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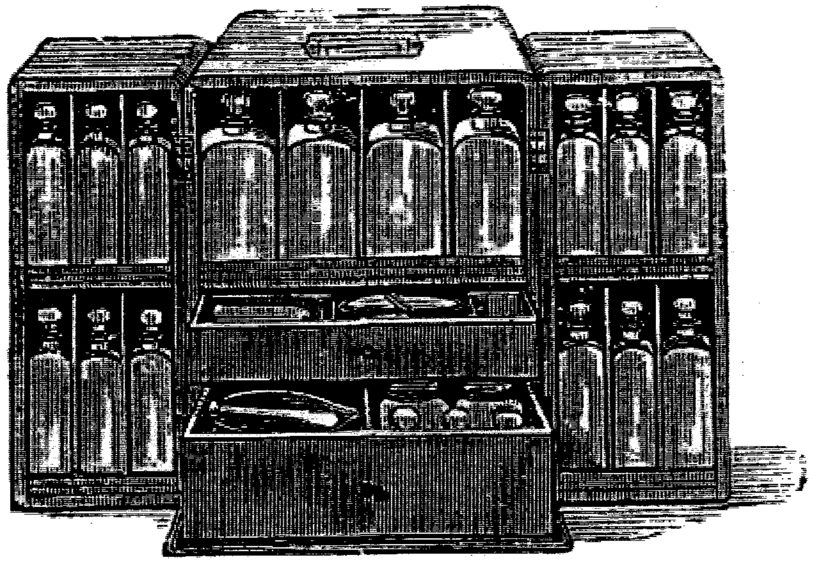
Historical Medical Equipment Society



Bulletin
No 8

July
2000

HISTORICAL MEDICAL EQUIPMENT SOCIETY

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EDITORIAL

Three years after our inaugural meeting at the Royal College of Surgeons in London, in April, 1987 we continue to hold two meetings annually and hope this has general approval. I believe we have established a meeting pattern and emphasise the following activities. Firstly, a growing number of museum curators attend bringing unusual and intriguing objects for identification, and secondly, the Society now has the collective expertise to answer many of their queries immediately, or to organise further advice. However, we are not only a forum for equipment identification but a source of interesting papers on a wide variety of topics, many of which are published in the Bulletin. At the same time the meetings take us to rewarding museums and collections which otherwise might not be seen. Recent doubts concerning our viability have I believe subsided although we remain aware that the times of meetings cannot suit every member. Anyone who believes strongly that a midweek meeting is desirable, would they let me know; if sufficient support is found, we must give this consideration. Other criticisms or suggestions are always welcome.

Meeting at Bath on 6th May, 2000

This meeting was, I understand, much enjoyed although several members were unable to attend at the last minute. In the morning Dr Roger Rolls provided excellent facilities at the Bathampton Surgery where instructive and stimulating papers were given by Jean Guy using her expertise in radiological history on "The Four Radiographic Elements: Current, Vacuum, Glass and Silver", by Roger Rolls an expert on the history of the Bath Waters on "Rays, Sparks and Vapours: the Gadgetry of Spa Treatment" and by Krishna Kunzru who is undertaking research into the work of Sushruta on "The Surgical Instruments of Ancient India".

At the business meeting we noted that 47 members are paid-up, the last 12 months' expenses were £413 and the bank balance is £ 1,381. Paul Thackray and Jean Guy were confirmed as Committee Members. Belinda Heathcote indicated her wish to resign from the Bulletin editorship after the forthcoming issue. A successor has not been confirmed, although Alan Humphries will help out for an interim period. I would, however, be glad to hear from anyone wishing to be Editor; with the support of Philip Harris Medical who undertake the printing, a new Editor would be free to introduce a change in format, add fresh themes and more illustrations, etc.

After lunch at the nearby George Inn, we travelled across the city to my home where a display of boxed 19th century instruments was arranged and I gave a short paper on "Vaccinating Instruments" demonstrating some examples of the many which were devised. Following tea a lively session developed examining and identifying instruments and equipment. In particular we were grateful to Tim Smith, Ruth Clark and Pauline Saker who brought fascinating items from a recent donation to the Royal Berkshire Hospital, originally belonging to a doctor working in Nigeria early in the 20th century. It is clear this aspect of the Society's meetings is much appreciated by those caring for smaller medical historical museums where equipment and instruments play a part. I believe our corporate knowledge is now substantial and developing, which augures well for future identity parades.

