

OBITUARIES

D.H. Davies, B.Sc., Ph.D., a biographical sketch

Donald H. Davies was born in Ottawa in 1938, an only son. After graduating with an honours B.Sc. from Carleton University, he went to England where he completed his Ph.D. in experimental physical chemistry at the University of Bristol. Dr. D.H. Davies joined the Chemistry Department at Dalhousie in 1965. He moved to the Chemistry Department at Saint Mary's University four years later, and he remained there until he retired in 1994. Dr. Davies served on a number of sports administering bodies since the early 70's: he was president of the Shooting Federation of N.S. and past president of Sport Nova Scotia. As director of the Shooting Federation of Canada, he arranged the shooting events for the Pan American Wheel Chair Games held in Halifax. He served as Executive Vice-President of the Sports Federation of Canada. Don took a keen interest in equestrian activities and rode his own horse, Krios, for many years. He died suddenly on May 29, 2000. He is survived by his wife, Sherill, son, Cedric, and daughter, Eleanor Allison.

Don had a very sharp mind and an infectious twinkle in his eye. This occurred especially when, in an argument or debate, he bettered his opponent, which he usually did. He set high standards for students, and did his best to encourage them to rise to the challenge.

Don Davies had been a major contributor to chemical affairs in Halifax for some thirty years. This began with his working for the annual national meeting of the Chemical Institute of Canada (C.I.C.) with some 1200 chemists in Halifax in 1971. He was elected a Fellow of the C.I.C. in 1978 and was a member of the Executive of the Atlantic Section for many years.

He was a founding member in 1978 of Nova Chem Ltd., later renamed Chitogenics Ltd. It has become North America's leading developer of carboxymethyl derivatives of polyglucosamine. These compounds readily form films, sponges, foams, beads, gels and viscoelastic solutions. Many practical applications are derived therefrom. More information can be found from the company's web side, www.chitogenics.ns.ca.

Don Davies joined the Nova Scotian Institute of Science in the 1970's, and he was a member of the NSIS Council from 1980 until 2000. He was the NSIS Treasurer from 1988 until he died. Under his auspices the total liabilities and financial net worth of the NSIS over the past nine years has increased by 55%! The growing finances of our Institute were achieved primarily by our dedicated and knowledgeable Treasurer, Donald H. Davies, even though our membership has declined over that period.

Don Davies was a strong source of common sense. For example, the By-Laws of the Nova Scotian Institute of Science had not been revised since 1981. Don Davies urged the Council to have the By-Laws revised, and he made several specific, sensible suggestions. New NSIS By-Laws were accepted unanimously in our May 1, 2000 Annual General Meeting.

All of us who know Don Davies, including members of the past as well as the present NSIS Councils were shocked by his sudden death and saddened by our loss of him. Let us remember what he did for us as well as his family and other parts of the community.

H.S. Heaps, D. Eng., L.L.D.; a biographical sketch

Dr. Stanley Heaps, distinguished computing scientist and applied mathematician, died peacefully at home in Halifax on 12 June 1999, after a short illness. Members of the Nova Scotian Institute of Science will remember him as one of our Institute's most loyal and active members for many years. Stan joined the Institute in 1951. From 1954 to 1967 he served on the Council, Recording Secretary 1955-1960 and Editor of the Proceedings of NSIS from 1957 to 1964. On leaving Halifax for the University of Alberta in 1967, he was made an Honorary Life Member of the NSIS. On Stan Heaps' return to Halifax in 1979, he again became an active member of the Institute, serving as NSIS Vice President 1996-97, President 1997-98 and Past President 1998-99. We shall miss him very much.

Stanley Heaps was born in Stockport, England in 1926. He obtained a B.Sc. in Applied Mathematics at the University of Manchester in 1947. He then moved to Canada where he was a Lecturer in Mathematics at Dalhousie University for two years. (I took a full year course from Stan each year and found him a very good teacher). He spent the next two years as a Teaching Fellow at the University of Toronto, where he obtained his M.A. Mathematics. In the 1949 and 1950 summers he worked at the National Research Council Laboratory in Ottawa on chemical physics with the famous Gerhard Herzberg, Nobel Laureate. H.S. Heaps' first published paper was coauthored with Dr. Herzberg.

