



Pharmaceutical studies during the Second Empire in the *Gaceta Médica de México*

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Abstract

Pharmaceutical activities during the Second Empire have been neglected by historians of science in recent decades, even though pharmacy was an important discipline in Mexico City. This is shown by analyzing 12 papers published in the *Gaceta Médica de México*, the journal of the Sociedad Médica de México. Examination of these papers helps us understand the interests, practices and pharmaceutical activities of some of this group's physicians and pharmacists, as well as detailing scientific endorsement of the therapeutic use of Mexican flora. This allows us to trace a historical continuity in the activities of pharmacists in the capital city throughout the nineteenth century.

Keywords: pharmacy; Mexico; press; medicine; professional associations.

In recent decades in Mexican history, there has been an increase in research on the processes of professionalization and institutionalization and the rise of professional associations for scientific disciplines, such as pharmacy in Mexico City during the nineteenth century (Azuela, Guevara, 1998, p.239-258). The topics emphasized have included the introduction of a degree in pharmacy at the Medical Sciences Establishment (Establecimiento de Ciencias Médicas) in 1833; the foundation of the Pharmaceutical Academy of Mexico (Academia Farmacéutica de México, AFM) in 1838, which published *Farmacopea mexicana* (Mexican pharmacopeia, 1846); the creation in 1871 of the Mexican Pharmaceutical Society (Sociedad Farmacéutica Mexicana, SFM), which published various editions of the *Nueva farmacopea mexicana* (New Mexican pharmacopeia, 1874, 1884 and 1896) and also *La Farmacia* from 1890 on; the creation of the National Institute of Medicine (Instituto Médico Nacional) in 1888; and pharmacists' complicated work environment, which was shared with (empirical) apothecaries. Even though these studies cover much of the century, little is known about the development of pharmacy under the Second Empire (1864-1867).

The historiography of Mexican pharmaceutical studies has tended to focus on the publication of scientific bibliography as a reflection of pharmacists' activities. The pharmacopeias mentioned above, as well as other specialized works written by pharmacists, have been the most studied; through their professional associations, pharmacists sought to inventory, study and apply botanical, zoological and mineral diversity for therapeutic ends (see Morales, Aceves, 2011). Historians have studied the role of the AFM and the SFM in creating bibliography and pharmaceutical hemerography as a reflection of the creation of a national *materia medica* to replace foreign drugs in apothecaries' stores (see Aceves, 1995). However, they have ignored the role of the Medical Society of Mexico (Sociedad Médica de México, SMM), which was founded in 1864 and which, in 1872, became the Academy of Medicine, a space that fostered the development of the practice of pharmacy by bringing together physicians and pharmacists to study flora. This led to 12 unique papers on pharmacy being published during the Second Empire in the *Gaceta Médica de México*, the Academy's official publication. These investigations had two objectives: firstly, to continue and broaden the scientific tradition of studying plant diversity in the country; and secondly, to legitimize the political goals of Maximilian of Habsburg via scientific activities led by supporters of the emperor, who took advantage of the monarchic regime to encourage this tradition.

The 1860s were characterized by a serious social, political and economic crisis in Mexican society unleashed by the Reform War (1857-1861), in which the liberals triumphed over the conservatives. Given the precarious state of the treasury, on July 17, 1861, president Benito Juárez decreed the suspension of debt payments to certain European countries. This caused England, France and Spain to sign the London Convention on October 31, agreeing to the goal of military and political intervention in the Republic of Mexico in the form of troops which arrived at the port of Veracruz in January 1862 to demand payment of their countries' respective debts. Despite the fact that the Mexican government was negotiating with representatives from England and Spain, the French army advanced towards the country's interior, paving the way for the so-called French intervention (1862-1863). The intervention meshed Napoleon III's expansionist ambitions with the interests of certain Mexican moderates and conservatives seeking to stabilize the country (see García Ugarte, 2011).

During the intervention, men of science were reluctant to collaborate with the French army until they realized that the monarchic regime might encourage “progress” in the nation under the command of a monarch who was interested in science and who seemed capable of keeping the anarchy that had reined since independence “permanently in chains” (Pani, 2002, p.52). Professional and amateur scientists recognized Maximilian of Habsburg’s fondness for the sciences and decided they would support his causes for the good of the nation.

During the years of the Second Empire in Mexico, various projects of a scientific nature were pursued with two goals: firstly, to gather data, objects and images of the territory, population and nature of Mexico so as to govern it rationally, and secondly, to enrich the archives of France under Napoleon III thanks to the work of French scientists who traveled the country. It can be argued that even though the Mexican Empire lasted only a few years, scientific life at the time was not weak and its historical transcendence was not minimal, since much of what was begun from 1864 to 1867 bore fruit under the Republic.

