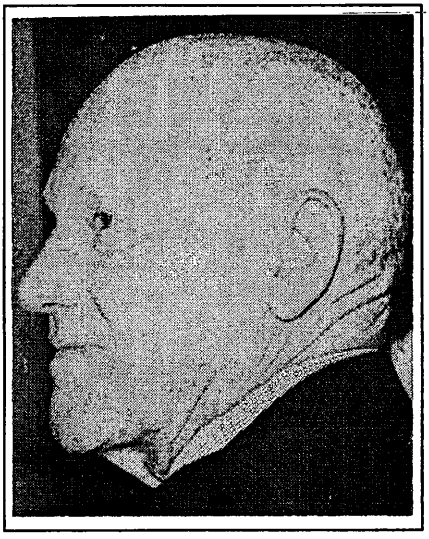

CATHETERS AND SOUNDS: THE HISTORY OF BLADDER CATHETERISATION AND SOME HISTORICAL ASPECTS OF URINERECIPIENTS AND URINALS

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> "There is little doubt that the catheter is the most valuable single instrument in the urologist's armamentarium."
>
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1. Catheters and sounds: the history of bladder catheterisation

The term 'catheter' is derived from the Greek word meaning to let down into, or send down.
The Romans used the word *demissorium* or *demissum* or *immissum*, meaning 'what is brought in'. Celsus designed the instrument as a *fistula*, and the later Romans named it *syringa*. The French anatomist Riolan described it as *claris vesicae*, which is the word *upu* or 'key' for the Mesopotamians. Later on, French doctors described the instrument as *algalie*, a name derived from the Arab language. In the 19th century the word *algalie* was reserved for hard silver catheters, and 'catheter' for rubber malleable ones.

Emptying the painful, overfilled bladder must have been one of the problems of mankind since ancient times. Catheterisations were reported to have been accomplished with reeds, straws and curled-up palm leaves. The Chinese used leaves of *allium*. *Allium* is the generic name of the onion family, and the long, thin leaves are hollow. When properly dried and prepared, and sometimes covered with Chinese lacquer, they would have made excellent catheters. The Sumerians, the antecedents of both the Babylonians and the Egyptians, may even have used gold to make

catheters. The Babylonian Physicians inserted directly pharmalogical prescriptions consisting of plant and mineral substances into the urethra through a tube.
"If a man's urine constantly drips and he is not able to hold it back, his bladder swells and he is full of wind, his urine duct is full of blisters: in order to cure him, bray *puqutter*, crush it in pressed oil, and (blow) it into his penis through a bronze tube." (Köcher F.)
However, we have no way of knowing how long the tube was, or whether it could in some cases also has functioned as a catheter in case of obstruction.
Because it is soft and malleable, gold was ideally suited for this purpose. In the Indian Vedas some catheters were described as coated with lacquer and lubricated with ghee (clarified butter). Sushruta, who invented the lithotomy position, is supposed to have used bladder catheters, but this is denied by Müller, who stated that the Hindu civilisation did not know about catheters. Although Zysk in his "Religious Healing in the Veda" writes that in the Veda a simple method is described in which a reed was used to cure bladder retention. An outline of Persian urology is found in the Yadiguiar of Ibn Cherif, who practised in Asia Minor (probably at Broussa). Catheterisation is suggested in a passage which advises the insertion into the urethra of polished twigs of the plant *tham teresi*. The Greek Erasistos (310-250 BC) of Kos used an S-shaped catheter. In the excavations of Pompeii, Roman metal catheters were discovered. Galen (131-210 AD) also demonstrated an S-shaped metal catheter.

The next significant step forward was a flexible, more malleable catheter devised by Avicenna in 1036. Avicenna was the first to insist that catheterisation should be done gently and without force. With this in mind, he designed catheters 'ex lenioribus corporibus et magis susceptibilibus flexionis' made from the skin of animals or fish, treated with an ointment of white lead and ox blood to make them firmer, and lubricated with soft cheese.

Abulcasis (936-1013 AD) practised at Cordoba. His technique of catheterisation is that of Paul of Aegina (5^{th} century AD) : 'The bladder should be emptied by a slender silver catheter expanding at its outer end

into a small tunnel'. Arcularius († 1484) also mentioned flexible catheters made of paper, wood or leather.

