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Barbara Kuźnicka (Poland)

THE EARLIEST PRINTED HERBALS AND EVOLUTION OF PHARMACY

The mediaeval attitude to science arose out of assimilation of ancient Greek and Arab concepts with only a few attempts at empirical studies and direct observations of nature. Treatises and commentaries circulating in manuscript were the sole form of dissemination of knowledge.

It was not until the Early Renaissance that Man discovered Nature in all its richness and plunged into investigating it. This gave rise to new truly empirical and experimental methods of studies, being in sharp contrast with the traditional scholastic approach and a mystic understanding of the world.

In his thirst for knowledge Man treated Nature not as a passive object of contemplations but as an unusually rich source which, once understood and investigated, would reveal all of its wealth. Misteries of Nature and their discovery got to the forefront of scientific research which was also engaged in rearranging and revising the earlier evidence based on classical and mediaeval sources. This period is particularly fascinating as the time of settling accounts with the earlier experience and discovering new territories and tools of scientific development such as invention of printing.

All this stoked intellectual imagination and fermented the drive for learning and investigating the unknown.

The first printed books on natural history date back to the 15th century. Those are mostly primitive compilations putting together fragments of mediaeval manuscripts. Invention of engraving technique permitted to illuminate the text, though such illustrations were, for the most part, the fruit of the artist's fancy and not an image of life. In-

formation concerning nature was chiefly recorded for the practical needs of medicine and agriculture.

Medical treatises written in Latin had a limited circulation as textbooks among a small group of physicians and apothecaries. People of medical profession confined to the cities and towns where the scanty pharmacies could be found were unable to cope with spreading disease and epidemics. Most of the people had to take care of themselves or resort to the advice of quack doctors and mountebanks. Folk medical knowledge was a general source of information passed on from generation to generation. Its dissemination was made easier as herbals appeared at that time. Those were the first medical and botanical printed books of encyclopaedic nature. They could hardly be called scientific in the present-day sense of the word since the concepts of the Middle Ages and Early Renaissance were rather aimed at rearranging and popularizing of what had already been known. Nevertheless, such books were signs of the times and an important step on the way to science.

THE ROLE OF HERBALS IN SPREADING MEDICAL KNOWLEDGE

THE MAINZ HERBALS FROM THE END OF THE 15TH CENTURY AS ENCYCLOPAEDIC COMPENDIA ON DRUGS

A great number of hand-written herbals date back to the time in between the Antiquity and the 15th century. Based on the texts by Greek, Roman and Arab authors and lacking originality they were hardly a contribution to the scientific progress. Nevertheless, at least some of them are worth mentioning. We shall point out three Venetian manuscripts whose novelty lay in naturalistic illustrations so painstakingly copied by the authors of later printed herbals. The first of the three appeared c. 1390. It was an Arab medical-botanical treatise written by Serapion the Younger (c. 800) and translated into Italian by a Paduan monk Jacobo Filippo.¹ Some of the illustrations are so realistic that one could easily attribute them to a much later date.

Benedetto Rinio compiled the second of these manuscripts, an important guidebook for herbalists at the time of great chaos in botanical nomenclature. Andrea Amati, a painter of little fame, illuminated the manuscript with a wealth of 500 full-page drawings of plants bespeaking the artist's talent for much more subtle observations of nature than those of any earlier illustrator.

The third of the Venetian herbals written in Belluno, the Venetian

¹ This manuscript, now in the British Museum, formerly was in the possession of the famous Bologna naturalist, Ulisses Aldrovandi (1522-1605). (W. Blunt, *The Art of Botanical Illustration*, London, 1950, p. 26.)

Alps, must date from the beginning of the 15th century. The names of both its author and the artist who made illustrations remain unknown. The text is almost fully borrowed from Dioscorides.

The realism of the miniatures in the Venetian herbals, drawn or painted by hand, is an obvious advance in the art of illuminating books on natural history. This line will be developed in the first woodcuts decorating the German herbals of the end of the 15th century. As to the contents of the texts they conservatively adhere to all the out-dated traditions of the mediaeval medical and botanical knowledge.

