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Article abstract

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THE ORIGINS OF ORGANIZED CANADIAN MEDICAL RESEARCH: THE NATIONAL RESEARCH COUNCIL'S ASSOCIATE COMMITTEE ON TUBERCULOSIS RESEARCH, 1924-1938

Georgina Feldberg¹

Abstract

The National Research Council's Associate Committee on Tuberculosis Research set the standard and precedent for organized Canadian medical research. Established in 1924, the Committee explored some of the most significant biomedical questions of the time, and in 1938 it metamorphosed into the National Research Council's Associate Committee on Medical Research. This circuitous path into medical research elucidates the pragmatic economic, industrial and political concerns that gave the Canadian scientific spirit – or research ideal – shape.

Résumé

Le comité associé de la recherche sur la tuberculose du Conseil national de recherches du Canada a servi de modèle à l'organisation de la recherche médicale au pays. Établi en 1924, le Comité a abordé certains des problèmes biomédicaux les plus cruciaux de l'époque et, en 1938, il se transforma en Comité associé sur la recherche médicale du CNR. Ce cheminement sinueux à travers la recherche médicale met en relief les problèmes pratiques, économiques, industriels et politiques auxquels elle a été confrontée et qui lui ont donné forme.

The gathering, in 1924, of a 'small committee of gentlemen,' appointed to 'consider and report as to the manner in which Council could co-operate in the solution of problems arising from tuberculosis (TB)'² launched Canada's first and most dramatic venture into organized medical research. Comprised of Canada's scientific elite, the gathering recommended that the National Research Council of Canada (NRC) establish an Associate Committee on Tuberculosis Research

1 Division of Social Science, York University, North York, Ont M3J 1P3.

2 National Research Council of Canada, *Report of the President (1924-25)*, 24-25.

(ACTR) to undertake the nation's integrated, scientific attack on TB. Convened in 1925, the ACTR assembled many of Canada's most eminent scientists, who began work with one of the largest budgets the NRC had yet appropriated – \$12,000. By 1927, the ACTR had grown into the largest and richest of the Associate Committees, and it received fully one third of all funds that Council disbursed. The ACTR explored some of the most significant bio-medical problems of the day, and until 1938 – when it metamorphosed into the National Research Council's Associate Committee on Medical Research – it set the standard for Canadian medical research.³ Its overall work, and its trials of the French BCG vaccine in particular, won Canadians an international reputation.

The history of the ACTR, between the years 1924 and 1938, consequently forms a significant chapter in the history of the NRC's efforts to institutionalise medical research. Comprised of J. A. Baudoin, A. B. Macallum, Ramsay Wright and many other leading Canadian researchers, the ACTR exemplified what Sandra McRae has called the 'scientific spirit' or 'research ideal.'⁴ Yet, the circuitous path that the NRC followed to set the precedent and example for organized medical research, also elucidates the pragmatic economic, industrial and political concerns that gave the Canadian scientific spirit – or research ideal – shape.

Defining the Mandate: Industrial Research and Animal Disease

Medical research was not part of the original NRC mandate. A response to the economic troubles of the First World War, Canada's Honorary Advisory Council for Scientific and Industrial Research, as the NRC was then known, emerged to confront the economic problems – most particularly the trade imbalance – that arose from the war effort. Council was to consider the means by which:

Canadian industries may be assisted to develop by the application to them of the most advanced scientific processes, and thereby enabled to not only meet the needs of the home markets but also to compete with their rivals abroad.⁵

3 For discussions of this metamorphosis see National Research Council of Canada, Associate Committee on Tuberculosis Research, *Report of the Meeting* (1937), 15. See also National Research Council of Canada, *Report of the President* (1937-38), 9.

4 'The Research Ideal in Medicine in Canada: the Early NRC Years, 1916-1938,' paper presented to the Seventh Kingston Conference of the Canadian Science and Technology Historical Association, Ottawa, 19 October 1991. See also, Sandra F. McRae, 'The Scientific Spirit in Medicine at Toronto,' (unpublished PhD dissertation, University of Toronto, 1987).

5 Honorary Advisory Council for Scientific and Industrial Research of Canada, *Report of the Ad-*

During its earliest years, the NRC concentrated on the promotion of Canada's foremost industrial interests. Council established standing committees in forestry, chemistry, and mining and metallurgy to investigate questions of resource utilization and industrial production. It turned its attention, as well, to agriculture and established temporary committees to investigate such problems as plant and animal diseases, wheat genetics, the nutrition of foxes, and dairy production.

Any tentative forays that the NRC made into what might be defined as health issues addressed only the physical problems of production. From its first term onward, for example, Council sponsored bacteriologic research as applied to the particular needs of food processing and fish canning industries. Similarly, it sponsored investigations into the medicinal properties of indigenous plants in order to promote pharmaceutical manufacturing. Throughout, it confined itself to setting standards or refining practices of testing.

