Professor Alexander Killen Macbeth

Angas Professor of Chemistry, 1928 - 1954

As a result of the sudden death of Professor Rennie in 1927, Alexander Killen Macbeth, at the age of 38, was appointed as the second Angas Professor of Chemistry in 1928. He was an Irishman with B.A., B.Sc., M.A. and D.Sc. from Queen's University, Belfast, specialising in organic chemistry. Before coming to Adelaide, he had served as a Lecturer and acting Professor at Belfast University, Senior Lecturer at St Andrews University and Reader in Chemistry at the University of Durham. As the professor of chemistry at Adelaide, Professor Macbeth was actively involved in teaching, research and university, commercial and public affairs.

On arrival in Adelaide, Macbeth faced a Chemistry Department which was in need of re-invigoration and lacking in adequate accommodation and laboratories. An endowment from the Trustees of the Johnson Estate in 1929 followed by a Commonwealth grant in 1932 allowed the Johnson Chemical Laboratories, with which Macbeth was heavily involved in planning, to be built and occupied at the beginning of 1933.

For the teaching of organic chemistry, he revised and published in 1930 the 2nd edition of his textbook entitled "Organic Chemistry for Medical, Intermediate Science and Pharmaceutical Students". The 1st edition, in Spanish as well as in English, was published in 1920. A 3rd edition of the book was published in 1952.

As indicated by his book, Macbeth was very interested in education in pharmacy. In 1932, he was instrumental in the establishment of a four-year course leading to a Diploma in Pharmacy. A Board of Studies to administer the course was set up and Macbeth was its Foundation Chairman. For research, Macbeth initially continued a study commenced in the United Kingdom of the reactivity of halogen atoms in certain organic compounds (his "induced alternate polarity theory" was later disproved). He soon , became involved in studies initiated by his predecessor, Professor Rennie, on natural product chemistry of local interest such as the colouring matter of the Drosera plant (*Drosera Whittakeri*) and the terpenes in eucalyptus oil from Kangaroo Island (produced commercially by A.M Bickford and Son). An interest in the application of ultraviolet spectroscopy in organic chemistry which began with A.W.Stewart in Belfast was developed; indeed in his Obituary in the Proceedings of the Chemical Society (1958 (April), 121), it was stated that "His earliest investigations with A.W.Stewart on the ultraviolet absorption of unsaturated compounds led him to recognize the diagnostic value of the technique and he must have been one of the pioneers in the application of ultraviolet absorption spectroscopy in organic chemical problems".

The advent of World War II caused Macbeth to restrict basic research and concentrate on applied research related to the war effort. His interest in pharmacy and the need at the time for Australia to reduce its dependency on overseas products led him to be heavily involved in setting up a pharmaceutical industry in Adelaide with the establishment of Beckers Pty Ltd. The company, for which Macbeth was a professional consultant, produced analgesics such as aspirin, phenacetin and caffeine. A mixture of these three compounds, in tablet or powder form became well known as the headache powder "Bex", which was widely used in Australia until the middle 1970s. During the War, there was a great need by the armed forces for anti-malarial drugs as well as anti-bacterial agents belonging to the group of sulfa drugs. A pilot plant for the production of some of them was set up in the Johnson Chemical Laboratories. Three research assistants (J.A. Mills, N.V. Riggs and H.J. Rodda) and Macbeth worked day-and-night to manufacture drugs. One of the most successful of the drugs was sulfamerazine whose synthesis was devised by Macbeth and whose manufacture

on a large scale was taken over, with Macbeth as a consultant, by Imperial Chemical Industries of Australia and New Zealand in Melbourne. During the War, Macbeth acted as Scientific Liaison Officer for the Commonwealth Supplies and Equipment Control Committee.

At the end of the war. Macbeth oversaw vast changes in the Department of Chemistry. In a relatively short time, there were large increases in the number of students, and significant increases in funds for research and for research personnel. As well, there were retirements of staff and the appointment of new staff of exceptional merit; one of these was G.M. Badger who introduced new areas of research leading to a surge in publications. The need for additional accommodation and laboratories was in part overcome with an extension to the Johnson Memorial Laboratories. The Council of the University determined that, on Macbeth's retirement at the end of 1954, the Department would be split into two with Professor D.O. Jordan (appointed as Macbeth's successor to the Angas Chair of Chemistry in mid–1954) to head the Department of Physical and Inorganic Chemistry and G.M. Badger, Reader, appointed to Professor, heading the Department of Organic Chemistry.

Professor Macbeth's activities were not restricted to Chemistry. Within the University, he was a member of the University Council for twelve years (1943 - 1955) and played a leading role in getting increased funding for postgraduate students and research. As well, he continued his Chairmanship of the University's Board of Studies in Pharmacy for twenty one years and was Dean of the Faculty of Science in 1930 and 1931 and again in 1942 and 1943. Outside of the University, he was a key member of the South Australian Food and Drug Board which dealt with the control of dangerous drugs and poisons. Indeed, he was a prominent adviser to the Government when the Dangerous Drug Act was passed in 1934. For twenty nine years, he was a member, including being Chairman for seven years, of the Council of The Presbyterian Girls' College (now Seymour College).

As a scientist, Macbeth published more than one hundred research papers in various journals, as well as the three editions of the above-mentioned textbook. Professor Macbeth's achievements were acknowledged in a number of ways. He was the inaugural Liversidge Lecturer (1930) at the University of Sydney and was made a Fellow of the Australian Academy of Science in 1955, a year after its inauguration. A lecture theatre in the G.M. Badger Laboratories is named after him. In the Imperial Honours for 1946, he was made a Companion of the Order of St Michael and St George (C.M.G.).On retirement in 1954, Macbeth was made Emeritus Professor. He died, aged 67, in Adelaide in 1957.

Most of the above material was obtained from two histories which were written to celebrate the centenary in 1985 of teaching and research in the Discipline of Chemistry in the University of Adelaide. The histories are: *Discoveries by Chemists*, by Rupert J Best, Hyde Park Press (1987), and *Chemistry in the University of Adelaide 1876 – 1980*, by V A Edgeloe, 1987. Both are in the Barr Smith Library. Ms Helen Bruce, University Archivist, is gratefully acknowledged for providing the information about Professor Macbeth being Dean of Science.

George Gream (2012)

NOTE: INCLUDE PHOTOGRAPH OF MACBETH