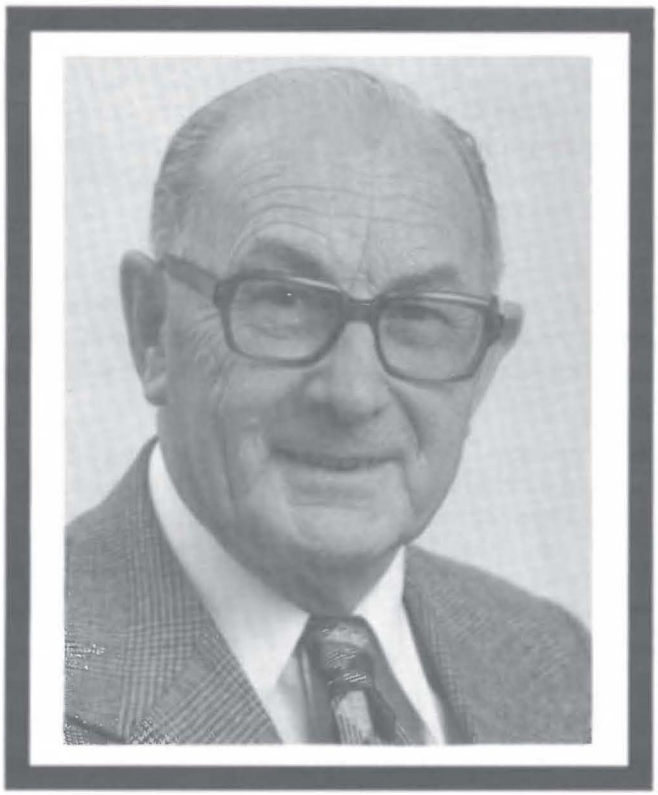
[RADIOCARBON, VOL. 38, NO. 2, 1996, P. v–vii]



ATHOL RAFTER, 1913–1996

One of the pioneers of radiocarbon, Thomas Athol Rafter died peacefully on 26 September 1996, at the age of 83.

Athol Rafter was born in Wellington, New Zealand, on 5 March 1913. He grew up in Wellington, attended school there (St. Patrick's College), and graduated from Victoria University of Wellington, then a College of the University of New Zealand, in 1938. Athol first attracted attention while at secondary school, not so much for his academic achievements as for his abilities as a middle distance athlete. In his early career, he worked as a schoolteacher, and in 1940 he was appointed to the staff of the Dominion Laboratory of the New Zealand Department of Scientific and Industrial Research (DSIR). At the end of World War II, Athol was one of a small group of scientists selected to investigate the possibilities opened up by the new field of nuclear science. As a chemist, Athol learned the techniques necessary for handling and using radioactive isotopes. Gordon Fergusson designed and constructed instruments for monitoring background radioactivity, and was joined by Graham McCallum. Others, particularly Bill McCabe, assisted Athol in such projects as using labeled ^{32}P for studying the action of superphosphate as a soil fertilizer. This isotope was also investigated as a therapeutic tool for cancer treatment.

According to Athol's own account, it was the head of the DSIR, F. R. Callaghan, who asked him, in 1950, if he would look into a new method of measuring the ages of volcanic ash showers using radioactive carbon, "to stop the geologists arguing". Accordingly, Athol assembled a small team

https://doi.org/10.1017/S0033822200017525 Published online by Cambridge University Press

comprising himself, Alex Wilson and Bill McCabe to work on the chemistry side, while Fergusson, McCallum and Fred Knox developed a suitable counting system. These initial attempts basically copied Libby's original method of using a solid carbon counter, and Athol corresponded with Libby on the best method of depositing a thin carbon layer on the inner copper surface. However, the New Zealand team soon encountered problems with this approach. One of the problems was that the chemical preparation laboratory was in Wellington, but the counting laboratory was in Lower Hutt, about 18 km away, and it was necessary to carry the counter with its delicate carbon layer by car along a road that bore little resemblance to the highway of today. All too often, the carbon had been shaken off the counter surface by the time it reached the Lower Hutt laboratory. It was at the end of such a trip that Bill McCabe recalls Athol remarking that there had to be a better way to do this! Other problems involved the difficulties of keeping the carbon free of radioactive contaminants introduced during the carbon reduction stage, and so attention shifted to developing a counter using CO_2 as the counter gas.

At this time, Hessel de Vries and G. W. Barendson were also working on a CO_2 counter, but their system was successful only for small volumes of gas. Athol and his team were in contact with de Vries, and they realized that the purity of the CO_2 was of paramount importance. By concentrating their efforts as much on the quality of the counting gas as on the configuration of the counter itself, they finally succeeded in producing a 7.7-liter counter system that could measure ages to a precision of better than ± 50 yr, a major achievement for the time.

With the radiocarbon laboratory now fully established at Lower Hutt, Athol turned his attention to monitoring natural ^{14}C levels in the environment. Regular sampling programs to measure ^{14}C in the atmosphere and the southern ocean were begun. This work began sufficiently early (in fact just in time) to establish a baseline of atmospheric ^{14}C before nuclear weapons testing changed the picture entirely. Athol reported the first measurements of environmental radiocarbon produced by nuclear weapons testing in 1957, but this was not just a lucky observation. He had signaled his intentions in his previous 1955 paper on ^{14}C variations in nature, the last sentence of which reads, "Samples for ^{14}C activity of the atmosphere are being constantly taken to study any trends with seasons or possible enrichment of the atmosphere in ^{14}C from atomic explosions that may not as yet have reached this part of the Earth's atmosphere."

This account of Athol Rafter's career has concentrated entirely on his work with ^{14}C, and does not cover his achievements in isotope geochemistry or his later connections with teaching. But I think it is important to finish with a view of him as man and a leader. Athol was in many respects a plain man, with a plain man's propensity to go straight to what is important, unhampered by a veneer of sophistication or undue intellectualizing. For him there was no conflict between being an eminent scientist and having a devoutly religious view of life. His postwar work culminated in his being appointed foundation Director of the Institute of Nuclear Sciences, a position he held until his retirement in 1978. In this role, his leadership was clear and firm, without in any way conforming to the stereotype of the autocratic director. He always maintained an easy relationship with his staff, and seemed to see them as part of his extended family. In the early days of the Institute, a tradition grew of Athol entertaining the entire staff at his home on the last day before the Christmas shutdown. One year, in a return gesture, the staff presented him with a glass candleholder shaped in the form of a hydrogen atom, complete with nucleus and orbiting electron. The following year it seemed appropriate to repeat the gesture, this time with a representation of a helium atom. Once the pattern was established, year by year, the candle progressed inexorably through the periodic table, to the growing despair of the Institute glassblower. Spontaneous fission set in at $Z = 5$, and the custom was reluctantly abandoned.

https://doi.org/10.1017/S0033822200017525 Published online by Cambridge University Press

The leadership Athol gave spread beyond Lower Hutt. Alex Wilson (now at The University of Arizona) went on to become professor of chemistry at Waikato University, where he set up the ^{14}C laboratory now ably managed by Alan Hogg. Henry Polach left the Institute of Nuclear Sciences to establish the radiocarbon laboratory at the Australian National University. Athol retired before the full impact of accelerator mass spectrometry was felt in the ^{14}C world. But even in retirement, he took a lively interest in this new way of doing things, although, to be honest, accelerators were always a bit of a mystery to him. No matter. All of us who knew him and worked with him will recall the universal greeting he had when he passed by in the corridors, whether to junior technician or senior scientist: "How's it going?"

Rodger Sparks

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