But in mediaeval times the silver catheter became the most popular type. Silver was chosen for several reasons: it was easily formed, easily bent as desired, and it was said to have some antiseptic function. The catheters used by Ambroise Paré (1564) were curved over a considerable part of their length. Paré writes : "Or les Sondes doiuent estre proportionnees selon le sexe et les aages. Partant il en faut auoir de petites, longues, moyênes, grosses, menuës, courbees, et droites. D'auâtage, lors qu'on les met en la vessie pour les faire vriner, il y faut mettre dedâs vn filet d'argent, pour empescher que quelque humeur ou sang ne s'engorge au bout, qui seroit cause que l'vrine ne pourroit passer au trauers : et quand elle sera dans la vessie, on doit retirer le fil d'argent, àfin que l'vrine passe librement au trauers d'icelle."

Fabricius of Acquapendente (16th century) described catheters made of silver, copper, and brass, but also of horn. He noted that: 'the Ancients made only a single orifice at the end, the moderns also at the side'. He also mentioned a catheter made of textile, impregnated with wax and moulded on a silver sound.

Some years later the Flemish scientist Van Helmont (1578-1644) applied the same principle, but instead of textile he used chamois skin, treated on the outside with lead and linseed oil. He introduced this catheter with the help of a stylet, made of whale bone. This allowed him to catherise the same patient forty times a day!

Later on, the woven catheter was produced, and the silk woven varnished catheter is its direct descendant. Woven catheters were of tubular construction, soaked in linseed oil and then dried.

Scultetus (1595-1645) of Ulm described and illustrated various surgical procedures, including catheterisation in his well known *Armamentarium Chirurgicum*. It is interesting to note that in mediaeval times, and even in the Renaissance, catheterisation was done in the upright, kneeling or sitting positions [Fig.1.].

Like many surgeons of this period Saviard filled the eye of his catheter with butter to prevent the entry of blood during the passage.

The silver woven, coated catheter is of course much smoother, more regular and easier to make. So is the catheter made of flat silver wires, spirally wound by the Dutch surgeon Van Solingen and described in his book *Manuale Operatien der Chirurgie* (1684).The Dutch translation by Hendrik Ulhoorn of Laurens Heister's book *Heelkundige Onderwijzingen* (1776) also describes a silver catheter.

In 1752 Benjamin Franklin described a silver catheter to his brother: 'It might be flexible, but must be covered with a 'fine gut', or rubbed with tallow to fill the joints'.

Catheterisation with a metal catheter was extremely difficult, and was known as a 'tour de maître' (attributed to Mareschal), or 'tour sur le ventre' and only a few doctors and surgeons were able to perform this 'tour de maître'.

J.L. Petit (1674-1750) invented a catheter with a double curve, but it was in fact Louis Auguste Mercier (1811-1882) who in 1836 invented the *coudé* catheter and in 1841 the *bicoudé* catheter. (*Coudé* means 'elbow' in French) [Fig.2]. Both were metal catheters. The coudé catheter provoked a lot of discussion since a few years later Leroy claimed that he was the real inventor of the coudé catheter which he did not name 'catheter à courbure' like Mercier, but 'à toute petite courbure ...'. And in 1857 the British journal *The Leech*, in Cardiff, published a biography with a picture of Emile Coudé as the inventor of the bicoudé catheter ! This was strongly contested by a letter in the *British Medical Journal* and followed by another letter published in the *The Lancet* from a certain Hercule Coudé who claimed that Emile Coudé was not only his uncle but the real inventor of the Coudé catheter. Howard Hanley later claimed that the real inventor was not Monsieur Coudé, but his half brother Bicoudé.

In 1875 J.J. Cazenave published a detailed monograph on his experiments with catheters, extending over a period of 20 to 30 years,

with whale bone, narwal tusks, and ivory tubes, and finally succeeded in producing a flexible and smooth catheter of real ivory, conforming to the shape of the urethra.

The introduction of catheters made of elastic gum or rubber was an important step forward. Herissand in France suggested that rubber might be used for the manufacture of catheters and Troja, an Italian surgeon, tried to put this idea into practice, but without success. In 1768 Macques had the same idea, but it was a silversmith in Paris named Bernard who had the idea of covering and impregnating a woven silk cylindrical tube with rubber. Still this first rubber catheter was of very poor quality because it became weak at body temperature and friable and rough through air contact. Fragments remained in the bladder and there was a lot of encrustation. Rubber could not be formed and shaped as desired until 1839 when Goodyear invented vulcanisation. By this vulcanisation technique the properties of firmness, flexibility and durability could be improved.

At the hospital St. Louis in Paris, Auguste Nelaton [Fig.3.] and Goodyear's vulcanisation process was used to produce what is still known and used as the Nelaton type of catheter of red rubber, with a solid tip and one eyed [Fig.4.]. The 'sondes en caoutchouc rouge' of Nélaton had a narrow lumen and could not be used for very long because the rubber became hard and friable. The rubber catheter was subsequently perfected and patented for commercial use by James Archibald Jacques, manager of a rubber factory in England.

