

## MATTHEW HAY'S LECTURES ON MATERIA MEDICA GIVEN AT ABERDEEN UNIVERSITY 1886-1887

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On 20 October 1886, Alexander Dyce Davidson, a consultant ophthalmologist and Professor of Materia Medica in Aberdeen since 1878, collapsed with a massive cerebral haemorrhage while giving a lecture, and died shortly afterwards.<sup>1</sup> The Senatus asked Professor Matthew Hay, who had been Professor of Medical Logic and Medical Jurisprudence (forensic medicine) since 1883 to act as interim professor and continue the course of lectures.



FIGURE 1

Professor Matthew Hay, MD, LL.D, FRCPI (Hon.), Professor of Forensic Medicine, Aberdeen University 1883-1926. Medical Officer of Health, Aberdeen 1888-1923.  
Photograph courtesy of the Medico-Chirurgical Society.

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The decision was justified. Matthew Hay, who had been born in Stirlingshire and educated at Dollar Academy, had had a brilliant undergraduate career in medicine at Edinburgh, graduating MB CM with first class honours in 1878 and winning the Ettles prize as the most distinguished student of his year. He became a demonstrator in materia medica in Edinburgh and proved himself a brilliant and energetic researcher. His particular interests were in the actions and uses of the saline cathartics, on the toxicology of certain alkaloids and on the actions and uses of nitrites and nitrates in angina. He obtained his MD with honours in 1881 with a thesis on the saline cathartics on which topic he published a short monograph<sup>2</sup> for which he was awarded the triennial Goodsir memorial prize for the best original monograph on an anatomical or physiological subject.<sup>3</sup> He also originated the simple test for bile salts in urine, using 'flour of sulphur', subsequently known as 'Hay's test'. This was still in use when I was a house physician and was a cheaper way of diagnosing obstructive jaundice than many present-day techniques.

Matthew Hay was thus fully qualified to respond to the Senatus' appeal and gave his first lecture just a week after his predecessor's untimely death. The full course of lectures, written in a strong, slightly sloping, easily legible hand, are in the possession of the Aberdeen Medio-Chirurgical Society, and a review of these is the basis of the present paper.

The notes extend to 574 pages and, while the content is now of only antiquarian interest, they give a fascinating insight to the state of therapeutics at that time. Limitations in knowledge of the art in these distant days is revealed, but many of his general statements have withstood the passage of time. In reviewing his notes, I have included many direct quotations and interjected some comments relating to changes in the subject as pertained to my own student years (1948-1954), and to present times.

#### INTRODUCTION TO LECTURES

Matthew Hay started with a six-page tribute to his predecessor: constructed in beautiful flowing prose; he records how Dyce Davidson had died suddenly. 'He fell at his post' (p3). He stressed his many contributions to pharmacology and ophthalmology, and to university and student affairs and the manner in which a large clinical practice in ophthalmology reduced his research activities so that 'he was not a voluminous writer, but what he did, he did well' (p5). Finally, he referred to the 'heart touching and impressive scene' at the funeral and suggested they 'take from it a most solemn and impressive lesson'.

Let your loins be girded about, and your lights burning; and ye yourselves like unto men that wait for their Lord. Blessed are those servants, whom the Lord when he cometh shall find watching. Be ye therefore ready also.

After this quotation from the Scriptures he defined materia medica and the separate meaning of pharmacology and therapeutics, and mentioned the role of 'The British Pharmacopoeia' which 'does not include all known remedial substances, but only such of them as have been found after prolonged experience to be of the highest value in therapeutics'. He then discussed comparative pharmacology and recorded some of the factors influencing the effect of drugs (p16-32) with a six-page account of homeopathy to follow. The introduction of the volatile anaesthetic agents, ether and chloroform, the local anaesthetic cocaine, salicin (a salicylate) for rheumatic fever and quinine for ague (malarious fever) featured as recent advances with an interesting

