SPOTLIGHT ON: POST-WW2 TRANSATLANTIC SCIENCE POLICIES

Introduction to Spotlight on Post-WW2 Transatlantic Science Policies: Comparing Strategic, Political, and Economic Agendas in the United States of America, Europe, and East Asia

Pnina G. Abir-Am*

Keywords. science policy, policy maker, Cold War, governmental agencies, philanthropic foundations, ideology, espionage, technoscience, leadership, subcontractors.

In the current era of globalization more people than ever before are involved in transnational collaboration on scientific projects. Meanwhile, transnational science policy plays a major role in the re/positioning of regions, countries, institutions and individuals in a multi-polar world characterized by competition for economic resources, political leadership and military strength.

The five papers in this Spotlight illuminate diverse aspects of the Cold War legacy of transnational science policy on today's knowledge and power landscape. John Krige, whose *American Hegemony and the Postwar Reconstruction of Science in Europe*[1] inspired this Spotlight via the intermediary of a special session at the History of Science Society Annual Meeting in Phoenix, Arizona[2] expands his previous work by exploring in his contribution, 'Building the Arsenal of Knowledge,' the historical changes in the United States of America's vision of scientific knowledge as a potential weapon that is essential for maintaining its global leadership. Krige focuses on two case studies that illustrate the shifts in the USA's outlook on transnational scientific exchanges from the 1950s to the 1990s.

The first case study examines the US appropriation of German science and technology following WW2, and how this strategy changed once that former WW2 enemy became a centerpiece in the US led European reconstruction. The second case study examines domestic opposition in the USA to strict restrictions on knowledge flows that were engendered by charges that US firms were leaking sensitive data to China. A formerly backward country during the Cold War, China has since emerged as the most serious

*Brandeis University, Women's Studies Research Center, 515 South Street, Waltham, MA 02454, USA. E-mail: pninaga@brandeis.edu

Centaurus 2010: Vol. 52: pp. 273–279; doi:10.1111/j.1600-0498.2010.00194.x

competitor of the USA for world leadership. Refining his former work in which American leadership in science and technology was taken for granted, Krige now shows it to be a social accomplishment. The US edge, he suggests, is the outcome of concrete efforts in transnational science policy to restrict the flow of scientific and technological knowledge not only to enemies, but also to allies.

The repositioning of the USA from being a scientific monopolist at the end of WW2, especially in the nuclear realm, to being merely one among several global players who has to continuously strive to maintain a leadership by the end of the 20th century, can thus be seen as the unintended consequence of a transition from a policy of restricting the transnational flow of scientific knowledge, via classification and legal measures, to one of free and open information flow. Such a relaxation of transnational science policy is not merely a humanitarian gesture, argues Krige, but rather reflects the recognition that scientific and technological innovation, upon which economic growth, military strength and political leadership depend, is more and more likely to occur in other countries. Hence a policy of open exchange serves US goals better, especially if the USA focuses on improving its capacity to monitor and better capitalize on new knowledge, wherever it may be created, as it did for example with the technologies underlying Stealth aircraft and X-ray laser. (see below the section on Peter J. Westwick's contribution) Both technologies benefited from research in the former Soviet Union but were perfected in the US.

The second contribution 'Science, Technology, and Free Enterprise' by Naomi Oreskes, interrogates three aspects of the ideological backdrop of science and technology during the Cold War that are discussed in Krige's book. The first is the assumption of the 'linear model' at the heart of *Science: The Endless Frontier*, Vannevar Bush's manifesto of 1945 that became the uncontested basis for US science policy during the Cold War. According to the 'linear model,' governmental support of basic science leads to technological development which in its turn leads to economic prosperity. Oreskes inquires why the USA focused its support of reconstruction in Europe after WW2 on basic science, if its goal was fast European recovery. Why did it not support primarily technological development, which is closer to economic prosperity even in the linear model's own scheme? After all, she argues, the Soviet Union and China opted for that seemingly more direct road to prosperity and invested primarily in technological development. Oreskes believes that the US' decision to invest in European basic science (other than pile related research into nuclear physics) is not necessarily a reflection of fear from economic competition by the Europeans, should they recover too fast, as Krige had suggested. Rather, that decision reflected a belief that being advanced in basic science was part and parcel of the European identity, and the reconstruction of Europe along free market principles and practices.

The second area of ideological underpinning of science and technology that Oreskes comments on is the American perception of a link between Lamarckism in France, which long persisted as a local alternative to Darwinism, and Lysenkoism in the Soviet Union. The latter was yet another doctrine of the inheritance of acquired characters that

revolved around the Russian tradition of vernalization, one which received state support after 1948, while attacking classical genetics as a tool of American and Western capitalism. Oreskes suggests that the refusal of US foundations to sponsor scientists suspected of Lamarckian sympathies, even though at the time the demarcation lines between the two types of genetics were not always clear, derived from the link of Lamarkism to Lysenkoism, the latter being a site of confrontation between geneticists in the USA and the USSR. Thus, it demonstrates the manner in which the content of science was unambiguously impacted by the context of anti-communist anxiety.

