Department of the History of Medicine and Medical Deontology[1], University of Crete School of Medicine, Heraklion, Crete, Greece; Department of the History of Pharmacy and Ethics[2], Erciyes University Faculty of Pharmacy, Kayseri, Turkey

Georgios Photeinos and his *Hellenic Pharmacopoeia* (1835) published in Ottoman Smyrna

G. Tsoucalas[1], H. Tekiner[2,*]

Received October 16, 2024, accepted November 21, 2024

**Corresponding author: Halil Tekiner, Department of the History of Pharmacy and Ethics, Erciyes University Faculty of Pharmacy, 38280 Kayseri, Turkey*
htekiner@erciyes.edu.tr

Dedicated to Prof. Christoph Friedrich, Marburg, on the occasion of his 70th birthday,

Pharmazie 79: 258-262 (2024) *doi: 10.1691/ph.2024.4050*

The *Hellenic Pharmacopoeia*, authored by Ottoman pharmacist Georgios Photeinos and published in 1835 in Smyrna (modern-day Izmir, Türkiye), is a historically significant yet largely overlooked work in 19th-century pharmaceutical literature. At a time when modern pharmaceutical resources in Greek were scarce, Photeinos sought to address this gap by creating a comprehensive pharmacopoeia that extensively drew from the *Austrian Pharmacopoeia*, as well as French and Latin sources. Although he initiated the project around 1804, political upheavals delayed its completion by more than three decades. Spanning 538 pages, the *Hellenic Pharmacopoeia* is divided into three sections: a Lexicon of Pharmacopoeia, a Synopsis of the Theory of Chemistry, and a section on Practice of the Pharmacopoeia, or the Preparation. In the lexicon, Photeinos included Turkish terms written in the Greek alphabet, reflecting his commitment to making the work accessible to Turkish-speaking Greek communities within the Ottoman Empire. Despite its ambition, Photeinos' work was overshadowed by the official pharmacopoeia of Greece, published in Athens in 1837 under the same title, *Hellenic Pharmacopoeia*. His efforts to modernize and standardize pharmaceutical practices for Greek-speaking communities represents an important step toward the professionalization during a period of significant socio-political transformation. This paper examines Photeinos' life, contributions, and the significance of his pharmacopoeia, which has remained largely forgotten.

1. Introduction

Pharmacopoeias, in the modern sense, had been in use for over five centuries, but the 19th century marked a period of rapid growth in their production and widespread adoption across various countries (Cowen 2001). This expansion was driven by advances in scientific knowledge and the professionalization of pharmacy, characterized by developments in pharmacology and therapeutics, as well as a shift from traditional herbal remedies to chemically synthesized compounds (Sonnedecker 1986). Notably, the isolation of alkaloids, such as morphine, atropine, and quinine, and the development of new methods in chemical analysis contributed significantly to this transformation (Hosztafi 1997; Zebroski 2015). Additionally, the emergence of local, national, and eventually standardized pharmacopoeias in the 19th century introduced uniform guidelines for drug purity, composition, and dosage in many countries (Anderson 2024). To support the growing demand for precise and current pharmacopoeias, many regions translated key works into local languages, facilitating their use among pharmacy practitioners (Cowen 2001; Crawford and Gabriel 2019).

A notable example of this effort is the *Hellenic Pharmacopoeia*, published in 1835 in Ottoman Smyrna (modern-day Izmir, Türkiye) by Georgios Photeinos (Photeinos 1835). This work aimed to address the shortage of Greek-language pharmaceutical resources by providing a comprehensive text that drew extensively from the *Austrian Pharmacopoeia* and incorporated insights from French and Latin sources, as noted in its subtitle. Additionally, it sought to modernize pharmaceutical practices for Greek-speaking communities within both the Ottoman Empire and Greece during a period of significant socio-political transformation (Photeinos 1835). However, the life and contributions of Photeinos have not been extensively studied, leaving our knowledge of his work relatively limited.

2. Scope and purpose

This paper examines the life of Georgios Photeinos and the historical significance of his *Hellenic Pharmacopoeia*. By situating his work within its broader context, this study seeks to highlight Photeinos as an often-overlooked figure in early 19th-century pharmaceutical literature and to underscore his role in transmitting European pharmaceutical knowledge to Ottoman and Greek pharmacists. The research draws from both archival and documentary sources, with primary materials accessed at the Gennadius Library (Athens) and the University of Crete Library (Heraklion). Despite thorough searches in the Hellenic State Archives (Athens) and the Ottoman Archives (Istanbul), no additional primary documents related to Photeinos were found. To supplement this archival research, additional searches across various digital libraries (e.g., Anemi – the Digital Library of Modern Greek Studies, Gallica – the Digital Library of the Bibliothèque nationale de France (BnF), Google Books, and the Greek Libraries Network) yielded limited but complementary historical information.

