Chemistry and Pharmacy in the Journal of the Academy of Medical Medicine (1836-1843)

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Abstract

This paper analyzes the articles published on chemicals and pharmaceuticals in the Periódico de la Academia de Medicina de Mégico. Through these publications it is possible to illustrate the transformation in the study of medical material of the era. At the same time, it shows discussions held by doctors and pharmacists about scientific news and analysis of local therapeutic resources.

KEY WORDS: *History of pharmacy. History of chemistry. 19th Century.*

Introduction

In 1836, the *Academia de Medicina de Mégico* (Academy of Medicine of Mexico) was created, an association that was key in those days when political instability, characteristic of beginnings of a new nation, turned the future of medical-pharmaceutical professions uncertain. The Academy had as its diffusion publication the *Periódico de la Academia de Medicina de Mégico*, which at its first stage of existence was able to publish six volumes, where its collaborators depict the concerns raised by the change of the medical model. In this sense, the *Periódico* is a first-hand source to address physicians and pharmacists' academic work as well as to identify the status of health sciences on the first half of the 19th century.

The declared purposes of the publication referred to the interest to study the therapeutic resources of the country, as well as to discuss the latest advances of health sciences, largely related to novel chemical substances that were arriving to enrich the *materia medica* (medical material/substance; pharmacology). The importance granted to such purposes drove one of its members, the professor of the course of Pharmacy at the Medical Sciences Establishment, José María Vargas, to state that the *Periódico* was addressed particularly to those who practiced that discipline.

The collaborators of the publishing claimed to be for the creation of a "national medicine", and therefore they undertook the task of gathering news on the weather, idiosyncrasy, remedies and legislation, since all these factors influenced on the treatment of diseases. They claimed that, once that information was gathered, doctors of other latitudes would no longer be imitated[1].

In this work, articles published on the *Periódico* whose title alludes to a vegetable or chemical product for therapeutic use are analyzed. It is about publications illustrating the knowledge the Academy members possessed on cutting-edge authors and works, while describing the status of pharmacy on the first half of the 19th century. In the articles, the critical posture by means of which doctors and pharmacists approached the commercial twist that was experienced in the production of medications is highlighted. This

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posture would set the grounds to the conformation of a local pharmacopeia by means of which systematizing pharmaceutical procedures was attempted, as well as to actively participate in the changes occurring in the study of pharmacology.

The *Periódico* as a space for scientific novelties

In the new scenario of an independent country, doctors and pharmacists collaborating with the *Periódico de la Academia de Medicina de Mégico* were convinced that their disciplines made concrete contributions to the task of building a new social environment. According to physicians of those days, providing healthy conditions, preserving from crime and reestablishing the health of the sick were the final duties of a State that is concerned for its population[2]. The training of teachers instructed on the study of man, the chemical tests that helped to identify dangerous substances in food or destined to criminal acts, and experimentation of new therapeutic resources, were some of the contributions that medicine and pharmacy had to contribute to such tasks.

In their collaborations, the professors discussed the concept of disease, initiated polemics about medical systems, the validity of bloodletting and the pertinence of full diet in febrile conditions, in addition to reviewing articles from cutting-edge journals such as *Répertoire Annuel de Clinique Médico Chirurgicale*, *Revue Médicale* and the *Journal de Chimie Médicale*, *de Pharmacie et de Toxicologie*, which accounts for the active bibliographical exchange the collaborators of the journal were involved with.

References to authors who were making original contributions to the fields of chemistry and pharmacy were also not omitted, with Apollinaire Bouchardat and his *Elements of materia medica and pharmacy* (1839) standing out, as well as Eugène Souberain, whose *Treatise on theoretical and practical pharmacy* (1827) was used as a textbook at the Medical Sciences Establishment, Spaniard Mateo Orfila, expert in toxicology, as well as the French botanist and physician François-Victor Mèrat, author of the *Dictionary of Materia Medica* (1837).

