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To Foster a Hybrid Imagination

Science and the Humanities in a Commercial Age

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> Commercialization threatens to change the character of the university in ways that limit its freedom, sap its effectiveness, and lower its standing in society. […] The problems come so gradually and silently that their link to commercialization may not even be perceived. Like individuals who experiment with drugs, therefore, campus officials may believe that they can proceed without serious risk.
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> Derek Bok, *Universities in the marketplace*, Princeton 2003

As the political ascendancy of neo-liberalism has come to infuse public policy and the public sphere itself with a kind of overarching commercial mentality, universities have lost much of their autonomy and the "academic freedom" that used to go with it. What was once a place where colleagues could share their knowledge with one another and pass on what they knew to the younger generation in a spirit of community has become a place for doing business. And as a result, the humanities, or the human sciences, have become an endangered species. A few among us have found ways to adapt to the new order, by selling their humanities expertise to the new power elites – ethicists seem to be particularly attractive – but many have seen their jobs and their entire departments cut back in the name of cost-effectiveness and global competition.

At the same time, in both Europe and the United States, religious faith has re-entered the cultural mainstream with a vengeance. From the White House to the Vatican, the secular values of the humanities and of scientific rationality itself are under attack, and, as so often before in human history, forces of reaction and intolerance are on the rise. They have shown themselves to be quite adept at influencing the "governance" of science and technology, as has been so tragically displayed in the United States during the Bush administration, and in Denmark, where a neo-liberal government has ruled with the parliamentary support of the neo-nationalist Danish People's Party since 2001.

It is not enough to meet the new unholy alliance of commercial hubris and religious fanaticism that is so rampant in our times by merely reaffirm-

ing a traditional faith in reason and truth, or by turning "Enlightenment" values into a new kind of dogmatic atheism. There is instead a need to foster what I have to come to call a hybrid imagination, mixing theory and practice, rhetoric and reality, and, not least, the human and non-human sciences into new combinations. If we are to avoid repeating the mistakes of the past, we must learn to think and act as hybrids.

As the links between universities and private corporations have tightened in recent decades, the identities of many scientists, and even a good many humanists, have transformed into project-seekers and networking money-makers. A new kind of academic entrepreneur has emerged, seeking niches in a global economy of knowledge, and, more specifically, competing with colleagues for financial support from funding agencies. Within most national governments, as well as at many intergovernmental bodies, such as the European Commission, science has come to be seen as a component part of international "competitiveness," and research is supported primarily for the contribution it can make to the development of new products, and to the engineering of new techniques of social control, now renamed "governance." Having taken part in several projects funded by the Commission, I have come to think of our role in this regard as a kind of self-imposed servitude. We sell our insights for the sake of feeling important, and for the opportunity to serve the powerful.

The language and mode of behavior that is used in this brave new world of transdisciplinary knowledge production - influentially christened by those in the know as "mode 2" to distinguish it from the old-fashioned, monodisciplinary "mode 1" ways of doing academic research – is explicitly commercial. Like businessmen seeking shares on the global market, we are expected to organize ourselves into transnational firms to seek contracts to carry out projects for those in power. It is the funding agencies that define the frameworks, set the priorities, formulate the programs, and manage the projects. If we succeed in getting funding there is the endless process of filling in financial statements and writing reports that very few will ever read – and organizing a new team for the next application. In the meantime, academic meetings have primarily become places to "network" (the word, at least in English, has become a verb) where we seek out partners for our next business venture and sharpen our marketing skills by promoting our own particular brand of concepts and methods.

An entire new type of consulting firm has emerged to train us in these new skills and to guide us through the labyrinths of project-seeking and knowledge management. In courses and summer schools, in seminars and conferences, we are socialized into the commercial research culture. Our university administrators encourage us to look for partners and funders and provide us with "seed" money so that we can buy ourselves free from our normal teaching tasks in order to prepare applications. And if, as a result of

all of this time-consuming and mind-numbing activity, we are able to learn anything that we did not already know and produce any real academic work, it is by accident, and certainly not by design. It is as if an elaborate system had been constructed to keep us busy so that we might not waste our time working with our fellow citizens to deal with the problems that confront us.

What has often struck me is the lack of any real interest on the part of the staff people in Brussels and many national agencies – our handlers – in any meaningful kind of interaction with us; they make it clear that we are their hired help, not their colleagues. If they come to our meetings, they seem only to be interested in keeping us in line, in making us fulfill the terms of our contract. Their task is to remind us that we are not in the first place being paid to push the research frontier forward, but to produce "deliverables." As for our fellow academics, we have come to see one another as competitors rather than colleagues, keeping what we know to ourselves in order to protect our competitive advantage. As such, the knowledge that is made under such conditions is fundamentally different from the knowledge that used to be made when we could decide for ourselves which problems to investigate and which methods were most appropriate, and when we tried to share what we knew with one another in seminars and collegial settings of our own design.

