The Scottish Society of the History of Medicine

(Founded April, 1948)

REPORT OF PROCEEDINGS

SESSION 1994 - 95 and 1995 - 96

The Scottish Society of the History of Medicine

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The Scottish Society of the History of Medicine

(Founded April, 1948)

Report of Proceedings

Session 1994 - 1995

Session 1995 - 1996

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Report of Proceedings

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The Scottish Society of the History of Medicine

REPORT OF PROCEEDINGS
SESSION 1994-95

THE FORTY SIXTH ANNUAL GENERAL MEETING

The Forty Sixth Annual General Meeting was held in the Fife College of Health Studies, Kirkcaldy, on 29th October 1994. It was attended by 47 members or guests and the President, Dr Elizabeth Rose was in the chair. The minutes of the Forty Fifth Meeting were approved. The President paid a warm tribute to Dr Martin Eastwood for his work during a lengthy term of office as Treasurer and the meeting passed a formal vote of thanks to Dr Eastwood. The new Treasurer, Dr Simpson, presented his Report.

The Society's funds were in a healthy state but he commented on the need to clarify the state of the subscriptions. There had been a rise in subscription in 1992 but some 100 members were continuing to pay at the old rate, having neither increased their contributions nor cancelled their subscription.

It was reported that the International Congress in Glasgow in September had gone smoothly and the President praised Mr Blair, both as SSHM President and BSHM President in bringing the Congress to a successful conclusion. It was announced that the 16th British Congress would be held in St Andrews on 23-26 August 1995.

Dr Ashworth and Dr Dupree, the outgoing Council members, were thanked for their work during their terms of office and the meeting elected Miss J. P. S Ferguson and Dr A. G. Walker to serve in their stead. Miss Fiona Watson who was retiring as Secretary was warmly thanked for her hard work and it was noted that Dr J MacGregor would take over her role. Mrs Brenda White, the other Joint Secretary, gave notice of her intention to retire. The remaining office bearers, being willing to stay in office, were re-elected.

THE ONE HUNDRED AND FORTY SECOND ORDINARY MEETING

This meeting directly followed the 46th Annual General Meeting held in the Fife College of Health Studies in Kirkcaldy on 24th October 1994.The President introduced Dr Mark Fraser, who had organised the meeting and who talked on Stephane Tarnier and the origin of incubators for premature babies.

STEPHANE TARNIER AND THE ORIGIN OF INCUBATORS FOR PREMATURE BABIES.

Obstetricians were the first to make improvements to the medical care of modern infants. Budin suggested in 1900 that it was the great reduction in maternal deaths, following the introduction of antiseptic methods, which allowed the accoucheur to turn his attention to the needs of the infant. One of the pioneers of neonatal care was E. S. Tarnier (1828-97), son of a village doctor near Dijon, who became an outstanding and innovative obstetrician in Paris.

At the Paris Zoo in 1880, on a visit to its director, Odile Martin, Tarnier saw in use an incubator (couveuse) for hatching the eggs of exotic birds, and persuaded Martin to make him one for premature babies. This was the first closed incubator for hospital use. Earlier some hospitals had been using the warm cradle introduced by Denucé in

Bordeaux in 1857, a double walled metal cot with warm water in the cavity but with no lid over the baby.

Tarnier's first incubator came into regular use in 1881 in the Maternité of Port Royal in Paris. Its thick wooden walls were filled with sawdust and the lower half was occupied by a large tank of hot water. The upper compartment was large enough to accommodate four babies in shallow baskets, with inspection through a double glazed lid. Disinfection was by a solution of mercuric chloride 0.1%. Early results were published by Auvard in 1883, showing that the survival of infants of less than 2000 grams in birth weight could by this means be increased from 35 to 62 %.

This original model was not preserved when it was soon superseded by smaller types which could be more easily moved and cleaned (Auvard 1884; Godson 1884). Glass walls were introduced for better observation of cyanotic attacks, and by 1895 the models in use strongly resembled those used in 1945.

Pierre Budin recorded that a third solution was introduced by Charles Pajot of Paris in 1885 in the form of a hot nursery, the whole room forming a giant incubator which Budin criticised on the grounds that the nurses were obliged to feed and tend the babies "in this oven". Nevertheless these three methods – the warm cot, the closed incubator and the hot nursery – remained in competition, used in different places, for seventy years until modern incubators were developed.

References:

Auvard P. V. A. Archives de Tocologie 1884; 10: 577 - 609

Budin P. C. The Nursling, 1907 Caxton Publishing London
This is the translation by W. J. Maloney of Budin's lecture, Le Nourrisson, 1900; Octave Doin, Paris

Godson C. Lancet 1884 ; 858 - 859

Dr. Fraser's paper was followed by one from Dr. H. T. Swan on couching for cataract, as related in the Book of Tobit.

APOCHRYPHAL TOBIT AND THE TRUTH: COUCHING FOR CATARACTS IN ANTIQUITY

Ancient records of successful treatment of blindness caused by cataract are rare but the Apochryphal book of Tobit provides an interesting example. The story helps to date itself, the son of the house learning "*before he died*" that Nineveh had been destroyed, an event that occurred in 612 BC. The earliest written version of the Tobit story to which we have access today seems to have absorbed events from several centuries later but even these date from before the 2nd century BC.

Tobit's blindness can be attributed to cataract because his vision was restored immediately by a treatment which seems to be reasonable. Tobit himself attributed his blindness to sleeping by the wall of his courtyard in the city of Nineveh

"*And I knew not that there were sparrows in the wall, and mine eyes being open, the sparrows muted warm dung into mine eyes, and a whiteness came into mine eyes, and I went to the physicians, but they helped me not.*"

The Jerusalem Bible states that Tobit became blind only "in the end" (Tobit chap 2 v 10) providing a more plausible reason for the blindness to be considered as due to cataract.

There is a second story to be considered. A story which carries medical interest and which becomes interwoven with the blindness and its treatment.

As a security in troubled times, Tobit had left ten talents of silver in the care of his cousin who lived in Rhages in Media (now Rai in modern Tehran). Many years later, now blind, Tobit sent his only son Tobias to redeem the silver.

Early in his journey Tobias and his companion *"came in the evening to the river Tigris, and they lodged there. And when the young man went down to wash himself a fish leaped out of the river and would have devoured him"*. Tobias escaped from this peril and by following the instructions of his companion, managed to bring the fish ashore. They cooked the meat of the fish and ate, but Tobias was instructed to preserve the heart, the liver and the gall. He was told that if the heart and liver were placed on *"burning incense", "on the ashes of perfume"* the smoke would drive away any evil that was present. The gall or bile was to be used *"to anoint a man that hath whiteness in his eyes, and he shall be healed"*

Some time later they reached Ecbatana, about 175 miles from modern Tehran and there they entered the house of a relative of Tobit and met a beautiful young woman named Sara who was the only child of the house. She had been fated to be married to seven husbands, who had, each in turn, died on his wedding night, apparently before the marriage had been consummated. A legendary demon was believed to have been responsible for the deaths. Tobias married Sara without more ado and became her eighth husband. Significantly perhaps, the heart and liver of the fish were placed *"on the ashes of the perfumes"* in the marriage chamber and Tobias survived the first night.

Two weeks of celebrations followed and then Tobias began the journey back home to his father. Being blind, Tobit could not see his son returning, but one day, Anna, his wife, saw them approaching. Tobit then *"went forth the door and stumbled; but his son ran unto him and took hold of his father; and he strake of the gall on his father's eyes, saying, Be of good hope, my father. And when his eyes began to smart, he rubbed them; And then the whiteness pilled away from the corners of his eyes; and when he saw his son he fell on his neck."*

The technique of application to the eyes of the gall of the fish had been according to the instruction of Tobias's companion who had said *"anoint his eyes with the gall, and being pricked therewith, he shall rub, and the whiteness shall fall away and he shall see thee."*

Returning to the subject of Sara's husbands, two research workers (1) have analysed systematically the events of medical interest in the Apocrypha as well as in the Old and New Testaments. When dealing with the Book of Tobit they drew attention to the suspicion of foul play which must have been prominent in the minds of Sara's maids, Sara having beaten her servants because they said that she had *"strangled"* her husbands. Perhaps the bride herself was responsible but greater suspicion falls upon her father as, when he heard that Tobias had survived the first night, he gave orders to his servants to fill in the empty grave that had just been dug for his eighth son in law. He had said *"that we may bury him and no-one will know"*.

The tale of Tobit itself is widely held to be fictional or legendary, as similar stories exist in adjacent countries, for example in Armenia. However since legends can have a historical basis it seems reasonable to discuss briefly the deaths of the seven young men, despite the lack of recorded evidence.

It is possible that incense in the bedchamber could have contained cannabis or opium alkaloids which would have made the manoeuvre of strangling easier to accomplish. Opium is known on modern evidence to have been commercially available for many years before the fall of Nineveh. In the adjacent countries of the Mediterranean, it was sold in small containers known as base-ring juglets.(2) These had a wide distribution and were made to cater for contemporary sales by being thrown by the potters into the shape of the capsule and corona of the opium poppy itself. This will have been as informative to an illiterate population as a modern label with "Opium" on it. By whatever means nar-

cosis was achieved, the employment by Tobias of the use of fish liver and fish heart in the role of incense to produce an unpleasant and unromantic smell could well, in some way, have broken the regular rhythm of bridegroom destruction.

In contrast to the surmise which surrounds the seven murders a commentary on the cataract story can be more convincing. There is no doubt about the powerful irritating qualities of bile. Although only slightly alkaline, its special stinging quality can be attributed to biliary detergents and in some freshwater fish, to the additional presence of enzymes. The angel who said that Tobit's eyes would be pricked when the gall or bile was applied was not exaggerating and the eyes would smart and be rubbed, indeed one imagines that Tobit was forced to rub them most furiously.

The technique of couching for cataract, a well known medical technique in use until relatively recently, involves a deliberate detaching or dislocation of the opaque lens from its supports, a manoeuvre made more feasible because of the increased fragility of the zonules of the lens capsules. The lens falls back into the vitreous and light can then pass through once more to the retina and sight is restored immediately. Even in modern cataract practice, patients with a mature lens may find that the lens undergoes unpremeditated dislocation following local trauma. Traditionally the earliest couching for cataract was performed by the Indian Susruta, although his dates are unclear – he could have lived about the time of Tobit but "there is no record of the surgical relief of cataract in the extant literature of Babylonia, ancient Egyptian or classical Greek medicine" during the same period (3) In the 18th century Samuel Sharp of London expelled the opaque lens from the affected eye "by the pressure of his thumb" as part of his surgical technique.(4)

There is nothing inconsistent with modern thinking in what we read as having happened to Tobit in Nineveh some 2,600 years ago. There is however an absence of other recorded cases treated in this way.

The person who first told the tale of Tobit, regardless of why the tale was told, was clearly acquainted with what reads like an acceptable technique of treating mature cataract and he incorporates his knowledge into the story. The book therefore provides us with one of the earliest descriptions of couching for cataract, although no instruments were used. The case report is of importance to us today as part of the history of medicine. The story of the treatment of cataract, unlike the murders of the seven bridegrooms, can survive on its own merit, is dated and remains significant however the book itself is regarded.

All quotations in italics have been taken from the Authorised King James Version.

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Mr I. G. Rennie for authoritative comments about couching for cataract.

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Dr J. D. M. Gordon of Dustaffnage Marine Laboratory for information about fish bile.

New College Library, University of Edinburgh for publications on Tobit.

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2. R. S. Merrillees Trade and Transcendence in the Bronze Age Levant. Vol XXXIX in Series : Studies in Mediterranean Archaeology. Goteborg 1974.
3. Duke Elder S., ed. System of Ophthalmology, Vol XI. London : Henry Kimpton, 1969. p 249.
4. Ibid p257.

THE ONE HUNDRED AND FORTY THIRD ORDINARY MEETING

The One Hundred and Forty Third Ordinary Meeting of the Society was held in Glasgow on 25th March 1995. 54 Members or guests attended and two papers were read. One was by Dr Witold Tomaszewski, who talked on the Polish School of Medicine, which had been set up in Edinburgh during the Second World War and which played a key role in the maintenance of the spirit of Poland. The other paper was by Dr Rufus Ross, who traced the events known of the life of Peter Lowe, the founder of the Faculty of Physicians and Surgeons of Glasgow.

PETER LOWE: FOUNDER OF THE FACULTY - MAN OF MYSTERY

In a minute of the Faculty of 3 November 1795, it was noted that, " their ancient portraits were fast going into decay" and the President, Dr Peter Wright was asked to arrange for copies to be made. He spent £59.10s on copies of the first three members of the Faculty - Peter Lowe, Robert Hamilton and William Spang.[1] It was thought that they were intended as a triptych, as Lowe's portrait is almost twice as big as the other two and a press photograph taken in 1949 shows Hamilton's portrait firmly screwed to the wall on Lowe's right and Spang's was no doubt fixed on his left. Today, Lowe's portrait hangs in the Hall of the Faculty in a place of honour, once again flanked by his colleagues, Spang and Hamilton.

That the Faculty of Physicians and Surgeons of Glasgow was granted a Royal Charter on 29 November 1599, is one of the few hard facts associated with its founder, 'Maister' Peter Lowe. Details of his origins are as scarce as the mystery surrounding the date of his death.

From contemporary records it is possible to sketch something of the man and his works, but the greater part of his life remains an enigma.

Lowe is first mentioned in a minute of the Town Council of Glasgow dated 17 March 1599. " . . . It is agreeit of new and contractit betuix the toune and Doctor Low for iiijxx merkis money be year."[2] – the twenty four is written in Roman numerals - one-one-one and the final one is written as a lower case ' j', followed by two "x"s. (A merk is equivalent to about 5½p). This minute implies a former agreement probably a year earlier which would mark the arrival of Peter Lowe in Glasgow about the beginning of 1598. Why and when he left Scotland and what caused him to return are also questions for speculation. Alexander Duncan writing in 1896 says:

> ...the intellectual barrenness of Scotland generally during the 17th century has often been made the subject of remark. The chief causes of this mental sterility are indeed not far to seek. The whole country was ablaze with religious and theological zeal. In the fierce heat of ecclesiastical polemics and the political convulsions, which added fuel to the flame, the seeds of literature were scorched and withered.[3]

This was the kind of Society that Peter Lowe found on his return. So what brought him back to his native land? Many reasons have been given and will be explored later, but to return to the known facts as revealed in the Glasgow Burgh Records.

A further minute of 1605 refers to pension arrangements, "...Gifin upon the last day of August to Mr Peter Lowe, Chyrurgin, for his pension in Anno 1608 addedit be the town to him, conforme to ane warrant liii £ v s viii d.".[4] This is a reference to his pension or salary for attending the poor of the town, the amount being £53:5s:8d Scots. (The Pound Scots is now equivalent to about 8½p). His salary would be a reasonable sum for that

period, but certainly it would appear, not sufficient reason why Lowe should settle in Glasgow.

Glasgow ranked about fifth in population in Scotland, T. C. Smout in his *History of the Scottish People 1560-1830*, gives a figure for this period of between 10,000 and 12,000 rising to about 14,000 by the end of the century .[5] As far as medical treatment is concerned in 1599, this was provided for by one physician, six surgeons, one apothecary and two midwives.[6] That he should move in middle age to a relatively small town with only a handful of doctors may seem odd, but perhaps it was this very fact that decided his move. It may have been the old medieval scholars' habit of continuously moving from place to place, or as a return to the land of his birth. Scotland for some unknown reason attracted back some of her sons. Two distinguished Scottish surgeons, Andro Scott and Robert Auchmowtie returned to Edinburgh at the height of their powers.[7]

Peter Lowe was undoubtedly a Scot thought to have been born in Errol, a village ten miles east of Perth; the title pages of all his published works all carried after his name the word 'Scottishman' or 'Scotchman' and often 'Arellian,' which was construed by many to be an allusion to his stay at the College in Orleans. To others, the word referred to his place of birth, as Arrol was the ancient name for Errol, thus, 'Arrelian'. It has also been suggested that he came from Ayr, but this has been discounted.

Weight is given to the Orleans theory by Dr A. Dureau, quoted in *Memorials of the Royal Faculty of Physicians and Surgeons of Glasgow* by Alexander Duncan.[8] Dureau was librarian at the Paris Academy of Medicine in 1877. He said that by Arellian, Lowe meant *Medicus Aurelianis* (Orléanais), that is, medical man trained at the School of Orleans. Dr Dureau also stated that he had personally inspected a manuscript register at Orleans which contained Peter Lowe's name. Duncan points out that the difference in spelling between 'Arellian' and 'Aurelianis' counts for little as an objection in view of the fluid state of orthography at this period.[9]

Further evidence for the Orleans theory comes from Duncan who points out that a treatise by one, Israel Harvetto, was annotated , "Auctore/ Israel Harveto/ Medico Aurelian .[10] However, a later piece of research by Dr Laurence Scott dated 1982, suggests that the term 'Arellian' or 'Arelius' was also used by a friend of Lowe, Alexander Dickson, who was born in Errol.[11]

Whatever may be the truth of the matter, the title Arellian is dropped in the 2nd edition of 1612 and also in subsequent editions of Lowe's work, possibly by that time he may have found that the term was not understood. I haven't seen this explanation anywhere, but it occurred to me that this might have been an example of Peter Lowe's well-known sense of humour and that the word 'Arellian' or 'Areellian' coming after 'Scotchman' was meant to imply that he was 'a real one' i.e. a Real Scotsman.

Most of what has been written about Peter Lowe's life was based on asides by him in his publications and the few contemporary records which have survived. So many of the records of the time were kept in the churches and were destroyed in the sackings and burnings of the Reformation. If he *was* born in Errol, about 1550, he would have been born a Catholic according to A. L. Goodall, (writing in the *Journal of the History of Medicine and Allied Sciences* in 1955) as the first Protestant minister did not appear until 1567.[12] Session Records at Errol did not start until 1660 and records of births 1553. The informative Register of Sasines did not start until 1617.

It is presumed that he was born about 1550, perhaps of a Catholic family who fearful of the spectre of Calvinism, packed him off to the Continent of Europe about the age of fifteen.

Perhaps being the son of a middle-class family of either faith he was sent to study in the Low Countries or France, as many young Scots were sent before him, particularly if

medicine were his goal. France at that time had special links with Scotland, in fact Scots were granted citizenship of that country and encouraged to stay.[13]

Where Lowe's first degree was granted is still not definite, but it certainly was *Magister Artium* (Master of Arts), as Lowe seldom omitted the 'Mr' or 'Maister' before his name. From his writings it is plain to see that he was a well-educated man for the times in which he lived.

His next place of residence was Paris where he trained in surgery at the College of St Côme whose surgeons claimed to be the 'Faculty of Surgery' in Paris. This enabled Lowe to confer on himself the status equivalent to a University training, thus distinguishing himself from those who trained as apprentices.[14] Once again there is a lack of positive evidence as many of the French records were destroyed in 1940 during bombing raids.

The next period of Lowe's life is based on information derived from his two publications. The first of these was *An Easy, Certain and Perfect Method to Cure the Spanish Sickness* published 1596, and *A Discourse on the Whole Art of Chyrugery* which appeared in the following year (1597). Both were published in London.

The 'Chyrurgerie', was the first complete treatise on surgery to be published in the English language. But more importantly from a dental point of view, the 2nd edition of 1612 and the 3rd edition of 1634 contain some twelve chapters dealing comprehensively with numerous dental conditions of the mouth, teeth, gums, throat and associated areas. Causes and treatments are discussed in these chapters running to about thirty pages of text and illustrations.

Lowe was one of the first to state that worms were not the cause of toothache, a view widely held at this time.[15] His detailed account of the treatment of various dental conditions are of great interest and a few examples are taken from the 3rd edition of 'Chyrurgerie'.

> ....for remedie thereof we make artificial teeth of ivory, Whales bone or hounds teeth, which shall be fastened by a wyre or thread of gold, passing the wyre or thread betwixt y whole tooth on either side next adjacent, then put the artificial tooth in the part, then knit the thread fast through about the ends of the thread, and cut it so neere as you can; if any portion rest uncut, passe it betwixt the whole tooth, that the tongue or lips be not hurt by it. ...[16]

> The toothe groweth blacke, mouldy, hollow, and evil-flavoured, either by rotten humours fallen from the braines, vapours ascending from the stomacke by receiving the fume of vapour of quick-silver, sleeping with open mouth and by not cleaning the mouth, tongue [and] teeth...[17]

Lowe then recommends scaling with a sharp iron instrument and I quote to "...rase and rub away such sources." as had collected and after using a mouthwash of vinegar and herbs, the teeth are whitened with a solution containing sulphuric acid. Although the quantity used is minimal, the effect of this repeated treatment is well-known.[18] Few dentists today would recommend it !

