
Building a retrospective collection in pharmacy: a brief history of the literature with some considerations for U.S. health sciences library professionals

By Michael A. Flannery, M.L.S., M.A.
Associate Director for Historical Collections

Lister Hill Library of the Health Sciences
University of Alabama at Birmingham
1530 Third Avenue South
Birmingham, Alabama 36294-0013

This paper argues that historical works in pharmacy are important tools for the clinician as well as the historian. With this as its operative premise, delineating the tripartite aspects of pharmacy as a business enterprise, a science, and a profession provides a conceptual framework for primary and secondary resource collecting. A brief history and guide to those materials most essential to a historical collection in pharmacy follows. Issues such as availability and cost are discussed and summarized in checklist form. In addition, a glossary of important terms is provided as well as a list of all the major U.S. dispensaries and their various editions. This paper is intended to serve as a resource for those interested in collecting historical materials in pharmacy and pharmaco-therapeutics as well as provide a history that gives context to these classics in the field. This should provide a rationale for selective retrospective collection development in pharmacy.

INTRODUCTION

Historical works in pharmacy show the evolution of therapeutics and the development of diverse treatment modalities in their various phases and manifestations as well as the relationship between an emerging allied health profession and physicians. In this sense, a retrospective collection in pharmacy has significant applications from both clinical and socio-scientific standpoints and is therefore a valuable tool for health care practitioners and historians.

Thus, the purpose of this paper is to outline the importance of pharmacy in medical history and to provide a guide for those interested in augmenting their library's historical holdings in the primary and secondary literature. A cautionary note is in order. This article has no intention of being comprehensive. However, it does purport to do two things: (1) describe those materials most broadly representative of the discipline and most reflective of the standards of practice through the years; and (2) explain *why* they are essential to developing a historical collection. While there are many valuable historical texts and treatises that could enrich a special collection in pharmacy, only those felt to be most influential and significant will be cited here.

The key to the importance of retrospective pharmacy materials rests in the fact that pharmacy emerged out of medicine and that for much of the past there was no clear separation between the two. This case was especially true in the United States, in which early colonial practice grew from English rather than continental European health care traditions. Unlike some countries such as Spain, France, and Germany—where, with the help of strong centralization and mandatory governmental controls, pharmaceutical practice emerged distinct from the medical profession comparatively early—the United Kingdom acquired a somewhat unique *laissez-faire* attitude in its law and custom, evident at least as early as the Herbalist's Charter of 1543. This tradition led to a health care environment that blurred the distinctions between the apothecary and physician. Further obscuring the boundaries of medical practice was a ruling of the Queen's Bench in 1703 (the famous William Rose case) that sanctioned and protected the right of the apothecary to diagnose and generally practice medicine as well as compound prescriptions and sell drugs [1]. At the same time, it was equally acceptable for physicians to prescribe and compound their own medicines as part of their ongoing office practice.

A variety of sources, including documentary and

material artifacts, attests to the fact that Americans adopted British traditions in medicine and pharmacy.* Indeed there was no discernible profession of pharmacy in this country until some like-minded men (most of whom were physicians) gathered together in Philadelphia in October of 1852 to establish the American Pharmaceutical Association (APhA). Even after the founding of the APhA, the professional identity of pharmacy developed slowly and unevenly across this agrarian nation. As late as the early twentieth century, the separation of pharmacy from medicine was still incomplete. While the corner drugstore and a developing sense of distinctiveness among those responsible for the prescription trade were clearly making themselves manifest by the turn of the century, a 1904 survey of Illinois pharmacists revealed that the vast majority of physicians still prescribed *and* dispensed their own medicines [2].

In addition to the overlapping history of the apothecary and physician, there are a couple of other reasons to maintain a collection of historical works in pharmacy. First, because so much of pharmacy remains at the core of every physician's therapeutics, a strong collection of essential reference works, materia medicas, dispensaries, pharmacopoeias, and formularies provide a valuable window into the nature and evolution of the physician's non-surgical practice. Second, and perhaps more important, historical texts are increasingly appreciated for their research value in modern drug prospecting and investigation by an increasing collaboration of clinicians and historians.†

EARLIER STUDIES AND SECONDARY SOURCES

This attempt is not the first to assess the literature in the history of pharmacy, although it is probably the first targeted specifically to librarians. Earlier studies were written by historians essentially for historians. More than forty years ago, Glenn Sonnedecker outlined some of the more important literature in the history of pharmacy by summarizing the bibliographies, international surveys, biographies, chronologies, serials, pictorial, and institutional resources then available

* See, for example, Montague S, Montague J. The daybook of a New York physician-pharmacist, 1743. *Pharm Hist* 1981;23(1):35-7. For a list of material representations of physician-pharmacists available for public viewing, see Griffenhagen G, Steib EW, Fisher BD. A guide to pharmacy museums and historical collections in the United States and Canada. Madison, WI: The American Institute of the History of Pharmacy, 1999.

† See, for example, Scarborough J. Pharmacy and therapeutics: the past and the future. *Pharm Hist* 1986;28(2):63-4. Holland BK, ed. *Prospecting for drugs in ancient and medieval European texts: a scientific approach*. Amsterdam, Netherlands: Harwood Academic Publishers, 1996. Flannery MA. The medicine and medicinal plants of C. S. Rafinesque. *Econ Bot* 1998 Jan-Mar;52(1):27-43.