3. Georgios Photeinos: a short biography

Although little is known about the personal life of Georgios Photeinos (Greek: Γεώργιος Φωτεινός), key insights can be drawn from his own works and the titles he held. In his *Hellenic*

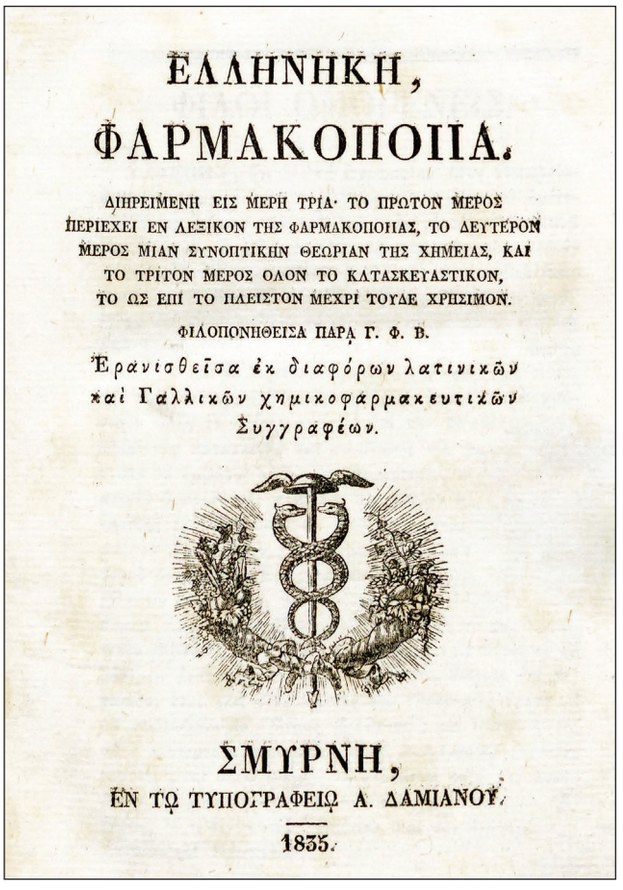
Pharmacopoeia (1835), Photeinos signed his initials as G.F.B. (Greek: Γ.Φ.Β.), with the 'B' likely standing for "Byzantiou" (Greek: Βυζαντίου), indicating his origin from Constantinople (modern-day Istanbul) (Photeinos 1835) (Fig. 1). He was also honored with the title "Archon Serdaris" (Greek: Άρχων Σερδάρης), a distinction conferred on individuals recognized for their leadership and service, particularly by the Christian Patriarchate of Constantinople. This title also granted him the freedom to travel and pursue academic work (Photeinos 1835). His intellectual stature is further evidenced by the consistent use of the same title in other scholarly works, such as *Elements of Algebra* (1806) and *A Chronological Epitome of General History* (1808), attesting to his esteemed reputation in intellectual circles (Antoniadis 1808; Gobdelas 1806; Karamberopoulos and Oikonomopoulou 2004).

From the foreword of his *Hellenic Pharmacopoeia*, we learn that Photeinos studied pharmacy in Bucharest, where he presented a thesis on pharmacopoeias, demonstrating his deep involvement in the scientific advancements of his time (Photeinos 1835). His academic pursuits were likely closely connected to the "Hellenic Golden Era" of the Phanariots (1711–1821), a time when educated Greeks from Constantinople's Phanar (Turkish: Fener) district, situated along the Golden Horn, held influential roles within the Ottoman Empire (Gavra 2019). During this period, Neo-Hellenism thrived in the Romanian regions, which emerged as significant centers of the Greek Enlightenment (Patrinelis 2001).

Coming from a prominent Phanariot family with several reputable members, Photeinos played a significant role in the intellectual and cultural movements of his time, not only in Ottoman Constantinople but particularly in Romania, where he was actively involved in the scientific community and academic life (Philliou 2011). However, the outbreak of the Greek Revolution in 1821 brought significant changes, as Hellenic institutions such as the Authentic Academy of Iaşi (Hegemonic Academy) and the Academy of Bucharest were closed by Ottoman authorities, who viewed them as centers of revolutionary activity (Camariano-Cioran 1974; Patrinelis 2001).

In addition to his contributions to pharmacy, Photeinos' influence was deeply intertwined with his political connections, particularly with Alexandros Mourouzis (c. 1750–1816), the Grand Dragoman of the Ottoman Empire and Prince of Moldavia and Wallachia. Mourouzis, regarded as one of the most capable rulers of the Phanariot era, played a key role in shaping the political landscape of the Principalities (Filitti 1997; Iftimi 2015). Political upheavals, including Mourouzis' eventual exile, likely influenced Photeinos' decision to return to Constantinople (Photeinos 1835).

Photeinos' life illustrates the interconnectedness of political, intellectual, and scientific developments during the Phanariot era. His active role in governance and cultural advancement underscores the significant influence Ottoman Greek expatriates had in shaping the intellectual and political landscape of this period.


ΕΛΛΗΝΙΚΗ,

ΦΑΡΜΑΚΟΠΟΙΙΑ.

ΔΙΗΡΕΙΜΕΝΗ ΕΙΣ ΜΕΡΗ ΤΡΙΑ· ΤΟ ΠΡΩΤΟΝ ΜΕΡΟΣ ΠΕΡΙΕΧΕΙ ΕΝ ΛΕΞΙΚΟΝ ΤΗΣ ΦΑΡΜΑΚΟΠΟΙΑΣ, ΤΟ ΔΕΥΤΕΡΟΝ ΜΕΡΟΣ ΜΙΑΝ ΣΥΝΟΠΤΙΚΗΝ ΘΕΩΡΙΑΝ ΤΗΣ ΧΗΜΕΙΑΣ, ΚΑΙ ΤΟ ΤΡΙΤΟΝ ΜΕΡΟΣ ΟΛΟΝ ΤΟ ΚΑΤΑΣΚΕΥΑΣΤΙΚΟΝ, ΤΟ ΩΣ ΕΠΙ ΤΟ ΠΛΕΙΣΤΟΝ ΜΕΧΡΙ ΤΟΥΔΕ ΧΡΗΣΙΜΟΝ.