In the United States it was not until 1883 that Petrie, a Frenchman of Philadelphia, began to manufacture catheters. Roy, a son-in-law of Benas, a Parisian instrument maker, established a catheter factory in a suburb of New York City around 1879. The business closed about 11 years later. George Tiemann and Company of New York City became the first major manufacturer of rubber catheters in the US around 1876. By 1893 about one half of the one million catheters and bougies used annually in the US were produced domestically.

Once the use of rubber and gum elastic catheters became widespread and production increased, some method of standardisation became necessary. Joseph Frederick Benoit Charrière, a French instrument maker and a contemporary of Nelaton developed the French scale, still the most widely used today, based on the metric system, and promulgated by the French Academy of Science in 1799. His scale was based on one third of a millimetre in the diameter of a bougie being equal to one unit in size. Thus a 1 mm catheter is a no.3 French. The system was modified a few years later by Bénique. He based his scale on one-sixth of a millimetre so that a no. 1 charrière was equal to a no. 2 bénique. The English, who always seem to like more complex measurement systems, had a scale based on differences of one sixty-fourth of an inch in diameter, which was known as the Weiss gauge (after one of the leading instrument makers of this period). Sir Henry Thompson, the English father of urology, when advocating adoption of the French scale as being more precise said: 'We must be cosmopolitan and tolerant'. And so in 1922 the Weiss gauge scale was changed and the English also employed the metric system. It was based on a scale of 0.5 mm in diameter, beginning with a no. 1 English equal to 1.5 mm in diameter.

One of the requested developments was a catheter that could be retained in place through its own configuration. Most indwelling catheters were taped or tied to the penis in men, and they were sometimes sewn to the urethral orifice in women.

In 1822 Theodore Ducamp used inflatable bags on his dilating bougies. The bags were formed of Goldbeater's skin, a submucosal layer of the intestine of oxen. In about 1841 Reybard designed a self-retaining catheter. One part was held in place by a movable flange and the other part fitted with a small inflatable balloon: the prototype of the Foley catheter [fig.5]. It was published in his book: *Traité Pratique de Rétrécissements du Canal de l'Urèthre* (Paris 1853) and was introduced as 'sonde à fixation automatique'. Later on, self-retaining catheters were designed by Lebreton, Desnos, Holt and Dowse.

In 1872, J.J. Wright, a surgeon from Halifax in Yorkshire (England), designed a rubber catheter with flexible shoulders. It was not until 20

years later that De Pezzer gave an account of his mushroom-ended catheter at the Congrès Français de Chirurgie (1890). Two years later, in 1892, Malecot, a senior intern of Felix Guyon described the 'sonde se fixant d'elle-même à demeure dans la vessie', a wing-tipped catheter known by his name. Numerous other self-retaining catheters were described during the early part of the 20th century. John R. Herman mentioned having made a 5 cc self-retaining catheter in 1927 by tying a balloon made of rubber to a two-way woven catheter (the idea of this catheter came from Dr. Vincent Odolo of Providence, Rhode Island). In use, this catheter proved impractical as the quality of rubber available at that time caused the balloon to disintegrate very soon after coming into contact with the urine in the bladder.

It was not until latex rubber became available in the early 30s that the 5 cc balloon self-retaining catheter became practical.
In 1929 Dr. F.E.B. Foley of St. Paul, Minnesota, ordered Bard to make a longitudinally-grooved catheter for him, to which he attached an inflating tube and a balloon by means of a fine silk thread and waterproof cement. During this period, Dr. Thomas M. Jarmon of Tyler, Texas, contributed considerably by inventing a very ingenious method of tying the bags. The first balloon catheter commercially manufactured and sold was presented to the profession by Dr. Hobert Dean Belknap of Portland, Oregon, in an article published in 1933 in the *Urologic and Cutaneous Review*. This catheter was manufactured by a mechanical rubber moulder in Portland and distributed by Bard. During the same period, the Anode Company, with the help of Dr. Foley, produced a practical balloon catheter, now known as the 'Foley'. This was published in the *Journal of Urology* in July 1937: 'A self retaining bag catheter for use as an indwelling catheter for constant drainage of the bladder'.