[3]. A decade later Alex Berman wrote an essay directed primarily at historians but equally useful to librarians. In it, he concluded that obtaining secondary literature in the field was relatively easy and that acquiring a few key print bibliographies would suffice to direct the researcher to much of the primary source material [4]. For those who think such collections would be found only on campuses with pharmacy curricula, it is interesting that Berman noted, "Frequently, medical school libraries will have more material dealing with pharmaceutical history than pharmacy schools" [5].‡

Today, there are three main sources of access to the secondary literature in the history of pharmacy: The American Institute of the History of Pharmacy (AIHP), the American Association of Colleges of Pharmacy (AACP), and the recent annotated bibliography by Gregory J. Higby and Elaine Stroud. The AIHP is this country's leading organization charged with promoting and preserving history in the field; much of the secondary literature is now available through their Website,§ which includes a useful catalog of publications in the secondary literature. Also, *Pharmacy in History*, the AIHP peer-reviewed journal and the only publication of its kind in the United States, has been devoted solely to historical topics in pharmacy since 1959. Another valuable tool is the AACP's list of suggested readings. Available on the Web, the 2000 AACP Basic Resources for Pharmaceutical Education comprises twenty-two recommended titles [6]. While this short bibliography may be useful, it is primarily focused (as its title would imply) upon materials of interest to the pharmaceutical educator and does not necessarily cover the broader scope required of a health-sciences library collection. For wider and more in-depth coverage Higby and Stroud's *History of Pharmacy: A Selected Annotated Bibliography*—issued as part of the *Garland Reference Library in the Humanities*, volume 1366, in 1995—should be consulted. Equipped with these resources and other advances in accessing the literature, such as online monograph and journal ordering through subject-specific profiling with vendors covering hundreds of domestic and foreign publishers, keeping abreast of new releases is easier than ever before.

However, the production of secondary literature in the history of pharmacy has lagged far behind that in

‡ More recently, historians of pharmacy have noted the advances made in the field, a fact made demonstrably evident in the historiographical bibliography appended to the published proceedings of a discussion held in November of 1991 as part of the fiftieth anniversary celebration of The American Institute of the History of Pharmacy (AIHP). See, Panel discussion: the historical literature of American pharmacy. *Pharm Hist* 1992;34(2):74-94.

§ The American Institute of the History of Pharmacy (AIHP) Website may be viewed at <http://www.pharmacy.wisc.edu/aihp/>.

medicine. This is due to a variety of complex factors, including the absence of endowed chairs in the history of pharmacy, weak curricular support at both graduate and undergraduate levels, and distinctive historiographical factors. Much of the problem rests with the status of teaching in the history of pharmacy at the university level, which has incrementally declined over the years.** This unfortunate fact, together with a lack of systematic graduate school training, has led to a situation in which basic secondary works are either in serious need of updating, such as *Kremers and Urdang's History of Pharmacy* (1976), or nonexistent, such as a general survey of U.S. pharmaceutical history.

One bright spot, however, has been the initiation of a pharmaceutical heritage series, as part of the Pharmaceutical Products Press imprint of Haworth Press, edited by Mickey Smith, research professor at the University of Mississippi's Research Institute of the Pharmaceutical Sciences, and Dennis Worthen, executive director of the Lloyd Library and Museum, Cincinnati, Ohio. This broad-ranging series offers significant potential for building a corpus of secondary literature in the field. The series has already released monographs on tropical medicine and pharmaceutical research along the Nile River Valley during the early twentieth century, the U.S. botanical medical movements, and the pharmaceutical laboratory operations for the Union Army during the Civil War, with more titles in the offing.

ESTABLISHING A CONCEPTUAL FRAMEWORK FOR PRIMARY RESOURCE COLLECTING

Primary research materials—those works issued from the period and representing first-hand accounts of pharmaceutical conditions and practices—form the most important consideration for those interested in building a working collection in the history of pharmacy. Therefore, *what* to collect and *how much* it will cost to collect both major and minor primary works in the field will comprise the remainder of this study. Before beginning, however, it is very important to keep in mind that the what and how much of materials acquisition in this area is geographically dependent. Because this essay is addressed primarily to librarians in the United States, the emphasis will be upon those items delineating U.S. practice. Readers are cautioned that a shift in focus to German, Spanish, French, or

even British pharmacy will affect not only what is acquired but, bearing in mind that all of these countries have produced distinctive pharmaceutical literatures much earlier than the United States, how much it will cost and perhaps its availability.

With this caveat in mind, one helpful way of embarking upon a collection-development program in this field is to understand that pharmacy is a broad designation with essentially three aspects: (1) probably most ancient, are the trade or commercial functions of the pharmacist; (2) the scientific and technical facets of the discipline; and (3) the profession itself. The trade aspects of pharmacy relate to the retail of goods and services as well as the production, on large and small scales, of the pharmaceuticals themselves. Scientific functions of pharmacy largely include chemistry, physiological actions, and other technical aspects of medicinal agents. Of course, these two aspects are not mutually exclusive, and indeed often blend together just as current technical functions and applications arising out of scientific research are a part of today's laboratory and manufacturing operations.

Science and commerce are inextricably tied to the professional context of U.S. pharmacy, and their interaction has affected the profession profoundly. For a variety of complex reasons, the trade and commercial functions have rested uncomfortably with the research and scientific functions of pharmacy in the United States. This fact is exemplified in the long-standing tension between the APhA, which has historically tended to represent the academic and research spheres of pharmacy, and the National Association of Retail Druggists (NARD), now the National Community Pharmacists Association (NCPA), which emerged in 1898 out of the older National Retail Druggists' Association (established in 1883) and which has always guarded the commercial interests of the community practitioner [7]. The specifics of this rivalry and contention—sometimes described as “pharmacy's split personality” between business and science—and its impact upon the profession date at least from the late nineteenth century and have been widely acknowledged and discussed by historians [8–10]. The literature emanating from these bodies—for example, the *Journal of the American Pharmaceutical Association* and *America's Pharmacist* (formerly *NARD Journal*)—continues to demonstrate this division in the field.

