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Introduction

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Abstract This essay introduces articles in this "Science and Nationalism" issue (part 1) by capturing some of the themes they illuminate and issues they raise. It highlights postcolonialism, Cold War politics, and post–Cold War geopolitics as the context in which various, shifting relationships between science and nationalism developed in Korea, China, and Japan. The essay also urges further research into science and nationalism "in action," that is, by critically investigating the dynamic process of the making of science and nationalism in the reciprocal mobilization of each other and by placing this process in the material, economic context.

Keywords Science and nationalism · empire · postcolonialism · Cold War · East Asia

Science and nationalism are arguably the two most vital features of modernity, yet their relationship to each other has received surprisingly little scholarly attention. For example, nationalism studies, which have developed rapidly in the past three decades, have rarely included a serious discussion of science.[1] Eric Hobsbawn, who expounds on the role of industrial technology in the modern imperial world in *Industry and Empire* (1968), has nothing to say about science in his popular later works *The Invention of Tradition* (with Terence Ranger, 1983) and *Nations and Nationalism since 1780* (1990).

In the science studies community, however, attempts to fill this gap have recently begun to emerge. *Osiris*, for example, published a special issue in 2009 titled "Science and National Identity." In their introduction to the issue, historians Carol E. Harrison and Ann Johnson describe its aim as "to explore the ways in which modern science and the nation-state grew up together. Each fully aware of the other's capabilities and

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[1] For example, *Nations and Nationalism: A Reader*, an anthology with some of the most distinguished scholars in nationalism studies, mentions natural science, as opposed to political and social sciences, only once (Spencer and Wollman, 2005). See the similar absence of the topic of science in other nationalism readers such as Woolf 1996 and Dehabour and Ishay 1999.

prepared to use them." Using such examples as Jawaharlal Nehru's postcolonial India and the Enlightenment-inspired French Revolution, Harrison and Johnson highlight the imperative of science in the vision of the nation-state and identity building in the modern world. "Scientific ability," in their words, "became a marker of national character" (Harrison and Johnson 2009: 3).

While an excellent, welcome project, the *Osiris* special issue also illuminates the scant presence of East Asia, especially Korea and Japan, in the existing scholarship on science and nationalism. In the *Osiris* special issue, eight articles are on Europe and the United States, two are on India, one is on Indonesia, and one is on Republican China (Shen 2009). This focus on the West (and its colonies) is not exclusive to *Osiris*. A survey of works related to science and nationalism shows that Europe—especially Germany, France, Britain, and the USSR—and the United States are the most frequent subjects of studies; India and China follow.[2] This subject issue of *EASTS* is an attempt to bring Korea and Japan as well as China to the front of this newly emerging field of inquiry.

The idea of this subject issue was originally conceived in a workshop at University of California, Los Angeles in May 2009.[3] During the two-day workshop, twenty participants from the United States, Korea, and Japan presented papers and discussed how to rethink the 1945 divide in Japanese and Korean historiography from the perspective of the history of science, technology, and medicine. What also emerged as a common thread among our diverse papers was the relationship between science and nationalism. In order to explore this subject further, we posted a call for papers to solicit manuscripts widely. Having received a large number of submissions (especially from younger scholars), we decided to present the "Science and Nationalism" subject issue in two parts, of which this issue is the first.

Included in this issue are papers from various disciplines and on various parts of East Asia. While each article is excellent on its own, taken together they illuminate several themes and raise new questions.

1 Science, Nationalism, and Colonial/Postcolonial East Asia

An exploration of science and nationalism in the case of Korea is inherently an investigation into its colonial and postcolonial history. Articles in this issue illustrate that scientific nationalism in Korea has operated as a subversive element against the Japanese colonial rule and its hierarchical colonial structure of knowledge making, as an ideological tool for the state-centered economic and military buildup after liberation,

[2] Nazi Germany and the Soviet Union have probably attracted most attention because of their strongly ideological history of science and nationalism; see Andrews 2003, Ehrenreich 2007, Joravsky 1986 (1970), Josephson 1991, Lekan 2004, Pollock 2008, Uekötter 2006, and Walker 1993, 2001. For France, India, and China, see, for example, Bassett 2009, Charkrabarti 2009, Croizier 1969, Habib and Raina 2007, Hecht 1998, Jacobs 1997, Liu 2009, Nanda 2003, Palit 2004, Prakash 1999, Schmalzer 2008, and Shen 2009. Noteworthy works on other parts of the world include Dubow 2006 (South Africa), Zeller 1987 (Canada), and Withers 2001 (Scotland).

