MEDICAL INCUNABULA

and the

DIFFUSION OF SCIENTIFIC KNOWLEDGE

Incunabula in the National Library of Medicine
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by

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All illustrations are from original works in the incunabula collection of the National Library of Medicine. The zodiacal illustration on the front cover is from Anianus: *Compositus cum commento*. [Lyons] Matthias Huss [ca. 1492]. The portraits on page 1 were taken from Schedel, Hartmann: *Liber chronicarum*. Nuremberg. Anton Koberger, 1493. Initial “T” is from Montagnana, Bartolomeo: *Consilia medica*. [Venice] Bonetus Locatellus, 1497.
The computer terminals that serve patrons in a medical library are one result of the electronic revolution that has completely changed the field of health science communications. Computerized literature retrieval systems produce needed information in a matter of minutes. A somewhat comparable revolution occurred about 530 years ago. In 1454, one year after the fall of Constantinople, the first European book printed with movable type (and bearing a date) appeared.

From the beginning of our civilization man has searched for methods of communication. Cave drawings and paintings were followed by carvings in stone, then by writing on vellum and on paper. Thousands of scribes spent lifetimes writing to spread the word. Even so, by the end of the Middle Ages the manuscript trade could no longer keep up with a greatly expanded reading public. The answer to increased literacy and to the growing demand for religious, artistic and instructional matter was movable type.

Incunabula is the term used to identify texts printed with movable type before 1501. The Latin word incunabula means the apparatus of a cradle, regarded as the symbol of infancy. The child, the printed book, was born in Mainz or in that area around 1450, and the next 50 years constitute its period of "infancy."

Johann Gutenberg's invention spread quickly, first to neighboring towns and then to many European cities. Albrecht Pfister introduced printing to Bamberg, Johann Mentelin to Strassburg, Ulrich Zell to Cologne. Two German clerics, Konrad Sweynheym and Arnold Pannartz brought printing to Italy — printing first in Subiaco, and by 1467 in Rome. Printing was introduced to Switzerland around 1468, to France in 1470, to Spain and the Low Countries in 1472. William Caxton introduced printing in England in 1476-7. These printers initially concentrated on theological and legal works as well as on classics in demand at the time. In 50 years approximately 40,000 editions were printed, totalling 6,000,000 copies. Science and medicine reached readers mainly after the market has been glutted with other works. This enormous escalation of output, referred to by many as the diffusion of knowledge, may be compared only with the computerized dissemination of information of our time.

The earliest printed medical book is generally accepted to be Jean Charlier de Gerson's tracts on self-abuse titled De pollutione nocturna, printed in Cologne by Ulrich Zell in around 1466. The National Library of Medicine owns the second edition of this work, also printed by Zell around 1467. In the latter year Hrabanus Maurus' De sermonum proprietate; sive, Opus de universo was printed by Adolf Rusch in Strassburg. The work describing the universe includes a chapter on medicine titled De medicina. The Library has the first edition of this work.
Incipit Traditum venerabile. Magis
joh. Gerfin cancellarii panisini tradans
et pollutione nocturna, an impediatus celebra
tem vel non.

Vibitarum est apud me sequerent
z suis pertinent post suferent fact
donei quis nocturno pollutus
suffo in celebrando misit esita
ta de vert. Expertus est finitus multos pertinent
religiosos aut nonnus quodem praebet talis
dubitationis figurul no pauci turbati. Du
ex vna post eos ad celebrandus habebit
tio altera timor ofensit scripit.

Tandem subsequens sup hoc ercessit, et
donei factur lectione eius expertus aut
virtuosus authorone a secto
s titus postremo et ipa radion aut
exemplaris cognitione attendero in
uit coteriades aliae breues aut non, praebet
inches supinens sup. Coteriades sub
almo quod erit accessorie. aut quod p. directus erit.

Per eundem baco veniam si fossan impurum liquor
dum est quia modus talis est qui viv
altere detegi vivi pulcherrimis medicamentis
sit sanar potest.

Sequentia Considerata prima

Capitus prius. Particula prima.

Modus cognoscendi prohemialis.

1. Ita brevis est et longa tepuis acutus et
perimetelli gallarii indicii vero difficil

1. Et vincte ejectiones s tudorum dicitat
2. et cumos/bis cumos cognitirines ap-
3. parentia declarant.

1. Paroxismos coxistentialia declarant egritudines et
ta anns et cirentuii admittit decetem suffi vi enare
post radion suffi amplius tempus et.

