

Erwin W. Rugendorff, M.D.

Urology & Philately

A Philatelic Ramble through Urology

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Introduction

History recognizes many names and ignores even more. This fact is particularly true for philately. As a result, a philatelic version of any aspect of the history of medicine cannot be totally comprehensive. The omission of any event or individual's role in no way lessens the importance of the impact or contribution.

Through the use of philatelic material I have attempted to provide some insights into many major milestones of the history of urology and also to introduce the individuals involved. It is a journey through medical history from the antiquity to the present.

All the stamps and philatelic material shown are from my collection. Deciding what to omit has been as difficult as deciding what to include. Though the resulting picture does not necessarily present continuity, it does emphasize certain peaks and memorable events in the evolvement of urology.

Erwin W. Rugendorff, M.D.
New York, New York
U.S.A.
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Uroscopy

In the beginning, although the real significance of urine was poorly understood, it was soon suspected of being an important marker to an individual's state of health. Thus abnormal changes in the appearance of the urine ultimately attracted the attention of man and eventually he associated it with bodily disease.

Uroscopy, also spoken of as water casting, was defined as the skill of making a diagnosis and prescribing therapy solely on the evidences afforded by looking at the urine (Fig. 1). Water casting dates back to the

there were few other diagnostic methods known. Inspection of the urine became more popular and spectacular, and more of an art than a science. Physicians, uroscopists, traveling ‘water doctors’ and charlatans carried it out. The urine was collected in a bulbous container, called matula, shaped like the urinary bladder, and made of fine, clear, transparent glass or – even better – crystal glass of Venice. The traveling uroscopist set up a stand in a village. Customers could take a matula home in its wicker basket and then bring it back filled. The uroscopist would pompously ‘examine’ (view and smell) the urine, then prescribe and sell medicines. Next day or so, he moved on to a new territory before any results of his diagnosis and therapy became known.

The urological scholars of Middle Ages distinguished twenty different colors of urine; they observed the quantity, clarity, deposits, and density of the urine, and frequency of micturition.

Used by serious physicians as one of the available diagnostic tools, uroscopy was for centuries a logical procedure based on the doctrine of the four elements and the four humors, a balance of which was deemed essential to health. If the ancients were aware of changes signifying disease, no evidence of this knowledge appears until the early Grecian period, when one finds uroscopy established as a diagnostic means of detecting disease.

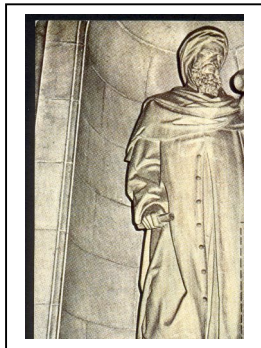


Fig. 1 Averroes
In the act of “water casting”

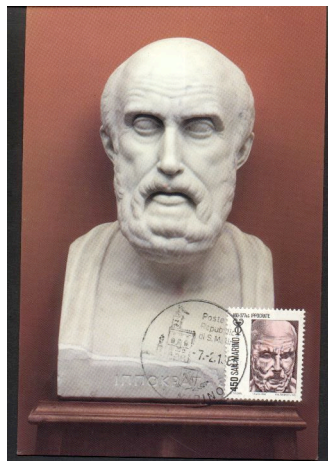


Fig. 2 Hippocrates
San Marino 1985



Fig. 3 Galen
Greece 1996

Hippocrates (c. 460-377 BC) devoted a special book to the study of the urine and recognized at least four conditions of the urinary tract that could be evaluated by the nature and appearance of the urinary outflow (Fig. 2). According to Hippocrates urine is a fundamental means for a correct diagnosis. In *Section VII* of the *Aphorisms of Hippocrates* one can find the first description of certain changes of the urine related to acute or chronic renal disease.

Claudius Galen (129-199) subsequently adopted the Hippocratic belief that the appearance of the urine was an aid in diagnosis (Fig. 3). He noted that flies were attracted to the urine of diabetics, thus denoting loss of sugar in such patients.

Isaac Judaeus (850-932) from Egypt wrote a treatise of uroscopy, translated into Latin under the title of *De urinis* and often reprinted. It

significance of the density, color, clarity, etc. of urine and gives fixed rules on the diagnosis and prognosis to be drawn from water casting. It was used as a reference source in European medical schools and in the Muslim world for more than five centuries (Fig. 4).

Avicenna (980-1037), in his *Canon of Medicine*, combined the concepts of Hippocrates, Galen and Islamic principles with the medical practice of his time (Fig. 5). In this work, he insisted several times on the testing of urine.

Constantinus Africanus (c.1010-1087), one of the founders of the School of Medicine in Salerno, translated Isaac Judaeus' work into Latin and claimed original authorship (Fig. 4). Only after 400 years was the plagiarism discovered and the work reprinted under the title *Opera omni Isaci*, providing a useful text on uroscopy. Constantine's importance lies in the fact that by such Latinizing he placed Mohammedan thought and culture at the disposal of European Medicine from the 12th to the 17th centuries. Curiously, though Isaac Judaeus and Constantinus Africanus lived a century apart, they are shown facing each other on the Tunisian stamp of 1998.

Francesco Petrarca (1304-1374), Italian scholar, poet and humanist, scoffed about uroscopy. Through harsh complaints, he attacked his contemporaries in the medical profession, who were focused entirely on criticizing the physicians of the antiquity rather than on seeking new advances in medicine (Fig.6).



Fig. 4 Isaac Judaeus (at left);
Constantinus Africanus (at right)
Tunisia 1998



Fig. 5 Avicenna
Algeria 1980



Fig. 6 Petrarca
France 1956

Pierre Gilles de Corbeil (1140-1224), also known under his name Aegidius Corboliensis, in his important treatise *De urinis, de pulsibus, de virtutibus et laudibus compositorum medicamentorum*, brings uroscopy to the highest degree of meticulous perfection (Fig. 7). He distinguished 19 different varieties of substances contained in urine, divided up by their consistence, quantity and layer in the urine sample. His work popularized the practice of uroscopy and for several centuries this practice came close to excluding all other types of medical examination.

William Shakespeare (1564-1616), in *Two Gentlemen of Verona*, refers to water casting when he makes Speed say: "These follies are within you and shine through you like water in a urinal, that not an eye that sees you but is a physician to comment on your malady."

Again, in *Twelfth Night*, when Fabian speaks of "carrying water to the wise

“Sirrah, you giant, what says the doctor on my water?” His page replies: “He said, sir, the water itself was a good healthy water; but for the party that owned it he might have more diseases than he knows for.” (Fig. 8).



Fig. 7 Gilles de Corbeil
Belgium 1967

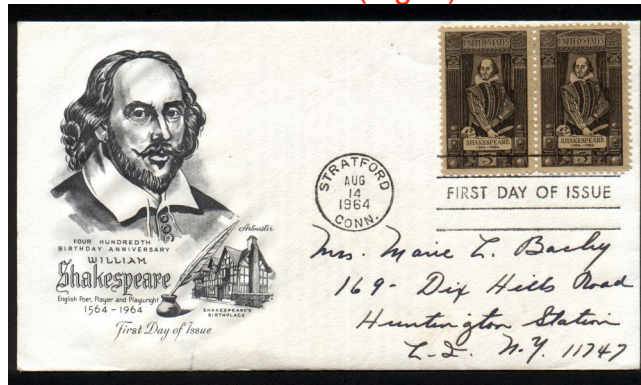


Fig. 8 William Shakespeare
USA 1964

The physician in the act of “water gazing” is depicted on many stamps and cancellations (Fig. 9-18).

In numerous medieval transcripts pertaining to uroscopy the physician is advised to take certain precautions in dealing with patients and their relatives. Apparently many patients tried to deceive the uroscopist when they sent their urine for examination. It is quite likely this was done to test the doctor’s knowledge and skill. The empiric contemplation of the urine flask lasted down to the sixteenth century when it reached its zenith in popularity. It was the principal if not the chief diagnostic method available to the physician who supplemented it with pulse taking and, at times, study of the face, the appearance of the tongue and excrements.



Fig. 9 Uroscopy (at left)
Brazil 1979



Fig. 10 Uroscopy. Miniature from Avicenna’s Canon of Medicine
5th Congress European Society of Urology, Vienna 1982



Fig. 11 Uroscopy: Miniature from Avicenna's Canon of Medicine
5th Congress European Society of Urology, Vienna 1982



Fig. 12 Uroscopy (at center)
Israel 1992



Fig. 13 Uroscopy
Gerard Dou (1613-1675)



Fig. 14 Uroscopy. 14th Congress Intl. Society of Urology
Munich 1967



Fig. 15 Uroscopy
22nd Meeting German
Society of Urology
Berlin 1968



Fig. 16 Uroscopy
20th Congress Intl. Society of Urology
Vienna 1985



Fig. 17 Uroscopy
34th Congress German Society
of Urology. Hamburg 1982



Fig. 18 Uroscopy
41st Congress German Society
of Urology. Freiburg 1989

Ancient Times

The Ebers Papyrus. Medical knowledge was recorded by Egyptians on papyri as early as 2600-1200 BC. The *Ebers Papyrus* was discovered in 1862 in a tomb at Thebes and is now preserved in the library of the University of Leipzig (Fig. 19). This papyrus was written about 1500 BC, but there is sufficient evidence that it was copied from a series of documents many centuries older. The *Ebers Papyrus* begins with a long series of prescriptions for various diseases, of which one (hydropsy with spasms) though quite vaguely described could be uremia. It draws attention to urinary incontinence, also mentioning means of treatment. The *Ebers Papyrus* records the use of "bread in a rotten condition" to treat bladder diseases, and clearly refers to hematuria, suggesting that it is caused by parasites. Probably because of this, certain Egyptian tribes practiced the wearing of a sort of case hiding the penis to prevent the parasites from penetrating into the urethra.



Fig. 19 The Ebers Papyrus

D. R. Germany 1981

Imhotep (c. 2780 BC) was a physician at the court of Pharaoh Djoser and could have been one of the authors of medical papyri (Fig. 20).



Fig. 20 Imhotep

Egypt 1928



Fig. 21 Dhanwantari

Nepal 1977

Dhanwantari. The Hindus based their medical practices on a divine revelation. A sacred book, the *Ayur Veda* (ayu meaning life or longevity) was believed to have been passed from Buddha first to Dakca, then to Dhanwantari, the surgeon of gods (Fig. 21). After centuries of preservation the physician Susruta (between 600 and 800 BC) collected the holy songs of the Hindus into a treatise, the *Susruta Samhita* (the Compendium of Susruta). Sophisticated surgery and detailed therapeutics are described in this treatise. Urine was often prescribed as medicine, a practice to be long continued and still found in pharmacopoeias as late as the 16th century. The *Susruta Samhita* describes syringes, several varieties of sounds, catheters of gold, silver, iron and wood, lubricated with butter or lard, used for the evacuation of urine, the management of urethral strictures, and instillation of plant preparations into the bladder. Susruta provided interesting details about the pathogenesis and management of urinary calculous disease. When bladder stones failed to respond to medical treatment, Susruta advised lithotomy, the “supreme cure”, which he regarded as hazardous even in the hands of experts. From very early times Indian healers developed considerable ability in cutting for the stone, being allowed to perform surgery only with the approval of the rajah. However, Susruta emphasized that “the hand is preferable to all surgical tools”, an early warning of the potential misuse of surgical instruments in lithotomy. Last not least, the *Susruta Samhita* deals with sexual hygiene and erectile dysfunction. The treatment involves Vaji Karana (aphrodisiacs) and ingestion of testis tissue, defined as remedies that “make a man sexually as strong as a horse and enable him to cheerfully satisfy the heat and amorous ardors of young maidens.”

For long times, Ayurveda was held in ridicule, and it withered. But the invincible

spreading the message of Ayurveda in the 20th century goes to Arya Vaidya Sala in Kottakal and its founder Vaidyaratnam **P. S. Varrier (1869-1944)**. Today, Ayurveda has grown into a mighty organization in South India, reaching its patients through a nationwide network (Fig. 22).



Fig. 22 P. S. Varrier of Kottakal
• India 2002



Fig. 23. Hippocrates' Oath
USA 1947

Hippocrates (460-377 BC) is credited with separation of medicine from religion (Fig. 2). After much experience, he was able to define and classify disease in a manner that previously had never been attempted. Although there is a lack of anatomical knowledge, the clinical interpretations of subjective and objective symptoms are astonishing. He describes, dysuria, stranguria, ischuria and urinary incontinence, though without analyzing the cause of those disorders. Calculous disease of the kidney was well described by Hippocrates and his theories of the causation of the stone were accepted until the time of Paracelsus. Even though Hippocrates mentions the catheter as being among his surgical tools, it seems he did not use it to diagnose bladder stones. In his *Aphorisms*, Hippocrates states that "desperate cases need the most desperate remedies" and "what drugs will not cure, the knife will."

"I will not cut persons laboring under the stone, but will leave this to be done by men who are practitioners of this work" -- a commitment in the *Oath* attributed to Hippocrates -- was said to reflect his attitude toward lithotomy (Fig. 23). In fact this passage is a late interpolation, inserted in the original text only during the 2nd century AD.



Fig. 24 Democritus
Greece 1983

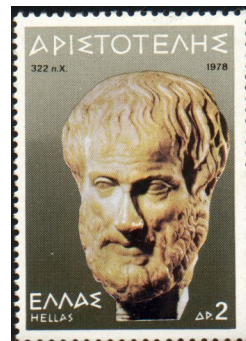


Fig. 25 Aristotle
Greece 1978

Democritus of Abdera (460-370 BC) maintained that illness is an alteration of the balance between atoms and pores: when the pores are too narrow, the

atoms cannot move, accumulate and cause diseases. This way also bladder stones may form (Fig. 24).

Aristotle (384-322 BC) was the first author to describe the structure of the kidney (Fig. 25). He observed that the human kidney appears like only one mass, but many parts compose it like little kidneys joined together. Since he had not observed blood clots in the internal cavity of the kidney he concluded that blood did not reach it. Aristotle maintained that part of the fluid consumed by an individual reaches the bladder directly through invisible pores of the intestine, that calculi occurred only in human beings and never in animals, and that stones were formed primarily in the bladder as a result of humors passing down from the kidneys. He asserted that the sperm derives from the blood and accumulates into the epididymis to be ejected from the urethra, but he misunderstood the function of the testicles and maintained that they were nothing but weights to keep the bending of the spermatic ducts. He gives a detailed description of the psychosomatic consequences of castration in men. In the field of sexology Aristotle was the first who observed that incorrect sexual education just at the beginning of puberty could cause great psychological and sexual troubles in ripe age.

Herophilus of Chalcedon (c. 335-280 BC) was a Greek physician and a careful anatomist (Fig. 26). He practiced in Alexandria, where human dissections were permitted, even performing some in public. He founded the first school of anatomy, encouraging his students to overcome their fear of dissecting human cadavers. Herophilus himself dissected about six hundred human bodies and also performed vivisections on criminals sentenced to death. His discoveries and descriptions included the seminal vesicles, the seminal ampullae and the prostate. He had improved Aristotelian anatomy by distinguishing arteries from veins, but saw the arteries as air tubes, similar to the trachea and bronchi, a common error because arteries are devoid of blood in corpses. He also wrote on the pulse as a diagnostic guide. Unfortunately, his works have been lost and only fragments and indirect quotations have been preserved, chiefly by Galen.

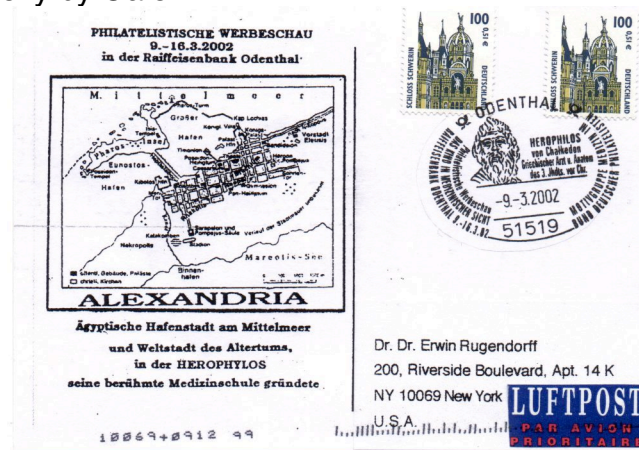


Fig. 26 Herophilus of Chalcedon
Germany 2002

Gaius Plinius Secundus (23-79) is also known as Pliny the Elder. In *Books XX-XXXII* of his treatise *Historia naturalis* (37 books) are quoted many pharmacological remedies to cure diseases of the genitourinary apparatus (Fig. 27). Ablutions with urine are also mentioned. This was the one work of classical antiquity that, despite the low quality of its material, was read steadily throughout the Dark Ages.



Fig. 27 Pliny the Elder
Italy 1979



Fig. 28 Pedanius Dioscorides
Yemen 1967

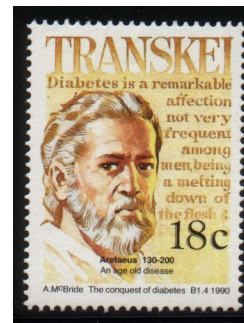


Fig. 29 Aretaeus
Transkei 1990

Pedanius Dioscorides (40-90) studied the medicinal properties of plants and minerals. In his treatise *De materia medica*, he describes about 200 plants used for the treatment of kidney and bladder diseases (Fig. 28). He recommends the external application of urine for the treatment of different disorders. Dioscorides gives also some prescriptions for pain soothing medicines to be used in performing surgical operations. His work was the authoritative source on the materia medica of antiquity. Dioscorides believed in talismans and recommended the use of the Jew-stone found in Judaea for dissolving urinary calculi.

Aretaeus of Cappadocia (81-138) related about acute and chronic conditions of the kidney and bladder (Fig. 29). He begins with a statement that the kidney is a glandular organ whose purpose is to secrete urine while extracting it from the blood. He recognized that stone formation takes place in the kidneys and describes the dilation of the upper urinary tract secondary to bladder neck obstruction. For medical treatment of renal calculi, he recommends fomentations, oil poultices, venesection, and cupping glasses, but he insists especially on the beneficial action of milk in the diet (milk of she-asses, mares, ewes, and of she-goats). He described urethritis and calculous disease as cause of urinary retention. His healing methods include a kind of particular therapy. In the case of urolithiasis, Aretaeus recommends the patient “to be jolted to put the stone in motion.” For bladder diseases, instead of warm baths he recommends “grilled cicadas on which the patient should sit, by the way of a perineal poultice.” Aretaeus described and practiced catheterization, perineal incision and urethrotomy in cases of bladder and urethral calculi that could not be removed otherwise. “Afterward we must take pain to make the wound cicatrize. Even if this does not succeed, it is preferable that the urine flow for a whole lifetime than to let the patient perish after atrocious pain.”

Claudius Galen (129-199). By ligating both ureters in animals, Galen demonstrated that urine passes into the bladder through the ureters coming solely from the kidneys (Fig. 3). He recommended a curved or S-shaped metal catheter for use in both men and women. Galen, who observed the competency of the ureterovesical junction, has recognized reflux. He described the prostate, the seminal vesicles, the seminal ampullae, the epididymis and the seminal ducts. He connects paralysis of the bladder to its true cause, a disturbance of the central nervous system, but not always. It is Galen who made general the use of the terms dysuria, stranguria, and ischuria. He coined the term ‘gonorrhoea’, considering it as an “involuntary excretion of sperm of which one is not conscious and which is accomplished

kidney to be higher than the left one. He thought the female genital apparatus to be the reverse of the male one, that the uterus was two-horned and that the ovaries were "female testicles." He thought that women produce and secrete a sort of sperm, which partly contributes to the formation of the embryo. Galen's account of human anatomy was based entirely on his dissection of pigs and apes and, despite this basic drawback, his anatomico-physiological descriptions dominated medicine for more than fourteen centuries.

Middle Ages



Fig. 30 Rhazes



Fig. 31 Old syringe



Fig. 32 Abulcasis

Syria 1968

Portugal 1979

Rhazes (c. 854-925 or 935), an influential physician of Persian origin, ranks with Hippocrates and Galen as one of the founders of clinical medicine (Fig. 30). He opposed uroscopy. In an encyclopedia of medicine, compiled posthumously from his papers and known as *Liber continens*, Rhazes copied Paulus of Aegina's account on lithotomy. Renal stones were said to be caused by excess of salt or by heat, which might be countered by bending forwards or by horse riding. For small stones, gentian, birthwort, wormwood and pepper were prescribed, and the penis was rubbed with scorpion oil. For large irregular stones, an incision was made at the root of the penis. Rhazes discusses the formation of urinary calculi, recommending remedies that prevent their formation and that dissolve them. "A formula for a diuretic remedy which makes the urine abundant, clears the urinary tract, and expels the matter that is at the point to becoming a calculus. On takes one part of husked grain of melon, a quarter part grain of wild carrot, half of the whole mixture in sugar. The patient drinks two mithqâls [a mithqâl equals 1/2 dram or about 6 grams] of it two hours before a meal, one mithqâl two hours after it, and one mithqâl ten or more hours after it. It is necessary to continue the use of this medication, and in the long term it has the faculty of preventing formation of calculi without causing heat or irritation." Rhazes invented a syringe for injections in the treatment of gonorrhoea. He introduced urethral injections of jellies made from quince, psyllium seed or honey to treat urethritis (Fig. 31). Rhazes is said to have been the first to use a stylet in the lumen of the catheter for the purpose of clearing the mucus, blood and pus, which might obstruct the lumen. He made malleable catheters of lead and replaced the terminal opening by two eyes in the sides. He did a buttonhole urethrotomy in the perineum when he was unable to pass a urethral sound.

Abulcasis (936-1013). In his treatise *The practice of method*, he gives precepts on urethral catheterization, irrigation of the bladder, lithotomy, and extraction of urethral stones (Fig. 32). He stated that vesical calculi could be recognized by the urine looking like water and containing gravel, by rubbing and pulling of the penis and often by prolapse of the rectum. In retention due

kneel and hold his breath to effect relaxation of the sphincter and disengagement of the stone. If urine still did not pass, the bladder should be emptied by a slender silver catheter. For instillations into the bladder, he used a short urethral tube made of silver or aurichalcum, the outer end of which was funnel-shaped. A sheep's bladder was used as a receptacle for the fluid to be instilled. He used a trocar for the puncture of hydrocele. Abulcasis also wrote about castration by pulping or by incision and cutting, yet - for religious or legal reasons - he described the operation as performed on animals. He was the first to reflect light into the vagina by means of a glass mirror.

Avicenna (980-1037), an eminent Persian physician, wrote an extensive encyclopedia, *The Canon of Medicine*, a vast compilation of all the known works of this epoch, likewise put into perfect order (Fig. 5). Besides uroscopy, other topics contained in this book are: kidney and bladder disorders; symptoms, treatment and prevention of urinary stones; different states of the urine, its normal flow, dysuria, stranguria, ischuria and its causes, their treatment by medication and catheterization. It is pointed that the Arabians were the first to develop a flexible catheter and that Avicenna was the first to describe it. The best catheters, he suggested, were of soft and flexible materials such as those obtained from stiffened animal skins and lubricated with soft cheese. Avicenna also used rigid catheters of gold, silver, tin and lead, and injected remedies into the urethra. His description of bladder lavage is the first adequate account of this procedure. As a counterirritant maneuver for the treatment of what was undoubtedly gonorrhoea, he recommended inserting a louse into the urethra. Avicenna taught that connections existed between the kidneys and nearby organs, so that the right kidney drained the secretions of the liver and the left, those of the spleen and other organs.

Avenzoar (1091-1161), one of the greatest Muslim physicians of the Western Caliphate, carefully described (but did not perform) lithotomy (Fig. 33). Apparently he is the first to mention a lithotrite. In his book *The Assistance*, Avenzoar suggests a particular treatment for kidney stones.



Fig. 33 Avenzoar
Syria 1968

Averroes (1126-1198). His treatise *Liber universalis medicinae* deals with renal structure and function, lithiasis and its medical treatment, but Averroes says nothing more than what former authors (namely Paulus of Aegina, Albucasis and Avicenna) had already presented (Fig. 1).

Maimonides (1135-1204). In Rabbi Moses ben Maimon's writings one finds references to kidney function, obstruction of the urinary tract, nephrotic syndrome, blackwater fever, proteinuria as an indication of chronicity of illness, macroscopic hematuria as a reflection of glomerular diseases, and the use of sweating as a therapeutic modality in conditions associated with urine retention (Fig. 34). In his treatise *The art of coition*, a précis on sexual hygiene composed for Aladdin's nephew, he gives the prescription of a particular diet to improve erection; living yellow ants must be added to certain radish

living ants – was used during all the following centuries and somewhere is still in us



Fig. 34 Maimonides
Israel 1953

Pierre Gilles de Corbeil (1140-1224) is said to have founded the medical School of Paris (Fig. 6). His poem *De laudibus* is the sum in verses of the Salernitan pharmacology, in which many medicines are listed and described as efficacious against bladder and kidney stones. Adequate medical attention for the poor was, in his opinion, an important duty of the medical profession and, with this in mind, he wrote a double pharmacopeia listing drugs suitable for both rich and poor.

Ibn al-Nafis (1210-1288), Arab physician who discovered the pulmonary circulation of the blood three centuries before Miguel Servet, also wrote a commentary on the anatomy of the kidneys and the bladder (Fig. 35). It is located in the Meyerhof Library of medical manuscripts in Cairo.



Fig. 35 Ibn al-Nafis
Syria 1967

Pedro Hispano (c. 1216-1277) was born in Lisbon, Portugal. The son of one Julianus, he was baptized Peter and was known as Petrus Juliani or Petrus Hispanus (Fig. 36). After graduating as magister of philosophy and medicine at the University of Paris, he moved to Italy. He taught medicine at the University of Sienna from 1247 to 1252. In his medical works (*De urinis*; *Thesaurus pauperum*), reprinted many times, he deals also with disorders of the genitourinary apparatus. Later he became archivist and personal physician to Pope Gregory X, whom he succeeded in 1276 with the name of Pope John XXI. He is the only physician ever to become a Pope. His tragic death, eight months following to the elevation to the papacy, was caused by the collapse of the ceiling of his private library, a new room built just for him in the Papal

on the papal throne. The other identifies him as a physician, showing him examining a patient's eye.



Fig. 36 Pedro Hispano
Portugal 1977

Alfonso X “El Sabio” (1221-1284), king of Castile and León, in his work ‘*Lapidario del Rey Alfonso X*’, mentioned 60 cases of urinary and kidney stones (Fig. 37).



Fig. 37 Alfonso X “El Sabio”
Spain 1984

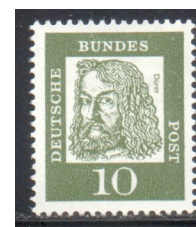


Fig. 38 Albrecht Dürer
F.R. Germany 1961

Albrecht Dürer (1471-1528), in 1496, carved the oldest document about syphilis, that decorates a Latin poem by the Nuremberg physician Th. Ulsenius (Fig. 38).

Cutting for the Stone

Aulus Cornelius Celsus (25 BC-50 AD). In his book *De medicina*, he describes the so-called *sectio celsiana* or the lesser operation (*apparatus minor*), that is to say a simple operation for extraction of the stones from the bladder by perineal incision (Fig. 39). This technique of lithotomy was practiced with only minor modifications up to 1522, when Marianus Sanctus of Barletta wrote and published his treatise *Libellus aureus de lapide a vesica per incisionem extrahendo*, in which a new technique of perineal lithotomy - introduced about 1520 by Franciscus de Romanis of Cremona - is described. The procedure came

to be known as the Marian operation. Because of the additional instruments to be employed it was also termed the greater operation (*apparatus major*).



Fig. 39 Aulus Cornelius Celsus
F.R. Germany 1984

Abulcasis (936-1013). His description of lithotomy differs little from that of Celsus, but the instruments used were different and more complicated (Fig. 32). In his opinion, if the stone is too large, it is unwise to make a long incision, because it may cause fistula or death; in this situation it is better to crush the stone. In case of hemorrhage from a cut artery, Abulcasis recommended the application of powdered vitriol on the area, compressing it with compresses, leaving the calculus and not extracting it, for the patient might die. "Then you should treat the wound, and when, at the end of several days, the flow of blood has stopped, and the site of the hemorrhage is healed, return to the operation until you have extracted the stone, if it pleases Almighty Allah." For religious reasons, Abulcasis did not operate upon female sufferers from stone, but he instructed midwives in his technique. Seemingly, he was the first trying to drill and break impacted urethral calculi using a triangular pointed blade of tempered iron fixed on a wooden handle. If this treatment failed, ligatures were placed above and below the stone, the urethra was incised and the calculus was removed.