Future Meetings

Jennifer Burton has kindly agreed to host the next meeting on Saturday, 14th October, 2000 at the George Eliot Hospital NHS Museum, College Street. Nuneaton, Warwickshire of which she is Curator. Anyone who would like to submit a 15-20 minutes paper to this or succeeding meetings,please let me know. Further details and application slips will be forwarded by the Secretary nearer the time.

Tim Smith and colleagues will host the April/ May, 2001 meeting at the Royal Berkshire Hospital, Reading. Further details to be announced.

Alfred Gunning is investigating the possibility of holding the October, 2001 meeting at Green College, Oxford to include visits to the Pitt Rivers and Science Museums.

Any offers or suggestions for other venues are always welcome.

Conclusion

Remember the Society exists for the study of not only the ancient and antique but for equipment and apparatus of the 20th century. Further, such items are discarded every day, to become objects for instant historical study. Don't forget every member is encouraged to contribute to the Bulletin; reports on local museums, on visits to collections and notes on unusual or rare instruments and equipment will benefit all members if published; even one informative paragraph is better than nothing.

May, 2000 John Kirkup

HISTORY OF ENDOSCOPY AND ENDOSCOPES: AN OVERVIEW*

Sisir K. Majumdar

The word "Endoscopy" is derived from the Greek by combining the prefix "endo" meaning "within" and the verb "skopein" "to view or observe". The result is an adequate term for the procedure of peering into the recesses of the living body, although "skopein" means not merely to look at something but rather to view with a purpose, to observe with intent and to monitor. This paper reviews the earlier methods of examining the gastro-intestinal tract and traces the historical steps in the development of fibre-optics, and particularly its role in the diagnosis and treatment of gastro-intestinal diseases.

Since the days of Hippocrates, the challenge to peer into the dark places of the body has been recognised (Keele, 1963). Historical precedence might thus be accorded to the vaginal speculum, equipped with dilator blades, which was used in Ancient Greece, but the first modem triumph of endoscopy was Hermann von Helmholtz's successful use of an optical system to illuminate the interior of the eye in 1851. The value of the ophthalmoscope in providing clinically important information was quickly appreciated both by ophthalmologists and neurologists. The development of laryngoscopy originated with Manuel Garcia, a London music teacher, followed soon after the invention of the ophthalmoscope. Its advantages were rapidly recognised and, in addition, opportunities were taken to obtain biopsy specimens from lesions (Stevenson and Guthrie, 1949).

Earlier, in 1806, Bozzini had attempted cystoscopy or urethroscopy by placing a candle in a box at the end of a tube which had been inserted into the urethra, but the system failed because of insufficient illumination. It did, however, provide a prototype for numerous improvements during the 10th century. By the end of the century cystoscopy had become the most sophisticated branch of endoscopy applied to an internal body cavity. Those who had ambitions of being able to examine the oesophagus and stomach were, however, faced with a much bigger problem. In 1881 Mikulicz became the first person to discern enough detail within the stomach to make it diagnostically helpful, which he achieved with a distally placed platinum-loop lamp which required water-cooling. The incandescent lamp was not applied to the straight tube gastroscope until after 1900.

The invention of the fibre-optic gastroscope is a miracle of modem medical science. Diagnostic technology in medicine really began with Laennac's invention of the stethoscope in the early 190 century. This invention has been followed by a spectacular increase in the availability of techniques for diagnosis and treatment of different diseases of internal hollow organs inside the human body, and the future is pregnant with more miracles to come in this field.

<u>NOTES ON UPPER GASTROINTESTINAL ENDOSCOPY</u>

Phase I: Straight, rigid tubes - some with angulated designs. 60 years from 1900 onwards.