The study of local *materia medica* or pharmacology was part of the therapeutic armamentarium review undertaken since the middle of the 18th century by some physicians and pharmacists who questioned the validity and efficacy of existing pharmacopeias' content. According to one of its founders, one of the purposes of the publication was to spread among physicians information on the new substances that were arriving to enrich pharmacology, as well as to study the resources provided by Mexican botany. And the thing is that changes in medical models had to be accompanied by a renewal of their resources, and health professionals of those days were therefore willing to review those products that had so far been administered with "blind faith", but that, with the lights provided by chemical analyses, should be used more cautiously[3].

In this sense, they were also looking to drive away from Galenic polypharmacy, which forced a pharmacist to prepare complicated formulas where numerous simple components intervened. The German botanist and physician Julio Schiede, collaborator of the publication, claimed in this regard: "Neither am I of the opinion that any plant with certain medicinal virtue, although indisputable, deserves to be readily admitted to increase the *materia medica*; on the contrary, I think that, for that purpose, it is indispensable for the substance to have a unique virtue, and not identical to others already known and widely used"[4].

Between novelties and local pharmacology

Between the years 1836 and 1843, 104 insertions with titles alluding to any therapeutic product were published in the *Periódico*. Out of them, 49 took care of describing resources originating from plants and 55 were used to offer news about therapeutically useful chemical substances (Table 1).

Among the enumerated vegetable resources, ergot of rye was the product that deserved the largest number of collaborations in the *Periódico*, since it had 11 insertions dedicated. Apparently, Manuel Carpio, editor of the publication, was particularly interested in ergot of rye, which was employed to promote uterine contractions and had been first described in 1826 by French professor Bordot. The rules for its use, the ways to prepare it, preservation methods and its different applications were some of the topics addressed to describe it. Gabriel Villete, Obstetrics professor at the Medical Sciences Establishment, celebrated that ergot of rye came to substitute castoreum, warm wine and saffron, sage or ruta tinctures that used to be administered to women on labor but that, according to his observations, caused abdominal inflammation, and therefore ended up hindering contractions[5].

Some *Periodico* collaborators underscored they were the first ones to resort to therapeutic novelties.

Table 1. Vegetable products appeared in the *Periódico* between 1836 and 1843

Volume	Product	Use	Product	Use
1 1836-1837	Ergot of rye	Oxytocic Hemostatic	*Erytrhyaea tretamera*	Febrifuge
	Opium	Pneumonia	*Erithrae stricta*	Febrifige
	Cainca	Hydrops	*Poligala scoparia* or *mexicana*	Emetic, expectorant, febrifuge
	Guaco	Antidote	Mesquite gum	Demulcent
	Ivy	Poisoning Sudorific		
2 1837-1838	Mellon root	Emetic Emollient	Pomegranate root bark	Taeniasis
	Ergot of rye	Oxtyocic	Sarsaparilla	Sudorific Anti-venereal
	Belladonna	Scarlet fever		
3 1838-1839	Nux vomica	Colic, dysentery	Ergot of rye	Oxytocic Uterine phlebitis (causative)
	Cinnamon	Disentery	Cubeb	Urethritis
	Indigo	Epilepsy		
4 1839-1840	Opium	Narcotic	Ergot of rye	Amenorrhea
	Violet (syrup)	Emollient	Sarsaparilla	Sudorific
	Copaiba	Urethritis	Ipecac	Emetic Expectorant
Volume 1 2nd epoch 1842-1843	Ergot of rye	Paraplegia	Cubeb	Vaginitis
	Belladonna	Scarlet fever prophylaxis	Copaiba	Vulnerary
	Strawberries	Gout	Monesia	Astringent

Doctor Germán Uslar, member of the Academy, described the first case of colic healing with nux vomica[6]. Ángel Binaghi narrated having cured one case of chronic diarrhea with recently-arrived to Mexico creosote[7]. Creosote, the discovery of which is attributed to German pharmacist Reichenbach, was included years later in the *Farmacopea Mexicana*, where it was indicated for toothache, but its main quality was being an anti-putrid, and was therefore used for meat preservation. However, in the desire to find different applications to therapeutic novelties, doctors did not hesitate to try them in cases where traditional remedies seemed to fail to yield results; this is what doctor Schiede did, who used creosote to treat a case of diabetes mellitus, where the resource acted, according to what he said, by decreasing the amount of urine[8].