Prior to the advent of prostatectomy the patient was usually condemned to a 'catheter life'. Patients with persistent retention were taught to carry out the procedure themselves. The necessary requisites consisted of a catheter and lubricant, which could be carried in a pocket case, a walking stick or other container: 'Patients carry in their walking sticks or umbrellas but one catheter'. A cabinet of elaborate apparatus was designed for the use of the affluent patient at home. Henry Thompson

referred to two patients, one of whom, aged 90, had been catheterised himself 35 000 times. Even in 1893 Buckston Browne maintained that as long as the catheter life was tolerable to the patient, prostatectomy should not be performed.

The expression 'catheter fever' was first used by Andrew Clark in 1833, to describe episodes of febrile illness in men with prostatic obstruction treated with catheters. One of the earliest descriptions of a systematic approach to reduction of infections due to the indwelling catheter was reported in 1928 by Cuthbert Dukes working at St. Marks Hospital in London. He developed an intermittent irrigation device in which the catheter was attached by a Y tube to a sterile closed drainage bottle. In addition, periodic irrigation with oxycyanide of mercury (1/500) was used to wash the system.

Tidal drainage was originally introduced by Laver but in 1947 was promoted by Munro in Boston. By the periodic filling of the bladder Munro tried to recover the atonic detrusor muscle sufficiently to increase the capacity of a hypertonic bladder.

Since World War II, the majority of centres in the United States practised bladder training with an indwelling catheter and tidal drainage. Over the years however, most of the centres abandoned tidal drainage in favour of other procedures, such as Bors blocking procedures which expedited the return to an upper motor neuron type of bladder. While in the United States bladder training has been performed since 1947, intermittent catheterisation with a 'non-touch' technique was being practised at the Stoke Mandeville Spinal Injuries Centre in England by Ludwig Guttmann. The non-touch technique must be performed by a physician who is surgically scrubbed and dressed; intermittent catheterisation by that technique is performed every 6 h.

In 1958 Paul Beeson published his landmark editorial entitled: 'The case against the catheter'. From 1970 'clean intermittent self catheterisation' was introduced and popularised by Lapides. By this method the patient learned to catheterise him or herself, so that this method could also be

applied without specially trained staff, and could be performed ambulatorily.

In recent years suprapubic drainage began to become popular as an alternative to drainage through a urethral catheter. Routine suprapubic drainage was first done in gynaecological surgery, but was soon extended to general medical patients. The first devices of trocart cystostomy were published in 1966 by Taylor and Nickel, and Hodgkinson and Hodari, followed by the Bonnano suprapubic drainage catheter with a coiled tip. The Cystocath drainage system (Reif design), obtained from Dow Corning Corporation, Midland, Michigan was the first available commercially set.

Today, when a nurse gives a patient a sterile well-packed disposable catheter in plastic or silicone, it is difficult to imagine how comfortable it is, both for the urologist and for the patient. It is good to know and to appreciate how difficult and how painful catheterisation of the bladder was until only a few decades ago.

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2. Some historical aspects of urine recipients and urinals

Although micturition is a normal human function, the collection of urine in a recipient did not occur until relatively late in the history of mankind. Right up to the 19th century, it was customary to simply urinate outdoors somewhere, and this is true of Western civilisation as well as primitive peoples.
Urinating into a recipient was restricted to the aristocracy, or used for medical purposes (uroscopy) only.

1. The first recipients.

Nevertheless, the use of a urine recipient has been described among a number of primitive societies. The Canadian Inuits have their "korvic", which literally means "urine holder". This was in the shape of a bucket and made of sealskin sewn together. (1)
F.W. Beechey, who stayed with the Eskimos in Alaska around 1825, was surprised to observe that they urinated into a recipient in public, amongst everyone in the tent. The urine was collected for tanning skins. (2)
Castenada de Nagera records in his travel journal that the Pueblos and Moquis tribes between Arizona and New Mexico collect their urine in large earthenware jars which they empty outside the village.(3) But these are exeptions among primitive peoples.

2. Urine recipients in antiquity.

Among the Greeks, chamber pots called "amis" were described as used by both adults and children from the 8th century BC onwards. (4) (fig.6)
They were essential during meals and drinking sessions, where according Aristophanes, guests relieved themselves with the assistance of slaves.
Athenaeus records in his Deinosophists XII:"They (the horsemen of the Sybarites) were also the first to invent chamber pots, which they carried to their drinking parties."
"Heliogbalus the Emperor excelled all others in his prodigious Luxury.....his excrements he discharged into Gold vessels, and urinated in Vessels of Onyx, or Myrrhine pots."(5)
But the Romans were the first to use chamber pots, most of which were made of earthenware. They were called *"matula, matella or matellio,* and sometimes *"lasanum."*(6) These recipients are very similar to our chamber pots today. The *"scapium"*, which was shaped more like a sauce boat, was also used, and was a precursor of the later *"bourdaloue"*.
Wealthy Romans had urine recipients of silver and gold, and Roman law even had provisions governing the inheritance of these valuable vessels. (7)
Plinius has described how there were large receptacles in the streets of cities like Rome and Pompeii, into which chamber pots of urine were

emptied. The urine was then collected by fullers. The fermentation of the urine produced ammonia, and this was then used to bleach linen. This continued to be done right up to the late Middle Ages in Europe.