Georg Bartisch (1535-1607) of Dresden performed lithotomy successfully in 400 cases and wrote an extensive, well-illustrated manuscript on different procedures of cutting for the stone (Fig. 40). The manuscript, dedicated to the Duke of Saxony, was discovered in 1893 at the Royal Library of Dresden and published in 1904 by the urologist O. Mankiewicz.



Fig. 40 Georg Bartisch
Germany 1997

Wilhelm Fabry (1560-1634), better known as Fabricius Hildanus, in 1624 wrote *De lithotomia vesicae*, a book in which he gives a detailed description of the operation for bladder stones derived from his own experiences (Fig. 41). He claimed to have invented a number of instruments, most of which were modifications of those already in use, but his speculum vesicae, designed to retract the wound and his four-pronged dilator showed his ingenuity. He recorded the passage of stones through the vagina caused by ulceration of the bladder and suggested opening the bladder by this route. He reported on an unintentional removal of a tumor during lithotomy; the removal of a stone weighing 21 oz, during which the patient died; a calculus with a bullet as its nucleus; a patient who passed more the 1,000 calculi over a period of two years.



Fig. 41 Fabricius Hildanus
F. R. Germany 1975

Nicolaas Pieterszoon Tulp (1593-1674) described the presence of calculi in diverticula of the bladder, so called "encysted calculi," a matter of importance to lithotomists (Fig. 42). At an autopsy performed in 1641, he found 39 calculi, each concealed within a diverticulum so "that in the beginning, the surgeon was led to suppose no calculi to be contained therein."

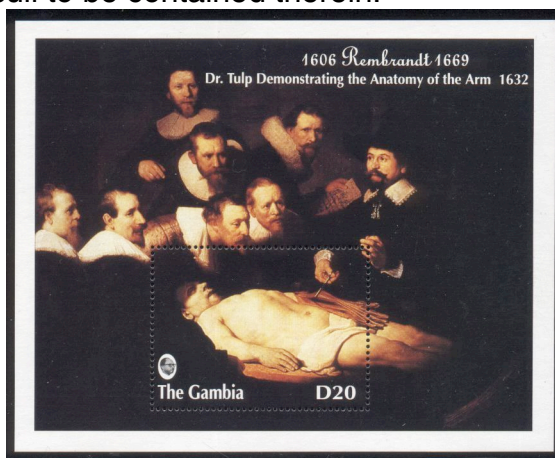


Fig. 42 Nicolaas Pieterzoon Tulp (at right)
Togo 1968

Dr. Eisenbarth (1663-1727). For centuries, itinerant lithotomists and barber-surgeons, as well as physicians who specialized in cutting for the stone, like

Dr. Eisenbarth, were regarded as mysterious, adventurous and shady figures (Fig. 43).

An eighteenth century lithotome and a 17th century cutting instrument for hernia from the collection of the Karl Sudhoff Institute, Leipzig, can be seen on a stamp from the former German Democratic Republic (Fig. 44).



Fig. 43 Doctor Eisenbarth
F. R. Germany 1977



Fig. 44 Lithotome

Joseph Warren (1741-1775). His practice and politics went hand in hand. By the summer of 1774, Warren had an active medical and surgical practice, which included skill in lithotomy (Fig. 45).

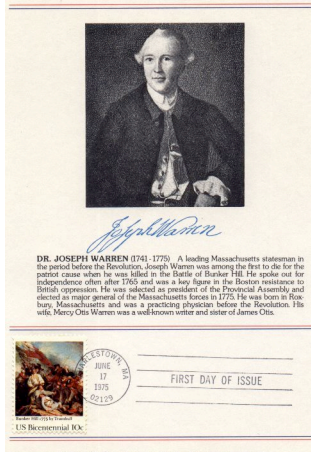


Fig. 45 Joseph Warren
USA 1975

Guillome Dupuytren (1777-1835), an opponent of lithotomy, invented a double lithotome with guarded blades for bilateral perineal lithotomy (Fig. 46, 47). Despite many criticisms, bilateral lithotomy became adopted as normal procedure, with modifications made by other surgeons.

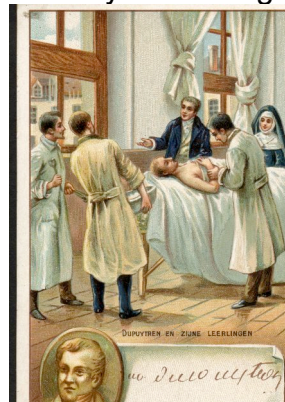


Fig. 46 Guillome Dupuytren
France 1977

Fig. 47 Dupuytren
Trade Card, Amsterdam

Ephraim McDowell (1781-1830) of Virginia, settled in the village of Danville, Kentucky, performed lithotomy 22 times successively without losing a case (Fig. 48).

Mandrake (Fig. 49) or opium (Fig. 50) was sometimes administered to the patient for soothing the pain while cutting for the stone.

Lithotomy flourished in the Middle Ages and into the 19th century, when physicians, like Civiale, Heurteloup, Amussat, Leroy d'Etiolles, Mercier, Jacobson, Thompson, and Bigelow, introduced new techniques for stone treatment. Civiale (1796-1867), in 1824, made the first successful attempt to crush calculi by passing a brass tube through the urethra into the bladder and fragmenting the stone with a drill. Today, new technology - lithotripsy - has radically transformed treatment by pulverizing stones with powerful bursts of energy, and recoveries are relatively swift and safe.

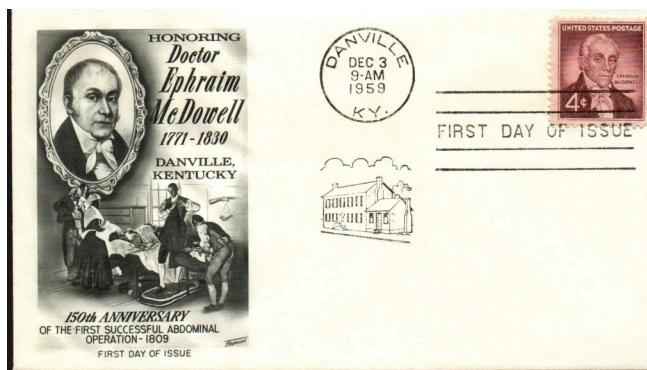


Fig. 48 Ephraim McDowell
USA 1959



Fig. 49 Mandrake
Austria 1986



Fig. 50 Opium poppies
Pakistan 1987

From the Renaissance to the Nineteenth Century

Leonardo da Vinci (1452-1519) is said to have contributed to a better understanding of the genitourinary system by his anatomical studies and drawings from autopsies, which he had to perform in great secret to avoid the punishments of that time (Fig. 51). His anatomical drawings, preserved in

contemporary anatomy when Galen and Mundinus de'Luzzi were the accepted authorities. Yet, da Vinci repeats some of their mistakes. So he puts erroneously the right kidney higher than the left one. Curiously, he evaluated the ureter as a simple tube with the urine flowing through it, influenced only by gravity and by those laws that influence the flow of liquids. He opposed the Middle Ages belief that air under pressure produced the hardness of the penis in erection by stating that an abundance of arterial blood makes the penis rigid. He even designed a device for determining the degree of erection.

Michelangelo Buonarroti (1475-1564). His special interest in anatomy and kidney function has been ascribed to his own urinary stone disease (Fig. 52). The artist was diagnosed and treated for urolithiasis by the Paduan physician and anatomist Colombo in 1549. Later in life Michelangelo had gouty arthritis, indicating the likelihood of uric acid stones. This is also reflected in his personal communications in 1549 regarding the special water he was drinking to dissolve the calculi.

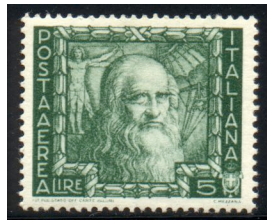


Fig. 51 Leonardo da Vinci
Italy 1938



Fig. 52 Michelangelo
Bulgaria 1975

Girolamo Fracastoro (1478-1553). In his poem *Syphilis sive morbus gallicus*, published in Verona in 1530, the mythical shepherd Syphilus blasphemes the sun god Apollo, for which he is punished with dreadful ulcerations and nightly pain in his extremities (Fig. 53). The poem epitomized the contemporary knowledge of syphilis. Fracastoro is awarded to have invented the term 'syphilis' with his poem, but this term seems to have been common in the environs of Verona at that time, and therefore the name Syphilus was probably called after the disease and not vice versa.



Fig. 53 Girolamo Fracastoro
Italy 1955



Fig. 54 Rabelais
France 1950



Fig. 55 Laguna
Spain 1967

François Rabelais (c. 1483-1553), monk, physician and satirist, was probably the first to use the term 'pisse-chaude' to indicate blennorrhagia (Fig. 54).

Andrés Laguna de Segovia (1490-1550) anatomist and surgeon, physician

excising vesical 'caruncles' in the bladder neck (Fig. 55). In his booklet *Methodus cognoscendi extirpandique excrescentes in vesicae collo carunculas* (Rome, 1551), Laguna clearly summarizes all current ideas of the so-called "carunculae" and their treatment.

Charles V (1500-1558), the Holy Roman emperor, who had micturition difficulties, applied probes to himself for urethral dilation, centuries ahead of modern-day self-catheterization (Fig. 56). When it became known that there existed a new remedy to treat narrowing of the urethra and "fleshy growths" with wax shafts containing caustic material, he was one of the firsts to apply it to himself.



Fig. 56. Charles V
Belgium 1941

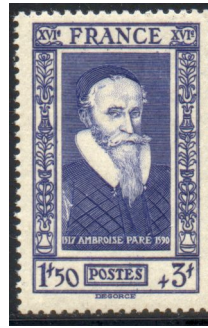


Fig. 57 Ambroise Paré
France 1943

Ambroise Paré (1510-1590), a barber's apprentice with a scanty education, who qualified as a master barber-surgeon in 1536, was appointed as an army surgeon to the French Army (Fig. 57). He was so interested in anatomy that he kept an embalmed body in his house to study before performing operations. He introduced new concepts not only in the treatment of gunshot wounds, but also in the treatment of hydrocele and urethral strictures. Paré maintained that 'carnosities' (caruncles), a result of 'pisse-chaude' or strangury, are the cause of obstruction to the passage of catheters through the urethra. He designed special leaden sounds for excoriating the carnosities. His operation for urethral stenosis is the same as performed and described by Heliodorus (1st century AD), but Paré had probably reinvented it, since he did know neither Greek, nor Latin. Paré was not worried about hemorrhage which "helps to shorten the cure ... for the material cause of carnosities is superfluous blood." Significantly, though Paré did not practice lithotomy himself, he describes the technique. Of interest are the unusual illustrations in his *Opera omnia* showing the position of the patient to be cut for the stone and ingenious tools used for this purpose. In this treatise is also depicted the earliest recorded impotence device (1565).

Bartolomeo Eustachi (c. 1510-1574), Professor of Anatomy at Rome, discovered the suprarenal glands and demonstrated that the right kidney was positioned lower than the left one (Fig. 58). In his *Opuscula anatomica*, he described the vascular tree of the kidney, the uriniferous tubules, the papillae with their urinary pores, and the funnel-shaped opening of the ureter. He was the first to suppose that urine originated from arterial and not from venous blood.



Fig. 58 Bartolomeo Eustachi

Stamp: Congo 1978 Portrait cancel: Italy 1974

Andreas Vesalius (1514-1564) revolutionized not only the science of anatomy, but also how it was taught (Fig. 59). Throughout his encyclopedic work on the structure and workings of the human body, Vesalius provided a fuller and more detailed description of human anatomy than most of his predecessors (Fig. 60). In his *De humani corporis fabrica libri septem*, he defied tradition and gave a correct description of the structure of the kidney, contradicting Galen and ridiculing the description of the famous ‘filter kidney’ consisting of two chambers separated by a filter membrane. Nevertheless, Vesalius repeated many of Galen's mistakes (e. g. he described and illustrated erroneously the right kidney in a higher position than the left one) and agreed without reserve to Galen's conception on physiology, that disease occurred as a consequence of an imbalance of the four humors (blood, phlegm, black bile and yellow bile). Even more epochal than his criticism of Galen and other medieval authorities was Vesalius' assertion that the dissection of cadavers must be performed by the physician himself. With the publication of his anatomical treatise, a storm of anger was hurled at Vesalius by Galenic followers. Jacques Dubois Sylvius, his former teacher, asked Vesalius to renounce his heretical utterances and to confess his mistakes in departing from the footsteps of Galen. When Vesalius refused, Sylvius called him a madman and a two-legged ass. Vesalius decided to end his days as an anatomist and received the position of physician at the imperial household.

Fig. 59 Vesalius
Belgium 1942Fig. 60 De humani corporis fabrica
Belgium 1993

Leonardo Botallo (c. 1519-1588), in 1564, published in Paris the first illustration of a horseshoe kidney with a commentary (Fig. 61). He was a relentless opponent of those who maintained the liver to be the origin and the centre of syphilis (and therefore prescribed abundant purging as main cure).



Fig. 61 Leonardo Botallo
Italy 1954

Caspar Bauhin (1560-1624), in his many works on anatomy, described the structure of the urogenital apparatus, mostly copying Eustachi's plates and even his captions without quoting the author (Fig. 62). He printed only one plate of his own: the vascular skeleton of a kidney, which he obtained by scarification and which is more realistic than Eustachi's one. Bauhin reports on double ureters draining the upper and lower portions of an elongated right kidney, on a left ectopic kidney situated in the pelvis, and a bladder diverticulum "six times as large as the bladder." He healed an anuric patient by extracting two stones through a lumbar incision.



Fig. 62 Caspar Bauhin
Switzerland 1983

Wilhelm Fabry (1560-1634) noted that sufferers from gout were liable to develop calculi (Fig. 41). He reported on patients who were said to have passed aniseeds in the urine and on an enormous tumor of the penis for which surgery was undertaken. He used Paré's bullet-forceps to extract urethral calculi and he himself invented a forceps for removing calculi from the urethra.

William Harvey (1578-1657) described a method of treating cancer of the testicle by ligation of the spermatic cord. In his days, he was probably better known for this procedure than for the discovery of blood circulation (Fig. 63).



Fig. 63 William Harvey
Soviet Union 1978

Nicolaas Pieterszoon Tulp (1593-1674), Lecturer of Anatomy at the University of Amsterdam, for the first time used the term 'spina bifida' (that causes neurogenic dysfunction of the lower urinary tract). He recorded cases of hypospadias referred as 'coles sine urethra' (penis without urethra) and, in 1652, described as 'coles incurvatus' (bent penis) the condition later known as 'Peyronie's disease'. He quoted the case of a female patient who died after anuria lasting eighteen days; at autopsy, both ureters were completely blocked by calculi. Rembrandt (1632) showed his likeness on the painting 'The Anatomical Lesson of Professor Nicolaas Tulp' (Fig. 42). The corpse is that of the villain Aris Kindt hanged for armed robbery.

Franciscus de le Bœe [Sylvius] (1614-1772) studied the problems of urine retention on which he wrote the treatise *De ischuria* (1671), and of the secretion of urine (Fig. 64). He devoted himself also to uroscopy and added the sound of urination to the traditional features to be observed in urine. "Differences in sound occur in passing urine. This may be a marked sound, as free froth forms when urine is serous, that is to say, watery and salty. At other times, on the contrary, urine falls silently, as does oil, if it contains a marked proportion of oleaginous substances."



Fig. 64 Sylvius
Netherlands 1937

Thomas Sydenham (1624-1689), who suffered from renal stones, described the clinical features of gout, especially the acute gouty attack (Fig. 65).

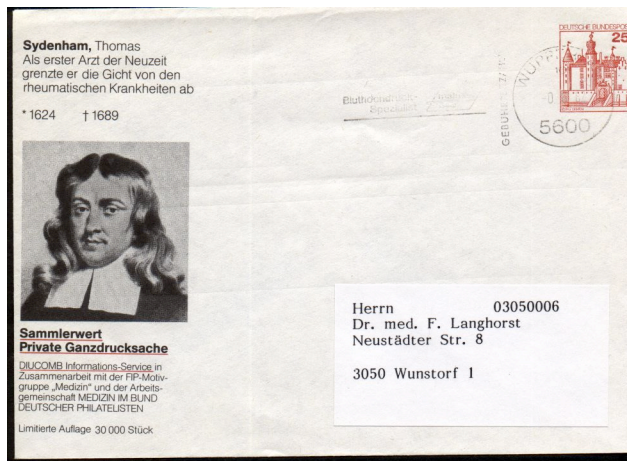


Fig. 65 Thomas Sydenham
F. R. Germany 1982

Marcello Malpighi (1628-1694), the founder of microscopical anatomy, discovered the renal glomeruli ('Malpighian corpuscles') by injecting a solution of Indian ink and alcohol into the renal artery (Fig. 66). He described this discovery in his work *De renibus* published in Bologna in 1666 as one of the four treatises *De viscerum structura*. It is worth mentioning that the 'corpuscules' were to him glandular follicles embraced by a network of arterio-venous capillaries, an idea that was rightly criticized by Frederick Ruysch. Although Malpighi's ideas on the secretion of urine were only partly correct, he realized that the kidney was more than a filter and that one of its functions was the alteration of the blood.

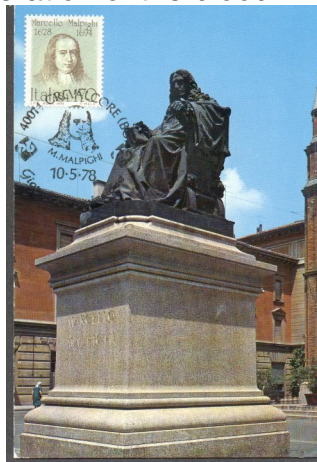


Fig. 66 Marcello Malpighi
Italy 1978

Antoni van Leeuwenhoek (1632-1723). With his rudimentary microscope he discovered spermatozoa (that have been observed for the first time by his disciple L. Hamm). He informed the Royal Society of his discovery in November 1677, but its importance was understood only two centuries later, when the role of spermatozoa in fecundation was discovered (Fig. 67).



Fredrik Ruysch (1638-1731), Professor of Anatomy at Leyden and Amsterdam, is notable for his method of injecting the vessels. The recipe for the material used by Ruysch has remained a secret. In his works (*Tesaurus anatomicus; Observationum anatomo-chirurgicarum centuria*) he gave many descriptions of the genitourinary apparatus and anomalies of its organs (the first illustration of a polycystic kidney; double bladder, etc.). He reported on a rare case of human infestation by the giant kidney worm, a large parasitic nematode (15 to 20 cm long) that can cause considerable damage and commonly affects the horse, dog, mink and other mammals. He criticized Malpighi on the 'corpuscles' and the secretion of urine and maintained correctly that the renal glomeruli discovered by Malpighi are not glands with particular ducts, but a ball of capillary blood vessels. Ruysch is honored on stamp issued by Hungary in 1966 showing the plant named after him *Dracocephalum ruyschiana* (Fig. 68).



Fig. 68 Dracoceph. ruyschiana
Hungary 1966

Sir Isaac Newton (1642-1727), in 1687, formulated the law of 'action and reaction', a principle employed by the lithoclast based on momentum theorem derived from this law (Fig. 69).

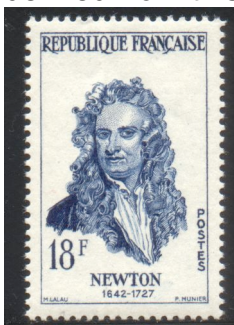


Fig. 69 Isaac Newton
France 1957

Antonio Maria Valsalva (1666-1723), Professor of Anatomy at Bologna, recommended suprapubic drainage of the bladder by means of needles used in the treatment of edema, as a last resort in cases of bladder stones (Fig. 70). At that time, the suprapubic approach had been rarely used, since it was thought that the dangers of suprapubic lithotomy would apply also to suprapubic puncture of the bladder.



Fig. 70 Antonio Maria Valsalva
Italy 1973

Hermann Boerhaave (1668-1738), who taught for fifty years in Leyden, emphasized the importance of practical training in medicine, clinical observation of patients and measurement of body temperature (Fig. 71). He described erosions of the urethral mucosa and the localization of infection in the glands of Littre in cases of venereal diseases.



Fig. 71 Boerhaave
Netherlands 1938

François Gigot de la Peyronie (1678-1747), in 1731, founded the Academic Society of Surgery (which became the Royal Academy of Surgery in 1748), sealing the fate of the barbers who, after 1743, were forbidden to practice surgery (Fig. 72, 73). In 1753, in a paper on 'Some obstacles preventing the normal ejaculation of semen', he fully described the condition known today under his eponymous name. It is worth mentioning that 'Peyronie's disease' had been already observed and described five centuries before by Guilielmus de Saliceto (who called it 'nodus in virga' and also suggested a suitable surgical operation), by Gabriele Fallopio in 1561, by Giulio Cesare Aranzi in 1579 and by Nicolas Tulp in 1652.



Giovanni Battista Morgagni (1682-1771) first described the testicular and epididymal appendages, and demonstrated the significance of prostatic hyperplasia (Fig. 74). In 1717, he first described posterior urethral valves in a 50-year old patient in whom the autopsy revealed an irregular urethra. At the age of almost 80, based on case studies, Morgagni produced his famous work *De sedibus et causis morborum per anatomen indagatis*. His work represented the beginning of the science of pathology. He made a clear distinction between urethral stenosis, prostatic hypertrophy and abscesses of the prostate; he classified the tumors of the bladder and clarified the causes of retention of urine and dysuria. In *Book III* Morgagni mentioned the compensatory hypertrophy of single kidneys and gave an excellent description of a number of renal disorders including obstructive nephropathy. He reviewed many cases of foreign bodies in the bladder, some acting as the nuclei of stones, and he discussed the frequent finding of needles in the female bladder, refusing to believe the usual explanation that the object had been swallowed.



Fig. 74 Giovanni Battista Morgagni
Italy 1971

Lorenz Heister (1683-1758), an adherent to the apparatus minor, wrote at length about catheterization and puncture of the bladder (Fig. 75). Though by the end of the 16th century the apparatus major had almost superseded the lesser operation for bladder stones, Heister still advocated the older method in 1745. He used a suprapubic trocar that he usually left in place for several days or even permanently in old men suffering from urinary retention. He also gave early descriptions about reconstructive treatment of hypospadias, external perineal compression and a penile clamp for urinary incontinence. In 1750, after observing the spontaneous healing of a kidney injury, Heister concluded that a surgical incision into the kidney wouldn't have a fatal outcome, a deduction ahead of the times.

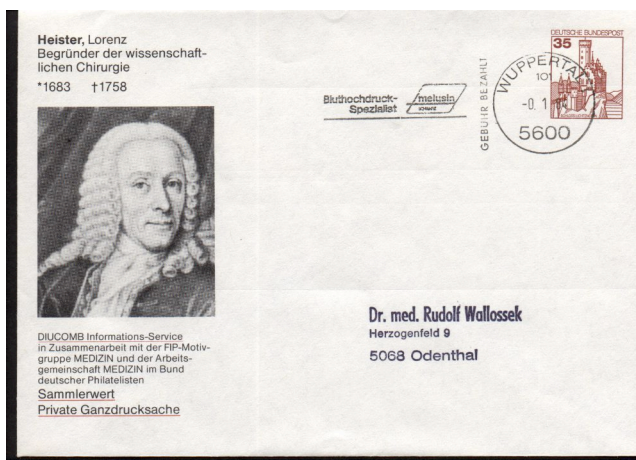


Fig. 75 Lorenz Heister
F.R. Germany 1984

The Dutch physician **Gerhard Freiherr van Swieten (1700-1772)**, appointed as court physician and knighted by Queen Maria Theresa of Austria, used a corrosive sublimate solution (*liquor Swietenii*) in the treatment of syphilis (Fig. 76).



Fig. 76 van Swieten
Netherlands 1939

John Wesley (1703-1791), a clergyman who worked as a missionary among the colonists and Native Americans of Georgia, wrote a most popular book entitled *An Easy and Natural Method of Curing Most Diseases* (Fig. 77). The book has been a long-term bestseller and has gone into over 50 editions. It contained instructions for making more than 900 "cheap, easy to use and very safe" remedies and the direction for their taking. An example of those remedies: A pint of warm water to be drunk nightly for the prevention of kidney stones.

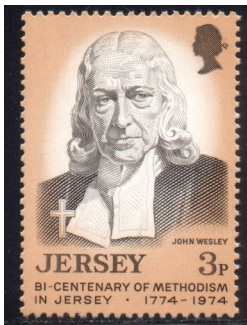


Fig. 77 John Wesley
Jersey 1974

Benjamin Franklin (1706-1790), in 1752, conceived a flexible silver catheter for his older brother John who suffered from multiple bladder stones (Fig. 78). The catheter was supposed to be covered with a "fine gut" or rubbed with tallow to fill the joints. The German Urological Society commissioned a silversmith to replicate the catheter in detail from a letter Benjamin Franklin

Benjamin Franklin's letter were donated to the AUA during the History Forum at the AUA Annual Meeting in San Francisco, 1994.



Fig. 78 Benjamin Franklin
USA 1938

Albrecht von Haller (1708-1777) was the founder of modern physiology, chiefly with the theory of sensibility of the nerves and irritability of the muscles (Fig. 79). He discovered that the contraction of the abdominal muscles plays a fundamental part in micturition. Von Haller gave a perfect description of the deferent ducts, ampullae and seminal vesicles, but didn't clarify whether they were glands or simple receptacles. He described the 'rete testis' and reported on anomalies of the bladder (double bladder with one ureter opening into each side, or both into the one cavity) and bladder diverticula. He discovered that the testicle forms in the abdomen and reaches the scrotum by a slow migration. Referring to infertility, Haller stated: "... no man can have sexual intercourse without testes. Further on, infertility is a result of a malfunctioning male penis. Anyway, sexual intercourse requires a perfect instrument, but to father a child a little bit more is needed."



Fig. 79 von Haller
Switzerland 1958



Fig. 80 Spallanzani
Italy 1979

Lazzaro Spallanzani (1729-1799), Italian priest, physiologist and natural scientist, convincingly disproved the notion of spontaneous generation (creation of life from inanimate matter). He investigated the male contribution to procreation (Fig. 80). Although Leeuwenhoek had first seen the spermatozoa, their function was not understood until some 30 years after the formulation of the cell theory in 1839. Using amphibians, Spallanzani showed that actual contact between egg and semen is essential for the development of a new animal and that filtered semen becomes less and less effective as filtration becomes more and more complete. He noted that the residue on the filter paper retained all its original power if it were immediately added to the water containing the eggs. Spallanzani concluded that the solid parts of the secretion, proteinaceous and fatty substances were essential for the fecundation, regarding the spermatozoa as inessential parasites. Despite this error, Spallanzani performed some of the first successful artificial insemination

Luigi Galvani (1737-1798). In 1767, he published a little work in which he describes and illustrates both the kidneys and the ureters of birds; he thought nobody had ever observed before him (Fig. 81). In fact, Marcello Malpighi and Antoine Ferrein had already observed the structures described by Galvani, but surely he didn't know their works.



Fig. 81 Luigi Galvani
Italy 1991



Fig. 82 Hahnemann
F.R. Germany 1955

Samuel Hahnemann (1755-1843), who formulated homeopathy's basic principles in the late 1700s, wrote about conservative therapy of urinary incontinence (Fig. 82). He recommended the use of Pulsatilla or Thuya for genitourinary catarrh, Helleborus niger for nephritis and Viola tricolor for inflammation of the male genital organs.

Christoph Wilhelm Hufeland (1762-1836), in his book *Enchiridion medicum*, gives a detailed description of three different forms of urinary incontinence and the respective therapy (Fig. 83).

Dominique Larrey (1766-1842), surgeon-in-chief, reported cases of hematuria among French soldiers in the Napoleonic armies in Egypt (probably a result of *Schistosoma* infestation). He recorded that atrophy of the testicles was frequently observed among the soldiers, and sarcocele (fleshy swelling of the testicle) among the Egyptians. As an army surgeon, he performed the usual urological operations of that time (cutting for the stone including *sectio alta*, surgery for injuries of the bladder, urethra and genitalia) and elaborated new operating methods for hydrocele, sarcocele, and bladder tamponade (Fig. 84).



