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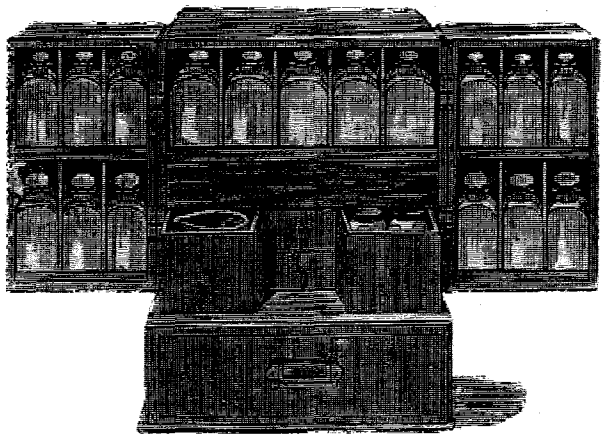
Historical Medical Equipment Society



Bulletin
No 5

January
1999

NEXT MEETING

Make a Note in Your Diary for the Meeting on Saturday 8th May, 1999 in the Hunterian Musem, Royal College of Surgeons of England, Lincoln's Inn Fields, London.

The guest speakers will be Professor Leslie Klenerman on historical aspects of tourniquets and Dr N.H. Naqvi on the history of blood pressure measuring equipment, on which subject he has just published a book, co-authored with Professor M.D. Blaufox.
Let us have your ideas for other topics for discussion and offers of papers however short.

Historical Medical Equipment Society

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EDITORIAL

Two Years after our Steering Committee suggested a working basis for the Society, it is time to take stock.

Following an enthusiastic inaugural meeting at the Royal College of Surgeons in London., in April, 1997 we were very unfortunate to lose the inspired leadership of David Warren, the veritable founder of the Society. Indeed his tragic death produced immediate administrative difficulties still not entirely resolved. The subsequent meetings at the RAMC Museum, Aldershot, the Gordon Museum, Guy's Hospital and the Thackray Museum, Leeds have been less well attended, partly due to late announcements by your Committee and, in October last, due to travel problems associated with widespread flooding.

Nevertheless we have a nucleus of regular attenders who believe the Society has a significant role to play at a time when the numbers of museums, collectors and collections are on the increase. Moreover we have some 70 paid-up members for 1998 combined with a reasonably healthy bank balance. What is uncertain is the ideal arrangement for meetings and also the content of this Bulletin.

To help future planning, I would be happy to receive criticisms and suggestions on the suitability of our meetings. Are they in the right place and at the right time? From the point of view of travel, would London only venues be easier, as has been mooted? Would a weekday meeting be better? Is the time of year appropriate? Are there subjects you feel have been neglected and what are these? Should more time be devoted to individual items and collections brought for discussion and identification? Are several short papers better than a few longer ones? You are, of course, free to offer papers yourself.

Likewise, is the Bulletin fulfilling your wishes? If not how might it be improved? What topics would you like included or excluded? If regular features, such as 'Notes and Queries' and 'Museums of Medical Interest' are valuable, we need your input. We believe many members have unique knowledge of obscure museums or collections, both at home and abroad, and consider their reports would be of great interest to the Society. Accounts of personal collections or unusual items are also encouraged. The Bulletin is a means of communication, and a source of valuable information as I have experienced personally. Even if you have difficulty attending meetings, the Bulletin is there to transmit your observations and questions: you may be surprised and stimulated to find someone with similar interests.

Remember the Society is intrigued not just by antique items but by equipment and apparatus of the 20th century especially where this enlightens today's practices. Do not overlook that equipment, apparatus and instruments are discarded every day and instantly become objects of historical study.

At our next meeting on Saturday, 8th May at the Royal College of Surgeons of Enqland, I have invited Professor L. Klenerman to talk on tourniquets and Dr N.H. Naqvi to talk about blood pressure measuring equipment and, incidentally, his recent book on this subject. Members are also invited to submit papers on any subject of their choice.

The subsequent meeting, probably on 23rd October, 1999 may focus on a radiological topic in London. In 2000, I would be happy to host a meeting in Bath but meanwhile the Committee are anxious to consider members suggestions and meeting offers elsewhere.

