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The Origins of the Institute for the History and Philosophy of Science and Technology

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Article abstract

An effort to establish programs of study in the history of science took place at the University of Toronto in the 1960s. Initial discussions began in 1963. Four years later, the Institute for the History and Philosophy of Science and Technology was created. By the end of 1969 the Institute was enrolling students in new MA and PhD programs. This activity involved the interaction of the newly emerging discipline of the history of science, the practices of the University, and the perspectives of Toronto's faculty. The story of its origins adds to our understanding of how the discipline of the history of science was institutionalized in the 1960s, as well as how new programs were formed at that time at the University of Toronto.

The Origins of the Institute for the History and Philosophy of Science and Technology

Philip Enros

Abstract: *An effort to establish programs of study in the history of science took place at the University of Toronto in the 1960s. Initial discussions began in 1963. Four years later, the Institute for the History and Philosophy of Science and Technology was created. By the end of 1969 the Institute was enrolling students in new MA and PhD programs. This activity involved the interaction of the newly emerging discipline of the history of science, the practices of the University, and the perspectives of Toronto's faculty. The story of its origins adds to our understanding of how the discipline of the history of science was institutionalized in the 1960s, as well as how new programs were formed at that time at the University of Toronto.*

Résumé : *Un effort soutenu en vue d'établir des programmes d'études en histoire des sciences s'est déroulé à l'Université de Toronto durant les années 60. Les discussions initiales ont eu lieu en 1963 et, quatre ans plus tard, l'Institut d'histoire et de philosophie des sciences et des technologies a été créé. A la fin de l'année 1969, l'Institut recrutait des étudiants à la maîtrise et au doctorat. Cette activité impliquait une interaction entre la discipline émergente qu'était l'histoire des sciences, les pratiques de l'Université et les perspectives de la faculté de Toronto. La reconstitution de ses origines à Toronto nous permet de comprendre comment la discipline de l'histoire des sciences s'est institutionnalisée dans les années 60 ainsi que la manière dans les nouveaux programmes étaient formés à l'époque à l'Université de Toronto.*

Keywords: Institute for the History and Philosophy of Science and Technology, history of the history of science, history of science programs in Canada, history of the University of Toronto, John Abrams

THE UNIVERSITY OF TORONTO'S BOARD OF GOVERNORS approved the creation of an Institute for the History and Philosophy of Science and Technology in 1967. That year is commonly taken to mark the beginning of the Institute. However, the emphasis on 1967 tends to obscure the fact that efforts to establish programs in the history of science took place over an extended period of time, beginning in 1963. And it would take another two years before the Institute began to offer its own degree programs in 1969. This article traces the activities over that six-year period which gave rise to and shaped the Institute, Canada's first graduate program in the history of science.

The Presidential Advisory Committee

The creation of the Institute for the History and Philosophy of Science and Technology began with an informal meeting of six University of Toronto staff in the fall of 1963: Vincent Bladen, dean of the Faculty of Arts and Science

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and a political economist; Maurice Careless, chair of the History Department; Tom Easterbrook, chair of the Department of Political Economy; James Ham, professor of Electrical Engineering; John Hamilton, dean of the Faculty of Medicine; and Moffatt St. Andrew Woodside, vice-president academic.[1] All had an interest in the history of science, although none were active participants in the field. Soon three other faculty joined the group: John Abrams, a newly appointed associate professor in the Department of Industrial Engineering; Thomas Goudge, chair of the Philosophy Department; and, Norman Hughes, dean of the Faculty of Pharmacy. They were somewhat more knowledgeable about the history of science with Abrams being the most familiar with the subject. He had taken a number of graduate courses in the history of science at University College London during 1949-51 and was a member of several relevant organizations including the History of Science Society and the Canadian Society for the Study of the History and Philosophy of Science.[2] Goudge worked in the philosophy of biology and had written *The Ascent of Life*, which had won the Governor General's Literary Award for Non-Fiction for 1961. Hughes had taken a special interest in the history of medical science, and his faculty offered courses in the history of both medicine and pharmacy. In addition to these three individuals, there was some thought given to adding Marshall McLuhan, who was "exceedingly interested" in the area. But it was decided that it would be better to consult with him at a later stage.[3]

Woodside reported on the meeting to the University's president, Claude Bissell, recommending a Presidential Advisory Committee on the History and Philosophy of Science. The use of such committees was a typical way at that time of moving forward with issues. The committee was to examine the desirability and feasibility of establishing such studies and how they should be organized. Bissell approved and named Woodside its chair.[4] The latter had, only a few months earlier, been appointed vice-president academic. He had a long association with the University, graduating from it in 1928 with a BA in classics and winning a Rhodes Scholarship. Woodside had taught ancient history at Toronto, and served as Dean of the Faculty of Arts from 1952 and Principal of University College from 1959.

The committee was not the first attempt to advance the history of science at the University of Toronto. A decade earlier, the Special Committee on the Humanities had recommended a chair in the history of science.[5] Arising out of concerns with the status and future of the humanities, the Special Committee —which included Woodside and Goudge, with Harold Innis chairing—had considered injecting "more humanistic studies into the honour courses in the natural sciences and the social sciences."[6] It felt that the study of the history of science could help achieve that goal. There was far from unanimous support, however, for this view. Several departments, including Geology, Mathematics, Physics, and Zoology disagreed, arguing that it would be difficult to find the right person for the chair, that it was a subject more suited to graduate study, and that courses in history of science might turn out to be more scientific

Figure 1. *Moffatt St. Andrew Woodside, with Northrup Frye to his left. Photo credit: Fednews, Toronto. Source: University of Toronto Archives.*

than humanistic in nature. The recommendation was not implemented, which suggests the Woodside committee may have been seen as an opportunity to deal with unfinished business.

The members of the committee were also not the first Toronto faculty to find the history of science appealing. For many decades, several scientific staff had taken an interest in the history of their disciplines. Anatomy professor James Playfair McMurrich (1859-1939), for example, had authored a study of Leonardo da Vinci's work on anatomy in 1930.[7] McMurrich, along with several other Toronto faculty—including George Wrong, head of the History Department—had been founding members of the History of Science Society in 1924, of which McMurrich would later become President.[8] Faculty interest at

Toronto had also resulted in a variety of courses in the history of science, which had been offered over a long period of time.[9] When Woodside's committee was formed, over a dozen of these courses were listed in the University's calendars. For example, a philosophy of science course was available to undergraduate engineers, a history of biological science to both undergraduates and graduates in Zoology, and a course in the historical development of mathematical thought to graduate students in Educational Theory. The situation of the history of science at Toronto before the 1960s reflected the general state of the history of science prior to the Second World War: it was an emerging field with scientists as its main participants (their basic interest then being in legitimizing science), and university courses in the subject depended on the enthusiasm of individual faculty.[10]

At the University of Toronto, the renewed engagement with the history of science took place in a context quite different from that of a decade earlier. In the postwar period, science underwent a rapid expansion, and had secured a general prestige and public faith in its development. The University also had a greater capacity for starting up new programs of study. With growing funding in the 1960s, the scale of operations at the University of Toronto had begun to greatly expand with increasing student numbers, new and reformed undergraduate and graduate programs, higher levels of research activity, and a building boom.[11] Bissell assessed the sixties as "a decade of institutional growth so great it often amounted to institutional transformation."[12]

There was also a shift underway in the study of the history of science. After the Second World War, the practice of the history of science, particularly in the US and the UK, began a transformation into a separate academic specialization.[13] Building on the expansion of universities at that time, it became better established. There was a rapid growth in graduate programs in the field, particularly in the late 1950s and early 1960s. By 1965, 15 doctoral programs in the history of science could be found in the US.[14] With this growth came a change in the profile of its practitioners. Individuals trained in the history of science, using the methodologies of history, displaced scientists. Some of the members of the Woodside committee—Abrams, Hughes and likely Goudge—were well aware of this development.