In addition to the novelties, the *Periódico* collaborators decided to make a description and analysis of local pharmacology with the express purpose to substitute medications coming from abroad. Previously mentioned doctor Schiede, interested in plants synonymy, i.e., in the identification of plants with local names but similar properties to those of resources coming from abroad, used to praise the country's geography and climatic diversity, which translated into vegetable richness and offered the possibility to reduce the dependency on exotic medications. On his collaborations, Schiede made concrete proposals for the substitution of some simple substances; for example, he considered that gum Arabic from Senegal, widely used as a demulcent, could be substituted by mesquite gum, "a vegetable that is despised and looked at as an annoyance by those who travel across the most sterile parts of the Republic because it doesn't provide shadow"[9]. In addition, Schiede proposed substituting *Polygala senega* with *Polygala scopatia* or *mexicana*, of expectorant, purgative and

diuretic qualities. The works of the German physician were recognized by the *Periódico* editor three years later since, in 1839, as a result of the first French intervention or War of the Cakes (1838-1839), the country suffered blocks that hindered the arrival of some plants; in that context, the works made in the field of replacements highlighted their usefulness. In addition, both mesquite gum and *Polygala mexicana* were included in the *Farmacopea Mexicana*, published in 1846.

For his part, Leopoldo Río de la Loza considered that every doctor should know the medicinal substances produced in the place he inhabited in order for not to depend on exotic substances that turned out being more expensive and were more exposed to be adulterated than the local ones. Based on these principles, the chemist also took care of describing some replacements. For example, he proposed using stramonium (or *toloache*) oil to substitute the belladonna ointment to fight rigidity of the uterine cervix[10].

Botany and chemical study of another local plant named guaco, originating from Tabasco, was carried out by José Manuel Herrera, chemistry professor at the Mining College. According to his observations, which had started in 1833, the active part of the plant was the substance that he himself had given the name of *guaquina*. It was, he said, the same compound referred to as guacine by French pharmacist Fauré, who had introduced it in the *Paris Journal of Pharmacy* on March 1836, that is, on the same year Herrera was publishing. The professor emphasized on the use given to the plant to cure venomous insects' bites and against snake venom. In Peru, he explained, the plant had been used to draw snakes away from fields abundant in mineral richness. Addressing this utility, he called the government to recognize that the promotion of natural sciences acted as a leverage for industrial activities, which were the "source of richness in civilized nations"[11].

One concrete example of the changes that were occurring in the study of pharmacology was the articles published about the "sarsaparilla essence", a commercial product that offered a spirituous preparation of the plant. The success of the essence aroused suspicion in an author, identified as B.P., who warned about the fraud of the product, which offered to act against syphilis, when its main ingredient, sarsaparilla, lacked the necessary qualities, he said, to even be a sudorific.

José María Vargas, who claimed to be the first one to prepare the essence, came out in defense of the plant by ratifying the uses that since ancient times had accompanied the use of sarsaparilla as a sudorific agent and in attenuating the mercurial effects of treatments against syphilis[12]. However, B.P. concluded that it was a "useless vegetable" and that sarsaparilla essence was an uncertain compound, since its preparation varied from one pharmacy to another, and its effects were therefore not uniform or chemical analysis of the plant conclusive, since the professors dedicated to that task were still trying to identify the active substance of the sarsaparilla root[13].

With regard to the chemical analysis of the plant, Marcos Arellano, a pharmacist and substitute teacher at the Medical Sciences Establishment, reviewed the works by doctor Poggiale who, by performing the corresponding examinations, determined that the active substances of the plant, identified by four different professors as parillin, sarsaparillin, smilacin and parillinic acid, were actually the same substance. With this dispersion, complained Arellano, "instead of expanding the domain of chemistry, this beautiful science is turned into a real chaos by introducing bodies that have never existed"[14].

