Chapter 5

Basic Research in the Max Planck Society

Science Policy in the Federal Republic of Germany, 1945–1970

Carola Sachse

The Max Planck Society for the Advancement of Science (MPG, Max-Planck-Gesellschaft zur Förderung der Wissenschaften) is commonly considered a stronghold of basic research in the German research landscape. When it was reestablished in 1948 in the Western zones of occupation, the society adopted the defining part of its predecessor's name, the Kaiser Wilhelm Society for the Advancement of Science (KWG, Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften), which had been founded in 1911. In contrast to its organizational counterpart, the Fraunhofer Society for the Advancement of Applied Research (Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung), whose distinctive purpose has been incorporated into its name since its foundation in 1949 (Trischler and vom Bruch 1999), the MPG did not include the term "basic research" in its full name, nor does the term appear in any of its statutes of the last one hundred years. The official documents of the MPG instead refer to "scientific research" in the broad German sense of *wissenschaftliche Forschung* and combine it in varying formulations with the terms "freedom" and "independence."[1]

Both of these terms are cornerstones in what became known as *Harnack-Prinzip* (Harnack principle). Named after Adolf von Harnack, the initiator and first and longtime serving president of the KWG, this principle included two main aspects: first, institutes should be founded only if a man was available (women were not considered) for the post of managing director "who has

proven himself as an excellent researcher in the field of experimental science through his great successes" (Harnack [1909] 1961: 88). Second, having the privilege of being appointed for life, a director should have the freedom to choose his research topics, methods and his scientific support staff, as well as possible scientific and industrial cooperation partners, independent of government, industrial sponsors, or directives from executive committees at the KWG/MPG (Vierhaus 1990; Harwood 1994; Laitko 2014). Thus freedom and independence of research were not understood as a democratic or an epistemological principle, but as a meritocratic distinction of the chosen few.

Like its predecessor, the MPG is neither an assembly of scholars like the academies of sciences, nor is it linked to a university. Instead, it is an additional type of institution dedicated exclusively to research. In the mid-1940s, the KWG comprised approximately forty institutes and research centers, which were scattered across Germany. In the last months of World War II, however, most of them were evacuated to the Western parts of the country. Thanks to the support of British scientists and occupation officers, as well as representatives of the Rockefeller Foundation, nearly all of them could be reintegrated into the MPG, even against profound reservations maintained by the U.S. military government in the early postwar years. In spring 1949, the so-called Königstein Agreement laid down the structure of the West German science system and regulated the responsibilities of *Bund* (federal government) and *Länder* (states) for funding science and research (Pfuhl 1959). Since then, the MPG has been financed mainly from state budgets, and operates as the institution responsible for "basic research" in the Federal Republic of Germany's new division of scientific labor. The number of member institutes grew substantially in the late 1950s and during the 1960s, then again after 1990 in the course of the German reunification process; in recent years it has leveled off at around eighty institutes.[2] The institutes undertake research in a very wide range of fields, mainly within the natural sciences but also in law, the humanities, and the social sciences.

Against this historical background, the MPG describes itself on its homepage as "the most successful institution of basic research in Germany," and emphasizes this claim with a programmatic quotation from Max Planck: "Insight must precede application."[3] This slogan evokes the notion of what later became known as the "linear model" of knowledge transfer from basic research at universities or independent institutes such as the Max Planck Institutes (MPI) to applied research and development in industry. However, by focusing this idea, the MPG seems to disregard the fact that the linear model has been for a long time subject to dispute and severe criticism within science studies, as well as in German science and technology policy.[4]