An example of this can be seen in the pharmaceutical activities carried out during the Second Empire. These have been neglected by historians, even though there has detailed analysis of the activities of the Scientific Commission of Mexico (Commission Scientifique du Mexique, CSM) and the Scientific, Literary and Artistic Commission of Mexico (Comisión Científica, Literaria y Artística de México, CCLAM); the birth of the SMM as part of the emergence of medical associations; the reorganization of the National Museum; the launching of the Pachuca Scientific Commission; and the support of Mexican Society of Geography and Statistics (Sociedad Mexicana de Geografía y Estadística, SMGE) for the emperor. These studies belong to the historiographical re-evaluation begun some two decades ago, when the activities of humanists, scientists and artists linked to the Second Empire were interpreted as the basis for various projects that were redefined under the Republic after 1867 (Pani, 2001, p.97). However, there is little recognition of the participation of pharmacy practitioners (pharmacists and physicians) in Maximilian’s scientific project, in which several of them featured prominently.

Pharmacists and physicians constituted part of the elite in the capital city, most of whom believed that the empire offered an “apparatus for hierarchical, centralized government” that favored scientific enterprises, especially those that lacked state support in the crisis years after the Reform War and the French intervention. Scientists who supported the Empire believed that it opened up “a space for doing what they had longed for: giving the state the administrative and legislative instruments that would allow it to act,” and those pertaining to science, for example, health and the regulation of the practice of pharmacy, would have an effect on society (Pani, 2007, p.43).

The origin of the above-mentioned SMM can be located in the founding of the Medical Section of the CCLAM by the field marshal of the Expeditionary Army, Achille Bazaine (1811-1888) in 1864. It was made up of Mexican and French individuals linked to scientific disciplines. The marshal proposed “to stimulate scientific exchange between the two countries” and he asked the colonel of engineers Louis Doutrelaine (1820-1881) and the geographer and engineer José Salazar Ilarregui (1823-1892), who was at that time minister of the Interior (ministro de Fomento), “to invite well-known professionals” to a meeting to set up the CCLAM, which was to be composed of ten sections and would support the

CSM (Martínez, 2011, p.232). The CSM was formed in Paris, that same year, “to explore and impart to its great scientific institutions the information collected by expert explorers sent to Mexico” such as, for example, samples of local flora and fauna (Soberanis, 2010, p.126). Napoleon III’s Commission also set out to inventory, study and try out the wealth of Mexican herbal remedies, only under the aegis of French science (see Ramírez, Ledesma-Mateos, 2013).

The Medical Section of the CCLAM brought together men interested in medicine, pharmacy and veterinary science who had joined the imperial ranks. They began work on April 30, 1864, under the leadership of the French physician Charles Ehrmann. It was divided into five subsections: pathology; hygiene, forensic medicine and medical statistics; medicine and veterinary medicine; *materia medica* and pharmacology; and physiology and anthropology. The publication that announced the first studies was entitled the *Gaceta Médica de México: Periódico de la Sección Médica de la Comisión Científica* (1864-1865). Given the success of the investigations and the important role that the Medical Section came to play in the CCLAM, the participants decided to form the SMM on December 30, 1865, and from then on it published the *Gaceta Médica de México: Periódico de la Sociedad de Medicina* (1866-1871) (Rodríguez, 1997, p.67).

Various pharmacists in the capital city joined the SMM as a political strategy designed to strengthen the future of the profession, since in 1865 they were still a minority compared to apothecaries; their internal coordination was weak, they lacked social recognition, unlike physicians, and they needed political and scientific representation at the School of Medicine (Azuela, Guevara, 1998, p.241). We can assume that pharmacists saw the empire as an opportunity to improve their professional status under the protection of the monarch by being valued as professionals useful to the empire. Only then would they manage to achieve the resources to become independent of physicians in educational and professional terms, whilst also winning the battle in their rivalry with apothecaries.

Some members of the SMM were either professors or graduates of the School of Medicine. There, pharmacy subjects were concentrated in various courses in two degree models. First, from 1855-1862, specialties were offered in natural medical history (Gabino Barreda), pharmacy (José María Vargas), medical chemistry (Leopoldo Río de la Loza), and *materia medica* (Ignacio Erazo). Several of the SMM’s physicians and pharmacists during the Second Empire were trained there. Second, from 1862-1868, courses were taught in medical chemistry (Río de la Loza), medical natural history (Barreda), pharmacy (Vegas) and pharmacology (Erazo); during this period the only 12 pharmacy studies ever published in the GMM appeared, reflecting the research undertaken at the School (Rodríguez, 2008, p.81-88). These courses were taught for over a decade, by the same set of professors. The courses reveal the relationship that existed between natural history, chemistry and pharmacy in the development of therapeutic investigations into the wealth of natural remedies in Mexico, in this case, in the heart of the SMM. It should be pointed out that Maximilian funded the School as a fundamental part of his project for modernizing higher education.

The goal of this article is to understand the interests, practices and pharmaceutical activities of some members of the SMM by analyzing the 12 pharmacy papers published in the GMM¹ from 1864 to 1868,² which provide scientific endorsement of Mexican flora for therapeutic purposes. Analysis of these papers shows the presence of two themes: naturalist practice, based

on anatomical and taxonomic description of Mexican plant species as a basis for extending the *materia medica* used in pharmacy; and the scientific study of Mexican plant species using physiology and chemistry to create and improve medications to alleviate conditions seen in the population. In the 1860s, practitioners of pharmacy sought not only to determine how medications acted but also to understand why (Rodríguez, 1997, p.67). The 12 papers were written by Mexican and French physicians and pharmacists as part of the international collaboration encouraged by the imperial regime. This sample also provides intellectual evidence of the objectives shared by French and Mexican physicians and pharmacists in terms of scientific research in the mid-nineteenth century.

