

## LITERATURE OF MEDICINE

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# KNOWLEDGE UNBOUND

LITERATURE OF MEDICINE

*"I cannot live  
without books."*

✍ THOMAS JEFFERSON







he AUA 2014 history exhibition *Knowledge Unbound: Literature in Medicine* is a bow to great ideas and the media on which they were stored: whether cave walls, strips of papyrus, scrolls of vellum, bound books of paper or the bits and bytes of the digital age. Writing is one of the great cultural techniques of humankind. It allows for information to be written down and passed down through the generations, not only in a much more stable way than through oral tradition, but also over vast distances and from an author to a reader who could live centuries in the future.

Writing down and spreading new knowledge can have revolutionary effects. Religious texts have inspired billions of people; at other times, books have been burned to stop their authors' ideas from spreading further. The 15th century saw the printing revolution in Europe, which allowed reproduction of leaflets and books in nearly unlimited quantities. It is no wonder that the scientific revolution (and the Protestant Reformation) soon followed the invention of the printing press. Following the print revolution was also the spread of the scientific journal, which was both a symptom and a promoter of increased scientific productivity. Imagine having to copy your medical school textbooks by hand, as doctors of yesteryear had to do!

Recently, we all have witnessed another media revolution - the digital or Internet revolution. It might be too early to say it will have similar consequences as the print revolution, but at the moment it looks as if it may. Bibliographic searches no longer necessitate consulting a card catalogue or volumes of the *Index Medicus*. Instead, thousands of pieces of literature today can be found online within seconds. Publishing, too, has become much faster. Today, submission, peer-review and publication of a manuscript can happen in weeks or even days. But with the information deluge comes problems of a different nature: of the hundreds of articles on any topic that are published yearly, monthly or even weekly, which are truly relevant? When you can only spend so much time keeping up with the literature, which publications are deserving of your attention?

This exhibition and brochure contain contributions that speak to three broad themes. The first is about the history of medicine and medical publishing from antiquity to the Renaissance. Here the focus is on the establishment of medical writing, on classical and medieval textbooks and on how the influence of the classical authorities was only slowly balanced by understanding the value of novel findings. The second theme is medical journals and medical books. Those include not only textbooks, but also books on the history of medicine itself. The closer we come to the present—and many of the journals and books featured stem from the 20th century—the clearer the role of individual authors becomes. Those are the people who formulated ideas, sometimes alone, sometimes in groups, often after exchanging thoughts with their colleagues at conferences. The third theme has to do with information management and especially with both the opportunities and the challenges of the digital world.

As you wander through the exhibit and look through this brochure, ask yourself: ***What were the most important, most interesting and most pleasurable pieces you have read?*** And while you might read your morning paper on a digital tablet and your medical journal articles on a computer screen, ***could you live without books? And if you could, would you want to?***

## MEDICAL PAPYRI OF ANCIENT EGYPT

Papyrus is a medium for writing, prepared from the papyrus plant in ancient Egypt. The medical papyri were documents much like our modern day medical textbooks. As a collective, these scrolls discuss medical conditions, and diagnosis and treatment of disease. Hieratic script in red and black ink was used for these documents. Medical papyri were copied from one scroll to another, enabling the information to be distributed and passed down through history.

Much of the knowledge of ancient Egyptian medicine has been gained through the study of medical papyri. To date, 10 medical papyri have been discovered from ancient Egypt, and numerous urologic issues have been described in five of these documents. The *Ebers Papyrus*, discovered in a tomb at Thebes in 1862, is the longest of the medical texts. The papyrus was written in 1550 BCE, but is believed to have been copied from books that date back to 3400 BCE. As the author remains unknown, it is named for its owner, German Egyptologist Georg Ebers. The papyrus consists mainly of a compilation of recipes for the treatment of various diseases. The treatment of urologic disorders makes up 6.8 percent of all the recipes found in the *Ebers Papyrus*. Urinary problems were treated with dates, grapes, gum, rush-nuts, wheat, celery, figs, carob and yellow ochre. Impotence and priapism were treated with carob, juniper, Hyoscyamus, oils, pine, salt, watermelon and flax. Honey, which has intrinsic antibacterial properties, was the ingredient prescribed most often in the *Ebers Papyrus*.

The medical papyri show evidence that the ancient Egyptians practiced medicine using a scientific method based on the clinical observation of disease, as exemplified by the *Edwin Smith Papyrus*. The manuscript does not disclose the name of the unknown author, though it is possible that a surgical treatise of this importance created during the Pyramid Age may have been written by Imhotep, a great physician who lived in the 30th century BCE.

No convincing evidence has shown that anything other than minor surgery was practiced in ancient Egypt. However, the medical papyri do make references to the surgical treatment of abscesses and tumors using “knife treatment.” It is thought that flint knives were used well into the Bronze Age and may have been used as a disposable surgical instrument. A passage in the *Ebers Papyrus* also talks of using a reed “for making the knife-treatment.” There is a surprising lack of reference to catheters. No evidence has shown that catheters were ever created or used. Urinary retention is documented in the *Ebers Papyrus*, but the treatment to “force out the urine” was a medical remedy.



Egyptian knives, ca. 600 – 200 BCE  
Science Museum, London, Wellcome Images





A river with clumped papyrus grass (Cyperus papyrus) and a rowing boat

Lithograph, John Harrison Allan, 1843  
Wellcome Library, London

## PAPYRUS AND THE ART OF WRITING

As the ancient Egyptians moved from prehistory to history by developing a written language, they needed to write on something other than stone. They found their medium in the papyrus plant (*Cyperus papyrus*), a triangular reed that grows to about 10 feet. It was light, strong, thin, durable and easy to carry, and for thousands of years there was nothing better on which to write.

After harvesting, outer fibers of the plant were peeled away, and the core of the stalk was sliced into thin, broad strips. These strips were soaked in water to remove the sugar content, pounded and drained, then placed side by side, overlapping slightly. More strips were placed at right angles to the first, again overlapping slightly. Next, the raw papyrus sheet was pounded once again and left under a stone slab to dry and seal for a few days. After drying, the surface of the sheet was polished by rubbing with a shell or ivory.





# THE SUSHRUTA SAMHITA: A COMPENDIUM IN MEDICINE AND SURGERY

*"All in all, Sushruta must be considered the greatest surgeon of the pre-medieval period."*

✦ ALLEN WHIPPLE: THE STORY OF WOUND HEALING AND WOUND REPAIR.



Sushruta  
Wellcome Library, London

In the great Indian epic *Mahabharata*, the surgeon Sushruta is mentioned as the son of Saint Viswamitra. Most scholars of ancient Indology now place Sushruta in the era between 600 and 800 BCE. His textbook of medicine and surgery, the *Sushruta Samhita*, was first translated from Sanskrit to Arabic as *Kitab-I-Susrud* in the eighth century CE. It was later translated into Latin, German and English. Most recently, Bhisagratna provided a modern English translation in three elaborate volumes in 1963. The work is divided into five principal sections:

1. **Sutrasthana**, or primary principles;
2. **Nidana**, or pathological concepts;
3. **Sarirasthana**, detailing anatomy;
4. **Chikitsasthanam**, dealing with medical and surgical treatment of various disease processes; and
5. **Kalpasthanam**, or toxicology.

The author Sushruta stipulated the necessary qualifications for students seeking medical education. The initiation was marked by elaborate ceremonial rituals ending in the preceptor reciting solemn injunctions to the student that in many aspects are comparable to the Hippocratic Oath. The *Sushruta Samhita* provides critical details on preoperative and postoperative care, diet, indications, contraindications and surgical techniques. Surgical procedures are classified into eight kinds: incision, excision, scarification, puncturing, probing, extraction, drainage and suturing. The *Samhita* contains details of manufacture and maintenance of at least 125 surgical instruments, including

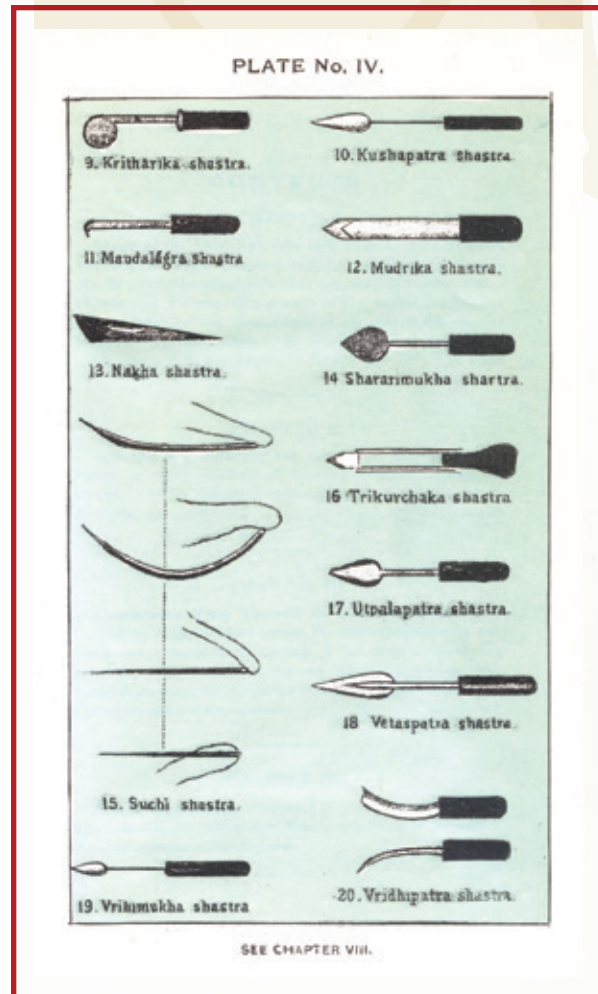
Various surgical instruments illustrated in the *Samhita*

*Sushruta Samhita*,  
Courtesy of Sakti Das, MD

28 types of catheters, sounds and syringes. A total of 13 types of alcoholic decoctions and soporific agents, like henbane (*Hyoscyamus niger*) and *Cannabis Indica* were recommended for anesthesia. Advice on fumigating the surgical suite with salt, mustard and clarified butter is given. Though this has nothing to do with our modern concept of bacterial antisepsis, it shows a similar concern with spiritual cleanliness.