Furthermore, the allegedly self-evident term "basic research" is often used casually and inconsistently in documents issued by the MPG. For example, in a Festschrift published to celebrate the MPG's one hundredth anniversary (Gruss and Rürup 2010), the then acting president, Peter Gruss, attributed "heterogeneity and lively diversity" to research done at MPG and acknowledged, suitable to the occasion, a history "of more than 100 years of successful basic research" (Gruss 2010: 11). While some authors completely avoided the term in the following portraits of selected institutes, others, quite naturally, affirmed that MPIs had conducted "basic research" from the beginning or had placed their focus on it later on. These portraits included the Institutes for Metals Research (MPI für Metallforschung, Stuttgart; Maier 2010: 332), Iron Research (MPI für Eisenforschung, Düsseldorf; Flachowsky 2010: 134), and Plant Breeding Research (MPI für Pflanzenzüchtungsforschung, Köln; Heim and Kaulen 2010: 357), which had originally been founded in close cooperation with industry in the last months and in the aftermath of World War I. In the same Festschrift, historians of science characterized the research programs of such institutes (with some restrictions) as *angewandte oder anwendbare Grundlagenforschung*—translated by the authors as "basic applied science" and "applied or applicable basic research" (Renn and Kant 2010: 75, English in the original). They legitimized the venerable status of these MPIs by referring to their continuously demonstrated innovative potential. The question of how useful basic research was *allowed* to be at the MPG was of great importance after 1945, but was no longer being addressed in the anniversary year 2011. The evidently more pressing question of how useful basic research at the MPG *needs* to be—in today's times of bitter competition for limited research funds—was met with a quotation that is ascribed to Einstein, and that popularizes Planck's previously quoted leitmotif: "If we left research exclusively to engineers, we would end up with a perfectly functioning kerosene lamp, but without electricity" (Renn and Kant 2010: 78; transl. C. S.).

In the last two decades, the history of science has increasingly concerned itself with the significance of the sciences in National Socialism and Stalinism, and based on this, has discussed the relationship between politics and science in modern societies, partly in a comparative mode (e.g., Ash 2002; Walker 2003; Sachse and Walker 2005; Trischler and Walker 2010; Roelcke 2010). In this context, the dichotomy between "basic" and "applied research" was often uncritically employed as a heuristic tool to analyze the complex interrelations of science, the economy, and politics in industrialized societies. Only recently, historians of science have been showing an increased interest in the origin, the historical contexts of use, and the varying semantic meanings of this conceptual pair, as well as the different objects for whose denomination this pair has been employed. The historians involved in these discussions

principally agree on the historicity of the two terms, each of which have their own terminological traditions that go back to different times and places in history.[5]

Recent studies analyzing the emergence of basic or fundamental research shed light on how the new concepts contrasted to the older term of "pure science" and its antonym, "applied science." In fact, the English terms "fundamental research" (or "basic research," as it was increasingly called from the 1940s on) and "applied research," as well as the German terms *Grundlagenforschung* and *angewandte Forschung,* have not always appeared together as a dichotomous conceptual pair. The way the new term "fundamental research" was used first in 1895 in the context of funding plant breeding research in the United States aimed rather at overcoming the old dichotomy between pure and applied science. Only a few years later, the British Department of Scientific and Industrial Research (DSIR), founded in 1916 to counter Germany's investment in research for military purposes and encourage the British industry to invest in research, deployed the new term in a similar way (Clarke 2010; Gooday 2012: 553). The adjective "fundamental" differentiated the research both from "pure" scientific curiosity and from industrial research, and described it as epistemologically important and practically useful at the same time. It was supposed to only slightly, but not principally, diverge from applied science in that its research findings were not directly applicable industrially and in that its research questions were relevant in a broader kind of context. It was not until the end of World War II that the terms "fundamental research"—or, as it was going to be called from then on, "basic research"—and "applied research" would be used in a dichotomous, delimiting way again.[6]

In this chapter, I follow this strand of research. I assume that the meaning of "basic" and "applied research," as well as the relationship between the terms and the objects they signify, has to be understood as historically variable. At the same time, it is not sufficient to expose the discourse on basic research as a rhetorical strategy in historical-political contexts. With regard to the MPG, this is evident and can be easily illustrated in the phase of its transformation after the collapse of the so-called Third Reich and its subsequent dissociation from Nazi research policy. Such a perspective would, however, not allow any conclusions on how what was accepted as basic research and what was marginalized as applied research were related to each other, how the objects bearing different denominations and the communication about these developed, and which institutional, organizational, and epistemically relevant decisions and actions were involved in this process.