If the physical problems of production dominated the NRC's earliest research, by 1919 Council's interests had already begun to shift toward the human costs of industry and trade. That year, it appointed an Associate Committee on Industrial Fatigue to gauge industrial efficiency. The assignment proved more complicated and comprehensive than Council had first imagined, for the Associate Committee on Industrial Fatigue soon found that all the factors of industrial fatigue are 'associated very intimately with the health and diet of the worker and hygienic conditions or otherwise of his environment, not only during his working hours, but also his life outside the factory or workshop.'⁶

Convinced that it could not properly fulfil its mandate without exploring these many determinants of productivity, the Committee on Industrial Fatigue asked to reconstitute itself as the Associate Committee on Industrial Hygiene. It requested permission, as well, to broaden the scope of its research. Council well appreciated these concerns. In 1920, it had formed an Associate Committee on Food Research to investigate nutritional standards, deficiency diseases, and related questions that seemed so critical to both the marketing and manufacture of foodstuffs and productivity. Here again, however, the Committee on Food Research could not stray far from industrial research, and like the Committee on Industrial Fatigue, Council fully recognized that the problems extended well beyond diet to 'hygienic conditions' both within and outside the factory or workshop.

ministrative Chairman (1917-1918), 13.

6 Honorary Advisory Council for Scientific and Industrial Research of Canada, **Report of the Administrative Chairman (1920-1921)**, 21.

Though Council understood the Committee's arguments for reconstitution and approved the changes in principle, its efforts to implement the change in mandate met with rebuke. From the time of its inception, the NRC had confronted a series of institutional contradictions. Council's mandate was ambitious but its resources and power limited. As the first Honorary Advisory Committee attempted to organize central laboratories that would mould pure science to the needs of 'industry and national service,' critics within Parliament and without objected that such a plan would draw funds and personnel away from universities. They objected, moreover, that the research initiatives themselves would conflict with work already underway in the research labs of several government departments. The NRC was thus left an umbrella organization. Its agenda was to 'organize, mobilize and encourage existing research agencies in Canada,' to 'undertake a comprehensive survey of existing scientific and industrial research,' to 'co-ordinate such research as is already going on, foster teamwork and gauge extension,' and to 'inform and stimulate' public interest.⁷ Allegations that its work was redundant, or trod on the toes of other organizations continually hampered the NRC's efforts,⁸ and nowhere were the jurisdictional disputes more pronounced than in the domain of health. New and eager to stake its turf, the Dominion Department of Health objected to Council's initiatives in industrial hygiene and made its opposition clear. Council 'was informed' the next report of the Committee on Industrial Fatigue read, that research into public hygiene fell rightly to the newly established Dominion Department of Health.⁹ Chastened by prior experience, the NRC retreated quickly. '[T]o have "investigations on subjects in certain lines in industrial hygiene carried on by a Committee outside of and not responsible to [the Federal] department," Council's report quoted, 'is contrary to the policy of the Research Council, which has scrupulously avoided any duplication of the work or the functions of a Department in the public service.'¹⁰

The NRC formally ceded responsibility for research into industrial fatigue and industrial hygiene to the Dominion Department of Health, but it could not so easily abandon interest in the relations between health and economic productiv-

7 For early histories of the NRC, see Wilfrid Eggleston, *National Research in Canada, the NRC 1916-1966* (Toronto, 1978) and Mel Thistle, *The Inner Ring: The Early History of the National Research Council of Canada* (Toronto, 1966).

8 For a discussion of these battles see Eggleston, *National Research*, 9-24.

9 Honorary Advisory Council for Scientific and Industrial Research of Canada, *Report of the Administrative Chairman, (1920-1921)*, 21.

10 Ibid.

ity. In 1924, after passage of the National Research Council Act, the NRC had formalized the role of its Associate Committees and codified their 'specific purpose of undertaking the coordination, organization and prosecution of research work on some main problem or group of problems.'¹¹ Despite its recent misadventure with the Committee on Industrial Hygiene, Council took advantage of this reorganization and appointed its 'small committee of gentlemen' to look into the tuberculosis problem. Tuberculosis, the leading cause of both human and animal deaths, seemed to easily number among the 'problems' that Associate Committee's were to resolve. Moreover, Council later noted, there had been 'a steadily growing conviction that sufficient attention has not been paid, in Canada, to the solution of tuberculosis problems through research.'¹²