Qualifying a remedy as uncertain constituted quite a discredit, since this indicated that it was prepared differently at each pharmaceutical office, that was easily altered and that therefore it produced uneven effects on the patient. This was one of the greatest problems pharmacists were trying to drive away from their practice, since in the new era of medication, the resources they worked with, were trying to be brought to a scientific, uniform and systematized field. The identification of active substances met this purpose since, by using them, it was explained, the amount of medication required in a formula could be reduced and doses could be accurately determined. These advantages, claimed Medical Sciences Establishment professor Ángel Binaghi, were not attained when the resources were directly taken from nature, since a plant's properties depended on multiple factors, such as the soil they grew in, their degree of maturity or the part used[15]. With this panorama, chemical analysis was the tool that aided health disciplines to standardize the resources.

Chemical novelties

While medical systems inherited from ancient times were being surpassed and experimental medicine was being established, observed Manuel Robredo, who was secretary of the Medical Sciences Establishment,

there was still the question of what to prescribe: "Mercury say the Englishmen, mercury answer the Americans, mercury, shout then the Frenchmen and mercury starts to repeat the Mexican echo"[16]. Robredo's observation is in line with the *Periódico* content, since the most cited chemical-type therapeutic resource was the well-known mercury, which had nine dedicated articles. In the publications, in addition to ratifying its anti-syphilitic qualities, chemical preparations such as mercury deutoxide or mercury phosphate are described, or else it is tested in different diseases such as typhoid fever, gastritis and erysipelas (Table 2).

Alkaloids did not take long to enter the scene. In 1837, Vargas reviewed an article where the difference between the effects of morphine and codeine was indicated: "a precious discovery for therapeutics"[17]. In this regard, the article indicated that while morphine caused a heavy sleep out of which the individual awakened with notable paleness, codeine produced a happy awakening, and the patient was therefore cheerful and ready for laughter. Since it also appeared to invigorate digestive functions, codeine was included in the *Farmacopea Mexicana*, where it was indicated for gastralgias and

Table 2. Chemical products

Volume	Product	Use	Product	Use
1 1836-1837	Creosote	Diabetes mellitus	Codeine	Gastralgias Enteralgias
	Liquid ammonia	Drunkenness Apoplexy	Iron carbonate	Hepatitis Splenitis
	Calomel	Typhoid infections	Opium extracted alkalis	Reagents
	Led acetate (F)	Pneumonia	Deutoxide of mercury	Typhoid fever
	Tritoxide of iron	Arsenious acid antidote		
2 1837-1838	Ammonia	Drunkenness	Liquid chlorine	Scarlet fever
	Calomel	Quinsy	Tannin	Hemorrhages
3 1838-1839	Hydrogen azide	Drunkenness Sudorific Rubefacient	Datura stramonium sulfo-soapy ointment	Substitute for belladonna
	Sulfate of quinine	Intermittent fevers	Cirilo ointment	Syphilis
	Mercury	Erysipelas	Creosote	Digestive ulcer
4 1839-1840	Antimony golden sulfur	Expectorant	Arsenic	Venom
	Sulfur carbide	Cold tumors	Mercury	Colitis Metritis
	Cream of tartar	Purgative	Phosphate of mercury	Buboes
	Sheets of gold	Smallpox scars	Tannin	Astringent
5 1840-1841	Arsenious acid	Poisoning	Amygdalin	Hydrocyanic acid substitute
	Phloricin	Febrifuge Substitute of quinine	Iron lactate	Chlorosis
	Mercury	Mercurialization		
1 2nd epoch 1842-1843	Quinine sulfate	Diabetes	Zinc sulfate	Blennorrhagia Leuokorrhea
	Iodine	Strychnine antidote	Iron	Arsenious antidote Chlorosis
	Mercury	Aphonia Phlegmons	Sulfur	Rheumatism
	Seidlitz powers	Purgative		

enteralgias. Subsequently, it was listed among the substances that every pharmacy should have, and its existence and preparation were therefore verified during inspection visits.

Not always did novelties arrive to facilitate work, but sometimes they complicated it, especially with regard to the new nomenclature. On his first collaboration in the *Periódico*, Vargas alerted pharmacists about errors deriving from wrongful use of the terms that designated new therapeutic products. In the article reviewed by the professor, incidents involving pharmacists in judicial problems were described; such was a case where, instead of filling a prescription for mercury protochloride (or calomel, a purgative substance) it was filled with mercury deutochloride (a corrosive compound). The case, he concluded, was a call of attention both for pharmacists and physicians, since they were also obliged to learn the new nomenclature, since sometimes they wrote their prescriptions in a careless form[18].

