Nationalism and internationalism in science, 1880–1939

Four studies of the Nobel population

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Introduction

The limited attention given nationalism and internationalism in the history of science makes them the poor relatives of this discipline. The relative neglect of two phenomena that were coincidental with the creation of modern science organization, and also shaped it in so many ways, is not easy to explain. The presupposition that science is and has always been universal – an assumption that will be examined presently[1] – has made inquiries into the influence of nationalism seem irrelevant, even inappropriate. It is somewhat ironic, then, that the most common form of inquiry into the modern science organization that emerged in the late nineteenth century is the national disciplinary history.[2] Also, that despite the universalist ethic with which George Sarton imbued the discipline of history of science, when it was founded early in this century, its practitioners are still billed as historians of French, German, American, or Scandinavian science. However rich in description and detail, their national disciplinary histories are bound to time and place; they are very rarely comparative. On the whole, national science or nationalism in science – and I will show later how the two are related – as an overreaching concept has hardly begun to be explored.

The inquiry into internationalism in science, too, has suffered from the universalist presupposition. The focal point here has been not so much how universalist ideals in science found practical expression in international scientific activities during the latter part of the nineteenth century but the damage done to those ideals during and after World War I. The scientists' not remaining aloof but going to bat for their

[1] See Chapter 2.

[2] For representative examples of national disciplinary histories, see Chapter 1, note 18, and the Bibliographical Essay.

nations in the nonshooting, propaganda war, and the breakdown in international scientific relations that followed the war and continued after, have both been seen as tests of how genuine and true-blue the universalist spirit in science really was. The adverse effect of the war is beyond question; in fact, as indicated by the first of the critical and empirical studies in Part II of this volume, the hurt was probably deeper and more lasting than once thought. What is unfortunate is the overconcentration on the war in the historiography of nationalism and internationalism in science.

The budding scholar of nationalism and internationalism in science is not likely to be better served by more general works in political history, social history, or international relations. The overwhelming majority of the authors of these works disregard the sciences, and nearly totally so in the voluminous literature on nationalism.[3] Again, this may be because of the universalist presupposition. A more likely explanation is that scientists constituted a distinct elite within their respective societies and they were therefore few in number. Their persons and activities had little to do with nationalist movements, which appealed mainly to the disfranchised and disgruntled, and among whose members, or programs, historians of nationalism have hoped to find the causes of World War I or II.

This book is an attempt to draw attention to the phenomena of nationalism and internationalism in the history of science, to define each for the purposes of empirical study, and to establish some equilibrium by bringing nationalism into focus and formulating the problem of internationalism in more general terms than the scientists' fall from grace in World War I. These tasks, I believe, can be accomplished only by juxtaposing nationalism and internationalism, trying to analyze them simultaneously. To treat nationalism and internationalism in science from 1880 to 1939 comprehensively is a monumental task, clearly beyond the capacity of the history of science because the empirical materials are not at hand. This volume can only prepare for such a treatise. It tries to do so in three ways: first, by a review of the methods and concepts, in general, those related to the study of scientific development, on which it would have to be based (Chapter 1); second, by providing an overview of nationalism and internationalism in science during the crucial period,

[3] An overview of the literature on nationalism is found in the Bibliographical Essay.

1880–1914 (Chapter 2); and third by a critique of existing work broadly related to the themes of the book. (The critique is contained in the four studies of the Nobel population that make up Part II.) The inquiry here differs from the customary approach to the Nobel prizes in that it is concerned neither with the selection of prizewinners nor with the significance of the prizes in shaping the public image of science.[4]

The juxtaposition of nationalism and internationalism calls for comparative studies, not just across national boundaries but also on the national as well as on the international plane. The Nobel population, which comprises the approximately one thousand individuals who acted as nominators and nominees for the prizes in physics and chemistry (1901–1939), admirably fulfills these conditions. As both Chapters 5 and 6 demonstrate, the subpopulations of personnel from the Kaiser-Wilhelm Society and American nominators and nominees were part of national elites, if not ultra-elites. At the same time, many of them were active in international networks in their respective fields and thus were highly visible internationally.

