

ture as an aid in teaching Pharmacognosy, I believe there are many opportunities for using this type of visual aid in teaching other subjects in the Pharmacy School Curriculum. The educational films which have been produced by the Erpi Picture Consultants are fine examples of what can be done with scientific material if the latest technical methods are employed and the production of the films is supervised by a capable staff.

At this time I would like to suggest that some consideration be given to the idea of establishing a film library in the new Pharmacy Building at Washington. No provisions have been made for a film library but I have been informed that there is ample space. If worth-while educational films portraying American Pharmacy are to be produced, and I believe they will be eventually, it seems that the Pharmacy Headquarters would be the logical depository and center of distribution for these films. Pharmacognosists would certainly play an important part in the development of a library of this kind and I believe steps should be taken in this direction.

I am convinced that motion pictures can be used to considerable advantage in teaching Pharmacognosy as well as other subjects now being presented in pharmacy schools and I am not unmindful of the difficulties which may be involved in the production of films of outstanding character; however, in any program which we may propose we must understand that the purpose of motion pictures is not to afford entertainment or portray the unusual, but to present subjects which could not be presented with equal effectiveness by any other means.

---

### THE FIRST MODERN PHARMACOPŒIA.\*

BY EDWARD KREMERS.

The word Pharmacopœia (1) did not appear until 1561 on the title page of one of the treatises now commonly designated by that name. Moreover, some writers are inclined to recognize as a pharmacopœia any collection of pharmaceutical formulas, be they the *Luminare* of Nicolaus Præpositus (2), the *Formulary* of Scribonius Largus (3), or the directions carved into stone or brick of even more remote antiquity (4). However, most writers on pharmaceutical history prefer to regard as modern pharmacopœias those treatises, originally for the most part merely collections of formulas, that were compiled by special authority and made the pharmaceutical law of the city state which authorized and adopted them (5).

Viewed from this angle it is the Florentine *Receptario* which is generally recognized as the first (5) modern pharmacopœia. As the title page indicates (6) it was compiled by the medical college at the request of the local apothecaries and published in 1498, the year in which Vasco de Gama circumnavigated the Cape of Good Hope, thus discovering the all water route to the (East) Indies. This was six years after Columbus had started on his westward trip hoping to reach the same goal but ending in the discovery of the West Indies. Both discoveries ultimately proved of the greatest importance to the materia medica, hence exerted an indirect influence on the making of pharmacopœias, though this influence did not manifest itself until much later (7).

---

\* Section on Historical Pharmacy, A. Ph. A., Madison meeting, 1933.

As the first modern treatise of its kind, the Florentine book is of unusual interest to the student of the history of pharmacy. Yet the information recorded in the so-called histories of pharmacy is most meager indeed.

Scherer (8) (1822) records the titles of three impressions.

Unfortunately, neither Phillippe (9) (1853) nor Phillippe-Ludwig (10) (1855) contain a subject index. A casual examination of the table of contents and of the chapter on Italian pharmacy, however, failed to reveal a reference to the Florentine treatise.

Frederking (11) (1874) in a chapter entitled "Aerzte und Naturforscher des 15. Jahrhunderts" makes the following remarkable statement: "Ricettario aus Florenz, geb. um 1450, schrieb ein med. Werk in Italienischer Sprache, dessen lateinische Uebersetzung von Guanerius unter dem Tittel Antidotarium 1518 erschien."

Rice (12) (1895) refers to it as "the first formulary or pharmacopœia issued by some public authority."

Guareschi (13) (1897), the commentator on the national Italian Pharmacopœia, makes mention of an edition of 1596.

André-Pontier (14) (1900) makes no mention of the book.

Schelenz (15) (1904) at least has something worth while to say, *viz.*:

"Die erste eigentliche Pharmakopœe, von einer Art Pharmakopœekommission bearbeitet und jedenfalls von gesetzlich bindender Kraft, wenn auch vorerst nur fuer den engen Kreis einer Stadt, ist das Ricettario di dottori del arte e di medicina del collegio Fiorentino all instantia delli Signori consoli della universita delli speciali. Firenze 1498.