A final difference from the 1950s was that interest in building a program in the history of science at the University of Toronto no longer originated in concern about the humanities. While departments like Philosophy and History were still interested, it was the professional faculties who were particularly keen. This was mainly due to their belief that students ought to know about the heritage of their chosen professions. Hughes, for example, argued for an integrated program in the history of science and certain professions.[15] He believed that each "professional person should know something of the historical background of his calling." A similar view, of course, had earlier stimulated the interest of scientists in the history of science.

The first meeting of the Presidential Advisory Committee was held on

November 7, 1963. Members quickly agreed that the University should offer courses in the history and philosophy of science.[16] They stressed that when referring to 'science' they also included technology. This was not a common practice at the time and may have been due to the presence of engineers and economists on the committee, as well as the fact that Toronto was the university of Harold Innis and Marshall McLuhan.[17] The latter's Centre for Culture and Technology had been expressly created for him earlier that year.

The committee identified a number of issues: the demand for history and philosophy of science, how the subject should be organized, and the need to recruit staff. They decided that they should seek advice from some of the subject's leading scholars. Woodside invited Bernard Cohen of Harvard and Charles Gillispie of Princeton to visit Toronto in January to meet with the committee. Cohen was unable to accept, but wrote: "It is very exciting to know that the University of Toronto may be planning a real effort in the area of history and philosophy of science, a move which would certainly be welcomed by many segments of our profession."[18] Gillispie was able to travel to Toronto and spent a January day in Toronto with the committee, which reported "a complete and exceedingly profitable discussion with him."[19]

In advance of meeting with Gillispie, committee members shared information. Hughes distributed material on the programs in history of science and in history of pharmacy at the University of Wisconsin. A major effort in these areas had commenced there in 1947, growing to become the "first full-fledged" department of the history of science in the United States.[20] Hughes also tried to set up a meeting with Ernst Stieb, a Toronto alumnus who had completed a doctorate in the history of science and pharmacy at Wisconsin and was currently on its faculty. But that did not work out. Ham circulated news about final-year undergraduates at the University of Cambridge now being able to devote their studies to the history and philosophy of science.[21] And Abrams, with Woodside's approval, talked with several participants at the December meetings of the History of Science Society and the Society for the History of Technology in Philadelphia. There he spoke with several "old friends", including Marshall Clagett, Derek de Solla Price, Gerald Holton, Thomas Kuhn and Joseph T. Clark, about how the field was organized at their universities and the challenges they faced.[22] Abrams reported that the history of science was growing in the US, that it was advisable to have a group of scholars rather than just one individual in the field, and that "serious courses" should be offered. By "serious" he meant that they needed to be based on research, graduate study, and adequate library resources. The history of science was also viewed as being more than the history of specific disciplines. It involved cross-fertilization among the disciplines as well as the interaction between science and society.[23]

The committee now felt it had enough information to move forward. At its meeting on March 19th, attended also by Ernest Sirluck, the dean of the School of Graduate Studies, the members decided to prepare a report for Bissell. They had concluded that the priority was to appoint qualified scholars, and set aside

earlier questions about demand, believing that it would appear once "proper work" in the history and philosophy of science was established.[24] In the same vein, they decided that it was unnecessary to compile a list of existing courses in the University because they were "quite different in character from courses in the history of science." Reflecting Abrams' comments about serious courses, they viewed the history of science as a newly developing discipline, where "the 'amateur' has rapidly been giving way to the true professional, educated in the methods of historical or philosophical investigation."[25]

The committee's report to Bissell did not consider it necessary to rationalize why the history and philosophy of science was needed at Toronto. Perhaps advocating on the basis of George Sarton's new humanism or of James Conant's vision of general education was outmoded by the early 1960s. Indeed, Bernard Cohen was then arguing that "it is surely no longer necessary to justify the study of the history of science."[26] The committee limited itself to saying that the subject was essential to the study of civilization and that the University of Toronto should establish these studies "not because other universities are doing so, but because such studies are valid, important and productive of intellectual advance."[27]

The committee's report to Bissell made several recommendations. It suggested appointing at least two and ideally four qualified scholars, one of whom would be a senior scholar. These staff could be appointed in various faculties but should be given cross-appointment in History or Philosophy or Political Economy so as not to be isolated from other staff with historical or philosophical interests. The new staff might ultimately be organized into a centre or a department. In the meantime, the committee would remain in existence in order to support and advise them. The report also recommended that the work of the staff be not necessarily limited to undergraduate instruction. The committee believed that the "discipline should be allowed to develop in its own way."[28]

Presumably Bissell responded by asking for a budget, for the committee met in October to review a proposed budget. The members suggested a total of $42,000 with $20,000 for a senior appointment, $10,000 each for two other faculty, and the remaining $2,000 to cover the group's expenses. The committee also suggested consulting with the University Librarian to see if $8,000 could be found from his budget for books. The committee cautioned the President that "good scholars in this discipline are scarce and that the demand is great and becoming greater."[29] Bissell authorized a search for a senior person who would then recommend additional staff and guide the establishment of the history and philosophy of science at Toronto.[30]

Goudge advised Woodside that the senior appointment should be someone competent in both the history and the philosophy of science.[31] He suggested individuals such as Mary Hesse, Norwood Hanson, Stephen Toulmin, and Thomas Kuhn. Other committee members also made nominations. On December 2, 1964, the committee met to consider a list of twenty candidates. The committee decided to approach Hanson, a philosopher of science and

a recent hire at Yale. Earlier he had built a large program in the history and philosophy of science at Indiana University and had been involved in establishing the subject at the University of Cambridge.[32] Woodside wrote on December 7th to sound him out. Hanson replied that while he would have to be offered more than $20,000, he was attracted by the opportunity of setting up a new program. He offered to visit Toronto in order to further explore possibilities with the committee.[33]

Hanson flew himself to Toronto and was there in late January 1965.[34] He met with the committee and with Bissell to discuss the University's plans. Goudge found his presence "robust, hard-driving and stimulating."[35] Hanson was enthusiastic about what might be done at Toronto, writing afterwards to Woodside:

> … your ideas concerning the history and philosophy of science are the most mature and reasonable I have encountered in a long time. My resolutions are firm now; I mean to help all I can in your admirable efforts to establish Toronto as THE center for advanced research and teaching in H+P of S.[36]

Hanson promised to prepare a report on his ideas. He also enlisted Stephen Toulmin's input and urged Toronto to consider recruiting him.