More rational treatment by modern standards, was the use of a pledget of cotton wool immersed in oil of cloves or sage and inserted into the cavity of an aching tooth. In more severe cases the remedy was the application of a hot iron or cautery made of silver or gold and inserted into the cavity.[19]

The significance of this work - *A Discourse on the Whole Art of Chyrurgerie* - written by a Scot is, that it is arguably the first original, systematic treatise on surgery and also the first corpus on dental treatment to be published in the English language, pre-dating the work by Charles Allen - *Operator for the Teeth* - published in York in 1685 by more

than fifty years. *Operator for the Teeth* is claimed by most dental historians to be the first volume exclusively on the subject written in English.

A curious fact concerns Lowe's claim to other writings. These were *The Poor Man's Guide, The Book of the Plague* and *A Treatise on the Diseases of Married Women and Maidens*. Throughout his published works, he continuously refers the reader to these publications, giving precise details of where specific items were to be found. Lowe writes as though these works were in print, but there is no record that they were ever published.

Returning to the life of Lowe. Most dental historians record that he was back in London in 1596 when the *Spanish Sickness* was published, but once again this is only an assumption. But where had he been in the previous thirty years since leaving Scotland?

In the preface to the 2nd edition of the 'Chyrurgerie', Lowe says that he had been in practice for twenty-two years in France, Flanders and elsewhere, and, " . . . as a Chirurgien Maior to the Spanish Regiments at Paris for two yeeres."[20]

This was at the time of the Siege of Paris, 1589-1590. He goes on, "...next following the French King, my master in the warres 6 yeeres".[21] This account spans a gap of thirty years, furnishing practically no details.

However, a letter found in the *Calendars of Scottish Papers* (vol.IX) by Dr Laurence Scott tells a different story, and I quote, "... there is one Peter Lowe, a Scotchman and a pirate; he has taken an English ship of Wells in Norfolk laden with corn for Berwick."[22] Apparently Lowe sailed the ship to Montrose and sold the corn. The writer of the letter suggests that an English Man-o-War be sent to these waters to 'encourage the King and the Protestants'. Could this be Peter Lowe, a Catholic pirating an English Protestant ship? It has also been suggested that the pirate's name was Peter *Love*,not *Lowe*.[23] A second entry in the *Calendars* seems more appropriate to our subject.

A Dr Macartney writes to Robert Bowes on 23 May 1595 that, "a new admittit chirurgian' to the King of France called Mr Lowe had prepared 'to perfection' a casket of documents including 'some secret devices of England, domestic and foreign,' with a description of the 'depis' [depots] of all the havens there and brought it to L'Aubespy in Paris.[24]

Apparently this material had been collected by Lowe a year or two previously when he had travelled with Alexander Dickson (mentioned earlier), Secretary to the Earl of Errol, both well-known Catholics. Was Lowe acting for James VI or for his 'Master' Henry of France, or as a go-between for both? According to Tom Gibson, the last explanation seems most likely, Like James, Lowe favoured Catholicism or Protestantism as the situation demanded. Catholic with the Spaniards, Protestant and then Catholic with Henry of Navarre. Protestant when he returned to Glasgow and the Reformation.

That King James and Lowe were close friends is illustrated by the fact that James in 1601, sent him with the Earl of Lennox, Ambassador to France, on a visit to the Catholic Court of Henry in Paris, at a time when James's plans for the English throne were coming to fruition. This is an extract from the Glasgow Burgh records for 18 June 1601:

> The Baillie and Council present at the special request and desire of my Lord Duke's Grace has licensed and gives licence to Maister Peter Lowe, chyrurgien to pass in company with my Lord Duke as ambassador appointed to France and dispenses with his absence and not remaining of the said Maister Peter, and that he may enjoy his pension of the town and that until the XI of November nixtocum, but prejudice of his contract in case of his returning or sooner at the said time as shall happen his Lordship to return.[25]

The Earl of Lennox was a powerful friend of James and represented the King after the Union. What better person than Lowe with his education, language and knowledge of Henry's Court to assist him?

A reasonable explanation of these revelations must be that Lowe had been engaged in political intrigue at the highest level, and that he used his sojourns through various countries as a pretext in order to gain information to be passed on to both James VI and Henry of Navarre (IV). Alternatively, as a well-known surgeon travelling in Europe he would not be subject to the same restrictions as others and would be able to gather information which would be of interest to his masters. That his espionage – [allegedly] was suitably rewarded can be gauged by the singular grant to him of a Charter for the Faculty of Physicians and Surgeons.

Lowe's return to Glasgow may have been earlier than 1598, according to Dr Scott, possibly 1596, and this may have been the date when he first approached James VI regarding a charter. Back in Glasgow, he soon became dissatisfied with the standards of medicine and dentistry he found and to which he often referred in his works. His ambition was to set up a College in Glasgow similar to the one in Paris, which would benefit all of the people of the West of Scotland.

In the 2nd edition of Chyrurgerie (1612 – but actually 1610) he writes, ". . . it pleased his sacred Majestie to heare my complaint about some fourteene yeeres agoe upon certain abuses of our Art."[26] And in several passages he scorns the barber surgeons and particularly their treatment of teeth. In one passage he says, " . . . by which opinion the common Barber Chyrurgion doe commit great error in plucking out innumerable teeth which might well serve."[27]

Backed by the Kirk Sessions and the Town Council, Lowe's memorial to the King resulted in the granting of a Royal Charter establishing the Royal Faculty of Physicians and Surgeons dated 29 November 1599. A name which continued for over three hundred years until 1962 when 'Faculty' was replaced by 'Royal College'.

The Charter, written in Scots, starts by noting:

> ...the grit abuisis quhilk hes bene comited in time begane and zit (yet) daylie continuis be ignorant, unskillit and unlernit personis quha, under the collour of Chyrurgeanis abusis the people to their plesure, passing away but tryel and punishment, and thairby destroyis infinite number of oure subjects. ... [28]

It had jurisdiction in Glasgow, Renfrew, Dumbarton, Ayr, Renfrewshire, Clydesdale, Lanark, Carrick and Cunninghame, in effect most of the South West of Scotland.

The Charter gave the right to three named men, Peter Lowe; whose name was prefaced by the words,". . . our Chirurgiane and chief chirurgiane to oure dearest son the Prince." (Prince Henry who died in 1612) and Mr Robert Hamilton; William Spang Apothecar was the third name mentioned.[29]

Lowe, Hamilton and Spang were authorised to carry out the registration and supervision of degrees in surgery and medicine, control the sale of poisons, inquire into suspicious deaths, murders and accidents and report their findings to the magistrates; in other words organise a form of inquest. In addition they were also required to organise free treatment for the poor thus anticipating the medical relief of the Poor Law Acts. All in all, a most comprehensive and far-sighted plan embodying remarkably progressive ideas for its period. According to Gibson, Lowe and Hamilton had their first meeting in Blackfriars Kirk on 3 June 1602.[30] Five new members were admitted and another two shortly after. These individuals probably included all the reputable practitioners of the healing art in the Burgh.

Tom Gibson in his remarks concerning the granting of the Charter says:

> ". . . the granting of the Charter to Lowe can best be explained as an unusually lavish gift for substantial services rendered by a friend and ally, with perhaps a hint of blackmail by an astute, well-travelled intermediary at a time when favourable opinions in as many quarters as possible, were essential for James's plans."[31]

Speculating on the contents of the Charter, it has been suggested that it was the Kirk Sessions that first took action about the unskilled practitioners around 1598.

Following an approach to the Town Council, a meeting was arranged with representatives of the Kirk Session, the University and the Council and, I quote, "... others cunying of that arte, to examinat and tak tryall of all sic persones."[32]

It is probable that Lowe was one of these and that he inspired the move. But Scott asks "Would Lowe who had been ordered to the 'pillar' be appointed their adviser?" (More about the 'pillar' later). And if he was one of the appointed, why was his name not mentioned? After all, Lowe was the only surgeon of distinction in Glasgow at this time, recently appointed Surgeon to the King of France and well-known to the leaders of the profession in Edinburgh, London and Paris.

It was around this time that Lowe memorialised King James VI regarding the standard of medicine in Glasgow. According to Scott, James and his Council must have acted with remarkable speed; studying the memorial, drawing up the Charter and granting it, all within six months.

But this theory depends on the authenticity of the dates involved. Scott points out that the area of jurisdiction is marked out very precisely and corresponds to the Diocese of the Archbishop of Glasgow, which continued to be extant after the Reformation.

It would appear from this that there is evidence of central planning and an explanation why the Glasgow Charter is unique among early medical charters in establishing the jurisdiction of the incorporation far beyond the area of the town in which it was situated.[33]

The comprehensive nature of the Charter is also striking, not only in its scope but also in its far-sightedness. Lowe was only interested in his own speciality, surgery and its abuses. Furthermore, although he attended meetings and served in minor posts, he never occupied high office, this was in the hands of Robert Hamilton, whilst Lowe busied himself with his practice and local politics.[34]

Dr Scott suggests that the author of the Charter was the King himself. James was a learned man with progressive ideas. In 1606 he granted a fresh Charter to the Barber Surgeons of London and in the following year gave a Charter to the apothecaries of London uniting them with the Company of Grocers, although this union was dissolved in 1617. He also attempted to establish a College of Physicians in Edinburgh, but it came to nothing because of opposition from the University. Remarking on these innovations, James is reputed to have added that it was 'part of his Princely office.'[35]

On his return to Scotland Lowe was soon in trouble with the Kirk Sessions. Finlayson, in his *Account of The Life and Works of Maister Peter Lowe* describes an entry in the Kirk Session Records (vol.iii p274), formerly kept in the Presbytery House of the Tron Church, Glasgow. Lowe had been sent to the 'pillar' for some misdemeanour, not specified, but even there had displayed so much levity that the punishment was repeated, and it also appears that he neglected to pay the treasurer his fine.[36] According to Dr Scott, not only was Lowe ordered to stand at the pillar, but also his father-in-law, Reverend David Weems, was criticised, " . . . for being negligent in preparacioun and in his teaching has gevin occasioun of laughter and assumes to be owertaine wt drink."[37]

Lowe had a son John by his first wife, Grizell or Grisill Pollart, possibly Flemish or from Linlithgow, according to Goodall,[38] and a daughter Christine or Christiane by his second wife Helen Weems or Wemyss, daughter of the above-mentioned Rev. David Weems. Weems was the first Presbyterian Minister in Glasgow after the Reformation. The dates of the marriages are unknown, but were probably before 1604, according to Tom Gibson.[39]

An entry in the *Glasgow Protocols* for 1591-1600, records that on 26 May 1599, one James Lyone sold to Peter Lowe and his 'spouses' Grisill Pollart, a fore tenement prop-

erty which was situated somewhere west of the present High Street between Duke Street and the Cathedral.[40]

A further fact which I recently discovered from the *Glasgow Protocols*, was that Peter Lowe had a brother John living in Glasgow. He is cited as a witness in a transfer of property on 31 October 1600.

The extract states specifically " John Low, brother of Mr Peter Low, physician (medico)."[41] It also transpires that Peter had a sister Helen Low. This came to light with the discovery of Peter Low's will.[42]

After Lowe's death, Helen Weems re-married. What is known is, that by 11 January 1615, she was married to Walter Stirling, that being the date recording the arrival of 'a lawful son John'.[43] The Stirlings had 3 sons and 2 daughters. All died unmarried except the eldest son John. The Stirlings were an influential Glasgow family, and are commemorated today through the Stirling Library in Glasgow. Helen Weems was still alive on 12 January 1658 (a legal claim by her is recorded in the Burgh Records),[44] she survived her second husband by at least 2 years and Peter Lowe by at least 46 years.[45] She must have been much younger than the doctor.

One of the last authenticated pieces of evidence recording the presence of Lowe in Glasgow is provided by an entry in the Glasgow Protocols. Dated 26 May 1610, it reads as follows:

> James Braidwood debursit and gaif furth the said sowme to maister Petir Lowe, pairtlie for his fey and partlie for the expensis maid be him in bowelling of the laird of Howston lait provost,...[46]

Bowelling was the term used for preparation of the body prior to burial.

The mystery surrounding Peter Lowe deepens when one examines the date of his death. His tombstone which stands against the south wall of the Churchyard of Glasgow Cathedral bears the date '1612'.

However, the preface to the 2nd edition of the Chyrurgerie states:

> "... and so I humbly take my leave at my own house in Glasgow, the 20. day of December in the yeere of Our Lord God 1612."[47]

This could only mean that he had died sometime in the last ten days of December 1612.

The real date of Lowe's death seemed to have been cleared up with the discovery of an entry in the Index Funereus Chirurgorium Parisiensium ab anno 1315 ad annum 1729. This being the death roll of the Confrairy of Surgeons where Lowe had studied. This showed that he died on 30 June 1617.[48] But this information was found to be false when it became known that his widow, now re-married, had a son baptised on 11 January 1615.

The answer to the precise date of Lowe's death came in 1896 when a Mr A.W. Gray Buchanan, searching the *Commissariat of Glasgow Testaments*, vol.7, discovered by chance Peter Lowe's will. James Finlayson, (Librarian to the RFPS) obtained a copy of the document in 1898 from General Register House, Edinburgh. The will which was drawn up only two days before his demise, on 13 August, gave the date of his death as 15 August 1610.[49]

It is interesting to learn that Peter Lowe left a net estate valued at £5,552.8s.8d. - Scots, which according to James Finlayson was about £463 sterling in 1900 . According to my calculations the equivalent *purchasing power* of £463 would, today be somewhere in the region of £200,000. (The pound Scots was worth about 1s 8d or 8½p - the merk was worth about 1s 1⅓d or about 5½p). The inventory drawn up also shows that amongst Lowe's debtors was the Burgh of Glasgow, who owed him the sum of

£26.13s.4d, (Scots) as half a year's pension or salary. This sum has not been found in the Burgh Accounts - if it had been, it might have led to the fixing of the date of his death .[50]

Other points of interest in the will reveal that he had a sister, Helen, who was left 500 merks, and that by way of investments, he had loaned money amounting to £5,496 (Scots) to various well known people, amongst whom were Alexander Colquhoune of Luss, John Campbell of Ardinkynlas, late Robert Lord Sempill; 'My Lord of Glasgow' and knight Robert Hamilton of Goslingtowne, to whom Lowe had loaned £2,000. The will was confirmed on 12 January 1611.[51]

Lowe fathered two children, one, John by his first wife and a daughter, Christine or Christiane by his second wife, Helen Weims. John had a son James, grandson to Peter Lowe. This James had a son (or less likely a brother), also Peter, who married a daughter of John Gray of Carntyne. Their children, William and Annabelle died without issue, so the family became extinct.

Some property which he had left came into the possession of members of the Gray family. Writing in 1862 to James Finlayson, the Rev. John Hamilton Gray related that some of Lowe's descendants were also descendants of his family, and as a consequence, either his father or his grandfather had come into possession of his burial ground, tomb-stone, a pair of gloves and a silver snuff box.[52] He sold the stone in '1833 or 1834'.

The tomb-stone was acquired by the Royal Faculty on 12 May 1834 from the Rev Gray, then Rural Dean of Chesterfield. As the stone was showing signs of decay, a bronze memorial tablet, reproducing the wording on the stone was placed on the north wall of the nave of Glasgow Cathedral and unveiled on 5 April 1895.

Several questions now present themselves:

1. What is the explanation for the last lines written in the 2nd edition – "and so I humbly take my leave – 20 December 1612"?
2. How can the 2nd edition of 1612 have been corrected by the author"?

The explanation given by Finlayson is simply that when the will was confirmed in 1611, the MS of the second edition along with the *Presages of Hippocrates*, - which had been completed before Lowe's death - were sent to the publishers for the benefit of Lowe's son, John. At the same time a number of illustrations were added by the publisher. Evidence to support this view, is that Lowe makes no reference to these in his texts. The publisher or printer, simply ignored the fact that Lowe had died in 1610 and in the preface, put in the date on which the second edition was printed, namely 1612. So it would appear that the second edition could have been corrected by the author, but **not** in 1612.

But there still remain two unanswered questions.

1. If Lowe died in 1610, why does the date 1612 appear on the stone?
2. Why was no attempt made to correct the date later?

It has been suggested that the stone was put up several years after Peter's death as the names of his son and grandson appear on it. The name of his son John is on the left hand pillar and that of his grandson, James on the right. On the other hand, the names could have been added to the stone at a later date. This still does not answer the question why the date '1612' has not been changed. One explanation, somewhat facetious, of the stone inscription might be that the mason who carried out the work was a bit fou' and the longer he worked the worse he became.

So I leave you with some unanswered questions. You may have some suggestions - I would be interested to hear them. Perhaps, some day, someone will provide a convincing explanation.

Although much of Peter Lowe's life was shrouded in mystery - one fact is abundantly clear, and that is, as founder of the Royal Faculty of Physicians and Surgeons of Glasgow, he made a major contribution to the development of medicine and dentistry in Scotland. This, I am sure will remain his true memorial.

Acknowledgments

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THE FOURTH HALDANE TAIT LECTURE

The Fourth Haldane Tait lecture took place in the University Staff Club, Edinburgh on 12th May 1995. The President Dr Elizabeth Rose introduced the guest speaker, Dr Jean Guy, a Consultant Radiologist. Dr Guy's talk, appropriate in the Centenary year of the discovery of X-rays, was entitled Röntgen's Rays and his Scottish Disciples.

RÖNTGEN'S RAYS AND HIS SCOTTISH DISCIPLES

In 1995 the medical imaging world celebrated a hundred years of X-rays. Their discovery and introduction into Britain have been told before, so those of you who are familiar with the story must be patient.[1] To this tale I have added a summary of the introduction of radiology into Scotland, and of the Scots who practiced radiology in England. This account concentrates on the first twenty-five years and is based mainly on printed sources, except for Glasgow where the Health Board maintains a comprehensive archive of manuscript and unpublished material.

[1] Further information is available in **E. H. Burrows,** *Pioneers and Early Years, a history of British radiology,* Colophon Press, St Anne, Alderney, CI, 1986, from which many of the sources for this paper can be identified.

Röntgen's Discovery

Since the beginning of the eighteenth century scientists in Europe and America had been experimenting with the effects produced when electricity passes through a partial vacuum. After Faraday's demonstration of electromagnetic induction it became easier to produce and control the electric current. Geissler of Tübingen succeeded in sealing platinum electrodes into partially evacuated glass tubes which were used to demonstrate the effect of the electric current on different gases within the tube. Another German, J W Hittorf, described the cathode rays which produced fluorescence when they impinged on the wall of the tube. William Crookes in England used more efficient vacuum pumps and a new design of tube in the investigation of the nature of cathode rays, and proved to his own satisfaction that they were particles, though the German scientists were not convinced. Hertz and his pupil Lenard pursued their own researches, and the professor of physics in Würzburg, Wilhelm Conrad Röntgen, decided to repeat Lenard's experiment before proceeding with a research project of his own.

Lenard had used a tube of his own design with a very thin aluminium window, through which the cathode rays could pass. They were detectable for a few centimetres beyond the tube. To show them, he used a screen covered with ketol[2], a complex organic compound which fluoresced when exposed to the rays. Röntgen used a card covered with barium platino-cyanide, a more sensitive chemical not available to Lenard, and his tubes were similar to those used by Crookes and Hittorf. He surrounded the tube with black cardboard to prevent its luminosity from interfering with his observations on the screen. On the fateful evening in November 1895 the screen was lying on the bench when he switched on the current. The screen began to glow, and the glow flickered in time with the pulsation of current from the induction coil to the tube. When he moved the screen, it continued to glow up to two metres away from the tube. This should not have happened. What was even more startling was his discovery that these rays would penetrate paper, wood, cloth, and even some metals. Holding his hand between the tube and the screen he saw that the rays passed through the flesh, revealing his bones.

Röntgen was at first convinced he was going mad. His colleagues, he thought, would not believe him. To confirm his observations he substituted a photographic plate for the screen. He was an able amateur photographer. We do not know how long this exposure was, or how often he had to repeat his experiment, but the first successful radiograph of a human being to be published was the image of his wife's hand. Before revealing this picture to the world he spent the next seven weeks in his laboratory, discovering all he could about the properties of these rays, which he knew could not be cathode rays. Cathode rays, now known to be electrons, were deflected by a magnet: x-rays were not. So thorough was he that the three papers he published in December 1895, March 1896 and March 1897 described most of the physical properties of 'the new kind of rays'. He also called them X-rays, from the mathematical tradition that x represents the unknown.

What was happening in his apparatus? With the benefit of hindsight we can "see" what was invisible then. An electrical current was produced by a series of batteries. This was fed to the primary circuit of an induction coil, named after Ruhmkorff who improved upon Faraday and later designers. The secondary winding of the coil produced a smaller current at a much higher voltage, at least 10,000 and up to 60,000 volts, depending on the size and efficiency of the coil. The tube was evacuated almost to the limit of the pumps then available. Röntgen was evacuating his tube continuously. However some air at very low pressure remained in the tube. Under the influence of the high voltage applied to the electrodes which penetrated the glass wall of the tube, the residual gas became ionised. Positive ions, the charged atoms of nitrogen, oxygen and so

[2] Pentadecylparatolylketone.

on, moved towards the cathode or negative electrode. The free electrons, negatively charged, moved in the opposite direction, which was the wall of the tube. They moved at speed and impinged on the glass with great energy. Their deceleration and loss of energy was converted into electromagnetic radiation: ninety-nine percent heat, one percent X-rays. Because the beam was not focused in any way, the rays spread out from the tube in all directions, hence the fuzziness of the first images.

