

***A Bridge Between Cultures: Reflections on a Long Career in History of Science at Duke. Valedictory Lecture, Seymour Mauskopf, White Auditorium, Dec. 9, 2010.***

**On his deathbed, the Roman emperor Vespasian supposedly uttered this witticism:**

**“Vae. Puto deus fio!” “Dear me, I think I am becoming a god!”**

I’m not on my deathbed – yet – and it’s not my style to be quite so pretentious even in wit but I will note that we are here to celebrate (and put to rest) my career of almost half a century as a teacher and researcher in the history of science at Duke University. I am honored – and abashed – to be asked to deliver an address to mark my own retirement. But I have been in something of an elegiac and synthesizing research mood recently: My friend and former colleague, Alex Roland (recently retired) and I have jointly written a narrative on the historiographical developments in the history of science and technology, and my friend and colleague (also former, now at the University of Michigan), Tad Schmaltz and I are editing a book on “Integrating the History and Philosophy of Science,” which has also compelled me to a self-examination about my own career and its relation to more general developments in the history of science.

I thought that I would use these minutes to reflect on something quite personal: how I assess my “local” career as an historian of science at Duke. Such a reflection

will necessarily involve broader considerations – about changes at Duke, about the transformation of the historical discipline, and, of course, about how my own discipline of the history of science radically changed during my long career here. Indeed, my main challenge today will be to reign myself in so that I don't end up hours from now "lecturing at the walls" (as Newton is supposed to have done)!

I have chosen as a general theme to organize my thoughts the famous (or notorious) "two cultures" of C. P. Snow's Rede Lecture. "The Two Cultures and the Scientific Revolution," delivered at Cambridge University on May 7, 1959 and published the same year. Snow's lecture had two principal themes.. They are: (1) the polarization and separation of the culture of the "scientists" from that of the "literary intellectuals"<sup>1</sup> and (2) the social, political and moral superiority of the culture of the scientists over that of the literary intellectuals. In Snow's phrases, the former naturally have "the future in their bones" whereas "literary intellectuals are natural Luddites."<sup>2</sup>

Over the years, Snow has been dismissed, reviled, and ridiculed, over this lecture, most famously in 1962 by the literary scholar, F.R. Leavis in another

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<sup>1</sup> Snow toyed with "three cultures," the final one to include history (his British historian supports, J. H. Plumb and Alan Bullock and "some of my American sociological friends." C. P. Snow, *The Two Cultures and a Second Look* (Cambridge: Cambridge University Press, 1964, pp. 8-9.

<sup>2</sup> *Ibid.*, pp. 10, 22.

Cambridge lecture, “Two Cultures? The Significance of C. P. Snow.” Yet somehow “the two cultures” as a mantra and a subject for continued debate refuses to die.<sup>3</sup> In recent years, the issue of the two cultures has resurfaced at Duke: On September 12, 2005, The Duke chapter of Phi Beta Kappa, of which I was then President, sponsored an unusual and, dare I say, innovating discussion on “Converging and Diverging: The Sciences and Humanities,” involving undergraduate and graduate students, faculty, as well as President Richard Brodhead and Duke University Medical center Chancellor, Victor Dzau. Very recently (November 17, 2010), Dr. Rudy M. Baum, editor-in-chief of the important weekly scientific journal, *Chemical and Engineering News*, gave a presentation at the IDC class of the FOCUS program, *Faces of Science* on his recent article, “Science and the Nature of Awe.” The article began:

At the dawn of the 21<sup>st</sup> century, C. P. Snow’s two cultures are alive and well. The chasm between the two cultures, between science and the humanities, or, perhaps, more accurately, between scientific and non-scientific ways of knowing the world, is as deep as it was four decades ago when Snow first articulated his powerful metaphor.<sup>4</sup>

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<sup>3</sup>Two recent examples: The first is the June, 2005 (43, no. 2) issue of the British journal *History of Science*, which was completely devoted to subject of the “two cultures.” The second comes from a book which appeared last year (the fiftieth anniversary of Snow’s Red Lecture): Guy Ortolano, *The Two Culture Controversy, Science, Literature and Cultural Politics in Postwar Britain* (Cambridge: Cambridge University Press, 2009). Ortolano attempts to “localize” the debate between Snow and Leavis terms of post-World War II British culture and politics, while admitting that there is also a context in an ongoing debate over science and the humanities.