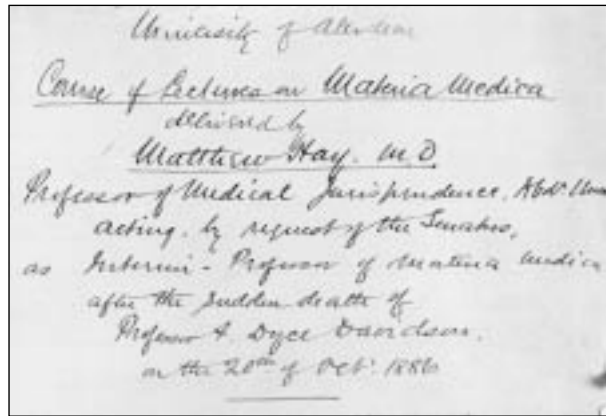


FIGURE 2

Title page to Matthew Hay's Lectures. Photograph courtesy of the Medico-Chirurgical Society.

account of the history of each of these agents. He also recorded the dispute for the discovery of anaesthetics. In this country credit is generally given to Sir James Simpson, the late professor of midwifery in Edinburgh, for the discovery of chloroform. In America, it is claimed for Horace Wells, a dentist who first employed nitrous oxide gas. He recognised the value of antiseptics, mainly due to the work of Lister which 'has revolutionised surgical practice'. This had followed the 'germ theory of disease' and he stated that 'It is now the object of the physician in many diseases to discover a drug which will kill the germs, without otherwise doing injury to the patient' (p46).

Hay also mentioned the use of iodides in the treatment of 'aneurism' (his spelling, p49), bromides in epilepsy, the laxative properties of *Cascara sagrada*, antipyrine for fever and also Pasteur's 'magnificent advance' in the prophylaxis of hydrophobia (rabies) (p50-51).

After this lengthy introduction extending to 52 pages, he gave a detailed account of pharmaceutical, pharmacological and therapeutic methods, and a classification for official preparations, discussing different routes of administration, and methods of study of effects, detailing these as general and specific (p16 - this section started again at p1). Methods of study and changes in the different systems were then detailed (p16-30) followed by a section on antiseptics, germicides and disinfectants (p30-35). Physiological antagonism was next covered (p37-43), followed by therapeutic methods (p44-61) including a discussion on all different methods of administration. Examples and rules of prescribing were given (p61-66), recounting that the names of all drugs had to be in Latin, weights to be given in figures using the apothecaries system (grains and scruples), and bulks given in Roman numerals using minims, fluid drachms and fluid ounces, although he stressed that it was 'advisable also to know the metric system and its relation to the English' (p63).

Reading this evoked personal memories, as this antique system was still in use around 1950 when I was a medical student, and the doses of all drugs in grains and minims as appropriate, were assiduously learnt, although shortly afterwards the system was abolished and metrication introduced. Old habits die hard however, and to this day I remain more familiar with the standard dose of morphine as a quarter of a grain rather than the modern 15 mg!

After a long discussion of incompatibilities (p65) he enunciated some 'Golden Rules' (p66). 'Never hand away a prescription without having read it carefully over. Write distinctly. Do not abbreviate too much'. Although prescription writing has changed almost beyond recognition, these rules remain as true now as then. Indeed their strict observance would have avoided some disasters in my experience, including one that had dire consequences.

Dosage, time of administration and methods of observing and testing the effects of drugs were dealt with (p66-79), with specific examples, and mention of some of the instruments, such as the sphygmomanometer available for these purposes.

#### SPECIAL MATERIA MEDICA

The next 165-page section covered what he called 'Special Materia Medica', all the earlier sections having been general principles. He noted that drugs could be classified in different ways. Alphabetical or pharmacopoeol or according to their chemical, botanical or zoological relations, their pharmacological actions, their therapeutic actions or by arrangement under the diseases they act on - more suited for a textbook on Practice of Medicine or a Dictionary of Therapeutics (p80).

He decided to adopt a combination of the second and third possibilities.

#### DRUGS FROM THE MINERAL KINGDOM

This section occupied 163 pages, commencing with 'water' and included mineral waters and baths, with his notes on this topic extending to 12 pages (82-94).