ΦΙΛΟΠΟΝΗΘΕΙΣΑ ΠΑΡΑ Γ. Φ. Β.

Ἐρανισθεῖσα ἐκ διαφόρων λατινικῶν καὶ Γαλλικῶν χημικοφάρμακευτικῶν Συγγραφέων.

ΣΜΥΡΝΗ,

ΕΝ ΤΩ ΤΥΠΟΓΡΑΦΕΙΩ Α. ΔΑΜΙΑΝΟΥ.

1835.

Fig. 1: Cover of the *Hellenic Pharmacopoeia* by Georgios Photeinos, published in Smyrna (modern-day Izmir, Türkiye) in 1835. (Courtesy of the University of Crete Library, Heraklion, Greece)

4. Greek-language pharmacopoeias in the early 19th century

The initiative to create a modern pharmacopoeia in the Greek language took root in the early 19th century as part of broader efforts to provide Greek-speaking pharmacists with accessible resources (Emmanuel and Dambergis 1969; Skaltsa 2015). In the first quarter of the 19th century, likely between the 1810s and 1820s, Priest Charisios Dimitrios Megdanos of Kozani (1768–1823) undertook the task of compiling a 206-page Greek-language pharmacopoeia in manuscript form, drawing on multiple reference sources. Titled *The United Pharmacopoeia and Pharmacology* (Greek: ἡ Ἑνωμένη Φαρμακοποιία καὶ Φαρμακολογία), the manuscript was meticulously reviewed and corrected by Dr. Georgios Sakellarios (1765–1838) (Megdanos undated). Despite these efforts, the work ultimately remained unpublished. Concurrently, in 1818, Dionysios Pyrros (c. 1774–1853) of Thessaly, a Greek Orthodox priest and scholar, produced a Greek translation of Luigi Valentino Brugnatelli's pharmacopoeia, originally published in Italian in 1802 (Pyrros 1818; Tekiner 2024). Pyrros' comprehensive volume, published in Constantinople, included 214 monographs, indices, and a guide on drug preparation tools, likely aimed at meeting the needs of Greek-speaking pharmacists within the Ottoman Empire (Etker 2000). In 1831, Pyrros also published *The Physicians' Handbook: Or Practical Medicine* in Greek, a two-volume work released in Nafplio, a coastal city in the Peloponnese, Greece (Pyrros 1831). Also known as the *New Pharmacopoeia* (Greek: Νέα Φαρμακοποιΐα), the second volume of this work includes a pharmaceutical codex of some 450 medical preparations and 150 medicinal herbs, each tailored to address the 362 diseases detailed in the first volume (Pyrros 1831).

Georgios Photeinos initially intended to publish his pharmacopoeia in 1807; however, it remained unpublished for several decades. It was finally brought to print in 1835, with the support of Konstantinos Rozos (Greek: Κωνσταντίνος Ρόζος), who took responsibility for its publication. This information is noted in the preface (p. 402) of the appendix titled "The Assistant of the Artisan" (Photeinos 1835). With this delayed publication, Photeinos introduced his *Hellenic Pharmacopoeia* (Greek: Ελληνική Φαρμακοποιΐα) in Smyrna (Greek: Σμύρνη), an Ottoman city on the Aegean coast renowned for its rich medico-historical tradition (Photeinos 1835). Following Constantinople, Smyrna hosted one of the largest Greek health professional communities in the 19th-century Ottoman Empire (Vladimiros 2018). In the foreword, Photeinos reflects on his background and motivations, highlighting the persistent shortage of contemporary Greek-language pharmaceutical textbooks, particularly in comparison to the abundance available in European nations. He underscores the pressing need his pharmacopoeia aimed to fulfill (Photeinos 1835). Photeinos further notes that his work builds on an earlier thesis written in Bucharest and relies heavily on the *Pharmacopoeia Austriaco-Provincialis Emendata* (Revised Austrian-Provincial Pharmacopoeia), a widely respected reference

used between 1794 and 1812, thereby grounding his work in established European standards (Kletter 2015b; Photeinos 1835).

Photeinos' choice of the *Austrian Pharmacopoeia* as a model was likely influenced by its strong reputation as a well-organized and up-to-date reference of his time. This decision aligns with praise from Earl Stanhope, President of the Medico-Botanical Society of London, who commended the *Austrian Pharmacopoeia* for including species not found in other major works, such as the *Pharmacopoeia Londinensis* (Stanhope 1830).

Photeinos spent three years, from 1804 to 1807, completing his pharmacopoeia, which he dedicated to Alexandros Mourouzis, a prominent political leader who supported the project by commissioning a committee of scholars to review it, including distinguished figures such as Daniel Philippides and Antonios Photeinos Byzantios (Photeinos 1835). However, Mourouzis' political exile in 1806 delayed its publication, and although the work was completed in 1807, it remained unpublished. During the Hellenic Revolution (1821–1829), further revisions were made to improve its accessibility for younger pharmacists (Photeinos 1835). Ultimately, the pharmacopoeia was published in Smyrna in 1835, two years before the official *Hellenic Pharmacopoeia* of Greece was issued in Athens by Vouros, Landerer, and Sartori (Vouros et al. 1837).