[3] "Dis/Continuities: Nation-State Formation in Japan with Science, Technology, and Medicine during Imperialism, War, Occupation, and Peace, 1932–1962," organized by Nakayama Shigeru, Sharon Traweek, Aaron Moore, and Michiko Takeuchi.

and as a mobilization force behind the fierce economic and political competition for regional and global leadership.

Manyong Moon's article examines how Korean biologists under Japanese colonial rule developed a belief in and methodology of uniquely "Korean" biology. This was most prominent, according to Moon, in the case of taxonomist Seok Ju-myeong (1908–1950) and other "teachers-cum-biologists," who lacked access to research facilities and funding; unlike those few Korean biologists who were trained by and worked with Japanese biologists at the colonial center of scientific research (Route 1) and therefore had a high intellectual and career stake in contributing to the Japan-centered scientific community, teachers-cum-biologists such as Seok invested their time and effort in "Korean" projects, projects that only those with strong and permanent local ties to Korean landscape could develop.

A parallel discourse of a uniquely Japanese science was also developing in the metropole in the late 1930s and early 1940s. The vision of a scientific Japan, once subversive against the mythological *kokutai* discourse, now justified the total war mobilization of the empire. This uniquely Japanese science, based on the Japanese brain and "local" Asian resources, was meant to free Japan from its reliance on Western knowledge, patents, and materials and Asia from the West's colonial exploitation (Mizuno 2009).

Timothy Yang's article provides a fascinating study of this utopian vision of the "scientific" empire from the perspective of a pharmaceutical entrepreneur, Hoshi Hajime (1873–1951). Yang examines Hoshi's ambitious plan for a cinchona plantation in Taiwan for the sake of both his company's profit and Japan's resource self-sufficiency. While Yang characterizes this project as "a classic case of what political scientists would call 'economic nationalism,' based on the cooperation between business and government working together toward a common goal of resource self-sufficiency for the sake of the nation," his article also demonstrates that the government, Hoshi Pharmaceutical, and its rival companies fiercely competed with each other over the control of cinchona production and its profit. They contested over the question of who should build a Japanese scientific empire but not Asia's role in it. Asia—both its climate and indigenous peoples—was something to be tamed and made productive by Japanese science.

In this context, Seok's asserting a "Korean" biology, as elaborated in Moon's article, was indeed a highly political act. While Seok's "Korean" biology is an illustrious example of how scientific nationalism can be examined as a subversive force under colonialism, South Korean chemist Lee Tae-kyu (1902–1992) and his career/research trajectory, examined in John DiMoia's article, leads us to ask what happened to this subversiveness after the liberation of Korea. Lee had a fascinating career, the epitome of Route 1 in Moon's classification but in the field of chemistry. He received a PhD from and taught at Kyoto Imperial University during the colonial era, spent more than twenty years postliberation at the University of Utah building his own career as well as South Korea's transnational scientific community, and returned to South Korea to serve the "technocratic regime" of Park Chung Hee and his promotion of heavy and chemical industry. As DiMoia makes clear, Lee's successful career is remarkable considering the ups and downs of political currents that Korean professionals trained in Imperial Japan needed to swim through. DiMoia suggests that the deployment of the rhetoric of "pure" science helped Lee and his colleagues "claim

for themselves a position of absolute political neutrality," since "an ethic of pure science . . . denied the presence of its own agency while acting on behalf of the state" both materially (through research) and ideologically (disinterested, serious science vis-à-vis ideological North Korean science).

2 Science, Nationalism, and the (Post) Cold War

DiMoia's article is intended to counter South Korea's "nationalistic," "heroic" narrative, that is, the narrative that emphasizes South Korea's success by erasing the colonial pedigree. It is fascinating to see how the United States functioned to facilitate Lee's transformation from Japanese chemist Ri Taeki to the Korean father of chemical research and industry in South Korea. It provokes one important question for *EASTS* readers: how did Cold War geopolitics shape and reshape the already complicated relationship between science and nationalism in East Asia? In DiMoia's article, we see that postcolonial South Korea—more specifically, the Park Chung Hee regime—successfully sanitized and depoliticized science-technology, a term that has the Japanese colonial birthmark (Mizuno 2009), by simultaneously globalizing it (through the transnational science network) and nationalizing it (through state-funded research initiatives and industrial policies). This was possible in part because Cold War America demanded it.

