Document generated on 05/02/2024 12:17 a.m.

Scientia Canadensis
Canadian Journal of the History of Science, Technology and Medicine
Revue canadienne d'histoire des sciences, des techniques et de la médecine

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Volume 15, Number 2 (41), 1991

Building Canadian Science: The Role of the National Research Council

URI: https://id.erudit.org/iderudit/800333ar
DOI: https://doi.org/10.7202/800333ar

See table of contents

Publisher(s)

CSTHA/AHSTC

ISSN

0829-2507 (print)
1918-7750 (digital)

Explore this journal

Cite this article

Tickner, A. W. (1991). The NRC Postdoctorate Fellowships, 1948-1978. *Scientia Canadensis*, *15*(2), 145–154. https://doi.org/10.7202/800333ar

Article abstract

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THE NRC POSTDOCTORATE FELLOWSHIPS, 1948-1978

A.W. Tickner[1]

Abstract

Following World War II the National Research Council established a programme of Postdoctorate Fellowships to meet the increasing need for postdoctoral training. Initially for tenure in the NRC laboratories and overseas, the fellowships were rapidly extended to Canadian universities, other federal departments and agencies and, eventually, Canadian industries. The development and achievements of the programme are reviewed from its inception in 1948 to its transfer to the new Natural Sciences and Engineering Research Council in 1978.

Résumé

Après la Seconde guerre mondiale, le Conseil national de recherches du Canada établit un programme de bourses postdoctorales pour répondre aux besoins croissants en matière de formation postdoctorale. D'abord conçues en vue de postes permanents dans les laboratoires du CNR et à l'étranger, les bourses furent rapidement étendues aux universités canadiennes, aux autres ministères et agences du gouvernement fédéral et enfin aux industries canadiennes. Le développement et les succès du programme sont passés en revue depuis sa création jusqu'à son transfert au Conseil de recherche en sciences naturelles et génie de recherches du Canada

The Origins

The National Research Council's postdoctorate fellowship programme originated in the late 1940s during the period of conversion and expansion experienced by the NRC following World War II. To understand its origin, however, it is useful to look back to the beginnings of the body known originally as the Honorary Advisory Council on Scientific and Industrial Research.

One of the earliest actions taken by this new Council was to set up programmes of grants in aid of research to encourage research in universities and of scholar-

1 National Research Council of Canada, retired.

ships to increase the number of trained researchers. These programmes began modestly enough; in the first year seven scholarships were awarded and the research grants totalled about $8,300. The growth of these programmes over the following years, however, led to steady increases in the amount of university research and in Canada's output of scientists with graduate degrees.

In parallel with this, the Honorary Advisory Council also decided to establish national laboratories in Ottawa. This was a more controversial and costly venture and it was not until the late 1920s that the government agreed to proceed. By 1932 the new NRC building on Sussex Drive was open. Although at first staffing was curtailed by the severe depression, by the late 1930s a good and diversified staff had been built up. At this point the outbreak of World War II diverted most of the laboratories' efforts into wartime activities for the next 5 or 6 years.

Late in World War II, with the end of the war in sight, the Council began to give its attention to postwar needs. It was decided that when the wartime work came to an end the laboratories should undertake a broader role, including the opening up of research in a number of new areas. This would require a considerable staff expansion including the recruiting of many individuals with training in newly emerging fields.

In the universities the return of large numbers of veterans at the end of the war led to a rapid increase in the number of students undertaking graduate work in the sciences. The Council responded with major increases in funding for both scholarships and grants in aid of university research. In addition it was agreed that the time had come to provide fellowships for Canadians to undertake postdoctoral training overseas. In 1947 the award of up to three of these Post-doctorate Overseas Fellowships annually was approved, providing that suitable candidates became available. This number increased steadily over the next few years.

It was in the NRC laboratories however that the most important new developments related to postdoctorate fellowships took place. The Chemistry Division was headed by E.W.R. Steacie, an academic who had come to NRC as Director of the division at the outbreak of World War II. With the war over he was now building up his division by recruiting bright young scientists in several promising new areas.

Steacie was concerned about the difficulty of maintaining, in a large scientific organization, the creative and stimulated staff that is essential for high quality research. In the 1930s he had spent a year in Germany and England on a Royal Society of Canada fellowship and the memories of that year were still fresh in his mind. It seemed to him that postdoctoral experience for scientists had much to recommend it. One or two fellowships for postdoctoral research in NRC laboratories had been awarded before World War II and he discussed with a number of

colleagues and acquaintances the possibility of using postdoctorate fellowships on a much larger scale than had been considered before in some at least of NRC's laboratory divisions. Several young Canadian scientists who became available for short periods at the end of the war were given limited term appointments in his laboratory - in effect a kind of pilot project.