Study of the GMM during its early years is relevant for exploring the development of pharmacy during the Second Empire as part of the link established between the interests of the monarch and the medical-pharmaceutical professionals in the capital who, for political reasons, resumed the tradition of siding with the national government in order to get various projects under way. This allows us to identify a historical continuity between the group activities of the AFM and the SFM in terms of researching the country's plant-based *materia medica*. Although there was no second pharmacopeia, the pharmaceutical articles in the GMM became part of the *Nueva farmacopea mexicana* (1874) which was proposed a few years after the fall of Maximilian's government (Schifter, 2010, p.156).

After the end of the Mexican empire, in the middle of 1867, various men of science who had been involved in imperial scientific activities had to reposition their activities politically under the republican government of Benito Juárez and disassociate themselves from the imperial past in order to achieve the scientific and professional goals they were pursuing. In the republican era, both physicians and pharmacists did the same within the SMM and later the SFM, including, for example, Gumesindo Mendoza, Alfonso Herrera, Luis Hidalgo y Carpio and Lauro Jiménez (Azuela, 2002). In the next few pages I will examine the scientific context in which the imperial pharmaceutical project developed and the results that were published in the GMM.

Pharmacy in the *Gaceta Médica de México*

On September 1, 1864, doctor Charles Ehrmann and doctor Miguel Jiménez (1813-1876), the editors of the GMM, drew attention in the "Prospectus" to the "favorable reception" enjoyed by medical and pharmaceutical associations during the first half of the century in Mexico City, thanks to their "repeated efforts" to disseminate scientific material useful to society. Following this tradition, members of the Medical Section of the CCLAM decided it was appropriate to share their research in a scientific journal that would equal the best in Europe and would reflect the monarch's encouragement of the country's modernization process. This medical journal would publish scientific research by members of the Medical Section, as well as other "intelligent persons" from the country's interior, side-stepping political controversies that caused discord among Mexicans (Ehrmann, Jiménez, 1864-1865, p.1). These words clarified for the public that participants in the CCLAM would supposedly remain politically neutral, although implicitly they sided with the Mexican empire which was sponsoring their activities.

In his review of the closing session of 1866, doctor Miguel Jiménez (1866, p.385) stated that the founding aims of the medical journal were being met: “to amass, unerringly, the facts that [had been studied by its members], so that in calmer times and by more competent men they [could] bear fruit and be of positive benefit and use to society.” The author was conscious of the importance of the body of works stored in the GMM as a testimony to Mexican wisdom and as a basis for future generations of professionals who would expand on imperial research. This situation did arise during the republican governments after the victory in 1867, and would culminate at the end of the century. This cumulative process can be seen in the creation of the *Nueva farmacopea mexicana*, one of the indirect results of the imperial regime.

Jiménez stressed the investigation of “the physiological processes caused by the use of medications” in order to modernize pharmacy and the importance of relying on “theoretical [elements], whose purpose was to make available knowledge about medications thanks to which it was possible to demand correct decision[s] about their use in the patient” (Hersch, 1998, p.283). This objective can be seen in the 12 papers, which demonstrate the connection between pharmacy and physiology, as well as the partnership with naturalist practice as a basis for extending the *materia medica* and pharmacological research pertaining to it.

In his “Review of the studies performed by the Medical Society during its social year (1866)” (“Reseña de los trabajos efectuados por la Sociedad Médica durante su año social [1866]”), doctor Ángel Iglesias (1829-1870) states that the group was divided into six sections by subject area,³ of which “pharmacy and *materia medica*” and “auxiliary sciences” included the members interested in the study of flora. The author stressed that pharmaceutical papers presented at the meetings were sanctioned by the experience of pharmacists and physicians, so that the results were beyond question, both in the experimental and the practical sense (Iglesias, 1866, p.393). The SMM became a medical-pharmaceutical body capable of emitting verdicts about the therapeutic properties of certain plants. This body reinforced the separation process between empirical therapeutics “seen as the use of means whose efficacy, whether real or supposed, lacked an explanation” and pharmacy based on chemical and clinical experimentation, which was being developed in Europe (Hersch, 1998, p.281).

Two studies of a pharmaceutical nature that were read at the meetings of the SMM, but not published in the GMM, were the botanical research of doctor Leonardo Oliva (1814-1872), a correspondent member from Guadalajara, describing the use of various types of Cucurbitaceae from Jalisco for therapeutic purposes, which reveals the participation of members from other Mexican cities, who broadened the sphere of influence of the GMM’s articles; and the research of doctor Luis Hidalgo y Carpio (1818-1879) who discussed the results “of the use of belladonna in various cases of whooping cough that he had occasion to observe at length,” included in the 1874 pharmacopeia (Iglesias, 1866, p.393-394). Even though the medical journal is the historical source for this research, there were other pharmaceutical studies which for some reason were not included in the GMM; a review of the historical archive of Mexico’s National Academy of Medicine would broaden the range of plants subjected to pharmaceutical studies.