Röntgen presented his paper to the president of his local scientific society on 28th December, it was published by the New Year and he posted copies to friends in Germany, Austria, England and Scotland.

The News Spreads

News of the discovery of X-rays reached Britain in the first week of 1896 by two routes: Röntgen's offprints were sent to Professor Arthur Schuster in Manchester and Lord Kelvin in Glasgow. Most people heard of it through the newspapers—foreign correspondents picked it up from the Vienna paper *Neue Freie Presse* whose editor's son was a young physicist colleague of Franz Exner, another friend of Röntgen's who received an offprint. The short newspaper reports on 6th, 7th and 8th January 1896 were factual and with little comment, but their significance was obvious to those who were familiar with recent experimental science. Interpretative articles soon followed. No previous scientific discovery had such a reception. The popular press, the world of science and the medical profession reacted with a mixture of amazement, incredulity and applause. *The Times* ignored the subject. *The Lancet* was initially scathing, then factual and by the end of January enthusiastic. The photographic journals made much of the discovery, treating it as a branch of their own science. The *Glasgow Evening News* published a poem, regretting the loss of privacy but celebrating the continued secrecy of thought.[3] *Punch* of course poked fun, publishing a series cartoons illustrating the feeling of the time.

Four groups of people tried X-ray production during the first six months of 1896: academic physicists, scientific amateurs, men of commerce and doctors. Scientists appreciated the difference this discovery would make to theories about the fundamental nature of matter and energy. Many doctors also saw its potential medical application and became engaged in clinical radiography. It is those clinical applications which I am best qualified to describe.

This was still an era in which gifted and wealthy amateurs, country parsons and school teachers were able to contribute to science. Amateur scientists, among them Lord Blythswood in Renfrewshire, tried their hands at the technique. Blythswood was a man of independent means whose science was a serious hobby.

Those British scientists who had already worked on the passage of electricity through vacua were equipped to repeat and confirm Röntgen's experiments, among them Alan Archibald Campbell Swinton, an electrical consultant from a landed family in Berwickshire who had by this time moved to London. Through public lectures, demonstrations and learned articles scientists helped to spread knowledge of the discovery to doctors and a wider audience. The most influential publications were Arthur Stanton's translation of Röntgen's paper in *Nature* on 16th January, the radiograph of Swinton's hand printed in *Nature* on the 23rd and the series of articles by Sydney Rowland in the *British Medical Journal* throughout 1896.

[3] Reprinted in **Smith, Christopher,** Medical radiology: its practical application 1895 - 1914 in **Checkland, O & Lamb, B**, Health Care as Social History: The Glasgow Case. Aberdeen UP, 1982, pp100 - 101.

J J Thomson of Cambridge and Arthur Schuster of Manchester assisted medical practitioners to obtain X-rays, by making their laboratory equipment available. Physicist-doctor associations sprang up round several British universities. In Glasgow Kelvin, who was ill, gave Röntgen's paper to his son-in-law, J T Bottomley, who passed it on to John Macintyre, laryngologist. At Glasgow Royal Infirmary he had been running the electrical department, established in 1887,[4] for some years and was well prepared to demonstrate the application of Röntgen's ideas to medicine, with the help of apparatus loaned by Kelvin and tubes specially blown for him by Mr. Otto Müller.[5] With Bottomley and Blythswood, he demonstrated X-ray production before the Glasgow Philosophical Society on 5th February 1896.[6] Showing the extremities was the first stage, and like most pioneers his first clinical radiograph was of a needle in a wrist. By March he was able to show the larynx, and later that year an abnormal heart, a diseased hip-joint, a coin in the gullet and a kidney stone. His greatest triumph was the world's first cineradiograph - of a frog's leg - shown in 1897. He also produced a cineradiograph of movements of the knee and pioneered rapid serial radiography of the heart.[7]

The larger Scottish hospitals all had X-ray apparatus within twelve months. What was notable about radiology was not only how quickly it spread, but how rapidly the equipment was improved, how its potential for different examinations grew, and how the number of patients diagnosed and treated increased.

Glasgow Royal Infirmary even had electricity supplied by the mains, not common in hospitals before the turn of the century. This was helpful to the rapid expansion of its radiographic work. Like Glasgow, the Royal Infirmaries in Edinburgh and Aberdeen had pre-existing departments of medical electricity, which meant that some of the necessary apparatus and the skill to run it already existed. Indeed the regulations drawn up at the foundation of Glasgow's Royal Infirmary in 1794 decreed that the Surgeon's Clerk was to 'electrify those patients for whom electricity is ordered.'[8] These departments used electricity for diagnosis, for example, electrocardiography and assessment of nerve injury, and for treatment using alternating current for high frequency diathermy, or high potential, low amperage direct current to induce an electrical discharge around the patient. Another favourite treatment was the four-cell Schnee bath. The patient immersed both feet and forearms in saline solution, through which a small current was passed. Surrounding a patient with light from electric bulbs was thought to be beneficial and this was one of the cures advocated by Kellog (of the corn flake). From 1900 hospitals began to install Finsen light apparatus for the treatment of lupus vulgaris.[9]

[4] **Macintyre, John**, The electrical pavilion, Glasgow Royal Infirmary. *Archives of the Röentgen Ray* vol.7, 1902-3, pp101-2.

[5] **Macintyre, J**, *Practical Photography*, vol. 7, 1896, pp68-72.

[6] **Bottomley, J T, Blythswood, Lord & Macintyre, J,** On the Röntgen rays or the new photography, *Proceedings Philosophical Society of Glasgow*, vol.27 1896 pp156-164.

[7] Some of the details of Macintyre's work have come to us from a letter he wrote at the end of his life to Dr John Comrie, lecturer in Medical History at Edinburgh University. Macintyre was correcting an error in Comrie's address at the closing meeting of the session at Anderson's College in 1928.

[8] *Glasgow Royal Infirmary Minutes*, 25 November 1794. I am grateful to Dr. Derek Dow, fomerly Archivist of the Greater Glasgow Health Board, for providing me with the reference in a pre-publication text of chapter 13, 'The impact of technology' in *Scottish Health Services* 1900 - 1985.

[9] Tuberculosis of the skin.

Radiation Treatment

From the turn of the century X-rays were used for treatment. The apparatus was not sufficiently powerful to penetrate deep tissues and for the first few years radiotherapy was used mainly for the treatment of skin tumours and non-malignant skin conditions. Radium, discovered in 1898, began to be used in Britain from about 1903, but its exorbitant price prevented widespread application. The Royal Infirmary at Edinburgh purchased radium annually from 1903, Glasgow Royal Infirmary had access to radium but did not pay for it, the Western and Victoria Infirmaries were still waiting, in 1910, for a generous donation towards its purchase, and Aberdeen Royal Infirmary refused Dr Levack's request to buy it.[10] In 1914 a committee was set up to provide radium for Glasgow and the west of Scotland, to be shared equally between the three Infirmaries, the Samaritan and the Royal Cancer Hospital. Its proper use was regulated by the appointment of recognised radiologists who reported on the results of treatment.[11]

That X-rays could be hazardous as well as beneficial was not immediately appreciated. Some operators who suffered sore eyes or cracked skin early on, immediately took precautions to protect themselves and suffered no long-lasting effects. Others ignored the danger signs and developed painful skin cancers or leukaemia. This was all too common amongst those taking up X-ray work during the First World War, when training and equipment were inadequate and there was great pressure of work.

Diagnostic Radiology in Scotland

X-ray equipment and special departments were set up in the larger hospitals throughout Britain, and in many smaller ones, by the beginning of the twentieth century. The process was expensive in buildings, equipment and non-medical staff, and the arrangements were not of uniform quality throughout the country. Consultant staff were not paid, but several of the early radiologists were given a small salary, not simply because it was difficult to make a living as a radiologist in private practice, but also because specialists were regarded with suspicion by many of the established physicians and surgeons, who by authorising a nominal payment disqualified the radiologist from sitting on the hospital boards. Consequently many radiologists continued to work as general practitioners.

Glasgow: - Glasgow Royal Infirmary

Macintyre transformed his electrical department by adding an X-ray section in March 1896. Previous experiments had been performed in his rooms in Bath Street. By this time, even within the first few months of the discovery, the design of the X-ray tubes had improved considerably and it was possible to achieve a sharper image with a shorter exposure time. Lord Blythswood gave apparatus to Macintyre and to the hospital. Macintyre published eighteen papers on the technique of radiography in 1896, but continued to practise as a laryngologist until his retirement, and received honours in both fields. Even before using X-rays he had pioneered the development of self-illuminated endoscopes.

He took warning from a skin reaction to X rays in 1896 and was able to protect himself and his staff from further damage.[12]

[10] **Dow, Derek**, op.cit. see note 7

[11] **Smith, C.,** p 116. see note 2 above.

[12] **Scott, J.,** The birth of radiology in Scotland, *Radiography* vol. 17, 1951 pp46-9.

The department was rebuilt in 1903.[13] Macintyre's first medical assistants were employed in 1899 and there were many others with short-term appointments including two women. James Riddell joined them as Medical Electrician in 1902, later to move to the Western Infirmary.[14] He was replaced in 1920 by Katharine Chapman who had been an assistant since 1906. As before 1896, the department was dealing with electrical diagnosis and treatment, now adding X-ray diagnosis and treatment, Finsen light, medical photography and bronchoscopy, and was running a service to the wards. By 1914 Macintyre had five medical operators and a large staff of nurses, and in this year with the rebuilding of the Infirmary the "George V Electrical Institute" was their new workplace.[15] From 1919 the hospital paid a fulltime technician, John Scott, formerly Kelvin's laboratory apprentice, to service the X-ray apparatus.

Glasgow - Victoria Infirmary

On 1st January 1902 an electrical and X-ray department was opened at Glasgow's Victoria Infirmary. X-ray apparatus was provided by one of the governors. This department was built as part of a new extension, and equipped at a cost of £350. Duncan Otto McGregor, the Medical Superintendent, studied at Glasgow and Leipzig. He ran the department and in 1919 was formally appointed radiologist, combining both posts until he died in 1929. His successor Jackson Wilson (1929-1946) had had his interest fostered in the RAMC during the First World War.[16]

Glasgow - Western Infirmary

Encouraged by the example of the Royal, the Western installed electricity before 1900 and appointed its own medical electrician. "As soon as it was clearly demonstrated that the rays were to be of practical value, the Western Infirmary set about obtaining the necessary apparatus, and Dr [D. J.] Macintosh[17] undertook personally the work of investigation and experimentation. At first apparatus was of the simplest—a ten-inch coil with a hammer break and a simple Crooks [sic] tube. Dr Mackintosh actually began with a small static machine and a tube made for him by Müller of Hamburg. The results of his labours were crystallised in his *Atlas* published in 1899."[18]

Archibald Hay and Joseph Goodwin-Tomkinson were appointed Assistant Medical Electricians in 1907, William Francis Somerville a year later. Tomkinson continued in dermatology. In 1920, after his return from First World War service in Macedonia, James Riddell was appointed Medical Electrician. He was also University Lecturer in Electrical Diagnosis and Therapeutics. At that time there were 60-80 examinations daily, and 14,500 patients attended in the year.[19] Riddell wrote a *Handbook of Medical Electricity and Radiology* in 1926. A School of Massage and Electricity was begun in 1918. Riddell was succeeded by J Struthers Fulton.[20]

The Royal Hospital for Sick Children acquired its apparatus from Dr W J Fleming, a former surgeon at the Royal Infirmary, who gave his own equipment on the condition

[13] **Macintyre, John**, The electrical pavilion, Glasgow Royal Infirrnary. *Archives of the Roentgen Ray vol. 7, 1902-3, pp101-2.* And in *Brit. Med J.* June 6, 1903, pp1299-1302.

[14] *Medical Directory 1915.*

[15] **Macintyre, John**, *Glasgow Medical Joumal,* vol. 82, 1914, 263 - 276

[16] **Murray, Ian**, *The Victoria Infirmary of Glasgow,* Glasgow 1967 pp.60, 63 - 4

[17] another medical superintendent.

[18] **Power, William,** *The Western Infirmary of Glasgow,* Glasgow 1924

[19] **Power, W C,** *The Western Infirmary of Glasgow,* Glasgow 1924.

[20] **Davidson, J K,** West Side Story *BIR News* June 1998, [pp.4 - 5]

that it was to be 'properly cared for by a competent medical man.' On his recommendation Dr John Gilchrist, already Medical Electrician to the Ophthalmic Institution, was appointed and the installation opened at the West Graham Street dispensary in 1901.[21]

Glasgow is also noticeable for providing us with what are probably the first British MD theses in radiology. The first was by Maud Hamilton McNaughton in 1908 entitled *The use of the Röntgen Rays in the examination of the stomach, with special reference to infants and young children.* Her work was done in Ancoats Hospital, Manchester, where a notable radiological pioneer, A E Barclay, was writing his own MD thesis on gastroenterology. James Conway submitted the next in 1914, *Personal experiences of the clinical value of radium,* based on clinical experience in Hull. James Kerr's description of casualties from Pilkington's glass works surgery was accompanied by radiographs, including one of a wired patella. Edward Glover included a section on radiographic examination in his *Diagnostic methods in early pulmonary tuberculosis.* He did not find radiography helpful in distinguishing old from recent infections.

Greenock's entry into radiology was typical of the smaller hospitals in Britain, often quick off the mark, but relying entirely on the enthusiasm and dedication of one man. Mr Matthew Blackwood of Port Glasgow gave the use of his own apparatus in 1899. "An enthusiastic pioneer in the use of all sorts of electrical equipment much of which he made and maintained himself. He was given the appointment of Honorary X-ray demonstrator in 1899 in recognition of his services and an X-ray apparatus was purchased and installed in the basement to replace his original primitive machine. When doctors were appointed to supervise the X-ray and electrical departments he continued his interest in these fields."[22]

The first X-ray apparatus to be installed in the Dumfries and Galloway Royal Infirmary was donated by the parish of Mouswald in 1908, when mains electricity was first introduced into the hospital.[23]

Edinburgh

Dawson Turner demonstrated X-rays to the Royal Medical Society of Edinburgh in their hall in February 1896. Robert Milne Murray was appointed Medical Electrician in November 1896 with Turner as his assistant. Murray became a gynaecologist in 1901, which left Turner in charge until 1911. His department was expanded during 1903-4. He was "extra" electrician from 1911 to 1925.[24] His equally famous colleague, William Hope Fowler, was assistant from 1901 to 1911 and in charge 1911-1926, during which period Fowler's assistant was Archibald McKendrick.[25]

Dawson F D Turner was a graduate of Dalhousie, Canada in 1884 and I believe also of Edinburgh, becoming MB CM in 1888. He also trained in Oxford, Paris and Vienna. Prior to 1895 he was already the author of several works on medical electricity in diagnosis and treatment. He was one of the first British authors of a textbook which includes radiology: *A Manual of Practical Medical Electricity* which in my third edition of 1902 carries the subtitle *The Röntgen Rays and Finsen Light.* As well as his hospital appointment he was Vice-President of the Electrotherapeutic Society and the Röntgen Society, and a Fellow of the Physical Society.

Aberdeen

An electrical department had existed in the Infirmary for a number of years before Röntgen's discovery, and provided treatment with ultra-violet and infra-red lamps,

[21] **Smith,** *op. cit* p.114

[22] **Ferrier, John,** *The Greenock Infirmary* 1806 - 1968, Greenock 1968 p.103

[23] *The Dumfries and Galloway Royal Infirmary. A brief pictorial survey 1776 & 1948.*

[24] Obituary, Dawson Turner, *British Journal of Radiology,* vol 2 n.s., 1929 p330

[25] **Turner, A Logan,** *The Story of a great hospitaL The Royal Infirmary of Edinburgh 1729-1929.* Edinburgh 1937, pp.292-3, 337.

galvanism, faradism and massage. Alexander MacGregor was medical electrician until 1895, but resigned when he failed to succeed to the professorial chair after being the professor's assistant. He was replaced by two people with the combined post of 'Chloroformist and Electrician', Drs Dalgarno and Galloway. They were soon replaced by John Levack as medical electrician, Galloway then concentrating on anaesthesia. Levack had already installed X-ray equipment in his house in Golden Square and had a close working relationship with James Mackenzie Davidson. Levack founded and ran the department until 1931. He taught medical students in the department from 1896 and was appointed lecturer in radiology and electrotherapeutics in 1919. The one-room department dealt with X-ray diagnosis, X-ray treatment, radium treatment and electrotherapy until 1931. The radiation hazard from overcrowding must have been very high. Levack had an assistant, Clifford T Bell, from 1905 to 1918.

James Mackenzie Davidson had an absorbing interest in physics. He heard of Röntgen's discovery while travelling on the continent, and went immediately to Würzburg to find out all he could from the great man himself. On returning home, he tried the X-rays himself and located a needle in a foot in February 1896. He was an ophthalmologist and soon showed how useful the X-ray technique could be in locating intra-ocular foreign bodies. His apparatus, with modifications, was widely used to pin-point the position of bullets and other metallic objects prior to surgical extraction before and during the First World War.[26]

The Exiles

The roll-call could continue, but I hope I have made it clear that Scotland in no way lagged behind the rest of Britain in initiating X-ray diagnosis and treatment in its hospitals. As in other branches of medicine and other walks of life, Scotland exported some of its best men across the border. James Mackenzie Davidson moved to Charing Cross Hospital in 1897, established a London practice as an ophthalmologist and radiologist, and earned a knighthood in 1912, the first radiologist to be knighted, for services to medicine. He distinguished himself as an advisor to the government on radiology during the First World War. After his death in 1919 his library and endowments became assets of the Röntgen Society, later to become the British Institute of Radiology.

Robert Knox, an Edinburgh graduate, had moved to London before the discovery of X-rays. His own radiological practice in Harley St. was set up while working as a general practioner in north London. Many radiologists working before the First World War had to continue in general or specialist medical practice to make their living. His first hospital appointment was in what is now the Royal Northern Hospital, the next at the Cancer Hospital in Fulham. On his move to King's College Hospital in 1912 he became a full-time radiologist. He remained there for fifteen years, being particularly interested in radiotherapy at a time when all radiologists practiced both diagnostic and therapeutic branches.

There have been many more - William Snowdon Hedley, an Edinburgh graduate, was the first radiologist at the London Hospital in 1896. Professor J M Woodburn Morison started life in Beith, Ayrshire and qualified in Glasgow. He witnessed Macintyre's first lecture and (unsuccessful) demonstration of X-rays in Glasgow in January 1896.[27] Morison worked in Manchester, served in India during World War I where he began X-ray work, completed his training in radiology with C T Holland in Liverpool and A E Barclay in Manchester, and began as director of radiology at Edinburgh Royal Infirmary

[26] Obituary, Sir James Mackenzie Davidson, *Archives of Radiology and Electrotherapy,* vol. 23 (1918 - 19) pp.337-340.

[27] **JMWM** Obituary - Dr John Macintyre, *British Journal of Radiology,* vol. 1 n.s. 1928 pp.445-6.

in 1925. Four years later he moved to London, to the first chair of radiology in the country and the directorship of the radiology Department at the Cancer Hospital, Fulham.[28]

After war service Ralston Paterson from Edinburgh started his medical course there and during student days began training in radiology with Hope Fowler. His graduate experience stretched from Wales through Cambridge, Aberdeen, South Africa, the Mayo Clinic in Rochester, Chicago, Toronto before returning to be director of the department of radiology at the Royal Infirmary in Edinburgh, January 1931. After only a few months he moved to the Christie hospital in Manchester where he spent the rest of his working life as a radiotherapist.[29]

Dalziel Buchanan McGrigor who graduated in medicine from Aberdeen received his radiological training much further afield in the X-ray Institute of India at Dehra Dun, as an officer in the RAMC. He was in charge of the field X-ray section of the Indian Expeditionary Force in France during the First World War. He maintained his connection with radiology and the army throughout his life, with further training at Millbank and Cambridge for his radiological diploma, and was both in charge of radiology at the Queen Alexandra Military Hospital and lecturer in the medical college. During the Second World War he was advisor in radiology to the War Office.[30]

William Ironside Bruce became Davidson's assistant at Charing Cross in 1905. He was an Aberdeen graduate and the son of a doctor in Dingwall. He had experienced the potential of radiology during the South African War. He was held in high reputation as an energetic and enthusiastic radiologist and a good teacher.[31] During his early years as a radiologist it was the custom to have the X-ray tube below the couch on which the patient was lying, to identify the area to be radiographed using a fluorescent screen, and then replace the screen with a photographic plate for the exposure. The tube was unshielded and irradiated the lower half of the radiologist's body. This practice was one which he discouraged in his *Atlas* but earlier technique had probably contributed to his early death in 1921 at the age of 42 from radiation-induced leukaemia.[32]

He was not the only pioneer to suffer the effects of radiation, but was in his time the most well-known. Other Scottish radiologists who had unwittingly damaged their bodies in this way were Dawson Turner, who died in 1928 with skin cancer, and his colleagues John Spence and William Hope Fowler, who retired prematurely with the same problem. George Alexander Pirie, the founder of radiology in Dundee, and James Robertson Riddell of Glasgow also have their name on the radiation martyrs memorial in Hamburg. John Chisholm Williams and John Duncan White, both Edinburgh graduates, were early directors of radiology at the Hammersmith Hospital in London who suffered severe radiation injuries. Their sufferings helped to bring about the technical improvements and safer working practices which protect patients, radiographers and radiologists today.