<sup>4</sup>*Chemical and Engineering News*, 79, no. 23 (June 4, 2001), pp. 56-62.

As an addendum, I should also note the current “crisis in the humanities” in this country<sup>5</sup> and abroad, particularly in Great Britain. Stanley Fish encapsulated the difference between the humanities and the sciences generally as being symbolized by access to extra-university funding. Referring to the case that has recently sparked debate about this crisis, the announcement on October 1 by the President of the State University of New York at Albany that the language and Theater Arts departments were being eliminated, Fish wrote:

Because the humanities ‘cannot count on heavy infusions of federal research dollars’ as the sciences can (anywhere from 100 million to a billion dollars each year) , there is a shortfall the humanities have no way of making up. A chemistry professor whose salary is only partly financed by the state can go out and get federal dollars to pay the rest and more; a humanities professor can’t.<sup>6</sup>

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I began graduate study in the history of science in 1960, the year after Snow’s Rede Lecture. My entrance into this field was rather serendipitous and reflected a sequential interest in the sciences and the humanities. As an undergraduate at

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<sup>5</sup> See Stanley Fish, “The Crisis in the Humanities Official Arrives” and “Crisis in the Humanities II,” *New York Times*, October 11 and October 18, 2010 respectively. The issue at hand was the announcement on October 1 by the President of the State University of New York at Albany that the departments of French, Italian, Classics, Russian and Theater Arts were being eliminated..

<sup>6</sup> Fish, “Crisis in the Humanities II.” Fish’s justification for the humanities is this: “When it comes to justifying the wrong questions are what benefits do you provide for society....The right question is how do you – that is , your program of research and teaching -- fit into what we are supposed to be doing as a university. “As a university” is the key phrase, for it recognizes the university as an integral unity with its own history, projects and goals; goals that at times intersect with the more general goals of the culture at large, and at times don’t; but whether they do or don’t shouldn’t be the basis of deciding whether a program deserves a place in the university.

Cornell, I had been a pre-med chemistry major for three years. But in my first semester I had become enthralled by a history course in “western civilization.” particularly the section on medieval history. I switched from chemistry to history and wrote an honors thesis on medieval canon law. I had, in fact applied to graduate school to study medieval history.

However, when I came to Princeton, I was informed by the Director of Graduate Studies that I had been placed in a new program in history and philosophy of science because of my heavy concentration of undergraduate pre-med science courses. I was, of course, given the choice of following my original intention and not joining the program. In a real sense, I was able to do both.

But my research focus and disciplinary identity lay in the history of science, indeed, the history of comparatively modern science (18<sup>th</sup>- and 19<sup>th</sup>-century science) and I began my career at Duke in 1964 in the history department as an historian of science. I cannot remember paying much attention to the “two culture controversy” during my years in graduate school but, when I arrived here, several people told me that an attraction of the history of science lay in its potential to “bridge” the sciences and the humanities. I was taken with this potential for the history of science and eventually made it something of my mission but not at the start of my Duke career. More on this a bit later.

From the start, my disciplinary home at Duke has been the department of history. In the early 1960s, I believe, history of science seemed particularly suitable for history departments because of their traditional foci: Eurocentric (with American history, of course), male oriented, and largely elitist – dead, rich, white males. The history of science was also Eurocentric in orientation and also studied (largely) dead, rich, white males. Until well through the twentieth century, there were few women scientists and even fewer minority scientists, with the exception of scientists of Jewish ethnicity. Until the nineteenth century, scientists rarely came from deprived backgrounds.

The perspective of history of science in the early 1960s hewed close to that of traditional European intellectual history. In addition to the characteristics of the scientists, just mentioned, the field largely focused on the development of scientific ideas, with relatively little concern for causal relations of extraneous social, cultural or political factors to scientific developments.<sup>7</sup>

During the 1960s and 1970s, major shifts took place in the discipline of history and in the contemporary social and cultural fabric both to change the relationship of history of science to the historical profession and to transform the history of science itself. First history: the most notable feature was the vast broadening of the discipline's purview, from Eurocentric to world, from elites to

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<sup>7</sup> The Marxist tradition (Bernal, Olschki, Zilsel, Panosky et.c) was an exception but not very influential at this time.

workers, slaves, and colonials, from almost exclusively male to gender inclusive. The field of the history of science participated to a degree in this expansion of perspective, but, I believe, this transformation of history also resulted in something of a marginalization of the history of science within history for the reason stated above. I might say that the same thing happened to European intellectual history.