While this fact has undoubtedly had a deleterious effect upon the discipline as a whole, it does help the librarian working in a medical center environment by delineating materials focused upon scientific subjects such as chemistry, physiology, pharmacology, and medical therapeutics as distinct from the economic and strictly business and manufacturing aspects of pharmacy. Libraries supporting pharmacy programs will need to acquire materials selectively in all these areas; those without pharmacy departments can prob-

** The decline in the teaching of pharmaceutical history and the lack of graduate training in the field have been the subjects of some discussion among those few practicing in this specialty. This was most recently presented at a symposium at the 144th Annual Meeting of the American Pharmaceutical Association, Los Angeles, 11 March 1997. See the proceedings, Buerki RA, ed. *Teaching the history of pharmacy today*. Madison, WI: American Institute of the History of Pharmacy, 1999.

ably ignore most of the trade and purely professional aspects of the field. But this is a distinction that emerges only after the mid-nineteenth century.

MAJOR SOURCES—HISTORY AND IMPORTANCE

As suggested earlier, Americans are fortunate to have a pharmaceutical literature that is comparatively recent. Growing primarily out of British practice, much of the pharmaceutical literature in colonial America can be found in British pharmacopoeial, dispensatory, and formulary compendia (Appendix A has brief historical definitions of each), for example, the various editions of the *Pharmacopoeia Londinensis*, the *Pharmacopoeia Edinburgensis*, William Lewis' *New Dispensatory*, and assorted imports from Europe. Some of the most beloved and utilized print resources included domestic healing guides by popular herbalists such as Nicholas Culpeper (1616–1654) and William Salmon (1644–1713). As a literature of the common folk, it was invariably written in English, making this empirical literature much more accessible to the average colonist. Much of this early literature is extremely scarce and expensive when it can be found.

A distinctive U.S. literature would emerge slowly out of the popular and professional traditions of England. The very first work emanating from colonial America discussing the *materia medica*, the substances of medicine, and medicinal therapeutics is a famous holograph "Receipts to Cure Various Disorders for My Worthy Friend Mr. Winthrop," written in 1643, probably by a Dr. Stafford. The *Lititz Pharmacopoeia* of 1778—a military compendium for the American troops named for its place of origin, the Moravian village of Lititz, Pennsylvania—is also important. This little book has been described as a "landmark in the history of American pharmacy," because it followed the time-honored tradition of meeting wartime shortages with officinal (Appendix A) substitutions largely of indigenous medicinal plants that its compiler (most likely Dr. William Brown) believed to be therapeutic equivalents for the more familiar imported products [11]. These substitutions are important, because they mark the first systematic break with compendia that still largely focused upon European or exotic imported medicinal agents rather than domestic sources. The other pharmaceutical work of note is *The Compendium Pharmaceuticum Militaribus Gallorum Nosocomii in Orbe Novo Boreali Adscriptum*, compiled in 1780 by Jean-François Coste (1741–1819). Often simply referred to as Coste's *Compendium*, this military formulary came as the result of French aid to the United States' war for independence. Unlike the *Lititz Pharmacopoeia*, this French compendium relied upon the 1758 *Codex Medicamentarius* of Paris for most of its *materia medica*.

These three works should be in every good historical

collection in U.S. pharmacy, because collectively they form the basis for a distinctive literature. The impossibility of acquiring all of these materials in their original form is obvious. The "Receipts" is a one-of-a-kind document housed at the Massachusetts Historical Society, while the *Lititz Pharmacopoeia* and Coste's *Compendium* would be cost prohibitive for most libraries, even if they could be found. Fortunately, all of these items have been reprinted by the AIHP with the addition of excellent introductions, annotations, and corrections to the Latin by Edward Kremers (1865–1941) and George Urdang (1882–1960) (Appendix B). Informed by the scholarship of arguably pharmacy's greatest historians, these reprints are actually more useful to researchers than the originals.

Through all of the colonial period and the Revolutionary War, there was no unifying compendium of drug standards in the United States, causing increasing problems for the medical community. Drug provision was often a regional and willy-nilly affair and even names for popular medicinals could vary widely. For physicians who wanted precision in their *materia medica*, this situation caused serious difficulties.

John Redman Coxe (1773–1864), physician and professor at the University of Pennsylvania, attempted to solve this problem. Largely based upon the *Edinburgh New Dispensatory*, his *American Dispensatory*, first issued in 1806, was something of a misnomer. Nevertheless, this alphabetized compendium was the only domestic publication of its kind, making it popular among the era's most progressive and informed apothecaries and physicians (Appendix C). Still, Coxe's *Dispensatory* had its limitations. Coxe placed little importance on formulas and its encyclopedic nature (reliant as it was upon the somewhat hodge-podge borrowings of the *Edinburgh New Dispensatory*) made it too broad and indiscriminant to be a reliable guide for establishing pharmacopoeial standards.