Phase II: Semi-flexible gastroscope with complicated lens system with 30° angulation, 1930-1960

Phase III: Flexible fibre-optic-light-conducting endoscopes
Gastric biopsy
Computerized transmission systems

<u>NOTES ON FIBRE-OPTIC ENDOSCOPY</u>

100 years ago: Light falling on any one fibre is distributed uniformly over the end phase of the fibre on emergence - light conduction by internal reflections in a flexible axis: J. Logie Baird, Pioneer of television.

1952:Dr. Hugh Gainsborough, Consultant Grastro-Enterologist at St. George's Hospital, asked Prof Hopkins to put a flexible fibre in a Ryle's tube. Hopkins was the inventor of the zoom lens.

1954: H. H. Hopkins and N. S. Kapany: Nature, Jan. 2, 1954, vol. 173, pp. 39-41. Imperial College of Science and Technology)

"A flexible fibrescope using static scanning". An optical unit has been devised which will convey optical images along a flexible axis. The unit comprises a bundle of fibres of glass, or other transparent material and it therefore appears appropriate to introduce the term "fibrescope" to denote it. An obvious use of the unit is to replace the train of lenses employed in conventional endoscopes."

Based on a paper presented at the Autumn Meeting of the Historical Medical Equiprnent Society, London, held at the Royal London Hospital Medical College, Turner Street, London E I 2AD on Saturday, October 16, 1999.

VACCINATING INSTRUMENTS

Summary of paper by John Kirkup at the Bath meeting, 6th May, 2000.

Before Jenner's introduction of cow pox inoculation, thereafter termed vaccination, actual small pox was inoculated to induce immunity by this sometimes lethal method known as variolation. Both variolation and early vaccination procedures were conducted with bleeding lancets, as Jenner advised in 1801: "...let the edges of the pustule be gently punctured with a lancet in several points. It... should be inserted upon the arm ... either by means of a very slight scratch, not exceeding the eighth part of an inch, or a very small puncture."

Vaccination by lancet continued in some practitioners' hands until well into the 20th century despite many alternative instruments and methods. Indeed, without extensive research and ignoring some minor variants, I have identified an astonishing 46 individual vaccinators in American, British, French and German instrument catalogues, the most prolific period for innovation being the second half of the 19th century. Towards the end of this period, it was generally concluded neither a wound nor bleeding were necessary to obtain a positive take, probably because the lymph available became much more reliable. A concept of minimal epidermal breach was born employing a needle, often a simple sewing needle, by a multiple pressure technique applied tangentially. By this means the epidermis was not penetrated and bleeding was avoided

When vigorous steps were taken to eradicate smallpox in the 1960's, especially In the third world, the large numbers for vaccination necessitated lymph was used sparingly and swiftly. Rubin provided the answer by cutting across the eve of a needle to produce two prongs which held by capillary attraction, a constant efficient dose. The needle point was rendered blunt enabling the bifurcated needle to dispense vaccine to large numbers with even greater reliability than vaccine 'guns'. Sadly this brilliant yet simple answer came in 1961, very late in the smallpox saga, now hopefully eliminated.

Briefly, the vaccination instruments of the past can be classified as (i) lancet-shaped, (ii) spear pointed (iii) nib pointed (iv) needle pointed (v) comb or fork pointed (vi) rotary or revolving and (vii) automatic or spring loaded (see figures).

Captions to Figures

Fig. 1. A standard lancet is shown alongside a spear pointed lancet devised about 1825 in France, popular there and elsewhere until late in the 20th century; note the groove to carry a drop of lvmph to the skin breach in one manoeuvre. Below are Hagedorn's flat spear pointed needle, popular in Britain in the middle of the 20th century, and Rubin's bifurcated needle of 1961.