John Kirkup Dec 98

A ROMAN REVELATION

By Bryan Hibbard

Instruments usually emerge by evolution but occasionally an entirely new concept is born. Such appeared to be the case with the development of the obstetric forceps by the Chamberlen family, Huguenot refugees who came to England to escape the hazards of life under Catherine de Medici. They profited by retaining their lucrative family secret for a century or more. Over the years there have been many pretenders as primogenitors of the forceps, notably the Roonhuysian school in Amsterdam who were also developing the lever at this time and Palfyn of Ghent, who used two spoon-like levers tied together in a crude articulation. Undoubtedly the more practical design of blade and the cross-over articulation originated with the Chamberlens.

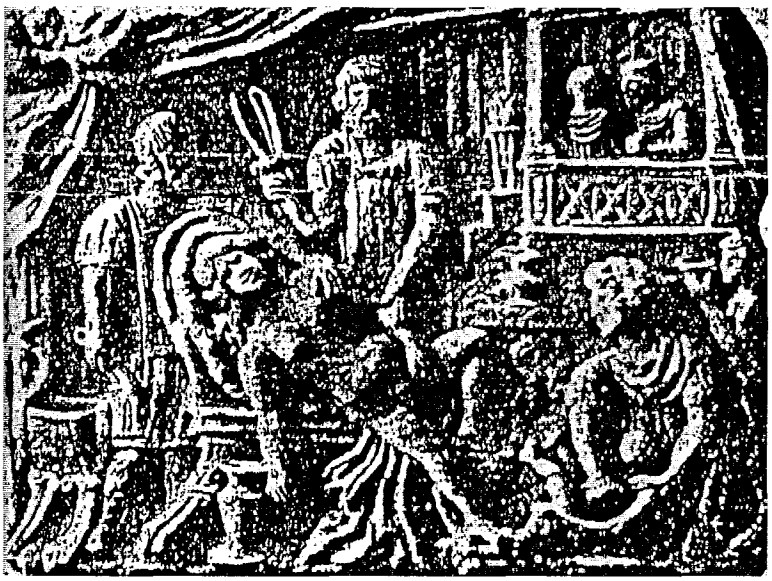
However this perceived wisdom was to change in 1937 when Baglioni, who was Professor of Physiology in Rome, brought to the public notice a bas relief depicting a birth scene and dated as of the Roman Empire 2nd – 3rd century A.D. The remarkable feature was a clear representation of a pair of obstetric forceps with fenestrated blades. The detail of the articulation is not clear. This concrete evidence has been advanced and reproduced for the last 60 years or more as proving that the obstetric forceps originated in an earlier age and that they were only reinvented by the Chamberlens.

A further twist to the saga was documented by Professor Franco Crainz, who was a student under Baglioni in the 1930's and had seen photographs of the plaque, although the plaque itself was never on view. By 1941 its authenticity was being challenged, particularly by Crainz, and was the subject of an article by him published in 1941 in the German medical press. However as German medical literature was not widely disseminated in the English speaking world during this period of hostilities, the article passed largely unnoticed.

In 1973 Crainz pursued the plaque again prior to giving a lecture on the forceps. By this time Baglioni had died but his son confirmed that it had been a hoax and that the (literally) concrete evidence had been destroyed when his father died (personal communication from Prof Crainz).

Crainz thought that this was the end of the matter but he had failed to recognise how a good story, albeit a myth, can be perpetuated, especially by authors who do not verify their data.

And so the legend lived on even though the Chamberlens should have been reinstated long ago to their rightful position as the true



innovators of the most successful and enduring obstetric instrument ever conceived.

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MUSEUMS WITH MEDICAL ARTEFACTS

PITT RIVERS MUSEUM, OXFORD

This houses collections associated with the School of Anthropology and Museum Ethnography of the University but is open to the public. It is extremely rich in material from a wide variety of cultures, collected by explorers, missionaries, researchers and others in the 19th and 20th centuries.

The ethnographer, M.W. Hilton-Simpson spent the Years 1913-14 and 1919-21 studying Shawiya Berber communities in the remote Aures Mountains of eastern Algeria. Gaining the confidence of several medical practitioners, he exchanged modern for traditional medical and surgical equipment later deposited in the Pitt Rivers Museum and the Hunterian Museum of the Royal College of Surgeons in London.
He described this material in: "Arabic Medicine and Surgery: a Study of the Healing Arts in Algeria", Oxford University Press, 1922.