3. The matula and uroscopy.

The oldest receptacle for urine, or urinal, is certainly connected with uroscopy and later developed into the "matula", a recipient specifically designed for the examination of urine.
Although the ancient Greeks and Romans performed uroscopy, the urine was probably collected in earthenware bowls before examination. [fig.7.] Even today, uroscopy is still performed as a diagnostic tool in Tibetan medicine, where the urine is collected in white porcelain bowls. (8)
ISMAEL EL GURIANI, a Persian physician of the 12th century, describes:" The urine needs to be collected in a large, transparent and clean bottle, possibly having the form of a bladder. The form of the receptacle needs to be similar to the form of the bladder so as to ensure that the urine remains in the same natural form."(9)
JOHANNES ACTUARIUS (died 1283) was the first doctor to describe a scientific matula. He was a physician at the court of the Palaeologi and an uroscopist at the Byzantine Court, where he was the last classical physician of the"Greek School". He wrote an important book about uroscopy consisting of 7 volumes: "De Urinis Libri Septem". He divided his urinal into eleven parts. (10)
CONSTANTINUS AFRICANUS (1018-1085) was a Benedictine monk and one of the founders of the School of Salerno. In his book "De Instructione Medici" he describes the ideal receptacle for the urine to be analyzed in: "it must be made of white glass, be clear and transparent, and preferably made of crystal, possibly Venetian crystal."(11)
In 1541, FLETCHER published his work"The Differences, Causes and Judgments of Urine", in which he describes his own matula: "A perfite forme of the urinall, wherein the urine according to its height is divided into three regions for the distinction of the three contents mentioned. 1,2,3,4,: the lowest region for the sediment; 5,6,7,8,: the middle region for the swimme; 9,10, 11, 12,: the uppermost region for the cloud."(12)
In 1548, ROBERT RECORDE published his "Urinal of Physick: "Touching the Urinall, it shoulde be of clere glasse, not thyck nor greene

in colour, without blottes or spottes in it, not flat in the bottom, nor to wyde in the necke, but widest in the myddell and narrow styll toward bothe the endes, lyke the facyon commenly of an egg, or of a very bladder beyng measurably blowen (for the urinal should represent the bladder of a man) and so shall every thyng be sene in his dew place and coloure."(13)
In Europe, from 14th -18th century, the urinal in the form of a bladder, became the medical instrument par excellence. The expression "matula facit medicum" became popular. [fig.8.] The urine became "pars pro toto" in which the whole person was anatomically reflected. The importance attributed to uroscopy by physicians is reflected in many paintings and in the seals of many Societies of Doctors and even Surgeons at that time.(14)

4.The development of urine recipients in Europe.

Archeologic findings confirm the use of earthenware chamber pots from the 13th -14th century onwards. Later, a lead glaze was added to make the material less porous.
From the 15th century onwards, a recipient with a long neck was preferred. From the 17th century onwards, chamber pots were also made of Delftware, and specially made faience, and porcelain chamber pots were imported from China. (15)
There is written evidence of the existence of pewter chamber pots even earlier than 1500 in the Low Countries. They were used primarily in monasteries, convents and hospitals. These pewter pots were handy to use, strongly made from a metal (pewter) which is resistant to acids and salts, and of a design with a low centre of gravity which made it less likely to tip over. This type of chamber pot remained in use right up to the beginning of the 20th century.
From the 17th and 18th century, earthenware and pewter pots were replaced by porcelain versions with elaborate decorations, especially among the higher bourgeoisie. The lower classes had to be satisfied with cheaper models in plain white porcelain.
The *"Bourdaloue"* is a very special porcelain model, long and narrow, with an opening at the top which could be as much as 22 cm. long and 10 cm. wide. It was usually lower in the centre than at the two extremities.

Bourdaloues were usually richly decorated with colourful scenes depicting flowers, birds, landscapes and gallant tableaux. Some are quite frivolous, with an eye or a mirror on the bottom, or a caption "Au plaisir des dames..." (For ladies pleasure) or "A petit coquin je te vois" (Little rascal I see you!)