Fig. 83 Chr. Wilhelm Hufeland
D. R. Germany 1982

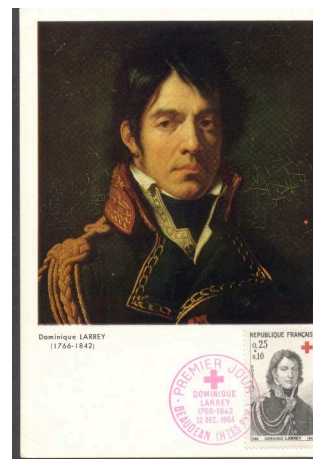


Fig. 84 Dominique Larrey
France 1964

François Joseph Victor Broussais (1772-1838) advanced the theory that all diseases, including the venereal, were due to inflammation of the digestive tract and this, in turn, were best treated by frequent bleeding and application of leeches (Fig. 85).



Fig. 85 Broussais
France 1972

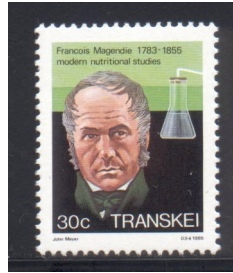


Fig. 86 Magendie
Transkei 1985



Fig. 87 William Prout
Romania 2000

Guillome Dupuytren (1777-1835) practiced urethral dilatation with indwelling bougies, and cured varicocele by a particular technique (Fig. 44, 45). His book *L'operation de la pierre*, written in 1812, contains the first topographic-anatomical description of the genitourinary apparatus. In 1831, he first described the scarring of the palmar fascia ('Dupuytren's contracture') that is frequently associated with Peyronie's disease.

François Magendie (1783-1855) studied the problem of dissolution of bladder stones and, in 1918, described his method in *Recherches sur les causes, les symptômes et le traitement de la gravelle* (Fig. 86).

William Prout (1785-1850), English chemist and physician, in 1821, published 'An inquiry into the nature and treatment of gravel, calculus and other diseases connected with a deranged operation of the urinary organs' (Fig. 87). He also proved that urinary sugar differed from cane sugar.

Richard Bright (1789-1858), assistant doctor to the Guy's Hospital in London, distinguished renal from cardiac dropsy (Fig. 88). In 1827, he published his *Reports on Medical Cases*, in which he gave a perfect description of the association between renal disease, dropsy and albuminuria, a clear definition of the disease called 'Bright's disease' after him. His researches first noted the association of hypertension with renal disease and laid the foundation for the study of nephritis.

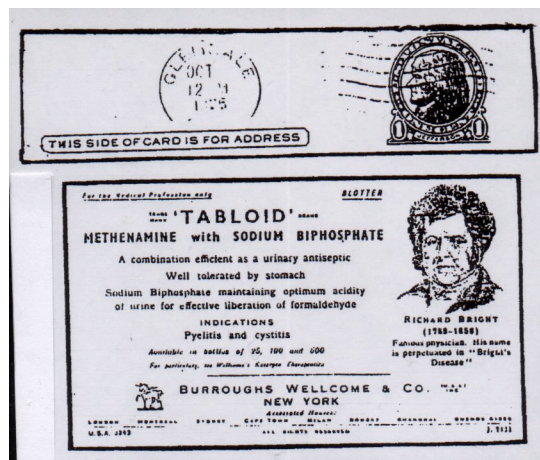


Fig. 88 Richard Bright
USA 1875

Johann Friedrich Dieffenbach (1792-1847). Besides his contributions to general surgery, he devoted himself to urological surgery, especially to plastic operations on the praeputium, the urethra and the skin of the scrotum (Fig.

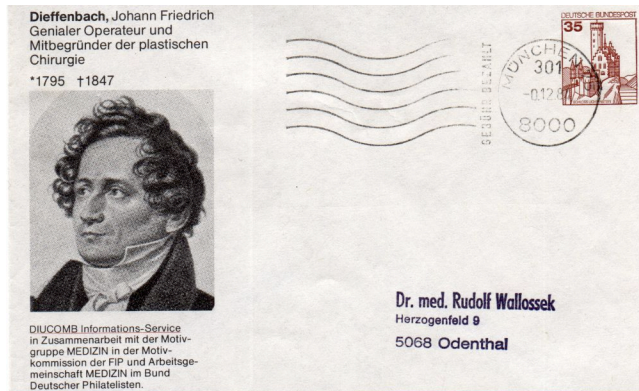


Fig. 89 Johann Friedrich Dieffenbach
F. R. Germany 1985

Thomas A. Addison (1793-1860) discovered the primary adrenal insufficiency, the so-called 'Addison's disease', which he described for the first time in an article published on March 15, 1849 in the *Medical Gazette* (Fig. 90).

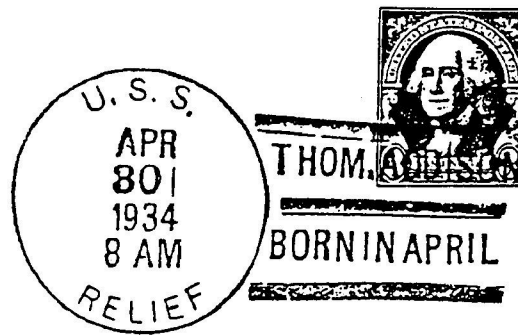


Fig. 90. Thomas A. Addison
USA 1934

From the Nineteenth Century to Modern Times

Johannes Peter Müller (1801-1851), considered as the founder of modern physiology, in his book *On the Internal Structure of the Kidneys*, gives the results of observations on kidneys of numberless animal species and their embryological development (Fig. 91). To him the 'Malpighian corpuscles' have no connection with the uriniferous tubules, a mistake that has been corrected by William Bowman.

Müller described the paramesonephric duct, the so-called müllerian duct. At about the eighth week of gestation, the medial segments of the müllerian ducts at the level of the bladder fuse to form the utero-vaginal primordium, the müllerian vagina.



Fig. 91 Johannes Peter Müller
F. R. Germany 1982



Fig. 92 v. Rokitansky
Austria 1954

Karl Freiherr von Rokitansky (1804-1878), considered as the founder of the anatomico-pathological school of Vienna, who in a period of 40 years personally performed more than 30,000 autopsies, described the amyloid kidney, a lardaceous degeneration of the kidney, secondary to chronic suppurative diseases, especially of the bones. He made important contributions to the research on hydronephrosis (that he called '*hydrops renalis*'), on exstrophy of the bladder, diverticula of the bladder, and on renal tuberculosis (Fig. 92).

Józef Dietl (1804-1878) of Cracow, in 1864, described the sudden severe attacks of pain, nausea and vomiting, and followed, at times, by polyuria ('Dietl's crisis'), ascribing them to partial turning of the floating kidney upon its pedicle (Fig. 93). In 1857, he founded a Balneology Commission in Cracow, and therefore Dietl is considered to be the father of balneology in Poland.

Auguste Nélaton (1807-1873) designed the flexible rubber catheter that spared the patient the distress of the classic 'tour de maître' with rigid instruments (Fig. 94). He modified the technique of bilateral lithotomy and also devised an aspirator for evacuation of stone fragments after lithotripsy. About 1850, he used an endoscope without much success, according to his son, Charles. Nélaton invented and performed many operations of cutaneous plastic surgery, among which the most famous is the reconstruction of the urethra with longitudinal strips of skin from the upper part of the base of the penis and from the abdomen in cases of epispadias.



Fig. 93 Józef Dietl
Poland 1959



Fig. 94 Auguste Nélaton
France 1975

Friedrich Gustav Jacob Henle (1809-1885), German anatomist and pathologist, described the U-shaped portion of the nephron, known as Henle's ansa or nephronic loop (Fig. 95). He discovered the external sphincter of the urinary bladder, and was the first to demonstrate that the urinary casts

Joseph Hyrtl (1810-1894) established the existence of the 'bloodless line' (a relatively avascular plane 5 mm posterior to the median line of the kidney) used in the incision for anatomic nephrolithotomy (Fig. 96).



Fig. 95 Friedrich Gustav Jakob Henle
Germany 1999

Fig. 96 Joseph Hyrtl
Austria 1937

Bernhard von Langenbeck (1810-1887) performed closure of the bladder and 30 suprapubic cystotomies, though with a high mortality rate (Fig. 97). In 1876, he excised part of a carcinomatous prostate through a perineal approach. He operated successfully a testicular neoplasm and suggested massages to cure cases of undescended testicle.

Nikolai I. Pirogov (1810-1881) was the founder of battlefield urology (Fig. 98). He opposed the introduction of instruments into the urethra just after an acute injury and stipulated bypassing the urethra, a method of treatment that is still in use today. Pirogov was the first in Europe to employ ether anesthesia, also being the first to practice rectal etherization.



Fig. 97 Bernhard von Langenbeck
F. R. Germany 1974



Fig. 98 N. I. Pirogov
Soviet Union 1960

The introduction of ether as an anesthetic in 1842 by **Crawford W. Long (1815-1878)**, followed by **William T. G. Morton (1819-1868)** in 1846, put an end to the excruciating pain associated with lithotomy (Fig. 99, 100).

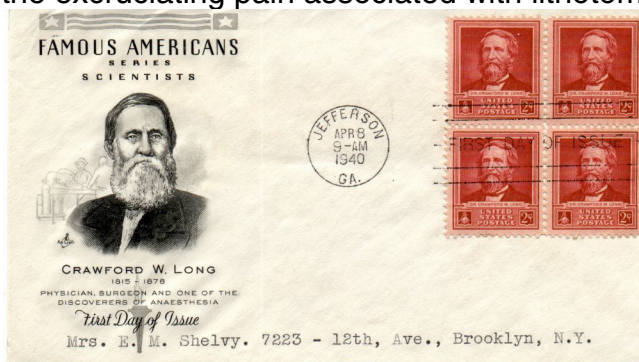


Fig. 99 Crawford W. Long
USA 1940

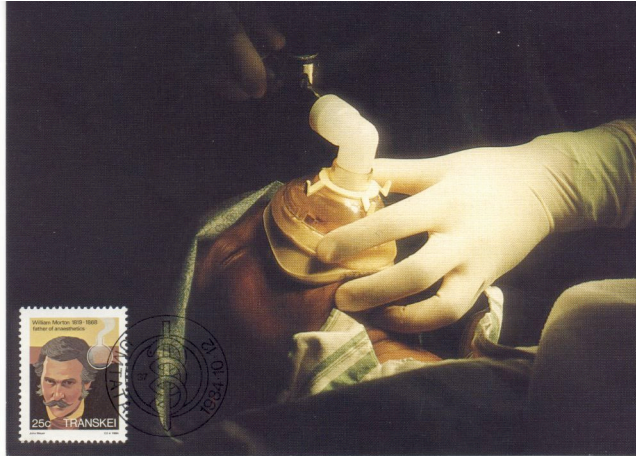


Fig. 100 William T. G. Morton
Transkei 1984

Carl Zeiss (1816-1888) and **Ernst Abbe (1840-1905)** have made major contributions in the development of the operating microscope used for microsurgery: vasectomy reversal, testicular autotransplantation, and penile reconstruction (Fig. 101, 102).



Fig. 101 Carl Zeiss
D. R. Germany, 1956



Fig. 102 Ernst Abbe
D. R. Germany 1989

Henry Bigelow (1818-1890) brought lithotripsy to the peak of its development (Fig. 103). He attempted to crush and remove bladder stones of any size and degree of hardness at a single sitting and named this procedure 'litholapaxy' (1878). Of prime importance to the success of his method was his evacuating apparatus, more powerful than previous aspirators.

Édouard Brown-Séquard (1818-1894), in 1889, announced that he had devised a rejuvenating therapy for the body and mind by injecting himself with a liquid extract derived from the testicles of dogs and guinea pigs (Fig. 104). The injections could not have rejuvenated the 72-year old professor, as he declared, but for his insight he might be considered a founder of early organotherapy and modern endocrinology.

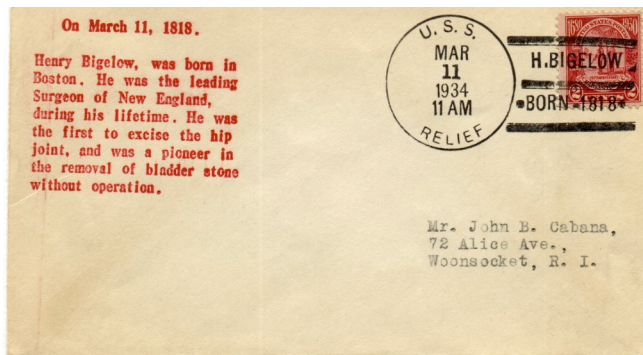


Fig. 103 Henry Bigelow
USA 1934

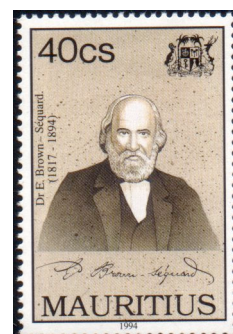


Fig.104 Brown-Séquard
Mauritius 1994

Rudolf Virchow (1821-1902). He was the first to observe and describe a bladder cancer found during the autopsy of a man affected by bilharziosis, and to ascertain that malignant tumors were more frequent in cases of undescended testis (Fig. 105). In 1863, he described two types of tissue in hyperplastic prostates as 'adenoma' and 'myoma' but remained in doubt as to whether they were true neoplasia. In 1869, he maintained that retention cysts caused by atresia of papillary ducts in fetal life are at the origin of the polycystic kidney.

Louis Pasteur (1822-1895), by stating the germ theory of diseases, opposed the natural production theory of organisms (Fig. 106). His discovery that most infectious diseases are caused by germs is one of the most important in medical history. At a meeting of the Medical Academy, Pasteur said that if he were a surgeon, he would wash his hands very carefully before each operation and the instruments would be sterilized. The medical society did not accept the aseptic method advocated by a chemist and it took about ten years before it was clinically applied.



Fig. 105 Rudolf Virchow
Berlin West 1952

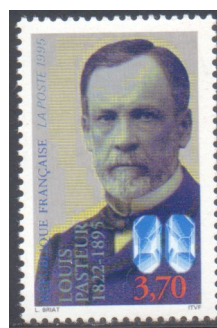


Fig. 106 Louis Pasteur
France 1995

Johann Friedrich August von Esmerch (1823-1908) of Kiel, who devised a set for chloroform anesthesia, in November 1869 excised a large hydronephrotic kidney under the impression that it was an ovarian cyst. The patient developed pulmonary edema and died two days later (Fig. 107).

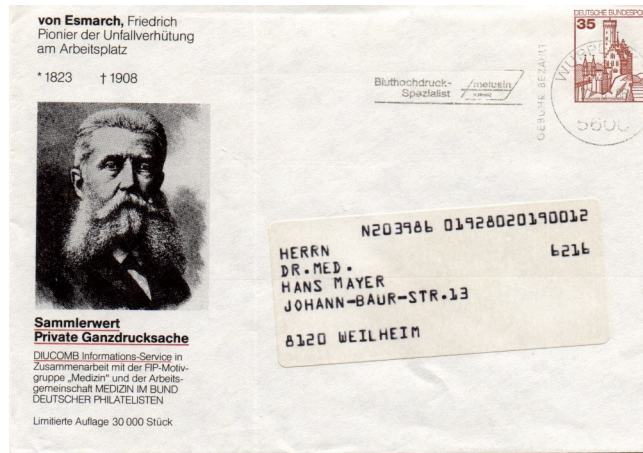


Fig. 107 Johann Friedrich August von Esmarch
F. R. Germany 1983

Gustav Simon (1824-1876), in 1869, performed the first deliberate nephrectomy on a 46-year-old woman for two persistent urinary fistulas after a partial hysterectomy (Fig. 108). The operation was performed under chloroform anesthesia and lasted 40 minutes. The patient made a slow but complete recovery, was cured of the urinary fistulas and returned to her work in six months. Largely forgotten is that one year later, in 1870, Simon also performed the first deliberate partial nephrectomy for hydronephrosis.

In August 1871, Simon performed his second planned nephrectomy, removing a kidney for calculous disease. The patient, a 30-year old woman residing in Savannah, had been suffering for 12 years from pain and disabilities caused by her condition. She crossed the Atlantic to put herself under the care of Simon. The patient did well for three weeks with a good urinary output, no fever and little pain. One day, as he was changing the dressing, Simon explored the wound with his unwashed fingers, which may well have just probed the septic wound of another patient. Within a few hours the patient had chills, high fever and the signs and symptoms of bacteremia. She died of septicemia after ten days. Simon never did another nephrectomy.

In the early 1870s, Simon performed the first blind ureteral catheterization to obtain separate urines. He dilated the female urethra, and then inserted his index finger into the bladder to guide a catheter up the ureter. Incontinence following this procedure prevented its general acceptance.



Fig. 108 Gustav Simon
Germany 1999



Fig. 109 Wilhelm Griesinger
D. R. Germany 1960

Wilhelm Griesinger (1817-1868), in 1850, was appointed by the Vice-Roy Abbas I (to whom he became personal physician) as Chief of the Sanitary

and zoologist **Theodor Bilharz (1825-1862)**, who became his assistant in the Hospital of Quasr Al-Aini in Cairo (Fig. 110). During the first seventeen months of his office, Bilharz performed 400 autopsies, with the special aim of searching for tropical and subtropical intestinal parasites. Right from the beginning, he had an amazing success: from May 1851 until June 1853, Bilharz was able to report to his teacher, Professor Theodor von Siebold in Breslau, in a series of nine letters, his discovery in branches of the portal vein of *Distomum haematobium*, which was later called *Bilharzia haematobia*. For a while Bilharz took this worm to be a cercaria, but he soon recognized that it was a trematode. In December 1851, he was already able to furnish the details of the zoological aspect of the worm, and in the course of the following year he found it in the outgrowths of the bladder, the ureter, the vagina and the rectum. This last discovery led him to suppose for some time that he had found the cause of dysentery. He observed the eggs, and the development and exit of the aqueous larvae, and formed a general idea of the mode of infection. He also recognized the trematode as the cause of the frequent formation of renal and vesical calculi in Egypt, having been able to show the eggs of the worm in the center of small calculi. He also found calcified eggs in the livers of patients suffering from hardening in this organ. The enigma of 'Egyptian hematuria' (known today as schistosomiasis) was thus solved. Sir Marc Armand Ruffer, in 1910, was able to find calcified eggs of the parasite in an Egyptian mummy of the 12th dynasty (around 2000 BC) and, in the same year, in a mummy of the 20th dynasty.



Fig. 110 Th. Bilharz
Egypt 1962



Fig. 111 Jean-Antoine Villemin
France 1962

Dr. Griesinger left his post in Cairo in 1852, but soon published the results of his assistant with other observations on the diseases of Egypt. His teacher, Theodor von Siebold, published about the discovery of *Distomum haematobium* by Bilharz in 1953 and 1956.

In 1855, Bilharz was appointed Professor of Internal Medicine at the University of Cairo and, in 1857, he was at the same time put in charge of a course of descriptive anatomy. In 1862, he was attached to an expedition of Ernst Duke of Saxe-Coburg-Gotha in Abyssinia, from whence he returned seriously ill with typhoid, which caused his death in May 1862. Despite the importance of his discovery for Egypt, it soon fell into complete oblivion. When in 1873 the Italian P. Sonsino, Chief of the Khedivial Laboratories, presented the parasite to the doctors of the school at Quasr Al-Aini, it had the effect of a new discovery. And once again in 1884, the zoologist and physician Dr. Walter Innes Bey had the same experience. On the fifth of May 1937, at the initiative of Dr. Mohammad Khalil 'Abd al-Khalil Bey, Professor of Parasitology at the Faculty of Medicine in Cairo, a solemn dedication of a bust of Theodor Bilharz was held in the library of the Medical School. The Egyptian doctors thus rendered touching

homage to the memory of the young scholar, who has been dead for three-quarters of a century.

Jean-Antoine Villemin (1827-1892), French physician who coined the term 'antibiotic', in 1865 proved experimentally that tuberculosis is a contagious disease and maintained that it is passed on by a microbe, not yet detected at that time (Fig. 111). Extremely controversial for the moment, Villemin's assertion was confirmed in 1882, when Robert Koch isolated the tubercle bacillus.

Federico Rubio y Gali (1827-1902) founded the first center of surgical specialties, the Institute of Therapeutic Surgery in the Princess' Hospital in Madrid (Fig. 112). He was an excellent surgeon and had a preference for urological surgery. Rubio y Gali was the first Spanish surgeon to perform a nephrectomy. A new method of emasculation was one of his main contributions to the European urology.

Joseph Lister (1827-1912), the initiator of the antiseptic method in surgery (1867), experimented with urine in putrefaction and found that urine was normally sterile (Fig. 113). He concluded that if the skin around the orifice of the urethra was treated with an efficient antiseptic, the urine might be collected by catheterization perfectly uncontaminated. Following Lister, clean technique and antiseptic principles became standard practice, and urethral instrumentation thereby achieved another degree of safety.

When Lister's carbolic acid (phenyl alcohol) spray was introduced to try and sterilize operating theatres, it had an unusual side effect. The urine of surgeons and others present in the theatre was black. This was because, when the air around the operating table was regularly sprayed with carbolic acid, some of the phenol was inevitably inhaled and absorbed into the bodies of those present. The urine turned black when the phenol was excreted as the surgeons were suffering from carboluria.



Fig. 112 Rubio y Gali
Spain 2002



Fig 113 Joseph Lister
Benin 1983

Theodor Billroth (1829-1894) was the first to perform a percutaneous puncture for hydronephrosis (Fig. 114, 115). In 1867, Billroth performed a partial perineal prostatectomy for carcinoma. A tumor the size of a duck's egg was removed from the 30-year-old patient who died of recurrence fourteen months later. At a time when other surgeons still used the perineal approach for bladder surgery, he published in 1874 a case describing the suprapubic approach and removal of a large bladder tumor in a child. In 1885, he carried out a suprapubic partial prostatectomy. For detecting bladder stones, he attached a sounding board to a metal sound. He initiated the introduction of Bigelow's litholapaxy as a preferential treatment for vesical calculi. Billroth studied neurogenic disorders of the lower urinary tract for some of which he prescribed intermittent catheterization as it is still practiced today.



Fig. 114 Billroth
Austria 1937



Fig. 115 Theodor Billroth performing surgery in the Auditorium
Austria 1992

Félix Guyon (1831-1920), recognized as the father of modern urology, in 1896 founded the *Association Française d'Urologie*, and, in 1907, the *Association Internationale d'Urologie* (which became *Société Internationale d'Urologie*). He was its first President from 1907 to 1914 (Fig. 116). His contributions to urology in general and chiefly to urological surgery are numberless and exceptional, though he maintained that radical treatment of hypertrophy of the prostate "is not and will not be practicable." In 1883, he stated that bilateral vasoligation led to an atrophy of the prostate. Guyon, in 1881, first draw attention to the fact that the sudden development of a varicocele located on the left side may be a sign of kidney cancer. The "floating" feeling in palpation of the movable kidney, and the instillation of silver nitrate into the posterior urethra for the treatment of gonorrhea are known under his eponym. Guyon introduced the segmented collection of urine specimens for the differential diagnosis of hematuria, and the filling cystometry for the routine diagnosis of functional bladder disorders. In 1892, he performed a primary end-to-end suture of a ruptured urethra and advocated the advantages of this technique. In 1896, shortly after Roentgen's discovery of the properties of x-rays, Guyon discussed the possibility of stones being demonstrated by x-rays and noted that uric acid stones did not throw a shadow. He carried out trials with Koch's tuberculin, found it useless in the treatment of urinary tuberculosis and it was discarded.

Alfred Fournier (1832-1914) described the necrotizing fasciitis of the male genitalia ('Fournier's gangrene') and, in 1907, first practiced side-to-side anastomosis on a patient with a severed ureter (Fig. 117).

Manuel Dagnino (1834-1901), a versatile physician who practiced and taught surgery, ophthalmology and urology, was the founder of the Chiquinquira Hospital in Maracaibo, Venezuela (Fig. 118).

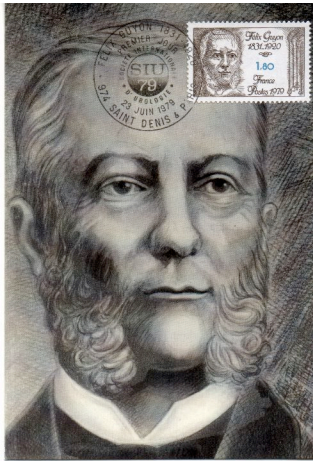


Fig. 116 Félix Guyon
France 1979



Fig. 117 Fournier
France 1946



Fig. 118 Manuel Dagnino
Venezuela 1966

Edwin Klebs (1834-1913), in 1870, reported the presence of microorganisms in the uriniferous tubules and recognized their etiologic significance in some cases of nephritis. Klebsiella, the organism causing urinary tract infection, named after the German-American pathologist, is mentioned on a Warsaw symposium cancel (Fig.119).

Ernst von Bergmann (1836-1907), in 1874, added a short transverse limb to Simon's incision for renal surgery (Fig. 120). Von Bergmann's excisional technique of the tunica vaginalis is most certain to result in permanent elimination of hydrocele. In 1889, he succeeded in removing a stone from the upper ureter in an anuric patient by introducing a forceps through a nephrotomy wound. He was considered one of the greatest surgeons of that time, but seems to have performed a nephrectomy with fatal result. Von Bergmann was one of the first supporters of aseptic methods and inaugurated the vapor sterilization of surgical instruments in 1866.



Fig. 119 Klebsiella
Poland 1967

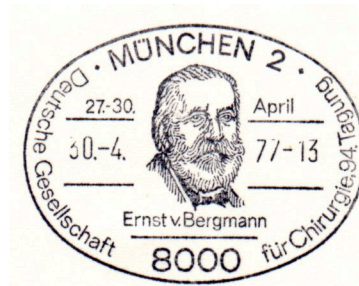


Fig.120 Ernst von Bergmann
F. R. Germany 1977

Wilhelm von Waldeyer-Hartz (1836-1921), Professor of Anatomy, first in Strasbourg, then in Berlin, discovered the fibromuscular structure that anchors firmly the ureter to the bladder (Fig. 121). He supported Charles Robin's theory that kidney cancer had its origin in proliferation of the epithelium of the renal tubules, with later malignant changes.

The Norwegian physician **Gerhard Hansen (1841-1912)**, in 1873, discovered the pathogenic agent of leprosy, which can cause specific nephropathy with consecutive renal failure (Fig. 122).

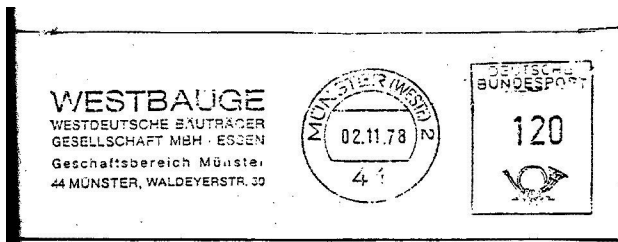


Fig. 121 Wilhelm von Waldeyer-Hartz
F. R. Germany 1978

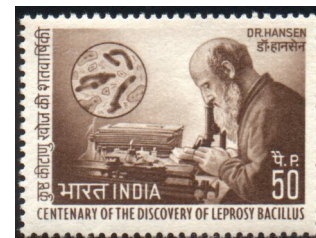


Fig. 122 Gerhard Hansen
India 1973

Theodor Kocher (1841-1917), in 1874, was among the last surgeons to remove a bladder tumor by the perineal lateral lithotomy approach (Fig. 123). In 1876 and again 1877, he performed the two first nephrectomies for carcinoma by an anterior midline transperitoneal route; both female patients died of peritonitis on the third day. In 1913, he suspended a mobile kidney by transfixing its lower pole with a strip of fascia lata and sewing the ends to the neighboring muscles. He made fundamental contributions to the solution of problems of ureterointestinal anastomosis after radical cystectomy and reconstructive operations of the bladder.