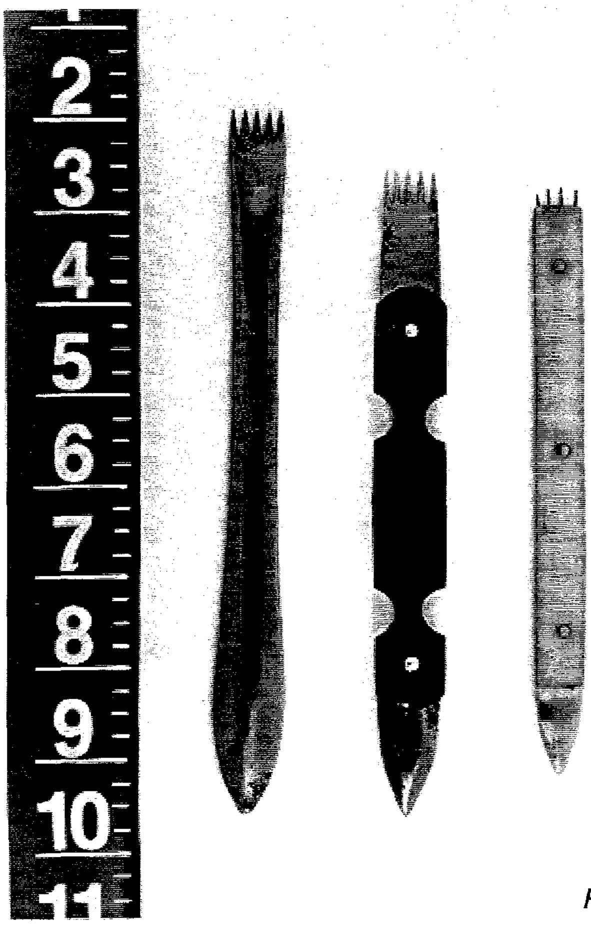


Fig. 1.

Fig. 2. At the top, Weir's vaccinator devised before 1866 and constantly modified as the other two vaccinators demonstrate. Multiple needle points were opposed to a lancet shaped blade but not rendered sharp, this was designed to spread lymph prior to scratching and/ or cross-hatching the skin. The bottom version is also termed Napier's or British Army pattern vaccinator.

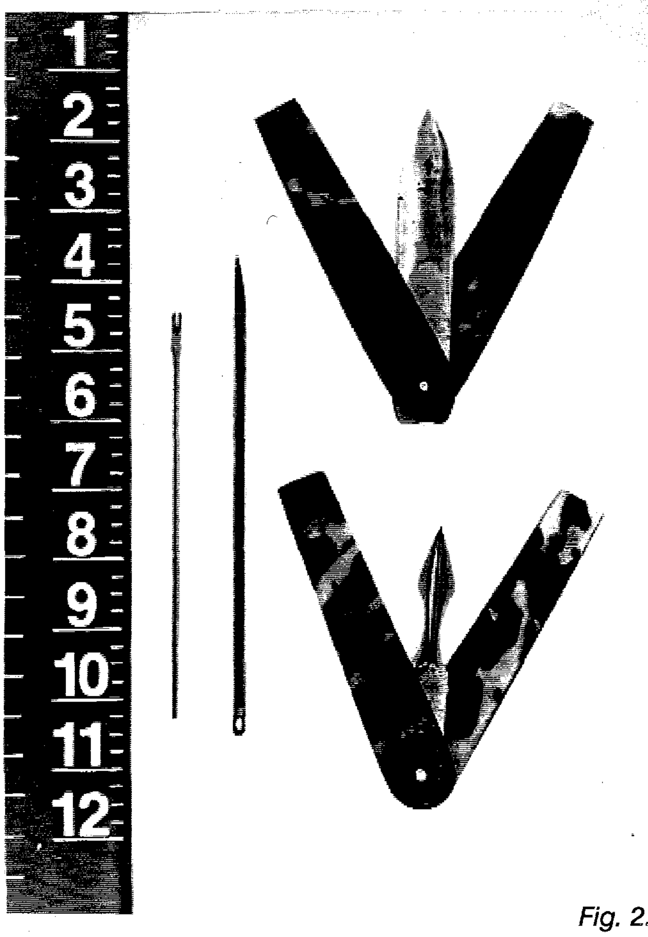


Fig. 2.

THE FOUR RADIOGRAPHIC ELEMENTS: electricity. vacuum, glass, silver a lecture given to the History of Medical Equipment Society in Bath, 6th May 2000

The discovery of X-rays by Wilhelm Röntgen in 1895 is an example of the essential interaction between science and technology. Techniques which had been developing for tens, hundreds or thousands of years provided the necessary components. Equally important was the scientific and therapeutic lineage of electrical discharge in an evacuated glass tube.

