber's apprentice. He obtained his phlebotomist license in 1798 and nine years later graduated as a surgeon. Munoz became a specialist in ophthalmology and also a designer of specialized surgical equipment: a stool with a high back to which the patient's head was tied, a scalpel, hooks to separate the eyelids and other surgical instruments. Contrary to the belief of some Mexican historians, Munoz did not develop this procedure. Originally developed in France, this operation was well known in Spain and included in Domingo Vidal's *Tratados de las Enfermedades de los Ojos*, published as a textbook for the surgical colleges of Cadiz and Barcelona. In Mexico, it had been taught at the Escuela de Cirugia for at least twenty years.⁵⁶

Although probably one of the most successful, Munoz was not the only surgeon to benefit from formal surgical education, as attested by the increasing number of surgeons that graduated each year. This interest in surgery may be explained by the graduates' certainty of a military or naval appointment and by the gradual legitimization of surgery as a profession. Furthermore, the urgent demand for surgeons forced the authorities to relax the requirements for admission to the Escuela de Cirugia. Overruling the enrolment regulations set by the founders of the School, the authorities reduced the requirements to only a baptismal certificate and the testimonials of three witnesses, thereby allowing entrance to applicants of a lower socio-economic level.⁵⁷ Fearing for the institution's reputation, its director complained about such laxity, stating that the Escuela had become "the refuge of many young men of modest means."⁵⁸ The Escuela's trend reflects the blurring of racial barriers among the middle social strata and the subsequent "whitening" of society. Professional and socio-economic mobility were facilitated as the differences between medicine and surgery grew fainter. When the Spanish surgical colleges began to grant the degree of Latin Surgeon, their graduates - such as Florencio Perez Camotto and Francisco Hernandez - were fully licensed to practice both medicine and surgery. Successive and contradictory legislation further confused the issue and allowed surgeons a broader latitude in their practice.⁵⁹ Although in theory Mexican surgeons did not enjoy the same status as their peninsular counterparts, in practice the independence of the army and navy from the *Protomedicato* and the shortage of qualified personnel resulted in their practising both branches of medicine. Thus, the surgical profession contributed to the increasing socio-economic mobility of the late colonial period by offering those individuals of "questionable" ancestry access to the medical profession.

Three main forces shaped naval medical reform in Spain and its colonies. First, the Bourbon dynasty brought to Spain a last chance to occupy a prominent place in European politics, a place that had to be claimed by force. Return to a golden past was not, however, Spain's only concern, as failure to recover its military might result in the gradual loss of its empire to stronger rivals. The stakes were high: imperial expansion or defeat. In this dangerous political game, the Spanish Navy, the link between the mother country and its possessions, played a crucial role. It was not by chance that reform started in Cadiz.

Second, Enlightenment ideology set the tone of reform. Contemporary ideas demanded structural organization, the rationalization of duties and responsibilities, professional specialization, and a more scientific approach to medicine. The new royal

hospitals were organized according to these trends, their functioning and routine described by detailed regulations carefully written by royal officials. Hospital life and treatments followed contemporary medical theories (often based on Hippocratic principles) that sought to understand illness by studying the interaction between humans and their environment. Although flawed, their conclusions provided the first clues to fighting disease and improving medical care. Hospital regulations were hardly if ever followed completely and eighteenth century hospitals may or may not have improved sanitation, but the new emphasis on hygiene would gradually bear fruit.

Third, the eighteenth century was characterized by increasingly tighter governmental control. Traditional institutions, such as universities, guilds, and the clergy, were being gradually deprived of medieval privileges and forced to bow to the state. Hospitals were no exception, and since early in the century key government figures had recommended direct crown control over them. This was a struggle that the Hipólitos of San Juan de Montesclaros could not win and by 1804 they were forced to close down their institution, hand the government all the hospital's possessions and leave the port. Following medical beliefs, the hospital building was demolished to prevent infection.⁶⁰

Direct state control was also behind the founding of the Spanish surgical institutions. Although the urgent need for practitioners to cater to the army and navy was the crown's main reason, the creation of colleges independent from the *Protomedicato* illustrates the authorities' mentality. The Cadiz, Barcelona and Madrid colleges were established to compete with university education and to undermine the latter's status. As a colony, Mexico occupied a different place in royal plans and the Escuela de Cirugia reflected this colonial status. Created to train surgeons to serve under peninsular practitioners, the Escuela was neither to be completely independent nor to have the same status as the university and colegios. Nonetheless, in Mexico as in Spain, surgery gained respectability under the auspices of the crown.