"Diese Arbeit, die auf Andrängen der Florentiner Universita dei speciali, einer Art Apotheker-Gilde, von einer jedenfalls ad hoc von dem dortigen Ärzte-kolleg zusammenberufenen Kommission in Angriff genommen wurde, war grundlegend nicht nur fuer eine zweite Auflage von 1550, sondern auch fuer das Antidotar von Antwerpen von 1561 und das Kölner Dispensator von 1565, und sicherlich hat Cordus sie auch fuer seine erste deutsche Pharmakopœe von Nürnberg eingesehen und benutzt.

"Ohne Zweifel ist die Bearbeitung des eben erwähnten Arzneibuches auf die Unannehmlichkeiten zurückzuführen, welche die Verschiedenheit der Arzneivorschriften in den mannigfaltigen von den Apothekern benutzten Kompendien, Antidotarien u. dgl. besonders in einer Stadt mit jedenfalls grossem Fremdenverkehr (wie in Florenz) nach sich ziehen musste."

The above quotation is taken from his chapter on "Mittelalterliche Arzneikunde." From the next chapter covering the 16th century, we quote the following paragraph:

"1550 kam in Florenz das zweite, wieder vom Collegio de' medici bearbeitete Ricettario heraus, dessen Inhalt eingeordnet war in: Semplici, Ricette, Misure und Succedanei. Es gedenkt der Verfälschungen der ersteren. Das Ricettario liegt der Antwerpener und Kölner Pharmakopœe zu Grunde" (16).

Tschirch (17) (1904) records the title of the first edition, also the dates of later impressions or editions, which we are not advised.

In his chapter on "Pharmacopœias," Wootton (18), informs us that "The College of Medicine of Florence adopted an Antidotarium in the early part of that century (16th) and . . ."

Danckwortt (19) (1913) makes the following statement:

"Als erste Pharmakopœe in diesem Sinne ist ein Werk anzusehen, das im Jahre 1498 in Florenz erschien unter dem Titel Ricettario di dottori del arte e di medicina del collegio Fiorentino

all' instantia delli Signori consoli della universita dei speciali. Die Florentiner universita dei speciali war eine Art Apothekerverein, auf dessen Wunsch das Arzneibuch von einer Aertzekommission herausgegeben wurde."

From Bruntz and Jaloux (20) (1918) the following statement may be quoted:

"En 1498, le Collège des médecins de Florence public l'Antidotaire florentin, sous le titre: *Ricetario di dottori dell'arte e di medicina del Collegio Fiorentino alla instantia delli Signori Consoli della universita speciali Firenze*. Cet ouvrage est, a juste raison, considéré comme une des premières Pharmacopées officielles. Il fut réédité d'abord en 1567 et souvent dans la suite: 1571, 1574, 1597, 1623, 1670, 1696, 1789."

LaWall (21) (1926) reproduces the title page of the 1696 edition which he enumerates in his Chapter "The Golden Seventeenth."

It is certainly worth while to quote these statements in full if for no other reason than to impress the student of our past with the painful meagerness of the information recorded. Even the bibliographic data cataloged are extremely fragmentary and no attempt appears to have been made to discriminate between revisions and reprints. Of a general pharmaceutical background, not to mention the equally important political, economic and social background, not a word, except possibly the most casual remark by Schelenz. Certainly, the book that is pronounced the first official pharmacopœia, in other words, the first representative of that type of literature to which we like to refer as being the bible of the pharmacist, deserves more careful study and a more generous treatment.

Having seen how little appears to have been known about this treatise to our pharmaceutical historians, let us now proceed to ascertain what may be learned about the book from other sources.

First of all, let us try to find an answer to the question why Florence should have been the first city state to produce such a guide for its apothecaries.