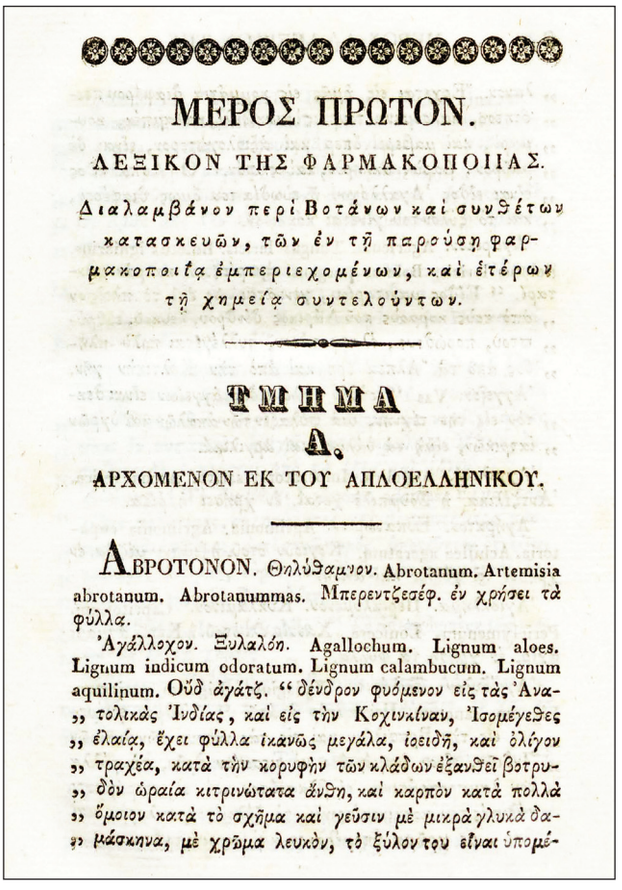
In the foreword, Photeinos also acknowledged Konstantinos Vardalachos (1755–1830), a prominent Greek scholar and educator associated with the Greek Enlightenment (Photeinos 1835). As the master of the Public Hellenic School of Bucharest and a graduate of the University of Padua, Vardalachos made significant contributions to Greek intellectual life, publishing Greek-language books in Bucharest that advanced the educational and cultural ideals of the Enlightenment (Koukkou 1966).

5. Results

The *Hellenic Pharmacopoeia* (1835) of Smyrna is a comprehensive, 538-page work organized into three main sections. The first section, titled "Lexicon of the Pharmacopoeia" (pp. 1–193) and subtitled "Containing information on herbs and compound preparations included in this pharmacopoeia, as well as other elements contributing to chemistry," presents an alphabetical catalog covering a wide range of substances, including herbs, minerals, chemicals, distillates, resins, oils, broths, and ointments (Fig. 2). This lexicon contains 1,268 entries in simple Greek (Greek: απλοελληνική), with some substance names also listed in Latin (1,513 entries), drawing on references from German, French, and Italian sources (Photeinos 1835). Some scholars believe that Photeinos' use of simple Greek aimed to enhance accessibility, making the text approachable for educated or younger professionals as well as uneducated readers (Karamberopoulos and Oikonomopoulou 2004; Skaltsa 2015). A distinctive feature of this first section is the inclusion of Turkish terms transcribed into Greek, alongside Greek and Latin nomenclature. For example, Photeinos records the plant basil under its Latin name, *Ocimum basilicum*, as Ὠκιμον ο Βασιλικός in Greek, and as Φεσλιγκέν οτού in Turkish, written with the Greek alphabet (Turkish transliteration: fesleğen otu) (Photeinos 1835). This approach reflects Photeinos' intent to make the work accessible to Turkish-speaking Greek communities within the Ottoman Empire, bridging linguistic and cultural divides.

The second section, titled "Theory of Chemistry" (pp. 194–229), is divided into eight chapters and offers a synopsis of essential chemical principles relevant to pharmaceutical practice. Photeinos regarded a solid foundation in chemistry as crucial for understanding the composition and preparation of medicines (Photeinos 1835).

The third and most practical section, titled "Practice of the Pharmacopoeia, or the Preparation" (pp. 230–400), contains around 450 main entries and provides comprehensive information on drug preparation, drawing from Latin and French sources. Following this is an appendix titled "The Artificer's Assistant" (pp. 403–504), which addresses topics such as the use of precious stones, cosmetics, and beauty techniques, along with updates to the Pharmacopoeia. From the preface, we learn that this appendix



ΜΕΡΟΣ ΠΡΩΤΟΝ.

ΛΕΞΙΚΟΝ ΤΗΣ ΦΑΡΜΑΚΟΠΟΙΙΑΣ.

Διαλαμβάνον περὶ Βοτάνων καὶ συνθέτων κατασκευῶν, τῶν ἐν τῇ παρούσῃ φαρμακοποιΐᾳ ἐμπεριεχομένων, καὶ ἑτέρων τῇ χημείᾳ συντελούντων.

ΤΜΗΜΑ Α.