This promotion of science-technology by and for the state is characterized as "techno-nationalism" by Shigeru Nakayama. In his insightful sketch of the history of *gijutsu rikkoku*, Nakayama presents an analytic schematization of Cold War and post–Cold War East Asia: the Cold War period is associated with American techno-nationalism, its enormous investment in defense technology by the state, and military industrial complex; whereas the post–Cold War "techno-globalism," which Nakayama argues has replaced techno-nationalism since the 1990s, represents the private-sector-driven development of market-oriented technology, privatization of science and technology and succeeding technology transfer, and an "Asian mode" of production. This scheme indeed seems to work well in the case of South Korea and China. As Nakayama critically points out, Japan exhibits a countertrend, making a "serious attempt to increase the public R&D budget for the first time" in 1995 under the slogan of techno-nationalism.

Nakayama's scheme challenges the narrative of postwar Japanese economic development centered on the Ministry of International Trade and Industry (MITI). For Nakayama, techno-globalism, rather than the techno-nationalism of the developmental state and its presumed architect, MITI, characterizes the Asian mode of production. To put it in perspective, the "Asiatic mode of production" in Marxist discourse placed Asia in an ever-stagnant state, destined to be such by the climate-driven mode of rice production and characterized by the authoritarian, despotic state. Chalmers Johnson's and others' espousal of the "developmental state" model, in a sense, effectively reversed this, casting a productive role for the strong state in the fierce economic competition of the post-1945 world. Now Nakayama gives it another twist, suggesting that techno-globalism, rather than techno-nationalism, in the area of production technology has enabled various modes of technology transfer among Japan, Asian newly industrializing economies, and China, and thereby made the "Asian miracle"

possible. This intervention has a tremendous significance, as the developmental state has been utilized and criticized now in other parts of the world such as Africa. It also raises important questions about the meaning of "independence" in this post–Cold War, "techno-globalist" network of technology transfer.

Perhaps this is why nationalism continues to be so important for science and technology in post–Cold War East Asia, where technology transfer and scientific collaboration were openly celebrated. Hang Ryeol Na's article on the East Asian Biosphere Reserve Network (EABRN) demonstrates that Korean nationalism has been a major driving force behind EABRN, one of the ten international collaboration research networks established under UNESCO. Nationalism here is Korean unification nationalism, not South Korean nationalism—"the economic developmentalist ideology" in the words of Na—that features prominently in DiMoia's article; likewise, the context is the post–Cold War technoglobal network of the twenty-first century rather than the Cold War industrial and military development of techno-nationalism, if we continue to borrow Nakayama's scheme. In an attempt to expand the international regime theory, Na effectively argues that "nationalism should be studied as a possible force of forming and developing international environmental regimes."

There are a number of important issues that Na's article pushes us to consider further. First, it urges us to be specific about the kind of nationalism we evoke and/or refer to in our analysis, especially in the case of Korean Peninsula, where the Republic of Korea (ROK) and Democratic People's Republic of Korea (DPRK) governments have promoted equivalent yet opposing nationalist discourses. South Korea's need for an economic alliance with the former colonial ruler only complicates the picture further. There are also variances between the official and popular nationalisms, and between progressive and conservative nationalisms, and between the older and younger generations, as witnessed in the post–Cold War debate on the role of Gen. Douglas MacArthur in South Korea (Sang-Hun 2006). Nationalism, of course, is multidimensional in any country. As the end of the Cold War has reconfigured the geopolitical scenery of East Asia, our analysis should also be attentive to shifting and multiple discourses of nationalism and science.

Second, international scientific collaborations such as EABRN are, as Na makes clear, an emerging arena in which a nation can attain regional leadership not through military achievements or economic supremacy but through scientific profile. As past issues of *EASTS* have indicated (e.g., Salter and Waldby 2011), nations, especially China, have invested strengthening their national scientific profiles in pursuit of regional and global leadership. The significance of international scientific collaboration in this context is particularly pertinent to ecological sciences that require policy coordination of the nation-states for research results to be fully utilized in practice, especially in light of a recent growing attention to "econationalism" and "resource nationalism." Critical attention to scientific nationalism remains important in the twenty-first century.