Vinzenz Czerny (1842-1916), in 1881, performed the first operation on a horseshoe kidney (Fig. 124). He exposed the enlarged right kidney of a 45-year old man with the intention of performing nephrectomy. The lower pole of the kidney extended medially and was firmly adherent to the inferior vena cava. Severe venous bleeding occurred as the kidney was being freed and could not be controlled. The operation was discontinued, but the patient died of blood loss before the wound was closed. The autopsy showed a horseshoe kidney, the right half of which was pyonephrotic containing many calculi. Czerny is credited with having performed for the first time a pyelotomy in 1880 and a deliberate partial nephrectomy in 1887. The patient was suffering from pain and hematuria following an injury to the loin some months previously. Between the middle and the upper thirds of the kidney, a transparent bluish area was found associated with a pulpy mass in the renal pelvis. The affected portion of the kidney was excised; the lesion was classified as an angiosarcoma. In 1888, Czerny performed at Heidelberg an almost radical prostatectomy for prostate cancer on a 47-year-old man, but the patient died nine months later.



Fig. 123 Kocher
Switzerland 1937



Fig. 124 Vinzenz Czerny
Germany 2000

Robert Koch (1843-1910), in 1882, isolated the bacterium tubercle bacillus (Fig. 125). His discovery revolutionized the diagnosis of urinary tuberculosis. In

not a cure for TB, but the skin reaction to it proved useful in the diagnosis of TB. For his investigations and discoveries in relation to tuberculosis, Koch was awarded the 1905 Nobel Prize in Medicine.

Edoardo Bassini (1844-1924) demonstrated by experiments on animals (1882) that sutures in the kidney substance were well tolerated and did not harm (Fig. 126). He then introduced the fixation of the floating kidney by capsular sutures, an important modification of Hahn's nephropexy. The results of Bassini's method of radical operation of the inguinal hernia, published in 1890, not only changed the way of hernia repair, but inguinal surgery in general.



Fig. 125 Robert Koch
Germany 1943



Fig. 126 Edoardo Bassini
Italy 1977

Friedrich Trendelenburg (1844-1924). At the end of the 19th century, the distension of the rectum by means of an inflatable bag that lifted the bladder forwards was of assistance when performing suprapubic cystotomy. Yet, some surgeons, including Trendelenburg and Fenwick, regarded it as unnecessary. Trendelenburg, who preferred a wide exposure of the bladder by a transverse incision, found that with the patient in the position known by his name the rectal bag was not needed (Fig. 127).



Bremen, Germany 2004

Camillo Golgi (1844-1926) was perhaps one of the earliest pioneers to apply maceration and microdissection techniques to renal tissue for renal imaging (Fig. 128).

Charles Louis Alphonse Laveran (1845-1922), in 1876, proved and maintained that cystic degeneration is always secondary to hydronephrosis or interstitial nephritis in adults, while in children it is due to tubular anomalies (Fig. 129). He was awarded the 1907 Nobel Prize in Medicine for his work on the role played by protozoa in causing diseases.

William Osler (1849-1919), an early mentor of Hugh Hampton Young, had suffered from urolithiasis and, during his lifetime, passed numerous stones (Fig. 130). In his Textbook *The Principles and Practice of Medicine*, he refers to a blue urine syndrome due to indicanuria and mentions a very rare form of human stones made up of indigo.

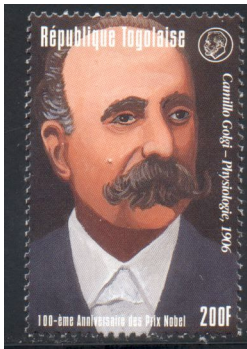


Fig. 128 Camillo Golgi
Togo 1995



Fig. 129 Ch. L. A. Laveran
Algeria 1953

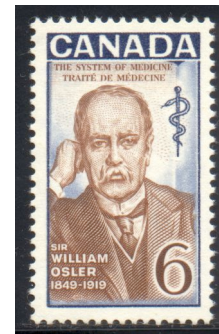


Fig. 130 William Osler
Canada 1969

Ludwig Ritter von Rydygier (1850-1920), Professor of Surgery at the University of Lemberg (Lviv) in 1897, took particular interest in plastic surgery of the ureter, perineal extraurethral prostatectomy and transperitoneal prostatectomy (Fig. 131).

William S. Halsted (1852-1922), on October 26, 1900, inserted a wax-tipped catheter through a nephrotomy, passing it from the renal pelvis into the ureter and down to the bladder (Fig. 132). When the catheter was withdrawn, scratch marks were observed on the wax tip. Further examination revealed a lower ureteral calculus that was removed vaginally.



Fig. 131 Ritter v. Rydygier
Poland 1989



Fig. 132 W. S. Halsted
Transkei 1985

In 1904, with the help of Halsted, Hugh Hampton Young planned and carried out radical perineal prostatectomy for carcinoma of the prostate. Two of Young's first four patients undergoing this procedure died, but he performed the next 128 operations with only one further fatality.

The German historian **Karl Sudhoff (1853-1938)**, reviewing the question whether syphilis originated in the New or the Old World, maintained that the

millennium BC or earlier and in the Old World continuously since Biblical times, often masquerading under other names, especially leprosy (Fig. 133).

Paul Ehrlich (1854-1915) who, in 1908, shared the Nobel Prize with Metchnikoff for their work on immunity, is probably best remembered as developing the first effective chemotherapeutic agent against the spirochete *Treponema pallidum* that causes syphilis (Fig. 134).



Fig. 133 Karl Sudhoff
D. R. Germany 1988

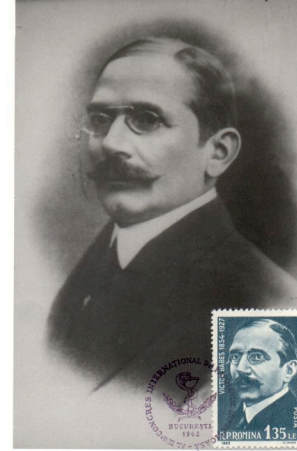


Fig. 134 Victor Babes
Romania 1982

He carried out this research with the Japanese bacteriologist **Sahachiro Hata (1873-1938)** at the Research Institute for Experimental Therapy in Frankfurt am Main, synthesizing a wide variety of compounds over a period of several years (Fig. 135). In 1910, they finally came up with arsphenamine, the 606th compound produced. It was patented as Salvarsan, Ehrlich's "magic bullet," that was used as an anti-luetic drug. The new drug required laborious preparation by the physician prior to use. At first it was given in large doses by intramuscular injection, but this method produced painful sloughs at the injection site. It was soon realized that intravenous use of the drug was more satisfactory, though still hazardous. The arsenical era of syphilis therapy lasted until the development of Penicillin in the 1940s. Ehrlich first applied the term 'chemotherapy' to systemic therapy for infectious diseases. Since 1910, when Ehrlich and Hata published the results of their work on the therapeutic effects of dyes, the number of effective agents for chemotherapy has increased dramatically (Fig. 136).

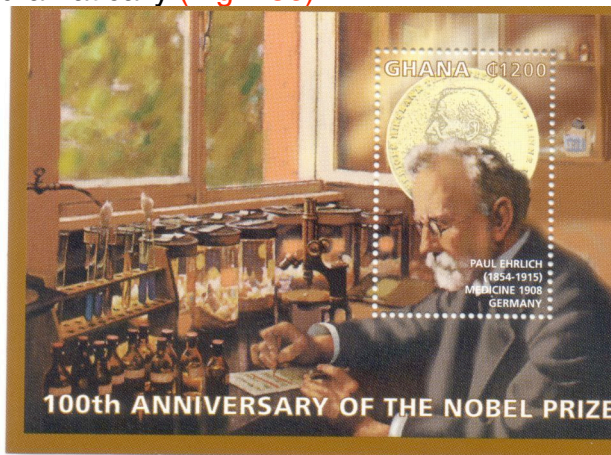


Fig. 135 Paul Ehrlich
Liberia 1973



Fig. 136 Systemic Chemotherapy
Turkey 1987

Jokichi Takamine (1854-1922) filed and was awarded a patent for 'Adrenalin'. Improved chemical techniques in later years were to show that the compound

(epinephrine) and its precursor, noradrenaline (norepinephrine). The injection of epinephrine into the corpora cavernosa is used for the treatment of priapism. The chemical structure of adrenaline and a space-filling model of the same compound superimposed on a portrait of the Japanese chemist are shown on a stamp issued in 2004 (Fig. 137).

Victor Babes (1854-1926), Director of the Institute of Pathology and Bacteriology in Bucharest (Romania), identified the tubercle bacillus in urine (Fig. 138).



Fig. 137 Takamine
Japan 2004



Fig. 138 P. Ehrlich and S. Hata
Niger 1977

Antoine Henri Becquerel (1852-1906), in 1896, discovered the occurrence of spontaneous radioactivity (Fig. 139). It inspired **Pierre Curie (1859-1906)** and **Maria Sklodowska Curie (1867-1934)** in their joint research on the radiation phenomena, and analyses, which led to the discovery and isolation of polonium and radium (Fig. 140). Those discoveries paved the way for the development of radioactive isotopes, their use in different techniques of radionuclide imaging of the genitourinary tract, and therapy of some medical conditions, especially cancer.

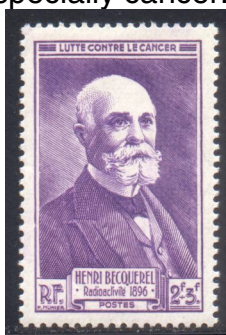


Fig. 139 Becquerel
France 1946



Fig. 140 Pierre and Marie Curie
France 1938

Albert Ludwig Sigismund Neisser (1855-1916) is remembered for his discovery of the gonococcus, the bacterium that causes gonorrhea, for his research on leprosy (Neisser was the first to identify the leprosy bacillus as the etiological agent of the disease), and for his research on syphilis in man and animals (Fig. 141).



Fig. 141 A.L.S. Neisser
Germany 2005

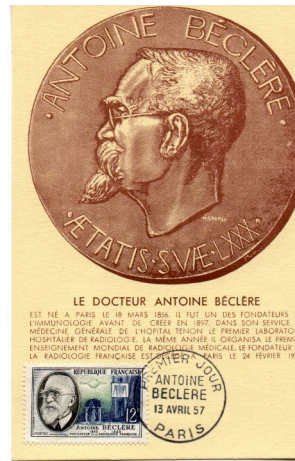


Fig. 142 Antoine Béchère
France 1957

Antoine Béchère (1856-1939), starting in 1887, studied the application of x-rays in medicine and acquired an increasing interest in radiotherapy (Fig. 142). In 1916, by application of ‘paquets de radium’, he successfully treated a young man with an abdominal metastasis after orchiectomy for seminoma; the metastases “melted like snow under sunshine.” This early observation led to the systemic utilization of radiotherapy (Fig. 143, 144).



Fig. 143 Radiotherapy
Turkey 1972



Fig. 144 Radiotherapy
Mauretania 1965

Vieira Machado (1859-1927), Professor for General and Analytical Chemistry in Lisbon, devoted his interests to urology and the history of medicine (Fig. 145).

Anton von Eiselsberg (1860-1930), in 1904, excised a diverticulum of the bladder by an extravesical technique (Fig. 146). He performed successfully total cystectomy for carcinoma and ureterointestinal anastomosis for exstrophy of the bladder.



Fig. 145 Stationary commemorating Vieira Machado Timor



Fig. 146 A. v. Eiselsberg Austria 1960

Thoma Ionescu (1860-1926), chairman of the Department of Topographical Anatomy and Surgery at the Faculty of Medicine in Bucharest, removed the capsule from the lateral border of the kidney and transfixed the floating kidney with nonresorbable sutures (Fig. 147). In 1893, he proposed a catheterless technique after cystotomy for bladder calculi.

August Bier (1861-1949) suggested in 1893 that atrophy of the enlarged prostate might follow ligation of its arterial supply (Fig. 148). He performed 11 such operations with three lethal outcomes, and in seven patients the results were considered good. In 1899, Bier introduced intraspinal anesthesia with cocaine.



Fig. 147 Thoma Ionescu Romania 1998

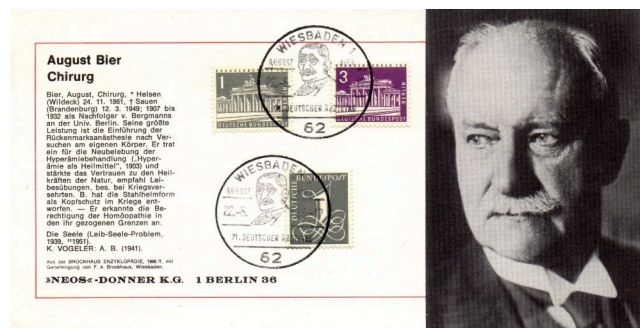


Fig. 148 August Bier F. R. Germany 1968

H. J. Pfannenstiel (1862-1909) introduced the transversal suprapubic incision for surgical approach to the lower ureter (Fig. 149).

Georges F. J. Widal (1862-1929) used the term 'azotemia' to denote a syndrome that resulted from retention of nitrogenous materials, normally eliminated by the kidneys (Fig. 150).



Fig. 149 H. J. Pfannenstiel
F. R. Germany 1979



Fig. 150 Georges Widal
France 1958

Antoine Depage (1862-1925) performed fundamental researches and experiments on techniques of ureterovesical anastomosis and uretero-intestinal anastomosis that he described in 1909 (Fig. 151).

Arthur Nicolaier (1862-1942), the discoverer of the tetanus bacterium, in 1894 introduced urotropin (hexamethylentetramine) as an antibacterial agent for the treatment of urinary tract infections. Its antibacterial action derives from the slow release of formaldehyde by hydrolysis at acidic pH. In 1942, Nicolaier committed suicide in Berlin before being deported to a concentration camp (Fig. 152).



Fig. 151 Antoine Depage
Belgium 1957

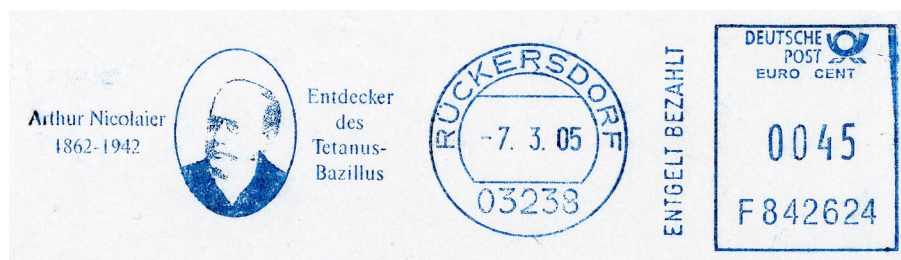


Fig. 152 Arthur Nicolaier
Germany 2004

Early attempts to induce immunity against tuberculosis with tuberculin and various vaccines failed. That is, until **Charles Calmette (1863-1933)** and **Camille Guérin (1872-1961)**, in 1925, discovered the method of attenuating the virulence of *M. tuberculosis* by repeated subcultures of the original *M. bovis*, eventually obtaining a permanently avirulent strain that they called **BCG**. BCG is perhaps the most effective intravesical agent in the treatment of carcinoma in situ of the bladder and recurrence prophylaxis in tumor-free patients (Fig. 153, 154). Creation of genetically engineered recombinant forms of BCG is a reality today.



Fig. 153 Calmette and Guérin
Afars and Issas 1972



Fig. 154 BCG
Cinderella Poland

Charles Mayo (1865-1939) was the first surgeon to employ clinically Coffey's technique of ureterointestinal anastomosis ('Coffey-Mayo operation') and, in 1912, he reported successful results in three patients suffering from bladder exstrophy (Fig. 155). The names of the Mayo brothers are also associated with the 'Mayo incision' for kidney surgery.

August von Wassermann (1866-1925), in 1906, in collaboration with Neisser and Bruch, devised the 'Wassermann test', as it was known, used in the diagnosis of syphilis (Fig. 156).

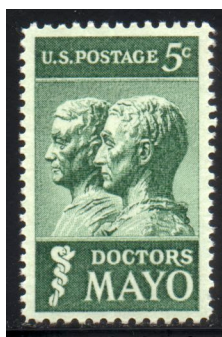


Fig. 155 Mayo Brothers
USA 1964



Fig. 156 August von Wassermann
Germany 2000

Edward C. Kendall (1866-1972), American biochemist, **Philip S. Hench (1896-1965)**, American physician, and the Polish-Swiss chemist **Tadeus Reichstein (1897-1996)** were awarded the 1950 Nobel Prize in Medicine for their discoveries related to the hormones of the adrenal cortex, their structure and biological effects (Fig. 157-159). Dubbed 'miracle drugs', the corticosteroids are used to treat a wide range of diseases, including Addison's disease, allergies, etc.

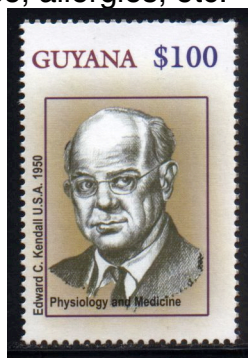


Fig. 157 E. C. Kendall



Fig. 158 P. S. Hench



Fig. 159 T. Reichstein

Karl Landsteiner (1868-1943), who received the 1930 Nobel Prize in Medicine or Physiology in recognition for his discovery of blood groups in man, and whose research with Alexander S. Wiener led to the discovery of the Rhesus (Rh) factor in 1940, introduced the dark-field microscopy for the diagnosis of primary syphilis (Fig. 160). Previously, spirochetes could be seen only in stained sections of tissue.

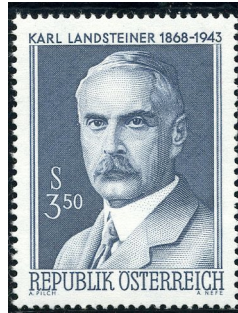


Fig. 160 Karl landsteiner
Austria 1968

Robert C. Coffey (1869-1933), in 1910, reported his experimental studies on ureterointestinal anastomosis in dogs using a submucosal tunnel in the bowel wall for implantation of the ureter (Fig. 161). The modern method of ureterointestinal anastomosis followed the experimental work of Coffey.

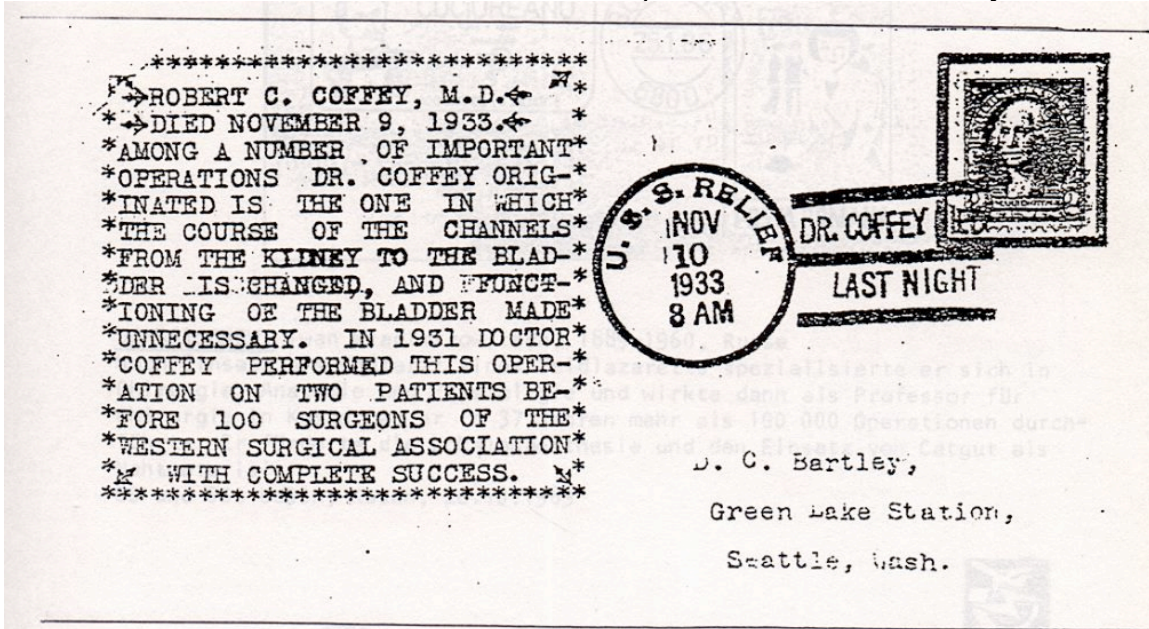
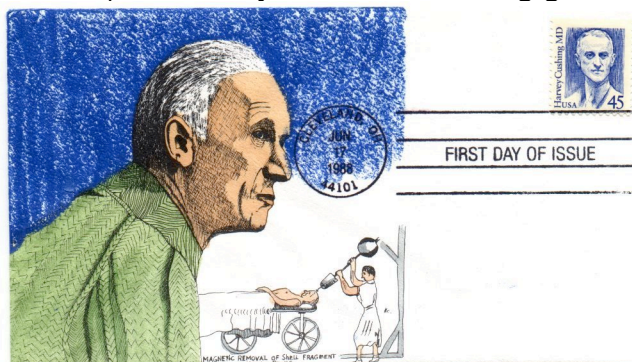


Fig. 161 Robert C. Coffey
USA 1933

Harvey William Cushing (1869-1939) described the symptom complex (Cushing's syndrome) caused by excess circulating glucocorticoids (Fig. 162).



Georges Marion (1869-1943) developed many surgical techniques and promoted the suprapubic prostatectomy in two stages. In 1819, he performed a nephrostomy by inserting a rubber tube through a small speculum introduced into the renal pelvis through a short nephrotomy wound. A ureteral catheter, left indwelling for 24 to 48 hours, was used by Marion to assist the passage of calculi. In 1921, he modified the nephropexy method of Albarrán splitting the kidney capsule into four segments and utilizing this portion of the capsule as a sort of capsular hammock (Marion-Albarrán nephropexy). In 1927, he described muscular bars around the bladder neck, 'Marion's disease', requiring surgical treatment; section showed hypertrophied muscle fibers with no evidence of infection. He practiced surgery on politicians of the Dominican Republic. For that reason, the Military Hospital of Santo Domingo was renamed Marion Memorial Military Hospital by the Dominican government (Fig. 163).

Jules Jean Baptiste Vincent Bordet (1870-1960), in collaboration with his colleague and brother-in-law Octave Gengou, in 1901 first published on complement fixation reactions used for diagnosis and control of infectious diseases (Fig. 164). Other physicians later modified these reactions for detecting various diseases. The most famous would be a test for detecting the antibody produced by persons infected with the protozoan *Spirochaeta pallida* (now known as *Treponema pallidum*), the causative agent of syphilis. For his discoveries relating to immunity, Bordet was awarded the 1919 Nobel Prize in Medicine.



Fig. 163 Marion Hospital
Dominican Republic 1940

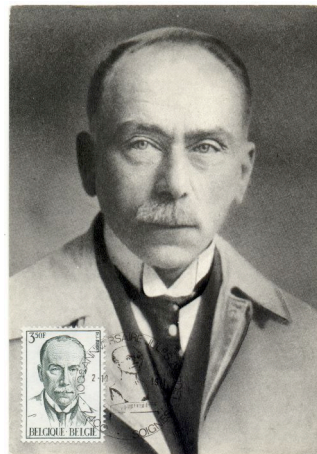


Fig. 164 Jules Bordet
Belgium 1971

Fritz Schaudinn (1871–1906), German zoologist, confirmed the work of Sir Ronald Ross and G. B. Grassi on malaria, investigated amoebic dysentery, and in his research on protozoa discovered (1905) with Erich Hoffmann the *Treponema pallidum* (or *Spirochaeta pallida*) pathogen of syphilis (Fig. 165).



Fig. 165 Fritz Schaudinn

Walter Stoeckel (1871-1961) folded the terminal ureter upon itself to prevent it being cut by the tie and used a variety of techniques of ligature and suture as a means of treating operative injuries and tumoral infiltration of the ureter (Fig. 166). He is the author of the classical extended *Gynecological Contribution to Urology* in the German *Textbook of Gynecology*.



Fig. 166 Walter Stoeckel
F. R. Germany 1971



Fig. 167 Pirajá da Silva
Brazil 1959

Manuel Pirajá da Silva (1873-1961), microscopist and historian, in 1908 discovered and identified *Schistosoma mansoni* (a blood fluke), presenting the first complete description of the parasite that afflicts in particular the lower urinary tract. In 1959, Brazil issued a stamp to commemorate the 50th anniversary of the discovery of *S. mansoni* (Fig. 167). Schistosomiasis, a parasitic chronic disease of the urinary tract, is mentioned on a stamp issued by Egypt in 1975 on the occasion of an international conference dealing with this topic (Fig. 168).

Otto Loewi (1873-1961), 1936 Nobel Laureate in Medicine, in 1900-1902 published a series of papers about experimental contributions to the physiology and pharmacology of kidney function, and the mechanism of the action of diuretics (Fig. 169).



Fig. 168 Schistosomiasis
Egypt 1975



Fig. 169 Otto Loewi
Austria 1973



Fig. 170 C. Levaditi
Romania 1962

Constantin Levaditi (1874-1953), Romanian bacteriologist interested in syphilis, was the first (1905) to demonstrate the presence of *Treponema pallidum* in a newborn with congenital lues (Fig. 170). He is best known for his method of staining *Treponema pallidum*, the agent of syphilis, with silver. He subsequently pioneered syphilis therapy with bismuth and arsenical compounds.

Carlo Ravasini (1874-1959) was chief of the Urological Department of the Trieste Hospital, a versatile surgeon, President of the Italian Society of Urology, author of 60 publications on his specialty (Fig. 171). He reported on

from the hospital activity in 1948, he dedicated himself to philately. His studies, collection and papers on *Disinfected Mail* are well known worldwide.

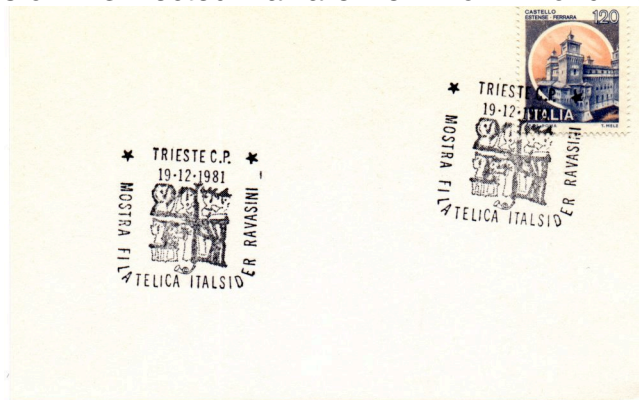


Fig. 171 Carlo Ravassini
Italy 1981

Hideyo Noguchi (1876-1928), in 1913, isolated the *Treponema pallidum* from a syphilis patient, proving that this spirochete was the cause of syphilis. He also developed a skin test for syphilis (Fig. 172).

Heinrich O. Wieland (1877-1957) laid the basis for the chemistry of sexual hormones (Fig. 173). For his studies on the structure of the bile acid and related substances he received the Nobel Prize in Chemistry in 1927.



Fig. 172 Hideyo Noguchi
Japan 1949/1952



Fig. 173 H. O. Wieland
Uganda 1995

Reynaldo dos Santos (1880-1970), Professor of Urology at the Medical School of Lisbon, chairman of the Department of Urology at the Santa Marta University Hospital, invented special instruments for the study of urodynamics (Fig. 174). In 1934, Reynaldo dos Santos proposed delayed nephrectomy for the treatment of renal tuberculosis for the first time in the history of urology, against the immediate nephrectomy advocated by Albarrán.

Ali Bey Ibrahim (1880-1947), Professor of Surgery at the University of Cairo and Minister of Health, performed research and published on urinary schistosomiasis in Egypt, ureteral stones, inflammation of the spermatic cord and varicocele (Fig. 175).



Fig. 174 Reynaldo dos Santos
Portugal 1999



Fig. 175 Ali Bey Ibrahim
Egypt 1980

Alexander Fleming (1881-1955), in 1928, while working on influenza virus, observed that mould had developed accidentally on a staphylococcus culture plate and that the mould, identified as *Penicillium notatum*, had created a bacteria-free circle around itself (Fig. 176). He was inspired to further experiment and found that a mould culture prevented growth of staphylococci, even when diluted 800 times, and that it was non toxic to animals in large doses. He named the active substance 'penicillin' and did not investigate further.



Fig. 176 Sir Alexander Fleming
Mauritius 1978

In 1938, **Howard W. Florey (1898-1968)** and **Ernst B. Chain (1906-1979)** started investigations on the therapeutic value of penicillin (Fig. 177, 178). It was their work that led to the purification and clinical trials of this antibiotic, bactericidal to many pathogenic organisms. In 1945, Fleming shared the Nobel Prize with Florey and Chain for the discovery of penicillin and its curative effects in various infectious diseases.