When visiting the Pitt Rivers Museum to examine the Berber surgical instruments, about 140 in number, I could not avoid observing adjacent to these many other surgical items collected from traditional cultures in Africa, Asia and Oceania.

Among these are instruments in organic materials as well as metal for umbilical division, for venesection and scarification and especially for thorn extraction. Clearly the latter was a common problem in many societies and undertaken with a wide variety of tweezers or spring forceps (see figure) and a lancet if necessary.

The richness of this Museum is overwhelming: if visiting ask for the 'Primitive Surgical Instrument' cases.

Address:
Pitt Rivers Museum. South Parks Road, Oxford, OX1 3PP Information line: 01865 270949.

P.S. The 36 instruments donated by Hilton-Simpson to the Royal College of Surgeons of England, Lincoln's Inn Fields, London are displayed on the 2nd floor of the College.

John Kirkup

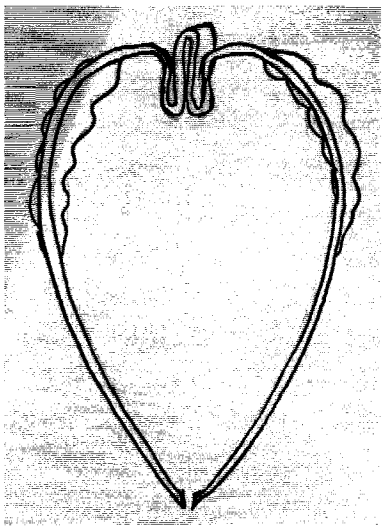

Figure Caption. Thorn Forceps. Dôr Tribe., White Nile, Central Africa. donated 1858. (Courtesy of the Pitt Rivers Museum)

CHEMICAL PATHOLOGY - A BRIEF EVOLUTIONARY HISTORY FROM PRE-TECHNOLOGICAL TIMES

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INTRODUCTION

It is not possible to fully understand the present if one is unaware of the roots by which it has arrived. The subject of chemical

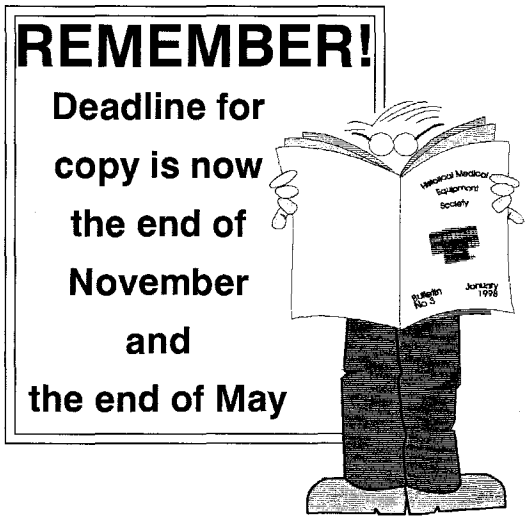
pathology is no exception to such general understanding. In this brief overview of the subject there will be an attempt to view some major technological advances from more recent years in the context of historical observations from pre-technological times. Attention will be drawn to the evolutionary progression that becomes apparent. Full credit must, of course, go to all those who made the accurate observations in the first place and, particularly, to the historians who deemed the facts to be worthy of their attention - and also for their foresight in assuredly establishing their place in the historical record.