ΑΡΧΟΜΕΝΟΝ ΕΚ ΤΟΥ ΑΠΛΟΕΛΛΗΝΙΚΟΥ.

ΑΒΡΟΤΟΝΟΝ. Θηλύθαμνον. Abrotanum. Artemisia abrotanum. Abrotanummas. Μπερεντζεσέφ. ἐν χρήσει τὰ φύλλα.

Ἀγάλλοχον. Ξυλαλόη. Agallochum. Lignum aloes. Lignum indicum odoratum. Lignum calambucum. Lignum aquilinum. Οὐδ ἀγάτζ. "δένδρον φυόμενον εἰς τὰς Ἀνατολικὰς Ἰνδίας, καὶ εἰς τὴν Κοχινκίναν, Ἰσομέγεθες ἐλαίᾳ, ἔχει φύλλα ἱκανῶς μεγάλα, ἰσειδῆ, καὶ ὀλίγον τραχέα, κατὰ τὴν κορυφὴν τῶν κλάδων ἐξανθεῖ βοτρυδὸν ὡραία κιτρινώτατα ἄνθη, καὶ καρπὸν κατὰ πολλὰ ὅμοιον κατὰ τὸ σχῆμα καὶ γεῦσιν μὲ μικρὰ γλυκὰ δαμάσκηνα, μὲ χρῶμα λευκὸν, τὸ ξύλον του εἶναι ὑπομέ-

Fig. 2: Opening page of Part One in the *Hellenic Pharmacopoeia* (1835), titled "Lexicon of the Pharmacopoeia," featuring names in simple Greek, Latin, and Turkish transcribed in the Greek alphabet, as shown on this page (Courtesy of the University of Crete Library, Heraklion, Greece).

was prepared by K[onstantinos] Rodes (Greek: Κωνσταντίνος Ρόδες) from Neochori on the Bosphorus (modern-day Yeniköy in Istanbul) in January 1836 (Photeinos 1835). The appendix also includes two tables on separate pages: "On the Various Alloys and Their Hardness or Malleability" following page 430, and "Of the Names, Specific Gravity, Colors, Fusibility, Hardness and Softness, and the Time of Discovery of Various Metals" following page 454 (Photeinos 1835).

The final appendix, titled "The Friends of the Muses Subscribers" (Greek: Φιλομούσοι Συνδρομηταί) (pp. 531–536), lists philanthropic subscribers from Constantinople, Thrace, Smyrna, Athens, Heliopolis, and Pergamon who supported the publication of the pharmacopoeia (Photeinos 1835). The list begins with prominent figures, starting with "The Most Honorable, Learned, and Respected Chief Physician of the Ottoman Empire, Mr. Aptulhak Efendi" (Greek: Άπτονλχάκ εφεντης; Turkish: Abdülhak [Molla] Efendi). Following him is "His All-Holiness, the Blessed Patriarch of Constantinople, Mr. Agathangelos" (Greek: κύριος Αγαθάγγελος). Other distinguished patrons include prominent religious figures, high-ranking officials, and several physicians and pharmacists (Photeinos 1835). This extensive range of supporters from diverse backgrounds illustrates the widespread backing Photeinos received from various sectors of society within both the Ottoman Empire and Greece. A list of errata is also provided on the final pages (pp. 537–538) (Photeinos 1835).

6. Discussion

Georgios Photeinos' *Hellenic Pharmacopoeia* (1835) is a significant yet often overlooked contribution to the history of pharmacopoeias in the Ottoman Empire and the Hellenic world. By adapting

the *Austrian Pharmacopoeia* into Greek, Photeinos transmitted contemporary European pharmaceutical knowledge, particularly to Greek-speaking communities in the Ottoman Empire. At the time, the *Austrian Pharmacopoeia* was widely referenced not only in Austria but also throughout the Eastern Europe and the Ottoman Empire, reflecting its broad influence. Photeinos' work was part of a broader movement to develop pharmacopoeias in local languages, incorporating European scientific practices into regional contexts (Karamberopoulos and Oikonomopoulou 2004). Despite its significance, Photeinos' *Hellenic Pharmacopoeia* (1835) appears not to have received the recognition it deserved, as indicated by its limited citations at the time and the few copies available in Greek library catalogs, with none found in Türkiye. Just two years after its publication, in December 1837, a new *Hellenic Pharmacopoeia* was released in Athens by a team of prominent experts: Ioannis Vouros (1808–1885), the personal physician to King Otto of Greece and professor of pathology and therapeutics; Franz Xaver Landerer (1809–1885), who studied pharmacy in Munich, accompanied King Otto to Athens in 1833 as the court pharmacist, and later served as a professor of chemistry, authoring numerous works on pharmaceutical, botanical, chemical, physiological, and mineralogical topics; and Josef (Iosif) Sartori (1809–1880), who also arrived from Germany in 1833 as the court pharmacist accompanying King Otto and went on to make significant contributions to the study of Greek flora (Graepel 1997; Kallinich 1975; Vouros et al. 1837).

This new pharmacopoeia was evidently part of the modernization efforts initiated during the reign of King Otto (1815–1867), the first modern king of Greece, who ruled from 1832 to 1862. As the second son of King Ludwig I of Bavaria – a noted Philhellene – Otto's policies were likely influenced by Bavarian scientific traditions, reflecting the impact of his homeland (Vlahakis and Economou-Amilli 2012). It is worth noting that a comparative analysis of the *Hellenic Pharmacopoeia* (1837) and the *Pharmacopoea Bavarica* (1822) underscores this connection (Philianos and Skaltsa 1993).