The Nobel population is a new data source for the history of science. It came into being when the documents in the Nobel Archives of the Royal Swedish Academy of Sciences (prizes in physics and chemistry) were made available to scholars for purposes of historical research. This occurred in 1974 when the Nobel Foundation relaxed the secrecy provision in its statutes, which applied to the four prize-awarding institutions,[5] and permitted access to archival materials, provided that the documents were at least 50 years old. Because the archives contain only the barest information (name and place of residence), access was only the first step in ascertaining the Nobel population. To serve as a database, biographical and other information had to be added. In 1987, nominal

[4] Cf. Elisabeth Crawford, *The beginnings of the Nobel institution: The science prizes 1901 – 1915* (Cambridge and Paris, 1984); Elisabeth Crawford and Robert Friedman, "The prizes in physics and chemistry in the context of Swedish science," in Carl Gustaf Bernhard, Elisabeth Crawford, and Per Sörbom, eds., *Science, technology and society in the time of Alfred Nobel* (Oxford, 1982), pp. 311–331, and Abraham Pais, "How Einstein got the Nobel prize," in Abraham Pais, *"Subtle is the Lord..." The science and life of Albert Einstein* (Oxford and New York, 1982). For other examples, see Robert Marc Friedman, "Text, context, and quicksand: Method and understanding for studying the Nobel science prizes," *Historical Studies in the Physical Sciences* 20 (1989): 63–77.

[5] The four Nobel prizes and the prize in economic sciences in memory of Alfred Nobel are awarded by four institutions: the Royal Swedish Academy of Sciences (physics, chemistry, and economics), the Nobel Assembly at the Karolinska Institute (physiology or medicine), the Swedish Academy (literature), and the Nobel Committee of the Norwegian Parliament (peace).

lists of the population were published for the first time.[6] Building up the database with biographical and other information is an ongoing task, inasmuch as the population expands naturally as new archival materials are made available (at present, up to and including 1941). Hence, each year a new vintage of nominators and nominees can be sampled.

The Nobel population of 1901 to 1939, from which the different subpopulations featured in the four studies of Part II are drawn, totals about 950 individuals representing 25 countries. It transcends national boundaries because its members responded to relatively uniform criteria. These were twofold: (1) There were the *candidates,* who were well-known, often eminent, scientists, proposed by their colleagues for their contribution to knowledge; and (2) the *nominators,* who were divided between those with permanent nominating rights and those specifically invited each year to suggest candidates.[7] The ratio of nominators to candidates was about three to one. There was some overlap because the same individual might figure both as nominator and nominee.

The Nobel population is broadly representative of academic physics and chemistry, both research and teaching, during the first three decades of the twentieth century. To appreciate this, one has to consider the small size of the physical sciences enterprise internationally. The number of physicists active in Europe and North America early in the twentieth century has been estimated at one thousand;[8] by the mid–1930s, it may have grown threefold or fourfold. Chemists may initially have been around three times that number and probably grew faster. Between one-fourth and one-third probably figured at one time or another either as candidates or as nominators for the physics and/or chemistry prizes and, hence, entered the Nobel population.

Physicists and chemists active in academe, in particular, university professors, constitute the majority of the population, as do those who hail from the four big science-producing countries: England, Germany, France, and the United States. The population also comprises the per-

[6] Elisabeth Crawford, J. L. Heilbron, and Rebecca Ullrich, *The Nobel population, 1901–1937: A census of the nominators and nominees for the prizes in physics and chemistry* (Berkeley and Uppsala, 1987).

[7] For details about the nominating system, see ibid., pp. 1–2.

[8] Paul Forman, J. L. Heilbron, and Spencer Weart, "Physics circa 1900: Personnel, funding and productivity of the academic establishments," *Historical Studies in the Physical Sciences* 5 (1975), whole issue.

sonnel of independent research establishments, such as the Kaiser Wilhelm Institutes in Germany; scientists in government research bureaus, such as the U.S. Bureau of Standards; and, starting in the interwar period, those working in industrial research laboratories.

In each of the four studies a different part of the Nobel population has been examined in detail in order to elucidate a particular problem using the prosopographic method (see Chapter 1). World-historical, geographic, and institutional criteria have been used to select the particular parts of the population examined.