PRE-TECHNOLOGICAL FOUNDATIONS OF CHEMICAL PATHOLOGY

In this section devoted to 'pre-technological times' three historical observations will be iterated briefly, in order to set the scene for discussion in the next section, i.e. following the transition to 'technological times'. The first proven reference to what could be termed the nidus of chemical pathology emanates from the ancient Sanskrit literature. Here there is mention of ants and other insects accumulating around the sites where certain people urinated in the fields; it was, we now realise, glucose in the urine of diabetics that attracted these creatures (Bolodeoku and Donaldson, 1996). The second anecdote hails from the account of the Peloponnesian War (which broke out in 431 BC) by Thucydides (born about 460 AD, died about 400 BC); he noted the very high death rate during the Plague of Athens, observing that those who had had the plague themselves and who had recovered from it (Thucydides, himself, suffered this illness around 430-427 BC - and survived it) never had it again - or, if they did, had it only in mild form (Thucydides, 1954 translation). This was, surely, one of the first pertinent observations, nowadays so obviously referable to the basic understanding of 20th century immunology. The third quote is from the voyage of Vasco da Gama, with his 140 Portuguese sailors, commencing from Lisbon in July 1497; it was seven months later that many of the men fell ill with what, in retrospect, was clearly scurvy. The point of note in this instance is that at the end of that voyage there was presented an opportunity to purchase oranges from Moorish traders who approached the boats; there was also the subsequent comment in the historical records, just 6 days later, stating that, "all our sick recovered their health for the air of this place is very good". It was, of course, the ascorbic acid (vitamin C) content of the oranges that was responsible for the rapid restoration of health (Carpenter, 1988).

TECHNOLOGICAL DEVELOPMENTS AND CHEMICAL PATHOLOGY

These three unrelated historical references were, in essence, merely accurately recorded observations; they were without the support of experimentation - and there was no involvement of any form of technology. It was Thomas Willis who, in 1674, succeeded in tasting the sweetness of urine from a patient with diabetes - but this observation differed from the previous anecdotes in that it involved the use of a silver spoon as receptacle for the urine. The spoon could, therefore, be construed as the simplest possible piece of technology being applied in an early scientific test (Bolodeoku and Donaldson, 1996). Nevertheless, the story advances yet further when one brings Mathew Dobson of Liverpool into the discussion; it was he who, a century later,



established that the presence of 'sugar' was responsible for sweetness of the urine. However, he relied upon rather more sophisticated laboratory technology in his scientific confirmation than did Thomas Willis in his observations of 1674.

Over the years there has been increasing complexity and ingenuity in both thought and development of scientific aids and apparatus - in the continuous quest for establishing scientific truth. Urine was, in fact, one of the earliest biological fluids to be analysed - largely because it was so readily and freely available (Bolodeoku and Donaldson, 1996); blood testing came later (Bolodeoku, Olukoga and Donaldson, 1998). In the early years progress was very slow. Large volumes of blood were required for chemical tests in those early days; moreover, the duration of laboratory procedures was long and only one or two tests could be dealt with at any one time. New techniques developed in response to the challenges occurring. Smaller volumes of blood came to be needed as technology advanced, the spectrum of tests became wider and tests themselves became shorter in duration. Alongside all of this greater numbers of tests could now be accommodated and it became possible, therefore, to increase the frequency of testing on any one patient. From this increased frequency of sample testing emerged evidence of biochemical and biological variations - and then followed the exciting possibility of opening up a way of identifying the physiological responses to stimuli of various types. Later still, came the confirmation of circadian, menstrual, annual and other biological rhythms.

From then onwards unfolded a sequence of advances - at first involving early instrumentation and later concerning development of the early laboratory; there was invention of the hypodermic syringe, spectroanalysis, colorimetry, the photoelectric cell, the centrifuge, the Bunsen burner, emission spectroscopy, electrophoresis, blood gas analysis, chromatography, radioisotopes and detectors, mass spectrometry, automation and computerisation - together with, in very recent years, telephonic communication, photocopiers, fax machines, e-mail communication and access to the internet. All these inventions - and the very many others which could have been iterated, are fundamental to the modern day chemical pathology/biochemistry laboratory. From early times laboratory testing has involved the application of many types of analytical procedures - including gravimetric, volumetric, titrimetric, gasometric, manometric, chromatographic, colorimetric fluorimetric, turbidimetric, nephelometric, osmometric and radioimetric, to name but a few. Moreover, in the growing organisation that has occurred additional issues must now be heeded, e.g. quality control, health and safety, accreditation, etc.