Hanson argued that Toronto's program would fit best in the School of Graduate Studies.[37] The program "should begin as an attack on 'frontier' problems in the history and philosophy of science," he wrote. This would not be a "one-man 'humanities' operation." It required recruiting staff "of the highest caliber" rather than "just a gaggle of interested amateurs, ex-scientists, or very inexperienced PhDs." Hanson's vision was ambitious. He estimated it would require over $180,000, including a director at $23,500, four senior staff at $20,000 each, support staff, and other expenses. The result, he claimed, would place Toronto at the "pinnacle of studies in the 'humanities of science'." The University's "humanists will at last come to recognize the centrality of the scientific adventure within the history of Western thought" and its scientists "will begin discussing, as they rarely can do now, the conceptual consequences of their own disciplines, the sociological impact of what they are doing, the historical roots of the laboratory work they hold dear." The program's studies would "naturally percolate downwards" and transform undergraduate studies. Attached to Hanson's report was a supplementary note by Toulmin. He believed that the proposed program at Toronto should be broader in scope than simply history and philosophy to encompass the "whole range of ways in which science interacts with its larger human environment." Toulmin urged the hiring of one or two scholars working on the "economic, political or sociological aspects of science."

Woodside's committee met in late February to consider Hanson's report. They were "enthusiastic about his proposals," agreeing in particular that the program should start at the graduate level. But they thought it impossible to find the amount of funding required.[38] Goudge noted in his diary that the committee was "rather staggered" by Hanson's proposed budget.[39] Nonetheless,

they decided to seek from Bissell clarity about a maximum budget. They also agreed that if the amount was insufficient for Hanson's plan, they would inform him and invite Toulmin to Toronto. A week later, Bissell told Woodside that the committee could count on $100,000 a year.[40] Woodside shared this with Hanson and Toulmin, and invited the latter to meet with the committee in Toronto. Toulmin declined, deciding to accept a position at Brandeis University instead.[41]

The committee now had doubts that a prominent scholar could be attracted to Toronto. However, they still liked Hanson's scheme and decided to approach three other candidates: Gerd Buchdahl at Cambridge, Alistair Crombie at Oxford, and Thomas Kuhn at the Institute for Advanced Studies, Princeton. Abrams called Kuhn who declined because he had just recently joined Princeton.[42] Crombie also turned down the opportunity, saying that he couldn't move his children at that time.[43] And Buchdahl similarly declined because of his children's schooling as well as his publishing commitments.[44]

When the committee next met in November, it was clear that they needed to approach their objective in a new way.[45] The members proposed launching several initiatives aimed at making a "definite beginning" in the study of the history and philosophy of science at Toronto. One was to review existing assets at Toronto and consolidate them. Bissell suggested making use of William E. Swinton, who was due to retire as Director of the Royal Ontario Museum in June 1966. Bissell wanted to use Swinton's "authority as a scholar and his persuasiveness as a lecturer to advance the interest of the History of Science."[46] Swinton was later named the Centennial Professor in the History of Science, with the task of giving a series of lectures. Another effort was to form in early December 1965 a Toronto Section of the Canadian Society for the Study of the History and Philosophy of Science. Swinton was elected president, and Abrams secretary.[47]

In addition, the committee proposed a lecture series, inviting outside scholars. A hoped-for side-benefit would be that some of them might find Toronto attractive enough to join the University. Ultimately the committee concluded that it was not positioned to pursue these activities. A different organization was wanted, a smaller, active one headed by someone knowledgeable in the history and philosophy of science. The members believed the ideal candidate was Abrams, who had expressed interest in helping advance the project.

Woodside asked the Faculty of Applied Science and Engineering if Abrams could take on this task. The next, and last, meeting of the Presidential Advisory Committee took place on December 6th and recommended the creation of a new committee.[48] A week later, Abrams met with Bissell who agreed to form a new presidential committee oriented to building on Toronto's resources. Bissell gave it $2,000 to cover expenses.[49]

The Committee on History and Philosophy of Science

John Abrams had joined the University of Toronto in July 1963. Prior to that he was chief of operations research at the Defence Research Board in Ottawa.[50] It is not known why he left the Board. It has been suggested that he had reached his ceiling or that he might have been unhappy with the policies of the Diefenbaker government.[51] Bissell, who knew him fairly well—they had been neighbours in Ottawa—suspected that it was "because he was more interested in increasing human understanding than in developing weapon sophistication."[52] Some things are known: the department he joined, Industrial Engineering, recruited him because it wanted to establish a graduate program, and the move meant a cut in salary.[53]

Although Abrams devoted most of his time to operations research and was not active in history of science scholarship, he had a longstanding interest in it. Born in San Francisco, he obtained a PhD in astrophysics in 1939 from the University of California, Berkeley. After service with the Royal Canadian Air Force during the Second World War, where he became involved in operations research, he taught university for a few years. Abrams became interested in the history of science while teaching a general-education science course for non-science majors at Wesleyan University. He joined Canada's Defence Research Board in 1949 and was given a scholarship.[54] He spent the next two years in London, splitting his time as a liaison to the Royal Navy and a student in the history and philosophy of science at University College London, the major centre for such studies in the United Kingdom at that time. His notebooks show he took almost all of the 14 courses available there, from scholars such as Herbert Dingle, Alistair Crombie, and Angus Armitage.[55] Abrams returned to Canada in 1951, continuing to keep in touch with the field.

Given his interests and experience, it is not surprising that Abrams was asked to be the chair of the new Committee on the History and Philosophy of Science. One of the challenges facing the Presidential Advisory Committee, given its members' busy schedules, had been finding time to meet.[56] The individuals in Abrams' group did not occupy senior administrative posts, and they were half as many in number. Besides Abrams, the group included Maurice Careless, chair of History, who had also served on Woodside's committee; G.R. (Pat) Paterson from the Faculty of Pharmacy, who had founded the Canadian Academy of the History of Pharmacy in 1955; James M.O. Wheatley, a philosopher of science; and, Edward A. Sellers, chair of Pharmacology in the Faculty of Medicine. The group's task was to take practical steps to foster the subject in the University. It acted quickly, meeting three times and reporting back to Bissell before the end of March 1966.

Bissell approved the group's plans, which included proposals on course offerings, appointments of historians and philosophers of science, and library requirements.[57] Bissell also bolstered Abrams' position by arranging a cross-appointment to the History department, revealing that history of science was perceived to be largely rooted in the discipline of history. Careless, who had

been very engaged in establishing history of science at Toronto, was glad to make the appointment. However, he also believed the subject was best pursued in a separate unit and not as part of the History department.[58] Careless's position shows that history of science was considered at Toronto, at least by History, to be an interdisciplinary field, albeit one which was beginning to produce its own specialists.