Lastly, doctor Lauro María Jiménez (1826-1875) published the “First secretary’s review,” in which he explained the complicated situation of the SMM in the middle of 1867, after the

republican victory over the imperial army. Despite the national crisis which occurred that year, the members had “constantly given an example of how to [attain] glory by walking the thorny paths of science and had not wavered but stayed firm in their thought and continue with their noble and laborious tasks” as the nation’s destiny was being decided (Jiménez, 1867-1868, p.369). Again, physicians and pharmacists adopted a “neutral” position regarding the outcome of the war between the empire and the republic, stressing that scientific activities took up all their attention. Using this discourse, the SMM managed to position itself as a scientific group that was indispensable to the future of the Mexican republic.

Pharmacy and the examination of flora

Pharmaceutical study of Mexico’s plant diversity under the Second Empire included various examples in which natural history and pharmacy were linked to the interests of the imperialist elite. Thus it is no surprise that the GMM included an article on general botany entitled “Plant vitality” (*Vitalidad de las plantas*), under the direction of the young doctor Francisco Cordero y Hoyos, as part of a thesis presented on February 22, 1864 in the contest for a teaching assistantship to doctor Barreda, mentioned above, a natural medical history professor. The text began with a historical overview of the use of Mexican plants for empirical therapeutics without any anatomical or taxonomic examination, and outlined the first steps toward deciphering their chemical composition. For the author, modern study of the *materia medica* began in the late eighteenth century when the first enlightenment institutions promoted pharmaceutical modernization, which the members of the SMM had inherited.

Cordero y Hoyos (1866, p.277) pointed out the general aspects of botany that were useful to physicians and pharmacists for exploring the physical and chemical characteristics of flora and the examination of “fibers, glands, cell tissue, fleshy and hairy parts” which led to the study of substances that were fundamental to the creation of medications. His thesis reflects the botanical training provided by the School of Medicine, from which several of the pharmacy papers’ authors had graduated. These teachings provided the scientific bases for further research on the therapeutic uses of flora, whether by physicians or pharmacists.

In 1865, doctor José María Reyes (1812-1885) published a historic document that included an excerpt from the scientific research carried out by the botany professor Vicente Cervantes (1755-1829) and naturalists José Longinos Martínez (1777-1802) and José Antonio de Alzate (1737-1799) and the description of a species of helianthus, unknown until 1790, when doctor Pedro Puglia, who was of European origin, carried out an anatomical and therapeutic study on it. This information was found in a file in the archive of the Royal Protomedicate of New Spain (Real Protomedicato de la Nueva España) which had remained unpublished until that point (Reyes, 1864-1865, p.335). For doctor Reyes, recuperating this pharmaceutical legacy of the colonial era was very important for establishing the origins of Mexican science as a weapon for legitimizing the imperial project and in opposition to the French commissioners on the CSM, who on occasion assumed Mexicans to be individuals who lacked an academic, professional and educational tradition. In this way, national scientific history became an ally for Mexican professionals and for imperialists in search of academic and political legitimation.

Doctor Puglia described the new species as a helianthus “with alternate, petiolated, spatulate leaves with sinuses, veined, coarse and rough, stem has a single flower and very long peduncle” found in the Sierra Madre (Reyes, 1864-1865, p.335). The botanical description is extensive and detailed, as was customary at the time, and the same one is found in the papers in the GMM. The European physician recognized that the helianthus possessed therapeutic properties through its bitter, aromatic, spicy root, and its resinous-smelling gum which when ground “with tallow [could be used for] poultices for falls, bruises and tumors” (Reyes, 1864-1865, p.336). This pharmaceutical approval of helianthus was part of the process of renovation of pharmacy in Mexico City through the creation of the Royal Botanical Garden (Real Jardín Botánico) and the Royal Chair of Botany (Real Cátedra de Botánica) which continued to be active in Mexico after independence. In the article it is noticeable that popular and scientific therapeutics co-existed side by side, a situation similar to the one under the Second Empire which the SMM’s members sought to eradicate with the support of Maximilian.

In 1866, doctor Lauro María Jiménez, assistant to the professor of natural medical history, presented a study on the Mexican fungus known as *chahuistle* (*Licea chahuistlea*). The goal of his paper was to examine the fungus from a pharmaceutical point of view, since it was considered a likely cause of disease among those who consumed sweetcorn, especially indigenous people. The author was a friend of the director of the School of Agriculture and Veterinary Science (Escuela de Agricultura y Veterinaria), Joaquín Varela, who one afternoon in July of 1865 invited Jiménez to visit the cornfields of Santa Rita and Santa Rosa “which were completely overrun with chahuistle.” Given this opportunity to carry out a pharmaceutical and medical study, Lauro María Jiménez (1866, p.141) thought to invite the students, since it was “the first opportunity that had arisen to observe a pathological state that was interesting both to physicians and to farmers.” It was obvious that practitioners of pharmacy needed to possess a naturalist bent to travel the countryside and the markets in search of new therapeutic species so as to cultivate them in their own personal gardens and study them carefully. It is known that students took part in the experiments conducted by the teaching staff in the School of Medicine and we can assume that some young people were interested in the therapeutic aspects of flora.