FOUR FUNDAMENTAL HISTORICAL INVENTIONS AND THEIR APPLICATIONS TO CHEMICAL PATHOLOGY

In order to present a more graphic account of applied technological development a selection of four inventions, across the board, has been made; these are illustrative of progress over the centuries. The names of their inventors - or those responsible for publicising their use, will be briefly quoted (Olukoga, Bolodeoku and Donaldson, 1997)

The Hypodermic Syringe

The first of the four items to be discussed is the hypodermic syringe. Although not actually a laboratory instrument, the syringe is of fundamental importance in providing a link between the patient and his/her quantitative blood results; it provides the means of extracting blood in a rapid and convenient manner. Names linked in the development include Francis Rynd (1803-1861) who introduced the hypodermic syringe in 1845, Alexander Wood (1817-1884) who was responsible for its modification in 1851 and Charles Gabriel Pravaz (1791-1853) who made further

changes in the form of adding a plunger to the syringe; the latter adaptation made it eminently applicable for administering drugs by the intravenous route.

The Bunsen Burner

The second technological illustration stems from Robert Wilhelm Bunsen (1811-1899) of Göttingen, Germany, who was a scientific inventor and one of the great experimental inorganic chemists of the 19th century; he was responsible for a multitude of widely ranging major discoveries. Contrary to popular opinion he did not actually invent the Bunsen burner - but he introduced and first used it in 1855 - adapting it from a design by Michael Faraday (1791-1867), the British chemist and physicist; it does seem, however, that Peter Desdega also had involvement in its design. The Bunsen burner was for many years (and currently continues to have some application in microbiology laboratories) a basic piece of apparatus in many laboratory settings world-wide; it must be mentioned, however, that it was the forerunner of both the gas-stove burner and the gas furnace. Its ability to combine air and flammable gas in a controlled manner helps to create a very hot flame - up to a temperature of 1500º C. Although modern methodological procedures avoid the need for presence of a naked flame (thereby significantly limiting the danger of fire and explosion), in some less developed parts of the world Bunsen burners are still frequently used.

Spectroscopy

The third topic in this section is that of spectroscopy. Among the many scientific inventions credited to Robert Wilhelm Bunsen (1811-1899) of Göttingen in Germany, was that of spectrum analysis and chemical spectroscopy - he was a pioneer of these tools; it was his work with Gustav Kirchhoff, in or around 1859, that led to the observation that each element emits light of characteristic wavelength. Each chemical element possesses, therefore, its own unique spectrum. Indeed, the dark Fraunhofer lines found in the solar spectrum were attributed by Kirchhoff in 1859 to absorption, by the elements in the cooler atmosphere of the surface of the sun, of the continuous spectrum emitted from the hotter interior. Applications of spectrum analysis extend both far and wide to include, in astronomy, those of the solar and stellar systems; it is in this way that the identification of certain elements in distant stars can be confirmed. The work of both Bunsen and Kirchhoff established the immense value and importance of spectroscopy in chemical analysis. More down to earth, however, but also linked with this technique, were Bunsen's and Kirchhoff's discovery of caesium and rubidium in 1861. Emanating from this very basic investigative technique has evolved many sophisticated analytical procedures, including spectrophotometry in all of its many current forms - ranging from infra-red, visible, and ultraviolet spectrophotometry to photochemistry; magnetic resonance spectroscopy (MRS), which is a powerful technique for analysing both the quantity and structure of chemical compounds in complex mixtures in solution, is currently being developed - although it has not, as yet, achieved wide application in chemical pathology/clinical chemistry.

Electrophoresis

The fourth illustration chosen is that of electrophoresis; the moving boundary apparatus was devised by Arne Wilhelm Tiselius (1902-1971) in 1937. Application to clinical practice permitted great advancement in the knowledge of protein chemistry; subsequent advances opened the way for electrophoresis of proteins on starch gel, filter paper, cellulose acetate, agar gel and acrylamide gel, etc. It is the presence of positive and negative charges, on the amino acids within the protein molecule as a whole, that determines the rate of migration of proteins (within serum or other biological materials) when exposed to a potential gradient along the strip - when a voltage is

applied across the electrodes. The combination of applying an electrical gradient, together with various subsequent immunological techniques, has made possible enormous advances in the knowledge of proteins. Protein electrophoresis now comprises a very fundamental part of daily laboratory life; in cases where there is clinical suspicion of monoclonal and polyclonal gammopathies (e.g. including myelomatosis) and of globulin deficiency states these procedures are nowadays vital.