1. In exercitationibus at summi boni habituines fal
lases et vi perio fuerint inim. ex tremo enim
quaeque cum queve non quielat recesiis possit
addere in melius rezintinur ignis ad pestis. Lhous
et ergo causa boni habituines foliis coteri/nos tarde/vi
rurus principuiy nutriment accipiet corpus nec com
passiones ad viutum facere sallaces enim nust Sci qua
his fuerit naturae suflinere bebe/res ad hoc se/ser vi
res posse tolerare. Similis est inanimalia ad viutum
sallaces iteri res fingiabit viutum sallaces.

2. In omni gravitate confessori mente et bene hic

t erat oblatioi boni contrarion veno malum.

3. No plenitudo in indigetia nec aliud quodcuis
magi natura fuerit nihil bonum.

2. Quo multo tempore extenuantur corpora tarde re
uerti confluerei que vero modice vel.

3. Nisi sim one adaequatis no optet crederi nec verei
mala valde que suis irrationabil. mala est talis et
ter nus valore gemaneres nec mutari confluereat

2. In modis minus percutiuntur ergocrates quibus eis
4. quae nature etiam habitudinem bore egredio en
in eis magia quae quib nec possa sim aliud bono ines.

2. Letris valde fini man can molei magi galer.

Gerson, Jean Charlier de. De pollutione nocturna. De
cognitiorum castitas et pollutionibus diurnis. Cologne,
Ulrich Zol., ca. 1467. Title page of second edition.

Hippocrates. Aphorismi, sive Sententiae. [Nuremberg,

From 1467 on, medical books, and books in
related fields, appeared in a growing number of
European cities. Arnold C. Klebs' Incunabula scienti-
fica et medica lists 1060 individual works (in
approximately 3000 editions in all), of which some
900 can be classed as medical. The National Library
of Medicine has 516 works, in 537 editions, printed
before 1501. Most of these medical and scientific
books were printed in prospering cities that were
close to universities. It is therefore not surprising
that the printers of Venice published more than 550
editions. Rome followed Venice, producing about
227 editions, Paris 214, Leipzig 204, Augsburg 179,
Cologne 156, Lyons 136, Strassburg 101, Antwerp
95, and Nürnberg about 93 scientific and medical
editions. In 50 years the printing of scientific and
medical books spread to more than 120 cities.

The output of medical works was decided by the
printers, and the printers were businessmen, whose
goal was to meet the needs of their customers. The
public's demand can be determined by the output
of the manuscript trade, which was well established
by the middle of the fifteenth century. The printer
had some estimate of the quantitative demand for
books and had some idea of what kind of books
the public was interested in. Thus the printer was
essential not only in the diffusion of books but also
in the diffusion of knowledge.

In the field of science the two most-published
authors were Albert the Great (Albertus Magnus)
and Aristotle. Albert the Great's popularity was
based mainly on his Secreta mulierum (a work on
cosmetics) and his Liber aggregationis (a book on
the virtues of herbs, stones and animals). Of the lat-
ter, the Library has 5 editions, the earliest published
in 1483. The Secreta mulierum et viorum is rep-resented by 7 editions, the first printed by Adam
de Rottweil in Venice, in 1478. The richness of the
Library's collection is reflected in other important
works by Albert the Great, including his De anima,
De animalibus (both in 2 different editions), De
generatione et corruptione, Mariale, De
mineralibus, Philosophia pauperum in 3 editions,
Habranus Maurus. De sermonum proprietate, sive Opus de universo. [Strassburg, Adolphi Rusch, 1467.]

First page with initial “D” colored in black, blue and red.
two printed by the Brescian Baptist Farfengus and one in Venice by Georgius Arrivabenus. In addition, the Library has the Logica published in Pavia around 1490. The Logica is not in Klebs, but is generally considered to be a scientific work. Aristotle is represented in the collection by the first edition of his Opera (in Latin, without the commentary), published in Augsburg by Ambrosius Keller in 1479. The Library has 3 of the 4 existing editions of De animalibus, including the first edition published in Venice by Johannes de Colonia and Johannes Manthen in 1476. The Problematia is present in the collection with 3 editions, and the Secreta secretorum with 2 editions.

These two authors dominated the western spiritual and scientific world. Hippocrates ranks a distant third among popular authors of scientific and medical incunabula, based on the number of editions printed. Such a giant of early medicine as Galen ranks twenty-eighth and Guy de Chauliac, the most distinguished authority in the field of surgery, ranks forty-eighth based on the number of their books printed before 1501.

Some of the most popular authors were Arnaldo de Villanova (among other works by him the Library has three editions of his popular work titled Breviarium practicae medicinae), Anianus (whose Comptus manuualis cum commento was published in 37 editions in 3 series) and Rhazes (the Library has the first edition of his Liber ad Almansorem, published in Milan in 1481).