Fig. 177 H. W. Florey
Australia 1995



Fig. 178 E. B. Chain
Dominica 1995

Enrique Finochietto (1881-1948) designed many surgical instruments (Fig. 179). His bladder retractor is very useful when performing suprapubic prostatectomy.

Daniel Ciugureanu (1885-1950), urologist (Fig. 180), was chief of the Urological Department at Queen Maria Hospital (Chisinau) and Ion Cantacuzino Hospital (Bucharest).



Fig. 179 Enrique Finochietto
Argentina 1994



Fig. 180 Daniel Ciugureanu
Romania 1993

Nicolae Hortolomei (1885-1971), a leading figure and chairman of the Romanian Surgical Society for many years, while working in the Necker Hospital in Paris (1914), performed extensive experimental work on ureteric reconstruction using autologous venous grafts (Fig. 181). Due to his efforts, the Romanian Urological Society, in 1934, became independent with its own statute and journal. In the same year, Hortolomei first used Coffey's technique of ureterointestinal anastomosis in Romania.

José Mendoza y Logotipo (1887-1951) was the founder of the Urological Society of San Salvador and co-founder of the Colegio Medico (Fig. 182).



Fig. 181 Nicolae Hortolomei
Romania 1979



Fig. 182 Frits Zernike
Netherlands 1995

Frits Zernike (1888-1966), Dutch physicist, 1953 Nobel laureate in physics, in 1930 discovered the phase contrast phenomenon in his totally black-painted optical laboratory and later invented the phase contrast microscope (Fig. 183). Phase contrast microscopy can be utilized in the analysis of the urinary sediment when looking for cells, casts, crystals, bacteria, yeast and parasites.

Selman A. Waksman (1888-1973) catalogued many soil microbes, including the actinomycetes, and observed that they produce antibacterial substances (Fig. 184). He searched for antibiotics (a term he coined) of medical importance. In 1940, he isolated actinomycin that proved to be too toxic for clinical use. In 1944, from *Actinomyces griseus* (now called *Streptomyces griseus*) Waksman isolated streptomycin, the first antibiotic effective against *Mycobacterium tuberculosis*. Streptomycin, that was also effective against bacteria resistant to penicillin or sulfa drugs, became commercially available in 1946 and was widely used in the treatment of genitourinary tuberculosis. For his discovery of streptomycin, Waksman was awarded the 1952 Nobel Prize in

Today, aminoglycosides have largely replaced streptomycin for TB, just as next-generation sulfonamides and man-made fluoroquinolones are taking on urinary tract infections. The treatments have greater potency than their antimicrobial ancestors, allowing for tailored dosages with fewer side effects.



Fig. 183 Mendoza y Logotipo El Salvador 1983



Fig. 184 Selman A. Waksman Gambia 1989



Fig. 185 Hulusi Behçet Turkey 1980

Hulûsi Behçet (1889-1948) described arthralgia, iridocyclitis, oral and genital ulcer, and the syndrome known under his eponym (Fig. 185).

Antonio Roig Soler (1889-1970) practiced urology in Barcelona. He built a strong reputation as a philatelist and eventually gave up his medical practice, opening a successful stamp store (Fig. 186).

Emil Teposu (1890-1948), in 1927, was named chairman of the new founded Department of Urology at the University of Cluj. He studied the efficacy of mineral waters on kidney diseases and published a monograph about Romanian spas (Fig. 187).



Fig. 186 Antonio Roig Soler Spain 1971



Fig. 187 Emil Teposu Romania 2000

Harold R. Griffith (1894-1985) made history in 1942 when, at Montreal's Homeopathic Hospital (now Queen Elizabeth Hospital), he became the first doctor in the world to use curare (a South American arrow poison) to relax the muscles of a patient undergoing an appendectomy (Fig. 188). The use of curare for muscle relaxation during general anesthesia became a clinical procedure that revolutionized worldwide the science of anesthesiology. It is widely used in urologic surgery.

Gerhard Domagk (1895-1964), in 1932, found out that the red azo dye Prontosil, when combined with a sulfonamide radical, showed protective power against streptococcal infections in mice (Fig. 189). Human trials soon began

was the sulfanilamide component of the prontosil molecule that was responsible for the therapeutic effect. Other sulfa derivatives followed and sulfonamides became widely used in the treatment of gonorrhea, urinary tract infections and many other infectious diseases. For the discovery of the antibacterial effects of prontosil, Domagk was awarded the 1939 Nobel Prize in Medicine. Hitler, who decreed that no German could accept a Nobel Prize, forced him to decline the award. In 1947, Domagk travelled to Stockholm and received his gold medal and diploma, but in accordance with regulations the prize money reverted to the Nobel Foundation.



Fig. 188 Harold A. Griffith
Canada 1991

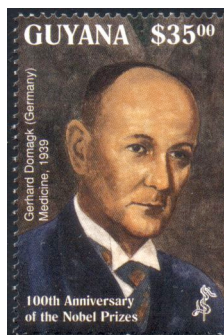


Fig. 189 Gerhard Domagk
Guyana 1995

The ileum was first used clinically to replace a portion of the ureter by Schoemaker in 1909. It was not until 1932 that **Rudolf Nissen (1896-1981)** performed the second such operation, replacing the extensively strictured lower half of the ureter with a length of isolated ileum (Fig. 190).

Mustafa A. O. Topcibashov (1895-1981), Soviet surgeon and pathologist, did research dealing with urologic surgery (Fig. 191).



Fig. 190 Rudolf Nissen
Germany 1996



Fig. 191 Mustafa A. O. Topcibashov
Azerbaijan 1996

Percy Lavon Julian (1899-1975) extracted sterols from soybean oil and subsequently perfected a method to convert these sterols to the male and female hormones testosterone and progesterone. Later he synthesized cortisone from pregnenolone, which is also found in soybean oil (Fig. 192).

Ernest O. Lawrence (1901-1958), in 1929, invented the cyclotron, a device for accelerating nuclear particles to very high velocities, used to bombard atoms of various elements and creating radioactive isotopes (Fig. 193).



Fig. 192 Percy Lavon Julian
USA 1993



Fig. 193 E. O. Lawrence
St. Vincent 1991

Mitica Popescu-Buzeu (1901-1991), a Romanian urologist, furthered the merger of the Balkan Medical Association and the Mediterranean Medical Association (Fig. 194). During the Second World War, he promoted the organization of special centers for treating heavily wounded soldiers with gunshot urinary fistulas.

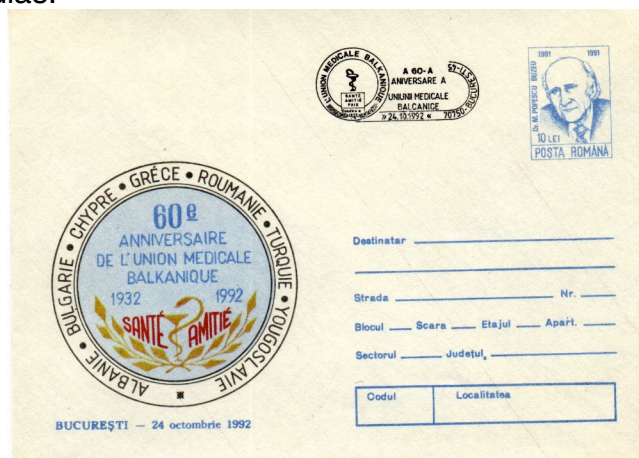


Fig. 194 Mitica Popescu-Buzeu
Romania 1992

Juscelino Kubitschek de Oliveira (1902-1976), a trained urologist, was elected President of Brazil. He promoted the construction of the new capital Brasilia (Fig. 195).

Adolf F. J. Butenandt (1903-1995) shared (yet forced by Hitler to decline) the 1939 Nobel Prize in Chemistry with Lavoslav S. Ruzicka (1887-1976) for their research and synthesis of sex hormones (Fig. 196). In addition to these researches, Butenandt carried out much investigation of the interrelationships of the sex hormones and on the possible carcinogenic properties of some of them. His work on the sex hormones was largely responsible for the production of cortisone on a large scale.

Werner Forssmann (1904-1979) developed the technique of cardiac catheterization in 1929 by experiments on himself (Fig. 197). This he did by inserting a canula into his antecubital vein, through which he passed a catheter for 65 cm and then walked to the x-ray department, where he watched the progress of the catheter into his heart in a mirror held in front of a fluoroscope screen. He presented his research at the 25th meeting of the German Surgical Society on April 1931 where the validity of his work was

face of severe criticism Forssmann abandoned his cardiovascular research and went to the Rudolf Virchow Hospital in Berlin for specialist training in urology. In 1956 he was awarded, together with André Cournand and Dickinson W. Richards, the Nobel Prize for their discoveries concerning heart catheterization and pathological changes in the circulatory system. Since 1958 he has been Chief of the Surgical Division of the Evangelical Hospital at Düsseldorf. He died in 1979 at a spa in the Black Forest after suffering a heart attack.



Fig. 195 Kubitschek
Brazil 1996



Fig. 196 Adolf Butenandt
Gambia 1995



Fig. 197 Werner Forssmann.
St. Vincent & The Grenadines

Theodor Burghеле (1905-1977), one of the third generations of professors of urology, was the founder of modern urology in Romania (Fig. 198). He directed animal trials for electrical stimulation of spinal nerve roots in neuromuscular dysfunction of the lower urinary tract following spinal cord injury (1957). In 1968, Th. Burghele and V. Ichim performed direct electrical stimulation of individual sacral nerve roots in patients with neuropathic voiding disorders. His book, *Erreurs, Fautes et Risques en Urologie*, is exemplary for means of avoiding errors in diagnostics and therapy by learning from his own and other people's mishandled cases.

Ulf von Euler (1905-1983), in 1935, isolated a group of lipids from seminal fluid that lowers blood pressure and has other effects on smooth muscle. He named the vasoactive substance 'prostaglandin' believing it originated in the prostate gland. Later work, including the identification and localization of noradrenaline, the humoral transmitters in the nerve terminals and the mechanism for their storage, release and inactivation, led to the 1970 Nobel Prize for Physiology or Medicine (Fig. 199). Although discovered over 70 years ago, the intricate role that prostaglandins play in renal physiology, pain, erectile function, inflammation and tumor biology has only recently begun to be appreciate.

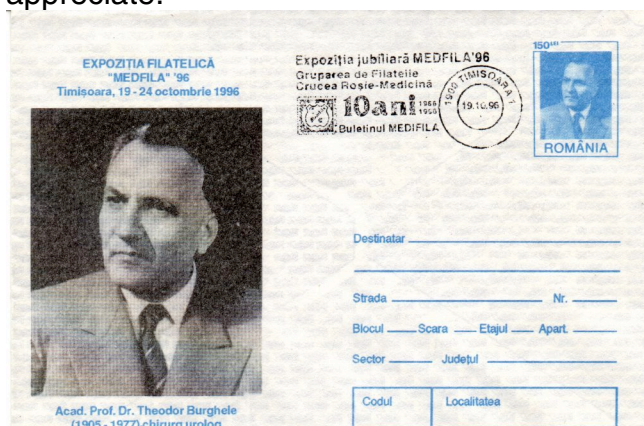


Fig. 198 Theodor Burghela
Romania 1996

Harry Fitch Klinefelter, Jun. (1912-), in 1942, together with Reifenstein and Albright, described a syndrome characterized by eunuchoidism, gynecomastia, azoospermia, decreased androgen production, increased gonadotropin levels and small firm testes (Fig. 200). The syndrome, named Klinefelter's syndrome, represents the most common major abnormality of sexual differentiation.

Mandel Tabakow Hidal (1915-1979) was an Associate Professor and chief of urology at São Paulo Medical School in Brazil, and later, Director of the Albert Einstein Hospital in São Paulo (Fig. 201).



Fig. 198 Theodor Burghela
Romania 1996

Fig. 199 Ulf von Euler
Sweden 1984



Fig. 199 Ulf von Euler
Sweden 1984



Fig. 200 H. F. Klinefelter, Jun.
Pisa, Italy 2005



Fig. 201 Mendel Tabakow Hidal
Brazil 1979

Charles H. Townes (1915-) and **Arthur L. Schawlow (1915-)** conducted pioneering research centered on the absorption of microwaves as the basis of probing molecular structure (Fig. 202, 203). These scientific investigations culminated with the invention of the laser in 1960. The use of different types of lasers has substantially changed the treatment of many urological diseases (benign prostatic hyperplasia, bladder cancer, penile carcinoma, urethral stricture, urinary calculi, etc.).

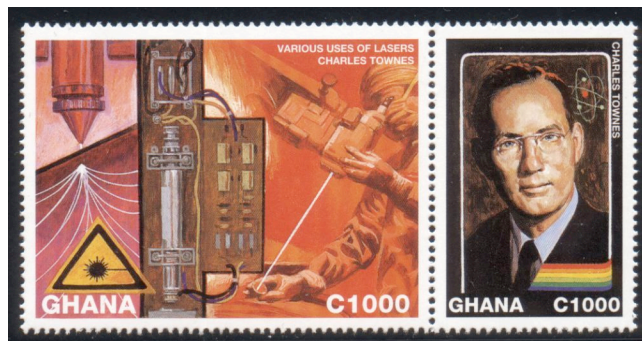


Fig. 202 Charles H. Townes
Ghana 1998



Fig. 203 Arthur L. Schawlow
Malagasy 1993



Fig. 204 Sune Bergström
Sweden 1996

Sune Bergström (1916-) developed a method for obtaining prostaglandin from animal tissues and produced the prostaglandins E and F in crystallin form. He shared the 1977 Albert Lasker Prize and the 1982 Nobel Prize in Medicine with John R. Vane and **Bengt I. Samuelsson (1934-)** for their discoveries concerning prostaglandins and related biologically active substances (Fig. 204, 205). The E series prostaglandins are vasodilators that relax smooth muscle and decrease blood pressure. The introduction of intracavernous injection of vasoactive drugs such as papaverine, phentolamine and prostaglandin E₁ has revolutionized the diagnosis and treatment of erectile dysfunction.



Fig. 205 Bengt I. Samuelsson
Sweden 1996



Fig. 206 Osamu Tezuka
Japan 1996

Osamu Tezuka (1928-1989) performed electron microscopic studies of the membrane structure of atypical spermatozoa (Fig. 206). Although he had a physician's license, Tezuka chose to devote his life to comics and animation rather than practice medicine, gaining popularity as a manga writer and illustrator in Japan.

Luc Montagnier (1932-), French molecular biologist, discovered and isolated the human immunodeficiency virus (Fig. 207, 208).
Dr. Robert Gallo, a physician and microbiologist, founder and Director of the

Immunology at the University of Maryland School of Medicine in Baltimore, is recognized as co-discoverer of the HIV virus responsible for AIDS.

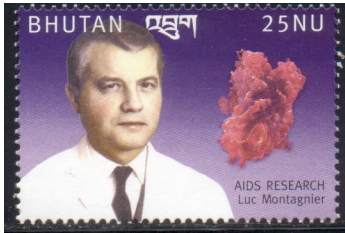


Fig. 207 Luc Montagnier
Bhutan 2000



Fig. 208 Immune Deficiency Virus
France 1994

Günter Blobel (1936-) was awarded the 1999 Nobel Prize in Medicine for the discovery that proteins have intrinsic signals that govern their transport and localization in the cell (Fig. 209). This research aids our understanding of the molecular mechanisms involved in many hereditary diseases, caused by key proteins that do not reach their proper destination, such as primary hyperoxaluria (associated with renal calculi, nephrocalcinosis and other distant oxalate crystal deposits) and of the functioning of the immune system.

Salvador Moncada (1944-) elucidated the physiology, pathophysiology, and pharmacology of nitric oxide, a highly reactive gas molecule critical to numerous biological processes, including vasodilatation, neurotransmission and macrophage-mediated killing of microorganisms and tumor cells (Fig. 210).

Georges J. F. Köhler (1946-) shared the 1984 Nobel Prize in Medicine with **César Milstein (1927-)** and Nils K. Jerne for theories concerning the specificity in development and control of the immune system and the discovery of the principle for production of monoclonal antibodies (Fig. 211, 211a). Monoclonal antibodies are used in diagnostic testing, for the development of drugs, vaccines and hormones, and for cancer therapy. A number of potentially useful monoclonal antibodies have been identified with specificity for bladder, kidney and prostate cancer.

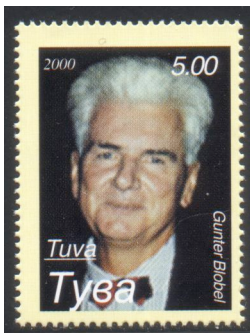


Fig. 209 Günter Blobel
Tuva 2000



Fig. 210 Salvador Moncada
Honduras 2000

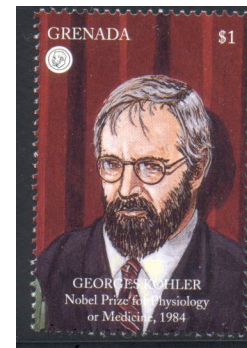


Fig. 211 G.J.F. Köhler
Grenada 1995

Ferid Murad (1936-) shared the 1998 Nobel Prize in Medicine with R. F. Furchgott and L. J. Ignarro for their discoveries concerning nitric oxide as signaling molecule in the cardiovascular system (Fig. 212). Nitric oxide promotes the smooth muscle relaxation in the corpus cavernosum. This knowledge has led to the development of new drugs for erectile dysfunction that reverse impotence by enhancing a nitric oxide-stimulated pathway.



Fig. 211a César Milstein
Argentina 2005

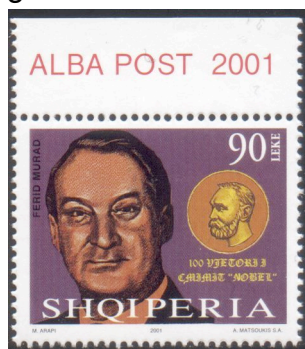


Fig. 212 Ferid Murad
Albania 2001

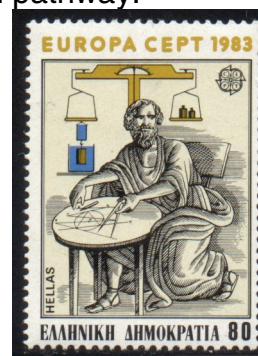


Fig. 213 Archimedes
Greece 1983

Urinalysis

Modern urinary examination began when doctors stopped looking through urine and started looking into it.

The concept of specific weight of liquids (Fig. 213) that led to the invention of the floating hydrometer was developed by **Archimedes (287-212 BC)**.

Shen Kuo (1031-1095), Chinese scientist during the time of the Song dynasty, in one of his prescriptions known as *Qiushi Recipe*, reported in detail that, already in the 11th century, Chinese scientists extracted sexual hormones from urine (Fig. 214).

Nikolaus Cusanus (1401-1464), also known as Nikolaus von Cues, studied science, mathematics and theology (Fig. 215). He had a good medical knowledge and suggested that it would be useful in diagnosis if variations in pulse and respiration, as well as the specific weight of blood and urine, were measured for comparison between health and disease states. His idea was not put in practice.



Fig. 214 Shen Kuo
P. R. China 1962



Fig. 215 Nikolaus Cusanus
F. R. Germany 1958

Paracelsus (1493-1541), who initiated the transit from alchemy to chemistry, postulated that the body is composed of three elements -- combustible sulfur, volatile mercury and residual salt -- and that the harmony of these elements sustains health (Fig. 216). He stated that urine was an index of the function of

challenged and discredited traditional uroscopy and inaugurated the analysis of urine by distillation. The urine was weighed and distilled, and the position of the resulting vapors in the alembic indicated "the site and the nature of the disease." Paracelsus regarded gout and urolithiasis as "tartaric" processes, caused by the precipitation of substances ordinarily voided from the body. He also believed in magic. Paracelsus designed a medallion, made of an alloy of gold, silver, pewter and lead, to give its wearer protection against renal stones.

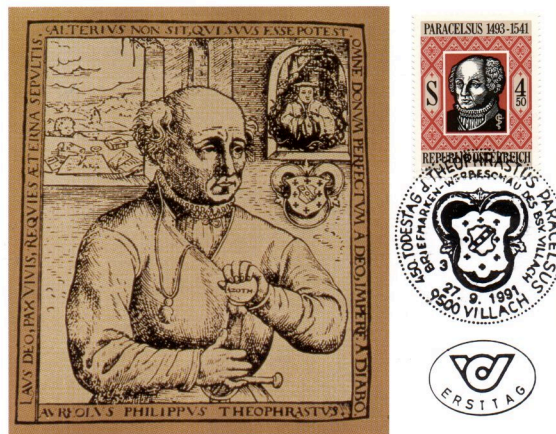


Fig. 216 Paracelsus (Theophrastus Bombastus von Hohenheim)
Austria 1991

Franciscus de le Bœe [Sylvius] (1614-1672), a supporter of the iatrochemical School established at Leiden the first university chemical laboratory in Europe (Fig. 64). He was convinced that chemical imbalances in the blood, consisting of an excess of either acids or alkalies, are causing different diseases and are reflected in the urine. Consequently he devised drugs to counteract the state of disequilibrium. Yet, in spite of this opinion he didn't neglect the subtleties resulting from clinical examination.

Jean-Baptiste van Helmont (1577-1644) appears to have been the first to use a hydrometer to measure the specific gravity of urine in health and disease (Fig. 217). He used a catheter made of chamois skin, treated on the outside with white lead and linseed oil, which he inserted into the urethra with the help of a stylet made of whalebone. This procedure allowed him to "catheterize the same patient forty times in one day without pain or discomfort."

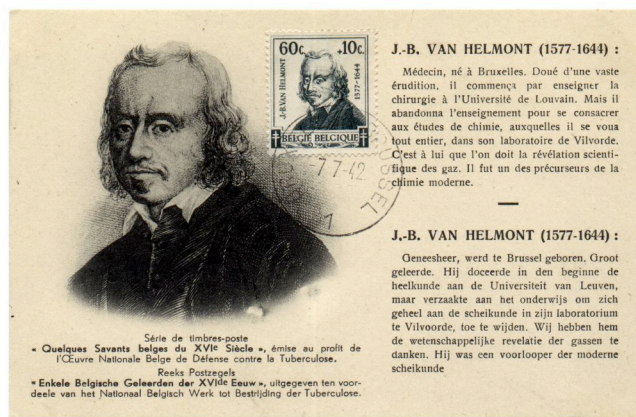


Fig. 217 Jean-Baptiste van Helmont
Belgium 1942

Hermann Boerhaave (1668-1738), who was intensely interested in chemistry, maintained that nothing could be in urine that was not previously in blood (Fig. 71). He stressed the importance of the specific gravity of the urine and used

examined urine under the microscope and concluded that all the elements of urinary stones are contained in normal urine, and that crystals are the very cores of stones. Boerhaave also expected physicians to taste urine samples in addition to smelling them. Mentioning the healing properties of urine, Boerhaave related that he had succeeded in the cicatrization of a long lasting ulceration on his lower leg by applying urine on it.

Joseph Priestley (1733-1804), who invented soda water in 1772 and discovered "dephlogisticated air" (oxygen) in 1774, was also the first to discover and describe (1788) uric acid called by him 'lithic acid' (Fig. 218).

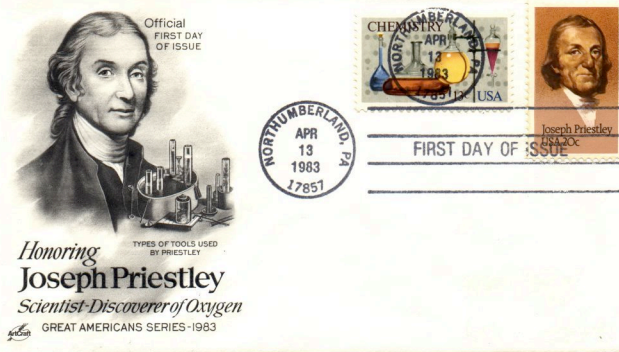


Fig. 218 Joseph Priestley
USA 1983



Fig. 219 v. Scheele
Sweden 1942

Carl Wilhelm von Scheele (1742-1786), Swedish chemist, found that the main component of a certain bladder stone was a substance that dissolved in alkali and formed a precipitate in acid solution. Scheele called the substance lithic acid (currently known as uric acid). He also isolated and investigated oxalic acid (Fig. 219).

Antoine François de Fourcroy (1755-1809), Professor of Chemistry at Jardin du Roi at Paris, discovered ammonium and magnesium phosphate in urine (Fig. 220). He studied the odors of urine ascertaining that the urine of hysteric women and hypochondriac men, immediately after meals, had the same smell of what they had eaten.

Nicolas Louis Vauquelin (1763-1829), Professor of Chemistry at the Medical Faculty of Paris, in collaboration with Fourcroy, did research on the chemical structure of urinary calculi and the substances that could dissolve them (Fig. 221).



Fig. 220 Colias croceus
(Fourcroy)

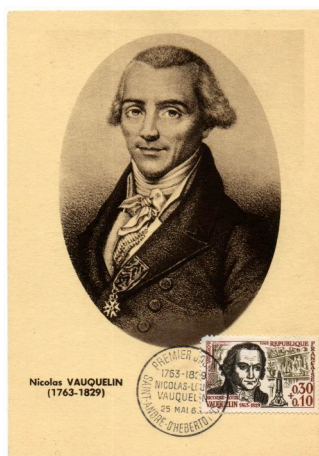


Fig. 221 L.-N. Vauquelin
France 1963



Fig. 222 L.-J. Thénard
France 1957

Louis-Jacques Thénard (1777-1857). By evaporating urine of diabetics, Thénard was the first to obtain sweet granules that behaved like sugar when treated with alcohol (Fig. 222). He coined the term 'glucose' to describe them.

Jacob von Berzelius (1779-1848), considered one of the founders of modern chemistry, introduced the quantitative urinalysis and, in 1809, performed the first full analysis of urine (Fig. 223).

Leopold Gmelin (1788-1853) developed a test for detecting bilirubin in the urine (Fig. 224). Urine is layered over nitric acid; if bilirubin is present, various colored rings become visible at the junction ('Gmelin test').



Fig. 223 v. Berzelius
Sweden 1939



Fig. 224 Leopold Gmelin
F. R. Germany 1988

Friedrich Wöhler (1800-1882), in attempting to prepare ammonium cyanate from silver cyanide and ammonium chloride, accidentally synthesized urea in 1828 (Fig. 225). This unexpected result was a remarkable fact, in so far as it presented an example of the artificial formation of an organic compound of animal origin out of inorganic components. It disproved the common vitalism theory about *vis vitalis*, a transcendent "life force" needed for producing organic compounds. Wöhler's discovery was a crucial contribution to the solution of the problems of diuresis and renal physiology.

Justus von Liebig (1803-1873) found uric acid in a free state in urine, but most chemists believed that it was present only in the form of urates. He was credited for perfecting organic analysis of urine and making it a routine procedure (Fig. 226). By 1831, he had described the method that served as standard practice until it was modified by the introduction of microanalysis in the 20th century.

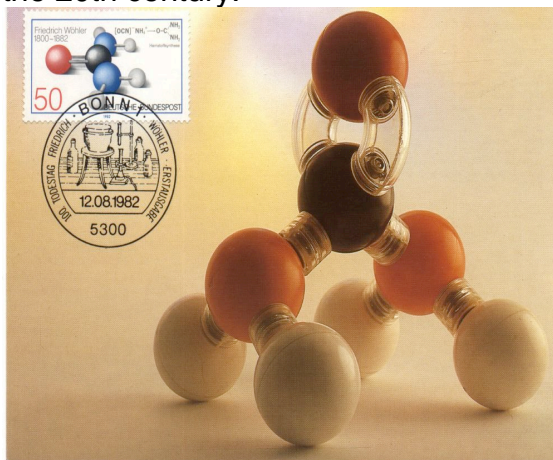


Fig. 225 Artificially synthesized by Friedrich Wöhler



Fig. 226 Justus von Liebig

F. R. Germany 1982

D. R. Germany 1978 **N. A.**

Eugène Millon (1812-1867), chemist, performed research about the excretion of medicaments through urine. He also discovered a reagent to detect protein in urine (Fig. 227).