Abrams' cross-appointment triggered a decision by Arthur Porter, chair of Industrial Engineering, to not promote Abrams to the level of professor. Abrams was bitter, feeling that this broke a gentleman's agreement he had with Porter when he had joined the department.[59] Bissell advised Abrams to accept the situation for now "with the expectation that we would establish asap a Department of History and Philosophy of Science" to which he "would be appointed as Professor, probably as Acting Chairman and possibly as Chairman."[60] The following year Abrams was promoted to Professor in both Industrial Engineering and History.

The first item on the committee's plan of action was to circulate a questionnaire to university faculty. It had a dual purpose: to inform faculty of what the committee hoped to accomplish, and to gauge their interest in participating in its activities.[61] Over two hundred faculty (about 15% of the total) replied that they would be interested in attending public lectures or faculty-student and graduate seminars.[62] In addition, a survey of departments in the Faculty of Arts and Science revealed that 70% of them thought that there would be interest among their students in the history of science.[63]

The questionnaire prompted the University Librarian to reply that the existing collection would need "heavy reinforcement over a period of years" in order to support graduate study. The Library began to take steps to do just that. It applied for a grant from the Canada Council to improve its collection in the history of science, receiving $10,000 in 1967.[64] It also acquired, that year, a major collection of Charles Darwin material. And in the same year, the Library offered to store Stillman Drake's large collection of Galileana.[65]

Another initiative was a public lecture series, funded with a $6,000 grant from the university's Varsity Fund.[66] Derek de Solla Price from Yale University gave the first lecture in October of 1966 on "The Mythology of Science" before an audience of 140. Another ten historians of science, almost all of them from other universities, gave public lectures during the 1966-67 academic year. The afternoon lectures were followed by meetings with graduate students and faculty. The series was judged to have been an enormous success and continued for several years, into the 1970s.[67]

Abrams' committee also initiated some courses in the history of science. A beginning was made when the Council of the Faculty of Arts and Science approved a course in June 1966. Bissell was in attendance at the Council meeting, supporting the decision and declaring it to be "long overdue."[68] The course was a first-year Religious Knowledge option. These one-hour-a-week options had originated as a way of allowing the University's church-federated

Figure 2. *Claude Bissell, with Omond Solandt to his right, 1969. Photo credit: Robert Lansdale. Source: University of Toronto Archives*

colleges to offer religious instruction. The secular University College offered its students a variety of choices to meet this requirement. The history of science option began in 1966-67 as History 116 and was taught by Abrams, attracting 40 students.[69] He modeled it on a non-credit, survey course for adults he had given in the University's extension division in 1964 and 1965.[70] In addition to the undergraduate course, Abrams led a weekly graduate seminar that used both the visiting lecturers in the public lecture series and University faculty. History and Philosophy sponsored the seminar, which attracted some 20 graduate students from a wide variety of departments: mathematics, history, philosophy, architecture, physics, medicine, pharmacy, languages and literature, and social work.[71]

Abrams' committee also pursued Bissell's commitment to establish a dedicated department. Dean of Arts and Science Albert D. Allen organized

a meeting in October 1966 with departmental chairs from History (Careless), Philosophy (Goudge), and five science departments to discuss this possibility. While there was "sympathy and support," there was doubt about the suitability of undergraduate studies in the history and philosophy of science.[72] In line with Hanson's advice, the group believed that an institute should be created within the School of Graduate Studies. Sirluck, who was also at the meeting, thought that was feasible. The School was already home to a number of graduate centres and institutes, many of them recently created in the University's favourable environment for interdisciplinary studies.[73] Sirluck saw these units as ways of permitting "horizontal, multidisciplinary specialization to run in parallel with the vertical, disciplinary specializations of the traditional departments."[74] Abrams' committee agreed and sought Bissell's approval. He met with Abrams and Sirluck on December 16, 1966.[75]

At the meeting, Abrams also asked to make two appointments in the history of science. Despite all the activity to build up and upon interest at the University, the Abrams' committee held firm to the view that a group of specialists was needed to supervise graduate studies and undertake research. Probably in preparation for the October discussion at Arts and Science, Abrams had put together a tentative budget of about $50,000 based on two full-time and two half-time staff.[76] Abrams would soon have some candidates for the full-time positions. For the hope that the public lectures series might turn up some scholars willing to move to Toronto was to be realized.

The second speaker in the series was Stillman Drake. His lecture, "The Scientific Personality of Galileo," was given on October 28, 1966 and was well received. He and Abrams must have discussed the possibility of a position at Toronto, because soon after Abrams raised the issue with Bissell. Drake had never had an academic appointment. After a bachelor's degree in philosophy and some graduate work in mathematics at UC Berkeley in the early 1930s, Drake had worked in the financial sector. Outside this employment, he had become a renowned Galileo scholar. Harvard had tried to recruit Drake a few years earlier, but he had then felt unable to leave his employer, a San Francisco-based investment-banking firm.[77] Clearly things had changed by late 1966. Drake found the situation at Toronto attractive. He thought the University had a "particularly enlightened attitude" concerning interdisciplinary studies. He appreciated the resources available there through the Centre for Renaissance and Reformation Studies and the Centre for Medieval Studies.[78] The position would allow him to spend more time on his research. The presence of a friend —Kenneth May, a mathematician and historian of mathematics hired in July 1966—was as well "no small factor" in bringing him to Toronto.[79] Furthermore, Drake's plans to remarry may also have played a part in his decision to begin an academic career.

The University moved quickly. Sirluck set up a committee to consider Drake for a professor's position. Letters of support were obtained from Marshall Clagett, Charles Gillispie, Derek de Solla Price, and Bernard Cohen—all of

them senior historians of science. Drake received a letter of offer in early February and soon accepted a full professorship with tenure commencing July 1 1967. Gillispie wrote to Drake in January 1967, following delivery of one of the public lectures at Toronto:

> … after two visits to Toronto I have formed a very good impression of the tone and intellectual vigor of the university. John seems to have created a very hospitable climate for history of science, and your being there would certainly establish the subject in a most important and gratifying way."[80]

Within the history of science community, recruiting Drake would have been considered quite a coup for Toronto. At the same time as Drake accepted, Abrams secured the second appointment. Once again, it came about through the public lectures. Bernard Cohen had given the third talk in the series, on November 1, 1966. He recommended a Harvard doctoral student to Abrams, Jonathan Hodge, who specialized in the history of biology. Hodge came to Toronto for an interview in January and subsequently accepted an assistant professorship, with a starting date of July 1st. Typical for this period of university expansion, Hodge had not yet finished his dissertation. In addition to Drake and Hodge, the Faculty of Pharmacy attracted Ernst Stieb to return to Toronto from Wisconsin as a professor of the history of pharmacy. A good beginning had been made in assembling a core group of professionals.