On the other hand, with chemistry as a tool, doctors and pharmacists found the way to serve public interest. Several articles took care of describing methods to determine food alterations, either by the commission of crimes or else as one more chapter of commercial abusive practices, as it occurred with chocolate, denounced Rio de la Loza, who dedicated an article to its forgery. The publication collaborators could realize that the "chemistry of living bodies", as it was referred to by doctor Robredo, by enabling digestion, blood or saliva analysis, was useful to understand physiologic, therapeutic and legal implications of diseases.

New pharmaceutical procedures

The original articles written by the *Periódico* collaborators, as well as the reviews and translations of foreign authors, gave cause for pharmacists to review their preparation procedures. Both doctors and pharmacists inserted constant allusions to the fact that medication preparation varied from one pharmacy to another, either due to low accuracy of formulas or poor training of pharmacists, which were aspects that translated into weakness for pharmacy, discredit for doctors and danger for patients. For example, Carpio did not hesitate in having analyzed the oxide of zinc by means of which he healed a skin ulcer, since he did not trust the pharmacies where he ordered its preparation[19]. In addition, he attributed the first failures he experienced to pharmacies' careless confection when he used this tannin, considered to be astringent in nature, against two cases of hemorrhage. The results changed, he claimed, when he obtained a product of quality[20].

However, the *Periódico* also shows the abilities of pharmacists interested on the changes that were occurring in the field of pharmacology and that left proof of their work. To perform the chemical analysis of the plants he studied, Schiede collaborated with pharmacist Antonio Simeón, who is continuously cited on his articles. Rafael Martínez, owner of the pharmacy located at the Las Damas street and assiduous pharmaceutical professional examination committee member at the Medical Sciences Establishment, put into practice the method known as solidification of "young chemists" Mialhe and Robin to reduce the bad odor and unpleasant taste of some medications[21]. With the same purpose to improve the taste of certain substances, the method proposed by French pharmacist Raquín to manufacture pure gluten capsules where difficult to administer medications (including copaiba, a vulnerary resin described as a substance that is "as repugnant as efficacious") were introduced, was accounted for[22].

The physician Manuel Andrade and previously mentioned Rafael Martínez replicated the works of a French professor named Gannal to preserve corpses by submerging them in alumina and led acetate. The professors detailed the employed method and as a sample of their good results, they brought a thigh to the session of the Academy celebrated on December 7, 1840.

Pharmacists were convinced that the skills their profession conferred them ought to b considered in the transformations being experienced in pharmacological analysis and confection. Such abilities manifested themselves when the professor managed to give medications a good taste or found adequate procedures to preserve his products. Methods to confer vinegar a long life, preparing a syrup with an attractive color and flavor, or else proposing substitute substances to replace popular chemicals were contributions achieved by pharmaceutical skills, which José María Vargas took care to review, probably to remind that pharmacy was also a form of art.

Chemistry and uncertain drugstore

In the new medication panorama of early 19th century, chemical substances and vegetable products were not the sole protagonists; new characters, such as drugstore shopkeepers, were also appearing on the scene, and their presence in the market of health forced both

physicians and pharmacists to have a critical posture with regard to the resources they worked with.

In this regard, the *Periódico* collaborators underscored two aspects that directly affected their practice: the first one was related to medications qualified as being uncertain that also came from chemistry; and the second one, to drugstores' "commercial greed", which impelled both physicians and pharmacists to use their skills and knowledge, in order not to give in before them.

In 1838, an author identified as L.R. (who might just well have been Leopoldo Río de la Loza) made a list of inconstant remedies where many of the novelties that had been the subject of enthusiastic articles on the *Periódico* first numbers, including different acids (hydrocyanic, nitric, benzoic), acetates (ammonia and morphine) and syrups (diacodion, ipecac and manna). These products, observed the professor, were chemically unstable, such as hydrocyanic acid, which broke down when exposed to light; others had no therapeutic value; or else it was about products that could be substituted with simpler substances[23].