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Following this talk there was an excellent dinner in the Staff Club.

This meeting brought the 1994-1995 session of the Society to a close.

[28] **Brockbank, William,** Professor John Miller Woodburn Morison, *The Honorary Medical Staff of the Manchester Royal Infirmary* 1830-1948, Manchester University Press 1965, pp.208 - 9 and typescript notes from his son.

[29] **Del Regato, Juan A.** Ralston Paterson, Int.*J.Radiation Oncology Biol. Phys.* Vol. 13 pp. 1081 - 1091 .

[30] Obituary, Brigadier D B McGrigor. *British Journal of Radiology* vol.31, 1958 pp.703 - 4

[31] see the illustrations in **Bruce, Ironside,** *System of Radiography with an Atlas of the Normal.* 1907

[32] Obituary, William Ironside Bruce, Brit. Med J. 26 March 1921, vol. L p.481., and 2 April 1921 p.514.

REPORT OF PROCEEDINGS
SESSION 1995-96

THE FORTY SEVENTH ANNUAL GENERAL MEETING

The Forty Seventh Annual General Meeting was held at the Scottish Health Service Centre, Edinburgh on the 4th of November 1995. Professor Ronald Girdwood paid tribute to the late Dr W Tomaszewski who died on the 22 June 1995. Dr Tomaszewski, who was a member of the Society, was on the teaching staff of the Polish School of Medicine in Edinburgh from 1941 to 1949. He was an excellent teacher, an enthusiast in all he did and a prolific writer in English, Polish, French or German. He received an honorary degree from Edinburgh University and was a Fellow of the Royal College of Physicians.

The minutes of the 46th Annual General Meeting were approved. Mrs Brenda White, who had contributed so much as Joint Honorary Secretary had retired and she was thanked warmly for her efforts. Her place was now filled by Dr James MacGregor.

Dr Simpson presented the Treasurer's report and this was accepted. Dr Swan was introduced by Dr Rose and installed as the new President. Dr John Forrester was elected as Vice President and President Elect.

Dr Isobel Alexander, Dr W. C. Shepherd, Mrs Brenda White and Dr J. B. Wilson retired as Council members and were thanked for their work. Mrs Alena Fraser, Mrs B Geissler and Dr M. J. Williams were elected to Council in their stead.

Dr Swan, the new President closed the meeting with a tribute to Dr Rose, Past President for her energy and liveliness.

THE ONE HUNDRED AND FORTY FOURTH ORDINARY MEETING

The One Hundred and Forty Fourth Ordinary Meeting was held at the Scottish Health Service Centre, Edinburgh and directly followed the Forty Seventh Annual General Meeting. The President Dr Harold Swan introduced Dr Gordon Leitch, Consultant Respiratory Physician at the Royal Infirmary of Edinburgh, who talked on Sir Robert Philip and his contribution to the development of tuberculosis services.

SIR ROBERT PHILIP'S CONTRIBUTION TO THE DEVELOPMENT OF TUBERCULOSIS SERVICES

Introduction

Robert William Philip was born in Govan in 1857 and moved to Edinburgh in 1866 when his father was appointed Minister to St. John's, now St. Columba's, Free Church at the east end of Johnstone Terrace. He was educated at the Royal High School on Calton Hill overlooking the underlying city wards of St. Giles and the Canongate, which had the highest death rate from tuberculosis in Edinburgh at over 3/1000 per year. He went on to Edinburgh University where he graduated in Arts and then with Honours in Medicine in 1882, the very year that Koch described the tubercle bacillus to the Physiological Society in Berlin. Philip proceeded to Vienna for postgraduate study and it was there that he saw the tubercle bacillus stained with hot alkaline methylene blue for the first time. He was quick to appreciate that if tuberculosis was due to transmission of infection with this bacillus then it should be a preventable disease.

On his return to Edinburgh in 1883 he served his term as a resident in the Royal Infirmary. Following this he was appointed as an Assistant Physician to Sir Thomas Grainger Stewart in the Royal Infirmary and simultaneously as an Assistant in the New Town Dispensary at 17 East Thistle Street. At the same time he was engaged on research on the aetiology and treatment of tuberculosis which would lead to an MD with gold medal in 1887. Philip was not satisfied with the New Town Dispensary management of tuberculous patients. Cough mixtures were prescribed; the seriously ill might be admitted to hospital but more often were simply visited at home by a medical student. Clearly, no attention was being paid to the social component of this disease which Philip now appreciated to be infectious.

The first tuberculosis dispensary in the world

Philip felt there should be a Directory of Tuberculosis for each patient containing details about their disease and their environment. The environment should be improved with an emphasis on access to fresh air and the patient should be taught how to prevent the spread of infection. The family should be the unit of medical care and contacts of the patient should be examined for evidence of disease - the "March Past" of contacts. Care should be provided by doctors and nurses specially trained for the purpose, operating from a new institution which was to be called a Tuberculosis Dispensary.

As is often the case, Philip was not to be encouraged by his senior colleagues. A respected Professor of Medicine told him "Not to think of such a thing. Phthisis was worn to a very thin thread. The subject was exhausted". Undaunted, and as he was later to write "with the help of a few kind friends", in 1887, which was Queen Victoria's Jubilee Year, he opened the Victoria Dispensary for Consumption and Diseases of the Chest in three small rooms in a first floor flat at 13 Bank Street at the top of the Mound. A plaque erected on the centenary of his birth by the National Association for the Prevention of Tuberculosis declares that this was "the first clinic in the world dedicated to fighting a disease of which he foretold man's eventual mastery".

The case register for this clinic resides in the vault of the Royal College of Physicians in Queen Street. The first patient was a 25 year old clerk from Musselburgh who did have phthisis. In the first full year, 1888, 212 new patients were seen of whom 43 had phthisis. Even then the commonest diagnoses were smoking related with bronchitis (44), catarrhal pneumonia (31), bronchial catarrh (23), bronchitis and emphysema (12) and dyspepsia (5) featuring.

In 1891, the clinic moved to larger premises at 26 Lauriston Place where there were both consulting and laboratory facilities and also rooms from which the Sanatorium Committee of Volunteer Ladies, the forerunners of our Health Visitors, could operate. Home visits by doctors and nurses were also made; in 1904 over 2000 visits were made by doctors and over 1000 by nurses. The first visit to the home was important in compiling what amounted to Philip's Directory and the nurses had to complete a schedule relating to each patient covering the nature of their illness, their occupation, the type of accommodation, ventilation, sleeping arrangements (several people might share the same bed) and various other aspects including the possible source of infection, procedures taken to disinfect secretions and an assessment of the household economy.

In 1912, the Royal Victoria Dispensary (regal status was granted by Edward VII in 1904) made its second move to the former St. Cuthbert's United Free Church in the appropriately named Spittal Street just outside the old city walls. There it remained until 1991 when it transferred as the Royal Victoria Chest Clinic to the Out-Patient Department of Chalmers Hospital. On the occasion of the recent move an interesting discovery was made in the administration files; a cutting from the Edinburgh Evening News in 1955 announced under the caption "Repeat Prescription", "A 77 year old man who had attended the Dispensary before, attended again when his chest problems

recurred and proudly presented his prescription for renewal. The prescription was dated 1902! The prescription was contained in a Victoria Hospital (pre-regal status) envelope with clear instructions about opening and dispensing times at Lauriston Place and a note to the effect that the cost was one penny but "bottles had to be supplied by the patient".

The prescription was issued on two occasions and had two components; extract of bynin (malt) with hypophosphites was considered to both nourish and counter general debility; mist. pect. stim. was a stimulant or expectorant mixture for the chest containing ammonium bicarbonate, tincture of opium and liquid extract of senega or rattlesnake root. The mixture was to be taken as indicated when cough was troublesome. The initials of the signatories of both the initial and the repeat prescription are of interest; WLL was Dr. W. Lesley Lyall and ISS was Dr. Ian Struthers Stewart - they were to be the first two Honorary Secretaries of the Tuberculosis Society of Scotland, the forerunner of the present Scottish Thoracic Society (see below).

Edinburgh's first sanatorium

Philip was very pleased with the results of his Dispensary Service but he and his subscribing friends, who were later to become the Royal Victoria Hospital Tuberculosis Trust, had not forgotten his original intention of establishing a hospital for the treatment of tuberculosis. To Philip it seemed that the Edinburgh fresh air should be as effective as the fresh air in the German sanatoria in hastening the cure of tuberculosis. Craigleith House and its 7½ acres of ground in the north of Edinburgh were purchased and the Victoria Hospital for Consumption was opened 100 years ago in August 1894 with two three bedded male wards and four wards for eight female patients. By 1903, when King Edward graciously consented to become patron of the hospital, Philip's plan to develop the hospital further came to fruition with the addition of the first three of eight south-facing wards contained in "butterfly" wings. Philip had a keen interest in the plans for this new hospital development and frequently made alterations to them. While poring over the plans with the architect on one occasion he could not help noticing that his initials, RWP, appeared from place to place. On modestly enquiring whether this reflected his impact on the developments, he was more than a little put out to discover that RWP stood for rain water pipe!

The mainstay of treatment at the Royal Victoria Hospital was rest and fresh air either in the hospital or in the numerous covered shelters which were dotted around the grounds and were utilised in all seasons. When the omens were favourable regular exercise and work would be introduced into the regimen. Regulated exercises included walking at different paces on different levels of ground, respiratory exercises and various other callisthenics. When this stage was past, regulated work which might range from picking and bunching flowers from the hospital garden to road making was introduced. Dr. Christopher Clayson, a past President of the Edinburgh Royal College of Physicians, recalls that soon after he graduated, when he was under Philip's care, sanatorium patients had to wear coloured lapel badges; white was for rest in bed, green for graduated exercise and red for graded work - nobody wore them unless the great man was known to be coming.

In 1906 a school was opened for children at the Royal Victoria Hospital and, of course, the lessons were conducted in the open air.

The hospital for advanced cases

In 1903 Philip concluded negotiations with the city authorities allowing him to locate patients with advanced tuberculous disease in two wards in the new Fever Hospital at Colinton Mains, now known as the City Hospital. Philip felt that the medical and nursing needs of these patients were significantly different from those with earlier and presumably curable disease. Although most patients accommodated there would die from

tuberculosis, the hospital certainly did not operate as a penitentiary; a health education film produced in 1911 by the National Association for the Prevention of Tuberculosis and entitled "The Story of John McNeil" shows the patients playing golf in ankle length grass between the wards.

Ninety years later, in 1993, the descendant of that service, the Respiratory Medicine Unit, transferred its beds to the Royal Infirmary of Edinburgh.

The Farm Colony

In 1910 a farm colony at Polton near Lasswade was opened. It was linked to the Royal Victoria Hospital and provided different types of adult work and training for patients who were considered well enough to leave the hospital but perhaps not well enough or well equipped to return to the community. The activities were agricultural such as planting potatoes, harvesting and caring for pigs, goats and hens. This was, perhaps, the least successful of Philip's ventures but indicates how his vision extended beyond the management of the disease alone to the management of its consequences.

Notification of tuberculosis

As early as 1890 Philip had pressed for compulsory notification of tuberculosis, only to be told by Dr. Henry Littlejohn, Edinburgh's first Medical Officer of Health, not to throw himself against a stone wall. The public and the profession were decidedly against such an idea. However, by 1903, Philip had established voluntary notification in Edinburgh and by 1906 local government had been awakened to its responsibilities under the Public Health Act making pulmonary tuberculosis compulsorily notifiable in Edinburgh in 1907, followed by non-pulmonary tuberculosis in 1914.

The Edinburgh Scheme for Tuberculosis

When formal procedures for notification of tuberculosis had been secured, what came to be known as the Edinburgh Scheme for Tuberculosis was fully operational. The lynch pin was the Dispensary. Patients were seen, diagnosed, treated and advised at the Dispensary. Their personal and family circumstances were assessed; their homes were visited by Dispensary doctors, nurses and voluntary workers; the curable might be admitted to the sanatorium for rest, fresh air, good food and eventually exercise, and more advanced cases were secluded in the City Hospital where most of them would die. Rehabilitation was possible in the farm colony at Polton and in colonies situated at the Royal Victoria Hospital itself. Notification of cases to the Medical Officer of Health not only allowed the progress of the fight against the disease to be monitored but also ensured that appropriate public health measures such as contact tracing were instituted.

In 1912, the Astor Committee, the Departmental Committee on Tuberculosis, was set up under Mr. Waldorf Astor MP to report on policy with respect to tuberculosis in the United Kingdom. Philip was an influential member of this Committee and it was he who determined the Committee's findings which, not unsurprisingly, largely recommended the implementation of the Edinburgh Scheme nationwide. One important difference was the recommendation that sanatoria be at more isolated sites (ostensibly on the grounds of cost) leading to the appointment of two different kinds of specialists - Medical Superintendents of Hospitals and Tuberculosis Officers of Dispensaries, the latter usually a senior member of the Medical Officer of Health's staff.

In 1913, Philip was knighted and in the same year Dr. John Guy was appointed Tuberculosis Officer with Sir Robert retaining his position as Consulting TB Officer. Although it was less apparent in Edinburgh, throughout the nation the TB specialists in dispensaries and sanatoria were now one step removed from the health service in general and would remain so until the advent of the National Health Service.

The Royal Victoria Hospital Tuberculosis Trust and Southfield Sanatorium

In 1914 the Royal Victoria Dispensary, Royal Victoria Hospital and the farm colony were all handed over to the Corporation of the City of Edinburgh and the Royal Victoria Hospital Tuberculosis Trust was founded. In 1917 the Trust funded a Chair of Tuberculosis to which Sir Robert Philip was appointed as the first ever Professor of Tuberculosis. Trust monies were also invested in patient services not only locally but nationally where need was apparent. In 1919 Southfield Hospital was purchased by the Trust and in 1922 it opened its doors as a sanatorium colony and effectively the first University Department of Tuberculosis. By then Sir Robert had responded to a letter from Dr. Struthers Stewart, Sanatorium Superintendent at Tor-na-Dee in Aberdeenshire, and the Tuberculosis Society of Scotland had been founded in 1921 with Sir Robert as President, and Drs. W. Lesley Lyall and Ian Struthers Stewart as Joint Honorary Secretaries.

Among the papers delivered to the Tuberculosis Society in its early days were reports on 'detuberculisation' or treatment of patients with injections of tuberculin which Philip favoured for many years although there was no evidence of any beneficial effect. Sanocrysin or gold injections, initiated on the basis of favourable reports from Sweden were soon abandoned because of severe side-effects. Zomotherapy, or treatment with a diet of raw meat, eggs and stout though nutritious was never popular with the patients. At Southfield the regimen of fresh air, exercise and sunshine was continued and for those children not benefitting from sanatorium treatment heliotherapy or sun-lamp therapy was introduced at the Royal Victoria Dispensary in the 1920s. Treatment with artificial pneumothorax was carried out to a small extent at Southfield Sanatorium and other surgical interventions such as phrenic nerve crush were conducted at the Royal Infirmary.

In addition to these treatments, Philip was concerned about preventing tuberculosis and in 1922 he established with the help of the Trust the first tuberculin-free herd of cattle at Gracemount Farm. More importantly, he demonstrated that the production of tuberculosis-free milk was an economically viable proposition and set the scene for the abolition of bovine tuberculosis in man. Although keen on prevention, Sir Robert was not so keen to endorse BCG vaccination which had been utilised in many countries long before he died in 1939. Indeed, Philip's influence may well have been the main reason why BCG was not introduced in the UK until 1949. It seems that Philip had a stormy friendship with Calmette, one of the originators of the vaccine, and Dr. Christopher Clayson recalls Sir Robert planting a sapling in the grounds of Southfield Sanatorium in the 1930s and saying "Dear boy, when you and I can smoke a cigar together under the shade of this tree, we can talk again about BCG".

Philip's contribution to tuberculosis control

By the time Sir Robert died in 1939 the mortality rate from tuberculosis in Scotland had fallen from over 300/100,000 in 1887 to almost 50/100,000. It will never be possible to assess what contribution Philip made to this fall in mortality (and also morbidity) from tuberculosis. What is clear is that he heightened public and governmental awareness of the disease. Transmission of disease was interrupted by the isolation of infectious cases in hospital; sanatorium treatment with good food, fresh air and exercise gave hope to

those less severely affected; milk from tuberculosis-free herds reduced the incidence of bovine tuberculosis; notification and public health measures such as health education and contact tracing may have prevented some disease and allowed earlier intervention in those who were affected. The Edinburgh Scheme for Tuberculosis was adopted worldwide; the 'March Past' of contacts is as important today as it was in Philip's day; both serve as testimonials to the visionary contributions of a great man to the fight against tuberculosis. His knighthood apart, his distinction was recognised by his Presidency of the Royal College of Physicians of Edinburgh from 1918 to 1923 and of the British Medical Association in 1927.

Dr Leitch's paper was followed by one from Professor J Williamson on the history of the Royal Victoria Hospital, Edinburgh.

THE ROYAL VICTORIA HOSPITAL, EDINBURGH 1894-1994 A BRIEF HISTORY

On 24th March 1882 Robert Koch delivered his historic lecture on the aetiology of tuberculosis; in this he demonstrated that tuberculosis was due to infection with a bacillus which became known as mycobacterium tuberculosis. This led to great excitement and argument throughout the medical world.

In Edinburgh in July of the same year, the young Robert Philip graduated in Medicine (with Honours). Intrigued by the news of Koch's momentous discovery, Philip made his way to Vienna in the autumn of 1882 where he saw the bacillus and learned of Koch's studies.

These events were soon to lead to the foundation of the Victoria Hospital in Edinburgh and the establishment of a comprehensive scheme to combat the White Plague, described by Bunyan as *"Captain of the Men of Death "*.

Philip reasoned that since almost all adults were infected with mycobacteriurn tuberculosis and only a small minority developed overt disease, then the lesions of initial infection must have undergone healing; hence tuberculosis must be potentially a curable disease. The crucial factor was the strength of the individual's resistance; if this could be maximised and the condition detected at the earliest stage then the chance of cure would be significantly enhanced.

Over the next few years he worked on these theories and finally came up with his Directory of Tuberculosis which encompassed three aspects of each patient's case -

1. ***Details of patient*** - full clinical assessment
2. ***Details of patient's environment*** - cleanliness, ventilation, crowding, nutrition, etc
3. ***Tracing patient's contacts*** - who was the source of the patient's infection and whom had the patient infected?

Having investigated these matters a list of all deficiencies was made and, wherever possible, these deficiencies were corrected (this is surely problem-based medicine nearly one hundred years before it was "invented"?)

This Directory approach gradually became refined and was called "The Edinburgh Scheme for Control of Tuberculosis" (sometimes Philip used the term "abolition of tuberculosis" with true Victorian certitude). The Edinburgh Scheme was based upon a central clinic from which the other components were to be co-ordinated to produce an effective preventive and treatment regime for each TB patient (and family). The clinic

was to be called the "Dispensary" and the other elements were to be the hospital (or sanatorium) for early cases, the hospital for advanced cases and the farm colony for the rehabilitation of patients after sanatorium care and before return to the community. It is interesting to note that Philip clung rigidly to the idea of two separate hospitals, one for early, the other for advanced cases, and I think he really meant separate hospitals not just separate wards. Whenever this seemed to be threatened he rapidly summoned up support from colleagues in the UK and abroad who would write in his support. I never managed to find out quite why this seemed so important.

In 1887, Philip opened the first Tuberculosis Dispensary at 13 Bank Street, on The Mound; this was a mere five years after Koch's discovery. This soon became too small and was relocated at 26 Lauriston Place (1891).

In 1889, a Tuberculosis Committee was set up under the Chairmanship of Sir A. Christison; its mission was to implement the Edinburgh Scheme. In 1893 a Sanatorium Sub-Committee was established; its immediate task being to find a suitable house to be used as a sanatorium.

In February 1894, Craigleith House (13 acres) was offered on lease for £112 per annum. "*Three gentlemen*" paid a visit to this site and declared it "*eminently suitable*" so a six-year lease was secured. Bathrooms were added for £210 and a Matron was appointed.

The official opening was held on 22nd November 1894, presided over by Lord Stormonth Darling. According to "The Scotsman" report there was a large gathering of ladies and gentlemen. Lord Stormonth Darling spoke at some length. He remarked that some had queried *"why a new charity when we already subscribe to the Royal Infirmary of Edinburgh where every form of disease could be received?"* The answer must be, *"no jealousy on the part of RIE. Ordinary hospitals could not provide the specialist care needed,"* and most important, *" TB is infectious, insidiously so."*

A sour note was sounded in the British Medical Journal of 1 st December 1894 -

"Mr Quarrier of Bridge of Weir is to open 8 to 10 homes for TB; the first to be for 30 patients; £6,000 already raised."