CHARGE

Frictional electricity has been known from antiquity. The Greek word for amber is ελεχτρον [electron]. William Gilbert of Colchester observed magnets and charged bodies. His description was published in *De Magnete* in 1600. Otto von Guericke of Magdeburg constructed the first electrical machine consisting of a sulphur ball rotating on an axis within a frame, and rubbed by a variety of substances. In the 1720's and 1730's Stephen Gray conducted a number of experiments using a rubbed glass tube to produce a charge which could be conducted over a distance by threads of cotton or silk. In one of these he succeeded in a charging a whole human body by induction, a boy suspended in mid-air. In 1745-6 the "Leyden Jal" which could hold a large electric charge was discovered simultaneously in Germany and the Netherlands.

VACUUM

The first air pumps derived from water pumps using a piston and two leather valves. Otto von Guericke's better known experiment was a public attempt to separate the Magdeburg hemispheres which involved evacuating air from a bipartite metal sphere. Robert Hooke made an efficient vacuum pump for Robert Boyle's experiments in the 1660's. A good vacuum could be obtained by using the Torricellian principle, that is, the low pressure above the level of mercury as seen in a barometer. It was assumed for many years to be an absolute vacuum, but this took no account of the vapour pressure of mercury itself or the air held within it. This idea was used in Geissler's pump of 1855 and Sprengel's of 1870. Later pumps used better quality oil with a low vapour pressure initially, followed by "molecular" pumps.

CHARGE AND VACUUM

Francis Hawksbee FRS 1705 observed flashes of light when mercury was shaken in an evacuated vessel, then rubbed dielectrics together in evacuated bell-jar to demonstrate that light could be produced without also producing heat. This phenomenon is now known to derive from an electrical discharge in a vacuum. He also used his hand on the outside of the tube to produce sparks. Various German professors improved the method, using a pad permanently in contact with the rotating glass vessel. JeanAntoine [Abbé] Nollet in France 1753 used a vacuum pump and electrical machine to pass electrical discharges through egg-shaped glass globes. William Morgan read a paper to the Royal Society in 1785 describing a experiment in which a current was passed through the Torricellian vacuum above mercury. He took the precaution of first boiling the mercury to remove any trapped air. He observed a green light when current passed and this has been interpreted as the production of X Rays. That would depend on whether the light was within the tube or on its surface: the latter indicates high velocity electrons impinging on the glass wall at the moment of X-ray production. There was at the time no method of detecting such rays, nor any suspicion that such might exist.

Humphry Davy observed the glow between electrodes in an evacuated tube when a current is passed and Michael Faraday went on to describe in detail the bands of coloured light appearing at different degrees of evacuation.

ELECTROTHERAPY

The discovery of the Leyden jar encouraged the medical use of electricity. Like many medical inventions it could be dangerous. Frictional machines were used for treatment in the 18th century. John Wesley was a famous proponent and practitioner of electrotherapy, his *"The Desideratum; or electricity made plain and useful"* was published 1759. He practised at his London base in Seven Dials and during some of his many missionary journeys. Apparatus said to be used by him is preserved in the Wesley museum in City Road, London. More sophisticated methods of generating power, such as primary batteries or small hand generators, encouraged widespread use. Domestic sets were introduced. Electrotherapy went in and out of fashion, claimed at various times to have universal healing properties, and being condemned as quackery. Dr Golding Bird founded an electrical department at Guy's Hospital and published results of treatment during the 1830's, '40's and '50's. Electrotherapy departments opened in several large hospitals in 1890's, including The London, and St Bartholomew's. The existence of electrical apparatus in hospitals and the skills required to operate it help to account for the rapid spread of medical radiography after Röntgen's discovery.

CURRENT ELECTRICITY

Alessandro Volta and Humphry Davy developed chemical methods of generating electricity. Faraday formalised the relationship between magnetism, current and movement, so that both motors and generators could be developed. Primary and secondary (rechargeable) batteries were developed. Mains electricity was very slow to develop in the United Kingdom. It varied from place to place in voltage, current and whether alternating or direct current. The first X-ray machines used batteries. They required a high voltage and direct current.