The Massachusetts Medical Society was the first to try to remedy this situation when they produced their landmark work in U.S. pharmacy, the *Massachusetts Pharmacopoeia* (1808). In the preface to that work, the society clearly stated, "it is necessary that there should be uniformity, both in the pharmaceutical preparations and language. By want of such uniformity, much inconvenience, and even very serious consequences have been produced" [12]. The medical community gave the *Massachusetts Pharmacopoeia* a warm welcome, but it also highlighted the need for a similar compendium of more national scope. Finally, through the efforts of three physicians—Lyman Spalding (1775–1821), Samuel Latham Mitchill (1764–1831), and Jacob Bigelow (1787–1879)—the first *United States Pharmacopoeia* (more commonly referred to simply as the *USP*) was born in 1820, with the convening of the U.S. Pharmacopoeial Convention (USPC) national convention in Washington, DC. The substances that finally found

their way into that reference work represented the collaboration of a broad spectrum of practitioners who used tradition and extent of use as their primary guides in establishing a blue ribbon list of most-favored officinals (Appendix A).

While the *USP* was a great step forward in establishing uniformity in substances, nomenclature, and crude drug authentication, it did not meet the needs of the average practitioner as well as the dispensatory literature. But there was one major problem: thus far, no single dispensatory was wholly satisfactory. Coxe's *Dispensatory* was essentially a stepchild of British practice and had already established both the advantages and disadvantages of a wide-ranging compendium of encyclopedic proportions. James Thacher (1754–1844) offered a partial solution with his *American New Dispensatory* (Appendix C). Although he paid some attention to indigenous medicinal plants, it was far from complete, and the character of the dispensatory still lacked the authority of a truly national reference work. The *USP* might have solved this problem, but it did not go far enough either. Reviewers quickly pointed out this deficiency when they noted that the *USP* contained no dosage information, no descriptions of the medicinal plant names contained therein, and few or no suggested therapeutic uses. Also, both the primary and secondary *USP* lists seemed to leave out a number of substances commonly used in daily practice. In the words of historians Lee Anderson and Gregory Higby, "These circumstances led to the appearance in 1833 of a quasi-official guide, the *Dispensatory of the United States* (commonly called the *USD*), which soon became the de facto national standard of uniformity Spalding and Mitchill had sought fifteen years before" in their calling together of regional medical societies and schools to develop the *USP* [13]. Like the pharmacopoeia, the *USD* was the product of collaborating physicians, in this case George B. Wood (1797–1879) and Franklin Bache (1792–1864).

Although the various decennial editions of the *USP* (usually designated by the acronym and the number of the revision, e.g., *USP I*, *USP II*, *USP III*, *USP IV*, etc.) would continue to define the core materia medica throughout the nineteenth century, it was the *USD* that expanded the coverage beyond officinals to include common products prescribed and dispensed. In addition, the *USD* gave detailed information on the crude drug products themselves, their medicinal properties, dosages, dosage forms, chemistry, therapeutic uses, and even some limited compounding advice. For the average pharmacist and pharmacist-physician, the *USD*, not the *USP*, was always at hand. One might wryly suggest that while the *USP*, was revised decennially to keep it up to date with medical practice, the *USD*, was revised as much to replace editions soon worn to tatters as to keep it current (Appendix C).

Still, the *USP* remained the fundamental drug stan-

dard for officinal products. Each edition is a window into the materia medica of its day and, hence, is a great picture, frozen in time, of pharmaco-therapeutics and its incremental evolution in the United States. Having a complete run of all the *USPs* will offer the researcher a vast panorama of medicinal agents as they were known through the years, and while there is no substitute for possessing all of them, there is one edition in particular that should be on the shelf above all others: the *USP VI* (established by the pharmacopoeial convention of 1880 and published in 1882). This is a watershed pharmacopoeia. Here, for the first time, the compilers gave thorough instructions for testing and assaying substances, presented checks on the quality of agents in greater detail, more fully described plants and minerals, discussed chemical properties, and provided symbolic formulas and molecular weights [14]. The modern pharmacopoeia had been born. "As they stand side by side on a shelf," explain Anderson and Higby, "just the size and difference alone between *USP V* and *USP VI* is striking. Almost twice as large [as *USP V*], *USP VI* has the heft and authoritative look of a dispensatory. Opening its pages, pharmacists and physicians soon learned that the old commentaries were much less necessary. *USP VI* is a complete pharmacopoeia" [15]. Gone were the old natural histories and narrative descriptions of medicinal agents; in their place were specific tests and assays for purity and strength along with other essential tables, conversion charts, and scientific guides.

Other modernizations of the pharmacopoeia would take place over the years, some less obvious than the *USP VI*. The *USP VII* (1890), for example, dropped the "officinal" designation in favor of "official" (Appendix A). While this change in terminology seems insignificant, it reflected the increasing recognition of the *USP* as the mandatory legal standard. As state after state implemented various mandatory drug controls, the pharmacopoeia increasingly became the legal benchmark for drug composition and purity. Rather than officinal, suggesting merely a professional expectation of availability and usage, the term official was deemed more indicative of its rising status in statutory law. The pharmacopoeia would finally receive national legal standing with the passage of the Food and Drugs Act of 1906. With the next piece of landmark drug legislation in 1938—the Food, Drug and Cosmetic Act—the pharmacopoeia slowly changed its emphasis from a compendium based largely upon extent of use to drug efficacy. Other changes would follow. While they are too numerous to mention here, one modernization of great import to the researcher attempting a keyword search was the board of trustees' decision to alter the spelling of pharmacopoeia to pharmacoepia in 1950 (*USP XIV*).