The prologue of this new *Hellenic Pharmacopoeia*, without reference to Photeinos' earlier work, states that it was created to establish a standardized system for selecting, preparing, and regulating medicines in Greece to prevent confusion and ensure quality in medical practices among doctors and pharmacists from diverse backgrounds (Vouros et al. 1837). It includes key synonyms in multiple languages, such as English, French, Italian, and, where relevant, German and Turkish. For chemical preparations and methods, it employed the most reliable and scientifically sound practices, drawing on several scholarly works and the latest pharmacopoeias from other nations (Vouros et al. 1837). Supported by the newly established Hellenic Kingdom and the University of Otto in Athens, this edition became Greece's official pharmacopoeia (Emmanuel and Dambergis 1969). Its alignment with the state's modernization efforts and the use of more up-to-date references contributed to its widespread acceptance over Photeinos' earlier work (Barlagiannis et al. 2022; Vouros et al. 1837). Additionally, Photeinos' choice of Smyrna as the publication location may presumably have limited its impact within Greece.

A comparison between Photeinos' 1835 *Hellenic Pharmacopoeia* and the 1837 edition reveals significant political and cultural shifts of the era. While Photeinos' work represented the culmination of his personal efforts over three decades, the 1837 pharmacopoeia was a collaborative project involving Greek and Bavarian scholars from diverse fields. Published in Athens, the newly established capital of Greece, and endorsed by the Royal Medical Council, the 1837 edition gained state support and was closely linked to a growing cultural and scientific center (Barlagiannis et al. 2022). This institutional backing and collaborative approach made the 1837 edition not only scientifically rigorous but also broadly accepted, as evidenced by its reprints in 1847 and 1865, followed by a second edition in 1868 (Emmanuel and Dambergis 1969). Additionally, while Photeinos' 1835 edition was translated from the *Austrian Pharmacopoeia* and written in simple Greek, the 1837 edition was eclectically compiled from multiple scholarly sources and recent pharmacopoeias, using both standard Greek and Latin to establish terminological consensus, which further enhanced its authority and accessibility (Barlagiannis et al. 2022; Vouros et al. 1837). Furthermore, the 1837 edition adhered to contemporary regulations, such as the Royal Decree on Poisons of April 11, 1835, making it legally more applicable for practical use (Vouros et al. 1837).

The *Austrian Pharmacopoeia*, along with Austrian medico-pharmaceutical institutions and traditions, significantly influenced not only Photeinos' work but also broader advancements in Ottoman medicine (Chahrour 2007). In 1838, acting on behalf of Sultan Mahmud II (r. 1808–1839), the Turkish ambassador to the Habsburg Empire sought to recruit skilled physicians from the Josephinian Military Academy of Medicine in Vienna to assist in establishing the Imperial School of Medicine in Constantinople. Consequently, Dr. Karl Ambros Bernard, Dr. Jakob Neuner, and pharmacist Anton Hoffman were selected for this mission (Tekiner 2014). Bernard (1808–1844), a young Bohemian physician from the Josephinian Academy with experience in cholera control along the Galician-Russian border, was appointed as the director of the Imperial School of Medicine. In addition to leading the school, he established a pharmacy class, served on the Ottoman Quarantine Committee, and, in 1844, published the *Pharmacopoea Castrensis Ottomana* (Ottoman Military Pharmacopoeia) in both French and Latin (Bernard 1844; Skopec 1987). This work drew upon the third edition of the *Pharmacopoea Castrensis Austriaca* (Austrian Military Pharmacopoeia), which had been published in Vienna in 1841 (Kletter 2015a; Tekiner and Mat 2009). Like Photeinos, Bernard adapted European pharmaceutical practices to local needs, incorporating Turkish terms to enhance accessibility (Bernard 1844).

The works of Photeinos and Bernard illustrate the significant role of Austrian pharmaceutical practices in shaping pharmacopoeias in the region. The *Austrian Pharmacopoeia*'s influence exemplifies the dynamic exchange of scientific knowledge between Europe and the Eastern Mediterranean, marking a shift from earlier Italian influences. The early influence of Italian scholarship is evident in Ottoman translation of key works, including the *Farmacopea Ferrarese* (Ferrara Pharmacopoeia) by Antonio Campana (c. 1751–1833), a professor of pharmaceutical chemistry and botany, in the late 18th century, and the *Farmacopea Generale* (General Pharmacopoeia) by Luigi Valentino Brugnatelli (1761–1818), a professor of chemistry who adopted the advancements of Antoine Lavoisier's chemical revolution and pioneered electroplating, in the early 19th century (Tekiner 2024). Nevertheless, the influence of the *Austrian Pharmacopoeia* would later be supplanted by the *Pharmacopée Française* (French Pharmacopoeia), which was translated into Turkish by Dr. Hüseyin Sabri in 1874 under the title *Düstūr al-Adwiya*, following the period when French became *lingua franca* of Ottoman pharmacy (Tekiner and Mat 2009).