More broadly, the same decades witnessed the first comprehensive critique of the scientific enterprise in modern times. despite – or because – of the unprecedented growth of government-funded “big science,” capped by the first manned moon landing of July 20, 1969. Representative of the growing critique of science was Rachel Carson’s *Silent Spring*, published in September, 1962. The title refers to the deathly future scenario when the “chemical” herbicides and pesticides used to advance agricultural production will, in fact, result in a dead world, bereft of birds and insects to signal the advent of the season of new life. This was quite a change from the optimism of Du Pont’s 1935 slogan, “Better things for better living through chemistry.”

Carson’s book really signaled a new era of concern and critique, exemplified by the “Counter-Culture” interest in “alternative” or “new age” science, and the rise of the environmental movement during the 1970s. The Vietnam War, with its use of chemical defoliants (“agent orange”) exacerbated the critical mode, and, to many who witnessed the 1969 moon landing, the domestic and international social

turmoil and change (Civil Rights and colonial independence movements) seemed to be far more significant.

The dominant perspective in the history of science also underwent radical transformation in the 1960s and 1970s. Previously, it had been not only idealist (as mentioned) but also what I would call “progressivist.” By this, I mean that, however empathetic an historian of science became with her period of study, it was accepted as largely unproblematic that science inexorably “progressed” in explanatory range and precision, and in its methods of discovery, of knowledge of an independently existing natural world.

This progressivist perspective was challenged most dramatically by Thomas Kuhn’s *Structure of Scientific Revolutions* (Chicago 1962). Kuhn replaced the progressivist model of scientific development by a much more disjointed one. Mature scientific development, what Kuhn called “normal science,” was punctuated by episodes of “scientific revolution,” in which one set of guiding principles for scientific research (“paradigms” or “disciplinary matrices”) was rejected by a significant part of a disciplinary scientific community and replaced by another set incommensurable with its predecessor.

The role that Kuhn assigned to “scientific communities” implied that social factors were involved in scientific change, particularly in revolutionary episodes.

Moreover, at the end of the book, Kuhn briefly (and rather cryptically) questioned the very notion of scientific “progress.” Both of these were developed in the 1970s by the new “sociology of scientific knowledge,” (SSK) developed first in Great Britain. The establishment of scientific practices (and changes thereof) was explained in terms of the social environment and the interests of the individual actors or, more broadly, the structure of the relevant scientific community. Power, authority, and resources exerted a preponderant influence in determining whether crisis and revolution were at hand and what resultant scientific practices would ensue. Most radical was the upending of the idealistic historical visions: scientific knowledge itself was “socially constructed” and the issue of how such knowledge related to an independently existing natural world became highly problematic – or was ignored.

In highlighting the social and cultural contexts of scientific knowledge “production” (N.B., not discovery) and change, this new perspective dovetailed well with other developments taking place within and without the history profession, such as feminism; a feminist—oriented history of science had come into existence by the early 1980s. Scientific practice itself – the means by which scientific knowledge was produced – came under analysis and investigation as a species of anthropology. And the scientists, whom Snow, in good Enlightenment fashion, had seen as the most socially progressive of people (“They are freer than

most people from racial feelings.... In their own internal climate, the breeze of the equality of man hits you in the face”<sup>8</sup>) were “unmasked” as being as susceptible to prejudice as anyone else and, moreover, able to inscribe that prejudice onto the natural world as scientific knowledge. Snow himself had originally envisaged the history of science as a resource to validate his vision of scientific progress. By the 1980s, the new dominant perspective of the field had been transformed virtually into the antithesis of progressivism.

My own career followed a more placid path during these years and was centered largely in the department of history. The most notable event, perhaps, was the inception, in 1967, of what became a forty-year-long tradition of a Duke – UNC spring semester taught by Michael McVaugh, my UNC colleague and fellow alumnus from the Princeton HPS Program and me. Many of my departmental colleagues were bemused by the idea because, in the 1960s, there was very little in the way of cooperative academic activities between the two universities despite their proximity. Deciding to start at the highest level, we devoted our first seminar to Newton. This proved to be fortuitous for our first (and probably greatest) graduate student, the late Betty Jo Teeter Dobbs, took the seminar, wrote a research paper on the few chemical publications of Sir Isaac, and then transmuted that paper into a pioneering dissertation study of Newton’s decades-long

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<sup>8</sup> Snow, *The Two Cultures and a Second Look* p. 48.