No doubt the most popular medical book, based on the number of editions printed, was the Regimen sanitatis. The regimen contains a series of hygienic and dietetic instructions dedicated to either the King of France or the King of England. The Library has the first edition of the work, printed in German in 1472, in Augsburg. The origin of the work is unknown, but according to Sudhoff it may have been based on a pseudo-Aristotelian epistle to Alexander the Great.
The second, third and fourth numbers on the best seller list of scientific incunabula are all attributed to Albert the Great. These are the *Liber aggregatio*

nis, *De mirabilibus mundi* and *De secretis mulierum*. Albert von Bollstädt, the Dominican monk who later became Bishop of Ratisbon and was called Albert the Great or Albertus Magnus, did not write on medical practice, as that was forbidden to the Dominicans, but he was probably the most outstanding naturalist of the 13th century. The Library has the second edition of one of his most important works, *De animalibus*, published in Mantua, in 1479. The fifth best-seller is *Somnia Danielis*, the book of dreams, passed down from the Middle Ages and still popular at the threshold of the Rinascimento. It was printed 39 times before 1501. The Library has one copy, the eighth edition, printed in Rome, in 1480. The *Somnia* is followed by Wenzel Faber's astrological predictions, Anianus' *Comportus*, Mandeville's *Itinerarius* and a great number of Herbals.

Pediculus Dioscorides is generally accepted as the originator of the materia medica. During his travels he described approximately 600 plants, one hundred or so more than Theophrastus. Hippocrates knew around 150 of these. Out of the 600, close to 100 are still in use today. The Library has the 1499 Venetian edition of Dioscorides' *De materia medica* in Greek. Most herbals were picture books, usually with hand colored illustrations that added to their great popularity. The Library has the first edition of the *Hortus sanitatis* printed in Mainz, in 1491. Because of the success of this popular work, printers produced more scientific books on botany.
ΠΕΔΑΚΙΟΥ ΔΙΟΣΚΟΡΙΔΟΥ ΑΝΑΖΗΤΗΣ
ΠΕΡΙ ΎΛΗΣ ΙΑΤΡΙΚΗΣ ΒΙΒΛΙΟΝ
ΠΡΩΤΟΝ.

Ο Πεδακίος, ο οποίος έγραψε το έργο στην ελληνική γλώσσα, υπήρχε ένας γλύπτης και μαθητής του Αριστοτέλους. Αναφέρεται ότι ζήσει μέχρι τον 1ου αιώνα μ.Χ. και ότι απεβίωσε στην Ασία. Απείχε τον στιλβότητα του σκεπτικιστικός εμπειρικός επιστήμης και έγραψε το έργο του, την "Διάταξιν τῆς Υλῆς Ιατρικῆς", την πρώτη γνωστή εικόνα της ιατρικής επιστήμης. Το έργο αυτό ήταν ένα εκπληκτικό έργο της εποχής του, καθώς έλαβε υπόψη την εξίσωση θεωρητικής και πρακτικής επιστήμης, και έγινε ένας από τους πρώτους εγκαταστατές της ιατρικής επιστήμης.

The next best seller was probably Aristotle’s Problemata. Aristotle is at his best—wrote Garrison—in logic, ethics, embryology, and natural history. His Problemata was published 28 times between 1473 and 1500. The Library owns the 1493 and 1500 editions of the work with the text beginning Omnes homines, including also the De vita et mortis Aristotelis.

George Sarton, evaluating the most popular scientific works of the incunabula period, found that the two leading classes were medicine (with 16 works) and astrology (11 works). These were followed by encyclopedic works (6), cosmographis, marvels (6), ethics (5). Others were astronomy, grammar, mathematics and physics, witchcraft, mnemonics, agriculture, chemistry, dreams, herbs, histories, metaphysics, physiognomy and chiromancy.