The world-historical population comprises some 950 physicists and chemists from the groupings of countries referred to in World War I as the Allied, neutral, and Central Powers (see Chapter 3). The analysis of their nominations for the prizes in physics and chemistry (1901–1933) sheds light on the effect of the war on the exchange of scientific honors and on internationalism in science more generally.

Geographically based populations are Nobel prize nominators and nominees from east-central Europe and the United States. They are used to examine critically both center-periphery relations within Central Europe and more generally (see Chapter 4) and the claim that the scientific ultra-elite in the United States is coterminous with that nation's Nobel prizewinners (see Chapter 6).

The institutionally based population is represented by the German nominators and nominees associated in various capacities with the Kaiser-Wilhelm Society for the Advancement of Science (Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften, or KWG) from its founding in 1911 to the outbreak of World War II. Their roles in and for the KWG reveal the particular breed of elite science promoted by the KWG (see Chapter 5).

In general, these studies support the contention advanced earlier that it is only by juxtaposing national and international science that we can hope to take the full measure of both, individually as well as their interactions. The added value is perhaps most manifest in the studies that are primarily nationally based. That no scientific institution, however national or even nationalistic in design and purpose, can function in isolation from international trends is brought home by the analysis of the interworkings of the Kaiser-Wilhelm Society and the Nobel institution. The advantage that the KWG, its members and institutes, sought

and found in Stockholm was the enhanced value – international certification, legitimacy, and, perhaps most important, prestige – that the Nobel prizes brought to its activities.

How the international side of science impinges on the national one is evinced even more clearly in the study of scientific elites in the United States. Here, one investigation, that of Harriet Zuckerman,[9] which uses the Nobel prize as the supreme criterion for admission to the American ultra-elite of scientists, is pitted against another, my own, which shows that there are more similarities than differences between the laureates and the nonwinning candidates when one examines the elite attributes brought to the fore by Zuckerman and me. It is significant, though, that irrespective of the discrepancies in our analyses and opinions, we both draw on international reputational measures to define a national elite.

When focusing primarily on the international side of science, again we are well advised to include the national viewpoint. In the study of the international system of nominations for the Nobel prizes in physics and chemistry (see Chapter 3), the upsurge in nationalism observed in the nominations of Allied and Central Power scientists at the time of World War I might have been taken as an instance of chauvinism that would pass once the war was over. However, doing this would have been to overlook the fact that the nominating system was based on the premise that the nominators would act primarily as representatives of their national scientific communities and that a high level of nominations in favor of the nominators' own compatriots was endemic to the system. The national element comes even more directly into play when we try to understand the mechanisms that have made for relatively uniform scientific developments across national boundaries. According to the most widely adopted theory, the explanation is found in the competition and mutual emulation between national scientific communities that have led to the division of the "world of science" into a center (or centers) and a periphery (see Chapters 1 and 4).

In the analysis of scientific development, abstract notions of the inherently universalist character of science have often been coupled with approaches that de facto treat the sciences as primarily national enterprises. It is clear that as analytic stances, both are inadequate. The demands of national science will always be counterbalanced by those of

[9] Harriet Zuckerman, *Scientific elite: Nobel laureates in the United States* (New York, 1977).

international science, and vice versa. We can begin to understand why one or the other comes to the fore by examining them as different forms of the social institution of science, keeping in mind that the form that scientific activities will take on when organized nationally (in disciplines or specialties, for instance) is not necessarily the same that they will present internationally.

The form that is the main focus here is the reward system of science, in particular, the Nobel prizes, which represent the apex of the hierarchy of honorific awards (prizes, medals, election to scientific societies, and so on). As an important creation of the turn-of-the-century movement toward internationalism, both in science and more generally, the prizes and the Nobel institution are particularly well suited for analyzing interactions between national and international elements in science. These form patterns of a particular kind, but, as in a kaleidoscope, this is only one of an infinite variety of images. It is hoped that the particular kaleidoscopic image produced by these analyses of interactions within and around the international reward system of science will induce alternative images, reflecting other parts of the social institution of science and other times.