Strange as it may seem, it was neither Venice nor Genoa, the two principal seaports which played so important a rôle in the commerce of oriental drugs and spices, that was the first to have a pharmacopœial standard officially adopted and in force. Neither did Naples nor Messina, the two other seaports of importance attain to this distinction. It was Florence, the inland commercial metropolis of the north central part of the Appennine peninsula that took the first step in this direction. Moreover, a study of the pharmacopœial map of Italy reveals that it was in the Lombardy plain and surrounding territory that city-state pharmacopœias flourished, presumably for the simple reason that here agriculture, industry and commerce enjoyed a greater development than in the more mountainous portions of the peninsula. The seaports enjoyed the possible advantage of the Levant commerce, but they presumably did not have the hinterland to develop either agriculture or industry. Moreover, Florence, while not in the Lombardy plain itself, was on the main highways across the Alps. Pilgrims to Rome, crusaders going and returning, armies of the German emperors passed through this flourishing city. It may have been, in part at least, this international aspect of Florence, which, as Schelenz points out (22), contributed to the desirability of a standard to be adopted by all apothecaries.

As already stated, a mere glance at the map of the city-state pharmacopœias of Italy reveals that the principal pharmacopœial development took place in the flourishing Lombardy plain. A somewhat more careful scrutiny of this same map reveals the mighty Po and its northern tributaries, also the Etch (Adige), the Brenta and the Piave with their sources in the Alps. The valleys of these rivers naturally constituted as many routes. Lakes Como and Garda afforded additional waterways farther to the north. Beyond the water shed, the Rhone, the Rhine and the Danube have their origin, and their valleys and those of their tributaries constituted as many routes into the transalpine countries. Mention need only be made of the St. Gotthard pass, the Engadin

and the Brenner pass to indicate the commercial, not to say anything about the military, importance of the topography to the north of Florence and to acquire a glimpse of the strategic significance of this city of the Medici.

Having pointed out how the geographical position of Florence aided its economic development that caused the humanities and the arts to flourish, a brief review of its history cannot be out of place.

"It would seem that as early as the time of Sulla there was a Roman colony on the site now occupied by Florence; another was established after the death of Julius Caesar, and it soon became a thriving town. But it was not till the time of Charlemagne that Florence began to rise out of obscurity. In the 11th century Florence and a great part of Tuscany were bequeathed to Pope Gregory VII by the Countess Matilda. Under the protection of Rome, Florence speedily adopted the forms and institutions of a free city. As early as the 11th century the Florentines were European traders and the possessors of commercial depots in the seaports and cities of France and England, and their skill as workers in gold and jewels had grown famous. The 'arti' or trade guilds were of great importance. During the bitter wars between pope and emperor which raged throughout Italy, Florence and all Tuscany seemed to have been saved from the feuds of Guelphs and Ghibellines—the former adherents of the papacy, the latter of the empire. But in 1215 Florence became involved in the great party struggle."

This struggle, supported by the French, lasted for two centuries and more. At one time during this period the plague or black death, demanded 100,000 victims, *viz.*, in 1348. In 1406 Pisa, an ancient and illustrious republic, fell under the sway of Florence, becoming, as it were, its seaport near the mouth of the Arno, in the beautiful valley of which Florence itself is located. From 1434 the history of Florence is intimately bound up with that of the House of the Medici. After various ups and downs Pope Clement VII of the House of Medici, formed a league with the Emperor Charles V which resulted in the capture of Florence in 1530. From this period on Florence loses her distinctive history, and is only known as the capital of the grand duchy of Tuscany (23).

As already pointed out, this meager skeleton of a general background, receives no pharmaceutical flesh and blood from the histories of our calling. When, therefore, Luca Landucci's diary, covering the period of 1450 to 1516, was translated into English (24), it was hoped that this record of a Florentine apothecary might throw light on the history of the first modern pharmacopœia. But while the author records faithfully the doings of the piazza on which his shop was located, not a word about the official guide. True, he makes mention of the revival of the apothecaries' guild, but only to inform us that its members met to discuss the price regulation of candles, but not that the guild requested the medical faculty to compile a pharmacopœia for their guidance (25).