"Contrast this with Craigleith House with 15 beds. What are they among so many?"

"If Mr Quarrier can do this in West of Scotland, why not Edinburgh?"

The BMJ, not for the first time, rather missed the point; the important concept was the Edinburgh Scheme of which Craigleith House was one part.

Craigleith House was duly opened; on the ground floor were two rooms for males each with three beds, on the first floor were three rooms for females each with three beds - a total of fifteen beds. Other accommodation such as old out buildings, wash houses, etc, were rapidly adapted.

By 1897 anxiety was aroused because of the approaching end of the lease in 1900. Negotiations were started with the owner, Sir J Maitland, and a "final offer" of £1,000 per acre was made. In 1899 his daughter, Miss Maitland, reached a verbal agreement on the purchase on the above term with half the money down and the rest in annual installments.

Thereafter, Philip planned successive additions and improvements, the first being the addition of all weather shelters which enabled more patients to be cared for. The basis of the sanatorium treatment was -

- fresh air and rest
- the use of shelters, including revolving shelters to follow the sun
- good food
- air and sunlight
- "respiratory drill"
- graduated exercise

It will be thought that this was a pretty poor therapeutic armamentarium but it must be realised that some of these patients came from very poor houses with little ventilation or sanitation, lack of sunlight and many would be having a poor diet. Exposure to this regime was therefore calculated to raise resistance to mycobacterium tuberculosis. It is quite likely also that the morale of the individual patient would be significantly improved by the personality of Philip and the staff he collected around himself.

The "graduated exercise" is interesting; patients started off on bed rest then "sitting out", then walking indoors, then measured walks outside (there are still traces of the full perimeter walk for patients just inside the wall which runs alongside Comely Bank Road). Thereafter, patients were given tasks about the hospital - in the flower garden, in the potato and vegetable garden and finally "road making" with a pick, shovel and carts.

Prevention of infection was emphasised from contact tracing designed to find who had infected the patient and whether the patient had spread infection to other persons. This took the form of a contact "march past" in which contacts queued up to be "inspected" by the doctor in the clinic.

Some case reports of patients reveal the dire conditions of overcrowding, lack of air, and poverty in which severely ill patients existed (and died) in unsatisfactory houses in Edinburgh at this time.

By this time the Tuberculosis Committee had become "The Victoria Hospital Tuberculosis Trust" and Philip was still the main spring of the operation. The Minutes in 1899 report that the Boer War was having an adverse effect upon fund-raising, while at the same time Philip was agitating for more beds in new "annexes". In 1900, tenders were accepted for three new annexes from W Ferguson for £1,731.

Philip reveals his concern that patients were having to wait nine months for admission. It was decided to have a campaign to raise funds; collectors were to be paid 3 pence per day and the campaign organiser was to retain 7.5% of the takings from door-to-door collections.

In 1901, Philip reported that in addition to the inpatients, there were 8-10 "visitant patients" who slept at home but came to the hospital by day. Philip emphasised that although not inpatients, "*they all had to be fed*". Were these the first "Day Patients", a term not mentioned until after the Second World War (in psychiatric practice)?

By good fortune, legacies began to arrive including £1,000 from Mr Wm Younger, MP. One of the new annexes was to be called "Younger Ward" in recognition of his beneficence.

At this time, the Trust agreed to accept a proportion of paying patients.

In 1902, Dr John Guy was appointed Medical Officer at the hospital, his salary being £105 per annum. He later became City Tuberculosis Officer and then City Medical Officer of Health. He and Philip were never to get along well together and this mismatch later proved an important obstacle to full development of the TB Service.

In this year, a Committee was set up to organise a one-day "Fancy Fair" in the Waverley Market. The astounding sum of £13,154 4/- was raised. I calculate that this represents about three quarters of a million pounds at 1995 prices; a truly remarkable achievement which enabled the three new pavilions to be completed. These were formally opened on 16th July 1903 by Lord Roseberry who presided over a *"large and fashionable gathering"*. A marquee was tastefully decorated in pink and primrose, his Lordship's racing colours. There was *"heavy rain and much mud"!*

The pavilions comprised two of twelve beds and one of eight and had cost a total of £8,004 12/-. In his remarks to the assembled company at the opening ceremony, Philip pointed out that annual expenditure was £1,093 more than income and the cost of

running the new pavilions would increase this deficit to more than £3,000. He reiterated his appeal for funds.

Even while the opening ceremony was taking place, Philip announced his intention to press ahead with plans for the next development which would comprise an administrative block and headquarters, a dining room for patients and a new kitchen.

Dr Clouston, President, Royal College of Physicians, and Sir John Halliday Croom, President, Royal College of Surgeons, were present and music was provided by the pipe band of Dr Guthrie's School. Sir John Halliday Croom said, *"Edinburgh has an embarrass de riches in medical charities,"* and, *"some charities overlapped, some even diverted money from that great institution, the Royal Infirmary, but the Victoria Hospital did not take anything from the RIE; it did work which RIE could not touch at all."* Finally he remarked, *"open air treatment had been to medicine what Listerism was to surgery."*

From this and other comments, it seems that medical enterprises were often judged not on their inherent worth but rather on the effect their activities might have upon the Infirmary! Has this changed? In 1903 it was announced that a Research Fellow was to be appointed and the Trust allocated £30 for equipment for the Fellow's use.

Also in 1903, King Edward VII agreed to be Patron of the hospital. Trustees were disappointed to learn that this did not mean that the hospital could use the word "Royal" in its title.

Philip now reports a rise in the cost of food, mostly due to the increase in patients' meat ration which was an important part of the new treatment regime, the results of which he reported to be *"gratifying"*. One is struck by the uncritical approach to assessment of the efficacy of therapy but one must remember that many decades were to pass before the advent of the double blind random controlled trial which has revolutionised how these assessments are made.

It was agreed that the Burgh of Hawick and the Stewartry of Kirkcudbright were to be allowed to have some beds for £80 each per annum.

Philip stated that the average number of patients for meals was 75 (59 resident and 16 visitant). They dined in an old wash house while the staff also ate in very unsatisfactory conditions. There was therefore an urgent need to improve this situation.

In 1904, it was decided that the next development (see above) should also provide two more wards each with eight beds; eight beds would be lost due to changes in Craigleith House so the net gain would only be eight beds. Two more nurses and three more "servants" would be needed, also a resident clerk and a "lady apothecary". Each pavilion would cost £3,970 and the administration block £6,000. A sketch of this development was provided.

It was agreed that 50% of patients would be "contributors", ie: paying patients. A Mrs Crosbie complains in July 1907 that her subscriptions are being used for "buildings" and "not for patients" and another subscriber objects that £25 had been allocated for "souvenirs" for Committee members - plus ça change plus c'est la même chose!

In 1907 also it was decided to install a pipe organ in the new dining hall and a loft was to be provided. A £7,000 legacy bequeathed to the hospital was disputed by the donor's widow; after lengthy legal wranglings it transpired that the "widow" had never really been married to the donor!

Plans for an opening ceremony for the new development were afoot and a "Royal Personage" was being sought; this was unsuccessful but Mr A J Balfour agreed to officiate. He had been Tory Prime Minister in the 1902-05 Government and had had a fairly disastrous premiership when things seemed to go totally against the Conservatives. He redeemed his reputation, however, when as Foreign Secretary in 1917, he masterminded

the Balfour Declaration which set forth plans for a national Jewish homeland in the middle east; this led eventually to the foundation of the State of Israel.

The opening took place in October 1907 and the report occupied 4½ full length columns in "The Scotsman". Lord Dunedin presided and Mr Balfour was the principal speaker. *"Cleanliness, fresh air, nourishing food, reasonable exercise in the open air; and a bright and cheerful environment"*, he declared were the basis of the cure; these would not only benefit the individual, but applied to contacts, would also raise "community resistance" and act in a preventative fashion. Much praise was heaped upon Philip who, of course, as usual had organised the entire event.

It was announced that there was to be a bell in the bell tower; this never occurred, probably to the benefit of those who came to live in the rapidly developing community of Craigleith/Comely Bank.

In 1908 there were some complaints about the sinfulness of fund-raising and door-to-door collections on the Sabbath.

The quaint West Gate Lodge was built about this time at a cost of £644 8s 9d; this provided a house for the porter/gateman and in his living room was a large wheel which, being turned, would open or close the gates. This mechanism was still in place (although inoperable) in 1954 when I joined the staff of the hospital. The other interesting feature of the gatehouse is that on its northern flank there is inscribed "The Royal Victoria Hospital" and below this it is clear that some carved letters have been removed; in 1954 this read "for Consumption"!

At this stage the hospital comprised 14.95 acres. There were 56 beds divided between five pavilions, each pavilion containing two separate rooms. These pavilions were all of the butterfly design and were "heated" by coal fires; patients' beds were set alongside the large windows which were open most of the time.

In 1910, Philip opened his Farm Colony at Polton; this was a large country house set in capacious grounds. I mention this occasion because it illustrates dramatically the great public relations skill which this man possessed. "The Scotsman" reported that two special trains left Waverley each carrying more than 400 persons bound for Lasswade to attend this opening ceremony! When I attended the opening ceremony for Phase III of the hospital in 1984 (180 new beds, two new day hospitals) there were about 50 people!

In 1911, King Edward agreed to become patron of the hospital and Philip at last achieved his ambition, the hospital was now the Royal Victoria Hospital for Consumption (and nobody had heard very much more about Mr Quarrier of Bridge of Weir!). In this year also St Cuthbert's United Free Church in Spittal Street was purchased for £2,000; this became the Royal Victoria Dispensary in 1913 and acted as the Central TB and Chest clinic.

About this time, a cine film was produced to outline the workings of the "Edinburgh Scheme". This must be one of the earliest health education films.

In October 1911 the Lloyd George Government passed the National Insurance Act; one of its many innovations was that local authorities were to be responsible for the care of TB patients in sanatoria.

In 1912 the interim report of the Waldorf Astor Committee was produced and in 1913 the final report appeared. These were landmark events; pulmonary tuberculosis became compulsorily notifiable, local authorities became responsible for the tuberculosis service in all its ramifications.

The main impact of these reports was to enshrine the Edinburgh Scheme as the national plan for the control of tuberculosis; it was not surprising that this was so since Philip had been a member of the Astor Committee and there is little doubt that he would have dominated it to a considerable degree.

Edinburgh Corporation's Public Health Committee was now to be responsible for the Tuberculosis Service including prevention and treatment. Dr John Guy (vide supra) was

appointed City Tuberculosis Officer. This was an appointment of great significance but unfortunately therein lay the seeds of future dissension. I have spoken to Dr Christopher Clayson about Dr Guy whom he remembers well (as he does Philip); he tells me that Guy and Philip were temperamentally incompatible. Philip was the "bon viveur" who loved his port and fine cigars, while Guy was an ascetic and teetotal. Even if they had been reasonably compatible, difficulties would have arisen as Philip saw his hospitals, his dispensary, indeed his life's work, being taken over and direct power slipping from his grasp. However it came about, the schism that began about this time was to last for well nigh forty years before the Tuberculosis Service in Edinburgh became unified and fully effective again.

About this time, letters were received from Professor Beranek of Vienna and Dr Herman Biggs of New York City, which praised Philip's contribution for his *"vast influence throughout the world"*. The main message from these eminent persons was that early and advanced cases of pulmonary tuberculosis should be treated separately - *"hospitals should not 'spail scientific completeness' by insisting in dealing with all classes of cases."* Once again we find this strange obsession with separation of late and early cases; it is difficult to resist the speculation that Philip may have solicited these letters from his distinguished colleagues in order to emphasise to the new managers of the Tuberculosis Service that they should continue to support this aspect of his policies.

This takeover was the subject of intense and prolonged negotiation between the Town Clerk and the Royal Victoria Hospital Trust. In particular there was lengthy correspondence over Philip's terms of appointment in the new structure; final agreement was reached with his appointment as "consultant and expert adviser" and he was entitled to visit the Royal Victoria Hospital at any time as Consultant and visiting Physician. Also it was stipulated that the Royal Victoria Hospital was not to be used for "advanced cases" for a period of at least seven years (hence the letter from abroad mentioned above).

The notes and correspondence of this period (1913-14) indicate the concern felt by Philip at the consequences of these changes; it is not surprising that it should have been thus since every single aspect of the scheme had been his idea and no detail was too trivial to have escaped his attention (even deciding which builder should receive the contract to put the slates on the roofs!)

The Public Health Committee received a letter about Philip's terms of appointment signed by 63 medical luminaries of the period. These signatories included the current presidents of the Royal Colleges of Physicians and Surgeons plus two past presidents and numerous professors.

The Town Clerk had written, *"it is undesirable to have some aspects under one system of control and other aspects of the same institution under another"*. Rather ominously he also wrote, "if these negotiations fail, the Public Health Committee will be compelled to make other arrangements". The agreement was finally signed on 10th July 1914.

About this time the University of Edinburgh approved the establishment of a Chair of Tuberculosis, the Royal Victoria Hospital Trust to contribute "not less that £15,000". This was finally approved by King George V in December 1917 "by order in Council".

In the meantime, the Royal Victoria Hospital had become a Red Cross Auxiliary Hospital (1914-1919), one of more than 3,000 such hospitals in the UK. Information about this dramatic change in the hospital's function is remarkably scanty but I have found out that in 1917 there were 190 beds for "other ranks"; this meant that the Royal Victoria Hospital was the largest Red Cross Auxiliary Hospital in Scotland (the next largest had 150 beds). It is rather hard to imagine where all these troops were accommodated; I suppose the rather large dining room would have accommodated several dozen beds and the wards could have been pressed to take extra beds. Of the 190 beds, 15 were

for "skin cases" and 90 for "neurasthenia"; the latter category presumably included "shell shock" and other stress related conditions.

The hospital was then part of the Second Scottish General Hospital RAMC.

The hospital returned to the Corporation in April 1919 once again, with scarcely a note or mention apart from *"fireplaces in wards were damaged"*. One can only presume that TB cases were quickly brought back to the hospital and life resumed where it had been disrupted in 1914.

A sub-committee of the Public Health Committee was set up to consider the position of Philip and the other conditions of the July 1914 agreement with the Royal Victoria Hospital Trust. In 1921 the MOH, Dr Max Williamson, pointed out that the old agreement with the Local Insurance Committee was now irrelevant and should be formally terminated; this was duly done. In 1921 it was pointed out that since Philip's appointment had been part of the above agreement, now cancelled, this appointment was likewise no longer valid. Eventually Philip received a letter from the Town Clerk informing him *"with regret"* that his appointment had been terminated. The Town Clerk indicated that the system of dual control had been highly unsatisfactory; it *"tended to friction"* and made *"Matron's position very difficult"*.

Philip was to be given *"reasonable facilities for research and teaching"* including one male and one female ward at the Royal Victoria Hospital. Dr Clayson tells me that Philip vowed never to set foot in the Royal Victoria Hospital again; this was only breached once when Derek Dunlop persuaded Philip to revisit the Royal Victoria Hospital but he only paid one visit and thereafter resumed his embargo.

About this time, the Scottish Board of Health wrote to the Town Clerk expressing concern, *"it is regrettable that the new scheme omits provision for the use of Philip..... a man of world-wide distinction"*. All these pleas were to no avail and Philip received his letter of dismissal in November 1921 by which time, of course, he was ensconced in Southfield Hospital where the new university department was located.

This period also saw a spate of complaints from patients about conditions at the Royal Victoria Hospital; many of these came from an ex patient, R Matheson, who was described as *"an expert trouble-maker"*. So persistent were these complaints that the Public Health Committee requested a report on the phenomenon from the MOH, Dr Max Williamson. It is most interesting to read this report today and to realise the changes that "political correctness" have brought about.

> *"Discontent, incompatibility of temper, absence of anything in the way of gratitude in return for efforts towards their best interests, are general characteristics of TB patients in sanatoria,"* wrote the MOH, no doubt to approving nods from the councillors and officials.

The Matron of the Royal Victoria Hospital was described as having a *"hard job"* in trying to cope with the results of *"dual control"*. The conflict was between *"old conditions under Philip"* and *"new official requirements"*. The medical staff of the hospital were described as being in a state *"little short of strike action"*.

The extraordinary situation culminated in an almost farcical fashion when a long serving boiler house stoker at the Royal Victoria Hospital resigned and was *"almost immediately re-employed at Southfield Hospital, Sir Robert's new TB Home"!* Clearly Dr Williamson believed that Sir Robert had suborned this stoker with the intention of embarrassing the Public Health Committee, Dr Guy and Dr Williamson. And maybe he did, such was the emotional tension of these times.

Things moved on and the hospital functioned without the services of Sir Robert.

In 1930, Dr Melville Dunlop was appointed Research Fellow (this was Derek Dunlop but at this time he was called "Melville"). In 1931 he was succeeded by Christopher Clayson, still active in his 90's.

Philip died in 1939, aged 82, and still in the Chair of Tuberculosis. Tributes came in from all quarters - *"Lustre has again fallen upon the Edinburgh School of Medicine "*. He had been indeed a most remarkable man with an amazing single-mindedness of purpose to overcome the menace of tuberculosis. Having consulted all the Minutes of the Royal Victoria Hospital Trust from 1890 to the time of his death, I could only find one occasion on which he sent apologies for absence and that was because of an urgent request to see a (private) patient in the Borders.

The University decided to leave the Chair vacant *"for the duration"* of the Second World War but in 1943, it was discussed once again and a firm decision taken that the next Professor was to be a *"true specialist in tuberculosis"*, and not merely an eminent physician who *"would devote some time to it"*.

In 1945, Dr Charles Cameron was appointed to the Chair having previously been Medical Superintendent of East Fortune Sanatorium. The University of Edinburgh was to contribute £1,000 per annum and the Royal Victoria Hospital Tuberculosis Trust £500 per annum towards his salary.

The Medical Superintendent of the Royal Victoria Hospital at this time was Dr H C Elder, City Tuberculosis Officer (after Dr Guy) and Professor Cameron visited the Royal Victoria Hospital on request.

In June 1948 the inaugural meeting of the Royal Victoria and Associated Hospital Board of Management was held and, thereafter, the National Health Service came into existence. Both Elder and Cameron were Board Members. Cameron produced a report for the Board on tuberculosis in Edinburgh. Things were described as bad and there was a pressing need for more facilities for thoracic surgery. In August 1948, Elder was relieved of his post as Medical Superintendent of the Royal Victoria Hospital in order to concentrate upon his work in the Dispensary. This move finally split the Tuberculosis Service into two parts, one concerned with the out-patient work, the other with in-patient treatment.

In December 1948 Elder and Cameron produced a most remarkable report in which they declared that doctors working in the clinic should not attempt to look after patients in hospital (and vice versa).

> *"The man (sic) responsible for the detection of tuberculosis and all its problems can find little time for the treatment of the individual which is becoming more and more specialised. If he does one properly he has no time for the other."*

This ridiculous claim was presumably made by its authors in good faith although it is difficult not to suspect that it was merely a device to arrange that the rival teams did not need to work together or even meet, so deep was the enmity between them.

This meant that a patient, having been diagnosed as having TB in the Dispensary, was then admitted (on the decision of the Dispensary Doctor who decided on priorities) to hospital and was then looked after there by another team of doctors. When discharged, the patient reverted to dispensary care and would not be seen again by his hospital doctor (unless needing readmission). Not only was this plainly non-essential, it was contrary to everything that Philip had taught and practiced. This sort of insanity makes one realise how senior doctors of this era could distort services and create great inefficiencies simply to gratify their strange predilections. Maybe it makes it easier to understand why general managers have had to be brought into the Health Service in the late 20th Century and why they have been granted such great powers!

Meanwhile, the waiting lists for admission to hospital continued to grow apace as Scotland suffered a post war epidemic of pulmonary tuberculosis, only matched in Europe by a similar phenomenon in Portugal.

In August 1951 the incumbent Secretary of the Royal Victoria Hospital Board of Management resigned and 104 applicants were recorded for his post which was awarded to Alex Welstead. This was a singularly fortunate appointment as Welstead proved to be

capable of seeing the Board through a series of tumultuous years in which the old regime was rapidly dismantled and replaced by new personnel, new philosophies and new practices.

The key person here was John Crofton who had been offered the Chair in November 1951 and who took up his duties in the following year. This appointment led rapidly to the healing of the schisms which had existed for nearly 40 years and which had so blighted the Tuberculosis Services of the City. Crofton had his base at Southfield Hospital but set about producing a master plan. An early step was to make Dr Norman Horne a Consultant with beds at the City Hospital, and Dr J D Ross similarly became a Consultant and Medical Superintendent of the Royal Victoria Hospital.

In April 1953 the Board of Management received *"with regret"* the resignation of Dr H C Elder *"after more than 30 years"*. This was to take effect on 31st December 1953 and thereafter Crofton temporarily took over the Royal Victoria Dispensary to be replaced there as Medical Superintendent by myself in April 1954.