The name "Bourdaloue" is probably a reference to Louis XIV's priest of the same name (1632-1704), and the confessions he heard from the aristocratic ladies of the court as their father confessor. A position in which he got to the bottom of things, as it were.

But according to Havard's "Dictionnaire de l'Ameublement", the reason why these oval chamber pots were known as "bourdaloues" had a much more physiological origin! Bourdaloue was renowned as an excellent - and lengthy- preacher, and whenever he preached, a huge congregation would gather to hear him. To get a good seat in the church, people had to get there hours in advance. This long wait, and the lenght of the sermon, was too much for many women. They solved the problem by bringing along this little chamber pot concealed under their skirts, so that if the need to urinate became too urgent, they could do so right there, without leaving their places.

However, a more scientifically sound explanation is that his name was given to a great many things, often satirically, both during his life and after. The fact that the earliest written reference to a *"bourdaloue"* in the sense of a chamber pot dates from 1742, supports this explanation.

The beauty of the bourdaloues sometimes led to some confusion, as we can see from the letter Mme.de Deffand sent to her friend Mme.de Choiseul on 9 May 1768:"My dear friend, I must tell you and the Reverend Father of my great astonishment yesterday morning, when a large bag was brought to my bedside from you. I made haste to open it, and found not only the first peas of the season, but also a bowl. What could this be? I opened the parcel quickly and see: it is a chamber pot. But a chamber pot of such beauty and charm that everyone here was unanimous that we should use it as a sauce boat instead. I put it out on display the whole evening, and it was greatly admired..."

A similar story about urine recipients used during long church services is told about the "Kuttrolf" in Germany (see below).

But the top was undoubtedly the silver chamber pot. This was only found in the very best circles, and few have survived today. In view of the price

of silver, most of them have been melted down to make other things. The most famous silver chamber pots still preserved today are one made in The Hague in the Netherlands in 1678, and the oldest known English silver chamber pot made in 1670 in York.
Louis XIV also had a silver pot bearing his coat of arms.
"The emperor" was the Regimental nickname for the silver chamber pot belonging to Joseph Bonaparte, King of Spain, and captured by the 14th (King's) Hussars at the battle of Vittoria, 21 June 1813. It is still in the hands of the 14th / 20th (King's) Hussars, who are consequently known as "The Emperors Chambermaids"! (16)
Queen Elisabeth I of England used a golden chamber pot!

A substantial earthenware chamber pot industry grew up in North Staffordshire, in England.
From the 14th -19th century, a chamber pot was referred to as a *"Jordan"*, a name which was only used in Britain. Two names appear more or less simultaneously in the 14th century: the English term *"judies, Jordan"* and *"Jordan"*, and the Latin *"Jordan's"*. One Latin text speaks of a *"urinal"*, while another writes of *"duae ollae, quas jordanes vulgo vocamus"*.
From the 19th century onwards, the name *"chamber pot"*came into general use. (17)

5. Urinals in glass

Urinals are also made of glass, and the most well-known is the "matula". Although it is very fragile, glass is used because it is easy to clean.
There is still some controversy over weather or not the *"Kuttrolf"* or *"Angster"* (from the Latin angustus, meaning "narrow") was also used as a recipient for urine.
A Kuttrolf is a glass recipient that has a cup-like wide pinched mouth or upper container, joined to a globular body by a neck composed of 3 to 5 intertwined thin tubes, so that when the liquid is poured from the body, it flows only drop by drop, which reduces the bubbling or gurgling sound.[Fig.9.]
The name has been said to derive from *"Kuttering"* (gurgling) or from the Latin gutta (drop) or gutturnium (a slow-pouring dropper for

perfume). The Kuttrolf was popular in the 16th and 17th centuries. Because a lot of upper containers of Kuttrolfs are inclined and have an oval form, some people have concluded that they were used as recipients for urine, especially by woman attending the long masses and other Christian ceremonies of the times. In an article in Therapia Hungarica, is stated that the Kuttrolf is a urinal for woman. The Grimm dictionary (1873) also mentions old poems where the Kuttrolf is used as a urinal!
A variation of the Kuttrolf is a tall single-tube flask with a thin curving neck, made in Persia in the 18th and 19th centuries, and used as a rose-water sprinkler. Here again the tall, thin and vertical attenuated neck, to provide slow pouring and to prevent the noise of bubbling insinuates that they have been used as urinals for woman, although we did not find any source that confirms this use.