7. Conclusion

The *Hellenic Pharmacopoeia* (1835) by Georgios Photeinos marks a significant development in Eastern Mediterranean pharmacy, blending European scientific and pharmaceutical traditions with local practices. Although later overshadowed by the *Hellenic Pharmacopoeia* (1837) published in Athens, Photeinos' work was one of the earliest attempts to make European pharmaceutical knowledge accessible to Greek-speaking practitioners in both the Ottoman Empire and the newly formed Greek state. Unlike its Athenian successor, which received official endorsement from the Greek monarchy, Photeinos' pharmacopoeia remained an unofficial reference, functioning as a practical guide for local pharmacists and physicians without statutory authority.

Despite its lack of formal recognition, Photeinos' work holds historical significance for its cross-cultural and linguistic adaptability. Drawing on the *Austrian Pharmacopoeia* as well as French and Latin sources, Photeinos crafted a hybrid resource that incorporated Greek and Turkish terms, bridging Western European pharmaceutical standards with Eastern Mediterranean practices. This inclusivity made his work accessible to a diverse Greek-speaking audience in the Ottoman Empire, demonstrating the

potential of localized efforts to advance professionalization even without centralized backing.

Photeinos' pharmacopoeia illustrates the impact of unofficial texts in shaping regional medical practice, emphasizing cultural adaptation over mere replication of Western standards. From a broader historical perspective, it underscores the enduring legacy of pharmacopoeias and technical literature in practical application and cultural resonance, highlighting the role of intellectual adaptability in the modernization of pharmaceutical sciences across diverse socio-political landscapes.

Author Contributions: HT conceived and initiated the study concept. Both HT and GT conducted the research and data analysis. Each author contributed to the manuscript's editorial revisions and has thoroughly reviewed and approved the final version. Furthermore, all authors have actively participated in the work and accept full responsibility for its integrity and accuracy.

Funding: None.

Conflict of Interest: The authors declare no conflicts of interest.

References

Anderson S (2024) Pharmacopoeias, Drug Regulation, and Empires: Making Medicines Official in Britain's Imperial World, 1618–1968. Montreal: McGill-Queen's University Press.

Antoniadis L (1808) Epitomi Chronologiki tis Genikis Istorias [A Chronological Epitome of General History]. Konstantinoupolis: Typographeio tou Patriarcheiou Konstantinoupoleos.

Barlagiannis A, Seriatou P, Seirinidou V (2022) From the Greek medical manuscripts of the Ottoman Empire to the Pharmacopoeia I of the Greek state: Pharmacy and political change in Southeastern Europe. The Historical Review/La Revue Historique 19: 187–228.

Bernard CA (1844) Pharmacopoea Castrensis Ottomana / Pharmacopée Militaire Ottomane [Ottoman Military Pharmacopoeia]. Constantinople: Impr. de Henri Cayol à Pera.

Camariano-Cioran A (1974) Les Académies Princières de Bucarest et de Jassy et leurs professeurs [The Princely Academies of Bucharest and Jassy and their professors]. Thessaloniki: The Institute for Balkan Studies.

Chahrour M (2007) A civilizing mission? Austrian medicine and the reform of medical structures in the Ottoman Empire, 1838–1850. Stud Hist Philos Biol Biomed Sci 38: 687–705.

Cowen DL (2001) Pharmacopoeias and Related Literature in Britain and America, 1618–1847. Aldershot: Ashgate.

Crawford MJ, Gabriel JM (2019) Drugs on the Page: Pharmacopoeias and Healing Knowledge in the Early Modern Atlantic World. Pittsburgh: University of Pittsburgh Press.

Emmanuel EJ, Dambergis CA (1969) Offizielle und inoffizielle griechische Arzneibücher [Official and unofficial Greek pharmacopoeias]. In: Vorträge der Hauptversammlung der Internationalen Gesellschaft für Geschichte der Pharmazie e.V. während des Internationalen Pharmaziegeschichtlichen Kongresses in Athen vom 8. bis 14. April 1967. Athen: IGGP, pp. 87–93.

Etker Ş (2000) Brugnatelli Farmakopesi'nin 1818'de İstanbul'da yayınlanan Elence çevirisi [The Hellenic translation of Brugnatelli's Pharmacopoeia published in Istanbul in 1818]. In: IV. Türk Eczacılık Tarihi Toplantısı Bildirileri (4-5 Haziran 1998, İstanbul). Dölen E, ed. İstanbul: Marmara Üniversitesi Eczacılık Fakültesi Yayınları, pp. 297–302.

Filitti GP (1997) Moruzi: din satul Moruzanda – n scaunele domneşti de la Bucureşti şi Iaşi [Moruzi: from the village of Moruzanda – in the princely seats of Bucharest and Iaşi]. Magazin Istoric 31: 59–63.

Gavra GE (2019) The Hellenic diaspora in Romania: cultural and ekistics heritage. In: Perspectives on the Hellenic Diaspora. Darwin, Australia: Charles Darwin University, pp. 178–188.

Gobdelas DP (1806) Stoicheia Algebras [Elements of Algebra]. Halle: n.a.

Graepel PH (1997) Sartori, Joseph (Josef). In: Hein WH, Schwarz HD, eds. Deutsche Apotheker-Biographie [German Pharmacists' Biography]. Ergänzungsband II. Stuttgart: Wissenschaftliche Verlagsgesellschaft, p. 265.