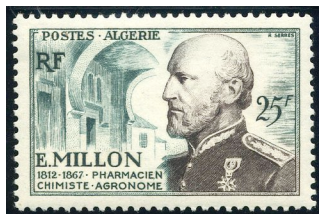


Fig. 227 N. A. Eugène. Millon
France 1953

Johann Florian Heller (1813-1871) introduced several urine tests: the nitric acid ring test for albumin in urine, still known as the 'Heller test', a test for hematuria, and the potash test for sugar. In 1860, he published an important treatise on urinary stones (Fig. 228).

Max von Pettenkofer (1818-1901), while working at Liebig's laboratory in Giessen, discovered creatinine and set up a test named after him for the detection of biliary acids in urine (Fig. 229).

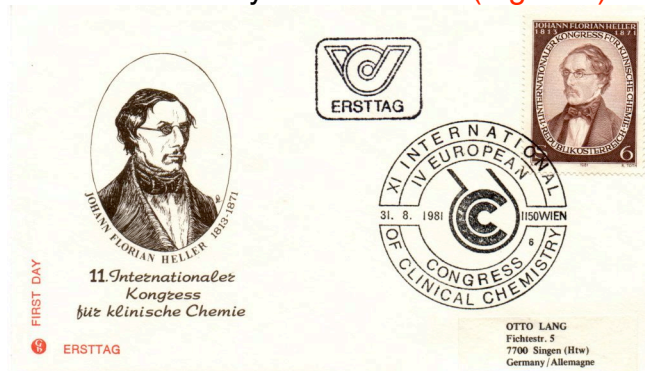


Fig. 228 Florian Heller
Austria 1981



Fig. 229 Max von Pettenkofer
D. R. Germany 1968

Paul Ehrlich (1854-1915) devised a test ('Ehrlich test') for bile pigments in urine (Fig. 134).

Alexander von Koranyi (1866-1944) first introduced the cryoscopic examination of urine and blood as a means of testing kidney function (Fig. 230).

Fritz Pregl (1869-1930) developed the microanalysis of organic substances in which quantitative determinations could be made in as little as three milligrams of a sample (Fig. 231). In the early stages of his investigations, he avoided publishing individual reports on his experiments until he had convinced himself that his methods did not only work in his own, but also in other laboratories. In recognition for his work, Pregl was awarded the 1923 Nobel Prize in Chemistry. Microanalysis of serum and urine became an important diagnostic tool.



Fig. 230 Alexander von Koranyi
Hungary 1966



Fig. 231 Fritz Pregl
Austria 1973

Arne W. K. Tiselius (1902-1971) developed the method of electrophoresis, which is used as an analytical tool in the differential diagnostic of dysproteinemia and proteinuria in cases of multiple myeloma (Fig. 232, 233). In 1948, he was awarded the Nobel Prize in Chemistry for his research on electrophoresis and adsorption analysis, especially for his discoveries concerning the complex nature of the serum proteins.



Fig. 232 Arne Tiselius
Togo 1995



Fig. 233 Electrophoresis
Sweden 1983

Diagnostic and Imaging Techniques

Johann Chr. Doppler (1803-1853), in 1842, was the first to describe the effect that bears his name (Fig. 234). The Doppler effect or shift refers to the changes in frequency of the sound beam that occur when the latter is reflected by a moving target, in this case the blood. The frequency increases when the blood moves toward the transducer and decreases when the direction of the motion is away from the transducer. The waveform generated by the combinations of real time sonography and Doppler techniques is known as duplex Doppler imaging. A newer technique, color Doppler imaging, facilitates the visual recognition of normal and abnormal vascular flow. Since the first medical application of Doppler ultrasound in 1959 (Satomura), this technique has gained wide acceptance. A number of urologic conditions (renal artery stenosis or occlusion, testicular torsion, priapism, etc.) can be studied by the use of duplex Doppler and color Doppler imaging.



Fig. 234 Johann Chr. Doppler
Austria 1992



Fig. 235 Conrad Roentgen
Danzig 1939

Wilhelm Conrad Roentgen (1845-1923), on the evening of November 8, 1895, while studying emissions generated by discharging electrical current in highly-evacuated glass tubes, found that, if the discharge tube is enclosed in a sealed, thick black carton to exclude all light, and if he worked in a dark room, a paper plate covered on one side with barium platinocyanide placed in the path of the rays became fluorescent even when it was as far as two meters from the discharge tube (Fig. 235, 236). During subsequent experiments he found that objects of different thicknesses interposed in the path of the rays showed variable transparency to them when recorded on a photographic plate. When he immobilized for some moments the hand of his wife in the path of the rays over a photographic plate, he observed after development of the plate an image of his wife's hand that showed the shadows thrown by the bones of her hand and that of a ring she was wearing, surrounded by the penumbra of the flesh, that was more permeable to the rays and therefore threw a fainter shadow. This was the first "roentgenogram" ever taken. In further experiments, Roentgen showed that the new rays are produced by the impact of cathode rays on a material object. Because their nature was then unknown, he gave them the name x-rays. For his discovery Roentgen was awarded the first Nobel Prize in Physics (1901). He declined to seek patents or proprietary claims on the x-rays, even eschewing eponymous descriptions of his discovery and its applications. Urologists seized upon this new way of visualizing the kidneys and the urinary tract without resorting to invasive procedures: KUB (Fig. 237), CT (Fig. 238).



Fig. 236 Old x-ray tube
Panama 1996

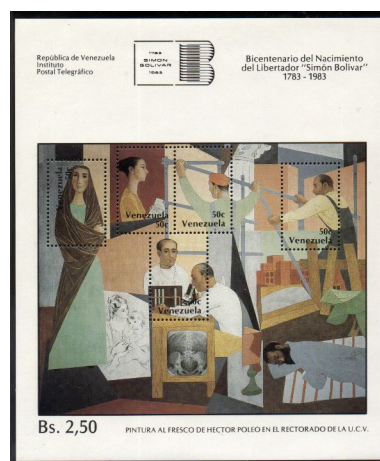


Fig. 237 KUB
Venezuela 1983

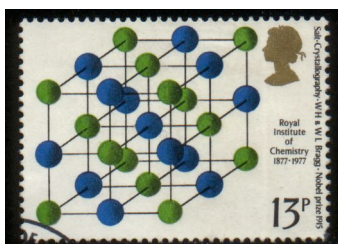


Fig. 238 X-ray diffraction
Great Britain 1977

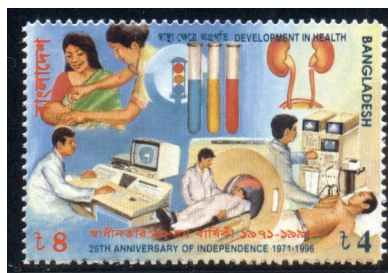


Fig. 239 Computed Tomography
Bangladesh 1996

A renal calculus was detected by radiography for the first time by John MacIntyre of Glasgow in 1896. Since x-rays are diffracted by crystals, x-ray diffraction (crystallography) is used as one of the procedures for analyzing urinary stones obtained from spontaneous passage or surgical intervention (Fig. 239).

Egas Moniz (1874-1955), in 1927, first introduced an intravascular contrast medium, Thorotrast (Fig. 240). A colloidal suspension of thorium dioxide, Thorotrast showed little acute toxicity and gave brilliant opacity of the cerebral vessels. It was also used as contrast agent for retrograde pyelography. Because of its radioactivity, making it carcinogenic, Thorotrast was later abandoned in clinical use.

Of all the elements listed in Mendeleev's periodical table, only iodine was found to be a suitable roentgen contrast medium for intravascular use. Intravenous urography was made possible in 1929 when an iodine-pyridine compound - a remedy for syphilis - was observed to be excreted by the kidneys, thereby visualizing the urinary tract.

In 1865 the German chemist **August Kekulé (1829-1896)**, having difficulty in formulating the structure of benzene, dreamed of a snake swallowing its tail, and hence the ring formula of benzene was discovered (Fig. 241). In 1952 the benzene ring was introduced as a safer and more effective chemical vehicle for iodine in intravascular contrast media used for renal arteriography, cavernosography, etc.



Fig. 240 Egas Moniz
Portugal 1974

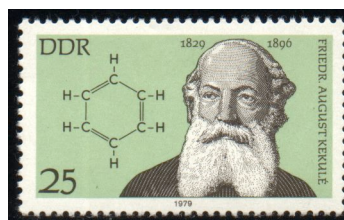


Fig. 241 August Kekulé
D. R. Germany 1979

Max Nitze (1848-1906) invented the forerunner of the modern cystoscope (Fig. 242). In 1877, he constructed his first direct vision instrument, which incorporated an optical system for enlargement, and an incandescent platinum wire at the end of the instrument, cooled by circulating water. After the development of the incandescent bulb by Thomas A. Edison, Nitze

replacing the incandescent platinum wire (1887). Moreover, he designed a catheter with a terminal inflatable balloon for dilatation of the ureter, a miniature cystoscopic lithotrite, an operating cystoscope for endoscopic treatment of bladder tumors, and a single and double catheterizing cystoscope.



Fig. 242 Max Nitze and one of his first cystoscopes with mignon lamp Germany 1997

Thomas Alva Edison (1847-1931), invented and, in 1879, patented the incandescent bulb that was first applied to an endoscope by David Newman of Glasgow in 1883 (Fig. 243, 244). The low amperage small bright light version of Edison's bulb, the mignon lamp, was soon used in most endoscopic instruments until fiber optics took stage in the mid-1950s (Fig. 245-248).

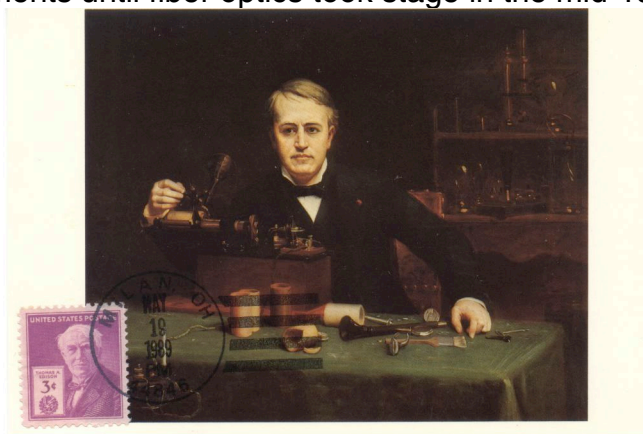


Fig. 243 Thomas Alva Edison USA 1947



Fig. 244 Electric bulb USA 1929



Fig. 245 Heynemann cystoscope Germany 1939

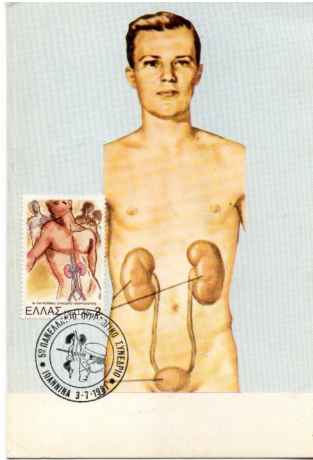


Fig. 246 Endoscopy
Greece 1981

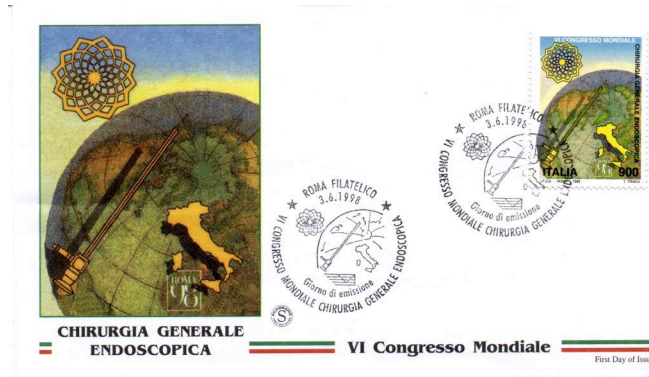


Fig. 247 Sixth World Congress of Endoscopy
Italy 1998



Fig. 248 Congress for Endoscopic Surgery
Cluj Napoca, Romania 2004

Karl Storz (1911-1996) made major contributions in the development and manufacture of endoscopic instrumentation (Fig. 249).

Nikola Tesla (1856-1943), an electrical inventor and great mechanical engineer, conceived the idea of the rotatory magnetic field, which found application in nuclear magnetic resonance (Fig. 250). He was one of the first to produce x-ray photographs of fluoroscopic images and to use protective metal devices to prevent the absorption of secondary radiation. He even designed an x-ray machine that was widely used in hospitals, at that time.

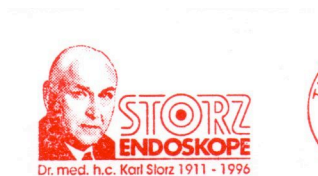


Fig. 249 Karl Storz



Fig. 250 Nikola Tesla

Reynaldo dos Santos (1880-1970), in 1929, first injected a contrast medium directly into the aorta through lumbar puncture, thus enabling the visualization of the renal and their branches (Fig. 174). Abdominal aortography allows a better diagnosis of kidney tumors and vascular abnormalities. In 1930, dos Santos performed the first urography in Portugal.

George Papanicolaou (1883-1962) applied his method of exfoliative cytology to the urine for the detection of tumor cells (Fig. 251). He advocated the use of cytology for the detection of tumor cells in the urine of workers exposed to carcinogens.



Fig. 251 George Papanicolaou
USA 1978

By bombarding light elements with alpha particles, the French physicist **Georg von Hevesy (1887-1966)**, was working under Ernest Rutherford at the University Manchester in 1913, when he realized that it must be possible to trace radioactive isotopes in chemical reactions and physical processes by their radiation (Fig. 252).

Radioactive isotopes are unstable elements that release radiations as they break down (Fig. 253). Many radioisotopes can be artificially manufactured by firing high-speed particles into the nucleus of an atom by using a cyclotron, the famed 'atom smasher' (Fig. 254).



Fig. 252 Georg von Hevesy
Hungary 1988



Fig. 253 Radioactive Isotopes
Israel 1968



Fig. 254 Cyclotron
Belgium 1982

In 1923, von Hevesy extended his chemical experiments to biology by using a radioisotope of lead to trace the movement of lead from soil into bean plants. In 1935, he began using artificial radioisotopes as tracers. This work earned him the 1943 Nobel Prize in Chemistry.

By the late 1920s the tracer technique was being applied to humans in Boston

blood circulation, an early example of using radioactivity to observe life processes. In our days, there are widespread applications for radionuclide imaging in patients with urologic diseases. A large number of radioisotopes have been developed for the investigation of specific anatomic and functional disorders, principally of the kidneys but also of other organs of the genitourinary tract (estimation of total and split renal function, assessment of the function of a renal transplant, determination of presence or absence or obstruction in a hydronephrotic kidney by diuretic renography, evaluation of renovascular hypertension, demonstration of vesicoureteral reflux, differential diagnosis in the acute scrotum, etc.). Isotope scintigraphy with technetium phosphate is the modality of choice in early detection of skeletal metastases (Fig. 255).

Felix Bloch (1905-1983) and Edward M. Purcell (1912-) developed nuclear magnetic resonance. They shared the 1952 Nobel Prize in Physics. Because of the ominous connotation of the word 'nuclear', it was deleted from the name, and the technique is now referred to as 'magnetic resonance imaging' (MRI). Since mid-1980s it has become a valuable research tool for urological diagnostics (Fig. 256).

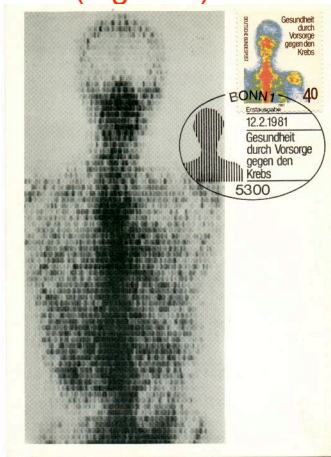


Fig 255 Skeletal Metastases
F. R. Germany 1981

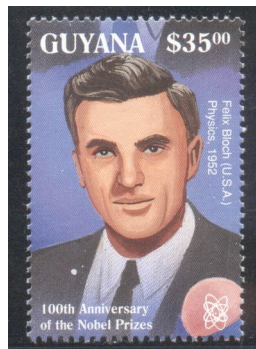
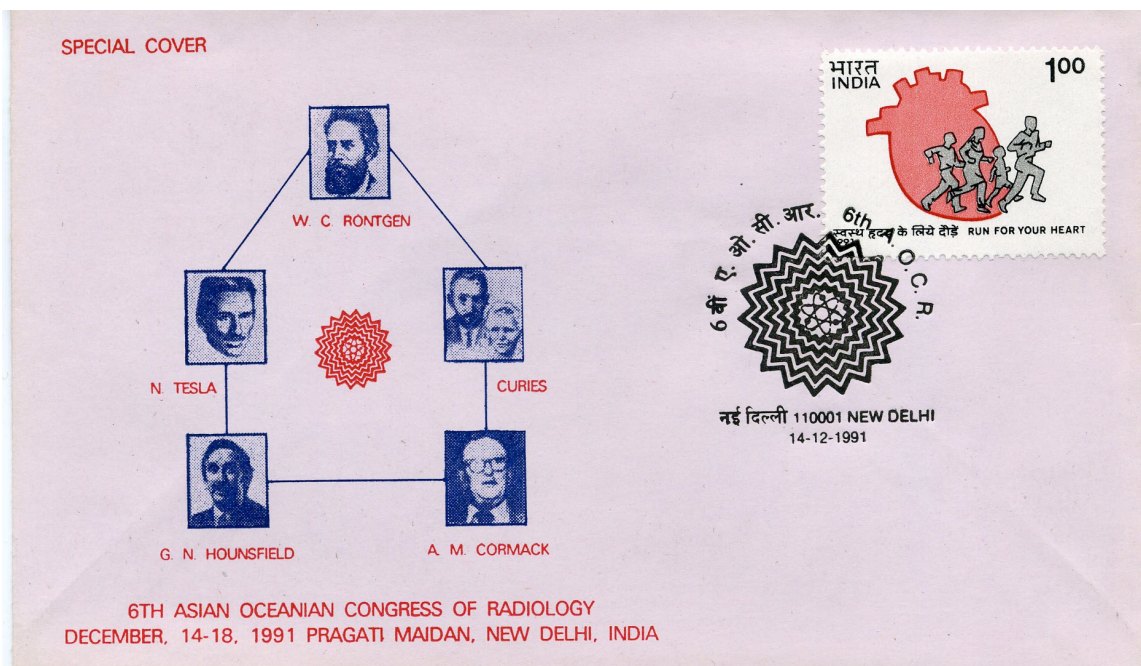


Fig. 256 Felix Bloch
Maldives 1995



Fig. 257 A. M. Cormack
South Africa 1996



India 1991

Allan MacLeod Cormack (1924-1998) shared the 1979 Nobel Prize in Medicine with **G. N. Hounsfield** for inventing computerized axial tomography or 'computer assisted tomography' (Fig. 257, 258). By 1971 the first clinical machine, the CAT scanner, had been installed in a London hospital. CAT scanners are now standard, albeit expensive, high-resolution x-ray diagnostic tools in the medical repertoire.

The use of computer technology overwhelmingly revolutionized the urologic imaging techniques (Fig. 259, 260). By today's standards for electronic computers, ENIAC - the world's first computer - was a grotesque monster. Its thirty separate units, plus power supply and forced-air cooling, weighed over thirty tons. Its 19,000 vacuum tubes, 1,500 relays, and hundreds of thousands of resistors, capacitors, and inductors consumed almost 200 kilowatts of electrical power. A U.S. stamp, issued 1996, marks the 50th anniversary of the development of the world's first computer, and calls attention to the almost unbelievable technological advancements achieved since then (Fig. 261). State of the art in imaging techniques of the urinary tract using computer technology are shown on various philatelic items: ultrasonography (Fig. 262) and computed tomography (Fig. 263) on stamps from Great Britain; magnetic resonance imaging on a stamp from Great Britain (Fig. 264) and on a U.S. first day cover (Fig. 265). The sophisticated imaging techniques enable urologists to diagnose urinary disorders with greater speed, depth and accuracy, with tests that are non-invasive, painless and safe.



Fig. 259
Computer Microchips
Marshall Islands 1999

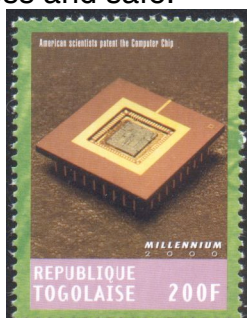


Fig. 260
Patent for Computer Chip
Togo 2000



Fig. 261
Computer Technology
USA 1995

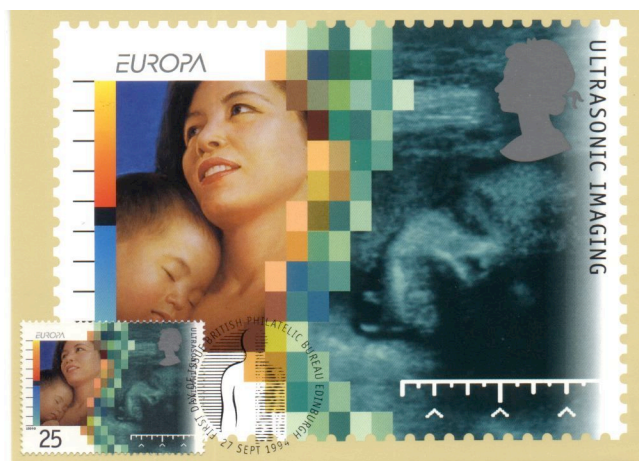


Fig. 262 Ultrasound Imaging
Great Britain 1994

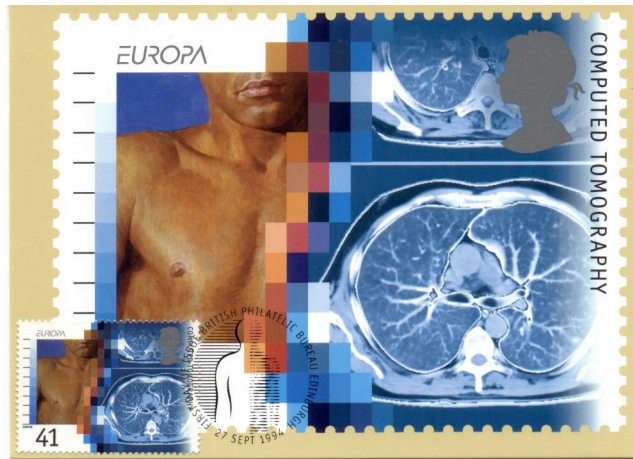


Fig. 263 Computed Tomography
Great Britain 1994



Fig. 264 Magnetic Resonance Imaging
Great Britain 1994

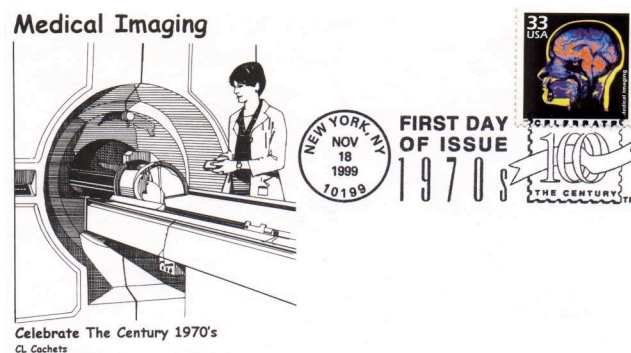


Fig. 265 Medical Imaging
USA 1999

Diabetic Kidney Disease

Diabetes mellitus, the result of insulin deficiency, is associated with impotence, renal papillary necrosis, emphysematous pyelonephritis, voiding dysfunctions, and urinary tract infection (Fig. 266). Diabetes is the leading cause of end-stage renal disease in the United States and Europe, requiring dialysis or

Stanley Rossiter Benedict (1884-1936), while a second year student at the University of Cincinnati, using a solution of copper sulfate, sodium hydroxide, and tartaric acid, devised a qualitative test for the detection of sugar in the urine. One teaspoonful of Benedict's solution plus 8 drops of urine, heated together in a flask, changes color from green to orange to red, depending upon the amount of sugar present in the urine (Fig. 267). This test is still used in many parts of the world today.



Fig. 266 Fight Diabetes
Dominican Republic 1974

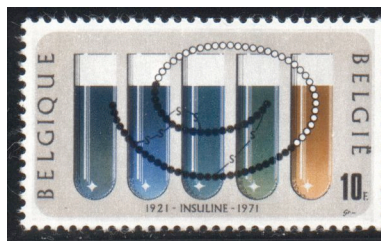


Fig. 267 Benedict's test
Belgium 1971

Frederick G. Banting (1891-1941) and **Charles H. Best (1899-1978)**, in 1921, successfully completed the extraction of insulin from the pancreatic islets of Langerhans (Fig. 268). Insulin therapy commuted the death sentence associated with the diagnosis of type 1 diabetes.

The Canadian stamp, commemorating in 1971 the 50th anniversary of discovery of insulin, shows a laboratory scene with an old style colorimeter and a blood glucose estimation equipment (the blue test tubes) that would be in use at that time (Fig. 269).

A screening strip for detecting glucose in the urine is shown symbolically as tail of the hummingbird on a 1992 Brazilian stamp (Fig. 270). Urine dipsticks provide a quick and inexpensive method for detecting abnormal substances (blood, protein, glucose, ketones, urobilinogen, bilirubin, white blood cells, and nitrite) within the urine.



Fig. 268 Fr. Banting and Ch. H. Best
Canada 2001



Fig. 269 Insulin
Canada 1971



Fig. 270 Screening Test
Brazil 1992

Hydatid Disease of the Kidney

Echinococcosis, produced by the larval form of tapeworm, which in its adult form resides in the intestine of the dog, is featured on a stamp of Algeria. It illustrates the life cycle of this parasite by showing a cow and the internal

organs of a man and a dog (Fig. 271). The liver, lungs, and kidney are particularly common sites of development and infestation.



Fig. 271 Echinococcosis
Algeria 1981

Infertility and Assisted Reproductive Techniques

The primary theory of conception in ancient Rome was the doctrine of the two seeds. According to this doctrine "both parents created semen." **Democritus (460-370 BC)** believed that semen was derived from the whole body, "particularly the important parts such as bones, flesh and sinews." Because both parents produce semen they both have the opportunity to contribute to the traits of their children. The parent with the dominant semen contributed the most characteristics. **Hippocrates (460-377 BC)** wrote that if both parents produced strong semen the child was male. If both produced weak semen the result was a female. If one parent produced strong semen and one weak the sex of the child would be determined by the stronger semen. According to Lucretius (c. 99-55 BC), the author of the philosophical epic *On the nature of the universe*, "When the male seed and the female seed are fused, one partner may be dominant, overpowering the other in a burst of violence. If this should be the woman then the child shall have her features and qualities. The same if the man assumes the role of dominance, the child will be more like the father."

Ancient Romans believed that the heat of lovemaking determined the sex of the child. Hippocrates wrote that coitus creates a "pleasure and heat" throughout a woman's body. This heat peaks with the introduction of sperm into the womb and then dies down. According to **Galen (129-199)**, this heat determines the sex of the child. His theory was based on Aristotle's belief that "a warm womb would produce a male child, a cold womb, a female child." According to Soranus of Ephesus, a contemporary of Galen and famous ancient medical writer, women should be "sober during coitus" because the soul becomes "the victim of strange fantasies" during drunkenness and the offspring will resemble the mother in body and soul. Lucretius is asserting that the semen causes infertility. It is either too thin and has no "clinging force" or too clotted and "cannot spurt with any truly penetrative force."

The field of infertility has undergone and continues to undergo rapid changes (Fig. 272). The 1980s witnessed an awareness of the frequency of male infertility, leading to increased emphasis on the evaluation of the male partner. Today, infertile men have many more options than they did a century ago when it comes to fathering children. The development of in vitro fertilization (IVF) led to an explosive rise in this technology for the treatment of both male and female infertility (Fig. 272a). This led to a shift in emphasis from

conception by bypassing fertility problems (Fig. 273, 274). In July 1978, the first test-tube baby was born at Oldham General Hospital (Fig. 275-277). Since then, more than 1 million babies have been born through in vitro fertilization. In the 1980s we were witnessing the refinement of assisted reproductive techniques such as egg and sperm donation (Fig. 278, 279), intrauterine insemination (IUI), IVF combined with intracytoplasmic sperm injection (ICSI), embryo transfer (Fig. 280), assisted hatching and the potential for embryo cloning.

There is still a belief among people, presumably dating back to prehistoric China, that ginseng as root, capsules, powder or seeds, promotes long life, wisdom and fertility (Fig. 281).

