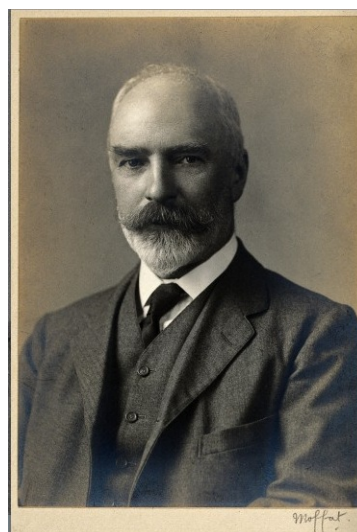


Arthur Robertson Cushny

1866-1926

It is intriguing that like many gifted Scots, Arthur Robertson Cushny came from a family of ministers (he was a great grand-son). Sadly his father died when he was nine years old, and left his mother with seven young children. His mother returned to her family home near Fochabers (Speymouth). When asked as a small boy what he was going to be, he replied “A professor, (a pause) because they have very long holidays.” He won a bursary to King’s College Aberdeen, and began his studies in humanities, graduating in 1886. He had begun his medical studies during his last year, and in 1889 he graduated with the highest honours, and was the George Thompson Fellow for Pathology, Physiology and Gynaecology. It was noted that he was a lively student taking part in debates, playing golf.

The Professor of Materia medica in Aberdeen was JT Cash, and he so inspired Cushny that he wished to study pharmacology, but his first appointment was to work in the laboratory of Hugo Kronecker (Bern). Following this in 1891 he went to Strasbourg to work under Prof. Schmiedeberg, as in 1892, at the age of 26, he was appointed as Schmiedeberg’s assistant. During this year he returned to Aberdeen to receive his MD, and by then has already published several papers in English and German journals. Schmiedeberg was a trained physiologist, and he showed the importance of studying the effects of drugs on living tissues under laboratory conditions. Thus Materia medica became allied with physiology and developed into the science of pharmacology. JJ Abel (founder of the department of Pharmacology, University of Michigan, Ann Arbor, USA) was touring Europe before taking up his new post at Johns Hopkins Medical School, and he asked Cushny if he would consider becoming his successor at Ann Arbor. On Schmiedeberg’s advice he took the post, becoming professor at the age of 27 (younger than some of his students). His days were filled with teaching and research; the evenings by writing.



More papers followed in 1891, and concomitantly he worked on his *Textbook of Pharmacology and Therapeutics*, the first edition appearing in 1899. The *British Medical Journal* quoted in an article after his death in 1926, “Pharmacology originated in Germany and the replacement of the old Materia medica by the science of the mode of action of drugs has been a slow process....but Cushny did more than any other person to bring about this change. His textbook... is recognised as the most trustworthy guide to the subject. His knowledge and exceptional powers of judgment made him one of the select persons who can write a great textbook. The first edition was a pioneer piece of work for it was the first general textbook of Pharmacology in the English speaking world. Cushny treated the mode of action of drugs as an exact science, and his book contains only those facts that have been established by carefully controlled observations on animals or man. Naturally his attitude appeared to some to be unduly sceptical, for he had no hesitation in rejecting cherished traditions as

unproven when they lack the definite objective evidence for their support.” (A lesson for us all!).

In 1905 he was offered the post of the new Chair of Pharmacology at University College London (UCL). In spite of dismay from his American colleagues, he accepted the post. However, before he left, he wrote up fully all the notes for his laboratory course and published *A Laboratory Guide to Experimental Pharmacology*. It was a struggle to set up the department at UCL, he started with one ill-lit and badly furnished room. His labour and subsequent achievements were greatly admired by Bayliss and Starling. Cushny was greatly assisted by his ‘lab-boys’ whom he trained. One of these, Condon, built apparatus and was gifted at laboratory work. He followed Cushny when he was appointed to Edinburgh, and worked for the two next Professors there, totalling over 50 years as the ‘lab-boy’.

Whilst at UCL, Cushny and his family lived in a tall Victorian house in Upper Park Road, Haverstock Hill in Hampstead. During the conferences of the Physiological Society, he would entertain widely, holding many dinner parties. He worked hard, retiring to his study every evening at 10pm to work until about 1am with his books and pipes. No-one was allowed to touch any of the papers, books strewn across the desk and filling the book shelves. The only person allowed in was the housemaid to light the fire. But, once a year, his wife insisted that a spring-clean and tidy-up should take place, usually when he was away examining. As a result of this Cushny wrote a poem:

I hear the steady thumping on the carpet on the line,
 There are careless people dumping books and papers that are mine,
 They are tossing them and mixing them, so I shall never more
 Get them back in disorder as I had them fixed before.
 They have gone in force and taken firm possession of my den,
 They have swiped my scattered pamphlets and have burned them. Ne'er again
 Shall I find the tracts containing thins I'd marked to read sometime,
 They are smoking in the alley, and the law permits the crime.
 They have robbed me of the cushion that was matted in my chair,
 They have put my pipe and ashtrays, well, I can't explain just where,
 They are rubbing, they are scrubbing there with all their might and main,
 And they shake their heads, assuming looks of sympathy and pain
 Showing that they think I'm crazy for presuming to complain.

(Familiar to anyone?)

Inevitably his work entailed a lot of travelling. His wife was one who was always early at the station, whereas he tended to be ‘last minute’. On one occasion, when taking the train from Euston (which is near UCL), they were so early that he went off to the Department, and only reappeared as the guard was waving his flag for the train to depart. When changing trains in the Scottish Highlands, and checking whether the luggage had been transferred correctly, he could be seen loping along the platform in tweeds and knickerbockers, again as the train departed; once delaying so long that his family departed without any tickets, which were in his pocket.