CONCLUSIONS

In this short review there has been attempt to identify the stages through which the subject of chemical pathology has evolved - from the very earliest days of mere observation, at a time when no technology had yet been invented. Over the years it has become clear that technological advances in science, generally, have been determinant of progress in the laboratory based science of clinical chemistry. Accordingly, four major technological achievements that have had major implications for the discipline have been discussed. Nevertheless, one must always keep in mind the fact that a chemical pathology laboratory comprises, overall, physics (i.e. laboratory machinery, pressures, voltages, etc), chemistry (i.e. the chemical solutions flowing through the tubes of the machinery, at the correct concentrations, etc) and biology (i.e. the personnel in charge of the technology and computerisation); it is interaction between these three that collectively constitutes the working laboratory. It is, furthermore, the chemical pathologist who provides diagnostic interpretation of the results being produced - in the context of his awareness that the variability of values being produced falls within acceptable statistical limits (as judged by quality control schemes integrated into the total working system).

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REPLIES TO NOTES AND QUERIES

(1) How Old Are Surgical Scissors?

I acknowledge the help of Dr Jennifer Burton for information on the association of scissors with 'Tailor's Guild' windows and memorials in German churches and the possibility that guilds elsewhere employed similar devices. I have found none in London but am happy to be corrected. I thank Tristan Oliver for drawing attention to 16th and 17th century Dutch paintings in the Bridgeman Art Gallery which illustrate early scissors.

I have also obtained important information from the British Museum, the Sheffield Museums Service and the Cutlery and Allied Trades Research Association. It is clear tailors' scissors from the 13th and 14th centuries sites exist in significant numbers and, in addition, there are reports of earlier domestic scissors from the 9th to IIth centuries in North West Europe.

Ward-Perkins concluded these were sporadic imports from Byzantium and Islamic countries which are the probable source of true scissors.

Unfortunately only one example from these regions has been drawn to my attention, by Dr Frank Duesberg of Solingen. This is illustrated in a superb book on the history of scissors, *Die Geschichte der Schere by* Hanns-Ulrich Haedeke, published by Rheinland-Verlag, Cologne, 1998, showing a rusted portion of what appear to be true scissors. Found in Tripoli, Lebanon, they are now in the Ashmolean Museum, Oxford and were identified by C.L. Wooley, who dated them to 430-315 AD. If the latter is correct then more examples from this and the post-Roman period must be discovered?

John Kirkup

NOTES & QUERIES (2)
Bow or Tenon Saws for Amputation?

Notes

Elective limb amputation through sound tissues above gangrene or disease to secure a healed stump is not recorded before the 15th century. Earlier Greek, Roman, Arabic and medieval accounts describe the excision of gangrenous and insensitive tissues only; this produced incomplete healing, persistent infection or death. By the 16th century, the grossly destructive and infective nature of gunshot shot wounds changed perceptions radically and curative amputation evolved. Soon soldiers and sailors clamoured for early dismembering on the premise, "it was better to live with three limbs than die with four." As a result several new instruments were invented, but not the saw.

Albucasis (9th c.) illustrated both bow or frame saws and flat or tenon saws. Gersdorff (1517) first illustrated a leg amputation scene utilising a bow saw and this became a standard instrument even though their narrow blades often broke in use, unlike tenon saws. In Britain towards the end of the 18th century, bow saws were replaced by tenon saws. Later the tenon saw appeared in North America but never attained popularity in Continental Europe: tenon saws persist in Britain for major amputations.

Queries

1. Why did the tenon replace the bow saw ?
2. Why did this change predominate in the Britain and America?
3. Was this related to the introduction of crucible or cast steel in Sheffield in the second half of the 18th century? This steel replaced less uniform shear steel and was relatively free of breakage; it was later available in Continental Europe to provide more reliable bow saws?
4. Was the introduction of the tenon saw a mere matter of fashion? I should add, the fancy handles of tenon saws have changed little for two centuries and remain awkward and uncomfortable, for me at least: indeed they require serious ergonomic study.
5. Are there any other factors?

Readers views, observations and corrections are sought. Please write to John Kirkup, 1, Weston Park East, Bath.. BAI 2XA, UK or phone or fax 01225 423 060.

THE OLD OPERATING THEATRE, MUSEUM AND HERB GARRET PUBLIC EVENTS & LECTURE PROGRAMME 1999

Sunday 17th January, 2.30pm.

In Fear of the Knife - Surgery before Anaesthesia.