Herbarium by Apuleius Placotonicus (or pseudo-Placotonicus)² is the earliest printed herbal published in Rome most likely in 1481. In the foreword the author mentions the Monte-Cassino manuscript over a thousand years old as a source-book for his *Herbarium*. This treatise of no special importance combines medicinal formulae with description of herbs.

Soon afterwards three printed books came out in Mainz that were to have a strong influence on the future of pharmacy. Those were the *Latin Herbarius* (1484), the *German Herbarius* (1485) and *Ortus* (*Hortus Sanitatis*) (1491). The first two of them must have been based on earlier manuscripts though the evidence of such borrowings can be found only when these herbals are compared with the texts by Apuleius or with the ancient Greek and Roman originals.

Latin Herbarius

Published by Schöffer in 1484, the *Latin Herbarius*³ was compiled out by earlier materials taken from mediaeval manuscripts or from some classical and Arab texts. It chiefly contained descriptions of the local plants growing wild and cultivated in Germany together with simple drugs. This was a typically anonymous book; neither is the artist known, whose illustrations though charming and well proportioned were drawn not from nature but from some unmentioned source. The author seems to be unfamiliar with the herbal by Apuleius, as there is no reference to him in the book. There is also every reason to believe that the *Latin Herbarius* first appeared in manuscript. It should be noted

² A still earlier publication is the incunabulum by Bartholomeus Anglicus, brought out c. 1470. It was a botanical encyclopaedia entitled *Liber de proprietatibus rerum*. The book went into as many as twenty five printings till the close of the 15th century. The treatise contained descriptions of plants and their medicinal application. Another botanical printed work was *Das Buch der Natur* by Konrad or Cunrat von Magenber (Augsburg, 1475).

³ It was also known as *Herbarius in Latino*, *Aggregator de simplicibus*, *Herbarius Moguntinus*, *Herbarius Patavinus*. It should be noted that both this herbal and the other two discussed in the present paper, were published in Mainz, the birthplace of printing, where books were printed as far back as 1440-1450.

that woodcuts often served for decoration rather than illustration of the text and the same wood blocks would be used in printing more than one publication giving rise to misinterpretations of the authorship. So the authorship of the first version of *Herbarius* was attributed to Arnoldus de Villa Nova, a physician who lived in the 13th century, for the front page of the earliest print is illuminated with an engraving showing Avicenna and Arnoldus and both their names are quoted further in the book.⁴

The *Herbarius* was published for the practical needs of the day. It provides prescriptions for the preparation and administration of simple drugs obtained from wild and cultivated herbs in Germany. Descriptions of herbs and their woodcuts are arranged alphabetically.

German Herbarius

The *Latin Herbarius*, translated into various languages, went into several printings in Bavaria, the Netherlands, Italy and, probably, in France, but it never acquired the significance of the second Mainz herbal. The *German Herbarius*⁵ appeared quite independently one year later as another P. Schöffer's publication and has been wrongly considered⁶ a translation of the *Latin Herbarius*. A. Arber⁷ believes that the medical part was written by Johann von Cube, a physician from Frankfurt, according to indications of the anonymous author. There is a hypothesis ascribing the authorship to von Breydenbach who was a great traveller and observer of plants. He was accompanied by the artist Rewich who must have drawn the 350 specimens of plants illustrating the book.

The *German Herbarius* was another resolute step forward as it contained personal observations of the author, the most significant of which was his statement that many of the plants described by the ancient Greek and Roman authors did not grow in Germany. This brings one very close to a critical approach to the choice of the herbs to be described. Another feature instrumental to the scientific progress is a great number of beautifully executed realistic drawings of plants illustrating the text. Most of the delicate woodcuts undoubtedly reproduced the drawings made from life. The first prints of the book were even coloured. Those woodcuts became a model of book illustration for

⁴ This suggestion can be found in A. Arber's *Herbals, their Origin and Evolution*, Cambridge, 1953, p. 22.

⁵ The more often used synonymous titles are *Herbarius zu Teutsch, Gart der Gesundheit*, the *German Ortus sanitatis*, *The smaller Ortus*, *Cube's Herbal*.

⁶ Blunt, *op. cit.*, (third edition), p. 35.

⁷ Arber, *op. cit.*, p. 22.

many years to come. They were often reproduced and copied in many foreign editions.