My first task was to determine exactly how many patients were really awaiting admission to hospital for the treatment of pulmonary tuberculosis. In May, there were 350 of whom a significant proportion had open cavitory disease and were thus infectious, some highly so. This number climbed to near 400 in the ensuing year.

Crofton was a superb leader of this team which had been joined by Dr Ian Grant (with beds at the Northern General Hospital). I had beds at the Royal Victoria Hospital where I joined J D Ross. It was a very happy place and morale was high among patients and staff. There were red squirrels in the grounds, some of which were quite tame and would climb onto window sills to be fed by patients from their beds.

Miss Rodger, Matron for more than 30 years, retired about this time and was succeeded by Miss Heddle. Matron's flat was redecorated, the first time in more than 30 years!

Crofton had been involved in the earlier MRC trial of Streptomycin and was very knowledgeable on the subject of the chemotherapy of tuberculosis. It was known that given a single drug regime, many tuberculosis bacilli would soon develop resistance to that drug; if PAS was given along with the Streptomycin then resistance would not occur. The snag was that quite a few of our patients at this time had had single drug therapy in the past, hence their bacilli were likely to be resistant, and giving two drugs was tantamount to single therapy. Hence we decided that we would always give three drugs ab initio and continue these until we had the results of drug resistance tests from the laboratory. In this we were extremely fortunate in having the support of Dr Archie Wallace, Bacteriologist at the City Hospital (later called "Microbiologist") whose hard work and enthusiasm I fear we all tended to take for granted. His efforts in the laboratory made possible ours in the clinic and the wards.

We dealt with the waiting list by classifying each patient according to severity, infectiousness and presence of vulnerable contacts; this was displayed in a visual fashion so that each time one of the Consultants had an empty bed he could see at a glance which was the most "urgent" case on his individual list.

Within a year, the situation was almost under control and by 1956 the waiting list had disappeared. The Scottish Health Department then decided that there should now be *"one last heave"* to end Scotland's unfortunate position alongside Portugal as the worst hit country in Europe for tuberculosis.

The mass x-ray campaign was launched in 1957 and Edinburgh's turn came in March 1958 when we set out to x-ray everyone in the City over 15 years of age. There were 27 MMR units in the City for the whole of this month. A technical planning committee had been set up with myself as Convenor and containing representation from the Health Department, Edinburgh Corporation Public Health Department, South East Regional Hospital Board and Board of Management. We met frequently in the Board Room of the

Royal Victoria Hospital and the whole campaign was conducted with military efficiency. We had expert advice on public relations from the then Editor of the "Daily Express" and daily press conferences were held.

Some figures may be of interest and give some idea of the complexity of this operation.

No. x-rayed	276,526 (or 76.6% of population)
Recalled for large x-ray	10,455
Significant thoracic abnormality	6,790
Seen in chest clinic	3,654
Admitted to hospital	452
TB treated at home	26
TB treated "at work"	266
"Observation" at chest clinic	1,666
Discharged after one visit	1,245
Active PTB	462
Doubtfully active PTB	1,072
Lung cancer	100

Even before the MMR campaign there had been moves to run down beds for TB and in 1956 there had been talk of a shortage of beds for "chronic sick patients", mainly the elderly.

At the end of 1958 it was decided that Southfield Hospital should become a geriatric hospital and, early in 1959, it was agreed that beds at the Royal Victoria Hospital should be reduced from 90 to 76; this meant the chalets were no longer to be used. They had been remarkably successful and had lasted more than half a century; they were eventually sold for £15 apiece.

By this time I had made a decision to become a Geriatrician and early in 1959 I started to take a hand in this field of medicine, joining Dr Neil McMichael who, until then, was the sole Consultant in Geriatric Medicine (although part-time). My first task was to become involved with Alex Welstead in the conversion of Southfield to become our Geriatric Assessment Unit.

In 1960, a decision was taken at Regional Branch to provide *"at least 150 new geriatric beds"* at the Royal Victoria Hospital. In the meantime, J D Ross had suffered a severe heart attack and was off work for a prolonged period. Miss Heddle had died and had been succeeded by Miss Euphemia Melrose, with Beth Williamson as Assistant Matron.

In February 1961 I met with John Crofton, Ian Ross and Bill Murray (of East Fortune Hospital) to discuss the implications of converting the Royal Victoria Hospital to a geriatric hospital. The remaining chest patients were to be transferred to East Fortune Hospital (at three per week) in order to vacate accommodation for geriatric patients.

In 1962 the patients' dining room was adapted for use as a Geriatric Day Hospital, a function it served well for many years.

In 1963 a planning group was established to develop the Royal Victoria Hospital site; Allan Reiach & Partners were appointed architects to the project. This group met regularly for some years while the various phases were planned and executed. I believe that this policy was less successful than it might have been probably because the planning group was far too large with representatives from Regional Board, Board of Management and Scottish Health Departrnent. As an example of this I shall mention just one episode; in 1967, when the new day hospital was nearing completion, I discovered to my horror that there was no Occupational Therapy Department therein. When I

expostulated about this, one of the planners said that it did not really matter since everyone knew that all day patients would properly be in-patients if only we had sufficient beds! In other words, this member of the Planning Committee did not really know what was the function of a geriatric day hospital.

In 1966 the West Gate House was listed as a building of architectural importance!

In 1967 I obtained a research grant from the Chief Scientist of the Department of Health to conduct a longitudinal study of a representative sample of the population aged 62 and over. We set up the Geriatric Research Unit in an old wooden building at the Royal Victoria Hospital and examined each member of the sample three times over the next five years. Dr J S Milne joined me as Research Fellow and we produced many papers in learned journals. Dr Margaret Maule performed the psychiatric assessments. This was the first such study carried out in the UK and it shed light on many important aspects of ageing. I hope that we were able to uphold Sir Robert's finest traditions in this work.

In 1968, Tony Lowther (who had joined me as Consultant Geriatrician) and I decided that we badly needed a unit for geriatric psychiatry to complement our own efforts; to this end, we agreed that one of the three new wards at the Royal Victoria Hospital should be offered to the psychiatrists. A meeting was held, attended by myself and psychiatrists, J W Affleck and G M Carstairs. I outlined our plan to have a psychiatric ward at the Royal Victoria Hospital; the psychiatrists expressed their pleasure at this. I then asked what they would contribute to this operation and was astounded when, after a slight hesitation, Dr Affleck said that he was sure they could arrange for a senior registrar to visit the ward once or twice a week! Needless to say our offer was immediately rescinded. Good sense however did prevail and eventually a new consultant appointment was made to be based at the Royal Victoria Hospital. We were extremely fortunate in being able to attract Dr R A Robinson to this post. "Sam" Robinson had been running for years an excellent psychogeriatric service at Crichton Royal, Dumfries. He is undoubtedly one of the true pioneers of geriatric psychiatry and, after coming to the Royal Victoria Hospital in 1971, he rapidly created a first class service based on the new ward alongside our own.

We were able to open our first new ward of 30 beds in April 1970, one year later. Once our new day hospital was in use, Dr Robinson took over our old day hospital (previously patient's dining room). This functioned well until the new psychogeriatric day hospital was completed.

The chronology of the Royal Victoria Hospital development was as follows:

1967	**Phase Ia**	30 x 2 beds, kitchen, stores and boiler house, staff dining room.
1968	**Phase Ib**	30 beds, medical day hospital.
1971	**Phase 2a**	Administrative block, x-ray and dental departments (geriatric assessment unit moved from Eastern General Hospital to Royal Victoria Hospital).
1978	**Phase 2b**	Craigleith House opened (29 beds for continuing care).
1984	**Phase 3**	180 beds, psychogeriatric day hospital, general psychiatric day hospital.

My association with the hospital ended in 1973 when I left to take up the Chair of Geriatric Medicine at Liverpool University. When I returned to Edinburgh in 1976, I had my base at the City Hospital but still was in touch with colleagues at the Royal Victoria Hospital. I attended the opening of Phase 3 in 1984. This was a massive development costing many millions; there were about 50 people at the Ceremony and I cannot help comparing this with Sir Robert Philip's opening of Polton Farm Colony and the two

special trains leaving Waverley Station each with more than 400 passengers to attend the Ceremony.

The Royal Victoria Hospital is now a very busy and active geriatric hospital with close links to the nearby Western General Hospital. Thus, it finds itself in the forefront of the drive to cope with current medical problems - how to cope with an ageing population in an era of startling medical advances. One hundred years ago this hospital was likewise involved in the struggle to cope with one of the major problems of the time - tuberculosis.

ACKNOWLEDGMENTS:

I am deeply grateful to Mike Barfoot, the Lothian Health Services Archivist.

I am also indebted to my old friend and colleague, Dr Christopher Clayson, who is not only old enough to recall some of the events described here but is the possessor of a razor sharp mind and memory which would be a credit to a person a quarter of his age.

Miss Mary Pugh, Archives Assistant of the British Red Cross, very kindly sent me details and photographs relating to the period 1914 - 19.

Sources:

I read all the Minutes of the Royal Victoria Hospital Tuberculosis Trust as well as the relevant Minutes of the Public Health Committee of Edinburgh Corporation. I also consulted the notes of the Royal Victoria Hospital for Consumption Committee (this was a Sub-committee of the Public Health Committee).

I read numerous pamphlets and articles on tuberculosis in Edinburgh including Christopher Clayson's "One Hundred Years of the Co-ordinated Service for Tuberculosis" (adapted from his lecture in 1957 to the Joint Meeting of the Scottish Thoracic Society, the British Thoracic Society and the Thoracic Society of Australia).

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THE ONE HUNDRED AND FORTY FIFTH ORDINARY MEETING

The One Hundred and Forty Fifth Ordinary Meeting of the Society was held at the Murray Royal Hospital, Perth on 23rd of March 1996. The President introduced Dr Elizabeth Lazenby, of the Department of Classics of the University of Newcastle upon Tyne, who read a fascinating paper entitled "Mandrake"

MANDRAKE

Mandrake, *Mandragora officinarum*, is a member of the *Solanaceæ* family, to which the Potato, Tomato, Deadly Nightshade and Tobacco also belong. It is a native of southern Europe, having dark leaves about two feet long, growing directly from the base of the plant. In summer it has single yellow bell-shaped flowers, which are succeeded by fleshy, greenish-yellow, berries the size of a small crab apple. The perennial root can grow to a large size, penetrating the ground to a depth of three to four feet, and may become forked and branched, occasionally assuming a rudimentary human shape.

This paper is divided into roughly three sections, beginning with the legends associated with mandrake, followed by the medicinal uses and finally the development of research into the chemical properties of the plant.

For three thousand years wonderful and disturbing legends and properties have been ascribed to mandrake and much illustrated; it has long been associated with strange rites

and customs, and curious magical ceremonies were carried out at its gathering. Its use in medicine also goes back for thousands of years and it has the distinction of being the earliest known drug used as an anaesthetic. It was considered to be a mystic plant and looked on as being the abode or embodiment of a demon or evil spirit; the Pythagoreans called the mandrake anthropomorphic and Columella refers to it as half-human.[1] Perhaps it is the unfamiliar departure from the normal which has led to the complex iconography of mandrake.

The connection of mandrake and magic dates from a very early period in history. It is thought that mandrake was the plant described in the *Odyssey* as being used by Circe to bewitch the companions of Odysseus. There are many legends of mandrake in Greek and Roman folk-lore, which may perhaps be traced back to Egypt. A carved ivory panel, part of a casket found in Tutankhamun's tomb, depicts mandrake in the side borders, together with poppies and cornflowers, and mandrake being picked by children in the lower borders. It was also among the plant remains found in the tomb.

Alternatively the legends could possibly have originated in the far east, which also includes many legends on mandrake in its folk-lore. The Chinese legends connected with ginseng and its powers and methods of collection are similar to the western ones concerning mandrake.[2] The powers attributed to mandrake for exorcising demons and for bringing good fortune are oriental in character; the Chinese also shaped the root into human forms to tell fortunes and bring good luck in the way that the German Alrauns of the 15th and 16th centuries did. As with many early legends there was much overlapping and intermingling among cultures.

In the old Herbals and manuscripts of the 12th, 13th and 14th centuries the roots are frequently depicted as male mandrakes, with long beards, and female womandrakes, with flowing heads of hair, where the leaves represent the hair. According to Campbell Thompson in his *Assyrian Herbal* this distinction into male and female goes back to the cuneiform texts of about 800 B.C. Both Pliny and Dioscorides refer to male and female varieties, terms which perhaps indicate the male as the more robust species, although the female is frequently shown as being just as robust as her partner.

This differentiation by sex continued to the seventeenth century. As late as 1629 John Parkinson mentions that many people still believed in mandrakes and womandrakes, although he himself believed that such variation in shape was man-made.[3] Many weird superstitions collected round the mandrake root, and even after the middle ages, such importance was attached to these beliefs that no fewer than twenty-two treatises dealing with the plant were published between the years 1510 and 1850.[4] As an amulet, mandrake was once placed on mantelpieces to avert misfortune and to bring prosperity and happiness to the house. It was so popular and in such short supply that, as Trevelyan says, the superstitions connected with mandrake were often transferred to Black Briony.[5] Bryony roots were cut into fancy shapes and passed off as mandrake, being even trained to grow in moulds until they assumed the desired forms. In Henry VIII's time quaint little images made from Bryony roots, cut into the figure of a man, with grains of millet inserted into the face as eyes, fetched high prices. They were known as puppettes or

1 Columella, *De Re Rustica*, Book X, line 20.

2 Thompson, C.J.S., *The Mystic Mandrake*, Rider and Co., Paternoster House, London, 1934: 81-86.

3 John Parkinson, *Paradisi in Sole Paradisus Terrestris*, [1629], reprinted by Methuen & Co. Ltd 1904: 378.

4 Thompson: 20.

5 M.Trevelyan, *Folk-lore and Folk Stories of Wales*, 1909. NB In Britain, mandrake was *Tamus communis*, Black Briony, and Womandrake, *Brionia dioica*, White Briony.

mammettes, and were credited with magical powers. Italian women were known to pay as much as thirty golden ducats for similar artificial mandrakes.

Between the twelfth and sixteenth centuries the mystic and remedial virtues of mandrake were regarded almost with reverence. It was considered to be a panacea for all ills, a sleep-producing drug endowed with wonderful magical powers as well as being a charm for barrenness. By the time of James I, mandrake was a well established physic herb, grown, as Parkinson says, 'for its medicinal qualities as well as the beauty of its flowers'. William Coles[6] in the seventeenth century believed that the roots were shaped to represent a person on whom the maker intended to perform witchcraft.

Mandrake was considered to be so magical and potent that it could not be gathered without risk of madness or death. Although the legends vary in detail, the basic components of all are the same, as can be seen in an illustration from the 14th century *Tacuinum Sanitatis*, where the man is about to flee. He has tied a rope to the dog, placed its water just out of reach, so that to get at it, it must pull on the rope and thus remove the mandrake from the ground.

The earliest mention of strange rites involved in the gathering of mandrake seems to come from Greek sources, such as Theophrastus. Because the tap root of the plant resembles human limbs it was thought to be a half human demon and as such would scream when pulled from the earth and cause death from terror. This scream may be nothing more than the strained squelching sound when the root is pulled from marshy ground.

Theophrastus, although giving the legendary method of uprooting the plant, does admit[7] that the methods recommended by the root-diggers and druggists might be exaggerated. Nevertheless he gives the following advice for digging up mandrake:

Thus it is said that one should draw three circles round mandrake with a sword, and cut it with one's face towards the west; and at the cutting of the second piece one should dance round the plant and say as many things as possible about the mysteries of love.[8]

Josephus, in his *Wars of the Jews* written in the late seventies A.D., was the first to mention the legend stating that you had to expose enough of the plant to tie it to a dog, and then persuade the dog to pull it up, the dog dying in the process.[9] After that the plant was safe to handle and could be used to drive out demons. The death of the dog is accounted for by the Arab writer, Ibn Beithar, who says that the Arabs thought that, when the plant was pulled from the ground, its demon left *via* the leaves and passed into the dog.[10] A 13th century illustration[11] shows the procedure in great detail, beginning at the right, with the root-digger holding the dog on a lead and carrying a treat for the dog. He will then tie the dog to the mandrake, throw the treat and the dog in chasing it will pull out the plant. On the left the dog is seen lying dead, next to the root whose scream killed it. The mandrake could then be used for the purposes listed in the text above, that is, for *stigma corporum*, or body-rash, and for *articulorum dolores* or pains in the joints.

The rules for uprooting mandrake were elaborated upon right up to the eighteenth century, when Schmidel, in 1751, adds that they must be dug up on Fridays, the diggers must fill their ears with wax and affix a sign of the cross to the plant.[12]

6 William Coles - *Art of Simpling.*

7 Theophrastus: *Enquiry into Plants*: 9.8.5.

8 Theophrastus: *Enquiry into Plants*: 9.8.8.

9 Flavius Josephus, *Wars of the Jews*: Book VII, cap. vi; translated by William Whiston in *The Complete Works of Josephus*: Kregel Publications, Grand Rapids, Michigan 1981: 595.

10 Thompson: 93.

11 *Medicina antiqua*, fol. 118. (Biedermann).

12 *ibid.*: 157

In ancient Greece there was considerable traffic in medicinal plants. The herbalists[13] and druggists,[14] the *rizotomoi* and *pharmacopolai*, were not held in great esteem. They were usually uneducated men, more inclined to be superstitious than scientific, observing extensive ritual in the digging up and preparation of their simples. They mixed magic and medicine in a way almost universal in the early history of healing. Agnes Arber[15] suggests that they tried to create a monopoly, by implying, by means of superstitious stories, that their craft was too complicated and dangerous for the uninitiated.

As a magical plant mandrake was used for wish fulfilment. In German legends, to bring good fortune, the mandrake or Alraun was washed with wine, wrapped in a cloth, laid in a cradle, and then bathed and dressed afresh each Friday like a demoniacal doll. If it were not bathed regularly it would shriek until attended to. Such an Alraun is to be found in the Germanic Museum in Nuremberg. Once acquired, an Alraun was difficult to get rid of; there are stories of their being thrown into fires and rivers but they were always found back at home, when the owner returned.

At her trial in the early fifteenth century, Joan of Arc[16] was accused of being in possession of a mannikin mandrake, which she was supposed to have carried in her bosom as a means of acquiring wealth by witchcraft. Such an artificially shaped mannikin of this type, albeit from a much later period, is now in the collection of the Pitt Rivers Museum in Oxford.

Some believe the fruits of mandrake to have been the Biblical love-apples eaten by Leah and Rachel as a pregnancy charm[17], although this was disputed as early as 1597 by Gerard in his *Herball.*[18] However Spoer asserted that in the early 1900s Jewish and Moslem women still purchased mandrakes in Palestine,[19] and Thompson says that in the 1960s dried mandrake roots, shaped like a woman holding a child in her arms, were still highly prized by women in Syria and Turkey and carried to promote fertility.[20] Frederick Starr even tells of a mandrake being sent from Jerusalem to a Jew in the United States, because he had no child to perpetuate his line.[21] In more recent years there have been claims in India that mandrake could control the sex of a prospective child.[22]

Throughout the ages mandrake has appealed to dramatists, poets and writers of fiction, such as Chaucer,[23] Shakespeare,[24] Ben Jonson,[25] Marlowe,[26] Webster[27] and in modern times in the story *The Screaming Plant* by Hal Pink.[28] As an example, one reference

13 ριζοτομοι - root diggers, ριζα signifies a medicinal plant as well as a root.

14 φαρμακοπωλαι - drug sellers.

15 Agnes Arber, *Herbals*, CUP 1986: 7.

16 Joan of Arc - 1412-1431.

17 *Genesis* xxx, 14.

18 p. 86 of Johnson's edition [edited by Woodward].

19 H.H.Spoer, *The Powers of Evil in Jerusalem*, 1907.

20 Thompson: 39-40.

21 Frederick Starr, *Notes on Mandrake.*

22 Dr K. L. Khetal in a paper at the All India Ayurvedic [Medical] Conference in Delhi in 1962 reported that a 90% success rate by the use of *Lakshmana*, identified as *Mandragora officinarum*. Male mandrake for a son, female for a girl.
Also CIBA, from their lab in Bombay, claimed that 'sterile' women, given an extract from a mandrake with a man-shaped root have consistently given birth to male babies.

23 Chaucer, *The Knighte's Tale.*

24 Shakespeare, *Henry IV: Henry IV: Antony and Cleopatra: Othello: Romeo and Juliet: Henry VI: Cymbeline: Macbeth.*

25 Ben Jonson, *Masque of Queens.*

26 Marlowe, *Jew of Malta.*

27 Webster, *Duchess of Malfi.*

28 Story explained in Thompson: 198-9.

in Shakespeare in *Antony and Cleopatra* indicates mandrake's narcotic effect, when Cleopatra says, "Give me to drink Mandragora, that I might sleep out this great gap of time".