Doctor Lauro María Jiménez’s article reveals the scientific practices of the era, for example, the use of magnifying glasses and microscopes for observing the anatomy of the fungus. Thanks to that, the author established that what had been assumed to be insect eggs on the corn husks were in fact a mass of spores making up the mycelium (Jiménez, 1866, p.143). It was still necessary to clarify the taxonomy of the *chahuistle*, since “its family relationships were somewhere among the multitude of microscopic fungi” that thronged the world, although it appeared to belong to the genus *Licea* (p.141). Jiménez named the parasitic fungus *L. chahuistlea* to maintain the term used in popular tradition and as a symbol of Mexican science. The author concluded the paper by explaining that he was still carrying out experiments to determine the chemical characteristics that would show whether the fungus was a harmful species or, if it was, to find some therapeutic property (p.144). Scientific approval of the *chahuistle* was part of the project undertaken by physicians and pharmacists for whom the empire provided a space to resume the therapeutic studies of earlier decades.

The members of the SMM were aware that this enterprise would take several years, and might involve new generations of young scholars prepared to inventory and examine the nation's wealth of flora. To do this, they needed the state to promote science and social peace, as well as providing generous resources for professional schools, associations and scientific institutions, as Maximilian had proposed. The articles in the GMM examining flora with therapeutic properties formed part of a scientific tradition begun in the late eighteenth century and renewed during the Second Empire.

Pharmacy and the exploration of therapeutic properties

The second interest of some members of the SMM was scientific examination of the therapeutic properties of Mexican species using chemical methodology and physiological analysis. Thus, pharmacy practitioners provided a framework for other colleagues to perform further research studies. For example, doctor Auguste Tourainne (1864-1865, p.153) published a "Note on the history of Ipecac" ("Nota para servir a la historia de la ipecacuana") as part of the work he had begun in France and continued in Mexico City. *Carapichea ipecacuanha* was a New World plant, known in Europe as a remedy for inducing vomiting in overdoses and poisoning. To do so, apothecaries would prepare a powder that was effective for these conditions. In Mexico, doctor Tourainne developed a chemical methodology for studying its therapeutic properties, as well as comparing it with Ipecac spurge (*Euphorbia ipecacuanhae*), which was used as a popular remedy. Tourainne's experiments can be seen as an example of the French commissioners' interest in discovering the wealth of plant life so as to increase the number of medicines made by European pharmacists. It is also worth noting the presence of both foreign and Mexican plants in the druggists' and apothecaries' stores in Mexico City that were available to members of the SMM.

Doctor Tourainne wrote that he was based in the capital from July 1862 on, as one of the doctors accompanying the interventionist army. Once settled in, he spent his time exploring the areas around the capital so as to get to know the flora in the Valley of Mexico. On one of these plant-hunting excursions, Tourainne contracted dysentery. According to his journal, on the first day of his illness he drank a saline purge, but his symptoms did not improve, so on the third day he consulted doctor Schutzenberger, who had just arrived in the capital from Orizaba, Veracruz, with the French army. He prescribed a mixture of calomel (mercurous chloride) and powdered Mexican ipecac. Some days later, the patient noted in his diary the "physiological action of the medication" and suggested that the mixture should be taken with honey to improve the taste (Tourainne, 1864-1865, p.155). After a few days, Tourainne was restored to health and decided to publish his experience in the GMM. As well as describing the illness, the author published some preliminary results on the chemical characteristics of Mexican ipecac. This is an example of medical practice in the 1860s that shows how Mexican and French doctors acted, how they recorded the evolution of diseases, the use of popular remedies following scientific rules and the botanical basis of pharmacy. It also reveals the objective of French physicians, who sought to interact with their Mexican peers so as to familiarize themselves with Mexico's scientific tradition and, later, share that range of expertise in France.

A similar case can be found in an article titled “Malignant pustule cured by the application of fresh walnut leaves,” by doctor Luis Hidalgo y Carpio (1866, p.282), in which he describes the case of a 25 year old Spaniard who worked as a clerk in a seed merchant’s store on the Calle del Rastro. On July 10 of that year, according to the patient, “at daybreak, for no obvious reason, he felt an itching about a centimeter from the far corner of his left eye, where he noticed that there was a small blister, which he burst by scratching.” On July 12, the left side of the patient’s face had swollen up, so he decided to consult a doctor. From that point on, Hidalgo y Carpio gives a detailed description of the case, since he did not know what had caused the condition.

