Some remarks about Rutherford

I read with interest Melinda Baldwin's article on Ernest Rutherford's publication strategies in relation to the journal *Nature* (PHYSICS TODAY, May 2021, page 26). She provides an excellent description of how, being in close competition with Pierre Curie and Marie Curie in France, Rutherford was conscious that working in Montreal put him—as he wrote in a letter to Otto Hahn on 6 January 1907—"on the periphery of the circle" and made it difficult to publish rapidly in Europe.

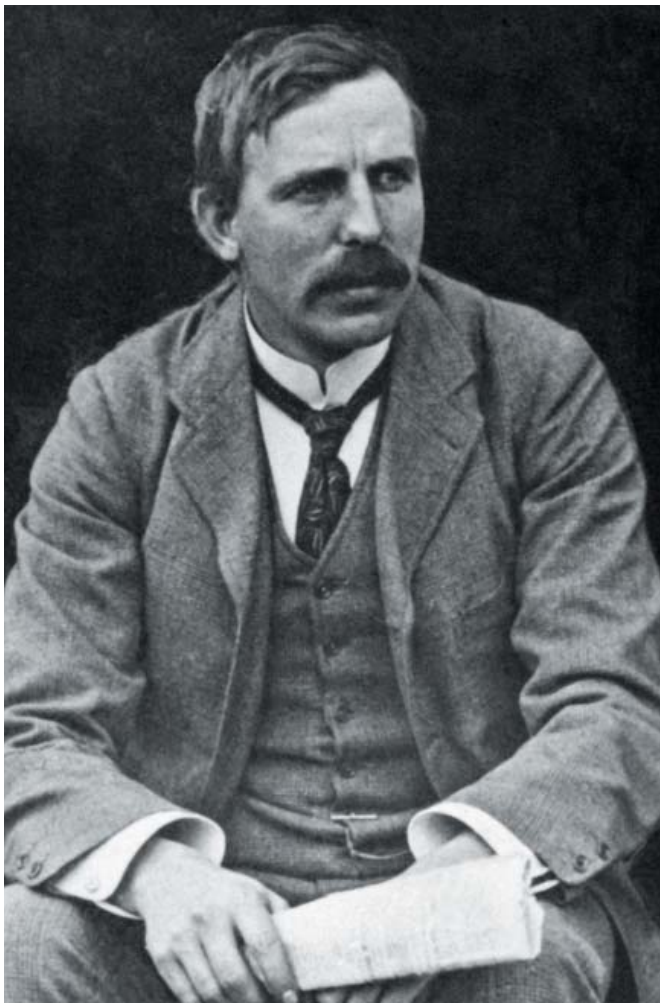
But there is more to the story. The discoveries of Rutherford and his colleague John McLennan, who was then also working on radioactivity at the University of Toronto, may have had a part in the creation of a means of rapid publication for the Royal Society of Canada (RSC).

Rutherford was elected a member of the RSC in 1900, and at the June 1904 meeting he was elected president of the RSC's section 3, devoted to mathematical, physical, and chemical sciences. As a section officer, Rutherford was a member of the RSC Council. In its annual report presented during the May 1905 general meeting, the RSC Council raised a problem related to the publication of the society's *Transactions*. The members pointed out that it was difficult to quickly publish a volume containing pieces from very different disciplines. In addition to Rutherford's section, the RSC also had members in the fields of biology and geology (section 4) and the humanities (sections 1 and 2). Though delays did not bother those in the humanities, it sometimes created problems for scientists.

The report insisted that "delay in the announcement of a scientific discovery may be very serious to original investigators, and, therefore, papers embodying important original results will not be sent to our volume of Transactions for publication" (reference 1, page II). Referring implicitly to Rutherford and McLennan's work on radioactivity, the report added the following:

> The revolution in scientific thought now in progress is fundamental, and some of our members are in the van of the movement. Conceptions of the constitution of matter which have been held for ages are now yielding to theories radically different, and laws established, even in recent times, are being profoundly affected. Under such conditions, and they have arisen very suddenly and recently, it might be well to inquire whether it would not be advisable to meet the emergency by issuing a bulletin. . . . In this way priority of discovery can be secured, and separate papers might be issued from the bulletin type. (reference 1, page II)

A committee, consisting of members of sections 2, 3, and 4, earlier had been formed to consider the idea of the bulletin. Presenting their report at the same 1905 meeting, they recommended a mechanism that would allow papers worthy of immediate publication, as judged by the secretary of the appropriate section, to be immediately printed. The author would receive a limited number of copies, which he could then distribute. Rutherford was absent, but Alexander Johnson, president of the society, moved the adoption of the report. McLennan seconded the motion, which was carried (reference 1, page XIII).