Spanish medical naval reform was the result of the struggle between tradition and modernity; between charitable institutions with medieval roots and the incipient modern hospital. In Mexico this reform left an important legacy. As in Spain, army and naval hospitals were the first steps towards the specialized medical care institutions staffed by medical personnel. Peninsular surgeons, representatives of this reform, contributed to the informal training of hospital personnel and promoted current medical theories and surgical procedures. Most important, the establishment of the School of Surgery resulted in the formalization of surgical education, the professionalization of surgery, and the improvement of medical care, while also offering a vehicle for social mobility to the humble surgeon.

NOTES

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Hospitales, vol. 20, exp. 1, ff. 1-25,1, Reglamento para el Gobierno Interior, Politico, y Económico de los Hospitales Reales, erigidos en la Isla de Cuba (1776).

2. John D. Harbron, *Trafalgar and the Spanish Navy* (Annapolis, 1988), 68-70.

1. Archivo General de la Nación (AGN),

3. Diego Ferrer, *Cirujanos del "Camp" en el*

Siglo XVIII. Su Contribution a la Restauration de la Cirugia (Reus, 1968), 57; and Michael E. Burke, *The Royal College of San Carlos. Surgery and Spanish Medical Reform in the Late Eighteenth Century* (Durham, NC, 1977), 61.

4. Jackie R. Booker, *Veracruz Merchants, 1770-1829: A Mercantile Elite in Late Bourbon and Early Independent Mexico* (Boulder, CO, 1993), 1-5.

5. The *averia* was a convoy tax paid by the annual fleet.

6. Joefina Muriel, *Hospitales de la Nueva Espana* (2nd. ed., 2 vols., Mexico, 1990), I, 223-229.

7. The amount paid for each crew member varied; in the words of a contemporary, "we cannot express their value as they are as diverse as the ports where [they] trade and the number of vessels." AGN, Hospitales, vol. 32, exp. 24, ff. 225-246, 239v, Autos (1764).

8. The Armada de Barlovento was a naval squadron based in the Caribbean.

9. AGN, Hospitales, vol. 36, exp. 6, 298-323, f. 317, Noticia del Hospital de San Juan de Montesclaros (1796).

10. AGN, Hospitales, vol. 32, exp. 24, 225-246, ff. 239-40, Autos (1764).

11. AGN, Hospitales, vol. 18, exp. 27, ff. 308-315, Prontuario de los haveres de este convento (1803).

12. AGN, Hospitales, vol. 18, exp. 4, 17-50, ff. 43v-44v, Testimonio (1594); and vol. 13, exp. 2, ff. 21-38, 34, Relación (1748).

13. Booker, *Veracruz Merchants*, 1-13.

14. AGN, Hospitales, vol. 36, exp. 2, 148-184, ff. 163 and 166v, Informe (1795); and vol. 32, exp. 24, ff. 225-246, Autos (1764).

15. AGN, Hospitales, vol. 32, exp. 24, ff. 244v and 245, Autos (1764).

16. AGN, Hospitales, vol. 4, exp. 1, ff. 1-25, Nombramiento de Fernando Bustillos como Superintendente de hospitales (1764).

17. AGN, Hospitales, vol. 32, exp. 24, 225-246,

ff. 240-241v, Autos (1764).

18. Muriel, *Hospitales de la Nueva Espana*, II, 260.

19. AGN, Hospitales, vol. 4, exp. 1, ff. 1-25, ff. 12-14, Nombramiento de Fernando Bustillos como Superintendente de hospitales (1764).

20. AGN, Hospitales, vol. 4, exp. 3, 69-122, ff. 107-108, Fernando Bustillos al virrey, Marqués de Croix (1766).

21. Although San Carlos was established as a military hospital, it soon began serving the navy as well.

22. In the late 1720s, fifteen percent of its cases belonged to the navy and nineteen percent were soldiers and seamen from the fleet and the mercury ships. But by the 1790s only about one percent of patients were seamen while the rest were either prisoners or destitute. AGN, Hospitales, vol. 36, exp. 2, ff. 148-184, f. 166v, Autos (1764).