Probably the highlight of surgical repertoire in the *Sushruta Samhita* is the procedure for nasal reconstruction or rhinoplasty. The technique was revived much later in Italy by Tagliacozzi. Plastic surgery in Europe that first flourished in medieval Italy is a direct descendant of classical Indian surgery. Even today, plastic surgeons refer to Sushruta's pedicled forehead flap as the *Indian flap*. The *Sushruta Samhita* also contains descriptions of laparotomy in order to repair intestinal perforations, which centuries later were still considered invariably fatal by Hippocrates.

Among the urologic ailments detailed in the book, there are several chapters on etiology and management of lower urinary tract infection, penile sores and sexual hygiene, as well as elaborate discussion on treatment of erectile dysfunction with aphrodisiacs. Urethral stricture disease was managed by dilation with dilators of gradually increasing caliber introduced every third day. For recalcitrant cases, external urethrotomy surgery is discussed. Probably the most fascinating chapters on urologic disorders deal with urinary calculus diseases. Several varieties of calculi are mentioned with dietary indiscretions as the main etiology. Then, in the chapter on therapeutic measures, initial medical measures with diet, fluids and alkalies are recommended. This is followed by exquisite details of the steps of the pioneering surgery of perineal vesicolithotomy, starting with a description of the anatomy and concluding with the postoperative care and potential complications.



The medical and surgical concepts presented in the *Sushruta Samhita* prevailed in the early era of civilization in India. They spread later to China through the Buddhist pilgrims, and also influenced the Arabic world through established trade routes. William Hunter stated that Arabic medicine was founded on translations from Sanskrit treatises and, in turn, European medicine down to the seventh century was to some degree based on the Latin versions of those Arabic translations of Indian medical texts.

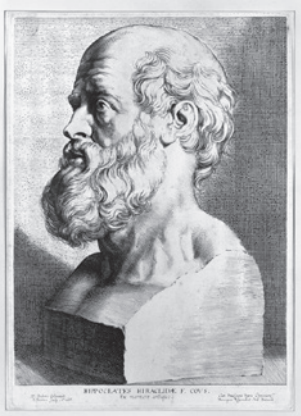




# A N C I E N T  G R E E K  A N D  R O M A N  M E D I C I N E: H I P P O C R A T E S  A N D  G A L E N

Two physicians from the classical period still tower high in the history of Western medicine: Hippocrates, the Greek physician from the fifth century BCE, and Galen of Pergamum from the second century AD. Though many of their writings were lost to European scholars during the Middle Ages, their names were always held in highest regard.

## HIPPOCRATES



Portrait of Hippocrates  
Wellcome Library, London

Little is known about Hippocrates (b. 460 BCE) with any degree of certainty. He came from a family of physicians residing on the island of Cos who traced their origins back to the Asclepius, the Greek god of healing, and therefore called themselves "Asclepiads." From 420 BCE onwards, Hippocrates practiced medicine as an itinerant physician travelling across most of the Greek world and its eastern neighbouring countries. He died in old age around 375 BCE at Larissa in the region of Thessaly.

The writings ascribed to Hippocrates are summarized as "corpus hippocraticum." This body of work encompasses a collection of nearly 60 texts compiled in the library of Alexandria in the middle of the third century BCE; its nucleus was probably the library of the medical school of Cos. The writings had a great number of authors and were written between 430-350 BCE; a quarter of it, however, stems from Helle-

nistic and Roman times (first/second century CE). It is not proven that any of these texts were composed by Hippocrates himself—his personal contributions remain uncertain. The collection contains texts of different literary forms: elaborate teaching documents, speeches, notes, case histories and philosophical treatises about a variety of topics without obvious structure or system. This multifarious character of the Corpus with often contrasting viewpoints reflects the state of Greek medicine between 450 and 350 BCE in its chronological evolution. A common feature of the writings is their tendency to let the world and the human beings appear as rationally perceivable phenomena.

## UROLOGICAL ASPECTS OF HIPPOCRATES' WORK

- Pathogenesis and symptomatology of the urolithiasis in children ("On Diseases"): impure milk, stranguria, hematuria
- Epidemiology and predisposing factors of urolithiasis ("Airs, Waters, Places")
- Description of several urine qualities ("Aphorisms")

## GALEN

In contrast to Hippocrates, we have a thorough knowledge of Galen's life, a consequence of his penchant for self-display in his own writings. Galen was born around 129 CE in Pergamum, an intellectual center in the Roman province of Asia Minor. He was the only son of a well-educated, affluent patrician who ensured that his son received a comprehensive education. Galen started his medical studies at the age of 17 as an assistant at the local temple of Aesculapius, where he frequented the courses of various anatomists. After the death of his father, Galen visited Alexandria, the leading medical school at that time with a long tradition in anatomical and physiological research dating to the third century BCE. At the age of 28, he returned to Pergamum, where he was appointed physician to the gladiators. By his own account, Galen was very successful and acquired essential surgical and anatomical experience.

With his reputation rising, Galen left Pergamum to move to Rome, where he was eventually appointed personal physician of the emperor's son. The esteem Galen enjoyed and the good relationship with the political class strengthened his position at the imperial court, where, under the emperors Marcus Aurelius, Commodus and Septimus Severus, Galen had the status of an academic "star," enabling him to pursue his research and publishing work. Though under discussion, it appears that Galen died in 216 or 217, thereby reaching the old age of 87 or 88.

Portrait of Galen  
Wellcome Library,  
London



## UROLOGICAL ASPECTS OF GALEN'S WORK

Galen devotes 33 case histories to broad urologic aspects, nearly 10% of the case histories presented in his medical text. Significant and original contributions of Galen to the field we today define as "urology" include:

- Theory of *uropoiesis*: urine resulting from the interaction of attractive, transformative and specific expelling faculties of the kidney
- Nosology of various *kidney diseases* (i.e., urolithiasis, renal abscess)
- Verification and first report of *vesico-ureteral reflux* by animal experiments
- Differential diagnosis of *voiding disorders*
- Anatomy and (patho-)physiology of *male genital organs* (e.g., priapism, spermatogenesis)

The writings of this vast oeuvre, now subsumed under the title *Corpus Galenicum*, comprise approximately 170 works, or about one-eighth of the total extant Greek literature between the time of Homer and the end of the second century CE. Galen explained the etiology of diseases by shifts in the proportion of the four humours. He ascribes particular importance to the Hippocratic principles based on the promotion of the healing forces of nature and the regulation of all external influences acting on the human condition ("dietetics"). Surgical therapy was recommended by Galen "only in case of irrefutable necessity." Nevertheless, he understood surgery as a constituent part of the art of healing and regarded the work of organ specialists, like oculists and stone cutters, as belonging to the "art of medicine."





# FROM MEDIEVAL MANUSCRIPTS TO THE PRINTING REVOLUTION

After the fall of the Roman Empire, monasteries became centers of scholarship in Europe. Texts by classical authors were studied, copied and often beautifully illustrated by monks. Original Greek manuscripts were first translated into Arabic by scholars in the Middle East, then from Arabic into Latin, and finally when the knowledge of Greek had returned to Europe, authors like Hippocrates, Aristotle and Galen were translated directly from the originals.

During the Middle Ages, Western medicine split sharply into the two branches of internal medicine and surgery. The first followed the teachings of Hippocrates, Galen and eventually Ibn Sina, while practice of the latter was forbidden to priests from the year 1215. This meant that lay surgeons and barbers, many of whom were not university educated, started to dominate this branch. The two main diagnostic tools for physicians were uroscopy, in which color, smell, taste and sediment of the patient's urine were analyzed, and pulse diagnosis. This led to the establishment of the uroscopy flask (matula) as a symbol of physicians.

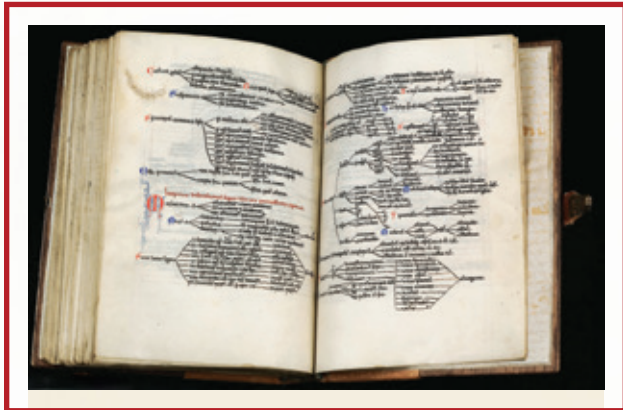
Books remained rare, handwritten objects until around 1453, when Johannes Gutenberg developed a printing press with movable, lead-cast type. Block printing had existed in Europe before that time, and similar presses had been developed in Asia centuries earlier, but neither had a similar effect. The invention spread through Southern Germany and Northern Italy, and within just a few years, all of Europe. Early prints, called incunabula ("cradle prints"), like the famous Gutenberg Bible, were still designed to look like manuscripts. By the year 1500, printers' shops existed in about 200 European cities, supplying books to the church, a developing middle class and the more than 50 universities that had been established in the meantime. Printing made possible the rapid spread of information that led to the proliferation of classical authors and to new scientific, political and religious ideas.



Printer's shop around 1568

Meggs, Philip B., *A History of Graphic Design*. John Wiley & Sons, Inc. 1998





The Articella, National Library of Medicine

## THE ARTICELLA ("SMALL ART") (NINTH CENTURY)

*The Articella* by Hunayn ibn Ishaq, a Nestorian Christian born and educated in Baghdad, became one of the earliest European textbooks of medicine. It was a collection of short medical treatises bound together, including, at its core, Hunayn ibn Ishaq's translation (from the Greek) and commentary of Galen's *Ars medicina*. When the book was first translated into Latin by Constantinus Africanus in the 11th century, Hippocrates' *Prognostics and Aphorisms* and treatises on urine and pulse diagnosis were included with the *Ars medicina*. The resulting book became the first major medical textbook at the Salerno medical school, where students studied it and professors wrote commentaries on it. *The Articella* remained in use until the first half of the 16th century.