Fertility dolls, carved wooden figures, believed to induce pregnancy and ensure a safe delivery, have been used in a wide variety of cultures (Fig. 282). In many countries, fertility dolls and fertility rituals are still used today and have become part of popular modern traditions.

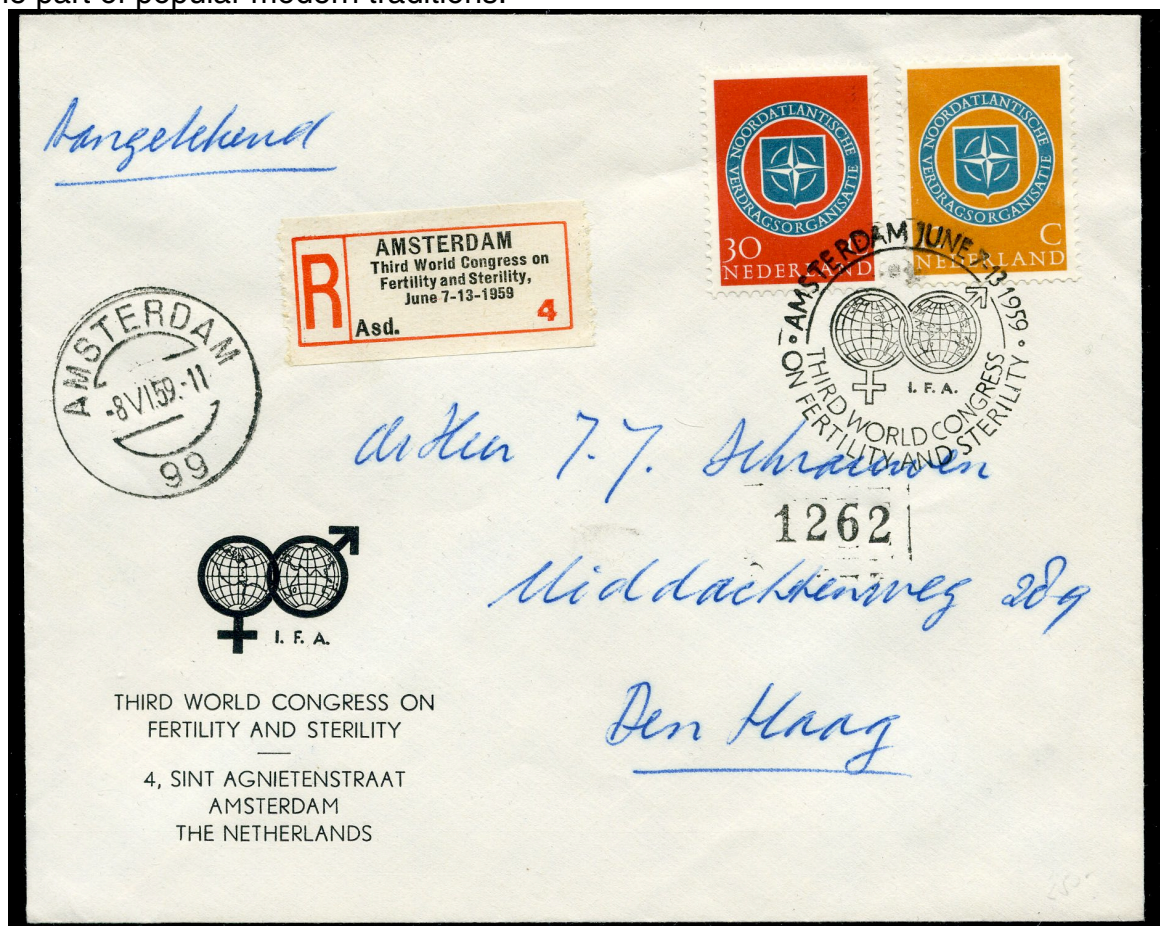


FIG. 272 Third World Congress on Fertility and Sterility
Amsterdam, The Netherlands 1959



Fig. 272a In Vitro Fertilization
Great Britain 1999

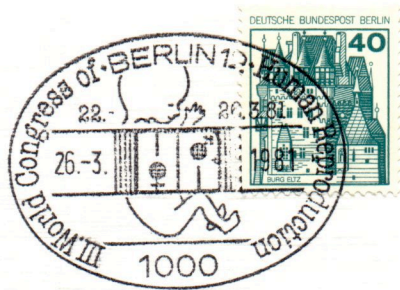


Fig. 273 Human Reproduction
F. R. Germany 1981



Fig. 274 Human Reproduction
Mexico 1997



Fig. 275 Test-Tube Baby
Great Britain 1999



Fig. 276 Test-Tube Baby
Great Britain 1999



Fig. 277 Test-Tube Baby
Grenada

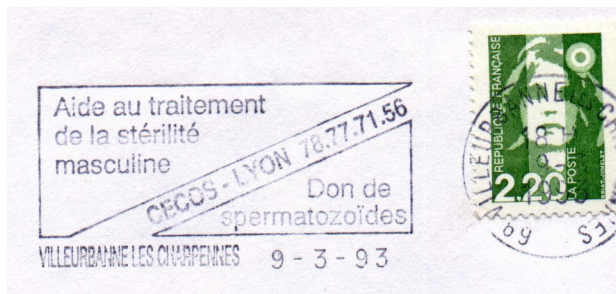


Fig. 278 Help Treating Male Sterility
France 1993

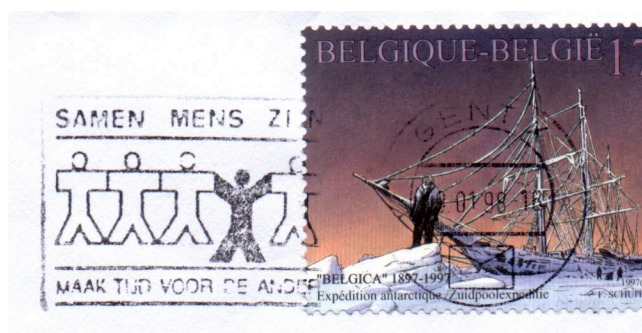


Fig. 279 Sperm Donation
Belgium 1998



Fig. 280 Embryo Transfer
F. R. Germany 1980



Fig. 281 Ginseng
North Korea 1994

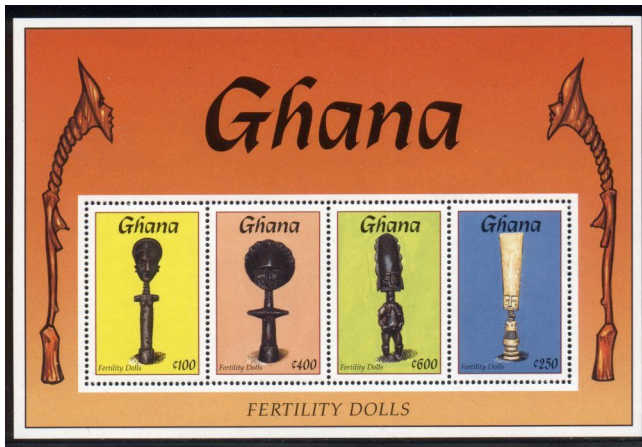


Fig. 282 Fertility Dolls
Ghana 1987



Fig. 283 St. Gabriel
Austria 1986

Infertile couples can address for help to **St. Gabriel the Archangel** (Fig. 283). According to the Scriptures St. Gabriel announced pregnancy to a young virgin in a remote village of Israel. He didn't talk very much. He just said "Hail Mary full of Grace, you are blessed among women." And vanished. St. Gabriel is also the patron of telecommunications, postmen, and philatelists.

Renovascular Hypertension

Awareness for one of the most common causes of secondary hypertension – renovascular hypertension - is symbolized on a stamps issued by Botswana, Pakistan and Uganda (Fig. 284-286).

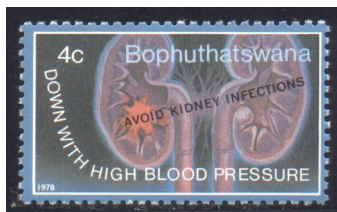


Fig. 284 Hypertension Awareness
Botswana 1978

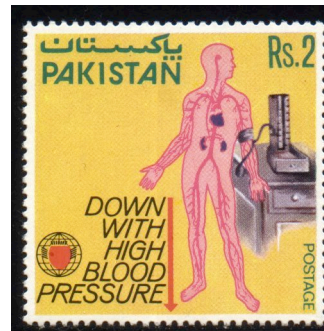


Fig. 285 Hypertension Awareness
Pakistan 1978

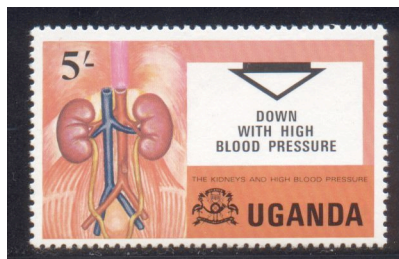


Fig. 286 Hypertension Awareness Uganda 1978



Fig. 287 Tigerstedt (Top left) Finland 1989

Richard Bright (1789-1858) first noted the association of hypertension with renal disease in 1827 (Fig. 88). The critical experimental work was the discovery of renin in 1896 by **Robert A. Tigerstedt (1853-1923)** and Per Bergmann, who noted an acute elevation of the blood pressure of rabbits injected with kidney extracts (Fig. 287). The first suggestion that unilateral renal disease might cause hypertension was made by Ask-Upmark in 1929 through the study of autopsy material. However, the significance of their work was not recognized until the critical experiments by Goldblatt and co-workers, who produced diastolic hypertension in dogs by clamping the main renal arteries and corrected the hypertension by unclamping these arteries. In 1937, A. M. Butler published the first report of hypertension cured by nephrectomy in a patient with a small pyelonephritic kidney.

Luis F. Leloir (1906-1987) et al. noted the proteolytic action of renin leading to the formation of angiotensin (Fig. 288).



Fig. 288 Luis F. Leloir Argentina 1976



Fig. 289 Kidney/Topgr. Anatomy Korea 2000

Renal Replacement

The kidney performs a number of important physiological and hormonal functions (Fig. 289). It plays a central role in maintaining acid-base, water and electrolyte homeostasis, as well as regulating extracellular volume and blood pressure. It produces hormones such as renin, prostaglandins, kallikrein, vitamin D and erythropoietin. It is the normal route for excreting nitrogenous and other waste products derived from intermediary metabolism.

An acute or chronic deterioration in renal functions may be seen in with a variety of insults and results in a buildup of nitrogenous wastes in the plasma (uremia) and/or a failure of the kidney to regulate extracellular fluid volume or composition. Because renal failure is accompanied by marked increases in morbidity and mortality, development of uremic signs and symptoms should result in rapid institution of renal replacement therapy. The most widely employed modality of renal replacement in chronic renal failure is dialysis (peritoneal dialysis, hemodialysis) but - for most patients - the preferred mode

of renal replacement is renal transplantation. Medical congresses about those topics are taking place all around the world (Fig. 290-298).

The first to use natural membranes for dialysis was nature itself. All body functions are based on the transport of substances across the natural cell membranes. Renal function in particular is nothing but a continuous exchange of water and solutes through the membranes of the kidney. The nonrenal tissues that can excrete urea and similar substances are mainly the skin, and the gastrointestinal and respiratory epithelium. In humans with renal failure, when the kidneys fail to fulfill their role, the alternative excretory membranes undertake this. Thus, the gut removes large amounts of urea resulting in diarrhea. The products are also excreted through the oral membranes, and can be seen as crystal deposits around the lips. The skin also removes urea and, in the era before dialysis, patients with end-stage renal failure were covered with fine urea crystals on parts of their body. Apart from the solids, water that is not removed by the kidneys passes across natural body membranes and accumulates either subcutaneously or in cavities like the abdomen and the pleural space.



Fig. 290 Transplantation
Greece 1978



Fig. 291 8th Europ. Congress
Dialysis-Transplantation
Berlin, D. R. Germany 1971

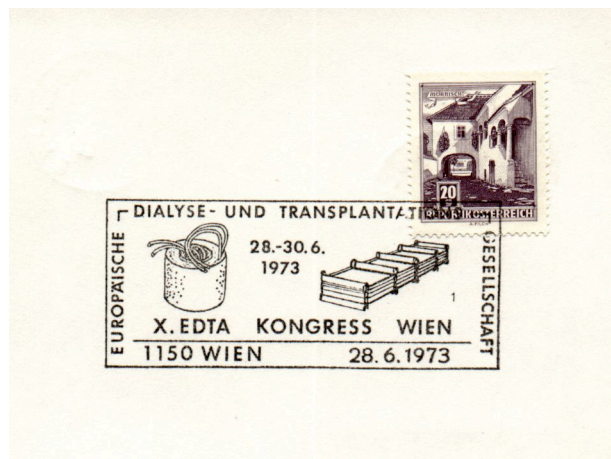


Fig. 292 Two Different Dialyzers
10th EDTA Congress
Vienna, Austria 1973

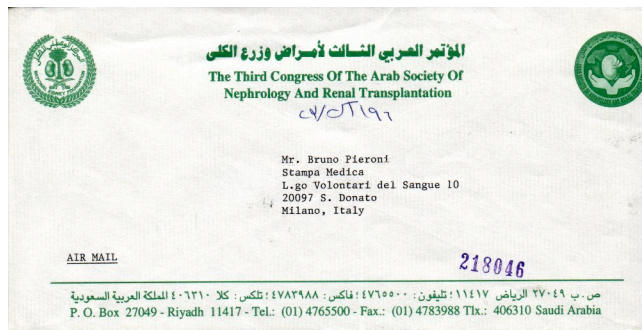


Fig. 293 3rd Congr. Arab Soc. Nephrology and Transplantation
Saudi Arabia



Fig. 294th European Congress
Dialysis and Transplantation
Vienna, Austria 1990



Fig. 295 6th Congr. Spanish Society
Dialysis and Transplantation
Murcia, Spain 1994



Fig. 296 16th Intl. Congress
Transplantation Society
Barcelona, Spain 1996



Fig. 297 Congress Renal Transplantation
End of Century
Villa Carlos Paz, Argentina, 1999

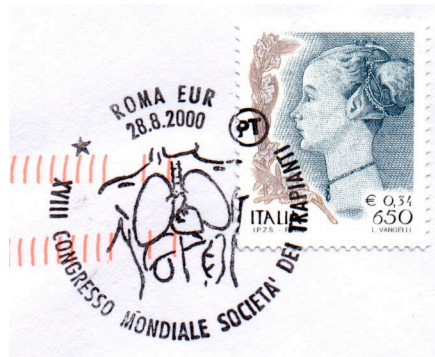


Fig. 298 18th World Congress Transplantation Society
Rome, Italy 2000



Fig. 299 Molière
Afars & Issa 1973

Humans tried to imitate nature. **Hippocrates (460-377 BC)** set down the indications for cleansing the body of unwanted substances: “If a patient who is not febrile presents anorexia, heartache, dizziness and a taste of excess bitterness, then he has need of purification.” (Fig. 2). Thus, ancient Greeks dictated a triple, indefensible commandment: bleed, to get rid of bad humors; starve, to prevent new ones from forming; purge, to get rid of the rest. The policy remained unchallenged for at least 15 centuries. The gut was one of the first natural membranes used for dialysis. Enemas were administered in an attempt to cause diarrhea and thus relieve the patient of toxic substances. **Galen (129-199)** recommended purging for renal diseases (Fig. 3). **Albucasis (936-1013)** and **Avicenna (980-1037)** repeated the suggestion (Fig. 32 and Fig. 5).

Molière (1622-1673), in his famous play *Le malade imaginaire*, ridiculed the universal use of purgation by doctors for any disease (Fig. 299). However, the prescription of enemas or purging agents like Sorbitol for renal failure continued until the acceptance of dialysis became widespread.

Skin was the other natural membrane used for dialysis, either by excreting solutes such as urea, or by removing an excess of body water through perspiration. Hence, hot baths were recommended in antiquity for a variety of diseases, amongst them kidney afflictions. Avicenna recommended sweating for the elimination of toxic substances. For dropsy, Albucasis recommended burying the patient under the sun, or into hot sand or a hot bath, while leaving him thirsty and prescribing diuretics.

The use of the peritoneum for removing water and urine toxins followed the observation that during renal failure and dropsy, the body was trying to eliminate the blood substances that were no longer excreted through the kidneys, by passing them into the peritoneal cavity, hence the formation of ascites. Drainage of ascites was the natural thing to do. Abdominal paracentesis was common even in Hippocrates' time. He himself wrote: “A dropsical patient will be cured if the water that is in the abdominal vessels is drained.” However, Hippocrates and Avicenna warned against the sudden drainage of a great volume of fluid.

Celsus (Fig. 39), in the first century AD, described the operation and the instruments used for abdominal paracentesis. The peritoneal catheter was made of gold, silver, lead or bronze. Albucasis, who wrote extensively on dropsy, used a pointed knife for the skin incision before introducing a

abdominal cavity. Thus, the idea of intermittent peritoneal dialysis was conceived in the Middle Ages, albeit only for water removal. The procedure was crude and left a lot to be desired. It was further refined by introducing fluid into the abdominal cavity, first by Christopher Warrick in England in 1748. Technical improvements were made during the following centuries and currently, many endstage renal patients are kept alive with peritoneal dialysis. It is sometimes referred to as continuous ambulatory peritoneal dialysis (CAPD), a term that emphasizes the continuous nature of this therapy – in contrast to hemodialysis, which is administered intermittently – as well as the fact that patients on peritoneal dialysis are ambulatory and can undergo dialysis while at home or at work. Use of peritoneal dialysis is less popular than use of hemodialysis because of the sometimes lesser effectiveness of peritoneal dialysis and because of the risks and complications associated with peritonitis.

Hemodialysis is a process by which fluid, electrolytes and certain substances of relative small molecular weight are removed from circulatory blood of uremic patients by diffusion through a semipermeable membrane. A variety of different hemodialysis machines (also called artificial kidneys) are available. Access to patient's blood is achieved through an external arteriovenous shunt or, more commonly, an arteriovenous fistula produced surgically.

In 1924, **Georg Haas (1886-1971)** from the small German town of Giessen was the first to perform an extracorporeal hemodialysis on a uremic patient (Fig. 300). Purified hirudin was used as anticoagulant for this experiment that lasted only 15 minutes and came off without complications. Haas calculated from measurements of indican concentration in blood and dialysate that 150 ml of blood had been cleansed. In 1925-26, Haas dialyzed five additional patients. In 1927, at his seventh experiment, Haas conducted hemodialysis using for the first time as anticoagulant heparin, discovered by **Erik Jorpes (Fig. 301)**. The necessarily short dialysis time presumably coupled with low blood flows and small dialysate volumes prevented the dialyses from having any significant therapeutic effect. In a lecture to the Giessen Medical Society in January 1928, Haas detailed the results of three blood cleansings, as he termed them, in two patients with chronic uremia. He concluded his lecture with the comment “Despite the limited number of observations, I have already gotten the distinct impression that it is worth the effort to continue along the path taken.” But Haas did not continue along that path, apparently because of lack of support from his medical community.



Fig. 300 Georg Haas
International Hemodiafiltration Symposium

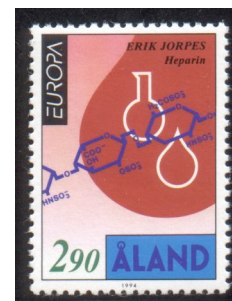


Fig. 301 Heparin
Åland 1994

Fritz Pregl (1869-1930) recommended the application of collodion dialyzers that were later used in the artificial kidney machines (Fig. 231).

In 1942, the industrialist H. Th. J. Berk and Dr. Willem J. Kolff, in Kampen, Holland, constructed the first clinically usable rotating-drum artificial kidney. The first 15 patients treated in 1943 with the artificial kidney died. In all cases death was due to complications incurred by the ravages of uremia and not by the artificial kidney. On September 11, 1945, Kolff saved the life of a 67-year-old woman with acute renal failure, using the artificial kidney machine. After a dialysis for 11.5 hours (sixty grams of urea were removed) the clinical condition of the patient had improved markedly and, several days later, she recovered completely. Although technical advances greatly improved the artificial kidney, the treatment, that – under certain conditions - can be performed at home (Fig. 302), continued to be expensive and distressing to the patient. A patient on dialysis with an artificial kidney is seen on a stamp from Bermuda (Fig. 303). The alternative was kidney transplantation.



Fig. 302 Board of Trustees for Home Dialysis Neu-Isenburg, F. R. Germany 1986



Fig. 303 Dialysis with Artificial Kidney

In 1905, **Alexis Carrel (1873-1944)** and Charles Guthrie, at the University of Chicago, developed a new technique of suture for anastomosis of blood vessels that revolutionized vascular surgery and enabled them to successfully transplant a kidney from one animal to another (Fig. 304). In February 1908, Carrel first successfully accomplished an auto-transplantation on a dog. He performed a bilateral nephrectomy on a female dog and an autografting of one of her kidneys. The dog survived the kidney transplantation; in March 1909, she gave birth to a litter of 11 offspring and, again in December, to a litter of three. In July 1910, after enjoying perfect health, she died of intestinal occlusion. The autopsy showed a normal kidney, both on a macroscopic and microscopic level. Transplantation of the heart, kidney, lungs and other organs in man are all made possible by the use of Carrel's vascular anastomosis technique.

Before anti-rejection drugs and when transplantation surgical procedures were in their infancy, surgeons like Keith Reemtsma in New Orleans and Thomas E. Starzl in Denver were transplanting baboon and chimpanzee kidneys into humans and getting three-to-nine month survival rates. For that matter, in 1910, Ernst Unger of Germany did the flip and transplanted the kidney of a deceased newborn into a baboon. He also transplanted a chimpanzee kidney into a young adult, who died two years later.



Fig. 304 A. Carrel
Sweden 1972

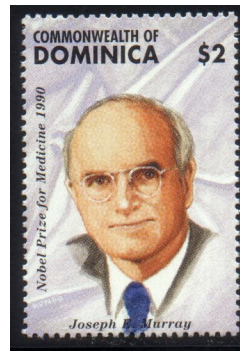


Fig. 305 J. E. Murray
Dominica 1995

In 1954, **Joseph E. Murray (1919-)**, J. P. Merrill and J. H. Harrison at Peter Bent Brigham Hospital in Boston achieved the first long-term success with human allografting by transplanting a kidney from one twin brother to the other who had end-stage renal disease (Fig. 305). Postoperatively the transplanted kidney functioned immediately with a dramatic improvement in the patient's renal and cardiopulmonary status. This spectacular success was a clear demonstration that transplantation could be life saving. During the 1950s Murray and his team transplanted several more sets of identical twins. Their third patient, a dizygotic twin, led a full active normal life until he died of cardiac problems 25 years later. In 1962, Murray performed his first successful transplantation of a cadaver kidney from an unrelated donor with the use of immunosuppressive drugs.

Renal transplantation for polycystic kidney disease is seen on a stamp from Singapore (Fig. 306). The situs after kidney transplantation is shown on stamps from Grenada and The Netherlands (Fig. 307, 308).



Fig. 306 Polycystic Kidney
Singapore 1975

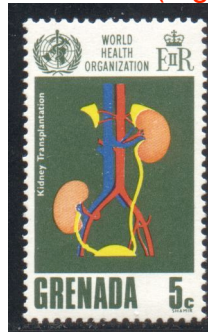


Fig. 307 Situs after
Kidney Transplantation
Grenada 1968



Fig. 308 Situs after
Kidney Transplantation
Netherlands 1978

Kidney allografts are obtained from living matching donors or cadavers, excluding living donors under 18 years of age, and those with a history of hypertension, diabetes, or medically significant illness (chronic lung disease, heart disease, malignant tumor). Over 2/3 of kidney transplants are from cadavers of previously healthy persons who sustained brain death, but maintained stable cardiovascular and renal function. Despite authorized organ sharing systems and grants for organ procurement in many countries around the world, there are still increasing numbers of patients awaiting kidney transplants. The growing shortage of organs available for transplantation has resulted in an increased use of living donors for kidney transplantation.

Special cancellations (Fig. 309-311), cinderellas (Fig. 312, 313), stamps (Fig. 314-319), and first day covers (Fig. 320, 321) dedicated to organ donation and organ transplants had been issued in various parts of the world. A human kidney transport flight is seen on a stamp from Great Britain (Fig. 322).



Fig. 309
Great Britain 1994

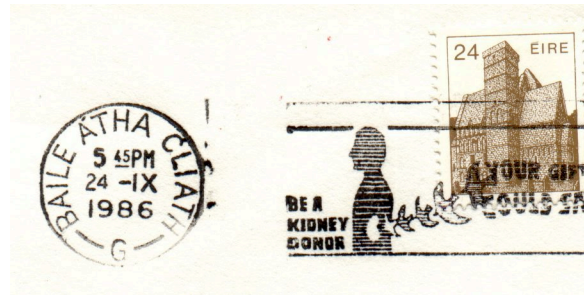


Fig. 310 Be A Kidney Donor
Ireland 1986



Fig. 311 Kidney Donated - Life Saved
France 1980



Fig. 312 Cinderella
Fig. 312 Cinderella
USA

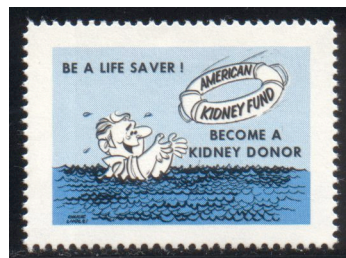


Fig. 313 Cinderella
Fig. 313 Cinderella
USA



Fig. 314
Organ Donation
Turkey 1988



Fig. 315
Organ Donation
Tunisia 1999

Fig. 316
Organ Donation
Italy 2000



Fig. 317 Organ Donation
Chile 2001

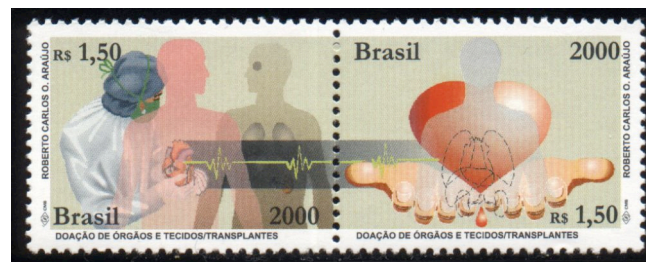


Fig. 318 Organ Donation
Brazil



Fig. 319 Organ donation
France 2004



Fig. 320 Organ transplants
Spain 1982

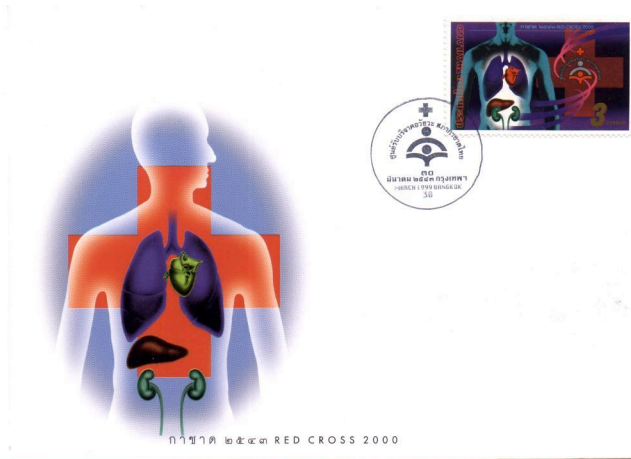


Fig. 321 Organ Transplants
Thailand 2000



Fig. 322 Kidney
Transport
Great Britain 1987

By suppressing the recipient's immune response, a transplanted organ may last for many years. **Peter B. Medawar (1915-1987)** and **Macfarlane Burnet (1899-1985)** were awarded the 1960 Nobel Prize in Medicine for their discovery of acquired immunological tolerance that can prevent the rejection of organ transplants (Fig. 323, 324).



Fig. 323 P. Medawar
Guyana 1995



Fig. 324 M. Burnet
Dominica 1995



Fig. 325 S. Tonegawa
Gambia 1995

During the past decades, renal transplantation has evolved from an experiment in human biology to an established therapy for ESRD. However, despite technical advances and improvement in graft and patient survival, two serious and interrelated problems remain: rejection and infection. To suppress the rejection mechanism immunosuppressive medications are required. These drugs also suppress the body's defense against infection. Thus, transplantation requires a continued effort to induce acceptance of the graft without paralyzing the body's immune system.