Stanley Heaps returned to Halifax in 1951 as a full-time faculty member in the Nova Scotia Technical College (later TUNS and now DalTech). He was responsible for the establishment of the Department of Engineering Mathematics. He stayed at NSTC for fifteen years. In succession he was Assistant Professor, Associate Professor, Professor and Head of the Department of Engineering Mathematics. During this period, 1952-67, Stan was a mathematical consultant at the Naval Research Establishment (now DREA) in Dartmouth.

In 1966-67, as a result of plans to develop a co-operative computing science teaching facility and centre for most of the Nova Scotia universities, Stan was interim Director of the Computer Centre and Professor of Mathematics at Dalhousie. This facility did not materialize, and Stan left for the University of Alberta. Stan and his wife, Doreen (Alley) Heaps, were faculty members of that University for the period 1967-72. Stan was Professor and Assistant Chairman in the Department of Computing Science. There Stan helped establish a graduate program leading to a Ph.D. in Computing Science, and he supervised nine graduate students. He was active in the Edmonton Chapter of CIPS, being President 1971-72.

In 1972 Stan was invited to Sir George Williams University in Montreal. Shortly afterwards it amalgamated with Loyola College to become Concordia University. There Professor Heaps developed the School of Computer Science in the renamed Faculty of Engineering and Computer Science. By the time he left in 1979 that Department had grown to a faculty of 24 and some 60 graduate students.

Stan (with Doreen) returned to Halifax in 1979 to be Professor and Head of the Department of Applied Mathematics at TUNS as a step in the development of a school of computer science. He became the founding Director of TUNS School of Computer Science, 1982-87. This School grew rapidly and is now the Faculty of Computer Science at DalTech. In the year following his retirement as Director, Dr. H. Stanley Heaps served as Acting Vice President of Research at TUNS, 1987-88.

As he had earlier supported NSIS, on his return to Halifax Stan supported all community activities related to computing science, both technically and socially. These activities included the Canadian Information Processing Society, Bluenose Chapter (Chairman of a Scholarship Committee - the computing science scholarship now carries his name), the Macintosh Users' Group of Nova Scotia or MUGNS (Secretary), and the Chebucto Community Net. Stan developed web pages and maintained accessible lists such as a list of scientific equipment for the Institute.

During his career H.S. Heaps published 67 research papers in a variety of areas including molecular physics, acoustics, applied mathematics, computer science, electrical engineering, mechanical engineering and information science. He also published two books. A scientist from another field can obtain some sense of the importance, several years later, of a published paper by looking up the number of citations of the paper as listed in Science Citation Index. By this criterion, H.S. Heaps published the following well cited articles:

H.S. Heaps and G. Herzberg, *Z. Phys.* **133**, 48 (1953). Intensity distribution in the rotation-vibration spectrum of the OH molecule.

H.S. Heaps, *J. Acoust. Soc. Am.* **34**, 355 (1962). Waveform of finite amplitude derived from equations of hydrodynamics.

H.S. Heaps and R.V. Wells, *Can. J. Chem. Engin.* **43**, 319 (1995). The effect of noise on process optimization.

H.S. Heaps and L.H. Thiel, *Inform. Storage and Retrieval* **6**, 137 (1970). Optimum procedures for economic information and retrieval.

L.H. Thiel and H.S. Heaps, *Inform. Stor. Retrieval*, **8**, 1 (1972). Program design for retrospective searches on large data bases.

E.J. Schuegraf and H.S. Heaps, *Can. J. Operational Res. Inform. Processing* **10**, 47 (1973). Storage analysis of a compression coding for document data bases.

E.J. Schuegraf and H.S. Heaps, *Inform. Stor. Retrieval*, **11**, 309 (1974). A comparison of algorithms for data base compression.

Also popular is the second book published by H.S. Heaps, *Information Retrieval: Computational and Theoretical Aspects*, (Academic Press, New York, 1978). The book is intended for undergraduate computer science students, librarians and information officers.

H. Stanley Heaps received a number of important academic honours. He was a Charter ISP member and an Honorary Life Member of the Canadian Information Processing Society, an Honorary Life Member of the NSIS and a Fellow of the Acoustical Society of America, and he had the distinction of receiving two honorary degrees. In 1987 St. Francis Xavier University conferred upon him the degree of Doctor of Laws, *Honoris Causa*. In 1993 the Technical University of Nova Scotia conferred on him the degree of Doctor of Engineering, *Honoris Causa*. An endowment fund in his name has been established by St. Francis Xavier University.