Hosztafi S (1997) The discovery of alkaloids. Pharmazie 52: 546–550.

Iftimi S (2015) Chipurile Domnitorului Alexandru Moruzi în portrete din secolul XIX [The faces of Prince Alexandru Moruzi in 19th century portraits]. Cercetări Istorice 34: 169–200.

Kallinich G (1975) Landerer, Franz Xaver. In: Hein WH, Schwarz HD, eds. Deutsche Apotheker-Biographie [German Pharmacists' Biography]. Band I (A-L). Stuttgart: Wissenschaftliche Verlagsgesellschaft, pp. 359–360.

Karamberopoulos D, Oikonomopoulou A (2004) I Elliniki Farmakopoiia tou Georgiou Foteinou, Smyrni 1835 [The Greek Pharmacopoeia of Georgios Foteinos, Smyrna 1835]. Praktika Imeridas Istorias tis Iatrikis: I Iatriki sta nisia tou Aigaiou [Proceedings of the History of Medicine Conference: Medicine in the Aegean Islands]. Chios: Iatriki Etairia Chíou, pp. 22–28.

Kletter C (2015a) The Austrian military pharmacopoeias and the medicine supply to the imperial army. ISHP Working Group History of Pharmacopoeias. https://www.histpharm.org/ISHPWG%20Austria2.pdf. Retrieved: Oct 10, 2024.

Kletter C (2015b) The civil pharmacopoeias of Austria. ISHP Working Group History of Pharmacopoeias. https://www.histpharm.org/ISHPWG%20Austria.pdf. Retrieved: Oct 10, 2024.

Koukkou EE (1966) Konstantinos Vardalachos (1755–1830). Athinai: n.a.

Megdanos CD (undated) Enomene Pharmakopoiia kai Pharmakologia [The United Pharmacopoeia and Pharmacology]. Reviewed and corrected by Georgios Sakellarios. Kovendareios Municipal Library of Kozani. [manuscript].

Patrinelis CG (2001) The phanariots before 1821. Balkan Studies 42: 177–198.

Philianos S, Skaltsa H (1993) Étude comparative de la première édition de la Pharmacopée hellénique (1837, 1868) et de la Pharmacopée bavaroise (1822) [Comparative study of the first edition of the Hellenic Pharmacopoeia (1837, 1868) and the Bavarian Pharmacopoeia]. In: Müller-Jahncke WD, Carmona-Cornet AM, Ledermann F, eds. Materialien zur Pharmazie-geschichte: Akten des 31. Kongresses für Geschichte der Pharmazie, Heidelberg 3.-7. Mai 1993. Schorndorf: Wissenschaftliche Verlagsgesellschaft Stuttgart, pp. 239–244.

Philliou CM (2011) Biography of an Empire: Governing Ottomans in an Age of Revolution. Berkeley: University of California Press.

Photeinos G (1835) Elliniki Pharmakopoiia [Hellenic Pharmacopoeia]. Smyrni: A. Damianou.

Pyrros D (1818) Pharmakopoiia Geniki [General Pharmacopoeia]. Konstantinoupoli: n.a.

Pyrros D (1831) Engolpion ton Iatron: Itoi Praktike Iatrike [The Physicians' Handbook: or Practical Medicine]. 2nd vol. Nafplio: Konstantinon Tombra Kydonieos.

Skaltsa E (2015) Istoria tis Farmakeutikis [History of Pharmacy]. Zografou: SEAB.

Skopec M (1987) Zu Leben und Werk von Karl Ambros Bernard, dem „Schöpfer und der Seele der medizinischen Schule zu Galata Serai" [On the life and work of Karl Ambros Bernard, the creator and soul of the Medical School at Galata Serai]. In: Terzioğlu A, Lucius E, eds. Österreichisch-türkische medizinische Beziehungen: Berichte des Symposiums vom 28. und 29. April 1986 in Istanbul. Istanbul: Fatih Gençlik Vakfı Matbaa İşletmesi, pp. 89–97.

Sonnedecker G (1986) Kremers and Urdang's History of Pharmacy. 4th ed. Madison, WI: American Institute of the History of Pharmacy.

Stanhope PH (1830) Address of Earl Stanhope, president of the Medico-Botanical Society, for the anniversary meeting, January 16, 1830. London: J. Vilson.

Tekiner H (2014) Pharmacy in Turkey: past, present and future. Pharmazie 69: 477–480.

Tekiner H (2024) A concise history of Italian influences on Turkish pharmacy. Atti e Memorie: Rivista di Storia della Farmacia 41: 43–56.

Tekiner H, Mat A (2009) Les pharmacopées turques de langue française [Turkish pharmacopoeias written in French]. Rev Hist Pharm 96: 17–22.

Vladimiros EL (2018) I Historia tis Ellinikis Iatrikis sti Smyrni [The History of Greek Medicine in Smyrna]. Athinai: Enosis Smyrnaion.

Vlahakis GN, Economou-Amilli A (2012) Botany in Greece during the 19th century: a periphery at the center. Osmanlı Bilimi Araştırmaları 13: 1–21.

Vouros I, Landerer X, Sartori I (1837) Elliniki Pharmakopoiia [Hellenic Pharmacopoeia]. Athinai: Vasiliki typographia.

Zebroski B (2015) A Brief History of Pharmacy: Humanity's Search for Wellness. New York: Routledge.