In cases of total urinary incontinence a glass bottle or a pig bladder was attached to a belt as a recipient as it is beautifully illustrated in 1683 by Fabricius Hildanus in his book:"De Ardore et Incontinentia Urinae, et nova Inventione Instrumenti, quo inter deambulandum colligitur. Observatio LV."

6.Curious urinals for babies in Turkestan.

Some curious exhibits and diaries can be seen in the "Museum für Völkerkunde" in Vienna (Austria). They were brought back by Austrian Prisoners of War who were interned in Turkistan after their battles with Russia in World War I.
In his diary Frans Heger (1853 - 1931) writes: "On the market I bought a small and deep vessel, glazed inside. This is a chamber pot for children, and is fixed at the lower side of a cradle. I bought also two Piss apparatus, one for girls and one for boys."(18)
What this apparatus means is beautifully described by Fritz Willfort: "Many of our soldiers had lost the pipes they had brought from home, and this article was not for sale at this place, because neither the Russian nor the local people smoke pipes. But we and the soldiers found what we were looking for in the Bazaars of the Sarthtic and Kirgiz people! A lot of wooden, simple.... curious things, with a straight, perforated wooden stem and a short part, about five centimetres long and a second part with

a diameter of two centimetres. Both parts brought together looked like something resembling a pipe. On the other part, and as great in numbers we found in the same manufacturers other wooden equipment similar to the first type, but composed only of by the straight, perforated round wooden piece, whereby the upper part had a trough-like incision of five to six centimetres long and one a half centimetres wide.[Fig.10] When our soldiers and ourselves showed great interest in these objects, all merchants and spectators started to laugh loudly, which laughter increased even more when the soldiers demonstrated how you could smoke with these "pipes"! At the beginning we were astonished, but we obtained soon the explanation for this hilarity. What we wanted to use as a pipe, was what the local women used to keep male babies dry, putting the penis into the short transverse part and the vertical part into a vessel in the bottom of the cradle! [Fig.11] Together with a towel looped double around the bottom, this enables the Sarthtic or Kirgiz mothers to keep their babies completely dry. The other kind of wooden equipment was used for girls."(18)
Some years ago we still found, and could buy these wooden urological instruments on the market in Samarqand (Uzbekistan) in 2000 and even in Georgia in 2002 (Tbilisi).

A lot could be said on Japanese urine recipients, the English custom to give a chamber pot as a marriage gift and the Sunderland ware frog pot. This latter was made to amuse with the liquid creating a glugging sound as it passed the frog in a mug!

Remembering the past, the actual view of the plastic urinals in my own urological department gives my only a glimpse of the glorious history of urinals and urine recipients!

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Illustrations.

Fig.1. In mediaeval times, and even in the Renaissance, catheterisation was done in the upright, kneeling or sitting position. (Heinrich Kullmaurer and Albrecht Meher – 16th century)

Fig.2. Mercier's coudé and bicoudé catheters

Fig.3. Auguste Nélaton (1807-1873), the father of the red rubber catheter. (Litho Lafosse 1865)

Fig.4. Nelaton's straight rubber catheter as it appeared in an early Eynard catalogue.

Fig.5. Reynard published in 1853 the first rubber self retaining Catheter with inflatable balloon

Fig.6. Greek urine recipient for children in terra cotta (8th century BC)

Fig.7. The matula used for medical diagnostic was probably the oldest urine recipient

Fig.8. *Matula facit medicum:* the importance attributed to uroscopy by physicians is reflected in the seal of the surgeons and pharmacists in Oudenaarde (Belgium) – *Societas SS. Cosme et Damian. Aldenarde.*

Fig.9. A Kuttrolf is a glass recipient that has a cup-like wide, pinched mouth, which is joined to a globular body by e neck, composed of 3-5 thin intertwined tubes such that when the liquid is poured from or into the body it flows only drop by drop, which reduces the bubbling or gurgling sound.

Fig.10. The "pipes" that the Austrian prisoners of war found at the bazaars of the Sarthic and Kirgiz people in Turkistan are used as urinary device for babies.

Fig.11. A typical Georgian cradle with a hole in the middle for passage of the urinary device for babies.