The author's medical concepts proceed from the hypothesis of 4 elements and 4 laws of Nature. He describes 435 medicinal plants and medical utensils to be found in apothecaries. The German original was soon translated into many foreign languages. The English translation was published by E. G. Tucker (1485, Augsburg) within a few months of the appearance of the original.

Ortus Sanitatis

Ortus (Hortus) Sanitatis, the third of the Mainz herbals, was published by Johann Meydenbach in 1491. This was a most popular and widely quoted book that went through several editions and served as a common source of compilations. *Ortus* is a much larger volume embracing not only plants but also a significant part of the animal kingdom: some of the mammals, fish and birds, as well as minerals and *materia medica*. The text is a Latin modification of the *German Herbarius*.

Ortus stands out for its more extensive and detailed description of medicinal properties of herbs. It is richly illuminated with two thirds of the illustrations borrowed from the *German Herbarius*. Unfortunately all illustrations are reduced—with the exception of the first edition where they are full-page—and erroneously identified. As to the woodcuts made especially for *Ortus*, those representing local plants are realistic enough, while others are mainly or fully drawn from imagination.⁸ The best of them are shown on the front page.

Latin editions of the Mainz herbals appeared all over Europe. Later they were used as models by translators compiling herbals in their mother tongues.

POLISH HERBALS

The Polish treatises on plants and herbs are hardly at all known in the world literature. Suffice it to say that the most comprehensive English historical monograph *Herbals, their origin and evolution* by Agnes Arber discussing the herbals printed in between 1470 and 1670 contains no mention of the Polish books on the subject.⁹

⁸ For instance, the woodcut showing a narcissus with human figures stepping out of it. It is most likely a symbol of the fate of the legendary youth who fell in love with his own reflection.

⁹ No mention can be found either of later entirely original herbals such as *Herbarz Polski* by Marcin of Urzędów produced in 1595 or *Herbarz by Szymon Syreniusz*, 1613.

Thus one may have a distorted idea of the state of pharmaceutical knowledge in Poland of the period as compared with other European countries. To fill in this gap let us have a brief description of Polish herbals.

Jan Stanko, physician and professor of the Cracow Academy in the end of the 15th century, was a great expert on herbs. He brought out a huge manuscript under the title of *Antibolomeum* in 1472. It is a Latin-Polish Lexicon in three volumes, of which the last two were compiled by J. Stanko himself. Out of a total of 523 plants described in the manuscript, 433 are native forms and the remaining 90—the foreign ones. This is altogether a huge number for those days. But Stanko's lexicon, though a herbal of European standard, had little social effect as it never came out in printed form.

The oldest¹⁰ among herbals printed in Polish is Stefan Falimirz's *On Herbs and Their Power ...*¹¹, published in Cracow in 1534. The Polish edition was thirty years behind the earliest European publications. The credit for its appearance should be given not so much to Falimirz, the author, but to the famous Cracovian printer, Florian Ungler. Being well versed in the world of literature, Ungler felt the urge to produce for public use a Polish medical-botanical encyclopaedia.

His encyclopaedia was no more original than the herbals published in other countries. It was likewise a translation and compilation based on the Mainz herbals, namely the Latin version of *Herbarius* (149 chapters) and *Ortus Sanitatis* (60 chapters) as well as on one more unidentified source. This herbal is a comprehensive study covering the whole information on medicinal herbs used in Poland in the first half of the 16th century, for alongside with a collection of borrowed texts in translated, modified and abridged form, it contains some personal observations of Falimirz as well as data on the geographical distribution of certain plants. A great achievement of Falimirz was also introduction of Polish terminology, the most part of which has survived to the

¹⁰ It was preceded by only one late mediaeval medical handbook, published in Latin in 1532 by F. Ungler, Cracow; compilation by Szymon of Łowicz, that is *Aemilius Macer de herbarum virtutibus, cum veris figuris herbarum*. This was a popular handbook of folk medicine containing a Latin text describing in verse about 80 herbs together with a short vocabulary of Polish names of medicinal plants. Szymon's nomenclature, criticized by the connoisseurs of the subject, covered less than 80 herbs, while Falimirz described 262 medicine plants in his *Herbal*.