I believe that all NSIS members who knew Stan well appreciated him as a fine person and someone who worked hard and successfully for the Institute. He was witty, clever and determined to get things done. He was a very good teacher of computing science and of applied mathematics. He was an excellent computer programmer and a first rate researcher. Let us remember him with great respect and affection.

Donald D. Betts, NSIS President, 1999-2000.

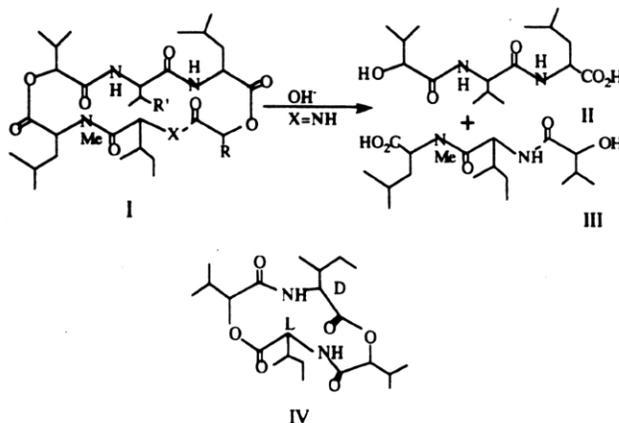
Several friends and colleagues helped me to write the above sketch. Mrs. Doreen Heaps, Stan's sailing companion and loving wife for many years, was particularly helpful and I thank her very much.

D.W. Russell

Dr. Douglas William Russell (Treasurer, 1967-1970) who died in June 1999 was born on 19th September 1926 at London, England. He was educated at Colchester Grammar School in Essex, and after working as an apprentice pharmacist, went up to read pharmacy and pharmacognosy at the Pharmacy School at Chelsea Polytechnic where he graduated with first class honours in 1949. Following National Service in the Royal Air Force, he pursued a Ph.D. degree with Mathieson in the Department of Pharmacy, London University. He then took a temporary post with Elliot in the Medical Research Council's laboratories in Mill Hill and there he was introduced to the difficulties and attractions of α -amino acid and peptide chemistry.

In 1958 he applied for and was awarded a facial eczema research fellowship tenable in New Zealand and was fortunate to be exposed to the experimental skills and rigor of R.L.M. Syngé. Facial eczema is a condition of young ruminants, prevalent in the North Island of New Zealand that is responsible for major losses of production of high quality edible protein. The condition occurs mainly in the fall and at the time of Russell's appointment was thought to be due to changes in the nutritional quality of herbage especially of perennial rye-grass (*Lolium perenne*). However, the painstaking and brilliant work of E.P. White had shown that it was possible to isolate from pastures where the disease occurred compounds that were not normally found in vascular plants, but were related to known fungal metabolites. These materials had little ovine toxicity but were a reliable indication of herbage, that when consumed led to facial eczema. It was therefore important to investigate these materials and Russell undertook this work.

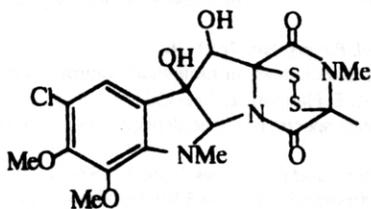
He was able to isolate the major component of the mixture, sporidesmolide I (I, $X=NH$, $R=C_3H_7$, $R'=Me$), by fractional crystallization and to determine its structure by showing it to be readily converted by mild alkaline hydrolysis into two sporidesmolic acids (II & III), easily separable, crystalline and accounting for all the carbon and nitrogen atoms in sporidesmolide I. His proposal was confirmed independently by mass spectroscopy (Macdonald et al., 1964) and by synthesis (Shemyakin et al., 1963) and thus became the first depsipeptide (a term coined by Shemyakin to describe compounds built of α -hydroxy- and α -amino acids linked together by amide and ester bonds) whose structure was rigorously proven.



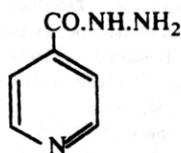
This result had novel biological implications. Russell had shown that the depsipeptide material was found only in cultures of *Pithomyces chartarum* that sporulated. This observation was enhanced by the demonstration (Bertaud et al., 1965) that electron diffraction patterns could be obtained by irradiating spores (caught in spore traps) with electron beams. These diffraction patterns were identical to those obtained by irradiation of sporidesmolides. In addition, single spores introduced into the source of a mass spectrometer (Macdonald et al., 1964) gave mass spectra identical to those of the sporidesmolides. Thus the long-standing question of whether "secondary metabolites" were a mere artifact of the culture of microorganisms, or whether they were an intrinsic manifestation of their growth and reproduction was settled.