The President of NRC, C.J. Mackenzie, was readily convinced of the advantages of this approach and in 1946 it was discussed by the Review Committee, a committee appointed by the Council to review the operations of the laboratories. Their minutes record that they welcomed the proposal, seeing it also as training for graduates from Canadian universities which would help to reverse the trend of their going abroad. They agreed further that rather than competing with the universities it would 'form a pool from which the universities might draw to the ultimate advantage of all concerned.'[2] Even the Treasury Board agreed that the idea was acceptable provided that the Fellowship stipends were paid out of NRC's salary allotment.

In the fall of 1947 the Council gave formal approval to the new Postdoctorate Fellowships tenable in NRC laboratories. Awarded for one year, the fellowships were renewable for a second year and two-year tenure quickly became the norm. The first fellowships were awarded for 1948 in the Division of Chemistry. Within the next year or two fellowships were also awarded in the Divisions of Physics and Applied Biology, in the regional laboratories and in the Atomic Energy Project at Chalk River. While preference was given to Canadians there were no nationality restrictions on fellowships in the laboratories generally. Those at the Atomic Energy Project were restricted to British subjects.

Internationally, the fellowships were welcomed as a new opportunity for postdoctoral training open not only to Canadians but to candidates from abroad. World War II had interrupted many of the normal activities of universities and had severely curtailed the freedom to exchange ideas which had existed in academic life prior to the war. The Commonwealth Scientific Conference in 1946 recommended a plan to exchange students and scientific workers between Commonwealth countries. This led to the Colombo Plan, and other plans came into being under the auspices of the United Nations. Canada supported these internationally-sponsored plans, but the Postdoctorate Fellowship programme of the National Research Council was entirely Canadian in both origin and operation.

It is important to note that in establishing these 'in house' fellowships, the Council was careful to ensure that they were not confused with employment. The dis-

2 National Research Council of Canada, **Proceedings of Review Committee**, 21-22 June 1946.

tinctions were clearly set out in a letter from F.T. Rosser, NRC's Director of Administration, to T.W. Morison, the Executive Assistant to the Vice-President in charge of the Atomic Energy Project. This letter includes the following statements:

Since scholarships are designed to assist students, the amounts of the fellowships are to be kept at maintenance levels, well below the actual earning capacity of the individuals concerned. The Income Tax Department, therefore, does not deem them to be eligible for taxation. Similarly the Treasury does not make deductions for retirement fund, or unemployment insurance.

National Research Council regulations governing leaves and attendance are not applicable to fellowship holders. Working conditions, approved by the Director, are administered by the supervisor of the work in accordance with recognized practices for similar personnel in the best universities.

Should an internal scholarship holder, at any future time, be appointed to a regular position on the National Research Council staff, he has no right whatever to claim for leave, superannuation, or other benefits, to cover the period he spent in the laboratories on an internal fellowship.

In addition to outlining the basis of the fellowships the final paragraph of the letter provides an interesting statement of their intent:

It is hoped that this plan will help to man the laboratories with very able junior staff who will move out into the universities and industrial laboratories, thus furthering the Council's policy of increasing the number of trained scientists in the country. It will also eliminate misunderstandings, which have arisen over the permanency of term appointments. At the present time it should help overcome shortage of research personnel, without tying up the establishment for the future.[3]

Fellowships in the Universities

Soon after the successful launching of the Postdoctorate Fellowships in the NRC Laboratories Steacie, in the summer of 1949, proposed that the programme be extended to include awards tenable in Canadian universities. The Council's Scholarships Committee endorsed this proposal, agreeing that priority should be given to building up research activities in the smaller universities. It was further agreed that providing means for new PhDs to engage in independent research and undertake a limited amount of teaching prior to accepting a university teaching appointment was an important secondary purpose.[4]

3 F.T. Rosser to T.W. Morison, 6 July 1948, NRC file C.41-4-6.

4 National Research Council, Minutes of the 170th Meeting, 8-9 September; 1949, Exhibit Q.

The first group of three postdoctorate fellowships at Canadian universities was approved in 1950 for research at Dalhousie University, the University of New Brunswick and McMaster University. Table 1 summarizes the numbers of fellowships awarded during the early years of the programme for work at Canadian universities as well as in the NRC laboratories and overseas.[5]

TABLE 1
NUMBERS OF NRC POSTDOCTORATE FELLOWSHIPS, 1948-1954

YEAR	OVERSEAS	NRC LABS	UNIVERSITIES
1948-49	1	20	-
1949-50	4	32	-
1950-51	7	37	4
1951-52	6	34	0
1952-53	5	45	5
1953-54	13	71	9
TOTAL	36	239	18

Fellowships in Other Government Departments

After the postdoctorate fellowship programme had been running successfully in the NRC laboratories for several years, interest was expressed by other federal government departments with significant research groups. The Department of Agriculture was the first of these. The Council reacted favourably and, following an inspection of the Department's laboratories by two Council members to ensure that the research facilities and supervision would be suitable, the fellowship programme was extended to the Department of Agriculture in 1954.