On July 14, doctor Hidalgo y Carpio started a treatment based on a poultice of fresh walnut leaves (*Juglans major*). It was prepared by “grinding the nerves of the said leaves and applying a large quantity of them one on top of another, on the site of the malignant pustule.” For reassurance about this therapeutic measure, the author consulted doctor Miguel Jiménez, who approved it, acknowledging that he did not know “what action some of the immediate principles of walnut leaves [would have] on a certain class of filiform infusorians called” bacterids by Casimir Davaine (1812-1882), as “the origin and immediate cause of the malignant pustule” in the patient. The Mexican physician pointed to the need to experiment on other patients and repeat the remedy to improve its efficacy (Hidalgo y Carpio, 1866, p.283-284). Although doctor Hidalgo y Carpio was not sure whether the origin of the condition was microbial or miasmatic, he was well-informed on modern biological theories of disease. The mingling of therapeutic prescriptions based on scientific bibliography, which was mostly European, with the experience of Mexican physicians is clear in Hidalgo y Carpio’s study, which reveals the circulation of scientific therapeutic practices at the time. Also notable is the author’s insistence on carrying out chemical studies on Mexican walnut trees as a way to render a traditional pharmaceutical practice more scientific.

The same year, the GMM published various studies on ways to create medications, based on the therapeutic properties of certain Mexican species. For example, the pharmacist Alfonso Herrera (1838-1901) published the paper “A new procedure for preparing extracting without the intervention of fire” (“Nuevo procedimiento para la preparación de los extractos sin la intervención del fuego”). In it, the author turned to certain chemical techniques common among pharmacists to determine “the principles that [constituted] organized bodies and the various properties with which they [were] endowed” in order to use them in modern procedures used to “obtain more powerful medications” (Herrera, 1866, p.200). The reference to chemistry as the basis for preparing new and better medications shows that SMM members were among the vanguard of scientific activity, and constituted the pharmaceutical elite of the country.

Herrera (1866) described the results of his experiments with a set of summaries in the GMM designed to inform readers about new methodologies used in the School of Medicine that could be practiced in apothecaries’ stores, the only reliable workspace for pharmacists, as a way of legitimizing the profession in the eyes of the imperial state and society. The author concluded by pointing out that doctors could use the results he described to fine-tune the dose of extract for each patient, to be prepared as syrups, herbal teas or pills (p.201). This indication of the role of physicians as a continuation of the pharmacist’s work shows

Herrera's interest in making them participants in pharmacy, professional allies, in opposition to apothecaries. He warned that the medications required both disciplines in order to gain wider use in society, since pharmacists prepared them while physicians prescribed them for their patients – a commercial strategy in which both benefited. Herrera described various chemical procedures that give us an insight into the practice of science in the capital city, as well as the variety of methodologies common among physicians and pharmacists from France and Mexico, their doubts about certain results and attempts to explain them, the interactions they had with colleagues through the School of Medicine and the SMM, and the specialized bibliography circulating and being consulted in the Second Empire.

In 1866, doctor Ramón Alfaro (1809-1869) did some research on powders made from the *cihopatli* plant (*Montano atomentosa*) which had been used for several centuries by indigenous people in the Valley of Mexico “to stimulate uterine contractions in cases of overdue, slow, difficult and arduous deliveries,” which could benefit all Mexican women (Alfaro, 1866, p.47). This physician, like other SMM members, believed that popular remedies required scientific endorsement using the premises of chemical and pharmaceutical sciences, since the only way that indigenous expertise could be transferred to the rest of society was by presenting the practical results in a scientific way.

Doctor Alfaro mentioned that the properties of *cihopatli* extract were being investigated scientifically and that it could probably be used in the future to treat feminine maladies. The physician appealed to the GMM's readers in the hope that *M. tomentosa* would stimulate them to research the “[popular] therapeutic agents, which, while efficacious and reliable in their effects, [had] not had the honor of being studied by men of science to grant them the place they [deserved]” (Alfaro, 1866, p.47). Only thus would popular regional practice in the empire be transformed into medications endorsed by pharmacy, chemistry and medicine, and available to the whole population. Likewise, more use could be made of Mexican flora instead of importing plants that drove up the price of medications demanded by patients.

Similarly, the pharmacists Gumesindo Mendoza (1834-1881) and Alfonso Herrera undertook a chemical study of the plant known as *yoloxóchitl* (*Talauma mexicana*). The first part of their paper covered the plant's anatomy and mentioned its use by indigenous people as an antispasmodic tea given to women (Mendoza, Herrera, 1866, p.223). The anatomical description was of great importance to the authors, bearing in mind that the GMM was read in various cities and mid-sized towns where there were physicians, pharmacists, naturalists and other men of science who were fond of natural history. Often, they were corresponding members of associations in the capital city, like the SMM, and they sent specimens or botanical reports that expanded the inventory of the country's flora.

The *yoloxóchitl* underwent various pharmaceutical tests in the School of Medicine laboratory in order to verify its authenticity as a popular remedy. Mendoza and Herrera (1866, p.224) found that chemical analysis, using ether, left as an “evaporation residue a solid, yellow, heterogenous substance, with an odor similar to the flower and even stronger” that they considered the extract necessary for making medications, above all, the antispasmodic tea. It is worth noting that pharmacists were performing chemical procedures to determine the therapeutic properties of the species in popular use. Chemistry linked physicians and pharmacists in the construction of a therapeutic project that solidified around the beginning

of the twentieth century. Also, the School of Medicine's facilities played a valuable role as a place for scientific endorsement of flora about which, until then, little was known. Bearing in mind that under the Second Empire students and graduates of this educational establishment had access to a solid corps of professors, specialized books, modern facilities, instruments and equipment, it is understood that they would have been trained to carry out chemical research like the kind published in the GMM. The imperial regime encouraged contact between the SMM and the School, like that of other professional groups in previous decades, from 1830 to 1850.