This needed a coil to raise the voltage, an interrupter and a condenser or valve. Frictional generation using rotating discs, the Wimshurst machine, was popular in the USA and on the continent but never became popular in Britain because of the difficulty of maintaining a charge **in** damp and polluted air.

GLASS

Glass blowing has been known from antiquity. Many good Roman examples survive. Most 19th century British glass contained lead, making it unsuitable for the passage of X-rays. Soda glass was imported ftom Europe. This caused problems during the world wars when trade with the continent was suspended. Vacuum tubes were all hand made in laboratories in 19th century, and even today some parts of the process cannot be mechanised.

SILVER

Silver is the essential element for photography. Photosensitive chemicals were known from at least as early as 1725, being described by J H Schulze, of the University of Altdorf. His experiments were confirmed by Dr William Lewis of Kingston-on-Thames (1763) whose notebooks were bought by Josiah Wedgwood, and used by his son Thomas who performed photographic experiments in 1799. The blackened image could not yet be fixed. In 1822 the world's first photograph was made by Niépce. In 1835 FoxTalbot made the first paper negative, a "photogenic drawing" of a window at Lacock Abbey. The wet-collodion process was invented by Frederick Scott-Archer in 1851. The dry-collodion improvement was first described by Hill Norris of Birmingham. The first gelatine emulsion was manufactured by Joseph Wilson Swan of Morson & Swan, manufacturing chemists in Newcastle.

Roentgen was an amateur photographer which explains how he was able to record and distribute radiographic images so soon after his discovery. Photographic emulsion is less sensitive to X-rays than to light. A thicker emulsion helps, but the best results are produced using intensifying screens surfaced by lwninescent substances which convert X-ray energy to light, placed either side of the radiographic film.

COMING TOGETHER

In 1895 Röntgen wished to confirm the experiments of-Faraday, Crookes, Hertz and Lenard, on the passage of electricity through an evacuated glass tube. He used multiple elements: a Ruhmkorff coil, an interrupter, a secondary battery, tube support and an evacuated pear-shaped glass tube. The results have been described many times before. Rapid dissemination of his reports led to the widespread use of X-rays in medicine.

J M Guy, 8.5.2000

Philip Harris advert from 1912

BOOKS FOR SALE

(PRICES INCLUDE POSTAGE)

PRACTICAL SURGERY by Robert Liston - Fourth Edition. London 1846. Original cloth binding which has been professionally repaired at the spine. Very good condition. Virtually no foxing. Illustrated with woodcuts.£120

THE PRINCIPLES & PRACTICE OF MEDICINE by Sir William Osier. Eighth edition. Appleton 1917. Original cloth binding.£40.

HANDBOOK OF DISEASES OF THE NOSE& PHARYNX by lames B.Ball. 54 illustrations. Third edition. Bailliere. Tindall & cox 1897.£28.

CLINICAL LECTURES & ESSAYS ON ABDOMINAL & OTHER SUBJECTS by H.D.Rolieston. London 1904. £28.

INTRODUCTION TO SURGERY by Rutherford Morison. 146 illustrations and 5 plates. Bristol 1910. £14.

CLINICAL LECTURES ON THE ACUTE ABDOMEN by William Battle. Illustrated. Constable & Co. 1911 £26.

THE ROYAL NORTHERN OPERATIVE SURGERY by the staff of the Royal Northern Hospital. Illustrated. Second edition 1951. £7.

THE EDINBURGH DISPENSATORY - original quarter leather and cloth. Spine has been professionally repaired. Original title. I - vi of the preface are missing, otherwise intact with no other pages missing. Some foxing. Four plates of woodcuts illustrating chemical apparatus. Also a plate of Daiton's symbols of the elements. Probably published between about 1810 - 1820 as there is a chapter entitled 'New French system of measurements" ie. The metric system. £30.

ALEXANDER FLEMING: the man & the myth by Glyn Macfariane. Paperback £1.

THE EDINBURGH SCHOOL OF SURGERY BEFORE LISTER by Alexander Miles. 8 illustrations. AkC Blac 1918. £36

THE LIFE & TEACHING OF SIR WILLIAM MACEWEN by A.K.Bowman. Bookplate of Basil Helai, orthopaedic surgeon to the London Hospital in the front. £34.