Tuberculosis, Work and Health

Though health might fall outside Council's rightful jurisdiction, through the early 1920s, it became increasingly clear that the future of Canadian manufacturing depended on the creation of a healthy workforce. Experiences with tuberculosis concentrated and crystallized these concerns. The leading cause of nineteenth century Canadian deaths, tuberculosis retained its rank as the first cause of human deaths well into this century. Though Koch's isolation of the tubercle bacillus, in 1882, had heralded the dawn of a new preventative and therapeutic era, little had come of his work. Mortality and morbidity remained high well into the twentieth century. In Ontario, the death rate had soared, during the first decade of the twentieth century, to almost 150/100,000.¹³ And during and after the First World War mortality and morbidity once again rose, most pronouncedly in industrial cities. For example, tuberculous mortality in Montreal, in 1921, stood at 200/100,000.¹⁴

Tuberculosis affected all Canadians, but as those who collected statistics repeatedly noted, it preferentially attacked those who would become the nation's workers. Again and again, over the course of many decades, North American

11 National Research Council of Canada, *Report of the President (1924-25)*, 17.

12 *Ibid.*, 24-25.

13 George Jasper Wherrett, *The Miracle of the Empty Beds: A History of Tuberculosis in Canada* (Toronto, 1977), 250.

14 *Ibid.*, esp. chapter 8; See also George Jasper Wherrett, *Tuberculosis in Canada: Report of the Royal Commission on Health Services* (Ottawa, 1965)

physicians repeatedly lamented that this disease took its subjects principally 'at the most productive period of life,'¹⁵ or that 'TB strikes most frequently those who are most valuable as fighters and workers – men and women between the ages of 20 and 50.'¹⁶ In Canada as elsewhere, TB predominated in urban, industrial environments where it preferentially affected the critical populations that formed the workforce. Survey after survey demonstrated how rampant infection was among the young men who returned home from war and new immigrants. In 1923, a study conducted by the Federal Department of Health revealed further vast and unsuspected reservoirs of disease among pre-school and school-aged children.¹⁷

As Canadian physicians, industrialists and parliamentarians grew increasingly aware that TB claimed its victims from young, able-bodied workers, they feared the toll disease took on the Canadian economy. 'To put the [tuberculosis] problem on no higher plane than that of financial values,' a member of the NRC's small committee of gentlemen explained,

apart altogether from the untold suffering and misery directly attributable to the ravages of this disease among humans, there is each year an appalling economic loss rising from the illness of those suffering from it and through the premature death of thousands of the most desirable type of citizens.¹⁸

Tuberculosis disrupted families and industries and caused dependency that cost millions of dollars in lost revenues and welfare payments. Hence, the well-being of Canadian industry and of the Canadian economy, depended on the successful eradication of tuberculosis.

Reciprocally, the eradication of tuberculosis depended on the reform of working conditions. If TB sapped industry, industrial work fostered TB, for here again study after study demonstrated that industrial workers suffered disproportionately. From the nineteenth century onwards, those who collected

15 The specific quote is from Lemuel Shatuck, *Report of the Sanitary Commission of Massachusetts* (Boston, 1850), 96. However, it could as easily be from Robert Koch, who wrote, in 1882, that 'If we confine our attention to the middle-aged, productive part of the population, one-third and more often more of the latter is destroyed by this disease,' or from numerous other Europeans and North Americans.

16 Again, the particular quote is from: Marshall C. Guthrie to Herman E. Hilleboe, August 28, 1942, Tuberculosis General, National Archives, Washington, D.C., RG 90, File 0425 TB Gen. However, virtually identical statements appear in numerous other sources.

17 The best summary of the epidemiology of tuberculosis, in Canada, is provided in Wherrett *Tuberculosis*.

18 National Research Council of Canada, *Report of the President (1924-25)*, 24.

North American statistics about disease recognized the particular prevalence of tuberculosis among those who worked in 'indoor, sedentary professions.'¹⁹ The working conditions of factories and mills, the damp, dust and artificial light, figured prominently among lists of causes of TB. Tuberculosis could not be eradicated, it seemed, unless the conditions of work were reformed. Or as one labour monthly colourfully proclaimed:

The most effective plan to fight tuberculosis is to implement the union workshop. Sunshine, proper food and nourishment, reasonable hours of labour, and a living wage, are the deadliest enemies of the white scourge. That's trade unionism for you. Child labour, long hours, and the sweatshop, are the breeders of disease. The non-union microbe is the propagator of tuberculosis above all things else. Fact!²⁰

Thus, tuberculosis embodied the problems that had roused the Committee on Industrial Fatigue in that its incidence, prevalence and costs were all inextricably bound with the welfare of the Canadian economy, but in a way that industrial hygiene had not, TB provided the NRC with an entrée into medical research.

Origins of the ACTR: the Role of Organization

Capitalizing on changes in the NRC's administrative structure, on TB's status as a disease of both animals and humans, and on the coincidence of mounting concerns about tuberculosis with the introduction of the French BCG vaccine, the NRC plunged into tuberculosis research. In 1924, it appointed its 'small committee of gentlemen,' which in turn organized the Associate Committee on Tuberculosis Research.