There is, of course, nothing intrinsically wrong with doing business. It is its overemphasis, the elimination of other reasons for making knowledge that seems to me to be the problem. If academic work is only to be supported in order to contribute to commercial innovations, and help our "economies" compete successfully in the global marketplace, then we are in serious trouble. Commercialization is based on the maximization of individual self-interest. The whole idea runs counter to any notion of cooperation or collective interests. It means that knowledge becomes a commodity, something to be owned or possessed, and eventually exchanged for money. The acquisition of so-called intellectual property makes sharing knowledge – and collective learning – difficult, if not impossible.

The entrepreneurial academics among us are not necessarily evil people. Like so many of our so-called leaders in business and politics, they are simply afflicted with an overdose of arrogance and not a small amount of greed. As Derek Bok, the longtime president of Harvard, put it in his book, *Universities in the Marketplace* commercialization can be likened to experimentation with drugs, and to keep it from growing into an addiction requires diagnosis and various forms of treatment. The ancient Greeks used the word hubris to refer to this kind of exaggerated sense of pride, and in our recent book, *Hubris and Hybrids* (New York 2005), Mikael Hård and I have characterized the creative work that is called for to deal with the exaggerations that are so widespread in the contemporary world of science and technology as "hybridization."

It is a multidimensional hybridization process that is called for, a vast project of socio-cultural learning. We in the social and human sciences need to combine forces with scientists and engineers to develop educational and research programs so that our fellow citizens can make more beneficial use of our technical achievements and scientific discoveries – and not simply be given more gadgets to play with, at the expense, we now know, of the planet's capacity to sustain life. We need to cultivate what Aristotle called phronesis, the kind of moral knowledge that is so essential, but so sadly lacking, in an age in which our scientific knowledge and our technical know-how are coalescing, as the dominant policy rhetoric would have it, into such powerfully new combinations of "converging technologies" (the four apostles of info, bio, cogno, and nano).

Engaging with scientists and engineers – and our fellow citizens – can also be a way to escape from the ironic or cynical detachment that many academics have adopted as their stance toward society. It might be a way – to paraphrase my colleague in Aalborg, Bent Flyvbjerg – to make the sciences and the humanities matter. If we live in a world that is no longer modern, whether we choose to call it postmodern or not, then we need no longer reproduce the barriers between the natural and technical sciences, on the one side, and the social and human sciences, on the other, that were so fundamentally constitutive of the modern age. The social contract that was established in the 17th century between the experimental philosophers and the surrounding society – leaving divinity and politics outside of the "meddling" of the academic culture, as it was so clearly stated in the charter of the Royal Society - has become anachronistic. Since "reality" itself has become one in which humans and non-humans, or nature and humanity can no longer be meaningfully distinguished from one another, then let us begin to behave like hybrids and foster a hybrid imagination.

To counteract the commercial disease that has afflicted the contemporary world, we need to cultivate a new spirit of cooperation. At an early age in most societies, promising scientists and engineers – and medical doctors, as well, for that matter - are separated out, and, from then on, they are taught almost nothing about humanity and our history. As for those who eventually become humanists, they are taught almost nothing about science, technology and medicine. That is why the hybrid imagination is so important. "Society" and "humanity" have to be brought into the educational process in a meaningful way, and, not least, into the cultivation of doctors, scientists and engineers as an integral part of "higher" education. But that requires major changes in how we educate scientists, doctors and engineers and how we relate science, technology and medicine to society.

I have spent most of my working life teaching science and engineering students about the history and social aspects of their fields of study. In many ways, it has been a difficult, even thankless task. The science and engineering

teachers have never much liked having a humanist around their students; fellow academics have never much appreciated the trespassing of their specialized disciplinary boundaries, and most of the students have not quite known what to make of a teacher who did not fit into an established discipline. You are either supposed to be an engineer or a humanist, a social or a natural scientist, but I have always felt that the meaning is in the mixing.

It has not been easy to survive as an interdisciplinary generalist, and sometimes I wonder if it has been worth the effort. But for some reason I have continued to believe in the things that we talked about during the student revolts of the 1960s when I was lucky enough to major in history *and* science at Harvard: making education relevant, connecting science to society, taking nature seriously. An outgrowth of the "general education" initiatives that were so prominent in the postwar period, „History and Science" was an undergraduate concentration that required courses from both sides of the academic divide and provided small group tutorials to help bridge the gap. Throughout my career, I have continued to consider it necessary to leave behind the traditional disciplinary identity that is so common in the humanities, and especially among historians, and become a hybrid, combining historical knowledge with other kinds of knowledge, other forms of science.