Once more, therefore, we are thrown upon the pharmacopœia itself for such internal evidence of its inception and evolution as we may glean from the title pages of its several editions or from the introductory prefaces.

P.S. After this paper had been written, there came to the writer's attention a lengthy article on early Italian pharmacopœias published in an Italian medical journal as far back as 1887. Both language and place of publication may be responsible for the fact that none of the authors mentioned were aware of such an article. Although this discovery will give new direction to further work on the subject, the facts recorded in this account remain unchanged.

## REFERENCES.

- (1) The *Pharmacopœa Mediomatrix* (Metz) of Anutius Foësius. Schelenz, *Gesch. d. Pharm.*, page 416.
- (2) *Ibid.*, page 407.
- (3) *Ibid.*, page 165.
- (4) *Ibid.*, page 23.
- (5) *Ibid.*, page 338.
- (6) See Bibliography of the *Ricettario*.
- (7) In this connection it would be of interest to ascertain which was the first American drug to find official recognition in a European pharmacopœia. (See German translation of Monardes.)
- (8) A. N. Scherer, *Literatura Pharmacopœarum* (1822), 5.
- (9) Adrien Phillippe, *Histoire des Apothicaires* (1853).
- (10) A. Phillippe u. H. Ludwig, *Geschichte der Apotheker* (1855).
- (11) Carl Frederking, *Grundzuege der Geschichte der Pharmacie* (1874), 142.
- (12) Charles Rice, *The Study of Pharmacy*. III. *History of Pharmacopœias*, Reprint from the *Ph. Era* (1895), 9.
- (13) I. Guareschi, *Commentario della Farmacopea Italiana* (1897).
- (14) L. André-Pontier, *Histoire de la Pharmacie* (1900).
- (15) Hermann Schelenz, *Geschichte der Pharmazie* (1904), 338.
- (16) *Ibid.*, page 416.
- (17) Alexander Tschirch, *Die Pharmakopœe, ein Spiegel ihrer Zeit* (1904), 4.
- (18) A. C. Wootton, *Chronicles of Pharmacy*, II (1910), 59.
- (19) P. W. Danckwortt, *Die Entwicklung der Arzneibuecher* (1913), 3.
- (20) L. Bruntz et M. Jaloux, *Plantes officinales*, etc. (1918), 50.
- (21) Chas. H. LaWall, *Four Thousand Years of Pharmacy* (1926), 274 and opposite 364.
- (22) Schelenz, *Gesch. d. Pharm.*, page 339.
- (23) Based on Funk and Wagnall's *Standard Encyclopedia*.
- (24) *A Florentine Diary from 1450 to 1516* by Luca Landucci. Translated from the Italian by Alice De Rosen Jervis. Published in London in 1927 by J. M. Dent & Sons, Ltd., and in New York by E. P. Dutton & Company.
- (25) For an account of the author and his diary so far as pharmaceutical matters are concerned, see the paper read at the Portland meeting of the A. Ph. A. in 1929.

A STUDY OF THE HYDROGEN-ION CONCENTRATION OF TINCTURE OF DIGITALIS, TINCTURE OF ACONITE AND FLUIDEXTRACT OF ERGOT.\*

BY C. JELLEFF CARR AND JOHN C. KRANTZ, JR.

DEPARTMENT OF PHARMACOLOGY, SCHOOL OF MEDICINE, UNIVERSITY OF MARYLAND.

*Introduction.*—This investigation was undertaken for the Revision Committee of the U. S. P. A monograph on hydrogen-ion concentration has been tentatively accepted for admission to the U. S. P. XI. Thus, the hydrogen-ion concentration of official preparations will be stated where it is deemed desirable. The determination of this constant must, however, yield information pertinent to the therapeutic efficacy or stability of the product. The test outlined must be simple and yet reasonably accurate. The colorimetric method meets these fundamental requirements and is accepted.

The preparations that have been studied are: Tincture of Digitalis, Tincture

---

\* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933.