This ACTR readily accepted the challenge of medical work, but nonetheless, it carefully tested the limits to its mandate. Just as human tuberculosis took a heavy toll on industry, so avian and bovine disease plagued Canadian farmers, and Council now invoked the hazards which tuberculous milk and meat posed to the Canadian economy and trade to justify its intervention. From the time of its inception, the NRC had promoted studies of animal diseases, and hence in this

19 For further discussion, see Georgina Feldberg, "An Antitoxin of Health Respect": North American Debates over Tuberculosis,' (unpublished PhD dissertation, Harvard University, 1989) The twentieth century Canadian debate can be followed in Canadian Tuberculosis Association, *Reports, 1910-1930*.

20 'How to Fight Tuberculosis,' Toronto, *Industrial Banner*, February 1908. See also, 'Tuberculosis,' Ottawa, *Cotton's Weekly*, 1 July 1909.

area, Council seemed to have clear jurisdiction. The bounds to its involvement were not unencumbered. Responsibility for research into veterinary disease rightfully fell to the Federal Department of Agriculture, which had engaged in studies of animal disease since the end of the nineteenth century. The Department of Agriculture, however, seemed far less possessive and far more eager for assistance, than the Federal Department of Health. Rates of bovine and avian tuberculosis paralleled those of human disease, and as they did so, public pressure mounted. On its own, the Department of Agriculture seemed unable to cope with the size of the tuberculosis problem, and whether or not the NRC could stand on the authority of prior precedent, public pressure now justified its intervention. 'Scores' of appeals from 'livestock associations all over Canada, asking that the Research Council be authorized to take up the matter,' Council's President, H. M. Tory wrote to Thomas Low in May 1925, affirmed the need for action.²¹

Council diplomatically planned its entry into the study of tuberculosis around a 'series of resolutions regarding research in the field of bovine tuberculosis;' ²² and it used this call to animal disease to broach the subject of human health. The problems of cross-infection, and the interconnection between agriculture, animal disease and human disease cast the two problems as inseparable. Thus, when the NRC's 'gathering' met, Tory wrote to Low, in 1925:

the question of the relation of bovine and human tuberculosis was discussed, and it seemed almost foolish to press the bovine tuberculosis unless there was carried with it an enquiry into the state of the problem at present in the human field as the two are so closely allied.²³

However, much as action seemed necessary, Council had learned from its earlier battle over industrial hygiene that it could not easily venture into research on human health. Nor did it have the means to. Unlike the private or independent research communities that have so often served as historical examples, the NRC's Associate Committees had no authority to initiate research. Instead, the NRC's structure and mandate obliged its Committees, as their primary task, to co-ordinate and stimulate research already underway in existing facilities.

Council's earliest efforts to establish the ACTR worked to circumvent these organizational constraints and to erase the memory of the recent battle with the Department of Health. The NRC began by appointing some of Canada's leading

21 H. M. Tory to Thomas Low, May 13 1925, in Thistle, *Inner Ring*, p.166.

22 Ibid.

23 Ibid.

scientists to the ACTR. Included among the Committee's 23 members and 6 associate members were H.M. Tory; J. H. Grisdale, Federal Deputy Minister of Agriculture; J. A. Amyot, Federal Deputy Minister of Health; J. A. Baudouin, Professor of Hygiene and Director of the School of Applied Social Hygiene at the University of Montreal; J. G. Fitzgerald, Professor of Hygiene and Preventive Medicine at the University of Toronto and Director of the Connaught Labs; A. B. Macallum, Professor of Biochemistry at McGill; and University of Toronto's renowned Emeritus professor of zoology – Ramsay Wright. The international reputation that these members individually and collectively enjoyed contributed the Committee's success. Their willingness to name TB a serious national threat and, in Wright's case, to even come out of retirement to study it, underscored the importance of tuberculosis research.

Research Diplomacy

The ACTR's stature thus derived, at least in part, from the concern that eminent Canadians accorded the tuberculosis problem. However, reputation could not alone carry the ACTR; the Committee's success also derived from its members' ability to diplomatically articulate and implement a formal research program.²⁴ This task entailed the setting of priorities, the fostering of co-operative research arrangements, and the funding of investigations. At the ACTR's first meeting, Committee members identified the most significant immunologic, biochemical and pathologic questions of their time. These included investigations into the nature of chemical immunity; assessment of the relative merits of killed and live vaccines; the uses of x-rays in diagnosis; and 'differences in receptivity, susceptibility and pathological anatomy in man and in different species of animals, and whether these differences are referable to the bacillus itself or the animal host.'²⁵

24 For contrasting views of what this articulation of a research programme entails, see Yves Gingras, 'De l'enseignement à la recherche: l'émergence d'une nouvelle pratique de la physique dans les universités canadiennes.' *Histoire sociale/Social History* 37:2 ((May 1986)), 73-91 and Yves Gingras, 'The Institutionalization of Scientific Research at Canadian Universities: The Case of Physics,' *Canadian Historical Review* 67:2 (1986), 181-94. cf Daniel Kevles, *The Physicists: History of a Scientific Community in Modern America* (New York, 1977). See also, Ronald Rainger, Keith Benson and Jane Maienschein, eds. *The American Development of Biology* (New Jersey, 1991). and Keith Benson, Jane Maienschein and Ronald Rainger, eds. *The Expansion of American Biology* (New Jersey, 1991).