¹¹ The book has no title and is commonly quoted as *On Herbs and Their Power...* Józef Rostafiński follows the historical tradition referring to it as Ungler's Garden of Health. Titles of individual chapters: *On Herbs and Their Power*; *On Making Tinctures of Herbs*; *On Preparing Oils*; *On Foreign Stuff*; *On Animals*; *On Birds and Fish*; *On Precious Stone*; *On Urine*; *On Pulse Beat and other Symptoms*; *On Childbirth*, *On Cupping and Bloodletting*; *On Tested Drugs and others*.

present day. He was also the first to use woodcuts made from life, thus heralding the trends of Renaissance in Polish writing on natural history. Most of the illustrations were reprinted from *Ortus Sanitatis* which points to the *German Herbarius* as their possible source.

Later, in 1542, Hieronim Spiczyński produced a revised version of Falimirz's book titled *On Native and Foreign Herbs and Their Power ...*, and in 1568 it appeared again as *Herbal—that Is Description of Local, Foreign and Oversea Plants ..*, edited by Marcin Siennik.

NEW ADVANCES IN NATURAL HISTORY IN THE FIRST HALF OF THE 16TH CENTURY

HERBAL BY OTTO BRUNFELS

The herbals produced by Otto Brunfels and Leonhart Fuchs in the first half of the 16th century were true signs of progress. One could trace their ancestry to the Venetian and German herbals, but their great novelty was in the beauty and naturalism of woodcuts on which plants looked as the living image of themselves. The text also underwent changes. Trying to arrange the plants systematically the authors based their classification not on the descriptions often deficient due to inaccuracy of the botanical terminology but on the drawings. Their precision associated with a highly artistic execution made the drawings the most sure tool of identification of plants in nature. This approach placed the artists next to the authors as co-creators of the book, which was in line with the major intellectual and artistic tendencies of the Renaissance.

The greatest artists such as Leonardo da Vinci and Albrecht Dürer turned to Nature and Man, producing marvelous studies from life. Dürer, who had an enormous influence on the art engraving as a whole, was a true student of Nature in his artistic work.¹²

It was in this favourable atmosphere that Otto Brunfels¹³ convinced a well-known artist Hans Weiditz to cooperate with him over the *Herbarium Vivae Eicones*.¹⁴ Making his illustrations unusually true to life and artistic, Hans Weiditz (vel Johannes Guidictus) became a co-author of the book, whose very title—*Live Portraits of Plants*—emphasizes the importance of this new approach. Nature was the only "source of in-

¹² J. Białostocki, *Albrecht Dürer jako pisarz i teoretyk sztuki*, Wrocław, 1956, p. 82.

¹³ T. A. Sprague, *The Herbal of Otto Brunfels*, "The Journal of the Linnean Society in London" XLVII, Botany (1928), 320, p. 83.

¹⁴ O. Brunfels, *Herbarium Vivae Eicones*, 1530; 2nd ed., 1532; 3rd ed., 1539. Id., *Novi Herbarii*, Tomus II, 1531; 2nd ed., 1536. *Tomus Herbarii Othonis Brunfelsii* III, 1536; 2nd ed., 1540.

spiration" for Hans Weiditz. As Wilfrid Blunt rightly pointed out in his book *The Art of Botanical Illustration*, never had beauty been so close to scientific scrutiny.

Weiditz portrayed plants from life with his own hand, while the woodcuts were carved from his drawings by a group of craftsmen and apprentices under his supervision. There is a point of view attributing the drawings to Brunfels himself, but it has been refuted by T. A. Sprague.¹⁵

Otto Brunfels (Brunfelsius), priest, theological writer and later physician, came from Mainz, the right place for a person with botanical interests. The Mainz herbals were a highly probable source of inspiration for his innovative book.

The superb illustrations made the text of the book less important and second-rate. Brunfels saw his major task in comparative studies of plants known to him from his personal experience with those described in the literature of Antiquity. Most precise drawings from life allowed him to discard a number of species that had been taken formerly for Middle-European ones. He also described many new plants unknown heretofore.¹⁶ His success as a taxonomist was partly due to the line of his studies—unlike his predecessors Brunfels showed no interest in practical medicinal application of plants.