The dichotomous use of the terms "basic" and "applied research," which became common in the first decades of the Federal Republic of Germany

(F.R.G.), should be understood as part of a broader discursive practice. When seen against the entanglement of science and politics in Nazi Germany, on the one hand, and the dropping of the atomic bombs on Hiroshima and Nagasaki, on the other, this discursive practice redefined the concept of scientific research, whose promotion had been the stated aim of the KWG/MPG since its founding in 1911. It established new scientific, institutional, and epistemological frameworks, which gave the MPG a position in the scientific landscape of the F.R.G. that was different from the one occupied by the KWG during the National Socialist (NS) regime. In this context, the distinction between basic research, which fell within the purview of the MPG, and applied research, which was to be carried out by other institutions, functions as a master signifier that defines both the administrative organization of scientific research in postwar West Germany and its symbolic meaning. That is, this distinction functions as what Lutz Raphael (2008) and Christoph Dipper (2010: 9) have described as an *Ordnungsmuster,* an ensemble composed of semantics and patterns of perception and experience, which guides the interpretation and design of elementary social processes; in our story, the most important social process is the growing relevance of scientific knowledge in the twentieth century.

To this day, it remains a challenge for the MPG to present itself internally as well as externally to the public, the media, and its patrons as a wellspring of basic research, no matter how the political, economic, and epistemic constellations of knowledge production may change. This chapter, however, focuses on the first two postwar decades, during which the leading representatives of the KWG/MPG, threatened by dissolution in the early postwar years, were forced to reinvent themselves and their institution. In this process, "basic research" functioned as a key argument, which was not tied to a definite idea, let alone a concept that was shared by all stakeholders. Nonetheless, strategically well placed, this argument could decide whether a specific research area was admitted, continued, or excluded from the MPG—it worked as an *Ordnungsmuster,* a symbolic and administrative formation in the previously mentioned sense.

In the following section, I will explain why the three parties that had been arguing about the future of the KWG/MPG from 1946 to 1948, namely the West German scientists, the British occupation officers, and their American counterparts, sang the song of "basic research" together, even if their voices were far from being harmoniously in tune with each other. In the last section, I will describe some episodes from the 1950s and 1960s in which discussion revolved around the question whether a specific research field could assert itself as basic research or not. These episodes illustrate, on the one hand, that the distinction between basic and applied research as an *Ordnungsmuster* did,

in fact, penetrate into self-perception, self-description, and decision-making processes. On the other hand, they demonstrate that this development was not a self-driven process, but often required strenuous terminological efforts, which rarely ended in consistency, but nevertheless had a decisive effect on shaping reality.

"Basic Research" as the (Re-)Founding Myth of the MPG

From the foundation of the Kaiser Wilhelm Society in 1911 until the end of the Second World War, the term "basic research"—or "fundamental research," according to the British meaning as coined in World War I—would have been adequate to describe the KWG's program and a large part of its research: both were conceptually hybrid and oscillated between pure and applied research, just as the KWG and its institutes held an intermediary position between academic and industrial research. The reason the term was not included either in the society's statute from 1911 or in later revisions in the interwar period is probably that, at the time, there simply was no need in Germany (in contrast to Great Britain and the United States) to accurately differentiate the research fields of the KWG from those related to industry, on the one hand, and from those that were funded publicly and investigated at universities and academies, on the other. The latter might have been suspicious in regard to a new rival in the competition for public funds, but industry, military, and state power agreed—at least in principle—on the necessity of nonuniversity and nonindustrial scientific research. They also agreed that this research should be institutionalized as an independent society, and financed by a combination of public and private endowments—a consensus that persisted beyond the German Empire and the First World War, while the proportion of public funds made available for this type of research grew continuously (Hachtmann 2007: 56–59, 81–258).[7] In negotiations within the NS regime, of which the KWG formed an integral part, the argument of basic research (if used at all) was only helpful when governmental financiers could be convinced that the respective research conducted at the KWG would have an actual or potential application, or rather, as the war progressed, that it was somehow relevant for armament and warfare. Here, the aim was to place the KWG's projects as high as possible within the ranking of levels of military urgency (Schmaltz 2005; Maier 2007).

With the collapse of the so-called Third Reich and the occupation of Germany by the allied forces, other terminological accentuations became appropriate. First, the meaning of "basic research" had experienced another shift since the 1940s. The flexible English term had again become part of a conceptual pair that was constructed dichotomously and formulated within military

jargon: basic research, understood as "long range strategic investigations," and applied science, understood as "immediate tactical investigations" (Clarke 2010: 305). "Basic research" assembled notions of the older term "pure science," which had been understood as a purely knowledge-oriented, disinterested, and self-sufficient type of research. Additionally, it comprised new meanings related to the early period of the Cold War, in which a "democratic" and "free science" was contrasted with "totalitarian," "communist," and "planned science." The latter was described in a way similar to science in the National Socialism and understood to be bound by ideological guidelines and societal (or rather military) interests.[8] Even if one tried to denigrate the research conducted by the opposing party as being "unscientific" or "pseudoscientific," the potential risks it posed were still to be taken seriously (Thiel and Walther 2008).