25 National Research Council of Canada, Associate Committee on Tuberculosis Research, *Minutes of the Second Meeting* (1925), 62-63.

The ACTR successfully convinced Council of the merits of such questions, and its efforts were financially rewarded. The Committee had begun work with a substantial budget of \$12,500, a sum that represented one of the largest expenditures Council had yet made and which it ranked second only to the grant awarded the Associate Committee on Cereal Grain Rust.²⁶ The following year, Council awarded the ACTR an additional grant of \$10,000, which was the largest sum appropriated.²⁷ By 1927, the ACTR received \$25,000, or fully one third of the \$74,464.89 that the Council expended in research grants.²⁸

However, though it had both the will and the resources to implement its research programme, the ACTR had limited means to do so. Money was not the problem. Once again, the ACTR's mandate proved the limiting factor. An arm of the NRC, its purpose was only to co-ordinate and promote existing research. It was to act as an umbrella organization that would 'undertake a comprehensive survey of existing scientific and industrial research,' 'organize, mobilize and encourage existing research agencies in Canada,' 'co-ordinate such research as is already going on, foster teamwork and gauge extension,' and 'inform and stimulate' public interest.²⁹

By adopting a form of scientific diplomacy that built bridges to the other agencies involved in tuberculosis research yet simultaneously mapped out a unique research terrain, the Committee manipulated this mandate to its own ends. As one of its earliest acts, the ACTR distributed a questionnaire, to fifty-three sanatoria, hospitals and universities across the country, which asked whether 'your institution be prepared to co-operate in carrying out in Canada a co-ordinated programme in Scientific Research on Tuberculosis?'³⁰ The Committee's 1925 questionnaire gauged the national need for tuberculosis research. It additionally solicited information about investigations already in progress, the availability of facilities, and questions that might be pursued were funding available. Responses to this questionnaire provided an indication of National interest and ostensibly guided the Committee. Nonetheless, the ACTR matched the abstract priorities it had established with work already in place. As Committee members sifted through numerous appeals for funding, they skilfully chose among competing in-

26 National Research Council of Canada, *Report of the President (1924-25)*, 64.

27 National Research Council of Canada, *Report of the President (1925-26)*, 80.

28 National Research Council of Canada, *Report of the President (1926-27)*, 76.

29 Eggleston, *National Research and Thistle, Inner Ring*.

30 National Research Council of Canada, *Associate Committee on Tuberculosis Research, Minutes of the Second Meeting (1925)*, 65.

terests and subtly directed Canadian initiatives toward the questions that its members had identified as key. The Committee accomplished this task by drawing connections between research problems. Directed, for example, toward studies of bovine tuberculosis, the ACTR made the case for investigations of human disease with the explanation that 'because of the essential unity of the problem of tuberculosis, it will be necessary to broaden the scope of the inquiry to include a study of certain phases of human tuberculosis.'³¹ The ACTR also used sensitive turf battles to its advantage and dismissed some research interests as the rightful jurisdiction of other governmental or private agencies. Simultaneously it staked its own turf by calling upon experts to testify to the importance of those questions it had chosen.³² Through publicity that drew attention to worthy causes, fund raising that marshalled additional monies for those causes, and a funding system that rewarded those causes, it institutionalized the ACTR's priorities.³³ During its first terms, the ACTR funded seven research areas which neatly mirrored the abstract priorities it had set. These included, 'the tuberculin question,' 'diagnosis,' 'the vaccination question,' 'chemotherapy and serotherapy,' 'bacteriology and pathology,' 'biochemistry of tuberculosis,' and 'epidemiology.'³⁴

The ACTR practised research diplomacy through its efforts to formulate and implement a unique research programme; it also did so through conscious efforts to make peace with the Dominion Department of Health and to avoid jurisdictional skirmishes with any other research agency. Senior officials at the NRC recognized that, having staked its claim to industrial hygiene, the Department of Health would closely scrutinize all further NRC ventures into health related research. Hence, in March 1927 Thomas Low warned H. M. Tory to consult widely and approach any new venture into tuberculosis research 'under very careful consideration . . . in view of the constant overlapping we have on these matters.'³⁵ Both here, and in the area of veterinary research, the ACTR consequently adopted a careful strategy of consultation and co-operation. It sur-

31 National Research Council of Canada, *Report of the President (1925-26)*, 30.

32 For examples see the correspondence between Tory and Low reprinted in Thistle, *Inner Ring*, 166-167.

33 In 1926-27, for example, the ACTR received \$10,000 from the Sun Life Assurance Company of Canada along with a commitment for three to five years of additional funding. See National Research Council of Canada, *Report of the President (1926-27)*, 45.