In the summer of 1918, Cushny left London to return to his native Scotland to the new Chair of Therapeutics in Edinburgh. Again he had to create a department from the old

Materia medica, full of dry and dusty specimens of leaves, and no research facilities. His lectures were well attended, though he had a weak voice that did not reach to the back of the hall, but full of pithy humour (and totally non-pc). He had no qualms about talking about ‘the practice of hocus pocus’, ‘the cockles of the heart’, that osmotic pressure was a Mesopotamian word, the Borgias, patenting of other men’s discoveries etc. By the 1920s Cushny knew that he had high blood pressure, but this did not stop his work, lecturing, research and writing. He died of a cerebral haemorrhage a few days before his 60th birthday.

Research Activities

Today, Cushny would be classed as a “boffin”. A glance at the subjects outlined below (and the references quoted) shows how he was able to turn his talent to subjects which interested him, without becoming a ‘specialist’.

The work that he had begun on the action of digitalis on the heart in Bern was continued in the USA, and published in *Transactions of the Michigan Medical Society* in 1894. 1897 saw the publication of three more papers on the rhythm of the mammalian heart.

Between 1902-1904 Cushny turned his attention to the kidney, and using a simple experiment, that of two excretion curves, one for sodium chloride, and one for sodium sulphate, he supported Ludwig’s view of re-absorption theory, rather than the Bowman-Heidenhiem view of ‘vital-secretion’, and proposed physical forces and glomerular filtration). His opinion was proven correct after his death. Later work was on the action of diuretics.

An important aspect of the work in Ann Arbour was the biological assay of drugs. Cushny was the first to suggest making use of animals to test the relative activity of different preparations of the same drug (particularly digitalis). Cushny accepted that experimentation on animals was not acceptable to all. In London, with the support of the Medical Research Club (later the Medical Research Society), public meeting with anti-vivisectionists were organised. This was to explain that unnecessary suffering was voided. Indeed, animals themselves were saved as Cushny’s research on rats showed that the eating of senecio (ragwort) weed (by cattle in Africa) was the cause of the “cattle-madness”. Before this, many herds were slaughtered as it was thought to be an infectious disease.

During the 1914-1918 war Cushny was able to help by advising on the effects of poison gases; in 1916 his presidential address to the British Association was on the analysis of living matter through its reactions to poisons.

When in Edinburgh he took up again his early work (1904) on optical isomers, turning his attention to adrenaline and the cocaine series. Here a quotation from his address to the inaugural session of the North British Pharmaceutical Society in 1919 would be appropriate. “...when we find an optically active substance on earth we may know that it arose through the agency of life. The petroleum we burn for example, must have arisen from living tissues as it is optically active.....more factors are involved than generally recognized and that very slight changes in chemical structure may alter enormously the reaction between them”

Papers (numbers in brackets refer to the number of publications on that subject)

Journal of Physiology, 1897-1921: fibrillation and action of digitalis in heart (2), diuresis (6), optical isomers (4), movements of the uterus (1), exhalation of drugs by the lungs (1), action of atropine (1),

American Journal of Medical Sciences 1891: electrical stimulation of heart etc., (3),
Journal of Experimental Medicine 1897: action of digitalis

Pflügers Archiv, 1899: contraction of the mammalian heart (3)

Journal of the American Medical Association 1903: pharmacological action of drugs

J Pharmacol Experimental Therapeutics 1911: senecio alkaloids; 1920 optical isomers
v. the thropeines.

Philosophical Transactions of the Royal Society of London, 1916: cobra venom

Proc Royal Society of Medicine 1908: nutmeg poisoning; 1909 tissue antiseptics with
reference to animal infections

Books

Textbook of Pharmacology & Therapeutics, 1899 (8 editions by 1926)

On the Pharmacology of the Respiratory Centre, 1915

The Secretion of Urine, 1917

The therapeutics of Digitalis and its Allies, 1910

Degrees & Awards

1886 Master of Arts Aberdeen, 1889 Bachelor of Medicine and Master of Surgery
Aberdeen, 1896 elected to the Association of American Physicians, 1904 elected
member of Society for Experimental Biology & Medicine of New York, 1906
member of the Pharmacy Committee of the British Medical Association and member
of the Medical Research Club, 1907 elected Fellow of the Royal Society, 1908
member of the Royal Commission on Whisky and other Potable Spirits, 1909
President of the Therapeutic Section of the Royal Society of Medicine, Vice-President
of the International Congress of Applied Chemistry, member of the Physiology
Section of the British Medical Association, 1910 President of Pharmacology &
Therapeutics of the British Medical Association, 1911 Honorary LL.D (Doctor of
Laws) Aberdeen, 1914 nomination for Fellowship of the Royal College of Physicians
(which he declined), 1915 War Physiological Committee, Poison Gas Committee at
the War Office.

Chairs

1893-1905 Pharmacology, University of Michigan, Ann Arbor, USA

1905-1918 Materia Medica & Pharmacology, University College, London

1918-1926 Therapeutics, University of Edinburgh, Scotland

Acknowledgments

For this article I am indebted to several articles including;

Helen MacGillivray “*A Personal Biography of Arthur Robertson Cushny, 1886-1926*” *Ann Rev Pharmacol* 1968;8;1-24

JJ Abel “*Arthur Robertson Cushny and Pharmacology*” *Science* 63:507-515

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