After World War II, influential political actors in the United States were of the opinion that Europe, and Germany in particular, should no longer be a location for research that could have any kind of military consequences. The KWG, which was viewed as having greatly contributed to the scientific advancement of NS armament and particularly to the regime's nuclear project Uranverein (uranium club) was thus to be closed down without replacement. Other American voices, especially from the natural sciences and the Rockefeller Foundation, as well as the British side, opposed this view: they argued that the West could not dispense with Europe's intellectual potential.[9] In order to conciliate the more radical U.S. positions regarding the future of research in Europe, they differentiated systematically between basic and applied research—against better knowledge of the inseparable interrelations between insight and interest: applied research, whose technical inventions could possibly become a threat, was, for the time being, to be conducted only on the American continent—a safe distance from the European scene of the Cold War. The domain of basic research, however, was not only suitable for flying the flag of freedom of science against the Eastern bloc; there was also no risk. The massive technological advantage of the United States would guarantee that European researchers would not be able to enter the hazard zone of technological application themselves. Thus U.S. researchers would be able to exploit Western European competences, including those of the KWG/MPG. Moreover, as John Krige (2006: 11, 3) has shown, promoting basic research in Western Europe by grants, exchange programs, and delivery of isotopes and scientific instrumentation was not only meant to help strengthen "long-term economic prosperity of the Continent" and thus stabilize the anticommunist bloc, but also to "reconfigure the European scientific landscape and to build an Atlantic community with common practices and values under U.S. leadership."

The MPG's president Otto Hahn and his secretary-general, Ernst Telschow, took up this line of argumentation. Ultimately, their fight against the winding-up order that had been imposed by the U.S. occupying force was successful, the result being the reestablishment of the MPG in the first bizonal, and later trizonal, area of West Germany.[10] In a position paper from February 1947, which was directed at the head of the American military government, General Lucius D. Clay, Hahn and Telschow drew up an organizational profile for the future of the MPG in the F.R.G.[11] This profile was, however, not the result of a critical evaluation of the MPG's previous research programs and their respective involvement with three political systems between 1911 and 1945. Instead, it was a reaction to the three central allegations which the American occupying force (whether rightly or wrongly) had brought forth against the MPG: first, the incorrect allegation that the KWG had been a tightly structured "research trust" (*Forschungs-Trust*) was countered by emphasizing the institutes' scientific autonomy. However, the idea of autonomy was more or less restricted to the "Harnack principle," according to which the directors were free to choose their areas of research and free to adjust the respective extent to which they cooperated with industry, government, and military. The second accusation, which Hahn and Telschow rejected, was the inappropriate interpretation that the KWG had lost its independence in 1933 and had, from then on, served as a henchman for the National Socialists. Instead of accurately explaining the KWG's involvement into the NS regime, this accusation was turned around and used offensively to argue for a future institutional independence of the MPG from any political authority. Finally, the correct allegation that the KWG had actually conducted military research was countered by assuring that even during wartimes, the KWG had, as had always been its tradition, concentrated on *Grundlagenforschung* (basic research). The following detailed explanations of what exactly this meant alluded to the complex contemporary understanding of basic research in the early postwar era.

On the one hand, it is stated in the paper that whenever problems were tackled that were relevant for the war economy, the reason was that they were "of scientific importance" (*von wissenschaftlicher Bedeutung*) as well. This clearly reflects the British understanding of basic research as long-range strategic research. On the other hand, Hahn and Telschow referred to the scientific commissions that had been sent by the allied forces to inspect the Kaiser Wilhelm Institutes (KWIs). Those, they stressed, had noticed "with astonishment to what high extent . . . pure research work (*reine Forschungsarbeit*) had been done" and how minor the proportion of "war work (*Kriegsarbeit*)" had been (Sachse 2009: 124–128).[12] At this point, the older concept of "pure science" was revived and added to the British understanding of "basic

research"—a combination that shortly after would be used to celebrate the "freedom" of science in Western democracies.