34 National Research Council of Canada, Associate Committee on Tuberculosis Research, *Minutes of the Third Meeting (1927)*. See also, National Research Council of Canada, *Report of the President (1925-26)*, 31-32.

35 Low to Tory, 17 March 1925, in Thistle *Inner Ring*, 166.

veyed the field to ensure that it had not usurped the interests of other investigators. 'If there is any research work being done other than preventative work,' Tory reassured Low 'in any department of the government at Ottawa, then I have been misinformed, as I was very careful to enquire about it.'³⁶ Moreover, the ACTR carefully and openly acknowledged the research underway in other departments. In its preliminary report, the Committee affirmed the importance of that ongoing research. And it put on paper its wish 'to commend and strongly endorse the work which has for several years been conducted in the Biological Laboratories of the Health of Animals Branch of the Department of Agriculture in research in the problem of bovine tuberculosis under the direction of Dr E. A. Watson.'³⁷

To ensure collegial relations, the ACTR also contacted and elicited the support of Watson, the Department of Agriculture's chief pathologist, and others who had already begun to study TB. Whether to expedite its own research initiatives, or to cover itself against the charges of overlap that had stymied its investigations into industrial hygiene, Council actively included those researchers in discussions of its scientific agenda. It then implemented some investigations co-jointly with other departments by fostering co-operative relations among varied researchers, subdividing its projects among them, and integrating, into a co-operative whole, investigations from nine participating organizations. By 1927, the Committee's co-operative agreement extended to personnel and projects housed within the Dominion Department of Agriculture, the Dominion Department of Health, the Indian Health Unit at Fort Qu'Appelle, Saskatchewan, the hygiene lab at the University of Montreal, the Connaught Labs at the University of Toronto, the Queen Alexandra Sanatorium in London, the Sun Life Assurance Company of Canada, Queen's University, and the University of Alberta.³⁸

Co-operation did not always prove successful. 'It would appear,' S.P. Eagleson wrote to H.M. Tory, in April 1927:

that this is but another of many examples which we have encountered where the departmental idea of co-operation is that the co-operation should all be on the part of the Research Council and that while they are quite willing for us to undertake difficult or unpromising problems, if any material progress is made with them, it should then be turned over to some Department to develop and exploit to their own credit . . . invariably when a department makes a success of work initiated by Council, it takes all the credit to itself, but if the work does not come up to the original expectations

36 Tory to Low, 13 May 1925, in *Thistle Inner Ring*, 167.

37 National Research Council of Canada, *Report of the President (1925-26)*, 30.

38 National Research Council of Canada, *Report of the President (1926-27)*, 43.

... the Department drops out of the picture and the Research Council is permitted to assume the blame.³⁹

As the early co-operative assessments produced results, members of the ACTR and the departments frequently disagreed on their significance and interpretation. Some of the dispute centred on the actual research findings, some on the question of to whom the work rightfully belonged. Again and again, Council ceded priority and credit for research.

Melding Theory with Practice: BCG Research

These squabbles hindered the progress of the ACTR, but bad as it might be for personal relations, in a paradoxical way the scientific controversy actually strengthened the ACTR's efforts to expand its mandate. In ceding priority and credit for co-operative investigations, Council had nonetheless gained the authority to pursue tuberculosis research. Departments might lay claim to research results, but no one, it seemed, doubted the ACTR's mandate. Moreover, as conflicts between the ACTR and the Dominion Department of Agriculture, or more specifically its pathologist Watson, came increasingly to turn on debates over BCG vaccine, the ACTR used that conflict to carve out a unique research agenda.

