

EARLY DISCOVERERS
XXX
EARLY ICE EXPERIMENTS AT DAVOS
J. C. McCONNEL (1860–1890)

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ONE OF the treasures of the Cambridge University Library is a collection of papers of Lord Rutherford, transferred to its safe keeping from the Cavendish Laboratory. The papers are listed in a carefully prepared manuscript catalogue, available for consultation in the Anderson (rare book) Room. Examining this in a (vain) search for a report on some early work in Montreal while the young Rutherford was on the staff of McGill University, I noticed at the end a somewhat unusual item. Being privileged by the Library authorities to examine this, I found it to be a small (140 mm by 190 mm) notebook of J. C. McConnell.

Containing about eighty pages of very small but firm and clear handwriting, it was obviously McConnell's working notebook. The first few pages deal with a study of the conductivity of slag wool and cotton wool but the remaining contents are all concerned with experiments on snow and ice, chiefly the latter. It was somewhat difficult to follow the exact chronology of the entries but it eventually became clear that most of the notes were written in Switzerland.

On 13 March, for example, apparently in the year 1888, McConnell drove up to the Morteratsch Restaurant and thence went up to the "Morainless Glacier", there drilling a hole 1.6 m deep for taking temperature measurements. Later that month, he left boxes, in his name, at the "*Magasin of Kuln*" and lists some experiments that he hoped to try "next winter". These included placing a bar of columnar ice between two supports in order to see the effect of loading on the columnar structure.

Reference is made to a visit to England in June 1888 but then the record of experimental results is resumed, apparently in the winter of 1888–89. He found that "bath ice might all be columnar". He records that "yesterday I made a curious discovery. I found that the irregular vertical columns in the lake ice are separate crystals with the axes arranged at random generally nearly horizontal". Elsewhere, he discusses the difference between "bath ice" (presumably made in his hotel rooms) and glacier ice, describing the shaping of a specimen of glacier ice near a stove.

When this interesting find was described to Dr L. W. Gold, in view of his own work on the properties of ice, he recognized the experiments as some of those described by McConnell in a paper presented to the Royal Society of London on 12 March 1891 (McConnell, 1891). This paper was communicated by R. T. (later Sir Richard) Glazebrook, with the advice that "Mr. McConnell died suddenly at Davos while engaged on the foregoing paper" so that the paper was "printed from his rough copy with some alterations of no great importance".

The fourteen different experiments described in this paper were carried out, in the main, in a north-facing room of the Buol Hotel at Davos, an interesting precursor of the notable experimental work of today at the Eidg. Institut für Schnee- und Lawinenforschung on the Weisfluhjoch. Some of the experiments described in the paper can readily be recognised from the preliminary ideas sketched in the notebook. The paper followed an earlier one by McConnell and Kidd, who is mentioned in the notebook ("Kidd having gone to Malogi I took some readings") (McConnell and Kidd, 1888). McConnell also refers to a much earlier paper by Professor James Thomson (1849).

Some information on McConnell's life has been obtained by Professor E. R. Pounder of McGill University, whom I consulted in case McConnell had been connected with McGill, and from Dr J. W. Glen of University of Birmingham, himself formerly a Fellow of Clare College. He was born in Lancashire in 1860. He won a Foundation Scholarship to Clare College, Cambridge in 1879, and read mathematics. He was tenth wrangler in 1882 (i.e. tenth in order of merit of those achieving first class honours in Parts I and II of the Mathematical Tripos) and he took Part III of the Tripos and obtained the degree of B.A. in 1883. In 1884 he was appointed assistant demonstrator in experimental physics, a post he held for one year. During this period he gave three or four papers on general physics subjects to the Cambridge Philosophical Society, of which he was elected a Fellow in 1885. He took his M.A. degree in 1886 and was elected a Fellow of Clare College in 1888. In that year he returned to Manchester to take up a post in a family business, but almost immediately he was forced by illness to leave for Switzerland. Here his natural scientific curiosity led him to undertake his studies of snow and ice but this new interest was terminated by his death on 4 June 1890.

His achievements before he had reached the age of 30 make clear that a potentially great scientist was lost through his early death. How his notebook came to be in Rutherford's papers is something of a mystery. McConnell's connection with the Cavendish Laboratory was in 1884-85, the first year of Professor J. J. Thomson's tenure of the Cavendish chair. Thomson was very young on appointment (only four years senior to McConnell) and it seems likely that Thomson, also a mathematician, may have been responsible for getting McConnell this post. After McConnell's early death, his papers might have been returned to the Cavendish Laboratory, and have remained there into the time when Rutherford had succeeded Thomson in the Cavendish chair, and then somehow have got incorporated into his papers.

I am indebted to Professor Pounder and Dr J. W. Glen for so kindly obtaining the information on McConnell's life, and to Dr L. W. Gold for advising me of the Royal Society papers. This minor example of the pleasures of serendipity resulted from brief truancy at the annual meeting of the International Glaciological Society at Cambridge in April 1972.

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