Generally, this reaction to the American allegations conformed to the discursive field of transatlantic science policy in the beginning Cold War. At the same time, it formulated specific arguments for the future positioning of the MPG within the West German research landscape. The paper constructed a conceptual triangle consisting of basic research, scientific autonomy, and political-institutional independence. Each corner of the triangle helped define the other two, and all three corners taken together formed a stable argumentative unit. This framework was democratically legitimized by its firm dissociation from the totalitarian construct that the American military government believed it had to combat. It was put to use repeatedly in the following years—namely, whenever the MPG had to press for public funding, scientific autonomy, and institutional independence in negotiations with West German science policy makers and supervisory authorities.

"Basic Research" as the Structuring Principle within the MPG

In a report of the German Research Foundation (DFG, Deutsche Forschungsgemeinschaft) for the fiscal year 1953–54, the distinction between basic research and applied, purposive (*zweckbestimmt*), or industry-oriented (*industrienah*) research was described as both inevitable and problematic.[13] Before, the German Research Council (Deutscher Forschungsrat), a short-lived science policy institution of the early F.R.G. that merged with the DFG in 1952, was dealing with the same terminological problem. According to the will of its most important protagonists, nuclear physicist Werner Heisenberg and biochemist Adolf Butenandt—both Nobel Prize laureates and leading MPG members—the mission of the Research Council was to regulate the relationship of science, state, and industry. Or, to put it with Heiko Stoff in Latour's style, the problem was to at once dissociate and associate industrial research and publicly funded research at universities and nonuniversity institutions (Carson and Gubser 2002; Stoff 2004; Carson 2010).

At first glance, the business of dissociation and association of basic and applied research was organized by means of a division of labor between various institutions in scientific research: the MPG was responsible for basic research, the Fraunhofer Society for applied research, and industry-affiliated laboratories did more immediate applied research. A closer look, however, reveals that the matter is more complicated. The business of dissociation and association had to be done also within these institutions and especially within the MPG. Even though, after the war, the MPG had declared itself an institution exclusively focused on basic research, it had inherited a rather

mixed portfolio of research institutes—according to the hybrid sense of basic research prevalent in the early 1940s—from its predecessor, the KWG. The internal delineations proved to be principally unending. With every new decision about the opening, closing, continuance, or outsourcing of whole institutes or single departments, these boundaries had to be negotiated anew and often led to controversial discussions. Propagated by these negotiations, the MPG's self-commitment to basic research as its formative pattern, which had been established in the early postwar era, had a lasting impact on both the MPG as a whole and its individual institutes and the conceptualization of their research programs. That is what the following examples are meant to illustrate.

The Agricultural Science Heritage of the Third Reich

In the final years of the Second World War, a group of KWG scientists began to voice their discontent about the foundation of numerous new institutes, particularly in the agricultural science sector. The new, more applied-oriented institutes were supported by Ernst Telschow, the long-standing secretary-general of the MPG, and Herbert Backe, a member of the senate, the highest decision-making body of the KWG, who at the same time held the positions of state secretary and, since 1941, minister of food and agriculture in the German Reich (Heim 2003; Hachtmann 2007, ch. 9). Among the critics of that development was first of all Adolf Butenandt, who was backed by the biologists Alfred Kühn, Max Hartmann, and Georg Melchers. Butenandt repeatedly demanded "to preserve the holy flame of pure insight."[14] Toward the end of the war, the group—also known as *Tübinger Herren* (the men from Tübingen)—evacuated their institutes from Berlin and moved them to southwest Germany, which would soon become the French occupation zone, and urged a stronger focus on "basic research" (*Grundlagenforschung*) in the peacetime that was to come (Lewis 2004; Gausemeier 2005: 307). In their view, basic research was more or less synonymous with their own approaches in biochemistry, plant physiology, zoology, and genetics. In fact, the senate of the MPG followed this view in March 1949 in reaction to financial decisions of the eleven *Länder* of the future F.R.G. that had not completely fulfilled the MPG's demand for funding. In view of the society's tight budget, it was decided to exclude three institutes that did not fall under this category of basic research. These included—along with the Institut für Phonometrie (Institute for Phonometry)—two agricultural science facilities, namely the Forschungsstelle für Pflanzenbau und Pflanzenzüchtung (Research Center for Plant Cultivation and Breeding) and the Institut für Seenforschung und Seenbewirtschaftung (Institute for Lake Research and Lake Management).[15]