A third example of ideology penetrating scientific judgment during the Cold War that Oreskes discusses is the case study of two leading American scientists, Frederick Seitz and William Neirenberg, who served as advisers to the NATO science committee during the early Cold War. (NATO is addressed in Chapters 6 and 7 of Krige's book) Oreskes seeks to understand how that involvement with NATO imbued these two with such a strong anti-communist ideology that they began to attack the environmentalist movement in the USA as a socialist plot. As Oreskes recognizes, more work remains to be done so as to clarify the complex ideological entanglements of Americans, Europeans and others during the Cold War.

The third contribution, 'Does Scientific Intelligence Matter?' by Ronald E. Doel expands upon Krige's study of the USA's role in the post-WW2 reconstruction of science in Europe by elaborating on the diverse visions of scientific intelligence held by the State Department, the CIA and the US Congress. Ironically, the CIA, often thought of as the antithesis of democratic principles, was keen to promote international exchanges in science during the Cold War, while the State Department, especially under President Eisenhower's Secretary of State, John Foster Dulles, sought to restrict scientific internationalism and reshape it to fit US foreign policy aims. Doel further shows that the initial arrival of scientific attaches at US Embassies in key European capitals (Paris, Rome, Bonn and Stockholm) was at times ineffective because European scientists presumed that the attaches were spies and declined to have contact with them. He also shows that the Communist press in Europe, especially in France, was very vocal in denouncing the US efforts at cooperation in Europe as a disguise for espionage. Ironically, that claim was not entirely far fetched since secret US reports from that time that Doel examined, such as the long classified Supplement to the well known Berkner Report, addressed explicitly the importance of gathering intelligence on both enemy and ally scientists.

Doel highlights the unique role of the International Geophysical Year 1957–1958 (hereafter IGY) not only in launching the Sputnik (and the space age) but also in enabling intelligence gathering on a large scale since more than 60 countries participated. Some of IGY's events were held in divided Germany and others in neutral Switzerland, two classical arenas for espionage, scientific or otherwise. Doel points to the advantage held by Europeans in hosting international meetings at a time both the USA and the USSR put ideological restrictions on scientist participants, by refusing visas, withholding passports and insisting on debriefing scientists who returned from conferences held in other

countries. Doel thus captures the challenge posed by the tradition of scientific internationalism to the nationalist agendas of the Super Powers, a point that is sometimes lost in accounts such as Krige's which emphasize the omnipotence of the American hegemon. Such accounts tend to overlook the limitations of policies that restricted international scientific exchanges, even when such policies were exercised by the USA, the USSR, China or other countries. The key role of international scientific exchanges in stimulating scientific innovation is further addressed in the following contributions by Abir-Am and Westwick.

Doel also draws attention to the role of the physical environmental sciences in emerging as the second most strategic field, after nuclear physics, for the military in the USA. He describes the earth scientists as pragmatists who were aware that their field was lavishly sponsored by the Office of Naval Research (ONR) and the Atomic Energy Commission (AEC) because of its value for national security issues. The impact of funding bodies from the USA on science in Europe is also addressed in the fourth contribution, 'The Rockefeller Foundation and the Post-WW2 Transnational Ecology of Science Policy: From solitary splendor in the inter-war era to a "me too" agenda in the 1950s' by Pnina G. Abir-Am. She contrasts the Rockefeller Foundation's funding strategies in the inter-war era, when the Foundation framed and implemented an innovative transnational and transdisciplinary science policy that emphasized technology transfer from the physico-chemical science to biology, with the Foundation's inability to adapt to the post-WW2 ecology of a large number of new players.

Included among those new, more confident and less burdened by a grand bureaucratic tradition and inflated self image as 'the only game in town' were US governmental agencies such as the Office of Naval Research and the Atomic Energy Commission, (see above, section on Doel's contribution) and the newly created National Science Foundation (NSF) with a very broad Congressional mandate for the funding of all areas of science. (except health which remained the provision of the National Institutes of Health (hereafter NIH)) Yet another group of players included the then new breed of scientific advisers who began operating during WW2 in key combat theatres, directors of divisions in new National Laboratories such as Los Alamos and Oak Ridge, and presidents of large contractor universities such as M.I.T. and Caltech. Abir-Am argues that when faced with this array of new players, who drew their legitimacy from their feats in bringing victory in WW2; as well as competition from new foundations such as Ford, the Rockefeller Foundation failed to reinvent itself. It became a 'me too' operation, as scientists quickly learned that Rockefeller was more likely to fund them if they had already secured support from a more agile foundation or governmental agency.

In any event, the Rockefeller Foundation withdrew formally its support of science by 1953, in favor of agriculture in Latin America. However, for various reasons, the process of phasing out its operations in Europe was prolonged into the late 1950s and early 1960s. Abir-Am suggests that the Foundation's slow transition misled some into

believing that it continued to do business as usual in the post-WW2 era. Abir-Am's interpretation of the Rockefeller Foundation's predicament in the post-WW2 era, when its once progressive ideologies of internationalism and scientism collapsed under the dual impact of the 'unsettling atomic dust' and the Super-power confrontation of the early Cold War, also explains why Krige's extrapolation of the Rockefeller Foundation's pre-WW2 image and influence into the post-WW2 era, in his Chapters 4 and 5, needs to be modified to take into account the different organization the Foundation had become in the post-WW2 new ecology of many, diverse players, all engaged in transnational science policy.