Salerno medical school  
Public Domain. Wikimedia Commons

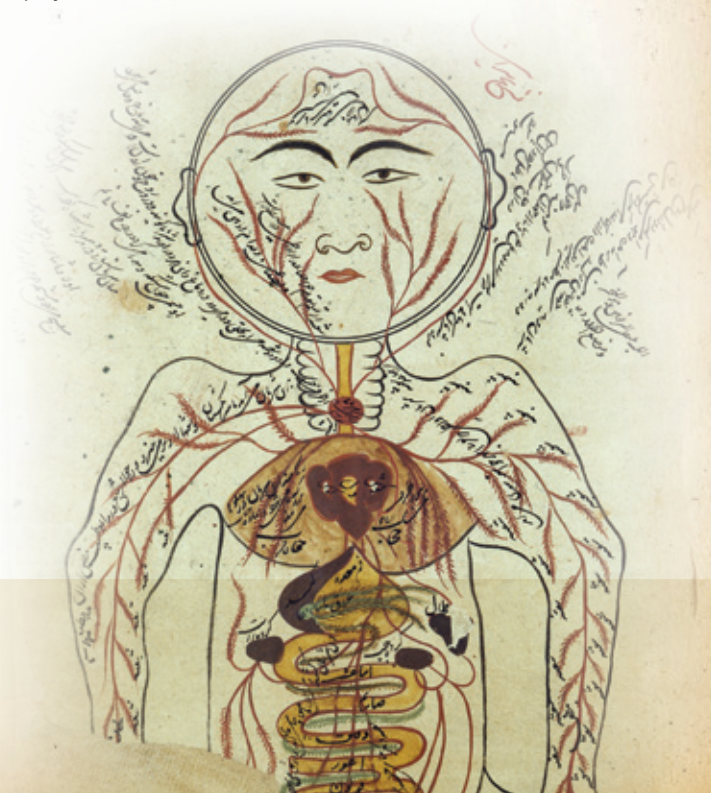
## THE CANON OF MEDICINE (1025)

Ibn Sina, known as Avicenna in the West, was one of the foremost philosophers and physicians of the Islamic middle ages. Chief among his medical writings is *The Canon of Medicine*, originally written in Arabic, a compilation of Greek medical knowledge and its author's practical experience. It includes more than 700 simple and compound medications and rules for the development and testing of pharmaceuticals. Two other chapters describe diseases of single organs or parts of the body, from feet to head, and diseases of the whole body.



Portrait of Avicenna  
Engraving early 17th cent.  
Wellcome Library, London

First translated into Latin by Gerard of Cremona, who chaired a school of translation in Toledo in the 12th century, the book soon spread all over Europe and became the standard textbook of medicine. It was first printed in 1472; within the next 30 years, 15 printed editions were published. It remained in use in medical education until the middle of the 17th century and has been called "the most famous medical textbook ever written" by William Osler. *The Canon of Medicine* brought its author, Ibn Sina, the title "prince of physicians."



Arteries and Viscera  
(according to Avicenna)  
1632. Wellcome Library, London



### CAUSAE ET CURAE ("CAUSES AND CURES") (MIDDLE OF THE 12TH CENTURY)



Hildegard of  
Bingen  
Wellcome Library,  
London

*Causae et Curae* is probably a compilation of the knowledge that Christian mystic and healer Hildegard of Bingen collected during the first half of her life, before she became a religious leader. During that time, she led the infirmary of the women's side of her monastery and gained experience in treating nuns and visitors. When Hildegard prepared to leave, she trained her successor; *Causae*

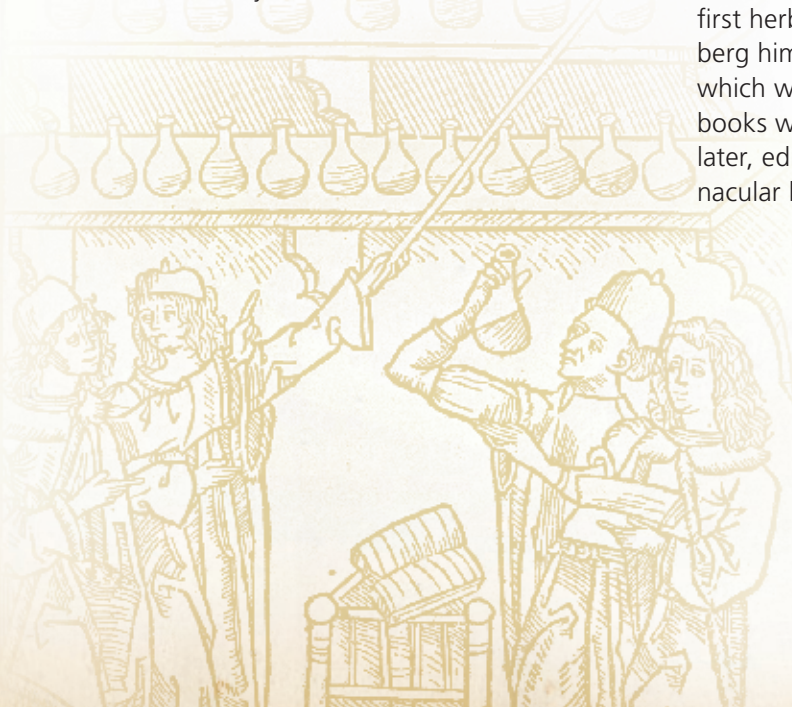
*et curae* is most likely the compilation of this training. The book is structured into five chapters. The first chapter is about the creation of the world and cosmology. The second is about the human body and its parts, containing entries on the liver, lung, heart, sexual organs, and also on bleeding and cupping. Chapters three and four give recipes for pharmaceuticals to treat a variety of different maladies. Finally, chapter five contains diagnostic techniques, including taking the pulse and looking at the patient's excretions. The book contains a mixture of medieval medical knowledge based on the few classical sources available in Germany at the time, and folk remedies.

### ORTUS SANITATIS (GARDEN OF HEALTH) (1485)



*Ortus sanitatis*: handcoloured woodcuts  
and text from section on minerals  
Woodcut. Wellcome Library, London

*The Garden of Health* is remarkable in many ways. At its core, it is an herbal—a collection of information on plants, their Latin, Greek and Arabic names, their natural histories and medical applications. In addition, the book contains information on smaller sets of animals and minerals, as well as a part on uroscopy. It contains everyday plants and animals like hares and wild clover, but also exotic ones like elephants and human-shaped mandrake roots. The book was the first herbal to be printed (by an apprentice of Gutenberg himself), and was first published in German, which was unusual at a time when most learned books were still published in Latin. Only a few years later, editions in Latin and many other European vernacular languages followed.



Doctor examining urine, assistants  
comparing contents of urine flasks,  
patients bringing urine for examination.

*The Garden of Health*  
Woodcut. Wellcome Library, London

## THE BDIANUS MANUSCRIPT: AN AZTEC HERBAL (1552)

For millennia, medical therapy consisted of herbal preparations and incantations. Recipes for such medicines were transmitted through the generations by word-of-mouth. In the Americas, it was much longer before anything was written. In 1552, an herbal was written and later translated by two Aztec Indians: Martinus de la Cruz, a native and prominent physician at the College of Santa Cruz in Tlatelolco, who composed the work, and Juan Badianus, who translated the text into Latin. De la Cruz produced beautiful colored images of 204 native herbs and trees and described the plants, their properties and preparation. The manuscript consists of 63 folios approximately 6 inches by 8 inches in size, written in Latin and Aztec. It is divided into 13 chapters, each grouping maladies by either similar type or similar location in the body.

The original *Badianus Manuscript* was sent to Charles V, who was both Emperor of the Holy Roman Empire and (as Charles I) king of Spain, but there is no record whether Charles or his personal physician Andreas Vesalius ever read it. The manuscript eventually landed in the Vatican library, where it was found in 1929 by the historian Charles Clark, who told of his discovery at a dinner with Johns Hopkins University faculty. Everyone believed this book should be translated, as it was the first medical manuscript of the Americas. Eight years passed before Johns Hopkins biologist and faculty member Emily Walcott Emmart translated the Latin text of the book and included commentary on that text from her biological perspective.

Images from *The Badianus Manuscript*

Top: Cure of the Pubes, "When this part feels pain, it is to be anointed with the juice which you are to press out and make from the bark and leaves..."

Bottom: Argemon or Herb of the Groin  
William P. Didusch Center for Urologic History





# PUBLICATION OF THE OPERA OMNIA OF HIPPOCRATES AND GALEN IN THE RENAISSANCE

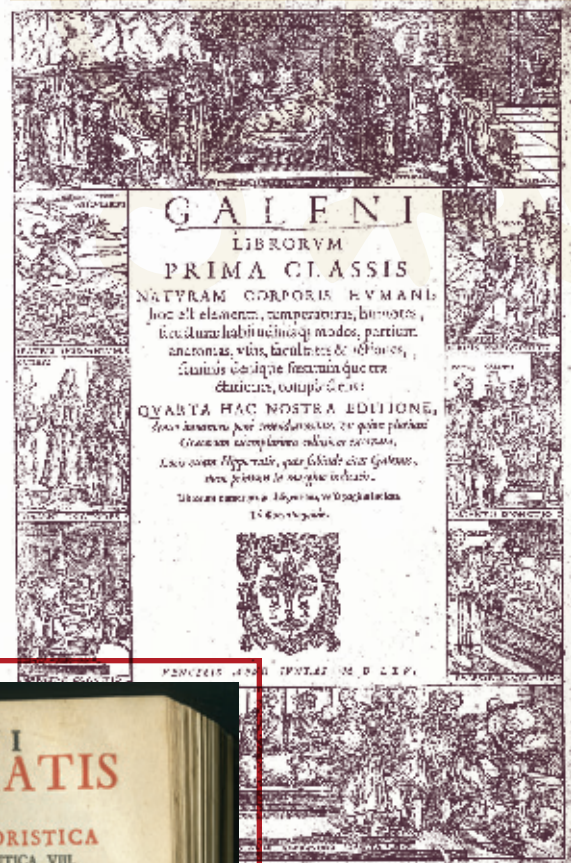
In earlier times, various works in Latin attributed to Hippocrates formed only part of the often republished and extended collection of the *Articella*. The first Latin edition of the complete *Corpus Hippocraticum* was to come out only in 1525/1526. It was published in 1525 in Rome in the house of the printer and bookseller Franciscus Calvus. The first edition of the Greek “original text” was published in 1526 in Venice by a brother of the famous printer, editor and humanist Aldus Manutius. Only one year earlier, in 1525, his printing house in Venice had published the complete work of Galen in Greek. This edition consisted of five volumes in folio. Its publication was possible due to the professional expertise in the Greek language and philology of immigrated Byzantine scholars from the mid-15th century onward, as well as the rediscovery and revision of Greek manuscripts, and finally to the introduction of Greek book printing. Before this edition, different texts of Galen had already been accessible as indirect translations from Arabic sources and in Greco-Latin versions transmitted by medieval authors.