A similar programme was started in the Mines Branch and the Geological Survey of the Department of Mines and Technical Surveys in the following year. Eventually the fellowships were also extended to the Dominion Observatories, to

5 J.B. Marshall, 'Postdoctorate Fellowships of the National Research Council,' **Chemistry in Canada** 6:9 (September 1954), 34-36. Dr Marshall, originally a biologist in NRC's Prairie Regional Laboratory, was made head of the Awards Office when it was set up in 1950 to administer NRC's grants and scholarships. His paper provides much useful information on the origin and early years of the fellowship programme.

laboratories of the Department of National Health and Welfare and to several other federal departments and agencies.

The 'other government departments' postdoctorate fellowship programme was approved by Treasury Board with the stipulation that it be operated by the National Research Council under the same rules and conditions that had been set up for the NRC laboratories programme. Stipends and travel allowances were provided from NRC's Grants and Scholarships funds.

The addition of fellowships in other government departments and the growing demands of the NRC laboratories and the universities resulted in a rapid increase in the number of fellows and some of the results of the programme began to appear. By April 1957, in addition to nearly 100 held overseas, 418 individuals had completed their fellowships in Canada and an additional 195 were currently being held. Of the 418 who had completed their fellowships, 147 had remained in Canada. The latter group consisted of 63 Canadians (83% of the Canadian fellows) and 84 (or 25%) of the fellows from abroad.[6] The great majority of these former fellows had found employment in Canadian universities, government or industry as shown in Table 2. Although over the next twenty years the totals increased greatly, the breakdown of where the fellows went following their fellowships remained similar.

TABLE 2
EMPLOYMENT OF NRC POSTDOCTORATE FELLOWS REMAINING IN CANADA TO APRIL 1957

TYPE OF EMPLOYMENT	NUMBER
UNIVERSITY	48
NATIONAL RESEARCH COUNCIL	43
OTHER GOVERNMENT	23
INDUSTRY	21
OTHER FELLOWSHIPS	6
UNKNOWN	6

6 J.B. Marshall 'Memorandum re University Postdoctorate Fellowships,' 26 April 1957. A copy is in NRC Archives in the volume 'NRC Postdoctorate Fellowships.' Discussion of the memorandum is reported in the Minutes of the 198th Meeting of the National Research Council, 6 June 1957, Exhibit E.

Years of Growth and Development

The following decade was one of continuous evolution and growth. Several other government departments were added and, beginning in 1959, the NATO Science Fellowships were administered as part of the Postdoctorate Overseas Fellowships programme. This increased the number of overseas fellowships by some 20 to 25 per year.

It was also a time of rapid growth for the universities. The number of new fellowships was increased to 60 per year which with renewals meant that about 120 were being held at one time. The fellowships were popular and, increasingly, university scientists began to supplement the number of postdoctorate fellows allotted to them by using funds from their research grants. As a result, in 1966 NRC discontinued its formal programme of postdoctorate fellowships tenable in Canadian universities and instead made provision for university scientists to include support for postdoctorate fellows in their applications for research grants. This was accompanied by an appropriate transfer of funds from 'Scholarships' to 'Research Grants' in the NRC budget. Soon afterwards the overseas fellowship programme was broadened to include tenure in laboratories in the United States and in Canadian universities. The latter were added to encourage Canadians who were completing their doctorates abroad to return to Canada for their postdoctorate experience.

By 1968 the postdoctorate fellowships programme had been operating for twenty years. In that year Dr J.B. Marshall, NRC's Awards Officer prepared a summary of the development of the programme. He reported that during the twenty-year period a total of 2,367 postdoctorate fellowships had been held in Canadian government and university laboratories in addition to those held overseas. Just fewer than 10% of the fellows had been Canadian and altogether more than twenty countries were represented. While no accurate statistics were available he estimated that about one-third of the fellows had remained in Canada or returned after a short absence, many of them to hold academic positions.[7]

7 J.B. Marshall, 'National Research Council Postdoctorate Fellowships: Postdoctorate Fellowships Tenable in Government Laboratories', 28 November 1968. A copy is in NRC Archives in the volume 'NRC Postdoctorate Fellowships.' Additional information on the development and operation of the fellowship programme is found in J.B. Marshall, **Grants and Scholarships at the National Research Council of Canada** (Ottawa: NRC, 1980).