The first volume of *Herbarium Vivae Eicones* appeared in 1530, the second—a year later, while the third came out posthumously in 1536. The first print as well as later editions of the whole book are in Latin.¹⁷

Brunfels' botanical knowledge chiefly results from studying Italian authors, Manardus for one, who were engaged in identifying the plants described by Dioscorides with those native for their neighbourhood. Brunfels followed in their footsteps when studying the flora in the environs of Strasbourg. He had not the slightest idea, however, of the geographical distribution of plants, namely that different regions may have different flora. This is all the more strange that even Theophrastus realized that certain provinces of Asia had endemic plants unknown in other parts of the world.

Brunfels' text was based in the first place on excerpts from Dioscorides and other classical authors such as Apuleius Placotonicus, the Arab

¹⁵ This opinion was advanced in 1919 by A. H. Church in his work *Brunfels and Fuchs*. *J. Bot.* 1919, 223–244 (see Sprague, *op. cit.*, p. 83).

¹⁶ A complete list of species discriminated by Brunfels can be seen in Sprague, *op. cit.*, p. 80.

¹⁷ The German editions appeared in 1531 and 1534 as *Contrafayt Kreüterbuouch*, while the second edition of the posthumous volume came out in 1537.

physicians Serapion, Mesue, Avicenna and Rhazes and the Italian botanists of the 15th and early 16th century, the above Nicolaus Monardes among them. The text made use of contemporary nomenclature and classification. The latter proceeded rather from vegetative characteristics, the general outlook and medicinal properties of a plant than from its inflorescent structure. In most cases Brunfels was satisfied with the plant names commonly used by the herbalists. His extremely detailed and exact descriptions allowed for a very accurate identification. Brunfels produced an overall description of 260 species of which 40 were probably new.¹⁸

The new attitude to an encyclopaedic book on natural history placing the main emphasis on realistic drawings as the best means to identify plants should not screen the significance of the text even though of inferior quality.

HERBAL BY LEONHART FUCHS

The herbal compiled by Leonhart Fuchs (Fuchsius, born in Wemding, Bawaria, in 1501) was published in 1542, in Basel, under the title of *De Historia Stirpium*.¹⁹ In this book, again, illustrations are more valuable than the text and the success of the herbal should be rightly shared by the author and the three artists, to whom we owe to a great extent the high standard of the book.

We can find their portraits in the volume. They were Albrecht Mayer who made drawings of plants from life, Fullmauer who transferred the drawings onto the woodcuts, and Vert Rudolf Spechle who did the carving. *De Historia Stirpium* has twice as many woodcuts as the book by Brunfels.

L. Fuchs started preparations for printing his herbal sometime around, but not later than 1540. This was already in Tübingen where he arrived as professor of medicine and the head of the chair at the University. The assumptions he proceeded from were different from those of his predecessors. Without underestimating the practical tasks of the herbal, L. Fuchs believed that the main purpose of a scientist was to advance the pharmaceutical and medical knowledge. To achieve this he

¹⁸ It took less than one hundred years for the number of species to have increased enormously. Thus, C. Bauhin's *Pinax Theatri Botanici* (1623) contains names and synonyms of c. 6,000 species.

From among 265 species described (285 including varieties), 78, had been identified by Theophrastus, 84 by Dioscorides and 78 by mediaeval authors. Discrimination of the remaining 47 species is attributed to Brunfels as no mention of them could be found in earlier works (see Sprague, *op. cit.*, p. 113).

¹⁹ T. A. Sprague, E. Nemes, *The Herbal of Leonhardt Fuchs*, "The Journal of the Linnean Society in London" XLVIII, Botany (1931), 325, pp. 545-642.

used extensively the ancient originals in combination with the contemporary data improved by means of direct observations of nature and introduction of realistic plant drawings.

Fuchs held a very low opinion of the pharmacy in Germany in the early years of the 16th century.²⁰ In his opinion, lack of fundamental education made chemists depend on the doubtful advice of women-herb-
alists. Such ignorance resulted in a growing number of professional errors. The task of his herbal was to correct those errors, to indicate proper methods for identifying medicinal plants and, thus, to raise the efficiency of their therapeutical application.