A second and perhaps more important influence of this work was that the demonstrated, crystalline spore coat of depsipeptides contributed a massive concentration barrier between the spore and encroaching pathogens. Clearly the concentration at which these depsipeptide metabolites inhibit growth *in vitro* is irrelevant to their role in nature. This phenomenon is only now, 30 years later, becoming appreciated in the context of the growing interest of using biocontrol mechanisms (Hjeljord and Tronsmo, 1998) in horticulture.

In 1962, Russell was offered a post at the Twyford Laboratories in London where he used his proximity to The Commonwealth Mycological Institute and M.B. Ellis to pursue the possible taxonomic implications of the New Zealand discoveries. Ellis (1960) had revised the taxonomy of some of the Dictyosporus group of the Hyphomycetes and had several viable specimens of organisms he had placed in the genus *Pithomyces*. Russell examined all of these and found that all had crystalline spore coats that were depsipeptides. Further, the depsipeptides of Ellis's assigned species differed in each species thus substantiating their classifications. These bald sentences conceal a great deal of chemistry, for each species produced a mixture of depsipeptides, difficult to separate and characterize. This work was in full swing when Russell decided to leave London and accept an associate professorship in the Biochemistry Department at Dalhousie University. He made full use of the laudable custom in the Department of a year free of teaching responsibilities and produced six papers that year, including a review of depsipeptide chemistry that was and is a landmark in the field. During the following years, indeed until 1990, he collaborated with colleagues and trained several summer and post-graduate students. The results of this work were the determination of the structures of sporidesmolide II, sporidesmolide IV, (I, X=NH, R=C₄H₉, R'=Me), sporidesmolide V, pimaydolide (I, X=O, R=C₄H₉, R'=Me) and angolide (IV). These taxonomic studies had unexpected practical value in the late 1980's when Russell and his colleagues showed that the populations of *Pithomyces chartarum* in the Americas differed from those in Australia, New Zealand and South Africa because they always produced sporidesmolides but did not usually produce toxic sporidesmins (e.g. V).



V



VI

This was also the first chemo-taxonomic study based on a solid biochemical foundation.

In these years he also contributed to our knowledge of the anti-tubercular drug isoniazid (VI). He developed a simple method for measuring the concentration of this drug in urine, and proved its reliability under difficult conditions in a remote region of Ethiopia. He showed that the act of acetylation and subsequent excretion of isoniazid was very different in individuals of different ethnicity. Knowledge of the pharmacology of isoniazid is of increasing importance as the scourge of tuberculosis, once again, is increasing (Rouhi, 1999).

After a few years at Dalhousie, formal teaching in lectures, tutorials and laboratories gradually assumed a larger role in Russell's life at the University. At one time or another, he participated in teaching biochemistry to students in all of the health professional streams - medicine, dentistry and pharmacy, as well as undergraduate students in the Faculty of Science. His outlook was, as in his research, rigorous: to keep the discussion simple if possible, but never to fudge the facts. He was a chemist first, a biologist second; to him thermodynamics was fundamental and he refused resolutely to dilute his approach. In comprehensive oral examinations of graduate and senior undergraduate students he was fond of asking "How can you establish the structure of a newly-discovered substance?" The answer he wanted was "Show that its properties match those of a compound that has been synthesized by an unambiguous route". To him, the current phrase "isolating a gene" glosses over the undeniable fact that the gene in question is never characterized chemically, and is usually inserted into a convenient vector.

Russell's teaching career took an unusual turn in the late 1970's, when he decided that he wanted to do something to improve the teaching of science in high schools. He did this in a characteristically thorough way by enrolling in the Department of Education and obtaining a Bachelor of Education degree and a Teaching Certificate. Subsequently he served for five years as the co-ordinator for secondary science in the Dalhousie Department of Education, and science teachers throughout the Province have benefitted as a result of his efforts and enthusiasm. Russell was also alive to the changes in medical education now sweeping Medical and Pharmacy schools. He adapted willingly and skilfully to the idea that he must refrain from providing answers, but instead must facilitate the student's struggle to understand illustrative cases (many of which he helped to develop). Russell continued to work to improve his teaching until he died, leaving useful notes describing his ideas for modifications to be made in the coming year.

We are all the poorer that he will not be with us to encourage us with his enthusiasm, his friendship and his knowledge; we extend our deepest sympathy to his family.

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