For the average pharmacist and physician, the *USP* served as the leading drug standard in the United

States, supplemented with the more utilitarian *USD*, throughout the nineteenth and into the twentieth centuries. Increasingly, however, there was a growing need for a compendium of formulas beyond those officially recognized in the *USP*. The increased—and almost faddish—prescription of elixirs following the Civil War especially influenced the need for more formulas. Pharmacists might try to ignore these aromatic, sweetened hydroalcoholic dosage forms as unsanctioned by pharmacopoeial approval, but the sheer demand for elixirs dictated some knowledge of their preparation in order to maintain a thriving prescription trade. Because the *USP* contained only a bare few elixirs, compounding pharmacists and pharmacist-physicians were pretty much left to their own devices as to how to make up the products. Just as the drug trade needed some standard for general practice in the early nineteenth century, so too did elixirs and other items not mentioned in the pharmacopoeia dictate a standard for their prescribing and compounding. After some private and local attempts to devise a serviceable formulary, the APhA finally took charge and developed the *National Formulary (NF)* in 1888 [16]. Curiously, when the Food and Drugs Act gave the *NF* legal standing equal to the *USP*, the United States became the only Western country with two compendiums of official standing that emanated from two separate professional bodies (the *USP* under the USPC; the *NF* under the APhA) [17]. While the old division of the *USP* into primary and secondary lists had long since been abandoned, the new status accorded the *NF* with the 1906 legislation can be viewed as a de facto secondary list of official drugs. This somewhat awkward division of labor would end with *NF XIV* (1975), when the USPC acquired the *NF* from the APhA and combined it with the *USP*, forming the *USP/NF*.

There is one last major primary resource worthy of mention: the *American Journal of Pharmacy*. Unlike so many scientific and technical serials, this journal was not the product of a professional association or society. Rather, it emanated from the Philadelphia College of Pharmacy (founded in 1821, the first U.S. institution of higher education devoted to pharmacy). Founded in 1825, the *Journal of the Philadelphia College of Pharmacy*, the first journal of its kind in the United States, changed its title to the *American Journal of Pharmacy* in 1835 as the content and contributors became more national rather than local in scope. This journal ran well into the twentieth century and predated the *Proceedings of the APhA* (its nearest professional companion) by twenty-seven years. From its inception, the *American Journal of Pharmacy* was the premier journal covering every scientific and technical aspect of pharmacy. “The *Journal*,” concludes historian Sonnedecker, “maintained its professional and scientific level despite every exigency of the nineteenth century. When a second pharmacy journal (*Druggists’ Circular*) ap-

peared in 1857, it was a private venture, infused with a more commercial spirit and geared more closely to the daily needs felt by the average practitioner. The second half of the century gave birth to more than a hundred pharmacy periodicals that survived at least a year, but none attained the level or character equal to the *American Journal of Pharmacy*” [18].

MINOR SOURCES

In comparison to the pre-pharmacopoeial literature already described—the *USP*, the *USD*, the *NF*, and the *Journal of American Pharmacy*—other works in the history of pharmacy are relatively minor, although not necessarily unimportant. One aspect of the literature that needs to be mentioned is that literature describing the apparatus and technical operations required by the pharmacists and physicians who maintained active compounding practices. The oldest such work published in the United States was *Practical Pharmacy: The Arrangements, Apparatus, and Manipulations of the Pharmaceutical Shop and Laboratory* (1849) by William J. Procter, Jr. (1817–1874). This book was actually a heavily edited version of Theophilus Redwood’s English translation of Carl Friedrich Mohr’s *Lehrbuch der Pharmaceutischen Technik* (1847). Although it would be an excellent addition to any historical collection, today it is quite scarce. Web searches in the AbeBooks, Bibliofind, and BookFinder databases failed to turn up a single copy.

A very similar book of the period was the *Introduction to Practical Pharmacy* by Edward Parrish (1822–1872), first published in 1856 and the standard text on the technical operations of the field until Joseph P. Remington (1847–1918) compiled the first edition of his *Practice of Pharmacy* in 1885 (later editions became known simply as *Remington’s Practice*). This massive tome soon became the guide of every student and the benchmark of professional practice, for it reflected the standard operations of essentially every aspect of pharmacy, from processing apparatus to weights and measures, conversion tables to assaying methods, prescription writing and interpretation to compounding methods. Still published today, *Remington’s Practice* remains the one descriptive source about the technical aspects of pharmaceutical operations as well as the specialties and subspecialties of the pharmaceutical sciences.

Less comprehensive but still worth mentioning is the *Pharmaceutical Recipe Book*, a small work first issued by the APhA in 1929 and continued through three editions until 1943. This book gives the common prescriptions and compounding processes of the early twentieth century and, therefore, offers a window into the nature of therapeutics during the period. Its demise reflected the ongoing shift from inhouse compound-

ing of preparations to mass-manufactured, prepackaged dosage forms.

While this by no means exhausts the historical sources available, the publications outlined here are essential to every history of medicine collection. They have defined the nature of pharmaco-therapeutics through the years and, hence, profoundly influenced the evolving standard of care delivered by the average practitioner.

Many other materials are less representative of pharmacy as a whole, but these too can have their place. There are a number of important materia medicas and therapeutic guides of this kind that can significantly enrich the historical collection. Roberts Bartholow (1831–1904), for example, wrote *A Practical Treatise on Materia Medica and Therapeutics* that went through twelve editions from 1876 to 1906. Similarly, and with the same title, John V. Shoemaker's book ran through seven editions from 1891 to 1908. Largely works by physicians for physicians, this genre of literature contains a considerable amount of discussion on pharmaco-therapeutics, from preferred remedies and regimens to dosages, dosage forms, contraindications, and adverse reactions. A word of caution is in order, however. Many of these voluminous treatises are idiosyncratic, expressing ideas on therapeutics that do not necessarily reflect standard or generally accepted practice in the field. It should be remembered that until the old empirical materia medica was replaced with a more sophisticated and precise pharmacology and a clearer understanding of the etiology of disease (neither of which was firmly established in health care until the early decades of the twentieth century), medicine and its therapeutic regimens were often characterized by extreme empiricism or dogmatic rationalism, making standards of care nebulous at best [19]. Despite the watershed achievements of medical science during the last quarter of the nineteenth century, physicians typically maintained their faith in the old traditional pharmaco-therapeutics well into the twentieth century [20].