ERNEST RUTHERFORD did not make North American journals a major part of his publishing plans, but his discoveries may have motivated the Royal Society of Canada to create a rapid-publication mechanism. (Courtesy of the AIP Emilio Segrè Visual Archives, gift of Otto Hahn and Lawrence Badash.)

The first such bulletin was printed in June 1907. It contained two studies—one on radium and another on its emanation—that were carried out under Rutherford's direction. Notably, it appeared one month after Rutherford's departure for the University of Manchester in the UK. McLennan and William Kennedy's paper "On the radioactivity of potassium and other alkali metals" was later published in bulletin form as well.

So, even though "North American journals did not play a large role in Ruth-

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erford's publishing strategy," as Baldwin rightly notes, Rutherford nonetheless contributed to raising his colleagues' consciousness about the importance of rapid publication.[2] That led to improvement in the Canadian publication system, which then better served his Canadian colleagues and former students.

References

1. Council of the Royal Society of Canada, in *Proceedings and Transactions of the Royal Society of Canada*, 2nd ser., vol. 11 (1906).
2. For additional detail, see Y. Gingras, *Physics and the Rise of Scientific Research in Canada*, P. Keating, trans., McGill-Queen's University Press (1991), p. 86.

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Melinda Baldwin's article in the May 2021 issue of Physics Today (page 26) makes a great contribution in demonstrating how Ernest Rutherford used *Nature* to get timely mention of his work in radioactivity and thus raised the weekly journal's profile in the new field. But it is disappointing that she refers to older works that introduced or propagated historical errors associated with Rutherford's early life and work. Such errors may be small, but more than 20 years after the publication of my book *Rutherford: Scientist Supreme* (1999), which is the only one to study original archives covering his early period, they occasionally make me wonder why I bothered.

Baldwin states that Rutherford "quickly distinguished himself as a talented student with a gift for physics and mathematics." But the records show that he was a normal kid who took two goes at each of the three scholarships he was awarded—for secondary school, university, and research overseas. In the last case, Rutherford was one of two candidates for the 1851 Exhibition Scholarship being offered to New Zealand for 1895. The other candidate, James Maclaurin, was judged better but declined the award.

But it is untrue, as Baldwin asserts, that Rutherford happened to graduate from Canterbury College (now the University of Canterbury) in the first year that students born in the British colonies could compete for the scholarship. The Royal Commission for the Exhibition of 1851 began offering the science research scholarships in 1891. They awarded one to a New Zealander every second year, starting in 1892 with David Jackson, a graduate of the Auckland University College. The scholarship for 1894 was pushed back a year, at the request of the University of New Zealand. If not for that delay, not only would Rutherford not have won the scholarship, but he would not have gone to Cambridge University because it did not accept non-Cambridge graduates for research until 1895.

The new policy is why Rutherford and other non-Cambridge graduates were treated as outsiders by the Cavendish Laboratory's Cambridge graduates. The usual progression to an academic position at Cambridge was receiving a Cambridge degree, then demonstrating in undergraduate laboratories and conducting research for a few years. Rutherford was the first non-Cambridge graduate accepted there for research, followed by John Townsend from Ireland. When Cambridge started accepting non-Cambridge graduates for research, the Cambridge graduates knew the path would now be much more competitive.

It is also untrue that Rutherford "developed a novel radio-wave detector back in New Zealand and brought it with him to Cambridge." His "wireless work" was done in England. In New Zealand he studied the magnetizing effect of very short current pulses ($^1/_{30\,000}$ of a second) during his first research year at Canterbury College in 1893. To generate pulses shorter than a fraction of a microsecond, in 1894 he used a Hertz oscillator to produce heavily damped oscillations lasting about one cycle that magnetized his detector needles. It was only when Rutherford got to England and placed his device in the receiving side of the Hertz oscillator to check its sensitivity that he carried out detection over a distance and in 1896 set a world record of half a mile.

Also, it is not exactly true to say that Frederick Soddy earned the 1921 Nobel Prize in Chemistry for his work with Rutherford. Officially, Soddy's prize was "for his contributions to our knowledge of the chemistry of radioactive substances, and his investigations into the origin and