I have no personal recollection of hearing anything as a student on this topic from our professor - the late Sir David Campbell, although we were subjected to two whole lectures on tea, coffee and alcohol. About 12 years later, however, when I myself was a lecturer in the department of Materia Medica and Therapeutics, as it had become, with the late professor Alastair Macgregor, I was intrigued, when clearing out a cupboard one day, to discover a series of reprints of articles written by Sir David when he had been a young lecturer in Glasgow, and these included several on the therapeutic uses of water!

After this rather mundane start, Hay's notes cover all the known chemical elements in sequential order. Iodides merited four pages (p107-111): all the salts were recorded and he noted they were more poisonous than bromides. The symptoms of iodism were enumerated and the uses included bronchitis 'with deficient or too viscid expectoration', 'scrofulous conditions with enlarged glands' (presumably tuberculosis), and also 'syphilis, particularly to reduce the pain of aneurism'. The only present-day usage, to reduce the vascularity of the thyroid gland before surgery, was not recorded, this not having been widely used until introduced by Plummer in the USA in 1923.<sup>4</sup>

Very few of the agents and uses discussed have stood the test of time, but the nitrites and nitrates in which he himself had earlier researched merited four pages (p135-138) and remain standard treatment for the relief of angina. Interestingly, he records that the preparations available (amylnitrite and nitroglycerine) were most effective if given during what he termed the 'aura of angina' (p137).

Arsenic merited ten pages (p146-156) being widely used then in chronic skin disease and as a stimulant in diverse forms of anaemia. It was also used locally as a paste to destroy epitheliomas on lip or nose, or injected into cancerous, sarcomatous or lymphomatous tumours. It was said to cause the disappearance of the tumour in some cases, but after this note of scepticism he concluded - 'in most, no result!'

Befitting his toxicological interest, enumeration of toxic effects occupied five pages,

but surprisingly, particularly given his background, there is no mention of the popular use of arsenic in that era as a homicidal agent, although the changes at autopsy in cases of arsenical poisoning were detailed (p150).

Bismuth, whose salts presently enjoy renewed popularity because of their action against *Helicobacter pylori*, was mentioned as 'almost the best of all remedies in gastritis and painful dyspepsia' (p164). Reflecting his own interest, the saline cathartics, which were the main purgatives then available, merited six pages (p188-194). Apart from their obvious use in 'ordinary habitual constipation', a concentrated solution of magnesium sulphate, daily before breakfast, was said to be 'very effective' in dropsy and 'useful also in pleuritic effusion' (p190).

Iron compounds occupied seven pages (p220-227). It was known then that iron was 'a normal and necessary constituent of the blood found especially in haemoglobin' and that 'red corpuscles cannot be produced from white without iron - there is always enough of Fe in food for this. So when haemoglobin fails in blood, not dependant on absence of supply of iron'.

Apart from the then-misconception on the origin of the red cells, it is noteworthy that little stress was made on the possible use of iron salts in the treatment of anaemia, although liquid preparations such as ferric acetate and chloride, and also the notorious Blaud's pill containing small quantities of ferrous sulphate, were then available (p228). He states that iron is 'not of service in pernicious anaemia' but is of value in 'general debility or due to loss of blood'.

Fifty years were to pass before the classical studies of Davidson and Fullerton<sup>5</sup> in Aberdeen showed the frequency with which dietary deficiency of iron, especially among the poorer female population, was a prevalent cause of anaemia.

Compounds of mercury merited 14 pages (p231-245). Mercury used medicinally since ancient times had a long-established place as local applications in various skin diseases, which he detailed. He also recorded the use of calomel (mercurous chloride) 'in typhoid, in purgative doses repeated at intervals, 1-3 doses given at commencement of typhoid will often render attack very mild' (p241). The main use of mercury recorded was however in the treatment of syphilis. It was, he said, 'a specific' and especially useful in the primary and secondary forms characterised by 'skin eruptions, swelling of glands, iritis and condylomatous ulcers of the mouth and throat'. 'Iodides were better in tertiary', he said.