During the Middle Ages the population of Europe was decimated by epidemics. Approximately 130 incunabula pest tracts are known. One of the first plague treatises appeared in print by Heinrich Steinhöwel in 1473. The Library has the fifth edition of his Büchlein der Ordnung printed in Ulm about 1482. The De arte cognoscendi venena, by Arnaldo de Villanova, was published five times between 1473 and 1475. The Library has three editions of the work, including the first one. The book also includes Valesco de Tarenta’s De epidemia et peste. The first treatise on syphilis was written by Konrad Schellin (Heidelberg, 1495); the second, by Joseph Grünpeck, appeared in 1496 in Augsburg and was entitled Tractatus de pestisentialia scroras, sive mala de Franco. Another important work is Niccolò Leonceno’s work on syphilis, titled De morbo Gallico and first published in Venice by Aldus Manutius in 1497, and in the same year in Milan by Le Signerre for Legnano. The Library owns both editions.
One of the most sought-after Regimen pestilentiae was that of Johannes Jacobi’s work (the prose version appeared frequently under the name of Canutus) which appeared in 23 editions on the continent and in three editions in England in English. The Library has three editions of the work. It also owns a copy of Simon Pistoris’ rare Declaratio defensiva cujusdam positionis de malo Franco (Leipzig, 1500) and a copy of the similarly rare work of Bartholomaeus Steber’s A malafranzos morbo Gallorum praeservatio ac cura (Vienna, 1497-8). The National Library of Medicine’s copy of this latter work would appear to be the only one in the United States. The many books and pamphlets describing, arguing about, and offering “sure” treatments for epidemic diseases were not completely useless. These works helped initiate embargos during epidemics and called attention to hygiene.

Medical practice in the 15th century was characterized by quackery and superstition, and a physician usually believed in astrology. One of the best sellers in this field was Marcus Manilius’ Astronomica, first published in Nuremberg, in 1473-4. The Library has the 1498-1500 Venetian edition. During the second half of the fifteenth century, Marsilio Ficino was the favorite philosopher-astrologer of both Cosimo and Lorenzo Medici, and he is represented by several incunabula in the Library’s collection. At the same time, much interest attended editions of the freedman of Augustus Caesar, C. Julius Hyginus. His Poetica astronomica printed in Venice in 1482 by the famous Erhard Ratdolt is present in the Library’s incunabula collection. Johann Müller, known as Regiomontanus, is a familiar name to astrologers because of the system of “house division” to which he gave his name. In Nuremberg he published his trigonometrical tables and in Venice, his Calendarium, helpful for astrologers and astronomers. The Library has a copy of the latter published in 1485.
Secundus

CAII PLINIUS SECVNDI NATURALIS HISTORIAE LIBER SECVNDVS.

An Finitus Sit Mundus. Et An Vener. Cap. I.

VDVM ET HOC Q. VOD NOMINE ALIO CAELVM
appellati libri: crucibus circitexu tegitur: cuncta nume eest credi: p
est tenetum misfumneq: geniturnmneq: intreptur: unq: Hunc ex
tera idagare nec iterel: hominis nec capi huana: coelaira mere
Sacer est: extemum flem cuto: i totoino ureau speratuti hinitis:
& infmti fimilis omni reg certus: & simili incerto. Extre intra cu
ror est mesurus eius animo quodae agitasse: atq: pderde auros.
Alios rursum occafiooe hinc sumpta aut his data innumerables tradidisse
mudos aut totidem reg naturas credi opoetert. Aut si s aoes: 4cu-
bar Estitionide ramer folos totideq: luna: & cetera estia: uno: & in
mensa & innumerabillty fydera:quai nQ eadem 4fisone:semper in termio cogitationis occurrure da
syderio finis alctius. Aut si hae: hinitus naturae omnium articlii positi afignarini illud idem: uno
facil;ius sic intelligi tanto pestiter opera. Furor: philosofur:segredi ex eso: & tanq: intema eius cu
mores: hominis uideret que mundus ipse non capiat: &
De Forma Eius, Cap. II.

Ancroga forma eius: extemio & irequieta ambitu tenabat: liceriter: xxiii: horatum:sp
rio circumagi folis exortus: & occabas: hand dubii: relinqueb: 4sit immensi: & ideo semin:
auri facile excedens. Tante moj: rotat: uertigine affigb: fomitas: nQ equidem facile dix
Cursum Mundus Dicatur, Cap. III.

&
De Quattuor Elementis. Cap. IV.

bias: de: omnina: initii. &
De Septem plantes. cap. vi.

Numerous almanacs were printed, usually on one sheet, helping both physician and members of private households to plan the year in advance: to know what to do, and what to fear, in certain months of the year. The almanacs usually included short medical instructions, depending on the months of the year and the standing of the constellations. One of the early printed almanacs in the Library's possession was published in Nuremberg in Latin in 1487 and is the only copy in the United States. Another almanac of which there is only one copy in the country is in German published by Jakob Honiger in around 1493.