Mounting concern about the 'tuberculosis problem' had coincided with the introduction of BCG – a French anti-tuberculosis vaccine. In 1921, Albert Calmette, director of the Pasteur Institute at Lille, and his veterinarian colleague Camille Guérin had attenuated a form of the bovine tubercle bacillus to produce what became known as *bacillus Calmette Guérin*, or BCG. This vaccine promised to solve the bovine tuberculosis problem. Ten years of vaccination trials on cattle, Calmette and Guérin claimed in their earliest reports, demonstrated that BCG vaccination would safely and effectively eliminate that disease.⁴⁰

Eminent Canadian researchers had responded quickly and enthusiastically to Calmette's findings, which they deemed 'of great scientific importance and practical interest.' Immediately, E.A. Watson initiated vaccination trials. So did Dr A. C. Rankin, professor of bacteriology, Director of the Provincial Laboratory, and Dean of the Faculty of Medicine of the University of Alberta. Others fol-

39 S. P. Eagleson to H. M. Tory, April 14 1927, in Thistle, *Inner Ring*, p.250.

40 A. Calmette and C. Guérin, 'Nouvelles recherches expérimentelles sur la vaccination des bovides contre la tuberculose' *Annales des Institut Pasteur* 34 (1920), 37.

lowed suit and moved quickly to test the French promise that BCG would resolve persistent tuberculosis problems.

Canadian enthusiasm about BCG grew after 1924, when Calmette's colleagues, B. Weill-Hallé and R. Turpin published the first results of human vaccination. Parisian physicians associated with La Charité Hospital, Weill-Hallé and Turpin had clinical experience to confirm their suspicions that newborns were particularly susceptible to tuberculosis. They consequently administered BCG orally to over 100 infants. The positive results of this initial trial led them to administer a larger dose to over 350 infants. Following vaccination, tuberculous mortality dropped to 1.5/100, whereas in the population at large, mortality during the first year of life ranged from 13/100 to 28/100.⁴¹

Buoyed by these results, researchers in Montreal and Toronto prepared to embark upon human vaccination trials,⁴² and by 1925, BCG was 'already made in considerable quantity in Canada.'⁴³ But as the trials of BCG grew more numerous, so did concerns about BCG's efficacy and safety. It became clear that not all Canadians were convinced of BCG's safety. Because BCG was derived from an attenuated form of the bovine tubercle bacillus, British and North American physicians had long feared that it would revert to virulence. Watson, one of the first Canadians to employ the vaccine, numbered among those who questioned BCG's safety. His early findings precipitated conflicts between his home Department and the ACTR, which intensified as a growing body of American literature supported Watson's reservations.⁴⁴

Amidst the controversy, the need for an umbrella organization which would coordinate and evaluate the various independent efforts to tackle the 'tuberculosis problem' and gauge BCG's safety and efficacy became increasingly apparent. 'As you doubtless know,' H. M. Tory wrote to Thomas Low,

41 A. Calmette, C. Guérin, B. Weill-Hallé and R. Turpin, 'Essais d'immunisation contre l'infection tuberculeuse' *Bulletin de l'Académie de Médecine*, Paris 91 (1924), 987-96. Also, B. Weill-Hallé and R. Turpin, 'Sur la Vaccination antituberculeuse de l'enfant par le BCG,' *Annales des Institut Pasteur* 49 (1927), 253-270.

42 See National Research Council of Canada, Associate Committee on Tuberculosis Research, *Minutes of the Second Meeting* (1925), 205-211. See also J. A. Baudouin, 'Vaccination against Tuberculosis with the BCG Vaccine,' *Canadian Journal of Public Health* 27 (1936), 20.

43 National Research Council of Canada, Associate Committee on Tuberculosis Research, *Minutes of the Second Meeting* (1925), 38-45.

44 E. A. Watson, 'Report on BCG and Tuberculin in the Campaign against Bovine TB,' in National Research Council of Canada, Associate Committee on Tuberculosis Research, *Minutes of the Second Meeting* (1925), 188-90. For further discussion see Feldberg, 'Antitoxin,' 244-318.

the losses from tuberculosis in Canada are enormous both on the animal and human side . . . [but] in the past few years, such scientific progress has been made in the study of tuberculosis that it seems possible it might be mastered if a cooperative scientific effort were made.⁴⁵

No administrative machinery existed, however, to undertake this task. The British North America Act (1867) had made little formal provision for disease control and the responsibilities it did recognize it assigned to the Provinces. Because a strong tradition of judicially supported provincial rights persisted into this century, federal organizations could not easily supersede this balance of power. Indeed, during the 1920s, the Judicial Committee of the Privy Council struck down several national regulatory schemes.⁴⁶ South of the border, Americans had also grappled with the difficulties of organizing medical research. There, however, traditions of voluntarism and pharmaceutical manufacturing stood biological research in good stead. No similar tradition of voluntary organization existed in Canada, and its major producer of pharmaceuticals, the Connaught Laboratories, was an arm of the University of Toronto. Hence, though experiences with tuberculosis provided a clear imperative, both economic and jurisdictional obstacles impeded efforts to co-ordinate research on the disease.