While these individuals were being hired, Abrams' committee prepared a short proposal recommending a graduate institute in the history of science for submission to the Council of the School of Graduate Studies. It stated that the institute's purpose was to bring together scholars interested in the subject and to support a research program.[81] Until the proposed institute could offer its own degree programs, it would give courses and seminars to graduate students registered in existing departments. And, it would provide limited undergraduate instruction as necessary.

The Council met on March 17, 1967 and established a committee to consider the proposal.[82] The committee members felt that they had been placed in a difficult position given that faculty had just been hired with the intention of eventual appointment to the institute. Nevertheless, they studied the proposal during three meetings in April. They were in "unanimous agreement that there is a real need for study and research in an important area between the humanities, sciences, and the professions which is presently being neglected."[83] They also agreed that a separate unit was needed, and estimated that it would require $100,000 in its first year. The committee was also responsible for giving the institute, as it acknowledged, the "cumbersome" title of Institute for the History and Philosophy of Science and Technology. The committee wished to be clear that the research of the institute would be "on the philosophical as well as the historical aspects" of science and of technology.

The committee reported back to the Council on April 26th. After a full discussion, the Council resolved that the establishment of the Institute for the History and Philosophy of Science and Technology be recommended to

the Senate.[84] The latter gave the item first reading, without any discussion, on May 29th, and agreed with creation of the Institute at its meeting on October 13th.[85] The Board of Governors approved the Senate's decision on October 26th.[86] One of the main goals of Abrams' committee had been realized. The Institute was now officially established. Yet another committee was struck to recommend a director. Not surprisingly, it unanimously nominated Abrams, who was appointed director of the Institute in March 1968 and approved on June 27th by the Board of Governors for a five-year term.[87]

When Drake and Hodge moved to Toronto in the summer of 1967, the Institute's establishment was still underway. They were both appointed to the History department and joined Abrams and his secretary, Lorna Price, at 621 Spadina Avenue, where Abrams had been given office space after his cross-appointment to History the year before. The additional staff permitted an increase in the number of history-of-science courses, all offered under the auspices of the History department. Four graduate courses were given, attracting 25 students. Abrams gave one on the history of the physical sciences and another on medieval astronomy (cross-listed with the Centre for Medieval Studies), Hodge a course on the history of the biological sciences, and Drake one on the Scientific Revolution. The undergraduate offerings were also expanded. There were now two Religious Knowledge courses: a first-year offering on the history of the physical sciences (150 students) and a second-year one on the biological sciences (80 students). There was also a new course taught by Abrams in the Faculty of Applied Science and Engineering, a third-year elective on the history of technology and engineering (125 students).[88] It would prove to be so popular with engineering students that it would cause tensions within the Institute around the appropriate balance between undergraduate and graduate teaching.

The developing program at Toronto did not go unnoticed by the broader history-of-science community. Derek de Solla Price included Abrams' committee in his published guide to graduate programs in the history of science, prepared in the spring of 1967.[89] It listed Abrams, Drake, Hodge, Stieb, and Swinton as faculty with May as an associate, noting that a degree program was anticipated in 1968-69. Coincidentally, both the History of Science Society and the Society for the History of Technology met in Toronto in December 1967, due to the meeting there of the American Historical Association. Abrams was in charge of local arrangements for both groups.[90] He was asked by the Society for the History of Technology to organize a session on work done in Canada in that field. The result was two speakers: J. J. Brown on technical museums in Canada, and Duncan F. Cameron on the importance of the history of technology to the contemporary museum visitor.[91] Mel Kranzberg, a professor of history and secretary of the Society, wrote to the University to acknowledge Abrams' assistance. He noted that

> … my colleagues and I were tremendously impressed by the announcement of your new Institute for the History and Philosophy of Science and Technology. The scope of this

> project and the scholarly resources which are mustered together promise to make it one of the great centres of knowledge and study of these extremely significant elements in our contemporary culture. I am certain that this new Institute will add lustre to your already great university.[92]

Kranzberg's letter serves as one more instance of the general support that the Toronto effort to establish a program received from the American history of science community.

By the close of 1967, much progress had been made. Specialists in the history of science had been recruited, course offerings expanded, a successful public lecture series extended, and a separate graduate institute created. Abrams' committee began to focus on its next steps, which were primarily about the structure and programs of the Institute.[93] It proposed that faculty whose principal interest was in the work of the Institute should be core members, whereas those who had related, but not primary interest, would be affiliates. The committee also identified a need for two new staff specializing in the history of technology, biology, chemistry, or geology. The most important challenge now was to design and obtain approval for graduate degree programs. With the formation of the Institute, however, all these tasks would be assumed by that organization. The Committee on History and Philosophy of Science was not formally disbanded until August 1968, but it appears to have had its last meeting in December 1967.

The IHPST

The establishment of the Institute within the School of Graduate Studies meant that its budget, space requirements, and other issues would be dealt with there rather than through discussions with the President. In 1968, the Institute had, for the first time, an entry in the School's Calendar. Some 15 faculty were listed. Besides Abrams, Drake, and Hodge from the History department, there were Pat Paterson and Ernst Stieb from Pharmacy, Kenneth May (Mathematics), William Swinton (Geology and Zoology), Francis Priestley (English), Ursula Franklin (Metallurgy), James Weisheipl (Medieval Studies), and five individuals from Philosophy—Thomas Goudge, J. Willison Crichton, Armand Maurer, James Wheatley, and Fred Wilson.[94] These faculty would comprise the first members and affiliates of the Institute, and would begin to meet to discuss the Institute's business.[95]

Abrams had asked for two new appointments for 1968-69, but received permission for one. Trevor Levere, a student of Crombie's at Oxford working on a dissertation in the history of chemistry, accepted the offer. When he arrived in Toronto, he joined Abrams, Drake, Hodge, and two secretaries at a new location. The Institute had moved to four leased rooms on the second floor of 191 College Street.[96]

The Calendar also listed 16 courses: four offered through History (the same ones given by Abrams, Drake and Hodge the previous year), one through Mathematics, three through Pharmacy, and eight through Philosophy. Abrams

had hoped to have some new graduate courses (for example, in the history of geology), but found that could only be done if the relevant department was willing to sponsor it (in this case, Geology). This hurdle would remain until the Institute's own graduate degree programs could be approved. At the undergraduate level one new course was begun.[97] It was an honours History course, "Science in Western Intellectual History," for third- or fourth-year students team-taught by Abrams, Drake, and Hodge.