*alchemical* investigations. The resultant book, *The Foundations of Newton's Alchemy, or "the Hunting of the Green Lyon,"*<sup>9</sup> added a new and very unexpected dimension to the scientist whose work in mathematics and physics is universally regarded as the crown to the Scientific Revolution, and it has spawned comprehensive reevaluation of the nature and the role of alchemy in early modern science.

Moreover, her study of seventeenth-century alchemy directly inspired Michael and me to take up the study of the history of a much more contemporary and local "marginal science," parapsychology. Researched and written in the 1970s, this book was published in 1980 as *The Elusive Science: Origins of Experimental Psychical Research*.<sup>10</sup> It is fair to say that our book did not impact on the general field of the history of science the way Betty Jo's work on alchemy did but it was an expression of the broader – and more flexible – perspective that was developing in our field.

It was in the late 1970s that I began actively to attempt to fulfill my disciplinary mission as an historian of science to "bridge" the academic "cultures" (which had become much more complex and expanded in purview since the original controversy over two cultures). The opportunity was provided by what was viewed

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<sup>9</sup> Cambridge: Cambridge University Press, 1975.

<sup>10</sup> Johns Hopkins University Press.

as a crisis in important segments of undergraduate education, particularly in the sciences: the rise of “preprofessionalism.” If memory serves, the cause – or a good part of it – was the downsizing of federal governmental support of science in the 1970s, including support for graduate training. Consequently, science-oriented undergraduates turned to careers in science-related professions, particularly medicine.

There was growing concern that these undergraduates were coming to focus too narrowly on what it would take to achieve their professional goal and not on getting a broad liberal arts education. Receiving considerable largess from the Commonwealth Fund to address this problem, Duke established a steering committee of faculty who were charged to develop strategies to address what were seen as components of the problem. I presided over a committee dealing with just about everything – “science, technology and society” or some such title. It was a truly “blue ribbon committee;” for example, Professor of Psychiatry, H. Keith H. Brody, the future President of Duke University, was a member.

I had a vision for an undergraduate “certificate” program that would span not only Trinity College but also the science-orientated professional schools, particularly engineering and even medicine. The impetus for this was due to the activities of William Bevan, Chair of the Psychology Department and Provost from 1979 to 1983. Bill Bevan was a remarkable person. Trained in psychology at Duke,

he had become Provost at Johns Hopkins and then, in 1970, took the post of Executive Officer of the AAAS before returning to Duke in 1974.

Once at Duke, Bevan deployed his wide range of professional interests in program building. Probably the most famous program was related to his psychological professionalism: the TIP (Talent Identification Program), which had begun at Johns Hopkins but was imported to Duke and still flourishes. But he also brought his perspective as AAAS executive by founding the *Round Table on Science and Public Affairs Program*, with the then Dean of the Graduate School, John McKinney. The core of this program was a lecture series by distinguished persons in science, medicine, technology and policy – Nobel Laureates, Surgeons Generals, Presidential Science Advisors etc. For several years, there was also a sequel discussion over lunch the day following the lecture for about forty invited guests from the universities and research corporations in the Research Triangle Park. I dare say that there has been nothing quite like these luncheons since their demise and that is really a shame. An organization with which I am associated, the Chemical Heritage Foundation, is presently trying to revive something like this in RTP. There was also a post-doctoral component, and a seminar on policy issues in science, technology and medicine taught jointly by Bevan and McKinney. It was through participation in this program -- and, more particularly, recognition that many of my best history of science undergraduates were enrolled in the Bevan-

McKinney seminar and were bringing perspectives gained there to my classes, that formed my “vision.”

The result of the vision and the committee deliberation was the Program in Science, Society and Human Values (shortly afterwards changed to “Science, Technology and Human Values”). Start-up funds came from the Commonwealth Fund grant to Duke but, facilitated by the Duke administration (particularly Bill Bevan, now Provost), we received a large grant from the Pew Foundation.