By the 1930s and 1940s, however, all this had changed. Excellent pharmacologically based therapeutic guides such as Harry Beckman's *Treatment in General Practice* (first edition 1930) and Louis Goodman and Alfred Gilman's *Pharmacological Basis of Therapeutics* (first edition 1941) began to appear that were both reflective of and responsive to prevailing practice. Also, the American Medical Association's (AMA's) Council on Pharmacy and Chemistry provided both pharmacists and physicians with a reliable therapeutic guide for pharmaceuticals that were too new to find their way into either the *USP* or *USD*. A more synoptic and contemporary compendium than either the pharmacopoeia or dispensatory, *New and Nonofficial Remedies* ran through numerous editions from its inauguration in 1907 through 1957 and was designed to give clinicians

quick information about drug descriptions, actions and uses, and dosages. Inclusion of items in this volume gave them immediate standing in the health care community, insofar as they had been approved by the AMA Council.

AVAILABILITY AND COST

Specific information on the availability and cost of these materials is given in Appendix B. It is important to note, however, that virtually all of the major works cited in this article are available in microfiche from UMI Research in their Primary Sources for the History of Pharmacy in the United States [21]. The entire series of 397 fiche covers materials from the colonial period through 1940 and is available for \$1,895.00. The microfiche collection must be purchased in its entirety, although librarians may want to opt for more selective item-by-item purchases of these materials through antiquarian dealers. For these purposes, an authoritatively annotated print bibliography of the collection is also available through AIHP [22].

CONCLUSION

Through much of U.S. history, there was little or no distinction between pharmaceutical and medical practice. The slow but inexorable separation of pharmacy from medicine as a distinct discipline emerged as the APHA began to assert itself, as the scientific and technical bases for pharmaco-therapeutics became increasingly specialized and complex, and as state and federal governments implemented statutory regulations for drugs and those responsible for compounding and dispensing them. All of these factors had a tendency to move pharmaceutical manufacturing and prescription compounding out of the apothecary shop and physician's office and into an environment of mass-manufactured, prepackaged dosage forms dominated by large-scale industry. The literature cited here reflects these changes in the nature and role of pharmaceutical practice. Many of the old stand-bys that were never far from the average practitioner's side have either ceased publication (e.g., the *USD*) or have primarily become industry guides (e.g., the *USP/NF*). Nevertheless, as a retrospective window into U.S. medicine, these pharmaceutical resources are essential.

There is really nothing new here. Medieval Europe appreciated this duality of the healing arts in its canonization of Cosmas and Damian, the fourth-century, martyred twins of Christian legend who became the patron saints of pharmacy and medicine. Today, these twin disciplines have become twin professions. Separate and distinct and yet somehow never far apart from one another, a historical understanding of each benefits every health sciences librarian. In some mea-

sure, to know the one will be to know the other, past as well as present.

ACKNOWLEDGMENTS

The author would like to thank Lee Anderson, Ph.D., A & P Historical Resources, Coralville, Iowa, for reading this manuscript and offering several helpful suggestions and insightful comments as well as Katie Oomens, M.A., specialist, Historical Collections Unit, University of Alabama at Birmingham, for her careful copy edit of this paper and her extensive research on the availability and costs of titles listed. Both provided invaluable assistance in the completion of this article.

REFERENCES

1. COWEN DL, HELFAND WH. *Pharmacy: an illustrated history*. New York, NY: Harry N. Abrams, 1990:108.
2. SONNEDECKER G. *Kremers and Urdang's history of pharmacy*. 4th rev. ed. Madison, WI: The American Institute of the History of Pharmacy, 1986:295.
3. SONNEDECKER G. Some guidelines into the historical literature on pharmacy. *Am J Pharm Ed* 1959 Spring;23:143–53.
4. BERMAN A. Writing in the history of pharmacy: sources of material. *Am J Pharm Ed* 1969 Dec;33(5):843–9.
5. IBID.
6. 2000ACCP Basic Resources for Pharmaceutical Education. [Web document]. Alexandria, VA: American Association of Colleges of Pharmacy. <http://www.aacp.org/Resources/Reference/Basic_Resources/00_bklst.x.html#X.1>.
7. SONNEDECKER, 1976, op. cit., 205–8.
8. SONNEDECKER, 1976, op. cit., 205–8.
9. HIGBY GJ. Professionalism and the nineteenth-century American pharmacist. *Pharm Hist* 1986;28(3):115–24
10. COWEN, op. cit., 159.
11. SONNEDECKER, 1976, 169–70.
12. THE PHARMACOPOEIA OF THE MASSACHUSETTS MEDICAL SOCIETY. Boston, MA: E. & J. Larkin, 1808:v–vi.
13. ANDERSON L, HIGBY GJ. The spirit of voluntarism: a legacy of commitment and contribution: The United States Pharmacopeia, 1820–1995. Rockville, MD: The United States Pharmacopoeial Convention, 1995:31.
14. SONNEDECKER, 1976, op. cit., 267.
15. ANDERSON, op. cit., 132.
16. HIGBY GJ, ED. One hundred years of the National Formulary: a symposium. Madison, WI: The American Institute of the History of Pharmacy, 1989.
17. SONNEDECKER G. The changing character of the National Formulary (1890–1970). In: Higby GJ, ed. One hundred years of the National Formulary: a symposium. Madison, WI: The American Institute of the History of Pharmacy, 1989:22.
18. SONNEDECKER G. The beginning of American pharmaceutical journalism. *Pharm Hist* 1991;33(2):68.
19. SHRYOCK RH. Empiricism versus rationalism in American medicine. *Proc Am Ant Soc* 1969 Apr;79:99–150.
20. FLANNERY MA. What did doctors really do? in search of a therapeutic perspective of American medicine. *J Clin Pharm Ther* 1999;24(2):151–6.
21. PRIMARY SOURCES FOR THE HISTORY OF PHARMACY IN THE UNITED STATES. [Web document]. UMI Research. <<http://www.umi.com/hp/Support/Research/Files/151.html>>.
22. KING NM. A selection of primary sources for the history of pharmacy in the United States. Madison, WI: The American Institute of the History of Pharmacy, 1987.