Susumu Tonegawa (1939-) discovered a key mechanism in the production of antibodies, for which he received the 1987 Nobel Prize in Medicine (Fig. 325). Tonegawa investigated the genes that code for antibodies and brilliantly demonstrated that the DNA responsible for antibody production is routinely reshuffled to create new genes during the lifetime of an individual, which accounts for antibody diversity and effectiveness. His discovery can help in increasing the efficacy of vaccines and rising the survival chances following organ transplantation.

Graft survival after living donor kidney transplantation is better than with

survival following living-donor kidney transplantation is about 95% after 1 year and 90% after 5 years. This is better than patient survival following cadaver kidney transplantation with a 1-year survival rate of 90% and a 5-year survival rate of about 80%. Several kidney transplant recipients now have grafts that have functioned for over 30 years. For 7 years there is also in use a practice of transplanting two adult kidneys into a single recipient. The concept is that using two kidneys rather than one decreases the potential for a poor outcome when it is anticipated that a single kidney from a given donor will work sub-optimally.

Prostate Cancer

Prostate cancer is now recognized as one of the principal medical problems facing the male population. The clinical problems associated with the disease are, and will be, a challenge to handle. The incidence of prostate cancer is increasing rapidly and so is the knowledge about diagnosis and treatment. Recently, a randomized study has indicated that radical prostatectomy may be superior to watchful waiting in the management of clinically localized prostate cancer. Therefore, early detection of prostate cancer by individual screening with the ultimate aim of improving the standard of patient care has become more and more important.

Awareness for prostate cancer is emphasized on some USA first day covers (Fig. 326-328) and cancellations (Fig. 329-332), as well as on a London sender's franking-machine cancellation (Fig. 333).

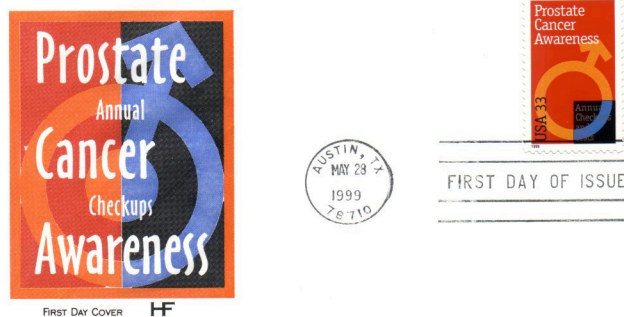
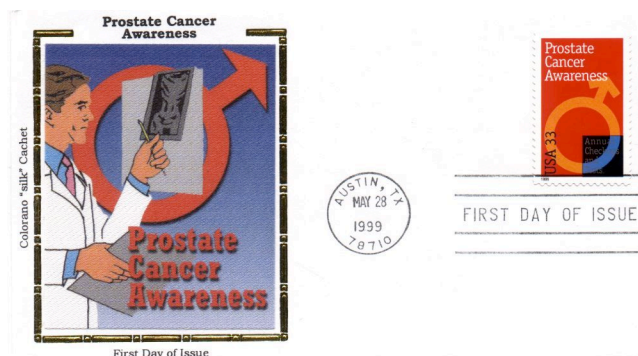


Fig. 326 Prostate Cancer Awareness
USA 1999



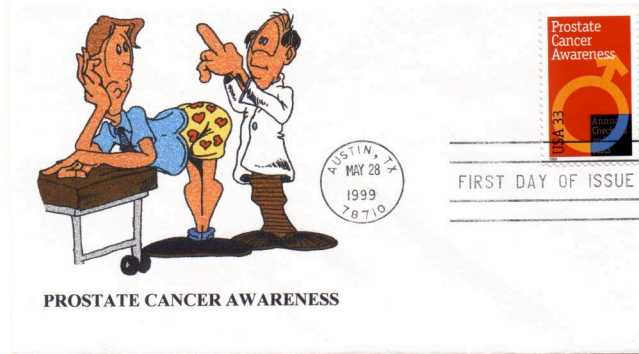


Fig. 328 Prostate Cancer Awareness
USA 1999

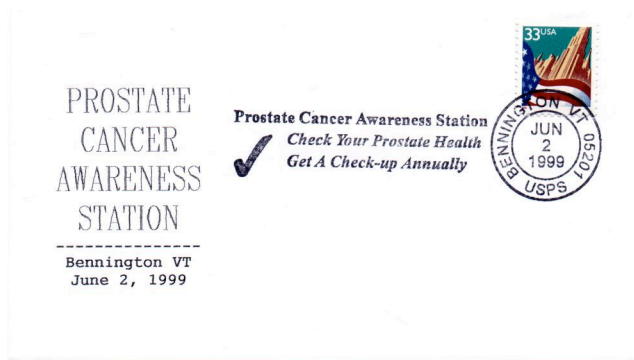


Fig. 329 Prostate Cancer Awareness Station
Bennington VT, USA 1999

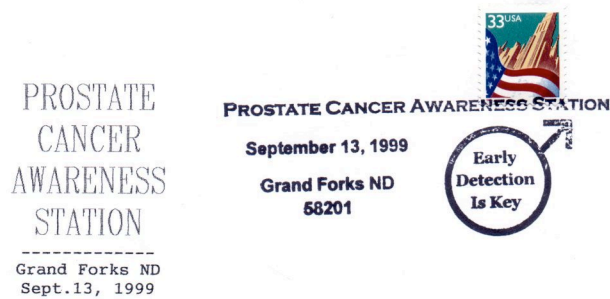


Fig. 330 Prostate Cancer Awareness Station
Grand Forks ND, USA 1999

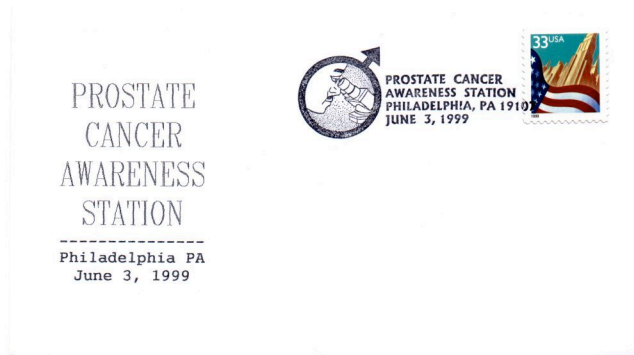


Fig. 331 Prostate Cancer Awareness Station
Philadelphia PA, USA 1999

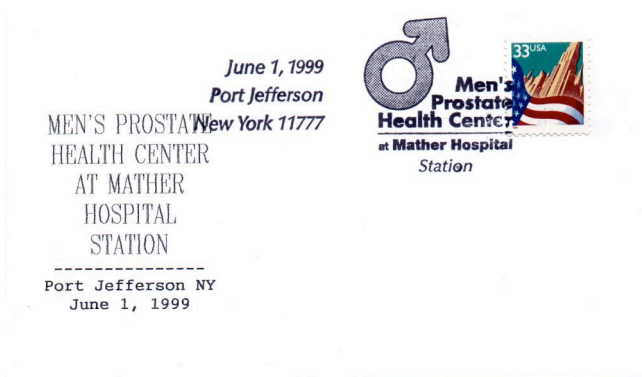


Fig. 332 Prostate Cancer Health Center
Port Jefferson NY, USA 1999 London 1998

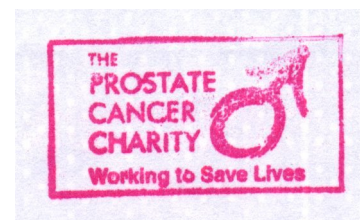


Fig. 333 Prostate Ca. Charity

Doxorubicin, an anthracycline antibiotic, is used in bladder cancer prophylaxis and in clinical trials for treatment regimens of Wilm's tumor. Before the availability of PSA, doxorubicin was also used as chemotherapy for hormone resistant prostate cancer. The chemical structure of doxorubicin and a cell with a molecule of doxorubicin being targeted to the nucleus (the red area) is shown on a stamp issued in 2004 (Fig. 334).



Fig. 334 Doxorubicin
Japan 2004

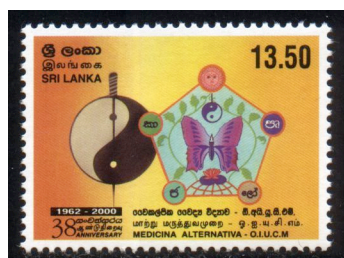


Fig. 335 Alternative Medicine
Sri Lanka 2000



Fig. 336 Dytiscus marginalis
Great Britain 2001

Complementary medicine is used together with conventional medicine, whereas alternative medicine is used in place of conventional medicine (Fig. 335). While some scientific evidence exists regarding some complementary and alternative therapies, for most there are key questions that are yet to be answered through well-designed scientific studies. Acupuncture, a noninvasive modality of alternative therapy with initially promising results, was applied in patients with interstitial cystitis, or neuromuscular dysfunction of lower urinary tract (Fig. 336, 337). Dried adult diving beetles (*Dytiscus marginalis*) are used in China as medicinal ingredients to cure nocturia and enuresis (Fig. 338).



Fig. 337 Acupuncture
P. R. China

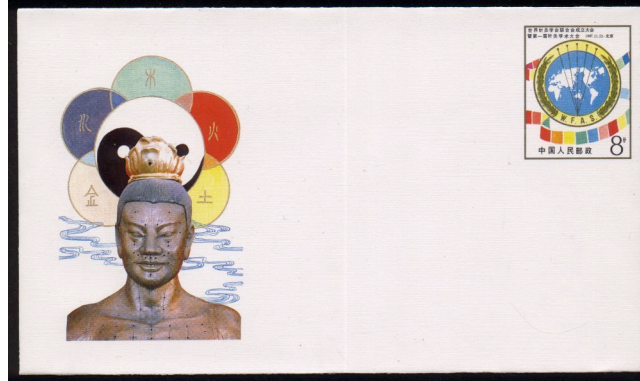


Fig. 338 The First World Conference on Acupuncture-Moxibustion
Beijing, P. R. China 1987

Saints

Sometimes, ill people are calling different saints for helping against diseases: **St. Benedict of Nursia** against kidney stones (Fig. 339); **St. Stephan** against diseases of the urinary tract (Fig. 340); **St. Gregor** against gout (Fig. 341); **St. Wolfgang** against gout and infertility (Fig. 342); **St. Peter** by people searching cure in spas (Fig. 343), and many other saints.

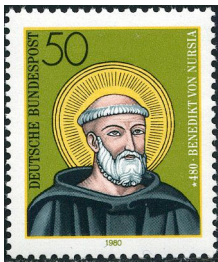


Fig. 339 St. Benedict
F. R. Germany 1980



Fig. 340 St. Stephan
Italy 1955

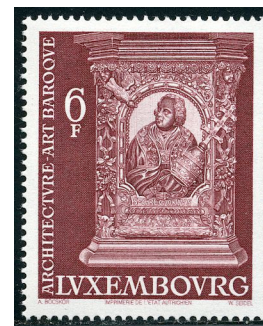


Fig. 341 St. Gregor
Luxembourg 1977



Fig. 342 St. Wolfgang
Austria 1976



Fig. 343 St. Peter
Spain 1961

Urological Facilities

Advertising for spas and clinics specialized in the treatment of genito-urinary diseases can be seen on some cancellations (Fig. 344-348).



Fig. 344
Spa for Urological Diseases
Bad Lauchstädt, Germany



Fig. 345
344 Spa for Urological Diseases
Bad Wildungen, Germany



Fig. 346 Spa for Urological Diseases
Bad Radkersburg, Austria



Fig. 347 Spa for Urological Diseases
Bad Wildungen, Germany



Fig. 348 Surgical-Urological Private Clinic Johanneum

Urological Meetings

Several cancellations (Fig. 349-360), special covers (Fig. 361-363), and first day covers (Fig. 9, 364, 365) have been issued on the occasion of urological meetings all around the world.



Fig. 349 Intl. Congress of Urology Athens, Greece 1955



Fig. 350 Urological Congress Santander, Spain 1968



Fig. 351 25th Congress Polish Urological Association Poland 1974



Fig. 352 16th Meeting S-W German Urological Society Reutlingen, Germany 1975



Fig. 353 Urolog. Congress San Marino 1978



Fig. 354 48th National Congress of Urology



Fig. 355 5th National Congress DSETY

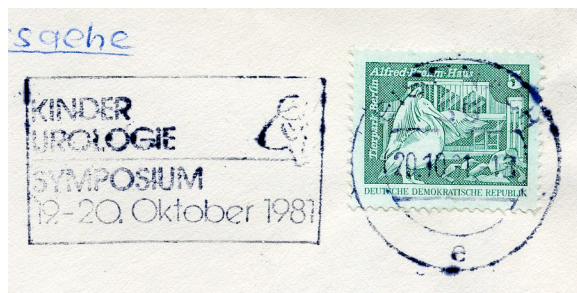


Fig. 356 Symposium for Pediatric Urology
Germany 1981



Fig. 357 Meeting on Preventing
Nephro-Urological Disorders
Biella, Italy 2000



Fig. 358 Intl. Urolog. Meeting
Ancona Citta, Italy 2000

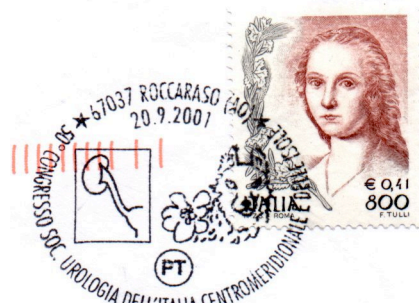


Fig. 359 50th Congress
Italian Urological Society
Roccaraso, Italy 2001

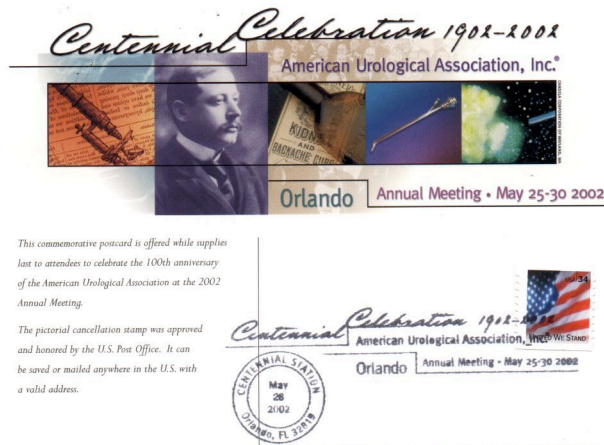


Fig. 360 AUA 97th Annual Meeting Centennial Celebration Orlando FL, USA 2002



Fig. 361 50th National Urological Congress Puerto de la Cruz, Spain 1985



Fig. 362 Prahova Therapeutic Days Prahova, Romania 1986

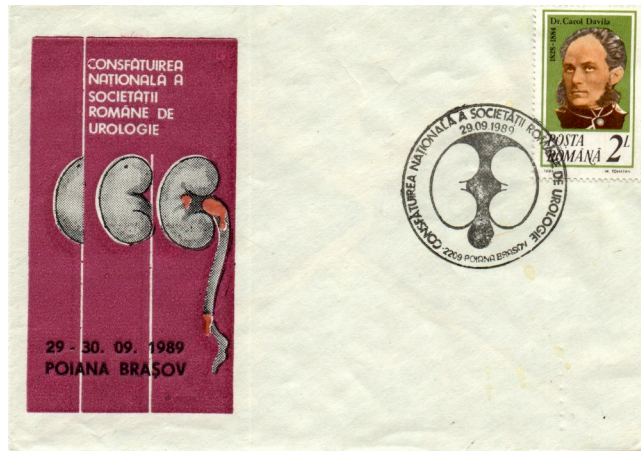


Fig. 363 National Meeting of the Romanian Society of Urology Brasov, Romania 1989



Fig. 364 5th Congress European Society of Urology Vienna, Austria 1982



Fig. 365 21th Congress Intl. Society of Urology Buenos Aires, Argentina 1988

Private Die Proprietary Stamps

At the turn of the 19th century, in America, a wide variety of nostrums, so called proprietary medicines or patent medicines, were sold over-the-counter to “cure” diseases of the bladder and kidneys, as well as the “loss of manhood” and

of the Civil War upon the Federal treasury resulted in Congress passing the Revenue Act of 1862. The Government provided revenue stamps (now known as private die proprietary stamps) to be affixed to boxes or packages of proprietary medicines. The stamps were usually torn in opening the box or container. Following are a few examples.

Collins Voltaic Plasters, sold by **Collins Brothers** (Fig. 366), and Mack's Kidney Plaster, made by **Ellwood Lee Co.** (Fig. 367), promised to relieve pain and inflammation of the kidneys.



Fig. 366 Collins Bros



Fig. 367 Ellwood Lee

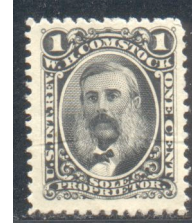


Fig. 368 Comstock

USA RS 59

USA RS 292

Sanmetto, sold by **Od Chemical Co.**, advertised as "genito-urinary nutrient and tonic with special action upon the glands of the reproductive organs, as the mammae, ovaries, prostate, testes, etc" (Fig. 369).

Vegetine, made by **H. R. Stevens**, advertised as "The Great Blood Purifier" (Fig. 370).

Tarrant's Seltzer Aperient, sold by **Tarrant & Company**, advertised to be taken in autumn for its "tonic action on the bowels, stomach and kidneys. Preparing the body for the reign of winter" (Fig. 371).



Fig. 369 Od Chemical Co.

USA RS 302



Fig. 370 H.R. Stevens

USA RS 229



Fig. 371 Tarrant & Co.

USA RS 241

Warner's Safe Kidney and Liver cure, made by **Warner Safe Cure Co.**, catered to a widespread fear of Bright's Disease (Fig. 372).

Kidney-Wort, sold by **Wells, Richardson & Co.**, claimed to be "the safest, the surest and the best ever discovered for kidney diseases" (Fig. 373).



Fig. 372 Warner's Safe Cure

USA RS 305



Fig. 373 Wells, Richardson

USA RS 263d

Medical Future – Gene Therapy

The molecule called deoxyribonucleic acid (DNA) holds the very key to the nature of living things. It stores the hereditary information that is passed from

the cell. The year 2003 marks the 50th anniversary of the discovery of the structure of DNA (Fig. 374). **James D. Watson (1928 -)** and **Francis H. C. Crick (1916 -)** first proposed this structure in 1953 (Fig 375, 376). Watson and Crick also explained DNA replication. Crick then turned his attention to deciphering the genetic code. For their discoveries concerning the molecular structure of nucleic acids and its significance for information transfer in living materials, Francis Crick, James Watson and **Maurice Wilkins (1916 -)** were awarded the 1962 Nobel Prize in Medicine (Fig. 377). Decoding DNA made identifying and modifying individual genes, and mapping the human genome possible, thus paving the way for the treatment and cure of many diseases by gene therapy.

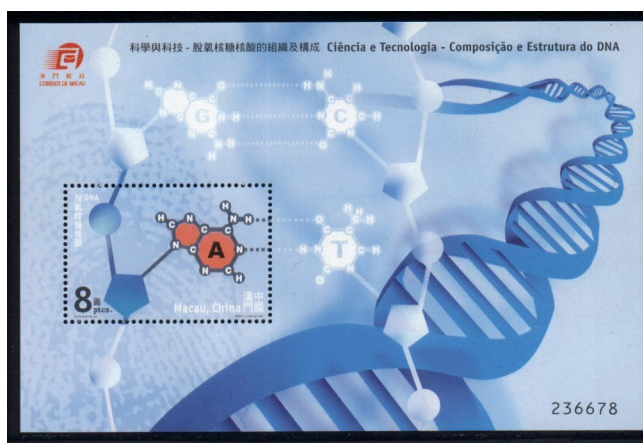


Fig. 374 The Molecule of Deoxyribonucleic Acid (DNA)
Macao, China 2001



Fig. 375 Crick and Watson
with their model
of the double helix
Australia 2003



Fig. 376 Francis Crick and James Watson
Marshall Islands 1999



Fig. 377 Maurice Wilkins
Palau 1999

The concept of gene therapy is based on the assumption that definitive treatment for genetic disease should be possible by directing treatment to the site of the defect itself within the genome. This can be done by gene replacement, in which a healthy gene would replace the damaged copy and/or gene augmentation, in which a healthy gene is added to the genome without replacement of the defective gene. In addition, investigators are working with genes that may trick malignant cells to commit suicide by the process called apoptosis. Unfortunately, 'naked' DNA is not suitable; the DNA must be attached to a vector that carries it into a cell. In the case of prostate cancer, scientists have experimented with two kinds of vectors. In one, the DNA is coated with a form of fat called liposome. In the other, more promising approach, the DNA is injected into a virus, which is then allowed to infect the

virus and to provide more space for the new genes, researchers sometimes remove the virus's own genes before proceeding further. Since the first trial of gene therapy for cancer in 1990, more than 150 studies have been conducted in the United States and at least as many are under way abroad. Though the majority of gene therapy protocols are in infant stage, the burgeoning field of gene therapy holds much promise for the future. Someday there may be a way to stop disease before it even starts (Fig. 378). It is too early for foreseeing the possible applications of stem cell research on the prevention and treatment of genitourinary diseases (Fig. 379).



Fig. 378 Medical Future

Great Britain 2003



Fig. 379 Cloning of human embryonic cells

North Korea 2005

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Guy de Chauliac (1300-1367), a famous surgeon of the Middle Ages, physician to pope Clement VI and later to his successor at Avignon, wrote a scholastic work of great importance: *Chirurgia magna* (Fig. 380). There have been many editions of this work, the first of which was published in French in Paris (1748). Galen was the source of most of his material. Calculous disease is treated at length, and although his account of lithotomy is remarkable, he does not seem to have performed the operation himself. The aversion to surgery led Guy de Chauliac to recommend medical treatment - vegetarian diet and a variety of medicines, mostly derived from Arab authors - in calculous disease, both for prevention and cure. When conservative treatment failed, lithotomy was considered. Since complications of lithotomy were so many and cures so few, he remarked "And if serious complications develop, may God help us."



Fig. 380 Guy de Chauliac
Germany 2006

Ivan I. Horbachevskyi (1854-1952), Ukrainian biochemist, synthesized uric acid from carbamide and glycine (Fig. 381). When uric acid enters human urine and urine becomes supersaturated with uric acid, crystals precipitate and form uric acid stones. During 1889-1891 Horbachevskyi discovered the enzyme xanthine oxydase that is a metabolic pathway for uric acid formation. Xanthine oxydase catalyzes the oxidation of hypoxanthine to xanthine and can further catalyze the oxidation of xanthine to uric acid. If a patient has a high urinary uric acid excretion and uric acid stones he is treated with allopurinol. This drug inhibits the conversion of hypoxanthine and xanthine to uric acid.



Fig. 381 Ivan I. Horbachevskyi
Ukraine 1995

Sigmund Freud (1856-1939), in an essay “*Über die allgemeinste Erniedrigung des Liebeslebens*” (About the most prevalent humiliation in erotic life), deals in detail with male “psychical impotence.” He blamed sexual dysfunction on emotional problems and maintained that psychical impotence is far more widespread than generally supposed. In Freud’s view, psychical impotence is a special variant of male erectile dysfunction; it is essentially a disturbance of the capability of love. Freud comes to the conclusion that “it must be said that whoever is to be really free and happy in love must overcome his deference for women and come to terms with the idea of incest with mother or sister.” This implies that freedom in life and happiness in love are bound to the overcoming of the Oedipus complex which nowadays is viewed more as a developmental phase characterized by the triangular processes that have to be mastered by the child than by the contents stressed by Freud (Fig. 382).

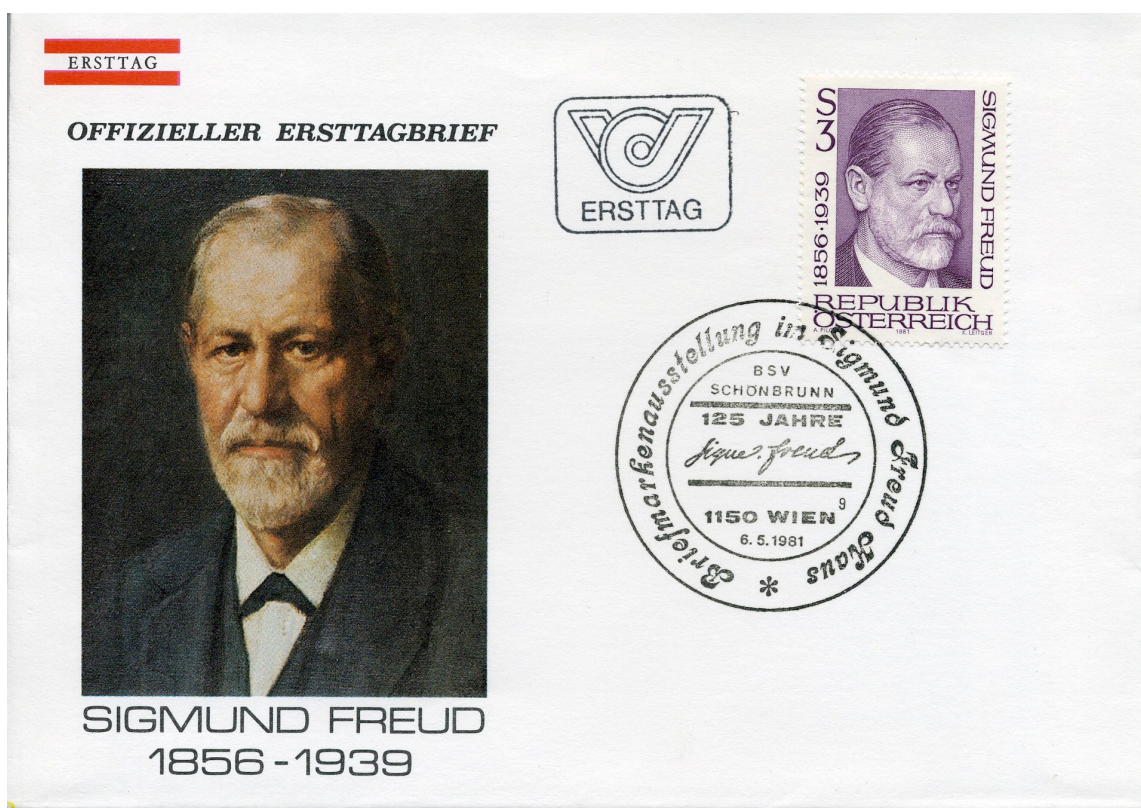


Fig. 382 Sigmund Freud
Austria 1981

Zoilo Cuellar Duran (1871-1935), a Colombian physician who specialized in Paris in urology and urological surgery, was a co-founder of the Surgical Society of Bogotá (Fig. 383). He established in Bogotá a urological service at the House of Health, the first in Colombia. There he continued to operate as urologist. In 1914, together with Carlos Esguerra, another urologist, he founded a urological teaching position and training center at the University of Bogotá that trained thousands of students.



Fig. 383 Zoilo Cuellar Duran
Colombia 2002

René Leriche (1879-1955), French surgeon, first described in 1948 erectile dysfunction due to occlusion of the aorta and iliac arteries (**Fig. 384**). Patients diagnosed with thrombotic occlusion of the terminal aorta (Leriche syndrome), which at times could affect one or both iliac arteries, suffered a sudden or slowly progressive loss of erectile function. Most of them regained potency after surgical correction: resection of the obliterated vessel segments and lumbar sympatectomy.



Fig. 384 René Leriche
France 1958

Earl W. Sutherland Jr. (1915-1974), American physician and biochemist, was awarded the 1971 Nobel Prize in Physiology or Medicine for his discoveries concerning the mechanisms of actions of hormones (Fig. 385). Thanks to his pioneering work, the biological significance of cyclic 3'5'-AMP (adenosine monophosphate) and cyclic 3'5'-GMP (guanosine monophosphate) is well established as intermediates of hormone and neurotransmitter action, and more general, as ubiquitous intracellular second messengers. Sutherland's work, as well as pertinent data from other investigators who have worked in this field, provided the basis of our understanding of the way that cell communicate with each other and of the molecular nature of the entities involved in these processes. Subsequently, this enabled research in the fields of human cardiovascular and immune systems as well as of the urogenital tract to evaluate key regulatory systems and elucidate pharmacological intervention by logical drug design to exert at least tissue specific effects, e.g. by the administration of phosphodiesterase inhibitors (sildenafil, vardenafil, tadalafil) for the treatment of erectile dysfunction.



Fig. 385 Earl W. Sutherland Jr.
Guyana 1995

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