In the following years, various calls were made to downsize the MPG to the core areas of basic research. Almost all of the institutes that had been able to escape to West Germany were maintained, however, including the remaining agricultural institutes that had been founded during wartime, namely the MPI für Bastfaserforschung (Bast Fiber Research), the MPI für Tierzucht und Tierernährung (Stock Breeding and Animal Nutrition), and the MPI für Kulturpflanzenforschung (Cultivated Plants Research). It was only when the institutes' directors, who had consistently held office throughout the years after the war, retired that some agricultural research facilities were shut down. In 1957, the MPI für Bastfaserforschung was closed; in 1968/69, the MPI für Kulturpflanzenforschung followed; and throughout the 1970s, other institutes from the area of agricultural science and breeding research were either shut down or consigned to new sponsors.[16] Due to the Harnack principle, the dissociation of basic bioscientific research from applied agricultural research followed the interests of the directors: as long as they were in office, their institutes and research trajectories were sustained.

Reintegration of the German Research Institute of Psychiatry in 1954

The Deutsche Forschungsanstalt für Psychiatrie (DFA, German Research Institute for Psychiatry)—founded 1917 in Munich and integrated into the Kaiser Wilhelm Society in 1924—was situated in the American zone of occupation. Here, barely any research was conducted after World War II. The reasons were manifold: the institute had suffered severe damage when the city was bombed during the war; the institute's director, Ernst Rüdin, inevitably had to be dismissed after his unparalleled involvement in the National Socialist eugenics program; several other executives were laid off as well; and the institute's clinical department was impounded by the occupation forces. The Central Administration Board of the KWG/MPG, which was located in Göttingen and thus fell under British military government, would not have been able to support the DFA, even if they had wanted to do so, as the American occupying force had serious doubts about the continuation of the KWG/MPG and nonuniversity research facilities in general. The remaining employees, headed by executive director Willibald Scholz, financed their work and the provisional maintenance of the remaining infrastructure with the help of grants by the Bavarian state government and reserve funds, which were, however, criticized by the Bavarian Court of Auditors. Another important resource for the institute's funding was an "increase in cases of syphilis" combined with the "occupation force's fear of an epidemic," which resulted in sixty thousand serological tests being administered by the in-

stitute per year, when in previous years it had only been an average of six thousand tests.[17]

By 1949, the DFA was almost fully incorporated into the medical supply system of the city of Munich, and thus excluded from the budgetary planning of the KWG/MPG. It therefore came as a surprise, when, in March 1949, the representatives of the *Länder* decided to include the grant for the DFA into the overall funding of the MPG. This decision was motivated strongly by the prospective reunification of the KWG/MPG across three of the four occupation zones. The MPG, however, did not include the DFA as a full-fledged MPI, but only agreed to take up the administrative responsibility, with the further condition "that the Max Planck Society was to appoint the institute's director in agreement with the Bavarian state government."[18] The position was given to the neuroscientist Willibald Scholz, a long-time member of the KWG and a reliable head of department, who had succeeded in maneuvering the DFA through the turmoil of the postwar era. It was not until five years later, in 1954, however, that the DFA was reintegrated into the MPG as an emancipated research institute under the name of MPI for Psychiatry.

Acknowledging this step with a contribution to the MPG's yearbook and identifying the new MPI as an institute for basic research was the obvious thing to do. The contribution was not written by the acting director Scholz, however, but by Werner Wagner, who had been appointed head of the clinical institute of the DFA in 1952. Wagner, who died too young (in 1956) to leave visible traces in the history of the MPG, felt compelled to explicate the reasons why his department stood "out from the range" of all the other institutes of clinical medicine outside the MPG that were engaged only with "applied natural science" (*angewandte Naturwissenschaft*) and why its claim for a place within the MPG family was justified. "Basic research," as he understood it, no longer inquired about the "causes" of mental illnesses, but about their "essence" (*Wesen*). To strengthen this argument, Wagner directly referred to his colleague Heisenberg. As Wagner understood it, Heisenberg as well did not "study causes in physics," but investigated the "essence and modalities of matter" (*Wesen und Weisen der Materie*). Wagner also borrowed terms from the liberal arts–oriented field of anthropology. According to him, these terms were helpful in understanding, for example, the psychopathologic symptoms of the senescent human being not as a consequence of arteriosclerotic processes, but as originating in the "essence" of his individual "being-in-the-world" (*In-der-Welt-Seins*). From there, it was only a small step to Martin Heidegger, whose "fundamental-ontological thinking" could, supposedly, make the "existential reason for the existence of all things" (*Seinsgrund alles Seienden*), and thus also that of mental illnesses, phenomenologically accessible and comprehensible. Wagner (1955: 242, 246, 253–255, 259–260, 266;

transl. CS) summarizes: "At this point, psychiatry becomes the cause for research, but at the same time it provides the material for basic research in the proper sense of the term."