There was also a legend that mandrake grew at the foot of the gallows, springing from the urine voided by the hanged man just before death, and that it might take on the image of the hanged man.[29] In Germany the root was popularly known as *galgemantlein*, 'the little gallows man'.[30] It is not unusual to find legends of plants springing from the earth after death: Daniel Defoe mentions Dane-weed[31] growing at the site of the ancient camp of Barrow Hill, where many Danes had died in battle. Also red poppies are said to have sprung up at Waterloo after Wellington's victory and on the fields of Flanders after the First World War.

Although the hoax continued for a long time, by the 16th century the Herbalists were beginning to question the belief in the legends and human form of the root and they were becoming sceptical of the legendary powers of mandrake along with those of other plants. For example, in the *Grete Herbal* of 1526 is the first avowal of disbelief in the supposed powers of the mandrake, that, "nature never gave forme or shape of mankynde to an herbe".

Despite this statement in the *Grete Herbal*, this work does include anthropomorphic mandrakes on its title page.

In the mid 16th century William Turner, who fought against superstition in science, mentions that he has often dug up mandrakes without harm and that they were frequently shaped by men into human form and sold to the gullible.[32]

Andrea Mattioli,[33] also in the mid 16th century, tells of ingenious mandrake forgers, who went to the lengths of sowing grains of barley or millet in those areas where they wished hair to grow, and then replanted the figures to be dug up again when the crop of hair had sprouted. It is still possible to see such specimens; there are several preserved in the Imperial Library at Vienna, kept there since 1680, as well as the Alraun from Nuremberg dressed in a cloak and enclosed in a glass box, mentioned earlier.[34] There is also a double specimen, shaped to resemble two figures, in the museum of the Royal College of Surgeons in London.

Gerard exposed the hoax again at the end of the sixteenth century saying that there had been many ridiculous tales told of this plant, whether by old wives or renegade surgeons, or physick mongers and that all of these dreams and old wives' tales should be cast henceforth from the mind.[35]

29 provided that he was a virgin.

30 The story of the hanged man probably goes back to the classical tale concerning the herb of Prometheus, told by Apollonius Rhodius:

> In the Caucasus the flesh eating eagle dropped to earth the blood of Prometheus. A flower appeared like a Corcyræan crocus, supported on twin stalks, and the root in the earth was like new-cut flesh. The dark earth shook beneath as the Titanian root was cut, and the son, Iapetus, groaned, as his heart was mad with anguish.

31 Dane-Weed = Dwarf Elder, *Sambucus ebulus* (L.).

32 Rohde, Eleanof Sinclair, *The Old English Herbals*: Longmans Green and Co., London 1922: 91-92.

33 Andrea Mattioli, Latin commentary on Dioscorides and whose *Herbal* was translated into German in 1563.

34 Thompson: 123.

35 p. 85/86 of Johnson's edition [edited by Woodward].

Parkinson in 1629,[36] as previously mentioned, ridiculed the belief in, and deliberate fabrication of, humanoid roots; he said that if ivory is boiled with mandrake root for six hours, it will become so soft "that it will take what form or impression you will give it".

Even in the late nineteenth century Von Luschan reported that mannikins of mandrake were being made in Antioch in Syria from artificially manipulated roots, which were forced into their human shape by soaking and tying with threads.

The horror of mandrake cannot be dismissed as a superstition of the remote past, as it is still encountered in some parts of the world in the twentieth century. There is evidence that a woman in Palestine, when asked to dig up a mandrake, agreed, but whilst doing so, was rebuked by a relative, who told her that there was a little black man down there, who, if pulled up, would cause her to become ill and to be confined to bed.[37]

The date of the introduction of mandrake to this country is unknown, but it is mentioned in Archbishop Ælfric's *Vocabulary* in the 10th century and in the eleventh century Anglo-Saxon translation of the *Herbal* of Apuleius. The legends were similar in both Britain and on the continent as is seen in a twelfth century English work in the British Museum and a contemporary Italian work.[38] From this can be seen that the legend of uprooting mandrake with a dog still prevailed.

The medicinal properties of mandrake are less sensational than the legends. When the legends and superstitions are discounted, there is scientific basis for the medical properties of mandrake. For example, it was regularly employed for pain relief, as a narcotic and anaesthetic until the fifteenth century. *Mandragora officinarum* (also known as *Atropa mandragora*) is poisonous, the berries being particularly dangerous as they can cause heart failure. A powerful drug, which is antispasmodic, can be produced from the root. The herbalists used a pulp from the root mixed with brandy against chronic rheumatism, and the leaves boiled with milk were used by Boerhaave as a poultice for scrofulous or glandular problems. Variations in the root forms, allied with the plant's reputation as an aphrodisiac, led to the belief that there were male and female varieties as is clearly seen in an illustration from the *Codex Neapolitanus* of about 700 A.D.

Mandrake contains scopolamine, long known to be hallucinogenic, as well as hyoscyamine and atropine. Recommended as a sedative and for nervous conditions, even the smell of the plant is said to cause drowsiness. It served as a pain killer during surgery and in many parts of Europe as an aphrodisiac as well.

As already indicated, several parts of the plant were used medicinally, the leaves, rind of the root, the fruit and the root itself all being used to combat disease.

The leaves were applied externally as a poultice to sooth inflamed areas and for erysipelas and gout. They were also used for eye problems and applied to abscesses and tumours to relieve pain.

Mandrake leaves were also used for inflammation of the anus as suppositories. and applied to ulcers and wounds.

Mixed with barley they were used as a poultice to remove foreign bodies from wounds, also as a softening agent and to remove scars from the face and body. They were also applied to snake bites and insect stings.

36 *Paradisi in sole paradisus ferrestris*: Selections by Hyatt entitled *A Garden of Pleasant Flowers*, Philip Wellby, London, 1894: 116

37 Crowfoot and Baldensperger, *From Cedar to Hyssop: a Study in the Folklore of Plants in Palestine*, London 1932.

38 Taken from Singer, Greek Biology (1921): 71. British Museum MS Harley 5294. folio 43 and Turin MS, Bibliotheca nazionale, Codex K iv.3, folio 20v.

Internally the leaves were recommended for quartan fever, for headache, dysentery and 'to draw out phlegm or black bile', the presence of which in the body was thought to cause many diseases.

The juice of both root and fruit also had powerful properties. Dioscorides distinguished between the juice obtained by scratching the bark and that obtained by boiling. Juice was obtained from the root and the fruit, the juice of the root being considered more potent. The bark was pounded from the fresh root; this was then pressed to extract the juice, which was then thickened by exposure to the sun and afterwards stored in earthernware vessels for future use.

There was much folklore concerning the sexual superstitions about mandrake. Greatly feared in the Middle Ages, not just because of toxicity but because its folklore was bound up with the doctrine of signatures, according to which the stouter, more robust, male-looking roots would be appropriate for certain masculine diseases and difficulties, and the more delicate parts were useful for treating problems of a more female nature.

Traditionally its use as an aphrodisiac goes back to the story of Rachel mentioned above. Whether the true mandrake is the plant referred to in Egyptian sources is unsure, although most Egyptologists seem to believe that the magical substance used for the elixir of life was the mandrake and various examples of mandrake have been found in Egyptian excavations. Mandrake became a symbol of the "Great Mother and the power of life-giving" and its fruit, the 'love apple' an aphrodisiac. It has been suggested that mandrake apples and its two-pronged root are being given by Nefertiti to her husband King Amenophis IV[39] in a painted relief of the 14th century B.C.[40] In 1871 Guillaume and Perrot found among bas-reliefs at La Ptérie in Egypt a carving showing a little figure in human form, which they believed to be a mandrake root. Its inclusion in a marriage scene they assume is symbolic of its virtue as an aphrodisiac.

This belief was elaborated on in Greek mythology and indeed its power to produce fruitfulness and inspire love is said to have survived in Palestine to the present day in love potions. Theophrastus[41] and Dioscorides[42] both mention its use in such potions, Theophrastus commenting that "the root is good for philtres" and Dioscorides that "the root seems to be useful for making philtres", but neither gives an account of its actions. There is an illustration of Dioscorides teaching the virtues of mandrake in a 13th century manuscript.[43] Aphrodite, the goddess of love, was even known sometimes as *Mantagoritis* and in rural areas of Greece young men still carry pieces of mandrake root with them as love-charms.[44]

As a rejuvenator the properties are similar to those attributed to ginseng by the Chinese.[45] The German legends, mentioned earlier, also describe how mandrake could change a man from old age back to childhood. Thompson mentions,[46] although without proper 'chapter and verse' reference, some correspondence in the *British Medical Journal* which alleged that the correspondent had met in Russia in 1917 a man who appeared to be about thirty years old but who claimed to be seventy. He attributed his

39 Akhenaton = King Amenophis IV.

40 NB *Hyoscyamus mutici*, Egyptian Henbane, is mentioned in the Ebers papyrus.

41 Theophrastus, *Historia Plantarurn* IX, 9.1.

42 Dioscorides [c40-90 AD]: 5.71.

43 Dioscorides: 13th century MS dated 1229, at present in the Topkapi museum in Istanbul, showing D in Arabian dress teaching the virtues of mandrake. (Reproduced on an Algerian stamp from 1963 commemorating the 2nd Arab Physicians' Union Congress.)

44 Thompson: 57.

45 The god of happiness, Dai Koku, who was reputedly very powerful against demons, is seen depicted as a dwarf-like man carrying on his back a huge root of mandrake. Bottcher, H.M., *Miracle Drugs*: Heinemann, London, 1959: 75.

46 Thompson: 230.

youthful appearance to the use of mandrake. He soaked the root in port and took three glasses from time to time; he also produced several roots of mandrake, one of which was shaped like a seated man. Another correspondent, replying to this, stated that he was much impressed by this prescription for eternal youth. Since his local chemist was unable to dispense mandrake, he drank the port on its own, after which he was "exactly the shape of a man sitting". He ended by saying that although his age was then thirty he looked and felt seventy!

Among the old Anglo-Saxon herbals both mandrake and periwinkle are endowed with mysterious powers against demoniacal possession. At the end of the description of the mandrake in the *Herbarium of Apulefus* there is the following prescription:[47]

> For witlessness, that is devil sickness or possession by demons, take from the body of the said herb, mandrake, of the weight of three pennies, administer it as a drink in warm water, heated to taste - soon the patient will be healed.

Josephus says that the mandrake - which he calls *Baaras* - has only one virtue, that of expelling demons from sick persons, as the demons cannot bear either its smell or its presence. He even relates that it was certain death to touch this plant, except under certain circumstances which he details.[48]

Perhaps the most interesting use of mandrake is as a narcotic inducing sleep; it has been used thus for over two thousand years; its action on the brain was recognised and it was recommended for convulsions, for depression and insanity, the general idea being to produce sleep. There are many references in ancient literature to mandrake being used for this purpose.

According to the *Ebers papyrus* mandrake was used by the Egyptians in the manufacture of intoxicating and narcotic drinks used in medicine and magic.[49]

In the *Assyrian Herbal*, mentioned earlier, the ancient Assyrians appear to have used mandrake around 800 B.C. for its anodyne and narcotic properties; for example, it was used as a cure for toothache.

In the treatise *De Hominum Locis*, once attributed to Hippocrates, probably written in the 3rd or 4th century B.C. directions are given to "administer less of the drug than causes delirium to relieve depression and anxiety". Obviously Hippocrates was aware of the powerful nature of the drug. Aristotle includes mandrake with poppies and darnel as sleep inducing drugs, which "cause heaviness of the head". Plutarch later says that "mandrake growing near vines is sufficient to impart lethargic properties to them". In the Commentary on the *Canticles of Theodoretus* it is said that "Those who have drunk mandrake have no perception of matters affecting the body".

Dioscorides gives much detail on mandrake as an anæsthetic; he says that "wine of mandragora is to be given to those who are to be cut or cauterised", although he cautions that it must be used in moderation. This wine of mandrake was made by boiling down the roots in wine or by stripping off the bark and allowing it to infuse in the wine for several months. There is a miniature in a manuscript of Dioscorides, known as the *Codex Vindobonensis*, dated to about 512 A.D.,[50] which shows Euresis or Invention presenting a mandrake to Dioscorides; It has been restored in Lambeck's *Commentarium* of 1680.[51]

47 12th century Latin *Herbal* of Apuleius.

48 Flavius Josephus, *Wars of the Jews*: Book VII, cap. vi; translated by William Whiston in *The Complete Works of Josephus*: Kregel Publications, Grand Rapids, Michigan 1981: 595-596.

49 Staub, H., *Helv. Chim. Acta 45* [1962]: 2297-2305.

50 NB Dioscorides also mentions its use in suppository form, and that it could be used as an abortifaciant.

51 redrawn from Lambeck's *Commentarium de Augustissima Bibliotheca Cæsarea Vindobonensis*, Vienna 1680.

Pliny, Dioscorides' contemporary, also advises its use as an anæsthetic, adding that "with some people the odour of the wine is sufficient to produce sleep". He recommends that before surgery the patient either smell the juice of the mandrake or that he should take two *oboli* in honey wine.[52] Since both Pliny and Dioscorides compare the use of anæsthetics made from both hellebore and mandrake, this would seem to indicate that the ancients used such anaesthetics on a regular basis.

The wine, known as *morion* or 'death wine', was given in Roman times on a sponge to prisoners about to be crucified. Thus their sufferings were alleviated and they passed into a death-like sleep, recovering after removal from the cross. One wonders if this 'death wine' was that offered to Christ on the cross[53] and could this account for his later resurrection? Many of the illustrations of the crucifixion show sponges being held up to Christ on poles, such as that in the *Rabbula Gospels* from Zagba in eastern Syria and dating to the year 586. Another example is from a work done about 900 years later by an artist known as the Master of the Tegernsee Passion; it was painted in a technique known as grisaille in Munich about 1440.[54]

Also from the period of the crucifixion comes the instruction for a soporific, given by Celsus, "to mix mandrake with opium seed and seed of henbane bruised up with wine".

In *De viribus herbarum*, a manuscript written in the fifth century A.D., it is said:

> If anyone is to have a limb amputated, cauterised or sawed, let him drink an ounce and a half of mandrake in wine; he will sleep until the limb is removed.

An eleventh century manuscript shows four cautery scenes; the one at the top left is of particular interest, as the hand at the left of the picture might be that of the physician applying a soporific sponge.[55]

By the time of Isidorus in the seventh century, mandrake's use as an anæsthetic was commonplace. He states that:

> The bark of mandrake is given in wine to those who are about to be surgically operated upon, that they may fall into a stupor and may not feel the pain.

Paulus Ægineta, who lived from 625 to 690, also comments on the heavy sleep caused by mandrake.

Avicenna, the famous Arab physician of the late tenth and early eleventh centuries, advises that anyone about to undergo surgery take three obols[56] of it to produce sleep. In an early Persian work, the *Ihliyant Badé*, there is a reference to the use of mandrake for amputation. Also for amputation Apuleius in the eleventh century says that half an ounce of the wine was sufficient to make a patient insensible to the pain; he also recommends it for headaches, sleeplessness and for devil-sickness or demoniacal possession, usually identified as epilepsy, and for expelling demons from the house. From his descriptions of the remedial virtues of the plant it is clear that its powerful narcotic properties were well known.

Bartholemeus Anglicus[57] in the mid thirteenth century gives the following instructions for its use as an anæsthetic, that the rind should be mixed with wine and drunk by

52 *Historia Naturalis*: xxv, 147-150. Obol: an apothecary's weight of ten grains or half a scruple, so presumably something similar in earlier times.

53 Idea originally proposed by Lyman.

54 Crucifixon by Master of the Tegernsee Passion, active in Munich c. 1430-1450. Crucifixion 1440-1445 Pine panel, painted in grisaille [painting in grey monotone to represent objects in relief].

55 M. S. Harley 1585, folio 9, London, BM. Anonymous pictures preceding Pseudo-Apuleius' *Herbarium*.
Patient at top left being operated on for podagra, by a combination of cutting and burning. Top right a hernia patient showing cautery points at groin. Bottom right - Hæmorrhoids.

56 See note 52 for obol.

57 Bartholemeus Anglicus, *De Proprietationes rerum*, mid 13c.

those about to undergo surgery so that they might fall into a stupor and not feel pain:[58] Bartholemeus gives two other beliefs about the mandrake, which I have not found in any other English Herbal - namely that while uprooting it the digger must beware of contrary winds, and that he must go on digging for it until sunset.

Hugo of Lucca in the twelfth century devised a preparation, which could anæsthetise his patients by smelling rather than imbibing a potion; again a sponge was impregnated with the mixture and as a result became known as the *spongia somnifera*. An illustration from the 14th century *Litlyngton Missal* made for Westminster Abbey again shows the sponges soaked in wine being offered to Christ on the cross; perhaps mere inhalation of the wine, rather than sucking the sponge, was all that was necessary to cause sleep.[59] Lucca's extremely toxic preparation was made by mixing opium, mulberry juice, henbane, hemlock and juice of the leaves of mandrake and wood ivy, together with the seeds of lettuce, dock and water-hemlock. A new sponge was placed in this mixture and the whole lot boiled until the sponge had absorbed all the liquid. Before use the sponge was soaked in water for an hour and then applied to the nostrils of the patient until he fell asleep. Thus the anæsthetic could be prepared well in advance. The patient was revived at the end of the operation by passing a sponge soaked in vinegar under his nostrils.

The length of time the narcosis lasted depended on the strength of the dose and the condition of the patient. Pierus Valerianus in the fifteenth century comments that:

> after a draft of the wine, sleep continues to be very heavy for about four hours, so that they feel neither the cautery nor the knife.

The *Grete Herbal* of 1526 was regarded as an important guide to the medicine of its period; it recommends that the root of mandrake is best, followed by the fruit and then the leaves and that it can be used for causing sleep, healing wounds and staunching blood. The writer concludes with various methods of administering the drug.

As no specific quantities are given by any of these authors, such anæsthesia must have been very hazardous. Turner in the sixteenth century warns of the dangers of taking an overdose of mandrake:

> If a man should smell or eat the apples of mandrake he will sleep. But if he smells it too much he will become dumb. In several ways this herb is very harmful to a man and may kill him if he eat or drink too much of it; he will fall asleep and lose his strength and memory.

Turner, although commenting on the dangers of an overdose, goes into great detail on the medical uses of mandrake, believing that the juice drunk in honeyed wine will drive out melancholy and phlegm by vomiting in the same way as Hellebore. The violent reaction to such drugs can be seen in a crudely effective 10th century miniature concerning bowel trouble. At the side of the traditionally stereoptyped herb the artist has mischievously pictured the patient in the process of being purged both upwards and downwards! Turner also says that some use mandrake in suppository form to cause sleep and for anæsthetic purposes. Amongst other ailments he recommends it for inflammations of the eyes and for wounds and sores.

Gerard, in his *Herball* of 1597, emphasises that he would only recommend mandrake as an anæsthetic and to relieve pain, believing that a juice made from the root is the most effective part, followed by the fruits.

Nicholas Lemery, a French chemist of the 17th century, is the only author I have found, who, although recommending mandrake as a narcotic, also lists various plants

[58] 'the rind thereof medled with wine.....gene to them to drink that shall be cut in their body, for they should slepe and not fele the sore knitting'.

[59] *History of Illuminated Manuscripts*:212 - Crucifixion from *Litlyngton Missal* made for Westminster Abbey, 1383 - 4. MS 37, fol. 157v.

which can be used as antidotes against the poisoning effect of the plant; he cites wormwood, rue, scordium, mustard and origanum, all with wine and vinegar, for this purpose

A later example of mandrake for anæsthetic purposes is give by Meissner in his *Skizzen* of 1782, where he tells the story of a surgeon called Weiss, who was surgeon to Augustus, King of Poland and Elector of Saxony. Weiss is said to have secretly administered a potion to his royal master and, when he was insensible, cut off a gangrenous foot.

In the nineteenth century investigations began into the active properties of the drug. The physiological effects of its administration were studied by Dauriol in 1847,[60] Michea in 1855,[61] Lemaitre in 1863,[62] Richardson in 1888[63] and in the early twentieth century by LeClerc.[64] For instance, Michea claimed to have experimented successfully with mandrake in the treatment of mental derangement. Lemaitre considered that it exerted its paralysing action by acting upon the peripheral centres, thus abolishing sensory excitability and finally motor excitability. LeClerc lists many uses for mandrake, including the soothing of exhausting, convulsive coughing fits,[65] the sedation of spasmodic states,[66] sedation in general pain and neuralgia, the improvement of depressive states, neuroses and insanity and as an anti-epileptic drug.[67]

Chemical analysis seems to have been begun in 1888 by Benjamin Ward Richardson. He made a tincture by placing the powdered root in alcohol diluted with five times its weight in water, for four weeks, trying to reproduce as closely as possible the ancient mandrake wine. His experiments proved that mandrake produced a very powerful anæsthetic. He concluded that the active principle was an alkaloid similar, if not identical, with atropine; he believed that this could lead to the production of one of the most active anæsthetics so far discovered. He stated that;

> From the circumstance that the heart continues to beat after the respiration has ceased, we may infer, that as a general anæsthetic the alkaloid might under necessity, be once more employed as in the olden times, to deaden the pain of a surgical operation, and that too, with comparatively little risk to life.