Fuchs was very consistent in bringing out his by all means significant treatise. He began with a critical study of the nomenclature introduced by ancient Greek authors using Dioscorides' *De materia medica* as his source book. Next, he presented all medicinal plants known at his time and set illustrations in order, that is each woodcut was printed together with the description of a particular plant as an aid providing additional information. In so doing Fuchs followed his own line of criticism—he criticised Brunfels for insufficient correlation between the text and illustrations and for using wrong names of plants.²¹ Brunfels' woodcuts were also of a higher quality. Admitting this, however, one should bear in mind that Brunfels was a pioneer in this field.

L. Fuchs described about 400 indigenous plants and 100 foreign ones. His classification was based on pharmaceutical, economic or, sometimes, phylological principles, while in the nomenclature and taxonomy he departed from *Materia medica* by Dioscorides. Fuchs introduced numerous personal observations into his descriptions of plants, but they are so tightly woven into the fabric of the compilatory text that it would be impossible to segregate them without a close comparison with the classified originals. Among the source books we can mention Theophrastus, Dioscorides, Pliny, Galen, Orbisius, Apuleius, Barbarus, Aemilius Macer, Valerius Cordus, Hieronim Bock and, of course, Otto Brunfels.

Though Fuchs identified several new species his text had no special influence on the development of classification of medicinal plants.

FACTORS OF PROGRESS IN RENAISSANCE PHARMACY

The rich intellectual life of Renaissance with its interest in Nature, the prosperity of cities and development of trade and craft—all these factors facilitated the advance of pharmacy. There was an ever growing

²⁰ *Op cit.*, p. 552.

²¹ *Op cit.*, p. 545.

demand for drugs. There appeared new plant raw materials. There were signs of great changes and new trends in the search of efficient remedies as proclaimed by Paracelsus.

It should be noted that a particular aspect of pharmacy was its boarderline position as it combined empirical and scientific knowledge. This combination and its effect on scientific progress are discussed in Bogdan Suchodolski's *On the World and Polish History of Science, Introduction to the History of Polish Science*.²²

"In some cases—writes Suchodolski—when there was no need to go beyond ordinary skills to achieve good results, practice could be a factor holding up scientific investigations, while in other cases it was practice that inspired discoveries and innovations."

The bulk of drugs prepared in apothecaries, the so-called *simplicia*, were primitive medicaments of plant rather than animal or mineral origin. Chemical preparations were extremely rare. The Galenic drugs were administered in the forms known to the present day as decoctions, infusions, extracts, oils, syrups, etc. Some drugs had a more complex composition (*composita*) like theriac (gypsy rose)—a mixture of 80 components.

New trends in pharmacy found expression first of all in transformation of former mediaeval grocery shops into *officinae sanitatis*. The 16th century also saw separation of most of the apothecaries from the guilds they shared with other professions (for instance, pepperers or grocers).

More chemicals were becoming known in pharmacy, chiefly still minerals but better and better refined. There was also an increased number of composite medications.

All this accounted for the need of a new type of medical books—pharmacopoeias which at first were binding in particular cities and later—throughout the country.

Publications of pharmacopoeias as books describing drugs, chemicals, and medicinal preparations, issued by an officially recognized authority was a sign of placing increased public demands upon apothecaries.

The authors of pharmacopoeias naturally turned to earlier herbals as a prototype of encyclopaedia on medicinal plants and drugs. Thus the early 16th-century herbals were an important feature of scientific progress, helping to spread the pharmaceutical knowledge. The great geographical discoveries enriched the stock of raw drugs due to exotic material, but investigations were devoted not so much to those exotics unheard of and never mentioned anyway in the works of the writers of the Antiquity, but to the plants indigenous to a particular region.

²² B. Suchodolski, *On the World and Polish History of Science, Introduction to the History of Polish Science*, Wrocław-Warszawa-Kraków, 1970, p. XVIII.

Another progressive feature was creation and dissemination of folk vocabulary, chiefly botanical, and, last but not least—use of woodcuts as illumination of books on natural history. The engravings developed from mere decorative illustrations loosely connected with the text into documentary portraits of nature.

A historical analysis shows that the art of plant description was lagging behind the skill of its illustration. Having evolved in the Middle Ages as a picturesque but often erroneous image of plants, phylography, the artistic illustration in a much improved form became an integral part of the printed Renaissance herbals to develop still later into a tool of scientific precision.