I think that we might have been the first “certificate” program (but I am not certain). We established a structure whereby student participants had to take five courses which fell into a three-by-three matrix of “science, technology, and medicine, and ethics, analysis (history, philosophy, sociology) and policy (e.g. sample courses might be: medical ethics, history of technology, science policy). These were, for the most part, courses already in existence. In addition, a year-long pair of interdisciplinary senior seminars (team taught by a scientist and a humanist or social scientists) had to be completed.

We had a steering committee consisting of scientists, engineers, historians, social scientists and humanists, and a student committee. One of the early student representatives was the distinguished medical ethicist, Jeremy Sugarman, now at Johns Hopkins. Jeremy has reminded me several times of how I used to literally

wake him up (at 8 or 9 am) to attend the student committee meeting. The faculty committee met monthly in the laboratory of Dick White (over sherry provided by him).

In order to prepare for this address, I have been rummaging in Special Collections and, for the first time in my life, doing historical investigation on myself. I came upon this statement of purpose and plan sent out to prospective students over my signature and dated February 12, 1982. I shall beg your patience while I read some of the justification for the STHV program, and some description of it. It is a tract for the early 1980s – and for us:

There is no denying that science and technology have strongly influenced our social development. The question of promoting energy generation from nuclear versus renewable resources, computer data banks versus individual privacy, automobiles versus mass transportation...are high on the immediate public agenda of many industrial nations. It is only in recent years that the complexity of such questions has called for a need to develop new modes of inquiry, and demands a new perspective in science education.

The STHV program was established at Duke to help in meeting these needs. The program brings together health professionals, humanists, social scientists, engineers, and natural scientists who combine their perspectives and work beyond boundaries of their individual disciplines in teaching and research. It encourages interdisciplinary team work and assists in gaining new insights in approaching complex socio-technical problems.

Currently there are over fifty students enrolled in the STHV program. These students have majors in engineering, French, psychology, botany, zoology, chemistry and religion (in fact, there were about 65 registered students).

I came across material relating to the senior seminars. One (fall, 1981) on “Nuclear resources in North Carolina”, was jointly taught by Jeff Pierce (Civil and Environmental Engineering) and Roy Weintraub (Economics). The following spring (spring, 1982) a senior seminar on “evolution” was team-taught by Dick White (Botany) and Robert Brandon (philosophy). I also noted that STHV sponsored a “Wine and Cheese Open House” (students could still be served wine) on November 3, 1983, with Earl Dowell, Dean of the School of Engineering, leading a discussion on “Technology in a Liberal Arts Education.”

In initiating and developing this program, I soon realized that Duke possessed an important faculty “culture” that had two general characteristics quite rare in a major research university, at least in my experience. The first is what I would call “*disciplinary permeability*.” This is not quite the same thing as “interdisciplinarity” for it did not necessarily lead to faculty in different disciplines working together on a specific research project, or even necessarily teaching together, although it could lead to either. Rather, it was something looser, perhaps something akin to what transpires – or used to – among the faculty of liberal arts colleges. It consists in the ability of colleagues across the disciplines to talk and work together

programmatically. The second characteristic no doubt promotes the first: There is *a deep commitment* on the part of Duke faculty – even in the professional schools – *to serious undergraduate teaching*. Even as Duke ascended into the ranks of the first-rate research universities, this commitment has persisted and contributes to the peculiar – and, in my view – outstanding academic culture that characterizes Duke.

I directed the STHV Program until 1984, when my colleague, Alex Roland, assumed the directorship for another four years. Towards the end of my tenure as Director, Bevan left Duke for the McArthur Foundation and STHV took over the running of the Round Table Program, which lasted, I think, until about 1990. The STHV program continued to operate (eventually from the Pratt School) for another decade.

Much of my university activities since 1980 has been devoted to facilitating similar inter- --or better – cross-disciplinary activities. Sometime in the early 1980s, Bill Bevan asked me to facilitate interdisciplinary faculty seminars. These reflected, I believe, Bevan’s commitment to what I have just termed “*disciplinary permeability*.” The first – and longest lasting – arose out of my own (changing) perspective as an historian of science and was initially named “The Progress of Knowledge” (but, significantly, the title morphed into “The Problems of Knowledge”). This, and the other seminars, had about a dozen participants, who met over lunch and discussed either a research paper of one of the participants or

some reading of common interest. At their peak, we had at least five seminars running concurrently. The ones I remember, in addition to the “knowledge” seminars, were devoted to Darwinism and to Marxism (this latter morphed into a “Marxism and Society” program, which, if my “googling” is correct, still exists in the Program in Literature).