The fifth and final paper, 'The international history of the Strategic Defense Initiative: American influence and economic competition in the late Cold War' by Peter J. Westwick amplifies Krige's argument on the key role of science in US foreign policy toward European reconstruction in the early Cold War with his own analysis of how the Europeans, Japan, China, and the Soviet Union, came to regard the Strategic Defense Initiative (hereafter SDI; SDI was also known as 'Star Wars') initiated by President Ronald Reagan in the late Cold War. They eventually came to understand that SDI provided the USA with a scientific platform to regain technical leadership and eventually economic advantage. This took place at a time when Japanese and European industry posed a formidable challenge to US economic supremacy on several fronts.

Westwick demonstrates how SDI cultivated international collaboration through industrial contracts. Other nations created their own high-tech R&D organizations as a result: *Eureka* in Europe, *Human Frontier* in Japan and *Plan 863* in China. These new organizations sought to ensure the scientific and economic competitiveness of these regions but still promoted American influence abroad by adopting US business models, including the integration of civilian and defense industries. Westwick also shifts his focus to very recent technoscience, i.e. from Krige's main focus on the early Cold War to the late Cold War, as well as from academic elites that loomed large in Krige's account of post-WW2 reconstruction of science in Europe under American stimulus to 'high tech elites.' These elites include civilian defense contractors (e.g. EG&G, Boeing, Lockheed, McDonnell Douglas) as well as National Laboratories, (e.g. Lawrence Livermore, Los Alamos) and newly ascendant Technological Institutes in Georgia and Texas.

Westwick excels in charting the diverse responses of Europeans to the challenge of SDI, ranging from an initial French refusal to sign an agreement as a 'subcontractor,' a concept not favored there as it was seen as infringing upon French sovereignty, to a more opportunistic response by the British and the Germans. The Europeans viewed the SDI not just as an American military response to the threat of Soviet missiles, but also as a response to economic challenges from Europe and Japan. Westwick extends his analysis of the response to SDI to East Asia, especially to Japan and China. Japan, much as Europe, understood SDI's value as an economic stimulus and

developed its own program. According to Westwick, the greatest impact of SDI may have occurred in China, which responded by restructuring its entire R&D system, while blurring the distinction between defense and civilian industries along the lines of the long standing American model. He concludes that SDI became yet another example of transnational alignment with US agendas, presented as some sort of 'technological Marshall Plan' during what he terms the Second Cold War (after the mid-1970s, amid heightened levels of tension between the superpowers and an increasingly multipolar global system).

Westwick also opens new historiographical questions on the rising role of applied science in the Second Cold War, as opposed to basic science in the early Cold War, and the accompanying shift from a transnational science policy framed by basic scientists, acting often as advisers to Presidents, military commanders and governmental agencies, to one dominated by heads of multi-national R&D corporations. He also provides insights into the SDI as a 'social accomplishment' or a program that began in the USA as a military challenge but soon was perceived abroad as an economic one, by Europe, Japan and China, who believed that they, not the Soviet Union, were the target. The question persists as to whether the Soviet Union's apparent inability to similarly view the SDI as a primarily economic challenge, precipitated its own demise. If it is found to have been a major factor, then transnational science policy can be said to have had a major impact on dissolving the bi-polar world order of the Cold War into a multi-polar one characterized by technoscientific cooperation and competition for economic rather than strategic advantage. Westwick thus concludes that the end of the Cold War is a story of unintended consequences, a conclusion that may well apply to its interim phases as well. As the other contributors have also shown, the transnational arena is no stranger to misreadings of intentions, underestimations of one's allies, and overestimation of one's enemies, among many other cultural, strategic and political misunderstandings.

Whether or not the contributions below expand or modify Krige's work on the motivations, dynamics and impact of the USA on the post-WW2 reconstruction of science in Europe, they all open new vistas of inquiry into a better understanding of the place of science and technology in the history of the Cold War. More research remains to be done on the impact of espionage, ideology and funding, on the changing technoscientific strategies and their economic, political and military implications. The authors in this Spotlight provide timely, useful and insightful guidelines for better addressing this challenge.

NOTES

1. The M.I.T. Press, Cambridge/Mass. 2006; references to Krige in this Introduction refer to this book.
2. The session was held on 21 November 2009; see Abir-Am (2010). I am grateful to *Centaurus* Editor-in-Chief Ida H. Stamhuis for foreseeing our session's potential as the subject of a Spotlight

and to the other authors, John Krige, Naomi Oreskes, Ronald E. Doel, and Peter J. Westwick for their gracious cooperation with converting impromptu comments into stimulating papers, while doing so in the record time of a calendar year. Session speakers Bruno J. Strasser and Zuoyue Wang have also contributed, albeit more indirectly, to the overall perspective of this Spotlight.

REFERENCE

Abir-Am, P. G. (2010) 'What's in a session?' *History of Science Newsletter*, 35(1), 24–25.