Fig. 1

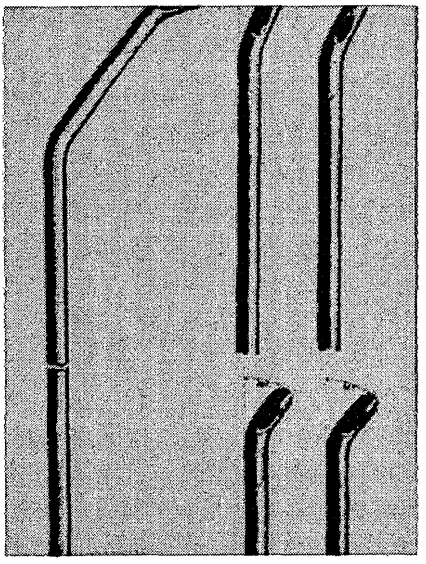


Fig. 2

Fig. 3

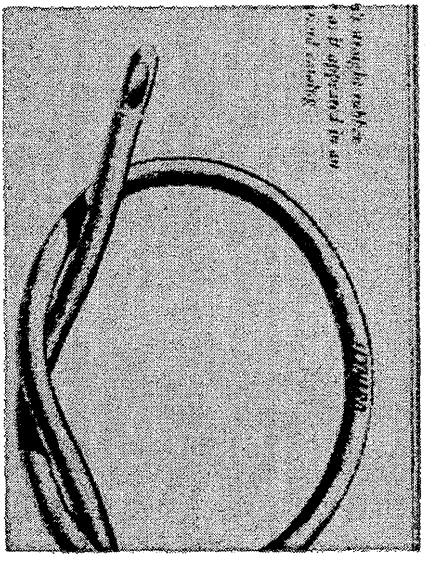


Fig. 4

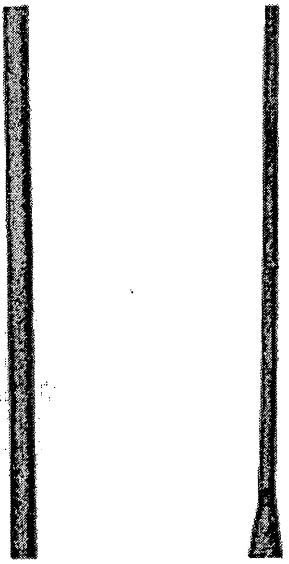
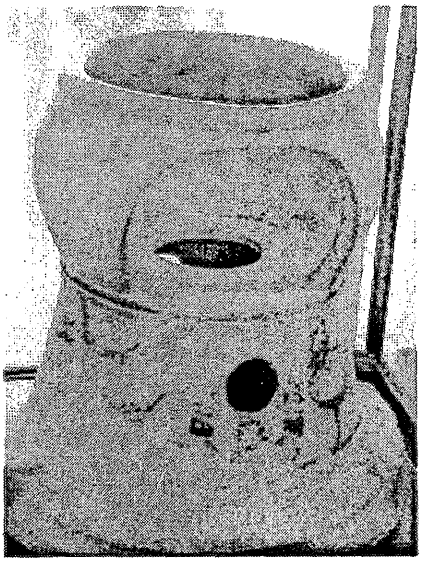


Fig. 5



Fig; 6

Fig. 7

Fig. 8

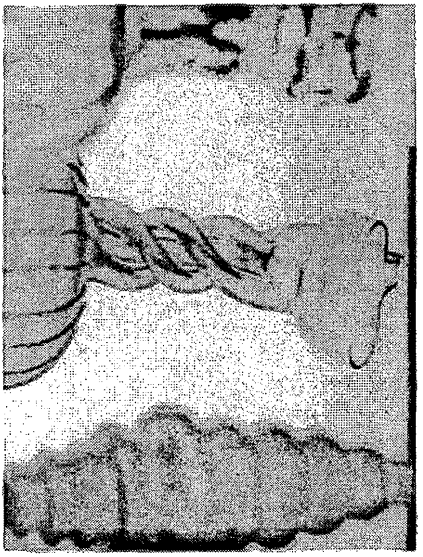


Fig. 9

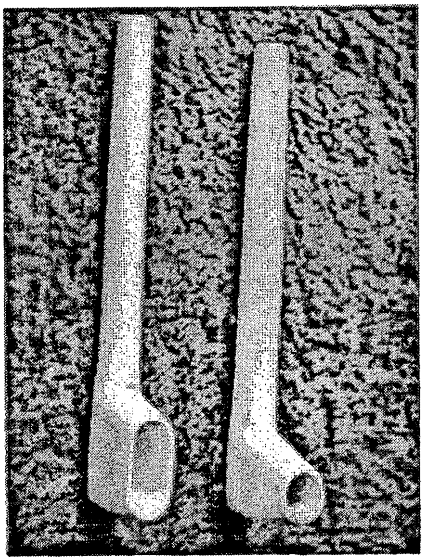


Fig. 10

Fig. 11