During the years which followed, one additional type of fellowship was introduced. This was the Industrial Postdoctorate Fellowship which became available in 1970. It provided up to two years of industrial experience for recent PhDs and was designed to bring Canadian industry into contact with highly qualified individuals coming out of graduate schools. The fellowship consisted of a contribution, equal to the value of the regular fellowship stipend, towards the salary negotiated by the individual with a 'participating company' or organization. Initially fifty firms agreed to participate and twenty of the fellowships were awarded in the first year. Thereafter the numbers grew steadily, averaging forty to fifty per year over the next several years.

The Final Years

By the late 1960s the fiscal climate had begun to change. Increasing inflation and government deficits brought a tightening of government finances and, in the case of the National Research Council, restricted budgets and reduced staffing levels. By the early 1970s the number of postdoctorate fellows in NRC laboratories decreased by about one-third. Fewer dollars meant greater difficulty in keeping fellowship stipends abreast of inflation and this in turn made it more difficult to attract top quality fellows. And while two-year fellowships had worked well in the sciences, NRC's engineering divisions had found it difficult to attract and utilize good people on this basis.

To overcome these problems the National Research Council in 1975 began to phase out postdoctorate fellowships in its own laboratories and replaced them with Research Associateships. These were limited-term junior-level staff appointments at salaries based on the current PhD recruiting rates.

Other government departments continued to use postdoctorate fellowships, however, and in 1978 responsibility for administering them as well as Postdoctorate Overseas Fellowships and all of the other University Grants and Scholarships activities of the NRC was transferred to the new Natural Sciences and Engineering Research Council. This formally ended NRC's connection with the programme of postdoctorate fellowships begun in 1948.

During the thirty-year life of the programme approximately 6000 NRC Postdoctorate Fellowships were awarded. Of these more than 5000 were held in Canada in the NRC laboratories, other government laboratories, universities or industries. Because of the decentralized way in which various parts of the programme was administered, it is difficult to obtain accurate figures for the entire programme. Fairly detailed records are available, however, for the 1900 fellowships held in the laboratories of the National Research Council. Of these, 234 were

held by Canadians and the remainder by fellows from some forty other countries. The main countries of origin and the numbers of fellows from each are given in Table 3. A survey in the 1970s indicated that, following their fellowships, approximately 85% of the Canadian fellows and 25% of the foreign fellows had remained in Canada. Of these 199 found employment at universities, 129 at the National Research Council, 115 at other government departments and 97 in industry.[8] Based on these figures and making some allowance for the different makeups of the other fellowship groups, it would appear that for the programme as a whole more than 2000 of the fellows found subsequent employment in Canada, including about 1000 Canadians.

TABLE 3	
POSTDOCTORATE FELLOWS IN NRC LABORATORIES	
TEN MOST FREQUENT COUNTRIES OF ORIGIN	
COUNTRY OF ORIGIN	NO. OF FELLOWS
UNITED KINGDOM	616
CANADA	234
INDIA	172
JAPAN	166
UNITED STATES	86
AUSTRALIA	77
SWITZERLAND	47
GERMANY	46
CZECHOSLOVAKIA	42
NETHERLANDS	35
TOTAL	1521

8 A.W. Tickner, 'Postdoctorate Fellowships in the National Research Laboratories,' **Canadian Chemical News** (Oct. 1985), 17-19.

Achievements of the Programme

The fellowships in NRC laboratories helped greatly to solve the staffing problems of the National Research Council in the expansionary period following World War II. It did this without 'tying up the establishment for the future.' The large numbers of bright young people from laboratories across Canada and around the world brought with them new ideas and approaches to problems which contributed greatly to the stimulating atmosphere of the laboratories for several decades.

With the fellowships Canada made a notable contribution to international postgraduate training in the sciences in the years following World War II. It also provided a means of bringing young scientists from less developed countries to Canada for experience with advanced techniques thus fitting them for service as specialists in their fields. As J.B. Marshall observed in 1954: 'For the first time the movement of scientists for training is into Canada as well as out.'[9]

The programme as a whole added significantly to the number of highly qualified scientists in Canada in the 1950s and 1960s when the country's needs could not be met internally. It did this both by attracting large numbers of young scientists from abroad and by helping to retain young Canadian scientists in Canada.

The fellowships played a major role in building up research activities in Canadian universities. This was particularly true for the smaller institutions which were just beginning to develop their capacity for advanced graduate training in science and engineering.

Other valuable benefits flowed from the programme. These included the very direct contacts established with many of the world's leading research laboratories and the advantages of having a large number of well qualified individuals in many countries with a good personal knowledge of Canada and its scientific institutions. There is little doubt that the programme helped to establish Canada's international scientific credentials in the postwar period.

All of this was achieved at modest cost and leads to the conclusion that the Postdoctorate Fellowships programme introduced by the National Research Council was a very successful Canadian science initiative.

9 J.B. Marshall, 'Postdoctorate Fellowships' (1954), 35.