Since the 12th century, Western medicine had been dominated by Galen, who in the second century CE had commented on and assimilated those texts of the *Corpus Hippocraticum* which suited his own ideas best. Galenic anatomical writings proved to be massively influential on the learned medicine of the early 16th century. Anatomy was now in the focus of the medical curriculum, and dissections became common practice in university teaching. Paradoxically, this triumph of Galen’s anatomy sowed the seeds of its gradual decline. Galen’s followers in anatomy took seriously his instruction to carry out dissections with their own hands and to “see with their own eyes.” In doing so, they found out that not all of Galen’s findings agreed with their own observations. In this context, only the best known “revolutionary” protagonists will be mentioned here: Paracelsus, with his “iatrochemistry”; Vesalius, with his dissection of human bodies that improved the knowledge of anatomy; and eventually Harvey, with his experimentally founded physiology. All these representatives of “medical progress” criticized Galen; but they all restrained from fundamental criticism or polemics against Hippocrates, who, in their writings, always remained present as “both the origin of medical progress and its ultimate goal.” (Rüten 2002)



The Greek-Latin edition (1821-1833) of Galen's complete medical works by the Leipzig surgeon C. G. Kühn, based on the first edition of 1525, continues to be an indispensable work of reference, even today. The primary purpose of this edition might have been to provide potentially valuable therapeutic knowledge to a medical public not versed in the Greek language anymore; but from the end of the 19th century onward, study of the language in Galenic texts came to the forefront, resulting in the publication of text-critical editions. In the last third of the 20th century, research eventually focused on historic and cultural aspects in the works of Galen that continue to attract the attention of scholars worldwide.

*Omnia quae extant opera, Claudius Galen*  
Wellcome Library, London



*Speculum Hippocraticum, Notas et Praesagia Morborum Nec Non Varia Medendi Praecepta, Ex Magnii Hipocratis Coi Moumentis with Magni Hippocratis Coi Opuscula Aphoristica Semeiotico-Therapeutica VIII,* published by Joh. Jacobi Episcopi, Basil in 1748

William P. Didusch Center for Urologic History



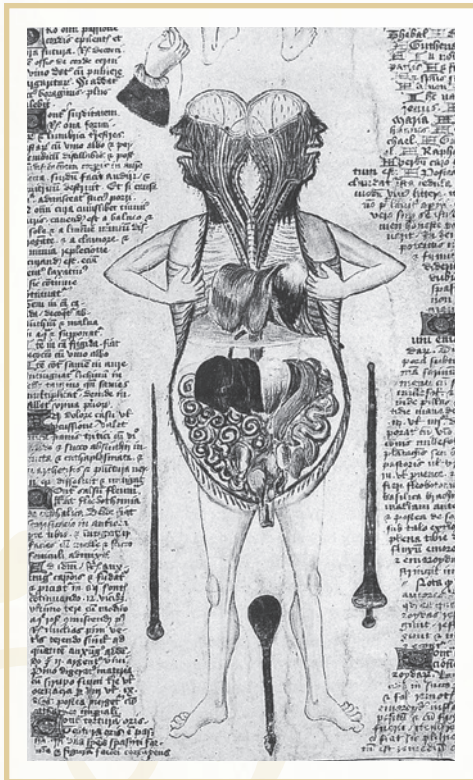
# MEDICAL ILLUSTRATION: THE ART OF MEDICINE

Despite the rise of art, history, literature, philosophy and science, there are no extant classical Greek medical documents with illustrations. Even of Galen of Pergamum, whose legacy remains extensive, no illustrated works are known. Around the same time, the *Gynaecica* by Soranus of Ephesus supposedly contained illustrations of female reproductive organs, but no copy of the work survived.

The very first illustrations appearing to be anatomical are in the works of Mondino dei Luzzi, also known as Mundinus. He performed human anatomical dissections in the 14th century that resulted in crude first attempts at showing students viscera. The English surgeon-anatomist John Ardene recognized the value of adding illustration to his work *De Arte Physicali et de Cirugia* in 1412.

Early medical illustration was profoundly influenced by the original Renaissance man Leonardo da Vinci. He was the first to render cross-sectional anatomy, as well as longitudinal images. Leonardo also developed cut-away views and partial morselment of viscera to illustrate them better. The physician Jacopo Berengario da Carpi followed in da Vinci's footsteps and performed hundreds of dissections and authored the oldest surviving medical anatomical textbook including illustrations.

A groundbreaking publication that allowed physicians to think independently and to explore all areas of anatomy appeared in 1543 with Andreas Vesalius' *De humani corporis fabrica libri septi* (*On the fabric of*



Above: Image from *De Arte Physicali et de Cirugia*, John Ardene

Right: Cross-section of skull in profile view, showing the intercranial nerves and vessels, by Leonardo da Vinci

Wellcome Library, London





*the human body in seven books, or Fabrica*). Medical illustration from the time of the *Fabrica* was now open to expansion and improvement. The anatomical works of the rivals Frederick Ruysch and Govard Bidloo exemplified this trend. Bidloo published his magnum opus *Anatomia Humani Corporis* in 1685 with magnificent illustrations that were promptly pirated by the English anatomist William Cowper to be included in his *Anatomy of Humane Bodies* (1698).

Image from *Anatomia Humani Corporis*, Govard Bidloo  
Wellcome Library, London



## MAX BRÖDEL

The modern era of illustration arrived in the United States embodied in the great Max Brödel, who was lured to Johns Hopkins by the institution's founding fathers. Brödel started the Department of Art as Applied to Medicine and trained over 200 medical illustrators. "There is no better way to learn a subject thoroughly than by teaching it to others," he noted. Brödel himself produced works for many of the staff, most notably for Howard Kelley and Harvey Cushing. He trained William P. Didusch, who illustrated many of the works on urology from Hopkins prior to becoming the executive secretary of the American Urological Association.

Medical illustration—whether it is additive to text for education, a stand-alone method of teaching, a reference source for archival purposes or works of art—is a keystone to our medical epistemology with a fascinating history in its own right.

Brödel teaching a class at Johns Hopkins, *Department of Art as Applied to Medicine*. Also pictured, student William P. Didusch (back row, far left).

William P. Didusch Center for Urologic History



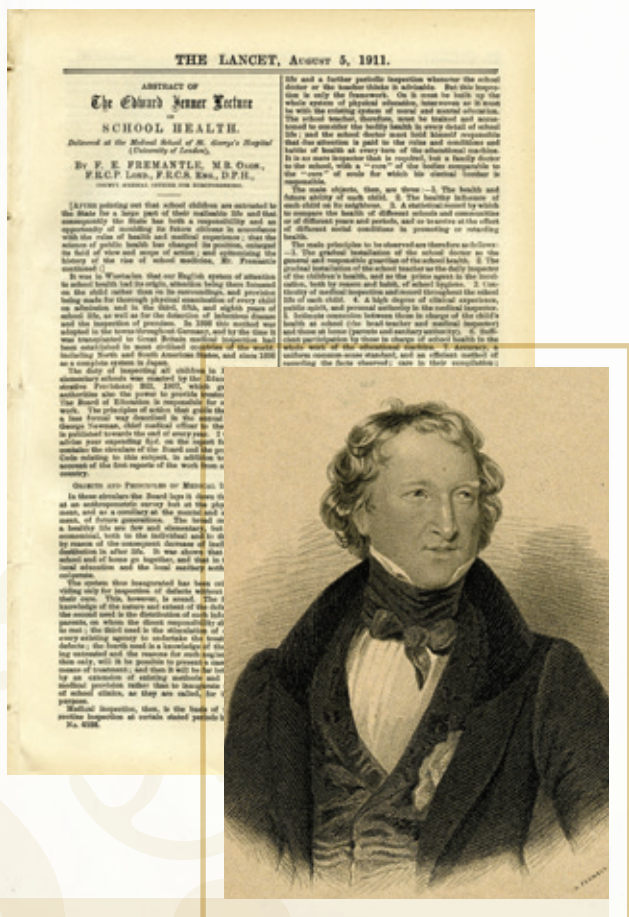
Left: Didusch illustration, 1923

Right: Bill Didusch with his dogs

William P. Didusch Center for Urologic History

# MEDICAL JOURNALS

Scientific journals began in the 17th century with the *Journal des Savants* and the Philosophical Transactions of the Royal Society. These journals were some of the first recorded investigations of what is now commonly referred to as science, and set the stage for rapid medico-scientific advances. In 1665, Henry Oldenburg became the first editor of *Philosophical Transactions of the Royal Society*, which, according to its subtitle, had the task of “Giving some Accompt of the Present Undertakings, Studies and Labours of the Ingenious in many Considerable Parts of the World.” Scholars like Marcello Malpighi, Christiaan Huygens and Antoni Leeuwenhoek became contributors soon after the proliferation of the microscope, publishing more than 200 papers on discoveries made with the new instrument.



Above Left: *The Lancet*, August 5, 1911.

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Above Right: Thomas Wakley, *Lancet* publisher

Wellcome Library, London

The dawn of medical periodical print literature arose out of periodical literature itself, specifically in the Victorian and Edwardian periods in England. Early medical periodicals were primarily news, social commentaries and reporting about significant publications in foreign languages, due to the fall of Latin and the rise of regional publications. These periodicals — the *Medical Times* for instance — represented an early form of medical journalism. Some of the important medical journals of today were founded in the early 19th century. One of the oldest, the *New England Journal of Medicine*, is now over 200 years old. Founded by John Collins Warren with collaboration with James Jackson, it first appeared as a quarterly publication in January 1812 as an arm of the Massachusetts Medical Society.

The *Lancet* was first published in 1823 by the sole efforts of Thomas Wakley, who was a physician, member of Parliament and coroner in England. A rebel and social reformer, Wakley would publish the latest medical lectures of prominent physicians and surgeons without their consent, as well as rail against the corruption of the colleges and established medical systems. The *British Medical Journal* was originally the *Provincial Medical and Surgical Journal (PMSJ)* and was first published weekly beginning in 1840. This journal has been closely linked with the development of the British Medical Association, which was founded in July 1832 in Worcester by a group of 50 physicians led by Charles Hastings.