I had one general rule for these seminars: “Don’t beat a dead horse into the ground.” If the participants think that they had done enough with their seminar, either drop it or move on to another topic.

I have dwelt on Bill Bevan quite a bit because I think that he brought an extraordinary vision of collegiate interaction to Duke that, in my opinion, receded somewhat since he left (although the Franklin Center goes a long way to ameliorate this). And I moved on to other things in the later 1980s; I became Director of Graduate Studies in the history department and then went on sabbatical leave to the Beckman Center for the History of Chemistry in Philadelphia and the Hebrew University of Jerusalem in 1989-1990.

When I came back from my sabbatical, I resumed my role as facilitator of interdisciplinary activities, first as the faculty advisory to the Society of Duke Fellows. This was a society of the graduate students with named fellowships across the entire spectrum of the university. Matt Cartmill was the original faculty advisor

but he recommended me instead, and I served in this function for about three years. Working with an enthusiastic steering committee of graduate students, we organized cross-disciplinary evening discussions led by faculty (with some wine and cheese). One memorable one I remember was over the very controversial book, *The Bell Curve: Intelligence and Class Structure in American Life*, by Richard Herrnstein and Charles Murray.<sup>11</sup> The discussion was led by the distinguished Duke psychologist, John Staddon and the brilliant, young historian of medicine, Keith Wailoo, then at UNC-Chapel Hill.

I gave up my mentorship of the Society of Duke Fellows in 1995 to direct my penultimate (and in some ways most ambitious) interdisciplinary enterprise, the *Focus Interdisciplinary Programs*. I was soon joined by an amazing Assistant Director, Barbara (“Babs”) Wise. Babs and I (she really served as my Co-Director) supervised FOCUS for eight years, until 2003. I think that we were effective and, indeed, many have given us too much credit, saying that we sort of “founded” FOCUS. I want to set the record straight here. FOCUS was the brain-child of Angela O’Rand, now Dean of Social Sciences in Trinity College, around 1990. It was run very effectively (and with an absolute minimum of resources) by Professor Thomas McCollough of the Department of Religion until 1995. We built on the very solid foundations of Angela’s vision and Tom’s implementation of this vision.

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<sup>11</sup> 1994.

One aspect of FOCUS did relate directly to my teaching in the history of science. This was the organization of some new FOCUS programs. In 1979, I opened a course in the history of science in the twentieth century – probably the most conceptually challenging course that I ever instituted for me as well as the students! One feature of the course was a final essay in which the students took up a contemporary scientific issue that was (a) significant (b) controversial and (c) still unresolved and open-ended. Two topics that particularly attracted students’ interest were the environmental controversies and the manifold issues in the neurosciences. Just a year before I became Director of FOCUS, I had proposed to Dick White, then Dean of Trinity College, the implementation of pilot team-taught interdisciplinary seminars in science around these topics and they did run for a year or two. However, once in FOCUS, I developed a more ambitious idea: two FOCUS programs around these topics.

Their implementation – and supervising FOCUS in general – brought home to me as intensely as anything in my long Duke career, how alive and well those two components of Duke faculty culture that I have previously mentioned, namely; *“disciplinary permeability”* and *a deep commitment to serious undergraduate teaching* were. A few phone calls, and I had both programs set up. For some reason, the environmental program was never a very great success but the neurosciences one, under the title, “Exploring the Mind,” and first directed by

Owen Flanagan of the Philosophy Department, has, since its inception, been wildly popular. This program has been paradigmatic of the interdisciplinary nature of FOCUS: the faculty usually coming from a variety of disciplines including philosophy, neurology psychology and linguistics.