Received October 2000; accepted November 2000

APPENDIX A

A brief glossary of essential terms in pharmaceutical literature

Pharmacopoeia (or pharmacopeia). A compendium of officially recognized medicinal substances. It is designed to standardize the names, descriptions, and purity of the listed items. As such, detailed descriptions for analyzing and assaying these official substances is an integral part of every pharmacopoeia. The first *USP* was issued in 1820 and was published decennially until the 1940s, when it was issued every five years, as it is today.

Officinal. From the Latin word *officina*, literally the pharmacists' workplace. In original usage, officinal substances were those considered essential and thus expected to be kept on hand in all apothecaries' shops. Thus, a pharmacopoeia of officinal substances was designed not only to establish and maintain acceptable standards of product strength and purity but also to standardize the pharmacists' product stocks as well. The term officinal was dropped from the seventh decennial edition of the *USP* (1890), signaling that the pharmacopoeial substances contained therein had acquired legal as well as professional standing.

Dispensatory. When dispensatorium began to be used in book titles in the sixteenth century, its meaning was roughly equivalent to pharmacopoeia. In England, the dispensatory evolved into a kind of commentary on the text of the respective pharmacopoeia. Dispensatories contain chapters on chemical techniques and information about the clinical indications suitable for treatment with each drug, including therapeutic guides to clinical uses for physicians. The advantage of dispensatories is that although they use the pharmacopoeia as their basis, they also include substances not part of this official compendium. The *USD* was immensely popular in the nineteenth century, but by the late twentieth century its utility was questionable as compounding moved away from the physician, out of the community pharmacy, and into a mass production and industrial manufacturing setting. The twenty-seventh edition published in 1973 was the last.

Formulary. As a literary genre, formularies were introduced by the Arab world and were in wide use by the thirteenth century. These compilations of formulas or recipes were arranged alphabetically and included

suggestions for their use and instructions for their compounding. Many formularies were devised for specific uses, such as in hospitals. In fact, hospitals, which had begun as charitable institutions, issued compendia regarded as "pharmacopoeias for the poor" like the Royal Infirmary of Edinburgh formulary titled *Pharmacopoeia Pauperum* (1752). In the United States, the formulary, first published in 1888, was designed as a guide to standardize those preparations (especially elixirs) not official in the *United States Pharmacopoeia*, hence the title *The National Formulary of Unofficial Preparations*. But in 1906, the Pure Food and Drugs Act made this title obsolete by giving the *National Formulary (NF)* official status. Originally separate publications, the *NF* officially merged with the *USP* on January 2, 1975. Today, the *NF* contains standards for excipients, which are any components other than the active substance or substances intentionally added to a dosage form.

APPENDIX B

Checklist of key titles and approximate costs for a retrospective pharmacy collection

Note: Prices compiled August and September, 2000, subject to change. For most information about availability and pricing, see <http://www.abebooks.com>, <http://www.bibliofind.com>, <http://www.bookfinder.com>, and <http://www.alibris.com>. Those inquiring about book purchases are cautioned that dealers' book descriptions are subject to interpretation and not all pricing is merely a matter of condition. Pricing can be a very individualized matter, based upon a number of factors including condition, availability, and dealer's specific profit margin on per title sales. It is often wise to call dealers and ask questions regarding specific volumes. Most antiquarian dealers maintain a high level of integrity, but, as with all purchases, *caveat emptor* remains sound advice.

Major sources

- KREMERS E, URDANG G. Documents pertaining to the medicinal supplies within the North American colonies from 1643 to 1780. Madison, WI: The American Institute of the History of Pharmacy, 1944. \$75.00 to \$85.00.
- *Pharmacopoeia of the Massachusetts Medical Society*. Boston, MA: E. & J. Larkin, 1808. \$950.00.
- COXE JR. *American dispensatory containing the natural chemical, pharmaceutical and medical history*. Philadelphia, PA: [various publishers and various editions, 1806–1831]. The first edition is available for \$450.00 with later editions ranging from \$115.00 to \$175.00, depending upon the dealer and condition.
- THACHER J. *American new dispensatory*. 1st–4th eds. Boston, MA: Thomas B. Waite, 1810–1821. The

first edition is available for \$350.00, with later editions ranging from \$100.00 to \$175.00 depending upon condition.