The history of medical journals themselves shows that each new (sub-)discipline eventually outgrows the parent organization and starts not only its own specialist society, but also its own publication. Medical journals and periodicals are expensive, and it is now all but impossible for anyone to keep pace with the knowledge output in these journals. The average medical practitioner spends not much more than one hour per week on professional reading. He or she seeks “synoptic” sources that educate and inform quickly and no longer looks for complex studies that take effort to digest. This has led to what Muir Gray has termed the “information paradox,” where more material is ever present, but people spend less time searching for and—more importantly—finding relevant, high-quality information.

## UROLOGICAL PERIODICALS

The history of journals solely dedicated to urology is quite young. The first scientific articles of the newly established speciality appeared in surgical journals or journals of general medicine, like *Lancet* or *The Journal of the American Medical Association (JAMA)*. It was in France in the year 1883 that the first journal solely dedicated to urology, the *Annales des maladies des organes genito-urinaires*, was published under the supervision of Felix Guyon and Joaquin Albarran.

The first German urology journal was *Internationales Centralblatt für die Physiologie und Pathologie der Harn- und Sexualorgane* (International Journal for the Physiology and Pathology of the Genito-urinary Tract), established in 1889/1890 by Wilhelm Zuelzer. It merged with *Monatsberichte für Urologie* (Monthly Messages for Urology), edited by Hugo Lohnstein, after the foundation of the German Urologic Society one year after the death of Max Nitze in 1906 to form the *Zeitschrift für Urologie* (Journal for Urology). This journal lasted until 1989 and was then included in *Aktuelle Urologie* (Current Urology). Between 1964 and 1989, it was titled *Zeitschrift für Urologie und Nephrologie* (Journal for Urology and Nephrology), and the Journal was published under the auspices of the Urologic Association of the “German Democratic Republic” (East Germany).



*Folia Urologica*

Courtesy of  
Museum and Archive,  
German Urological Society

## POPULAR TOPICS IN UROLOGY JOURNALS

A PubMed search was performed of all articles published in the 13 most cited urological journals between 1955 and 2009. Articles with more than 100 citations were identified as “classic” and further analysed. Of 97,554 articles published during this time, 1,239 articles were cited more than 100 times. (Heldwein et al. 2010)

The most popular topics in urologic literature over the second half of the 20th century were:

- prostate cancer and prostate-specific antigen
- bladder cancer
- benign prostatic hyperplasia

Another reputable journal in the German-speaking world was the *Zeitschrift für Urologische Chirurgie* (Journal for Urologic Surgery), established in 1913 and published until 1944. This was a continuation of the *Folia Urologica: Internationales Archiv für Krankheiten der Harnorgane* (International Archives for Diseases of the Urinary Tract), which had been published since 1907. *Urologia Internationalis* was started in 1955 as an independent international forum for clinically orientated research, and is currently the official English language scientific publication of the German Society for Urology. *Der Urologe* was started in 1962 by the (West) German Society for Urology and continues to be its official German language journal.

### THE JOURNAL OF UROLOGY®

The six-issue, first volume of *The Journal of Urology*®, which contained 32 articles and 579 pages, was published in February 1917 with Hugh Hampton Young as Editor and Drs. David M. Davis, Herman O. Mosen-  
thal and John T. Geraghty listed as the Executive Editorial Committee. In the Foreword to this issue, Dr. Young wrote

*The title of this publication, 'The Journal of Urology, experimental, medical and surgical,' expresses briefly the aims, hopes and ambitions of the editors. It is...evident that some common meeting place is extremely desirable—some medium in which all types of papers upon the field of common interest may appear—archives of Urology—historical, embryological, anatomical, biochemical, pharmacological, pathological, bacteriological, surgical and medical, experimental and clinical.*

The American Urological Association (AUA) became the legal owner of The Journal in 1921.

### THE JOURNAL OF UROLOGY® MATURES

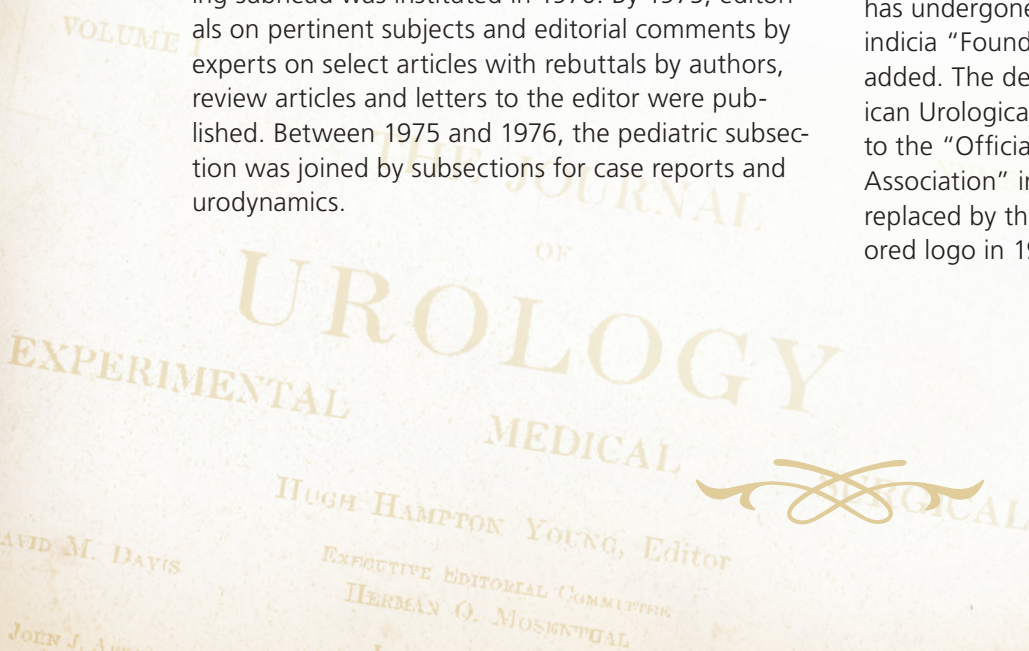
Numerous changes in submission procedures and format have taken place over the years. While the subject matter had become more diversified, the manuscripts submitted for publication and the process of their consideration became more formalized.

Grouping pediatric urology articles under an identifying subhead was instituted in 1970. By 1975, editorials on pertinent subjects and editorial comments by experts on select articles with rebuttals by authors, review articles and letters to the editor were published. Between 1975 and 1976, the pediatric subsection was joined by subsections for case reports and urodynamics.

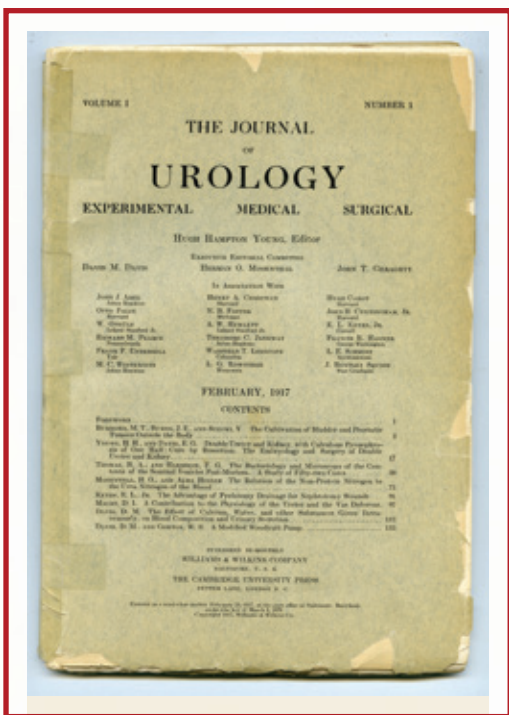
In the 1980s, the manuscript review process was expanded, and the selective use of statistical consultants was instituted. In 1982, a major expansion of The Journal reconfirmed its commitment to provide a broad spectrum of information pertinent to urology. The journals *Urological Survey*, edited by Hugh J. Jewett, and *Investigative Urology*, founded by William Wallace Scott and edited by Jay Y. Gillenwater, were incorporated as special sections in The Journal of Urology®. The editors of these journals and their associates maintained control of the designated sections in The Journal resulting from these mergers. This "journal within a journal" format was expanded in 1994 when *Pediatric Urology* became the first subspecialty to have a designated section in The Journal.

Regular use of supplements with The Journal of Urology® was initiated in 1986 with the yearly publication of manuscripts from papers presented at the annual meeting of the Section on Urology of the American Academy of Pediatrics. The *Urologists at Work* designation was also added the same year. In 1994, a quarterly Spanish edition was introduced. In 1995, single-page preview articles entitled "This Month in Clinical Urology" and "This Month in Investigative Urology" were added.

In addition to changes in content, the physical format of The Journal has evolved throughout the years. The 6 ½ x 9 ½-inch page size used since 1917 was changed to the 8 ½ x 11 inches in 1976, presumably to accommodate advertisers. Additionally, the cover has undergone a series of changes, and in 1956, the indicia "Founded by Hugh Hampton Young" was added. The description "Official Organ of the American Urological Association" of 1925 was changed to the "Official Journal of the American Urological Association" in 1972. The table of contents was replaced by the AUA logo in 1989 and a revised colored logo in 1998.







*The Journal of Urology*®,  
Volume 1, Number 1  
William P. Didusch Center for Urologic History

## EDITORS OF *THE JOURNAL OF UROLOGY*®

Hugh Hampton Young . . . . . 1917 – 1945  
J.A. Campbell Colston . . . . . 1945 – 1966  
Hugh J. Jewett . . . . . 1966 – 1977  
William Wallace Scott . . . . . 1977 – 1983  
Herbert Brendler . . . . . 1983 – 1985  
John T. Grayhack . . . . . 1985 – 1994  
Jay Y. Gillenwater . . . . . 1994 – 2004  
Martin Resnick . . . . . 2004 – 2007  
William Steers . . . . . 2007 – Present



# MEDICAL TEXTBOOKS AND TRAINING

## WILLIAM OSLER'S *PRINCIPLES AND PRACTICE OF MEDICINE*

Born in rural Ontario in 1849, young William Osler went on to become known as one of the most influential physicians in modern times. Sometimes referred to as the *Father of Modern Medicine*, Osler is not known for any major medical discoveries, no breakthroughs in knowledge or legendary papers, but rather for a variety of accomplishments. One of the most noteworthy is his *Principles and Practice of Medicine*, which not only became a best seller, but



the iconic link to Osler's philosophy of medicine. Osler had recently become Professor of Medicine at the fledgling Johns Hopkins Hospital and allowed himself the precious time for the culmination of his "inkpot career" when he wrote his magnum opus.