Rather than shying away from controversy, the ACTR honed in on the problem of vaccination, increasingly directed its energies toward the 'vaccination question,' and moved in to fill the administrative gap. 'Much of the attention of the committee,' its third report to Council indicated,

is being given to a vaccine not previously tried in Canada. it was developed at the Pasteur Institute in Paris by Professors Calmette and Guérin, from whom it derives its name "Bacillus Calmette-Guérin," or "BCG" as it is commonly called . . . While BCG has not afforded complete protection against tuberculosis, even when used under Calmette's direct supervision, the results obtained are such as to justify the belief that this development marks an important forward step in tuberculosis research.⁴⁷

Though the ACTR continued its other investigations between 1927 and 1938, with every year it devoted more and more energy to investigations of BCG. Appraisals of the epidemiologic and clinical vaccination trials that it sponsored –

45 Tory to Low, May 13 1925 in Thistle, Inner Ring, 167.

46 Robert C. Vipond, 'Constitutional Politics and the Legacy of the Provincial Rights Movement in Canada,' *Canadian Journal of Political Science* 18:3 (1985), 267-291; Robert C. Vipond, *Liberty and Community: Canadian Federalism and the Failure of the Constitution* (Buffalo, 1991); Peter Russel; Rainer Knopf and F. L. Morton, *Federalism and the Charter* (Ottawa, 1989), Part I.

47 National Research Council of Canada, *Report of the President (1926-27)*, 44.

among cattle, school children and native populations – dominated its reports to the NRC.⁴⁸

The ‘vaccination question,’ though one on which Watson and the ACTR most strongly disagreed, consequently defined a research problem upon which the Committee could concentrate. Eminently practical, the vaccination problem also had important theoretical dimensions. BCG research raised fundamental questions about allergy, immunity and the relative merits of live versus killed vaccines. Such questions all impinged on the practical issue of safety, but they could also be pursued independently of that question, and by focusing on them the ACTR skilfully circumvented further battles over research territories. It found a way to pursue problems that had immediate significance, but to also give the Committee’s work a ‘theoretical’ slant that distinguished it from other governmental initiatives. BCG research allowed the ACTR to meld theory with practice and to define ‘medical’ questions that lay outside of the Dominion Departments’ mandates. Through the ‘vaccination question,’ it found a way to pose questions large enough and varied enough to include both Watson and those who disagreed with him; it successfully incorporated the departments into the ACTR’s research without treading dangerously on their turf.⁴⁹

The focus on BCG research also won Canada international acclaim. ACTR-sponsored epidemiologic and therapeutic trials of BCG brought Canadian researchers into co-operative arrangements with French, British and other foreign scientists, and they garnered Canada’s reputation within the international research community.⁵⁰ On the merits of these investigations, Canada emerged as one of the world’s leading producers of BCG; as late as 1960, the Connaught Labs served as the United States’ major supplier.

Ultimately, the institutional stature of the ACTR drew Canadian attention to the cause of and created a national place for medical research. In 1938, when the NRC formed its Medical Research Committee, it openly acknowledged the precedent of the ACTR.⁵¹ Yet, by using the ACTR to institutionalize medical re-

48 See, for example, National Research Council of Canada, *Report of the President (1937-38)*, 122-124.

49 E.A. Watson, ‘Studies on Bacillus Calmette-Guérin and Vaccination Against Tuberculosis,’ *Canadian Journal of Research* 9 (1933), 128-136.

50 For a more complete discussion of the Canadian trials and their importance see Wherrett, *Miracle*, 58-71; Feldberg, ‘Antitoxin,’ 281-345.

51 National Research Council of Canada, *Report of the President (1937-38)*, 9.

search, the NRC had followed a most circuitous path. In other areas, such as chemistry and physics, the NRC had adopted a far more direct approach and constituted overarching, disciplinary bodies. The mandate of the NRC, the significance of tuberculosis as a disease, and the intellectual and institutional contexts in which tuberculosis research was conducted provide insight into Council's actions. Established to consider the relations between science and industry, the NRC could not easily engage in studies of health, nor did it possess the power to chart out new areas for investigation. Its entry into the health field consequently depended on the skilful manipulation of its mandate. As first Council and then its 'small committee of gentlemen' well appreciated, tuberculosis figured prominently among the nation's economic problems. Its agricultural and industrial significance justified, even demanded, the NRC's attention. Simultaneously, however, the intersection of human health with industrial problems tied the Committee's hands. By capitalizing on political and institutional events, carefully defining a research programme, practising scientific diplomacy, and melding practical with theoretical concerns, the ACTR managed to circumvent the obstacles to its entry into medical research. The Committee also took advantage of distinctions between pure and applied research. Practical concerns drew the NRC's attention to health, yet, the ACTR articulated its research programme and made its reputation by disjoining the technicalities of disease control from the theory that underlay them. Its pragmatic appeal to this 'research ideal,' its recognition of the essential links between health and the industrial order, and its ability to subsume a range of concerns under the 'tuberculosis problem' allowed the NRC to capture the medical research program and make it so successful.