THE EARLY HISTORY OF SURGERY by W.J.Bishop. First Edition. Robert Hale. Intact dustwrapper. £30.

VICTORY OVER PAIN: a history of anaesthesia by Victor Robinson. Henry Schuman. New York 1946. £20.

MEDICINE & THE NAVY: 1200 - 1900 by Keevil, Lloyd & Coulter. 4 volumes, but only volume I has a dustwrapper. Very good condition. E&S Livingstone 1957. £270.

LAWSON TAIT by Christopher Martin. Reprinted from the Birmingham Medical Review 1931. Hardback. 11 pages of photographs. £20.

SIR CHARLES BELL: HIS LIFE & TIMES by Sir Gordon GordonTaylor & E.W.Walls. Dustwrapper. E&S Livingstone. £30.

HISTORICAL REVIEW OF BRITISH OBSTETRICS & GYNAECOLOGY 1800 - 1950 by Munro Kerr, Johnstone & Phillips. Livingstone 1954. £65.

DOCTORS & DISEASES IN THE ROMAN EMPIRE by

Ralph Jackson. British Museum Publications 1988. Dustwrapper. Near mint condition. £10.

GRANVILLE SHARP PATTISON: ANATOMIST & ANTAGONIST 1791 1851 by F.L.M.Pattison. Canongate. Dustwrapper. Near mint condition. 1987. £12.

BY CANDLELIGHT: THE LIFE & WORK OF DR ARTHUR HILL HASSALL 1817 - 1894. Dustwrapper. Hale. Near mint. £3.

DR RICHARD BRIGHT 1789-1858 by Pamela Bright.Dustwrapper. Near mint. Bodley Head. £3.50.

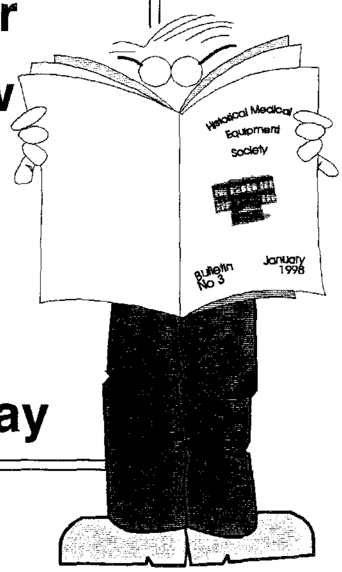
JOHN ABERNETHY by John L.Thornton (Printed by the author in 1953). Dustwrapper. Endpaper inscribed 'to James Tait with compliments John L.Thornton". £20.

A HISTORY OF THE BLADDER STONE by Harold Ellis. Dustwrapper. Illustrated. Near mint. £22.

Please telephone Dr Brightman on 01522-528607 (work) or 01522-811432(home) or e-mail: bugsquad@hotmail.com

REMEMBER!

Deadline for copy is now the end of November and the end of May



The Old Operating Theatre. Museum and Herb Garret

Diary of public EVENTS

Millennium Festival of Medicine

All events are free with admission to the museum, unless otherwise stated.

Suitable for all and all welcome

The Old Operating Theatre, Museum & Herb Garret is offering an extremely interesting programme for its Millenium Festival of Medicine. There is not room to reproduce the full brochure here but in July we are offered "The Herbal Sanctuary" on the 2nd and "Women Under the Knife" on the 12th. In August (12th) we can hear about the "Weekes Letters - A Year in the Life of St. Thomas' Hospital." In September there is a talk on the 10th on "The Doctor's Grave Excavated", the story of the finding of a 2000 year old set of Roman surgical tools. October brings "The Blade and the Bone - Surgery without Anaesthesia" on the 1st and "Fearful Symmetry" a talk on parallels between present day organ donation and 19th century body snatching on the 15th. More comes on the 5th November with "The Surgeon, the Cadaver and the Resurrectionist" and the year ends on 31st December with "Medicine in the Age of Shakespeare'. Full details are available from the Curator Tel: 020 7955 4791.