William Osler, 1896  
Wellcome Library, London



*The Principles and Practice of Medicine*  
William Osler  
William P. Didusch Center for Urologic History

The *Principles and Practice of Medicine* became an instant best seller. The first edition sold 23,500 copies; the second edition was issued in 1895 and sold 17,500 copies; the third through seventh editions were published approximately every five years. The sixth edition came out in 1905 and the 100,000th copy was given by the publisher (Appleton) to Osler's son Edward Revere. The seventh edition was Osler's last sole author edition, and is considered the zenith

*"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."*

➤ SIR WILLIAM OSLER



of his work because he so ably encompassed all of the most recent scientific advances of medicine since the first edition of 1892.



Frederick T. Gates  
Public Domain,  
Wikimedia Commons.

Osler's textbook had far-ranging consequences outside of its core purpose of medical education because it was read widely, even by laypersons. One of the most significant readers was Frederick T. Gates, advisor to John D. Rockefeller's philanthropic endeavors. In July of 1897, Gates read *Principles and Practice of Medicine* during his summer holiday and reported back to Rockefeller the need

to fund medical education and medical scientific research. Harvard Medical School first benefited from Rockefeller's largesse with an endowment of \$1 million in 1902; Johns Hopkins Hospital was next with a donation of \$1.5 million for the establishment of the full-time staff system in 1913. Rockefeller also funded the Johns Hopkins School of Hygiene and Public Health (1918), the Institute of the History of Medicine and the Wilmer Institute (1929). In the meantime, the Rockefeller Foundation had been established in 1914, as well as the Rockefeller Institute of Medical Research.

Osler also left a lasting legacy of literary and historical gems within the confines of his textbook. He insinuated that chlorosis was described in Maudlin's song from Izaak Walton's *The Compleat Angler* describing the "green sickness." He used Lord Byron's "oily dropsy" to describe obesity and Dickens' use of the uncontrollable sleep in the obese as "like the fat boy in Pickwick."

### QUICK FACTS ABOUT WILLIAM OSLER AND THE *PRINCIPLES AND PRACTICE OF MEDICINE*

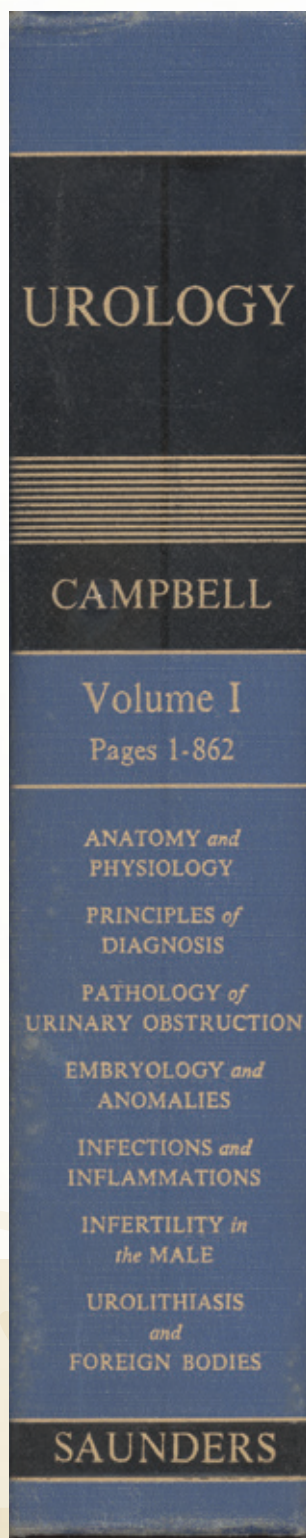
- Osler's textbook *Principles and Practice of Medicine* was the standard teaching text in both North America and England for more than 50 years.
- In the book, he famously writes: "To know what has to be done, then do it, comprises the whole philosophy of practical life."
- Osler's style, which included bedside teaching, discussing diagnostic errors and spending time with patients, was considered radical. Until Osler, medical education consisted of textbook-reading, lectures and studying illustrations; there was no contact with patients.
- The tenet of Osler's teaching methodology was that the best teachers are those who are perpetual students themselves, and he frequently put himself in the place of students during his classes. This philosophy would leave an indelible mark on the medical world.



William Osler at the bedside of patients

From Harvey Cushing, *The Life of Sir William Osler*, 1925  
Wellcome Library, London





Campbell's  
*Urology*, First  
edition, 1954

William P.  
Didusch Center  
for Urologic  
History

### CAMPBELL'S UROLOGY

Training in urology involves accumulation of knowledge, as well as experience that includes both observation and participation. There were multiple personal treatises to impart knowledge to urology residents. Most involved specific areas of urology, such as stones (Thompson, Bigelow), testis (Cooper), bladder and prostate (Gross) and venereal disease (Hunter). In 1926, Young published his two-volume *Practice of Urology*, the first complete textbook of the specialty. Practical texts like McCrea's *Clinical Urology* were also helpful to trainees as 'how I do it' books. But it was not until 1954, when Campbell's *Urology* was first published, that residents had available the most comprehensive text for their specialty.



Meredith Campbell  
William P. Didusch  
Center for Urologic  
History

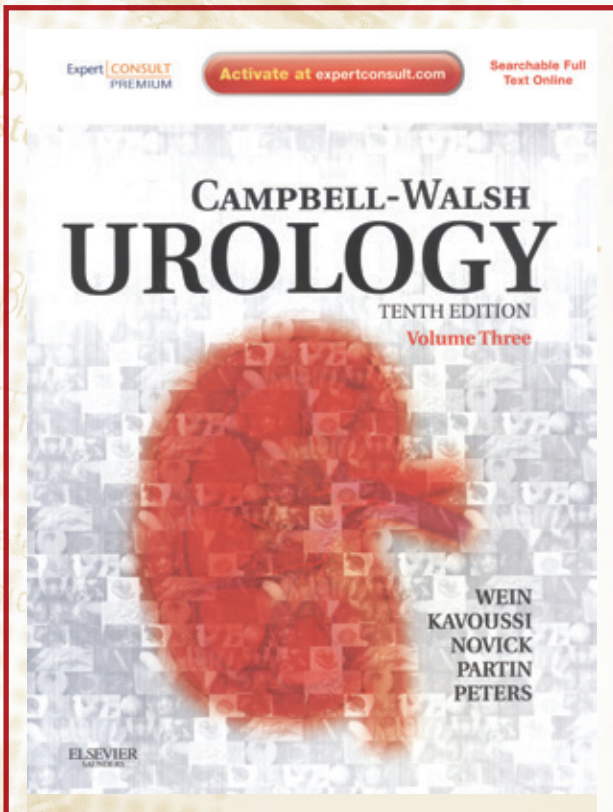
Meredith Fairfax Campbell, born and raised in Wisconsin, received bachelor's (1916) and master's (1917) degrees at the University of Wisconsin. In 1919, he received his medical degree at Columbia College of Physicians and Surgeons and began his internship at Bellevue Hospital. Campbell joined the faculty at the New York University Post-Graduate Medical School as instructor in Urology in 1925, advancing to become Professor and Chair of the department from 1937 to 1949. He remained Professor Emeritus until he retired in 1964. A prolific writer, Campbell authored and co-authored more than 250 journal articles, in addition to numerous textbooks.

In 1954, Campbell published his comprehensive three-volume textbook *Urology*. Divided into 18 sections with 51 chapters, all heavily referenced, this text promptly became the 'Bible of Urology.' Campbell, at this time Emeritus Professor of Urology at New York University, edited this text of more than 2,300 pages with more than 1,100 illustrations. The list of 51 contributing authors was a veritable "Who's Who" of urology. Campbell himself wrote three of the chapters. He did not live to see the actual publication of the third edition in 1970. Hartwell Harrison, Professor of Urology at Harvard and Chief of Urology at Peter Bent Brigham Hospital in Boston was the co-editor for this updated edition, which now included 74 contributing authors and more than 2,800 pages. There were now 70 chapters, including new chapters on radioisotope imaging, transplantation and reno-vascular surgery, urosepsis, vesicoure-



eral reflux and uropharmacology. When the fourth edition, titled *Campbell's Urology*, came out in 1978, there were now five editors, including Harrison; Reuben Gittes, now Professor of Urology at Harvard and Chief of Urology at Peter Bent Brigham Hospital; Alan Perlmutter, Chief of Pediatric Urology at the Children's Hospital of Michigan and Professor of Urology at Wayne State; Thomas Stamey, Professor and Chair of Urology at Stanford; and Patrick Walsh, Professor and Chair of the Department of Urology at Johns Hopkins. The list of contributing authors had now expanded to 105, of whom 87 were new contributors. The text was greatly revised and updated.

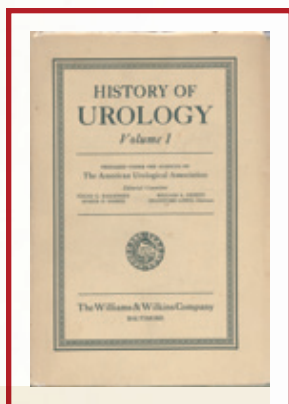
This preeminent text in urology, now titled *Campbell-Walsh Urology*, is currently in its 10th edition and remains the primary source of education and knowledge in the field for both trainees and practitioners. This most comprehensive text now encompasses more than 3,750 pages in 138 chapters and four volumes authored by more than 200 contributors. What began more than six decades ago as a proposal to Meredith Campbell from W.B. Saunders Company, the publisher of his *Clinical Pediatric Urology*, for a one-volume textbook of urology resulted in the three-volume text *Urology* in 1954. After 60 years, *Campbell's Urology* remains the 'Bible of Urology.'