Jiri Hudecek's article on Wu Wen-Tsun (1919–) shows an intersection between nationalism and science on the Communist side of the Cold War. Hudecek details how a series of turbulent political events in Communist China from the 1950s to the 1970s eventually propelled Wu, an internationally renowned mathematician trained in France, to espouse a uniquely Chinese mathematics. After studying ancient Chinese mathematics as a response to the 1974 campaign against Confucianism,

Wu developed his theory that the mechanized character of ancient Chinese mathematics not only contributed to the birth of modern mathematics as much as ancient Greek mathematics but also was highly effective for the mechanization of mental labor required for the future age of computers. Hudecek argues that Wu aimed to establish a Chinese mathematics independent of world mathematics (that is, mathematics centered on Western academia) but ended up more dependent on it. Another irony is clear in this story: Wu's attempt to establish a mathematics that was free of a state intervention brought him closer to the state's mobilization of science.

Hudecek's interest, however, lies not in "Orientalizing" Chinese science and its relationship to politics but in placing Wu in "a more universal story of the formation of cultural nationalism and its intimate connection with historicism." It is refreshing to see Wu's mathematics explained through Ernst Gellner's classical theory that cultural nationalism was a tool invented by elites of a nation disadvantaged and frustrated by uneven modernization of the globe. Harrison and Johnson (2009: 3), in the introduction to the *Osiris* special issue, differentiate invented tradition as past-looking (rooted in the past) and science and nationalism as future-looking (rooted in the technological achievement of the present and the future), but Wu's case elucidates a different picture, that science and nationalism in fact *fuse* the past and the future. In fact, Hudecek's and DiMoia's pieces in this issue, Tae-Ho Kim's 2008 *EASTS* article on the Hwan scandal, and recent articles on marketing traditional medicines in contemporary China and Korea all challenge the limited scope of "tradition" and "culture" in nationalism studies and resist the simplistic dichotomy of the past and the future (Adams 2002; Hsu 2008; Kim 2008; Langwick 2010; Ma 2010; Ryan 2008).

"Tradition" is often exploited in the reciprocal mobilization that takes place between science and nationalism—the promotion of science relying on nationalism and vice versa—in the non-Western world. Since defining tradition is a highly selective and political act, how a scientist invokes tradition in his or her defense of science should be read as a political commentary as well as a scientific, intellectual enterprise. Likewise, as I have argued elsewhere, defining science is also a political act. It often involves a specific vision of a society, based on a specific understanding of the past and the present. How various forms of nationalism rely on science to defend and/or critique tradition should be equally carefully read and analyzed (Mizuno 2009). In this way, a study of science and nationalism effectively serves to complicate and intervene in the existing scholarship on the construction of tradition and national identity.

Let me conclude with the quote from Marx and Engels that introduces Yang's article in this issue, as it is relevant to all the articles in this issue: "Even this 'pure' natural science is provided with an aim, as with its material, only through trade and industry, through the sensuous activity of men." We may recall that in this section of *The German Ideology*, Marx was attempting to reconcile the classical epistemological problematic of the West, the subjectivity and objectivity split, while critiquing idealism and Feuerbach's materialism (Marx and Engels 2004 [1974]). To Marx, the material world was not merely the sensuous reflection of men's contemplation as idealism would have it, not merely the object of the sensuous mind of men as materialists (such as Feuerbach) would have it, but was really the physical world that was ever changing

through trade and industry, that is, the "sensuous activity" of men.[4] "Practice" in Marx thus bridges the subjective and objective worlds. By bringing the concept of practice, Marx was also accentuating the dynamic, productive role of the activity, or action, of human beings in transforming both objective and subjective realities; human actions (and consciousness) were in turn shaped by the ever-changing objective and subjective worlds. In my view, paying attention to this dynamic, productive role of practice is highly relevant to studies of nationalism and science. That is, one way to further explore the inquiry of science and nationalism is to see nationalism as not just a mere ideology but an act. Nationalism is something that needs to be acted out and acted upon. Likewise, science is always in action, as readers of *EASTS* will agree. And all these "actions" take place in the material world, which does not stay the same. All the articles in this issue illuminate science and nationalism in action. Instead of taking nationalism or science as an already existing or defined set of ideas, vocabularies, and programs, it is our hope that "Science and Nationalism" will lead to more inquiries and new exploration into the dynamic relationship among the practice of science, the act of nationalism, and the sensuous activity of men.

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[4] Marx states that "Feuerbach wants sensuous objects, really distinct from the thought objects, but he does not conceive human activity itself as objective activity" (Marx, "Theses on Feuerbach," 122, in Marx and Engels 2004 [1974]).

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