The lack of approved degree programs also meant that students could not be enrolled in the Institute. As was the case with graduate courses, students had to be registered in other departments. However, the Calendar for 1968-69 stated that in "anticipation of the formal implementation" of MA and PhD programs, prospective degree candidates could be accepted as special students. Three students took up that opportunity. Richard Jarrell enrolled in the History Department taking only history of science courses. He had moved to Toronto to avoid being drafted by the American military, having already completed a year of graduate work in the history of science at Indiana University. The other two, both graduates of Toronto, enrolled as special students. Ron B. Thomson had just finished a BA in History. Elizabeth Quance registered part-time as she was working at the Ontario Science Centre, having obtained a BSc in physiology and biochemistry in 1963.

Abrams had begun work on a submission for the appraisal process for the Institute's proposed programs, consulting with Sirluck and others in the School of Graduate Studies in the summer of 1968. At one point, the plan had been to set up a master's program first, followed a year later by a doctoral program. But the School thought there were sufficient resources in the University to go forward with both at the same time. The Council of the School approved the submission in November. It was then forwarded to the Ontario Council on Graduate Studies for review. This process was fairly new, having been instituted at the beginning of 1967 as part of an effort by Ontario universities to show the Ontario government, during that period of rapid expansion, that they could govern themselves.[98] Three external consultants were selected by the end of December. Their task was to advise the appraisals committee on whether the Institute's programs were consistent with acceptable standards in the discipline. The first to visit the campus, in early March 1969, was Edward Grant from Indiana University. His report had just been submitted when a dispute arose that threatened to delay the review process.

The Philosophy Department had met and prepared a letter stating that it found the Institute's proposed PhD program unacceptable.[99] It wanted its presence in the program increased or "philosophy" taken out of the Institute's name. Since the start of Woodside's committee philosophy had been paired with history. The grouping of history of science and philosophy of science was not unusual at that time in programs at other universities—nor without its difficulties.[100] All the new appointments at Toronto had been in the history of science and been associated, for the most part, with the History department.

Figure 3. *John Abrams. Photo taken at the Burndy Library, probably in 1974. Source: Jacqueline (Abrams) Elton.*

Perhaps because Philosophy was a large, well-established department, it was believed that no additional appointments were needed there. The Toronto committees had never explicitly laid out how the relationship between history and philosophy would be manifested in the Institute's graduate programs. Abrams, and likely most of the other core faculty, thought it should be limited to the history of the philosophy of science. Philosophy did not agree, however, and wanted to include some contemporary philosophy of science courses, with sole responsibility for them.

A quick round of meetings was held, with Sirluck putting pressure on the parties out of concern that the issue would delay the beginning of the Institute's programs. By April 3rd the matter had been resolved. A commitment to interdisciplinarity appears to have been the deciding factor. All graduate students in the Institute would be required to take at least a half course in contemporary philosophy of science.[101] Members of the philosophy department would teach these courses. The word "philosophy" would be deleted from the titles of courses offered by Institute core members—for example, HPS 1011 changed from "History and Philosophy of Science: Physical Sciences" to "History of the Physical Sciences." Kenneth May played a key role in the negotiations. In the process, a constitution was drafted for the Institute specifying its membership, committees, and governance.[102] May wanted to put the Institute "on a sound basis so we can proceed with our business without raids by outsiders."[103]

With the issue resolved, the other two consultants—Bernard Cohen of Harvard and Glenn Sonnedecker of Wisconsin—visited the campus. Together with Grant, they gave their full support for the program.[104] Grant wrote "I can see no good reason to delay the start of what will become a major program in North America." They did have some concerns and advice. For example, Sonnedecker was worried about the "uneasy alliance" between the Institute and Philosophy, Grant thought there was some weakness in period coverage, and Cohen believed the Institute should pay attention to the "special features of Canadian scientific development." All three were very impressed by the

range and depth brought to the Institute by its affiliates.

The Ontario Council on Graduate Studies endorsed the proposed graduate programs on June 26. The PhD was approved for the 16 areas that had been put forward, apparently reflecting faculty interests.[105] These were a curious mix of very general, such as science in intellectual history, philosophy of biology, and history of mathematics, and quite specific—Newtonianism, history of operational research, and science in the 16th century. The bundle of areas would cause problems later on when the Institute wished to move into areas not covered in their submission, such as the history of medicine. On October 9, 1969, the University Senate established the MA and PhD degrees in history and philosophy of science and technology, and their courses of study.[106]

The Institute's graduate programs were designed to give its students both a broad and deep knowledge of the history of science, and had been formulated after discussions with leading historians of science. Abrams thought that they closely resembled graduate programs at University College London.[107] The MA program normally took two years and required seven graduate courses and competence in one language other than English. Students had to take at least a half course in contemporary philosophy of science, two courses chosen from the history of the physical sciences, biological sciences or technology, and one advanced course requiring a major research paper. There was an option in the second year to replace several courses with a thesis. The PhD program required the completion of an Institute MA or equivalent, all three courses in the history of the physical sciences, biological sciences and technology, qualifying exams (both a general one and a specific one in two separate fields), and a dissertation.[108]

To help deliver the programs, some new core faculty were added to the Institute for 1969-70. Bruce Sinclair, an historian of technology at Kansas State University, was recruited as an associate professor (on Kranzberg's recommendation). Mary P. Winsor, a doctoral student in the history of biology at Yale, came as a replacement for Hodge who left for UC Berkeley. And James MacLachlan, working on a doctoral dissertation at Harvard, joined the Institute on a half-time basis, the other half being at the University's college in Mississauga. To accommodate them, the University rented the remaining space on the second floor of 191 College. The Institute's expenditures for that year totaled $81,835.[109]

The now fully established Institute attracted 15 graduate students (in addition to the three from the previous year) into its new programs in 1969-70. For the next decade, the annual total enrollment would number in the thirties. The 1969-70 cohort provided the first of the Institute's PhDs. Nachum Rabinovitch obtained a doctorate in 1971 with a thesis on "Probability and Statistical Inference in Ancient and Medieval Jewish Literature," as did Peter Bowler later that year with "The Impact of Theories of Generation upon the Concept of a Biological Species in the Last Half of the Eighteenth Century." Ron B. Thomson, in 1970, earned the first MA granted to a student enrolled

in the Institute (Richard Jarrell had completed his MA in 1969 in the History department). After that several MAs would be granted annually. Fifty years later, well over a hundred Institute students have earned PhDs and many more MAs.

Six years had been required to take the Institute for the History and Philosophy of Science and Technology from idea to implementation. Even with the support of senior officials and a favourable environment of university expansion, many institutional hurdles needed to be overcome. It took the judgment and perseverance of two presidential committees, the dedicated efforts of John Abrams, and the work of several other committees to create the Institute. While a pioneer in Canada, the Institute was itself inspired by the handful of universities that had led the way in transforming the history of science during the prior decade. The University had grafted the emerging newly institutionalized discipline onto its own longstanding interest in the history of science. Encouraged and assisted by the external scholarly community, Toronto created a graduate program that aimed at participating fully in the new discipline. Its goal was to join in with the efforts of those universities in advancing research and in guiding the development of professional historians of science.