In the early 1970s I taught a course for natural science students at the University of Copenhagen, while pursuing doctoral studies in the theory of science (a hybrid combination of history and philosophy of science, a part of what in those days was called "science, technology and society"). It was a kind of bridge building, helping to carve out a space in the university where different kinds of knowledge could interact with one another. Later, at the University of Lund, I developed a masters program and an undergraduate curriculum in science and technology policy, where students from both sides of the two cultures divide could meet and learn together. Both programs have since been eliminated, as have many of the other efforts that have been made since the 1970s to bring some kind of social and human understanding into the education of scientists, engineers, and medical doctors.

At Aalborg University, where I have been based the past ten years, we try to contribute what we term *contextual knowledge* into the project work of all first year science and engineering students. It is by no means a perfect arrangement, since we are confined to the first year when most students are not really ready for what we have to offer. Ever since I arrived in Aalborg our activity has been under constant attack by many a science and engineering teacher, who feel that we are taking too much time away from the proper education of their students. But sometimes, as has been the case this year with some of the students in our new educational program in nanotechnology, our efforts do seem to work, and not only interest the students, but also take on a role in what we might call the cultural assessment of science and technology.

The projects that several of the groups have carried out combine an impressive understanding of the relevant scientific theory and experimental practice with insights derived from the social and human sciences. Some have conducted surveys of public attitudes to nanotechnology, another has tried to connect nano engineering applications in solar energy to the public discussion of global warming, and others have explored the relation between nanotechnology and the military. Of course, the contextual knowledge that the students have acquired is rudimentary, but, compared to what most science and engineering students – and, for that matter, most working scientists and engineers – actually know about the social contexts of their fields, it is by no means trivial. And in a new field like nanotechnology, where the social and human implications are still far from clear, it seems particularly useful to offer qualified instruction in such matters.

Every university has its own way of doing things, and in most places it is no easy matter to build meaningful bridges between the humanities and the science and engineering faculties. The barriers are deep-seated, and they are reinforced by a more general gap between the humanities and the sciences in the broader culture. The abyss that separates what C.P. Snow once termed the "two cultures" remains a central feature of our contemporary world, not least in our institutions of higher education. The commercialization of universities has served to reinforce these separations, as the spaces for interdisciplinary learning have largely been replaced by offices of fundraising and programs in entrepreneurship. Interdisciplinarity tends to come from below, from an interest in sharing knowledge across disciplines, while what is now referred to as transdisciplinarity tends to be imposed from above, from the interests of politicians, bureaucrats and business firms to manage knowledge production more effectively.

What seems to be needed is a new kind of "public history" of science, technology and medicine, focusing on the broader cultural appropriations, or uses, of knowledge rather than its private production or individual development. Instead of the heroic tales of great men making inventions and discovering the truth, there is a need to give account of the myriad ways in which groups of people, banding together in social, political and cultural movements, have learned from each other to deal with collective challenges. And there is a need, as well, for better interaction across the specialties and sub-specialties of the historical sciences, as well as truly cooperative ventures created from below with other kinds of scientists, both human and non-human. The important thing is to try to combine separate interests into genuine processes of intellectual cross-fertilization, or what Ron Eyerman and I, in our writings on social movements, have characterized as integrative forms of cognitive praxis.

In fostering a hybrid imagination, we might well draw inspiration from the public intellectuals of the first half of the twentieth century, who often

prided themselves on their breadth of knowledge rather than the depth of their specialized competence. Particularly important for the history of science, technology and medicine is the example of Lewis Mumford, who wrote scholarly works on the history of cities, literature, architecture and technology while supporting himself as a writer and journalist. For Mumford the task or social function of the historian was to evaluate the past, including the achievements of science and technology, and not, as has so often been the case in the history of science, technology and medicine, to glorify those achievements.

If science and technology are to help solve problems rather than causing new ones, they need to interact with the rest of society in very different ways than they are currently doing. Scientists and engineers – and, for that matter, medical doctors, as well – need other "missions" than money-making to revive their spirit and perhaps once again be of use to their fellow citizens. Commercialization has gone too far. It needs to be countered with other kinds of rationale, or motivation. But in order to develop such alternative motives, humanists need to stop reaffirming the values of a bygone age and instead help to foster a hybrid imagination.

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