Wagner's understanding of basic research was probably quite different from Heisenberg's and from what the British and American authorities had in mind when, after hesitating for quite some time, they finally approved the continuation of the KWG/MPG. However, this specific understanding was in vogue in the intellectual discourse in West Germany in the early 1950s. Not only did Heisenberg and Heidegger both make major contributions to the discourse, but they even explicitly referred to each other's positions. They did so, for example, at a lecture series organized by Heidegger at the Bayerische Akademie der Schönen Künste (Bavarian Academy of Fine Arts) in the fall of 1953. There, they presented contributions on "The Picture of Nature in Physics" (Heisenberg 1956) and "The Question concerning Technology" (Heidegger 1956), and reflected on "The Arts in the Technical Age" (Heidegger 1956; Carson 2010: 109–113; Vagt 2011).

From Human Genetics to Molecular Genetics, 1958–1964

In the field of genetics, the understanding of basic research changed in a different way. This shifting emphasis was reflected in the complicated transition from the MPI für Vergleichende Erbbiologie und Erbpathologie (Comparative Genetic Biology and Genetic Pathology) to the MPI für Molekulare Genetik (Molecular Genetics)—a process that started in 1958 and was not completed until 1964 (Sachse 2011). The retiring director, Hans Nachtsheim, who had conducted his hereditary research on rabbits under the roof of the KWI für Anthropologie, menschliche Erblehre und Eugenik (Anthropology, Human Heredity, and Eugenics), which would, soon after 1945, be notorious for its dubious research practices during the Nazi era, was one of the people who persistently ignored the discursive turn toward basic research in the postwar era. In his view, it was the importance of his findings from experiments on animals for human genetics—or rather eugenic practice in accordance with the law on forced sterilization of 1933, which would remain the *ultima ratio* of his research. Nachtsheim even persistently defended the law as not being fundamentally National Socialist in nature, but rather as being scientifically reasonable and even progressive as compared to international standards (Schwerin 2000, 2004).

Karl Thomas, however, emeritus director of the Medizinische Forschungsanstalt (Medical Research Center) at the MPG in Göttingen, who tried to mediate in the conflict about Nachtsheim's succession, believed that human genetics and basic research were mutually incompatible:

> The main focus of research done at Max Planck Institutes is on basic research. Can human genetics contribute to this? Wouldn't the field rather have to be situated within applied research—given that one can draw a clear line between the two at all? In my opinion, such considerations only further underline that transferring [the MPI's Department of Human Genetics, C. S.] to the Free University [in Berlin-West, C. S.] as its new sponsor is a sensible decision.[19]

Eventually, this view would in fact prevail within the MPG. The Department of Human Genetics and its head, Friedrich Vogel (a student of Nachtsheim's), were not transferred to the Free University, however, but taken over by the University of Heidelberg. This clearing up was implemented despite the prospect of additional funding offered by the Federal Ministry of Nuclear Affairs, who asked the MPG to continue investigating the human genetic consequences of radiation exposure, which was expected to increase in the course of the "atomic age" (Sachse 2011).

Nachtsheim's direct successor Fritz Kaudewitz, who, only after a few years as director (1960–65), left Berlin and relocated to the University of Munich, was not at all interested in the applicability of his molecular genetics research to human genetics. He was prepared to make concessions to woo his audience, however, for example when he gave his inaugural lecture (which would at the same time be his farewell speech) on "Basic Research in Genetics Today" at the annual general meeting of the MPG in 1963: after giving a detailed and complicated account of the latest discoveries about the molecular processes involved in DNS-duplication and the transmission of "genetic information," which had been made mainly in experiments with microorganisms, he drew upon a schoolbook example from human genetics (sickle cell anemia) to make the practical relevance of this kind of research comprehensible also to the lay people in the audience (Kaudewitz 1964: 34–64). About ten years earlier, the British pathologist A. C. Allison (1954: 290–294) had traced the inheritance of sickle cell anemia, which was coupled with malaria resistance, while performing highly questionable human subject research on African men.[20] Kaudewitz explained further that he could now—thanks to the comparative analysis of the respective amino acid sequences in "normal hemoglobin" and "sickle cell hemoglobin"—show in which position exactly this "minor change" within the polypeptide chains "had taken place in the gamete of one human being thousands of years ago." Similarly, he continued, he could show how molecular genetic methods could sometimes be employed in order to formulate hypotheses about human evolution: "Using this example, we can see that biological basic research, even though today it preferably uses microorganisms as experiment subjects, fulfills the '*tua res agitur*' just as well as human genetics does" (Kaudewitz 1964: 60–61, transl. C. S.). Finally, human genetics