23. Muriel, *Hospitales de la Nueva Espana*, II, 260.

24. AGN, Hospitales, vol. 49, exp. 9, ff. 204-209, Relación de presupuesto (1784).

25. AGN, Hospitales, vol. 20, exp. 1, ff. 1-25, Reglamento para el Gobierno Interior, Politico, y Económico de los Hospitales Reales, erigidos en la Isla de Cuba (1776).

26. AGN, Hospitales, vol. 20, exp. 2, ff. 28-55, Descripción de Don Pedro Antonio de Cossio manifestando en las partes que se adapta el Hospital de San Carlos al Reglamento para los hospitales de la Ysla de Cuba (1777) (Hereafter *Description*).

27. /t^., 30v-36.

28. A distinction was made between internal medicine cases, such as epidemic victims, and surgical patients who required the surgeon's intervention.

29. *Descripcion*, ff. 36-40.

30. AGN, Protomedicato, vol. 1, exp. 6, ff. 305-212, Que facultativos presenten sus titulos (1809); Protomedicato, vol. 1, exp. 5, ff. 117-278, Expediente promovido por el Dr. Florencio Perez

Camoto (1809); and Hospitales, vol. 64, exp. 4, ff. 53-77, Informe (1816).

31. AGN, Inquisición, vol. 1449, ff. 141-149, Lista de los libros del uso del Dr. Don Florencio Pérez y Camoto (1810).

32. AGN, Protomedicato, vol. 1, exp. 5, ff. 225-226v, Hernandez, Francisco, Hoja de Servicio (1809); and Protomedicato, vol. 1, exp. 6, ff. 279-367, ff. 293-294 and 312-315, Que facultatives presenten titulos (1809).

33. Although the regulations required a surgical intern to accompany the surgeon, Cossio explained that, due to the difficulty of finding such an individual, this job was usually carried out by a surgeon's aid. *Descripcion*, f. 43.

34. *Ibid.*, ff. 42-43v.

35. During the 1762 yellow fever epidemic, Puertas performed numerous post-mortem examinations in an effort to understand the disease. A specialist in the treatment of syphilis, the surgeon was also praised for the painstaking instruction he imparted to those under his charge. AGN, Hospitales, vol. 29, exp. 1, ff. 2-25, Juan de Puertas, Solicitud (1772).

36. Crivelli, who was born in Ireland in 1751, served as surgeon of the Regiment of Ireland in North Africa and Cataluna for eleven years. He was then posted to Chihuahua in northern Mexico and in 1803 transferred to Veracruz, where he remained until at least 1817. Among the many services rendered to the crown, Crivelli listed having introduced inoculation in Mexico City and Celaya during the 1797 smallpox epidemic, and then taking inoculation to northern Mexico. In Veracruz, he regularly carried out the health inspections of arriving vessels, took care of prisoners and army invalids (presumably without pay) and ran a private practice for recently arrived officials and cadets who lay sick in private homes. In 1812, during a serious yellow fever epidemic, he was put in charge of two provisional hospitals. AGN, Hospitales, vol. 10, exp. 6, ff. 104-117, Petition de Jubilación de don Juan Bautista Crivelli (1817); and Inquisición, vol. 1419, ff. 323-325, Lista de libros (1803).

37. *Description*, ff. 44-45.

38. These include the works of various environmentalist authors, such as Roviére Audin, J.B.T.

Baumes, James Lind and Diman Jacob Van den Bosch. AGN, Inquisición, vol. 1449, ff. 141-149, Lista de libros para Florencio Pérez y Camoto (1810); and Inquisición, vol. 1419, ff. 323-325, Lista de libros reconocidos por el Santo Tribunal de la Inquisición para J. B. Crivelli (1803).

39. James C. Riley, *The Eighteenth-Century Campaign to Avoid Disease* (New York, 1987), xv, 17 and 129-132.

40. AGN, Hospitales, vol. 36, exp. 2, ff. 150-152, Reporte (1795).

41. Riley, *Eighteenth Century Campaign*, 100-102.

42. *Description*, f. 41.

43. Such measures were taken in Philadelphia during the 1793 yellow fever epidemic. The authorities recommended carrying handkerchiefs soaked in vinegar or camphor to avoid inhaling harmful vapours and burning gunpowder to clear the air. J. M. Powell, *Bring Out Your Dead. The Great Plague of Yellow Fever in Philadelphia in 1793* (Philadelphia, 1993), 29-43; and Riley, *Eighteenth Century Campaign*, 111.