- *Pharmacopoeia of the United States of America*. [Various places and publishers, 1820–2000]. Available decennial editions and prices are as follows: 1820, \$1,250.00; 1830, \$250.00–\$395.00; 1850, \$200.00; 1870, \$40.00–\$125.00; 1880, \$45.00; 1900, \$50.00; 1910, \$15.00–\$50.00; 1920, \$15.00–\$42.00; 1930, \$20.00–\$60.00; 1940, \$25.00–\$50.00; 1945–1985 starting at \$15.00–\$17.50.

- *Dispensatory of the United States of America*. [Various places and publishers, 1833–1976]. Available editions and prices are as follows: 1836, \$200.00; 1845, \$100.00–\$175.00; 1847, \$200.00; 1849, \$150.00; 1854, \$62.40–\$125.00; 1858, \$100.00–\$190.00; 1869, \$150.00; 1868, \$50.00–\$250.00; 1883, \$55.00–\$225.00; 1888, \$150.00; 1899, \$365.00; 1907, \$30.00–\$90.00; 1918, \$125.00–\$206.00; 1926, \$45.00; 1937, \$40.00; 1943, \$20.00–\$28.00; 1947, \$45.00; 1973, \$72.50.

- *National formulary*. 27th ed. Washington, DC: The American Pharmaceutical Association, 1888–1973. Available editions and prices are as follows: 1888, \$60.00–\$150.00; 1906, \$25.00–\$55.00; 1916, \$18.00–\$25.00; 1926, \$20.00; 1936, \$14.95–\$35.00; 1942, \$20.00–\$50.00; 1946, \$14.00–\$35.00; 1950, \$13.00–\$23.00; 1955, \$15.00–\$27.00; 1960, \$13.50–\$20.00; 1965, \$11.95–\$36.00; 1970, \$14.95.

- *American journal of pharmacy*. Philadelphia, PA: Philadelphia College of Pharmacy, 1835–1978. Merged with *Pharmacy management* to form *PM*. *Pharmacy management*, ISSN 0163–464X. Available from Norman Ross Publishing, Inc. (\$60.00 per reel); see <http://www.nross.com/scijrn1.htm>.

Minor sources

- PARRISH E. *Introduction to practical pharmacy*. 1st ed. Philadelphia, PA: Blanchard and Lea, 1856. \$150.00.
- REMINGTON JP. *The practice of pharmacy*. 1st–8th eds. Philadelphia, PA: J. B. Lippincott, 1885–1936; 9th–12th eds. Easton, PA: Mack, 1948–1961. The title changed to *Pharmaceutical sciences* with the appearance of the 13th edition in 1965. Available editions and prices are as follows: 1891, \$300.00; 1907, \$35.00; 1917, \$35.00; 1948, \$65.00–\$75.00; 1956, \$65.00; 1961, \$30.00.
- AMERICAN PHARMACEUTICAL ASSOCIATION. *The pharmaceutical recipe book*. 1st–3d ed. Washington, DC: The Association, 1929–1943. 1929, \$25.00–\$120 (most \$70.00–\$90.00); 1936, \$75.00–\$124.00; 1942, \$75.00.
- BARTHOLOW R. *A practical treatise on materia medica and therapeutics*. 1st–12th eds. New York, NY: D. Appleton, 1876–1906. Available editions and prices are as follows: 1876, \$35.00–\$72.00; 1884, \$28.00–\$59.50;

1887, \$20.00; 1889, \$33.62–\$59.50; 1893, \$45.90–\$74.00; 1904, \$40.00.

■ SHOEMAKER JV. *A practical treatise on materia medica and therapeutics: with especial reference to the clinical application of drugs.* 1st–7th ed. Philadelphia, PA: F. A. Davis, 1891–1908. \$17.00–\$40.00.

■ AMERICAN MEDICAL ASSOCIATION. COUNCIL ON PHARMACY AND CHEMISTRY. *New and nonofficial remedies.* Chicago, IL: The Association, 1907–1957. Older available edition (1911) is \$27.50; others considerably less expensive.

■ BECKMAN H. *Treatment in general practice.* 1st ed. Philadelphia, PA: W.B. Saunders, 1930. \$14.00–\$37.50.

■ GOODMAN L, GILMAN A. *The pharmacological basis of therapeutics: a textbook of toxicology and therapeutics for physicians and medical students.* 1st ed. New York, NY: Macmillan, 1941. \$14.00–\$50.00.

APPENDIX C

Important U.S. dispensatories and their editions

■ *Coxe's American dispensatory:* 1st ed., 1806; 2d ed., 1810; 3d ed., 1814; 4th ed., 1818; 5th ed., 1822; 6th ed., 1825; 7th ed., 1827; 8th ed., 1830; 9th ed., 1831.

■ *Thacher's American new dispensatory:* 1st ed., 1810; 2d ed., 1813; 3d ed., 1817; 4th ed., 1821.

■ *Dispensatory of the United States of America:* 1st ed., 1833; 2d ed., 1834; 3d ed., 1836; 4th ed., 1839; 5th ed., 1843; 6th ed., 1845; 7th ed., 1847; 8th ed., 1849; 9th ed., 1851; 10th ed., 1854; 11th ed., 1858; 12th ed., 1865; 13th ed., 1870; 14th ed., 1877; 15th ed., 1883; 16th ed., 1888; 17th ed., 1894; 18th ed., 1899; 19th ed., 1907; 20th ed., 1918; 21st ed., 1926; 22d ed., 1937; 23d ed., 1943; 24th ed., 1947; 25th ed., 1960; 26th ed., 1967; 27th ed., 1973.