*Campbell-Walsh Urology, Tenth Edition, 2012*  
William P. Didusch Center for Urologic History



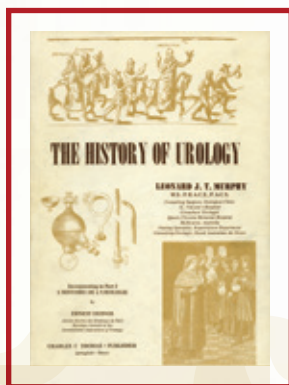
# A HISTORY OF UROLOGY HISTORIES



*History of Urology,*  
1933

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The AUA's two-volume *History of Urology* (1933) was the first comprehensive text published chronicling the history of urology in the United States. At the time it was published, the field of urology had begun to come into its own. In the preface, the author describes how just a few years ago, urology was considered in many academic institutions a minor department of general surgery and how a doctor who specialized in urology was considered to be "nothing but a respectable venerealist."



*The History of Urology,*  
1992

William P. Didusch Center  
for Urologic History

Leonard Murphy's *The History of Urology* was one of the first complete history-of-urology texts. Published in 1972, it is divided into two parts, with Part I incorporating an edited translation of Ernest Desnos' *L'Histoire de l'Urologie* covering "The History of Urology to the Latter Half of the Nineteenth Century." Part II of Murphy's book is titled "The Development of Modern Urology" and is divided into chapters organized by organ systems: the

kidney, the ureter, ureteric repair and replacement, the bladder, the prostate, the urethra, and miscellaneous. Murphy bridges the advances in urology from the period when anesthesia and asepsis opened the field of surgery up to the 1970s, including the works

of many early master-surgeons (Trendelenburg, Nitze, Gustav Simon, George Goodfellow, H.H. Young and Bigelow). Upon completing his text, Murphy realized that "the history of urology is too vast to be reviewed by a single individual." He ended the preface to his book with: "Feci quod potui: faciant meliora potentes" ("I have done what I could: let those who could do more.").

John Herman was a clinical professor of urology at Albert Einstein College of Medicine in New York. He introduced his book *Urology: A View Through the Retrospectroscope* (1973) with the following words: "A study of history need not be painful. Here then is offered a short description of the development of urology, to be read with ease and (hopefully) to be enjoyed." His annotated bibliography includes a list of books about the history of medicine in general, and urology in particular. Murphy's text, for instance, he describes as "fine reading and excellent history;" the *History of Urology* (1933) he characterizes as "good source from which to research the development of urology [but] on the whole not very exciting." Herman's short text (only 181 pages) was meant to be an introduction to the history of urology, not a magnum opus. He states: "if this work comes into the hands of medical students and residents and inculcates a sense of enjoyment of medical history, it will have served its purpose." The AUA History Committee's



Dr. John Herman (right) visiting the Museum on  
Charles Street with Dr. Rainer Engel (left) in 2001  
William P. Didusch Center for Urologic History



Annual award for the best history forum presentation and paper, originally named the "Rusty Cystoscope Award," was renamed the AUA Earl Nation Retrospectroscope Award in 2006 in honor of Earl Nation and in recognition of John Herman's book.



*Perspectives in Urology, 1976*  
William P. Didusch Center for Urologic History

catheters and sounds, suprapubic prostatectomy, venereal diseases, noncalculous obstruction at the ureteropelvic junction, urologic x-ray cinematography, hemodialysis and peritoneal dialysis. The Didusch Museum, which was opened in 1972, is extensively featured in the volume. Despite the fact that the proposed second volume was never published, the text remains a valuable source of urological history from its time.

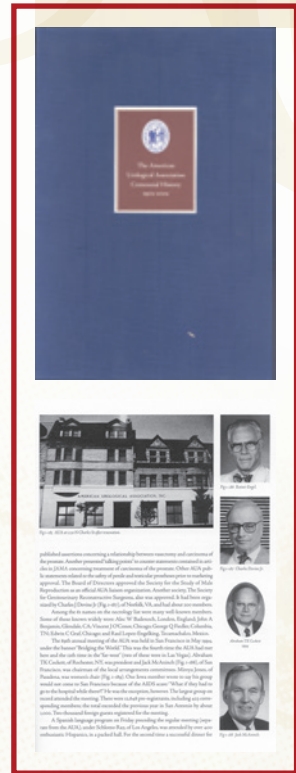
In 1976, Ralph Landes, Ronnie Bush and Adrian Zorngiotti pointed out that since the AUA published its first *History of Urology* in 1933, "new pioneers in urology have emerged with as much impact as Guiteras, Bigelow, Young, Albaran, Nitze." As a consequence, they published *Perspectives in Urology*. Volume 1 includes 12 chapters on various topics: endoscopy, nephrectomy, pyelonephritis, endoscopic manipulation of ureteral stones, vesicoureteral reflux,

A two-volume work was begun in 1991 in anticipation of the AUA's centennial in 2002. Ever since Bransford Lewis had edited and written the first chapter on the history of urology in 1933, there had been several unsuccessful attempts to produce a history of the AUA. The volumes titled *The American Urological Association Centennial History: 1902-2002* now feature a thorough history of the AUA. Filled with photographs of the "giants in the field" and many of the founding fathers of urology, the authors track the development of each of the sections of the

AUA and the history of *The Journal of Urology*®, as well as the growth of the William P Didusch Museum. Comprehensive and chronologically oriented, it includes notes in the margin corresponding to other national and international historical events during the time. Some examples include: "The average nonsalaried physician earned \$22,100 in 1960" and "In 1961 cystoscopes cost \$175-\$300, a sterilizer \$75, a new microscope \$250, a used one \$150, and a complete set of urethral catheters cost \$150."

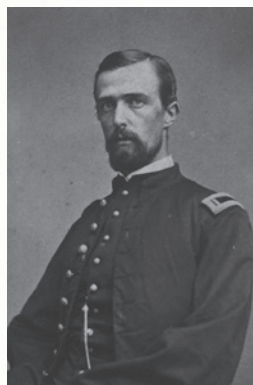
*The American Urological Association Centennial History: 1902-2002, Cover (top) and Interior (bottom), 2002*

William P. Didusch Center for Urologic History





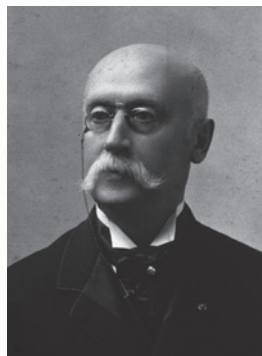
# INDEX MEDICUS: MAKING DATA USEFUL AND AVAILABLE



John Shaw Billings  
National Library of  
Medicine

**JOHN SHAW BILLINGS** was a physician, soldier, hospital planner, bibliophile, librarian, archivist, census statistician and medical knowledge indexer. It was his great work to organize a comprehensive index of all journal articles by subject and organize the medical literature, including monographs, pamphlets and theses. He began this task, curiously enough, with his own struggle to compile a complete bibliography for his medical degree thesis on the

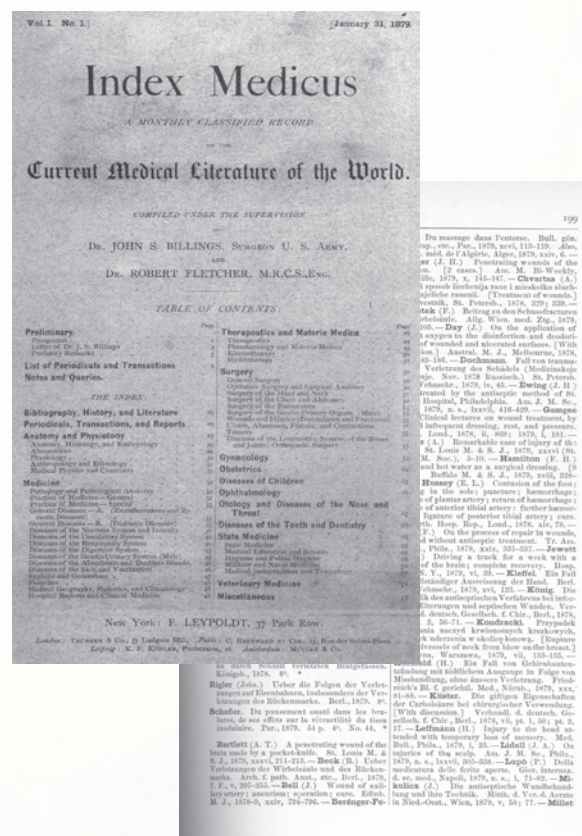
surgical treatment of epilepsy. Billings subsequently published a 316-page, 18,000 item bibliography on cholera in 1875, which was widely hailed as a landmark. He then moved to promote the future work by preparing the *Specimen Fasciculus*, a precursor to the *Index Medicus*, for which he received both funding and an assistant paid for by Congress. This bibliography was a gargantuan task undertaken at a time when the only available technologies were informed people, reading, pen and ink, and index cards. It took Billings and his assistant Robert Fletcher 15 years to produce the primary bibliographic output, the *Index Catalogue*. This first series, consisting of 16 volumes of the *Index Catalogue*, was completed in 1895, the same year Billings retired and moved on to become Director of the New York Public Library.



Robert Fletcher  
National Library of  
Medicine

Billings wrote in the introduction to the first volume of the *Index Medicus*:

*It has often been suggested that it is highly desirable that [the Index Catalogue] should be supplemented by some current publication, which should show all recent works, together with articles and periodicals, arranged by subjects, but until quite lately no proper means have been available for such an undertaking. Now, however, Mr. F. Leypoldt, of New York City, proposes to undertake the publication of such a current medical bibliographical serial.*



Left: *Index Medicus*, 1879

Right: *Index Medicus*, interior  
National Library of Medicine



Billings went on in his "Prefatory Remarks" to mention subject headings, which later evolved into MeSH (Medical Subject Heading) terms: "The nomenclature and classification are essentially those adopted by the Royal College of Physicians, based on Dr. Farre's well-known system." Frederic John Farre was a literary physician who was also a historian and did work for the Royal College of Physicians.

The first issue of the *Index Medicus* under this name (not as a subheading to the *Index Catalogue*) was published in 1911 and was 1,357 pages in length. Though alphabetical in listings, the first reference happens to be a History of Medicine paper: *Abbe (R.): Custodianship of the watch and bible of Dr. Benjamin Rush; with biographical notes. Med. Rec. N.Y. 1910, lxxviii: 805-807*. Sir William Osler, at that point in time Regius Professor of Medicine at Oxford, is referenced eight times in the volume. William Welch

considered this contribution to medical bibliography the greatest American contribution to medical science in the 19th century.