While the six-year gestation period was lengthy, it did result in a robust organization. University policies and priorities would continue to evolve. Several of the issues the Institute had faced during its formation—such as its relationship with Philosophy, the appropriate balance between undergraduate and graduate teaching, tight financial resources, and its location in the School of Graduate Studies—would resurface in the following years. The frontiers of the history of science would also shift. The Institute's programs, which at the time it was formed reflected the discipline's focus on the Scientific Revolution and emphasis on intellectual history, would be questioned. Yet the Institute that had been established in the 1960s proved to be resilient enough to deal with all these challenges.

Philip Enros studied at the IHPST in the 1970s, completing a PhD in 1979. Now retired, he spent most of his career working in science policy in the Government of Canada. Philip is the author of Environment for Science: A History of Policy for Science in Environment Canada *(2013). He continues to research various aspects of the history of Canadian science policy.*

Endnotes

1 Memo to the President, October 3 1963, UTA A77-0020/18. In the following endnotes, UTA stands for University of Toronto Archives and LAC for Library and Archives Canada. I am indebted to the staff of these archives for their help in finding and accessing material for this article.

2 The Canadian society is now called the Canadian Society for the History and Philosophy of Science.

3 No reasons were given for this decision in Woodside's report (op. cit., endnote 1).

4 Memo to Woodside, October 11 1963, UTA A71-0011/84

5 University of Toronto, *President's Report 1953-54* (Toronto: University of Toronto Press, 1954)

6 Report of the Special Committee on the Humanities (1954), UTA A83-0036/19. After Innis's death in 1952, Woodside became the committee's chair.

7 The book was *Leonardo da Vinci, The Anatomist (1452-1519)*, written by McMurrich at George Sarton's suggestion. Sarton had given three lectures at the University of Toronto in January 1918 before a large audience. One was on daVinci, the others on the need for the history of science and, of course, his signature theme of the new humanism. See the student newspaper, *The Varsity*, January 18 and 21, 1918.

8 Frederick Brasch, "List of Foundation Members of the History of Science Society," *Isis* 7, 3 (1925): 371-393

9 David Orenstein, "Jazz Age Toronto," paper presented at the meeting of the Canadian Science and Technology Historical Association, November 2015

10 Arnold Thackray, "The Pre-History of an Academic Discipline: The Study of the History of Science in the United States, 1891-1941," *Minerva* 18, 3 (1980): 448-473. See also Marshall Clagett, "Review of George Sarton's Horus – A Guide to the History of Science," *Isis* 44, 1-2 (1953): 91-93

11 Martin Friedland, *The University of Toronto: A History* (Toronto: University of Toronto Press, 2002)

12 University of Toronto, *President's Report 1969-70* (Toronto: University of Toronto Press, 1970)

13 There is no overview of the history of the history of science. I have relied especially on: Elena Aronova, "Studies of Science before "Science Studies": Cold War and the Politics of Science in the U.S., U.K., and U.S.S.R., 1950s-1970s" (PhD dissertation, UC San Diego, 2012); C.C. Gillispie, "A Professional Life in the History of Science," chapter 2 in *A Master of Science History: Essays in Honor of Charles Coulston Gillispie*, ed. J.Z. Buchwald (Dordrecht: Springer, 2012); Marie Boas Hall, "Recollections of a History of Science Guinea Pig," *Isis* 90, 52 (1999): S68-S83; Thomas S. Kuhn, "Professionalization Recollected in Tranquility," *Isis* 75, 1 (1984): 29-32; Anna-K. Mayer, "Setting Up a Discipline, II: British History of Science and 'the end of ideology', 1931-1948," *Studies in History and Philosophy of Science* 35 (2004): 41-72; and, Nathan Reingold, "History of Science Today, 1. Uniformity as Hidden Diversity: History of Science in the United States, 1920-1940," *British Journal for the History of Science* 19, 3 (1986): 243-262

14 Duane H.D. Roller, "The Teaching of the History of Science in the United States" (July 1 1965), copy in LAC, Abrams papers, box 40

15 Memo from Hughes, November 22 1963, UTA A77-0020/18

16 Minutes of the First Meeting, November 7 1963, UTA A77-0020/18

17 Bruce Sinclair, "John W. Abrams (1913-1981)," *Technology and Culture* 23, 3 (1982): 527-530. For more on Innis's and McLuhan's thinking about technology, consult R. Douglas Francis, *The Technological Imperative in Canada: An Intellectual History* (Vancouver: UBC Press, 2009).

18 Letter from Cohen, January 10 1964, UTA A77-0020/18

19 Letter from Woodside, January 13 1964, UTA A77-0020/18

20 Victor L. Hilts, "History of Science at the University of Wisconsin," *Isis* 75, 1 (1984): 63-94

21 Michael Hoskin, "History of Science Gathers Strength," *New Scientist* no. 376 (January 30 1964): 274

22 The institutionalization of the history of science in US universities followed many paths, some as separate departments, some within history departments, and still others as interdepartmental committees. Richard H. Shryock, "The History of Science in American Universities," *Proceedings of the American Philosophical Society* 105, 5 (October 1961): 512; and, I. Bernard Cohen's contribution in Part 8, "The History of Science as an Academic Discipline," in *Scientific Change*, eds. A.C. Crombie and M.A. Hoskin (London: Heinemann, 1963)

23 Memo from Abrams, January 7 1964, UTA A77-0020/18

24 Minutes of the Second Meeting, March 19 1964, UTA A77-0020/18

25 Report to the President, May 11 1964, UTA A77-0020/18

26 Cohen, op. cit., endnote 22

27 Op. cit., endnote 25

28 Ibid.

29 Memo for the President, October 16 1964, UTA A77-0020/18

30 Woodside to Hanson, December 7 1964, UTA A77-0020/18

31 Letter from Goudge, October 19 1964, UTA A77-0020/18

32 Matthew D. Lund, *N.R. Hanson: Observation, Discovery, and Scientific Change* (Amherst, NY: Humanity Books, 2010)

33 Hanson to Woodside, December 16 1964, UTA A77-0020/18

34 Flying was a passion for Hanson. It would claim his life two years later in April of 1967.

35 Goudge's personal journal, UTA B1996-0009/1

36 Letter from Hanson, January 28 1965, UTA A77-0020/18

37 N.R. Hanson, "A Report to the University of Toronto on History and Philosophy of Science as a Subject for University Research and Teaching," UTA A77-0020/18

38 Minutes, February 25 1965, UTA A75-0021/19

39 Op cit., endnote 35

40 Woodside to Toulmin, March 4 1965, UTA A77-0020/18.

41 Toulmin to Woodside, March 24 1965, UTA A77-0020/18.

42 Minutes, April 20 1965, UTA A77-0020/18

43 Crombie to Woodside, June 8 1965, UTA A77-0020/18

44 Buchdahl to Woodside, July 12 1965, UTA A77-0020/18

45 Minutes, November 1 1965, UTA A77-0018/20

46 Bissell to Woodside, November 24 1965, UTA A77-0020/18

47 Swinton to Woodside, December 8 1965, A77-0020/18

48 Minutes, December 6 1965, UTA A77-0020/18

49 Bissell's diary, December 13 1965, UTA B88-0091; and, memo from Bissell, February 2 1966, UTA A80-0029/1

50 He left the Defence Research Board at the end of 1962 or very early in 1963 with the intention of joining the University of Toronto in July. For the first half of 1963 he worked as a consultant with Price Waterhouse & Co.