Doctor August Tourainne (1866, p.182) also published the "Experiencias sobre la *Tradescantia erecta* (yerba del pollo)" ("Experiences with *Tradescantia erecta* [cockerel weed]") which examined its properties. The author stated that the origin of the popular name of *T. erecta* was connected to the treatment of wounds in fighting cocks. The owners would cover the birds' wounds with a poultice made from the plant which, within a few minutes, made the blood clot so the wounded rooster could return to the ring. The French doctor saw medical endorsement of the gamecock owners' therapeutic expertise as leading to a possible application of the plant to human wounds. The research required combining medicine, botany, pharmacy and chemistry, which physicians and pharmacists frequently pointed out they were trained to do.

Doctor Tourainne performed an experiment on rabbits to clarify the hemostatic effects of the plant and obtain results that would allow experimentation on human beings. From December 5 to January 4, 1866, the doctor observed hemostasis in the ears of a group of adult white rabbits to monitor the therapeutic effect of the cockerel weed. To do this, the author made various incisions of different sizes and depths in the rabbits' ears, and applied a poultice to them. The results were noted in a journal. On the last day, Tourainne (1866, p.182-184) sacrificed one of the rabbits and performed an autopsy to see if there were any changes in arteries and veins. This is the only paper that mixed experimentation in birds and mammals to test the physiological effects known about in popular therapeutic remedies.

That same year, doctor Maximino Río de la Loza (1830-1903) presented a study on *itzcuinpatli* or Puebla plant (*Senecio canicida*) as a medication to control epilepsy. After performing some physiological experiments, the author determined that the plant was better than other "antispasmodics, of foreign origin and very expensive, [that are] recommended for this condition." The doctor presented this research for the first time in 1861, in a thesis written for the contest for a teaching assistantship in chemistry at the School of Medicine, and subsequently continued his experiments (Río de la Loza, 1866, p.345). Despite the tumultuous years of French intervention in Mexico City, certain conditions were maintained so that men of science were able to continue some of their research, such as the case of *S. canicida*, since several scientific spaces kept a certain amount of regular work going, for example, in the School of Medicine. From 1864 on, the emperor decided to support new scientific projects or ones that had begun at an earlier date, some of which were linked to the goals of the French commissions, as was the case for pharmacy.

Doctor Río de la Loza mentioned other experiments performed recently by SMM members such as doctors Leopoldo Río de la Loza, (1807-1876), Jesús Oñate, P. Balbuena and Ramón Alfaro, whose clinical observations were included in his paper as part of the socialization

of Maximino Río de la Loza's research. The author was confident that other "physicians, perhaps encouraged by the aforementioned observations," would use the plant and observe its effects on epileptic patients (Río de la Loza, 1866, p.345). The doctor's words show his trust in the GMM as a way of connecting pharmacy practitioners who were interested in extending the number of medications available nationally, regardless of their political affiliations at the time, even though the SMM was imperialist from the outset and several of its members took part in activities sponsored by Maximilian's government.

In April 1867, Gumesindo Mendoza (1867-1868, p.101) published the "Análisis inmediato de la corteza de la *Ixora*" ("Close analysis of the bark of the *Ixora*"), as part of his chemical research into plant species in Mexico's *materia medica*, since "all nations [had] their own in which there [were] native substances. Mexico [should] also have its own, which [could] be the richest and most varied, like the substances that [were] found in the heart of its metal-rich mountains." Clearly, practitioners of pharmacy were drawing a parallel between the wealth of Mexico's flora and its mineral deposits, suggesting that just as many pharmacists as mining engineers were needed to bolster the country's economy and material progress – a political argument aimed at public opinion and the emperor to improve pharmacists' work situation.

Mendoza stated that some indigenous groups from the center of the country used the bitter bark of the *chichiquahuítl* of the genus *Ixora* (now *Garrya ovata*) to cure gastrointestinal conditions in the Jalatlaco region in the state of Mexico. These were common among the population and represented one of the main causes of death. Therefore, Mendoza and other pharmacists set to work to research the plant's efficacy through chemical analysis. The author procured some samples of *Ixora* bark and prepared an extract that contained properties to "contain dysentery and calm stomach aches." The preparation was applied by doctors José María Vértiz (1812-1876), Barragán, Leal and Cueva to their patients; they observed the effects and results and reported them to Mendoza (Mendoza, 1867-1868, p.101). Once again, it is clear that physicians and pharmacists worked together to provide scientific endorsement of a popular remedy, at the meetings of the SMM, the facilities at the School of Medicine and through the GMM's publication of papers of interest to both professions.