John Billings also mentored others into books, bibliophilia and the history of medicine. Not only did he nominate William Osler and William Welch to their positions at Johns Hopkins, he also mentored David Low Huntington, Fielding H. Garrison, James Cushing Merrill and others into what would become the National Library of Medicine. There are now more than 18 million articles catalogued in the biomedical literature, with 800,000 added in 2008 alone. The accession rate has doubled every 20 years and surpassed one million articles in 2012. Without information professionals and a system of classification and organization, drinking from the well of medical information would be like trying to drink from a fire hose indeed.



John Billings in Library Hall (between 1887 and 1894)

National Library of Medicine

# ELECTRONIC MEDICAL BIBLIOGRAPHY: THE FUTURE TODAY

The exponential rise in medical knowledge led directly to electronic methods of computerized searching and data storage. The Medical Literature Analysis and Retrieval System (MEDLARS®) began in 1964 based upon Frank Bradway Rogers' computer-based technologies at the National Library of Medicine. The first computerized literature search was carried out in June 1966 on "Anterior Pituitary Insufficiency due to Postpartum Necrosis, 1949-1965," and it produced 77 citations. Over the next decade, MEDLARS was decentralized to 11 regional libraries to further increase the overall efficiency of data mining. Agreements for international cooperation were advocated by Director Cummings, with Great Britain and Sweden becoming the first to sign on in 1965. Germany, France, Australia, Canada, Japan, the WHO, Iran, Mexico, South Africa, Italy and Switzerland had all joined by 1980.



Research using catalog generated as part of MEDLARS, 1977  
National Library of Medicine

Subsequently, an abridged digital *Index Medicus* (AIM) was developed and linked to a teletypewriter exchange network, thereby creating the first autonomous search and retrieval system. The system launched as MEDLINE in 1971. Within a year, there were 150 institutional subscribers, submitting more than 10,600 searches per month. MEDLINE kept up with the development of digital technology—it subsequently was published on CD-ROMs and then moved to the Internet. Searches on the free, Web-based database rose from 7 million in 1996, to 255 million in 1999, to 400 million annually in 2001. The ever-increasing volume of medical scholarship is now at the fingertips of doctors everywhere. With access to MEDLINE, it is possible to search thousands of journals in mere seconds. The only challenge is the thousands of responses that any search might yield.



PubMed/MEDLINE, 2014  
National Library of Medicine



# THE APPEAL OF BOOKS IN THE AGE OF THE INTERNET

The great accumulation of humankind's wisdom, knowledge, leisure and enjoyment has both an overarching sense of grandeur and a mournful sense of works lost forever. In every major area of academic achievement there are classic authors whose books were lost along with the ancient library of Alexandria. This year's historical focus is a tribute to the efforts of our predecessors in medicine, paying homage to the artifacts of written culture (papyri, books and journals) and to the ideas that they have left us.

There is also what has been called the "*paradox of print*" – glorifying the ancients' leads to the overthrow of past models [paradigms]. Johannes Regiomontanus learned ancient Greek in order to print a Latin translation of Ptolemy's *Epitome*, which, in turn, stimulated Copernicus to question the heavens and publish his own *De revolutionibus orbium coelestium* in 1543. Pliny's Natural History was printed and corrected by Niccolo Leonicensi and, in turn, stimulated botanists in the Renaissance to question plants and classification, which led to the physician Carl Linnaeus to publish his *Systema Naturae* in 1735. Discovery and recollection of the past is intimately tied to revolution and future developments in science and medicine. ***In this way, the past and the future are tied together in a Gordian knot.***

Today, the National Library of Medicine (NLM) in Bethesda, together with the Library of Congress (LOC) in Washington, is the closest thing to a universal depository of mankind's knowledge. The NLM has an estimated 17 million items in its collection, and the LOC has an unimaginable 119 million items. Those magnificent libraries are, in sheer quantity of information, only surpassed by the Internet. But information is not knowledge. Most of the Internet is not curated by librarians (or other information professionals). And while the Internet might just as well start a revolution today as a book did 500 years ago, it lacks the appeal of a good book by a warm fire.

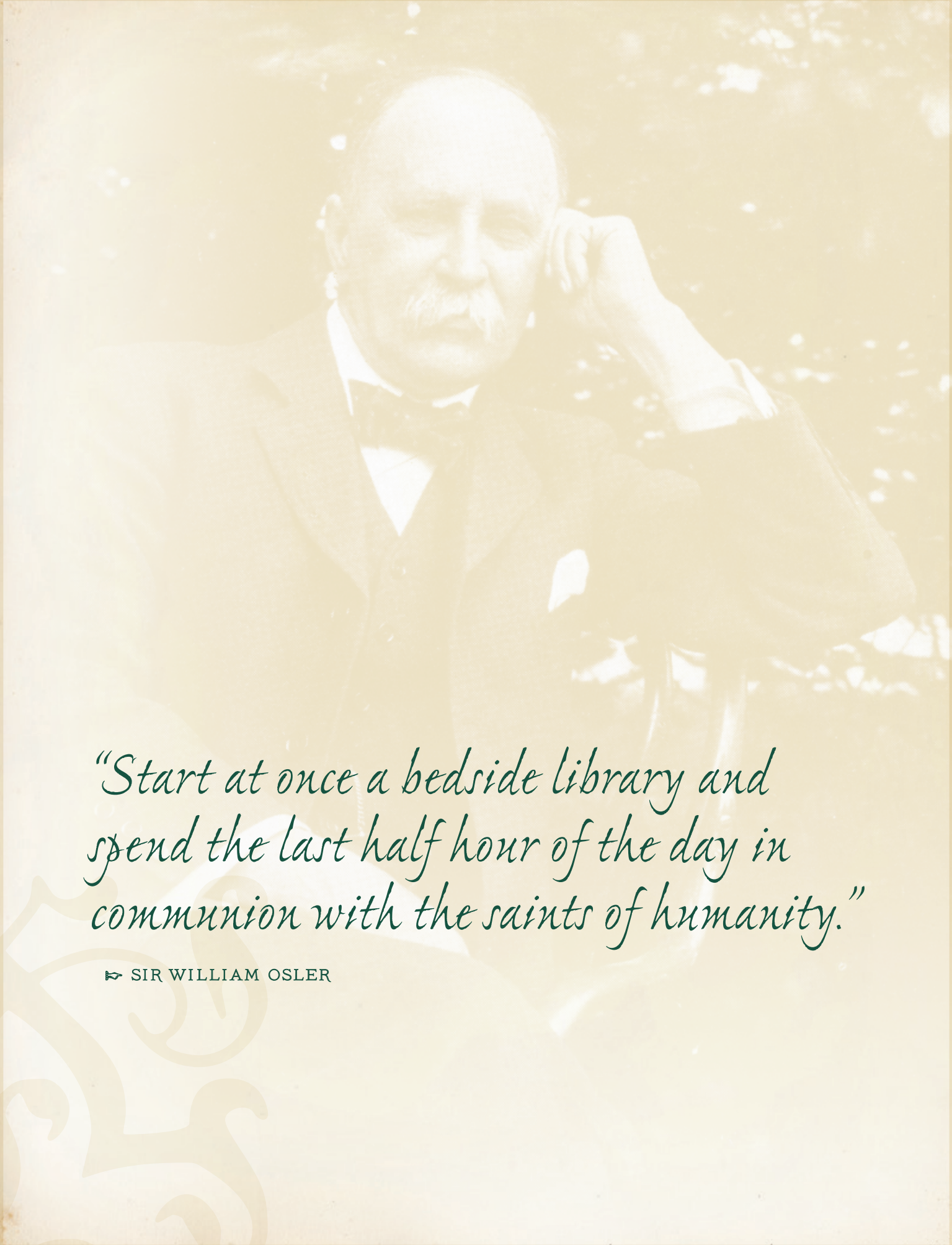
*"Show me the books he loves and I shall know the man far better than through his mortal friends."*

➤ SILAS WEIR MITCHELL, MD



Alexander the Great entered Gordium (Turkey today) in 344 BC and encountered the chariot of Gordius, father of King Midas. The yoke of the wagon was fastened by a complicated knot. It was prophesied that he who loosened the knot would become the ruler of Asia. Instead of trying to untie the impossible knot, Alexander cut through it with his sword and went on to conquer Asian kingdoms as far east as Afghanistan.

Giovanni Paolo Panini, *Alexander the Great Cutting the Gordian Knot*, Bequeathed to Walters Art Museum by Henry Walters in 1931



*"Start at once a bedside library and  
spend the last half hour of the day in  
communion with the saints of humanity."*

✦ SIR WILLIAM OSLER



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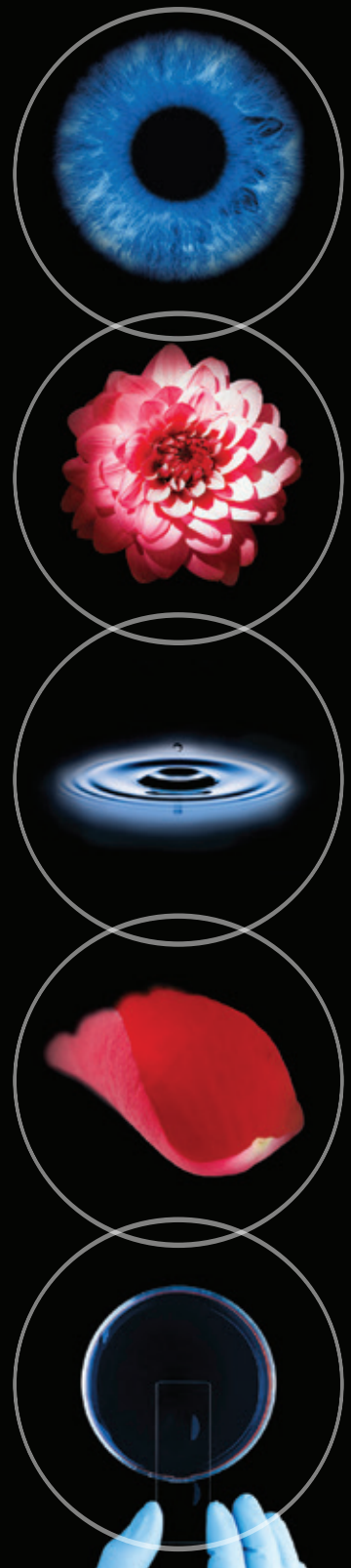
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