The last interdisciplinary activity in which I have participated is a recent one and is closer to my home discipline than my previous activities. This is the formation of HPSTM (graduate certificate program in History and Philosophy of Science, Technology and Medicine). The initiative came from Tad Schmaltz, formerly professor of philosophy (and Chair of the Philosophy Department) at Duke. Tad approached me about five years ago about forming an entity involving history and philosophy of science. The result was the above-mentioned program. It has sponsored yearly “core seminars” which have almost always been oversubscribed and we held a conference three years ago at Duke which, I am delighted to say, is to be published (with some additional papers) as *Integrating History and Philosophy of Science* as a volume in the *Boston Studies in Philosophy of Science* series. In order for this promising program to continue and expand, it will obviously be necessary that there be a continued presence of the history of science at Duke.

I would like to say that, over my years at Duke, I am proud to have attracted some extraordinary bright science majors to do a history minor with a

concentration in the history of science, technology and medicine. About a dozen of these students have subsequently gone on to do graduate study in the history of science or related fields. I should mention that two of the earliest of these are colleagues in the history department in history of medicine. I should also include Tom Robisheaux in this list. Although Tom did not go on directly into history of science, he did study it with me as an undergraduate and he teaches what is perhaps the most popular history of science course ever at Duke: “Magic, Science, and Religion.” At least one other of these students will be returning for my retirement celebration this Saturday.

At this point I want to also mention the extraordinary personal and professional relation I have had with my colleague, Alex Roland. Since he came to Duke in 1980, we have frequently team-taught a course on the changing historical relation between science and technology and we have recently published together. I think that our efforts, as well as those of our colleagues in history of medicine, have enhanced the attraction of the history curriculum to undergraduates in the sciences and engineering.

How does all that I have been narrating relate to my initial theme, the Two Cultures controversy? Let me conclude by sketching out some tentative thoughts. Firstly, I think that C.P. Snow did put his finger on an issue that has been persistent since his time. Moreover, although it may have arisen from “local” conditions in

post-World War II Britain, as the recent book by Guy Ortolano, *The Two Culture Controversy, Science, Literature and Cultural Politics in Postwar Britain* suggests, it has become much more universal in its implications and application. This is especially true as science and science-based technology have become far more complex, and socially and environmentally interactive in the fifty years since Snow's lecture. Are other domains of knowledge, particularly the humanities, destined to wither in the face of the fact that science and science-based technologies have become, more than ever, the governing world economic engines? Might they contribute to the elucidation of the challenges facing us regarding science and industries? One area that obviously has concerned me in this respect is academic pedagogy. We have barely begun to figure out what exactly we ought to teach our students (even those going into a scientific or science-based professional career) about sciences and technologies. As I have tried to indicate, I have grappled with this challenge through much of my career at Duke, particularly in the STHV and FOCUS programs.

Secondly, although Snow's comparative judgments of scientists and humanists now strikes many of us as a naïve last gasp of the Enlightenment hopes for science, he was also on to something in seeing disjunction, suspicion and even hostility between many in science and in humanities. I recently had the experience of talking to a class about Thomas Kuhn's problematization of scientific progress at

the end of *Structure of Scientific Revolutions*, hardly cutting-edge radical sociology of science, and I could literally see how it set the teeth on edge of some scientists who were present. Chemistry, the scientific specialty of my own research, has suffered particularly from this hostility (not without some reason of course), and the very word, “chemical” has come to have opprobrious connotations.

Thirdly, I think, therefore, that there is a place for the history of science in facilitating dialogue bridging these disciplinary domains in academia. It is hard to give a recipe for how this should be done – indeed, I do not think that there is one “royal bridge” here. I certainly do not think that it can be what Snow himself envisioned – ancillary support for a “progressive reading of history – certainly not history of science. Rather, it depends on vaguer factors (but just as important ones): a commitment of historians of science not only to pursue their own disciplinary perspectives but to try to serve as catalysts (another chemical term) for dialogue and interaction between scientists and humanists. I should say here that one exciting but challenging recent development has been the active engagement of some of literary intellectuals in discussions about the nature of science and its relationship to other cultural domains. We are fortunate to have at Duke some of the leaders of this field.

The catalytic role for historians of science, in turn, involves the ability to *listen* – to be sensitive to the perspectives of all parties, and to secure credibility from

them and, from that, to facilitate the development of new perspectives and ways of implementing them, This is a tall order and, for some and in some cases, may not be feasible. But where it can succeed, I think that it will make for more vibrant and meaningful academic life as we move into the rapidly changing, unpredictable world of the twenty first century.