"A patient preparing for an operation was like a condemned criminal *preparing for execution."*

In Britain's only surviving 19th century operating theatre, a lecture demonstrating the ordeal of Victorian surgery, when a patient's only relief from agony was the speed of the surgeon's blade.

Saturday 23rd January, 2.30pm.

Victorian Surgery.
"I have broken my arm, I am a dead man!"
A demonstration of the ordeals of surgery without aneasthesia, when a patient's fate rested on the speed of the surgeon's knife. A real amputation kit awaits! How will you survive?

Sunday 7th February, 2.30pm.

The Doctor's Grave Excavated: AD 50.
by Philip Crummy, Director of Archaeology, the Colchester Archaeological Trust.
In 1996 excavations of the Stanway burial enclosures produced a rare find, the discovery of a 2000 year old set of surgical instruments in a doctor's grave. Philip Crummy's lecture discusses the excavations, the likely nationality of the healer, and the mystery of the divining rods.

Half Term Events

Sunday 14th February. 2.30pm.

For the Love Of... Pills, Potions, Poisons.
Explore the medicinal secrets of worms 'n' snails, heartsease, rosemary, mandrake and many other forgotten flowers of romance in the apothecary's Herb Garret. Hands-on history with pill making and poultices.

Thursday l8th February, 2.30pm.

Victorian Surgery.
"/ have broken my, arm, I am a dead man!"
A demonstration of the ordeals of surgery without aneasthesia, when a patient's fate rested on the speed of the surgeon's knife. A real amputation kit awaits! How will you survive?

Thursday 25th February, 7.30pm:

Special Event.

Which Herb? A Guide for Connoisseurs.
by **Jan Greenland, of the Herb Society.**
An illustrated talk on the choicest forms of selected species, photographed in a variety of natural and aesthetic enviroments, including the Chelsea Physic Garden, the Museum of Garden History, and Heslington Manor. Explore the horticultural, botanic, and medicinal identities of the plant kingdom in the Herb Garret of St. Thomas' Church.

Sunday 7th March, 2.30pm.

The Herbal Sanctuary.
A lecture exploring the 300 year old apothecary's Herb Garret of Old St. Thomas' Hospital. Discover the medicinal secrets of Snail water, Venetian Treacle, wormwood, comftey, and many other forgotten remedies of herbal physic.

SET 99 Events

Sunday 14th March, 2.30pm.

The Venus Glove.
In the dramatic arena of a Victorian operating theatre for women, a talk surveying the history of the male contraceptive, from its supposed inventor, Colonel Cundun to Goodyear's vulcanisation of rubber.

Saturday 20th March, 2.30pm.

The Theatre Of Pain - Surgery Without Anaesthesia.
"A patient preparing for an operation was like a condemned criminal *preparing for execution."*
In Britain's only surviving 19th century operating theatre, a lecture demonstrating the ordeal of Victorian surgery, when a patient's only relief from agony was the speed of the surgeon's blade.

Thursday 25th March, 1.00pm:

Special Event as part* of *SET 99 and National Literature Week.
Anatomy of a Creative Process.
by Diane Samuels.
A presentation of the prequel to the theatrical production of Doctor Y (originally broadcast on Radio 4). In Britain's only surviving 19th century surgical theatre, the playwright Diane Samuels will dissect the dynamics of her creative exploration of the biological sciences:
"The blood will only flow in your imaginations. But remember, that blood is my ink."

Sunday 4th April, 2.30pm.

The Surgeon, the Cadaver, and the Resurrectionist.

A lecture on the bodysnatchers who procured corpses for medical dissection, working hand in glove with renowned surgeons such as Sir Astley Cooper, until public outcry led to the dreaded Anatomy Act.

LONDON'S MUSEUMS OF HEALTH AND MEDICINE

The London Museums of Health and Medicine Group was formed in 1991. It's aim is to raise awareness of the outstanding resources offered by these museums through Joint undertakings such as publicity leaflets, education packs, exhibitions, lectures and research.

CLASSIFIED ADVERTISEMENTS

TRANSLATIONS

Belinda Heathcote can offer translations from German, French, Swedish, Norwegian, Danish, and Spanish and arrange for such from Russian, italian and Portuguese.
Tel: 0181 688 7636 or Fax: 0181 681 8202