#### DRUGS FROM THE VEGETABLE KINGDOM

Plants were the main source of medicinal agents and so, not surprisingly, this next section extended to 262 pages (p246-508) and covered 228 different drugs or groups of drugs. He also, however, included 'drugs obtained by fermentation or destructive distillation' and such banal remedies as tea, beef tea, horseradish (claimed to have a diuretic effect), lemon juice - 'the best antiscorbutic', and cotton wool.

Many in this large group such as chloral hydrate, the vegetable laxatives, digitalis and drugs with euphonious names such as 'syrup of tolu' and 'infusion of quassia' were still in use in my own student days, but few have stood the test of time, being replaced by the isolated active ingredient or by more effective agents. Indeed, of the total group covered only morphine (p338-347), codeine (p347), quinine (p417-424), atropine (p453-460) and colchicine (p492-493) survive in use.

#### DRUGS FROM THE ANIMAL KINGDOM

This final section covers 14 pages (p508-522). Smacking of the 'eye of newt and toe

of frog' of the mediaeval quack, Hay mentions 18 different groups or substances including honey, musk, milk, ox-blood and hirudo (leeches). Only the last remains in therapeutic use in plastic surgery units - all the other agents have vanished into obscurity. It is interesting, however, that he states that skimmed milk is used 'for treatment of diabetes' (p509); few present day diabetologists would disagree.

His notes terminate at this point. All pages were numbered sequentially but it is not clear if some final pages may be missing. Surprisingly, there are no concluding remarks, despite the lengthy formal introduction.

Lodged among the notes, are the papers for the First and Second Examinations in Materia Medica held on 22 January 1887 and 10 March 1887 respectively, and also attached is a sheet showing the marks for the 17 students in the class. Each paper was worth 100 marks giving a combined total of 200; the top three were A. Keith (165), R. G. McKerron (155) and J. S. Riddell (147). All went on to illustrious careers. Sir Arthur Keith, as he became, was probably the most distinguished graduate of his year, and became a world famous anatomist and anthropologist, serving for 25 years as Conservator of the Hunterian Museum of the Royal College of Surgeons and was later a rector of Aberdeen University. R. G. McKerron held the chair of midwifery in Aberdeen from 1912-1937 and J. Scot Riddell became a distinguished consultant surgeon.

Such lecture notes from so long ago give a more personalised account of the subject than would be found in a contemporary textbook, and also give some insight into that individual's method of lecturing and illustrate the changes which have occurred since. I doubt, for instance, if quotations from the scriptures often feature in lectures today.

Matthew Hay's duties as interim professor of materia medica formed only a minute part of this distinguished career. A replacement professor - John Theodore Cash - was appointed and held the post from 1887-1919. A Manchester graduate, he was the first to establish pharmacology as a distinct subject, and his most distinguished pupil, Arthur Cushny, later Sir Arthur Cushny, became a distinguished professor in his subject in Edinburgh.

Hay's university duties in forensic medicine were not very demanding but, because of his expertise, he figured as an expert witness in many causes célèbres of that period.<sup>3</sup> He also taught public health and in 1888 took on the additional post of Medical Officer of Health for the city, which position he held for 35 years and in which role he made his major contributions to local medical affairs.<sup>6</sup> He was responsible for the upgrading and further development of the City Hospital (the hospital for infectious diseases), the opening of a separate pathological laboratory there in 1920, whilst unquestionably his greatest contribution was as the originator of the Aberdeen Joint Hospitals Scheme, first proposed at a historic meeting of the Aberdeen Medico-Chirurgical Society in February 1920. At this time, the old Aberdeen infirmary, the maternity hospital and the sick children's hospital were all on separate sites, and all old and inadequate for the city's needs. Hay was the visionary who suggested that a new 'greenfield' site be found to accommodate all the hospitals along with a medical school to house the various clinical departments, a nurses' home and a hostel for students. The site at Foresterhill, then on the outskirts of the city, was chosen by Hay and although there were many frustrations and delays, his scheme was taken forward and brought to fruition in the 1930s.<sup>7</sup>

## ACKNOWLEDGEMENTS

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