In May 1867, Herrera and Mendoza published another paper, this one on a "cockrel weed" known as *matlaliztic* (*Tradescantia erecta*) by the indigenous people. It came at a time of political crisis, since the imperial army was suffering continual defeats at the hands of the republicans. This study resembled the earlier one by doctor Tourainne the previous year. The pharmacists sought to investigate the hemostatic property of cockrel weed by identifying the active principle. Through chemical analysis, the authors determined that the mixture of "acetic acid, ammonium acetate, potassium chloride, albuminoidal principle, plant albumen, chlorophyll and cellulose" was beneficial for controlling bleeding (Herrera, Mendoza, 1867-1868, p.161). Herrera and Mendoza shared their results with doctors Lauro Jiménez, Víctor Lucio and Miguel Jiménez, who used the plant on different patients in pill form, injections and tonics with good results. As the Mexican empire was waning, members of the SMM continued their meetings, professional activities and printing the GMM, as part of science's "neutral" attitude to the upheavals in the political sphere. Using this stance, physicians and pharmacists in the capital repackaged imperial plans to suit the new republican era, whilst

continuing the pharmaceutical project that would lead to the *Nueva farmacopea mexicana* of 1874.

Scientific research carried out by pharmacy practitioners in Mexico City continued the tradition begun at the end of the colonial regime of promoting educational spaces, associations and publications for the sciences. The GMM published the experiments of SMM members at a political juncture that made it possible to develop the scientific projects that people had been interested in for decades. They continued with therapeutic research during the republican administrations, which helped consolidate the SFM and its publishing projects.

Final considerations

Historical studies of Mexican science under the Second Empire have ignored the development of pharmacy, and overlooked the ongoing role of the SMM in the interests and activities of practitioners of that science throughout the century. Physicians and pharmacists benefited from Emperor Maximilian's interest in science as a way to legitimize his government, since they resumed the project of classifying and studying therapeutic flora that had been initiated decades before. Members of the SMM took political advantage of the monarch's recognition of their association and the School of Medicine to publish various pharmaceutical studies in the GMM.

The 12 papers in the GMM are a testimony to the scientific activities of some physicians and pharmacists, who used the press to announce their scientific endorsement (botanical, chemical and physiological) of some Mexican plants that were used as popular therapeutic remedies. The effectiveness of the species analyzed in this article had been known about for some time, but they lacked scientific recognition that would incorporate them into the *materia medica* available to health care professionals, not only in Mexico, but in other parts of the world, like France.

The scientific approach to popular therapeutic knowledge was seen as a means to political and economic legitimation, since the emperor gained supporters among the middle and upper strata of society, who saw him as a promotor of science that was useful to the nation, and the practitioners of pharmacy forged an argument to convince the regime to provide them with all sorts of resources to continue their naturalist practice as a basis for expanding the *materia medica* and chemical research on it. This provided a way to consolidate scientific practice so that in the long run it would cease to be dependent on foreign knowledge. Even though the Mexican empire lost the battle against the republic in 1867, the physicians and pharmacists of the SMM maintained their stance, with certain modifications in line with republican projects, which in scientific terms did not differ too greatly from the imperial ones.

The government of Benito Juárez (1867-1872) valued the expertise of physicians, naturalists, pharmacists, mining engineers and geographers, and thus many of them were admitted to the republican state apparatus. In the case of SMM members and School of Medicine professors, the president offered funding for educational development, ongoing remuneration for research of use to the nation, prestige as part of a new intellectual elite, a decision-making role in the process of centralizing scientific development, employment in governmental positions, sponsorship of meetings and publication of the GMM (Azuela, 2002,

p.64). These were convincing reasons for former imperialists to join the republican cause, once again under the banner of the supposed neutrality of science for the good of the country.

Also, almost all the physicians and pharmacists who published the 12 papers in the GMM, the physicians Luis Hidalgo y Carpio, Maximino Río de la Loza and Lauro María Jiménez, and pharmacists Alfonso Herrera and Gumesindo Mendoza, participated in the *Nueva farmacoepa mexicana*. Other authors who did not appear on this list of collaborators for the *Nueva farmacoepa mexicana*, but whose work was taken into account, were doctors Ramón Alfaro and Auguste Tourainne. The only physician excluded who had published pharmaceutical research was José María Reyes, perhaps because his work was of a historical nature, and doctor Francisco Cordero y Hoyos, who published a botanical study that was not relevant to a pharmacopeia.

The practitioners of pharmacy were welcomed into new scientific associations in Mexico City such as the Mexican Society of Natural History (Sociedad Mexicana de Historia Natural, 1868-1914) and the aforementioned Mexican Pharmaceutical Society. Both emerged in the reorganization of science that took place after Juárez came to power.

Lastly, it is worth pointing out that we still need to find out what became of pharmacy in the School of Medicine, in hospitals and apothecaries' stores, in the general press, in the Interior ministry (ministro de Fomento) and other scientific bodies in the capital in order to fully understand the role played by pharmacy during the Second Empire.

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NOTES

¹ The initials GMM refer to the journals of the Medical Section of the Scientific Commission and the Medical Society.

² Although the Second Empire was defeated in the middle of 1867, the GMM published papers presented by members during Maximilian's regime in the 1868 volume. Thus, the period covered in this article runs from 1864-1868.

³ The sections were physiology; pathology; hygiene, forensic medicine and Mexican statistics; auxiliary sciences; veterinary medicine; and pharmacy and *materia medica*.

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