44. *Description*, ff. 44v-45.

45. These were Juan de Puerta, Miguel Maria Ximénez, Francisco de Paula Herrera Bosquet, and Francisco Hernandez. The last three held the degree of Physician-Surgeon. Puerta and Hernandez were graduates of the Colegio de Cadiz.

46. AGN, Hospitales, vol. 13, exp. 6, ff. 200-334, ff. 201-203v and 238v, Quaderno 16 sobre la extinción del Hospital de San Juan de Montesclaros (1805).

47. *Description*, ff. 49-49v.

48. Burke, *The Royal College of San Carlos*, 61-64; and Ferrer, *Cirujanos del "Camp"*, 65-84.

49. In 1788, a third institution, the Real Colegio de San Carlos was opened in Madrid.

50. David Howard, *The Royal Indian Hospital of Mexico City* (Tempe, 1980), 46-47; and Informe de Antonio de Arroyo (1779), in Rómulo Velasco Ceballos, *La Cirugia Mexicana* (Mexico, 1946), 4-6.

51. Burke, *Royal College of San Carlos*, 61-62; John Lanning, *The Royal Protomedicato: The Regulations of the Medical Professions in the Spanish Empire* (Durham, NC, 1985), 273-275; and AGN, Hospitales, vol. 53, exp. 9, ff. 235-246v, Manuel Moreno, Informe reservado (1792).

52. Luz Maria Hernández-Sâenz, *Learning to Heal: The Medical Profession in Colonial Mexico, 1767-1831* (New York, 1997), 93.

53. Serrano to Calleja (1815), in Velasco Ceballos, *La Cirugia Mexicana*, 369-375; and Burke, *Royal College of San Carlos*, 100.

54. It is not clear if or when the Mexican programme offered courses on "mixed diseases," *medicina castrense* and Hippocrates' aphorisms as taught in the Spanish colegios. According to the examination records, the candidate required four years of courses and four of practice. Some of the courses may have been substituted by practice, but the examination records and the certificates of attendance indicate that the graduates did fulfil a total of eight years training before applying for licensing. Examination and licensing records are located at the Archivo Histórico de la Facultad de Medicina and the Instituto Nacional de Antropología e Historia Archives, Colección Antigua.

55. AGN, Archivo Histórico de Hacienda, vol. 569, exp. 7, Serrano to Virrey Conde del Venadito, 1819.

56. Francisco Fernandez del Castillo credits Munoz with having developed this procedure, quoting Guillermo Prieto and Dr. (Rafael?) Lavista as his sources. The extraction of cataracts was first performed by the French surgeon Jacques

Daviel (1693-1762) in the middle of the eighteenth century. Daviel was well known on the Iberian peninsula, where he had travelled in 1736 to perform a great number of operations among the nobility and was even asked to remain at King Ferdinand VI's court. Cataract operations were among the topics included in the 1780 *oposicion* for the post of *catedrático* of the Escuela de Cirugia. The fact that the two Mexican candidates, José Montañez and Felipe Vega, received their surgical training at the Escuela illustrates that its graduates were familiar with such an operation. The procedure must also have been practised by naval and army surgeons, such as Florencio Pérez Camotto, who counted the works of Vidal, La Faye, and the *Memoirs* of the Academy as part of their libraries. Hernandez Saenz, *Learning to Heal*, 96-99; and Ferrer, *Cirujanos del "Camp,"* 146-147.

57. According to Montaner y Virgili and Moreno's regulations, surgical students were to present "complete" (*plena*) *limpieza de sangre*, consisting of their own baptismal certificate and that of their parents and grandparents, a certificate from the town's authorities, and a *afe de vita e moribus* signed by the local priest and regidores of their place of residence. Serrano to Calleja (1815) and Solicitud de José Vazquez de Silva (1788), both in Velasco Ceballos, *La Cirugia Mexicana*, 366 and 451-453.

58. Serrano to Calleja (1815), in *ibid.*, 366; and AGN, Archivo Histórico de Hacienda, vol. 569, exp. 7, Serrano to Apodaca, 1818.

59. See Hernandez Saenz, *Learning to Heal*, 110-111.

60. AGN, Hospitales, vol. 44, exp. 20, ff. 405-434, Testimonio (1804).