Richardson continued his experiments[68] and found that the active component of the root was more soluble in water than alcohol. This was a fact known to the ancients, who made either an infusion or decoction of mandrake root in water, and later added wine to preserve it. He administered his tincture of mandrake either by mouth or as a subcutaneous injection, and found that its active principle was absorbed very rapidly. The effects produced were those of narcotism, dilatation of the pupil, paralysis of movement and sensation, excitement during recovery, and sleep and paralysis if the dose were too potent.

Richardson also noted that mandrake was effective with all types of animal, but that obviously he needed to vary the dose according to the size of the animal. When mandrake was administered in sufficiently large doses to cause fatal effects, the mode of death was accompanied by narcotism and respiratory failure. The paralysis of all the voluntary muscles was absolute and the pupils were widely dilated, showing that the involuntary muscles were also affected. The heart, however, continued to beat for a

60 Tercinet: 1., *Mandragore Qui Es-tu?*; original edition, published by the author,1950: 55.
61 Tercinet: 55.
62 *ibid*: 123.
63 Richardson, Benjamin Ward, A history of some original researches in therapeutics, *Pharm. Journal*, 3rd series 1888: 1049.
64 Tercinet: 124.
65 as in whooping cough and tuberculosis.
66 as in hiccups, stomach cramps, enterospasm, colic, dysmenorrhea.
67 Tercinet:124
68 *Asclepiad*, Vol. V, 1888: 183.

considerable time after respiration had ceased. Thus he concluded that the action of mandrake is purely upon the nervous system.

The effect of mandrake on the human body had been noted in 1581 by William Turner, as mentioned earlier; he observed that when a tincture of mandrake was applied to the tongue it produced a sensation of numbness, which lasted for several minutes. It also left a taste and sensation of acidity and dryness lasting for several days. In small doses it seemed to produce a desire for sleep, a sense of fulness in the blood vessels of the head, enlarged and confused vision, exaggerated sounds, and restlessness and nervous excitability rather like hysteria.

From these facts one may believe that the medical use of mandrake as an anaesthetic in ancient times was correctly recorded.

Richardson concluded that the alkaloid, atropine, could be extracted from mandrake and would become one of the most active anæsthetics yet discovered. He believed that, in addition to being a general anæsthetic, it could also be a local anæsthetic, since, like Turner, he had discovered by applying it to his lips that a numb sensation lasted for more than an hour.

He also remarked that it might be useful for dilating the pupils, as atropine is now. He believed it might also be used to counteract strychnine and as a good antagonist of muscular tetanisation.[69] It is perhaps worth mentioning that Hippocrates, over two thousand years earlier, also advocated the use of mandrake for tetanus.

Richardson's investigations seem to have stimulated further research into the medicinal and chemical properties of mandrake. In 1889 Ahrens isolated an alkaloid from mandrake, which he called mandragorine. Twelve years later in 1901, Thoms and Wentzel proved that Ahrens' mandragorine was a mixture of hyoscyamine and hyoscine, with possibly a little of a third alkaloid.[70]

A little later Hesse discovered that the root of mandrake also contained scopolamine, pseudohyoscyamine and a new mandragorine. Whether the sedative effects of mandrake were due to hyoscyamine or the new mandragorine discovered by Hesse was in doubt. It is worth noting that the chemical constituents vary according to the age of the root, the hyoscyamine usually being in excess of the other components.[71] According to Southall[72] the root:

contains a mydriatic alkaloid, Mandragorine,[73] which in spite of the name and formula which have been assigned to it, is probably identical with atropine or hyoscyamine.

From about 1872 narcotics had been regularly used by European surgeons for anæsthesia by inhalation; this procedure was used for many years with various refinements. In 1900 Schneiderlin showed that surgical anæsthesia could be produced by the use of scopolamine, an alkaloid of the atropine type, combined with morphine. This combination was used in obstetrics to induce what was called 'twilight sleep'. In effect this scopolamine-morphine narcosis was a revival of the anæsthesia produced by the preparation of mandrake two thousand years earlier.

There is a mediaeval illustration showing the inhalation of tranquilising fumes, in this instance for curing toothache; it is taken from a 14th century manuscript of the works of Roger of Salerno. The accompanying text instructs the patient to inhale the fumes

69 Richardson, Benjamin Ward, A history of some original researches in therapeutics, *Pharm. Journal*, 3rd series 1888: 1049.

70 Thoms, H. and Wentzel, M., *Berichte d. D. chem. Gesellschaft*, Jahrg 34., Band 1 [1901]: 1023.

71 Henry Kraemer, *Botany and Pharmacognosy*, Lippincott Company, Philadelphia 1907: 463.

72 *Organic Materia Medica*, 8th edition, revised by Ernest Mann, 1915.

73 ($C_{17}H_{27}0_3N$)

through the pipe and to let them envelope the teeth and thus ease the pain. Much earlier Celsus, the Roman medical writer, had recommended the use of anodynes such as mandrake for toothache, which he described as 'the greatest of torments'![74] Eleanor Sinclair Rohde[75] in her book *Herbs and Herb Gardening*, published in 1936, says that there were still peasants in Syria and Turkey who attributed aphrodisiac properties to mandrake, and that in America orthodox Jews still bought the roots for such purposes. Tercinet in 1950 concluded that the topical action of mandrake was due to two factors: anæsthetizing the sensory nerve endings, leading to a rapid cessation of pain and causing vasoconstriction.[76] It would also produce a deep sleep with almost complete abolition of sensitivity by cerebro-spinal sedation.

More modern research by Petkov and Staneva in 1957 showed that when mandrake was used together with the narcotics morphine, sodium amytal and chloral hydrate, if injected before the narcotics, the effect of the narcotics was inhibited. It regulated the modifications of the blood sugar by hindering the development of hyperglycæmia caused by morphine. It also, to a certain extent, eliminated the hypothermic action of the narcotics.[77]

The various tropane alkaloids contained in mandrake, like those in the related *Belladonna*, do have marked unwanted side effects, such as palpitations, elevated blood pressure, intense thirst and a rise in intraocular pressure. Overdosage can be very dangerous, causing the effects already mentioned, along with dizziness, flushing, photophobia, constipation, confusion, hallucinations, delirium and even death.[78]

Under the terms of the Medicines Act of 1968 herbal practitioners are allowed to use plants such as mandrake up to statutory maximum doses, but they are not permitted to be sold over the counter. A tincture made from the fresh plant is used by homeopaths today for the treatment of coughs, asthma and hay fever.

According to an item in *The Times* in March 1995, if atropine, which may be derived from mandrake, had been available in the minutes after the recent Sarin gas attack in Tokyo, lives could possibly have been saved. One of the various treatments for nerve gas poisoning is by injections of atropine, given both intravenously and intra-muscularly as soon as possible. So even in the 1990s mandrake could be of great value.[79]

Mandrake, like many plants used as drugs from ancient times, contains properties later discovered to be valuable. As Tercinet says:

> If all the many activities claimed for mandrake throughout the ages were to be true, then like Serres we can well understand the esteem in which it was held in antiquity, as a result of which it became known as 'The Prince of therapeutics'.[80]

74 Celsus, *De medicina*: VI, 8.

75 Rohde, E. S., *Herbs and Herb Gardening*, The Medici Society, London, 1936: 152-153. Similar references are given by Thompson and Starr; see footnotes 20 and 21.

76 This would result in local reduction of blood flow, leading to decongestion of the tissues and underlying organs.

77 Petkov, v. and Staneva, D., Izvest. Otdel. Biol.i Med Nauki. Bulger. Acad. Nauk., No3 [1957]: 83-92, via *Chemical Absracts 54* [1960]: 17696.

78 Wren, R. C., *Potter's Cyclopaldia of Botanical Drugs and Preparations*, The C. W. Daniel Company Limited, Saffron Walden, 1988: 28.
see also M. I. Berry, PhD thesis, University of London 1970: 49.

79 *The Times*: Tuesday March 21, 1995.

80 Tercinet: 123.

Perhaps the physiological activity of mandrake may best be summarized by saying that it acts first upon the respiratory and gastric systems, eventually becoming inhibitory to all the involuntary nervous systems. When a chemical analysis has been made of the properties of mandrake using modern techniques, it may once again take its place in the *materia medica* of our own times.

★ ★ ★ ★ ★

In the absence of a second speaker because of illness, Dr John Forrester filled the gap with some personal impressions of the conference on medical history in medical education which had been held at the Royal Society of Medicine on 22nd March 1996.

THE FIFTH HALDANE TAIT LECTURE

The Fifth Haldane Tait Lecture took place in the University Staff Club, Edinburgh on 15th May 1996. The speaker was Dr A. R. Butler of the School of Chemistry in the University of St Andrews who talked on how medicinal rhubarb came to Scotland.

THE COMING OF RHUBARB

Rhubarb has been used in medicine for purging since the earliest times in both East and West and it is possibly the most prescribed of all remedies. Although the stem is used in cooking, it is the dried root or rhizome which is used medically. The Greek physician and botanist Pedanius Dioscorides recommended treating a variety of conditions and it was greatly valued. The rhubarb he used was grown locally (probably *Rheum ribes*) but at some time during the 10th to 12th centuries a superior medicinal rhubarb appeared. It was rumoured to come from somewhere in the Far East and thus began a strange quest for the 'true rhubarb'.

Rhubarb had been used in traditional Chinese medicine since the third millennium BCE. and a survey of Chinese herbal manuals shows that one prescription in five includes rhubarb. In classical Chinese rhubarb is known as *da huang* (big yellow); the term yellow has a special significance in Chinese thought and is associated with high office. It was recommended as a purgative - a preoccupation of Chinese traditional medicine - and as an antibacterial agent in the treatment of dysentery, where it is effective. But, as is common in primitive forms of medicine, it was prescribed for the treatment of almost everything else. There was a much-used, rather earthy, Chinese proverb:

Illness comes from the head; relief comes from the bottom

It was also claimed that rhubarb could demolish walls. By the time of Tao Hongjing (452-536 CE), compiler of one of China's earliest pharmacopoeia, its purgative effect had already earned it the nickname of 'The General'. This appellation, he remarks, 'comes probably from its galloping charge'. Another commentator adds graphically, 'It expels the stale and occasions renewal, pacifying rebellion to bring about universal peace'. The earliest descriptions of rhubarb's use occurred in the *Shennong Bencao Jing (Pharmacopoeia of the heavenly husbandmen)*, a Chinese herbal manual (*bencao*) dating from the second or third century, and preserved in quotation in the work of Tao

Hongjing. There, and on through China's voluminous herbal literature, authors are in general agreement on its properties and extensive applications. It is described as 'bitter' and 'cold', although there is some disagreement over whether it is toxic or non-toxic. Anecdotal literature suggests that the former was the prevailing view, and one 19th century official records how a servant died from overdosing.

The *bencao* describe many and varied uses for the dried root, summed up in Li Shizhen's (1518-93) encyclopaedic *Bencao Gangmu (Materia medica, arranged according to drug descriptions and the technical aspects)*. It was seen not just as a simple purgative, but as a powerful tonic for reducing 'heat' and 'swelling' in the digestive system and settling all the internal organs. It was also taken internally for amenorrhea (suppressed menstruation), tumours, headaches and jaundice, and externally for boils and inflammations, insect bites and traumatic injuries of muscles.

Its curative properties also stretched into the miraculous, because it was apparently used as a panacea for epidemics. The *Song Shi (History of the Song Dynasty)* records an anecdote about the statesman Chen Yizhong, a rather notorious figure who lived *ca* 1228-85 CE. He dreamed that a divinity addressed him, saying 'Heaven-sent calamities will spread, many will die of plagues, only those who are administered rhubarb will be saved'. Yizhong made this known throughout the land, and where there was a plague, multitudes were saved by eating rhubarb, so the *Song Shi* claims. We may doubt the miraculous, but the medicinal value of rhubarb is beyond question.

During the 16th and 17th century Chinese rhubarb was greatly prized as it was found to be superior to local varieties but the exact provenance of Chinese rhubarb remained a mystery. Marco Polo claimed to have seen it growing wild in Kiangsu province but his geography may have been at fault and there is considerable doubt that he actually went to China. At the height of rhubarb's popularity in Europe, China was almost a closed country to foreigners so it was almost impossible to go there to see if the claims concerning Chinese rhubarb were correct.

The desire to find seeds of the 'true rhubarb' and cultivate them in the West became something of an obsession, rather like finding the North West Passage.

Over the years, many people claimed to have obtained authentic Chinese rhubarb seeds. Some seeds were sent to Carl von Linne (better known by his Latinised name of Linneaus) and he cultivated them in his garden in Uppsala, subjecting them to his recently-invented system of plant classification. This assisted the search, allowing Linnaeus to recognise species of rhubarb more readily, but did not lead him to authenticate the true rhubarb.

John Parkinson, botanical adviser to James I and Charles I, cultivated some seeds of rhubarb from Thrace, in his garden in Long Acre, Covent Garden. The variety 'Englishe Rhubarb' (*Rheum rhaponticum*) derives from this cultivar, but from a medical point of view it was inferior to the imported variety, so the search turned to China. A number of missionaries who were allowed to travel in China reported that rhubarb was carefully cultivated there, but the Scottish physician and adventurer John Bell contradicted this view. He accompanied a Russian mission to China in 1720, and claimed that he only saw it growing wild.

Pere Vincot, a missionary in China, obtained a live rhubarb plant from Sulinfu in western China, and it was eventually cultivated successfully in a garden at Bouffemont, near Paris. The botanical taxonomist Henri Baillon described it fully, and named it *Rheum officinale*. As an ornamental plant it was magnificent, but medically it was in no way superior to other rhubarb cultivated in the West.

The great Russian explorer Nikolai Mikhailovich Przheval'skii (1839-88) made a significant contribution to the rhubarb debate. During his travels, he made extensive enquiries about the origins of Chinese rhubarb, and discovered that the town of Sining was a major production centre. He obtained seeds, but they produced only a variant of

Rheum palmatum, by then widely grown in Europe. What astonished Przheval'skii was the contrast between the luxuriant growth he observed for rhubarb in the wild, and the diminished appearance of the plant when cultivated in the West. This turned out to be the key to the search for the true rhubarb. It was not only the species, but also the growing conditions that produced the superior Chinese medicinal rhubarb.

Because of the failure to identify and cultivate a special rhubarb in the West, the trade in rhubarb grew at an alarming rate. The East India Company brought large quantities to London from China and even larger quantities came to Europe via Russia. About 1760 the Society for the encouragement of Arts, Manufactures & Commerce, now known as the Royal Society of Arts, decided that importing large quantities of rhubarb was wasteful because the plant could be grown in the UK. The Chemistry Committee of the Society, which was responsible for promoting plant cultivation for non-agricultural purposes, passed a resolution promising to 'take into consideration the planting and curing of rhubarb in the British dominions'.

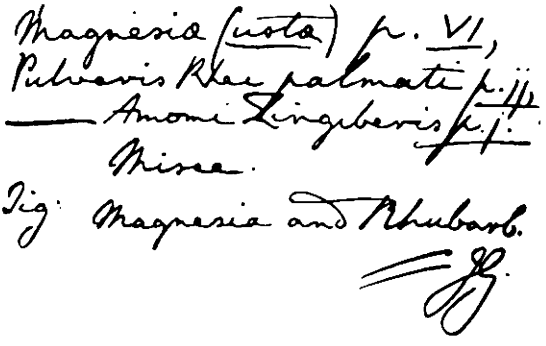
In Scotland the demand for rhubarb was met in a rather curious way through a physician whose life has been so expertly recounted by one of the Society's members, Dr Jack Wilson. James Mounsey was born at Skipmire in 1710 and studied medicine in Edinburgh with Alexander Munro, the first professor of anatomy at the University, but did not graduate. This did not prevent his accepting a post at the naval hospital in St Petersburg and in 1738 he was attached to the Russian army. He accompanied General James Keith to Paris but on his return to St Petersburg he was dismissed from military service and then proceeded to graduate MD from the University of Rheims. He returned to St Petersburg and was appointed physician to the Land Militia and served until 1756. He then appears to have set up a private practice in St Petersburg, later becoming personal physician to Czarina Elizabeth I, a rather tiresome woman. When she died he continued as physician to Peter III who was murdered by his wife Catherine the Great. Mounsey was dismissed because of his association with the former regime and returned to Scotland in 1762 when he built a fine mansion at Rammescales. He subsequently played a large part in the scientific and cultural life of Scotland.

On his return to Scotland he brought with him seeds of a rhubarb plant growing in the botanic garden in St Petersburg which had originally come from China. He gave the rhubarb seeds to a number of people including Sir Alexander Dick, president of the Royal College of Physicians of Edinburgh. The bank of this rhubarb (*Rheum palmatum*) that grew at his home, Prestonfield House (now a restaurant and conference centre) became quite famous. Dr Johnson dined at Prestonfield House and later wrote to James Boswell, who was then about to leave Edinburgh, 'Bring with you the rhubarb which Sir Alexander Dick so tenderly offers me'. Whether he wanted it for medical or culinary reasons is not known. It was from Dick that James Gregory obtained rhubarb to incorporate into what became the most nauseating of childhood remedies, Gregory's Powder, a mixture of powdered rhubarb, magnesia and ginger. Those dosed with Gregory's Powder during childhood seem unable to convey in words the unpleasantness of the remedy. The best I have heard is 'It was like eating brick dust'.

The Royal Society of Arts issued 19 appeals and awarded 15 gold medals and five silver ones for the cultivation of rhubarb. The first gold medal went to Sir Alexander Dick for the rhubarb at Prestonfield House and it also gave a medal to James Mounsey. By 1790 the Society's zeal for rhubarb cultivation had declined because, in spite of its efforts, rhubarb continued to be imported in large amounts. Rhubarb from the mysterious east still had a special appeal.

What was it in the rhubarb root that gave its mild purgative action? About 1784, the great Swedish apothecary Carl Wilhelm Scheele detected acid of sorrel (oxalic acid) in rhubarb roots. Larger quantities occur in the leaves of the rhubarb plant, making them

inedible, and presumably protecting the plant from ruminants. Much of the chemical activity during the 18th century concerned ways of authenticating powdered rhubarb root, because adulteration was quite common, but it was nearly the end of the century before chemists had the skills and knowledge to separate and identify the components of the medicinal rhubarb root. Alexander Tschirch, Professor of Chemistry at Bern University, separated what he claimed was the active substance in rhubarb, and named it chrysophanic acid. In 1911, Frank Tutin and Hubert Clever, working at the Wellcome Research Laboratories, published a paper describing the separation of various substances from powdered rhubarb root and examining their physiological effects. More recently, rhubarb has been re-investigated by a number of Chinese and Japanese scientists. Most of the significant components of rhubarb are anthraquinones and such compounds have, in isolation, a purgative action. The modern laxative Danthron is a dihydroxyanthraquinone made synthetically.



PRESCRIPTION FOR GREGORY'S POWDER, IN THE HANDWRITING OF JAMES GREGORY

Why is Chinese rhubarb more effective than that grown in Europe? It appears not to be the species but the cultivation which sets it apart. The soil and climate in Xinjiang produce luxuriant growth and make domestic rhubarb look rather puny. Also the Chinese take great care in the manner in which plants are gathered for medicinal purposes. Medicinal rhubarb must be harvested in the 8th month.

From the remote slopes of Xinjiang to Prestonfield House is an unexpected journey for the world's most successful laxative. Its popularity in the 18th and 19th centuries led to its being called the All Bran of the Age of Reason and, under the guise of Danthron, its good work continues.

★★★★★

Following Dr Butler's memorable presentation, which generated a number of questions and much discussion, he was accorded a hearty vote of thanks. Subsequently, forty eight members and guests enjoyed an excellent meal. This meeting brought the 1995-1996 session of the Society to a close.

★★★★★

The Scottish Society of the History of Medicine

CONSTITUTION.

1. The Society shall be called "THE SCOTTISH SOCIETY OF THE HISTORY OF MEDICINE," and shall consist of those who desire to promote the study of the History of Medicine.

2. A General Meeting of Members shall be held once a year to receive a report and to elect Office-Bearers.

3. The management of the affairs of the Society shall be vested in the Office-Bearers, who shall include a President, one or more Vice-Presidents, a Secretary, a Treasurer, and not more than ten other Members to form a Council. The Council shall have power to co-opt other Members who, in their opinion, are fitted to render special service to the Society.

4. All Office-Bearers shall be elected annually. The President shall not hold office for more than three successive years, but shall be eligible to serve again after one year. Not more than eight Members of Council, or two-thirds of the total number, shall be eligible for immediate re-election.

5. The Annual Subscription shall be fixed from time to time by the Council and reported to members of the Society.

6. The Secretary shall keep brief Minutes of the proceedings, shall prepare Agenda, and shall conduct the correspondence of the Society.

7. Meetings shall be held at least twice yearly, and the place of meeting shall be in any of the four University centres, or elsewhere, as the Council may decide.

8. This Constitution may be amended at any General Meeting of the Society on twenty-one-days' notice of the proposed amendment being given by the Secretary, such amendment to be included in the Agenda circulated for the Meeting.

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