At the end of the century more and more "specialized" works appeared, discussing one or two parts and functions of the human body. These included Gilles de Corbeil's *De urinis* (Padua, 1483), *De pulsibus* (Padua, 1484) and *De urinis et de pulsibus* (Venice, 1494-5) all present in the Library's incunabula collection. Benevenutus Grassus' *De oculis* (Ferrara, 1474), Matteolo de Perugia's *De memoria* (Rome, about 1474, Milan 1475, Rome about 1490) are also present in the Library's collection. Michele Savonarola's *De febribus* was published once in Bologna (1487) and twice in Venice (1496, 1498). The Library has the latter two editions.
The most important author on surgery was Guy de Chauliac. His *Chirurgia* appeared in several French, Italian, Spanish, and Latin editions. The Library owns the Venetian 1480, 1493, 1498 and 1499 editions of the work. Another author of surgery, Guglielmo da Saliceto, is represented in the collection by the French edition of his *La cyrurgie* (1492) and the Italian edition of the same work entitled *La ciroxia vulgarmente fata* (1486).

The works specializing in surgery were adequate for the average surgeon of the time. The “general practitioner’s” instructional works were the *Practica* and in old German the *Versehung*. A representative work in this field is Valasco da Tarenta’s *Practica* (the Library has the 1490 and the 1500 Lyons editions) which discusses the symptoms of sickness followed by the description of the suggested cure. The anonymous *Versehung von Leib, Seele, Ehre und Gut* tries to be more comprehensive. The Library has all three known editions of the work. We may classify as “practica” Johannes de Ketham’s *Fasciculus medicinae* even if it does not follow the usual pattern of the practica. It was very popular because of its folio-sized anatomical illustrations which are clear and instructive for the period. The incunabula years witnessed four Latin, one Italian and three Spanish editions. The Library has the 1495 and 1500 Venetian editions in Latin.
Some of the most sought after and enjoyed readings of the 16th century were encyclopedias, chronicles, and histories. Rhazes (Muhammad ibn Zakarīyah, Abū Bakr, al-Rāzī) was the author of one of the great medical encyclopedias of the Arab-speaking world. The Library has a good copy of this incunabulum, the only edition printed in the 15th century, entitled Liber Elhavi id est Continens artem medicinae (Brescia, 1486). This work is larger than the popular Canon of Avicenna. The most important scientific incunabulum in Hebrew was the Canon medicinae by Avicenna (Ibn Sīnā), published in 1491, in Naples. A leading historical work on the “best seller list” is Pliny the Elder’s famous Historia naturalis published in 18 incunabula editions. This work was one of the main sources of scientific knowledge until the end of the sixteenth century. The Library has 4 Latin and 2 Italian editions of the work. A very popular work with visitors to the Library is Hartmann Schedel’s Liber Chronicarum, published in Nuremberg by Anton Köberer in 1493. It contains several hundred illustrations depicting Medieval cities, popes, philosophers, and the most famous medical doctors from the beginning of Western civilization until 1480.

The publication of important collected works of scientific and medical authors began slowly. Not only was there little demand for them, but also the costs of producing the opera of voluminous authors were great. For example, Galen’s Opera omnia (in Latin) was published late (in Venice in 1490) and


only once during the incunabula years partly because of the great expense. While we have no knowledge of the exact price of the first Latin edition, A. Asulanus, who edited and published the first Greek edition of the same work (Venice, 1525), charged 30 golden florins for the three large unbound volumes in Basel in 1526. By comparison, a physician earned an average of 16 golden florins a year, a baker 12, and a schoolmaster 3.5 during the same period. The National Library of Medicine has both the 1490 (Latin) and the 1525 (Greek) Venetian editions.

Aside from its historical and scholarly importance, any incunabula collection is a great treasure for a library: a treasure in the sense of "first," in the sense of "old" and in the sense of "rare." Fine contemporary or later bindings and illustrations add to the esthetic feeling of holding such a book. From the scientific point of view, however, these works often have shortcomings. First, as has already been mentioned, the early printers did not publish the best ancient and mediaeval literature, but only what seemed likely to sell best. Second, during the Middle Ages many Greek authors were available only in corrupt Latin translations. The world had to wait another century or so until better-educated printers, including famous humanist-printers, republished the Greek works in new translations by humanist scholars such as Niccolò Leoniceno, Guilelmus Copus, Guillaume Plancy, Johann Reuchlin, and others. Items in the National Library of Medicine's incunabula collection have been selected with great care by scholar librarians since the end of the last century. Consequently the Library has one of the finest collections of medical incunabula in the world. The Library's History of Medicine Division continues to build the collection, albeit at a slow rate because of the rarity and cost of such works. The collection is an invaluable resource for scholars studying the history of ancient, medieval and Renaissance medicine and science.