The chemist didn´t stop criticizing commercial presentations of "fashionable" products as, for example, Seidlitz powder, a purgative with good taste and simple formula, could be prepared at any pharmacy, and he therefore advised his colleagues to reject "the vulgar concern of bestowing merit that drugs covered with ornament lack and the only recommendation they have is to carry the method written in a language that not everybody understands"[24].

In 1841, acting as the secretary of the Higher Council of Public Health, Rio de la Loza asked the authorities to protect health disciplines from charlatans with no training and drugstores void of scruples that assumed their buyers were ignorant. He also advocated for fostering the study of pharmacology of the country, the soil of which was filled with therapeutic agents, but where physicians, denounced the chemist, had to wait for them to arrive from abroad in order to be able to know their effects; in this sense, he lamented that Mexican pharmacology was developing abroad: "our plants have to travel beyond the oceans to be given a name that we will then study in books written in a foreign language; the drugstore business takes the simple substances to reduce them to the least expression, and ask us for a flask garnished with insubstantial decorations four times its real value"[25].

A couple of years prior, doctors and pharmacists, led by Río de la Loza and José María Vargas, had already taken the initiative to work local pharmacology since, in 1839, they organized around the Academy of Pharmacy with the purpose to develop to elaborate a pharmacopeia intended to systematize pharmaceutical procedures and investigate local medical materials and substances.

In the contents of the *Farmacopea*, published in 1846, the inclusion of the drugs that were the subject of some journalistic review can be identified[26]. All vegetable resources were included in the text, either listed on the record of most common simple medications in pharmacy, or as part of some pharmaceutical preparation. On the side of chemical-type resources, only three elements, mercury phosphate, sulfur carbide and *Cirilo* ointment, were excluded from the formulary.

Some of the products that had been the subject of criticism on the *Periódico* pages were only documented without being part of any pharmaceutical formula; such was the case of monesia, "the fashionable astringent" of the moment, which Río de la Loza had recommended to keep under surveillance to verify that its virtues were true. Hydrocyanic acid, which had been addressed with suspicion in the *Periódico*, was referred to in the *Farmacopea* with similar skepticism by describing it as a dangerous and rather unsafe sedative, and it was therefore not part of any pharmaceutical preparation. On the other hand, the most commonly referred resource in the *Periódico*, ergot of rye, was replaced with the recommendation of a local substitute, *zoapatli*, also with oxytocic virtues. In this sense, it could well be inferred that the critical posture of the publication collaborators was considered in the formulary that guided the use of therapeutic resources for a good part of the 19th century.

The ties between the *Periódico* and the *Farmacopea* may have derived firstly from the common authors that collaborated in both publications. On the other hand, these ties also make it evident that the contents of the *Periódico* were at the vanguard of general discussions related to therapeutics and its resources, the study and review of which were becoming necessary in the face of the changes the new pharmacology was generating in doctors and pharmacists professional practice.

Conclusions

Through the articles published in the *Periódico*, the theoretical and practical renewal of health sciences can be addressed, as well as the interest of doctors and pharmacists to incorporate therapeutic novelties deriving both from vegetable products and chemical analysis. In the *Periodico* articles related to pharmacology, the intention to abandon Galenic

polypharmacy and to provide a series of chemistry-related theoretical-practical concepts as part of the new frame of abilities that will distinguish 19th century physicians and pharmacists is observed.

In that effort, the *Periódico de la Academia de Medicina de Mégico* became a space that also represented quite a novelty in front of traditional health professions' association and organization forms, previously tied to corporate structures (guilds and universities). The Academy members knew how to construct a means where they exchanged opinions, announced novelties, debated on pharmacology and advocated for the study of local therapeutic resources as part of their practice.

The discussions around new therapeutic resources, on the incursion of new stakeholders in medication production and on the need to systematize pharmaceutical procedures, widely discussed in the *Periódico*, were reflected on the project undertaken by doctors and pharmacists to create a pharmacopeia where the resources reviewed in the publication were included. This way, the collaborations did not remain between the *Periódico* pages, but found an application in a project by means of which, the attempt to create a national corpus of medicine and pharmacy, a purpose that would remain current during the 19th century, was given a foundation.

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