51 Jonathan Turner, "The Defence Research Board of Canada, 1947 to 1977" (PhD dissertation, University of Toronto, 2012)

52 Speech at Abrams' Memorial Service, November 5 1981, UTA B2011-0018/12

53 Memo from Porter, April 15 1963, UTA A85-0009/12

54 Op. cit., endnote 51

55 Notebooks, LAC Abrams papers, box 4; University of London, University College, Calendars for 1949-50 and 1950-51

56 Woodside to Toulmin, March 4 1965, UTA A77-0020/18

57 Interim report, March 21 1966, UTA A1985-0009/12; and, Bissell to Careless, March 31 1966, UTA A80-0029/2

58 Careless to Bissell, April 7 1966, UTA A80-0029/2; and, SGS Committee on the history of science and technology, April 13 1967, UTA A85-0009/10. Careless served as a trustee of the Ontario Science Centre from 1963 to 1973.

59 Bissell to Woodside, May 20 1966, UTA A77-0020/20; see also Bissell's diary, April 15 & 22 and May 18 1966, UTA B88-0091

60 Bissell to Woodside, ibid.

61 Circular letter from the Committee, no date, UTA A75-0005/10

62 Lists of faculty responses, LAC Abrams papers, box 43

63 Survey of Departments in Faculty of Arts and Science, LAC Abrams papers, box 62

64 Esplin to Abrams, LAC Abrams papers, box 43

65 Drake's collection was comprised of approximately 2,348 volumes, then estimated to be worth a little over $88,000. The Library's offer was conditional on it having first chance to buy any material Drake wished to sell. Abrams to Drake, January 18 1967, and Esplin to Drake, June 28 1967, Thomas Fisher Rare Book Library, Drake Collection, box 89

66 The Varsity Fund was a pool of private donations to the University. Memo to Abrams, July 12 1966, UTA A80-0029/2

67 Bissell to Abrams, April 28 1967, UTA A80-0029/2

68 Minutes of the meeting, June 22 1966, UTA A2000-0005/6

69 "Report of the Committee on the History and Philosophy of Science," October 12 1966, LAC Abrams papers, box 43

70 Course outline, LAC Abrams papers, box 70

71 Op. cit., endnote 69

72 Report of the Committee, October 12 1966, LAC Abrams papers, box 43

73 Ten centres or institutes had been created between 1960 and 1965. "Laskin Report", *Graduate Studies in the University of Toronto: Report of the President's Committee on the School of Graduate Studies, 1964-1965* (Toronto: University of Toronto Press, 1965). See also chapter 34, Friedland, op. cit., endnote 11, and Ernest Sirluck, *First Generation: An Autobiography* (Toronto: University of Toronto Press, 1996).

74 Sirluck to Drake, April 7 1969, UTA A1985-0009/12

75 Bissell's diary, December 16 1966, UTA B88-0091

76 Abrams to Bissell, September 26 1966, LAC Abrams papers, box 43

77 Abrams to Bissell, November 10 1966, Thomas Fisher Rare Book Library, Drake Collection, box 89

78 Drake to Sirluck, March 28 1969, UTA A1985-0009/12

79 S. Drake, "A Memorial Tribute to Kenneth O. May," *Historia Mathematica* 5 (1978): 3-12

80 Gillispie to Drake, January 30 1967, Thomas Fisher Rare Book Library, Drake Collection, box 89

81 Report of the Committee, n.d., UTA A1984-0028/10

82 Council meeting, March 17 1967, UTA A1985-0009/10

83 Report of the [SGS] Committee, 1967, UTA A1984-0028/10

84 Council meeting, April 26 1967, UTA A1984-0028/10

85 Minutes of the Senate, May 29 1967, UTA A79-0037/4; Senate statute number 2995, October 13 1967, UTA A1984-0028/10

86 Minutes of the Board of Governors, October 26 1967, UTA A1978-0019/1

87 Sirluck to Sword, January 29 1968, UTA A75-0021/96

88 Report of the Committee, [Dec. 6 1967], UTA A75-0005/27

89 Derek de Solla Price, "A Guide to Graduate Study and Research in the History of Science and Medicine," *Isis* 58, 3 (1967): 385-395. It included 29 institutions (all in the US, except for Toronto) totaling 144 full-time faculty and 324 graduate students.

90 He had also helped with local arrangements for the History of Science Society meeting in Montreal in 1964.

91 SHOT, December 1967, LAC Abrams papers, box 21. See also "The Toronto Meeting December 27-29, 1967," *Technology and Culture* 6, 2 (1968): 327-345

92 Kranzberg to Sword, January 8 & 26 1968, UTA A75-0021/96

93 Op. cit., endnote 88

94 School of Graduate Studies, *Calendar* for 1968-1969

95 The first meeting was on April 28 1968, UTA A1985-0009/12

96 Abrams to Sirluck, November 19 1968, UTA A85-0009/10. The house was owned by the Royal Canadian Institute, a resilient scientific organization founded in 1849 in Toronto as the Canadian Institute.

97 The Religious Knowledge courses were still offered. They would be replaced in 1969-70 by regular undergraduate courses in the history of science and technology when the "New Programme" of undergraduate studies in Arts & Science was implemented. For more on the reforms of the undergraduate curriculum, see Emily Greenleaf, "The Toronto Scheme: The Undergraduate Curriculum in the Faculty of Arts and Science at the University of Toronto, 1945-2000" (PhD dissertation, University of Toronto, 2010)

98 Friedland and Sirluck, op. cit., endnotes 11 and 73

99 Letter from John G. Slater, March 12 1969, UTA A1985-0009/12

100 See Lund, op.cit., endnote 32; and, Thomas Nickles, "Philosophy of Science and History of Science," *Osiris* 10 (1995): 139-163

101 For more details see a transcript of the meeting of March 25 1969, LAC Abrams papers, box 43

102 Draft Constitution (n.d.), LAC Abrams papers, box 62. The Institute's constitution set up a Council as its governing body, largely consisting of core staff and affiliates. Woodside would chair the Council for its first few years.

103 May to Abrams, March 30 1969, LAC Abrams papers, box 43

104 Notes from consultants, UTA A85-0009/11

105 Ontario Council on Graduate Studies, UTA A85-0009/10

106 Senate statute 3038, UTA A1984-0028/11

107 Abrams' Report for the 5-Year Review, 1972, UTA A85-0033/12

108 School of Graduate Studies, *Calendar* for 1970-71

109 Abrams to Bissell, November 9 1970, UTA A1977-0020/80