found its way back into the institute, which was relabeled in 1964 as MPI für Molekulare Genetik. It remains to be investigated how this discipline had to prove itself in order to be considered "basic research" (Vingron 2014).

Founding of the Max Planck Institute for Research into Living Conditions of the Scientific-Technical World, 1967–1969

The founding of a new institute with the complicated name MPI zur Erforschung der Lebensbedingungen der wissenschaftlich-technischen Welt (MPI for Research into Living Conditions of the Scientific-Technical World) was the subject of great controversy. The case is particularly interesting because it forced the humanities section of the MPI to reflect on the issue of "basic research." The nuclear physicist and philosopher Carl-Friedrich von Weizsäcker, who—together with his teacher Heisenberg—had been part of the "uranium club," was the instigator and designated director of the "Starnberg institute," as it would soon commonly be referred to after its location in a Bavarian town. Weizsäcker did in fact not use the term *Grundlagenforschung* (basic research) in his foundation proposal. Rather, he preferred the rarely used term *Grundwissenschaften* (basic sciences), which he used to denote disciplines such as information theory, game theory, systems theory, and cybernetics. His "ambitious goal" was to "conclusively" unravel the "connections of these sciences with each other and with other sciences," but also with their "potential practical applications." Furthermore, his institute aimed to confront these "abstract sciences" with "concrete issues of immediate practical relevance." The array of issues to be tackled ranged from "feeding the world," "structural problems of highly industrialized societies," "civil technology," "consequences of biology," and "arms technology and strategy" to possible "objectives of global politics" and the "future structure of Europe."[21]

Thus, it was not a remoteness from practical issues and applied research that was supposed to distinguish his institute from the numerous other West German institutes and think tanks that were being founded at the time and that concerned themselves with political consulting. The Stiftung Wissenschaft und Politik (German Institute for International and Security Affairs), for example, which was located in the neighboring town of Ebenhausen, conducted its "analyses of foreign policy and strategy preferably by government mandate." Even though von Weizsäcker announced prospective cooperation with this institute, he emphasized that, in Starnberg, research topics would be chosen freely, "without the influence of any client." Furthermore, he asserted that any research at his institute would "consider the big picture with sufficient responsibility."[22]

Most of the other MPG members who had to decide whether the institute as conceptualized by von Weizsäcker should be incorporated into the MPG probably agreed with his ideas of scientific autonomy concerning the selection of research topics and institutional autonomy of governmental funding. In view of the wide range of possible topics to be researched by the institute, however, it remained unclear to most of them what exactly von Weizsäcker had in mind when he referred to "the big picture." With regard to the name of the institute, a variety of alternatives were discussed to make it "mannerly and comprehensible," as Fritz Münch, an expert in international law, urged.[23] Under consideration were denominations such as "futurology," "peace studies," or "foundation of planning sciences" (*Grundlegung der Planungswissenschaften*). The name "theoretical and experimental prognostics" was rejected because of its—all too apparent—allusions to physics. Von Weizsäcker himself preferred the denomination *Mellontik,* which no one but himself understood.[24] Ultimately, von Weizsäcker's original proposal was accepted—without the debutants being able to really discern the conceptual outlines of the institute to be founded. During the final session of the humanities section in February 1969, which was critical for the decision about the foundation of the institute, the chairman of the humanities section, art historian Wolfgang Lotz of the Bibliotheca Hertziana, made the decisive argument in favor of Weizsäcker and his proposal: "By current definition, the Max Planck Society conducts basic research. If there exists something like basic research, it seems to me that this project . . . deserves the name and requires basic research. The individual projects that shall be realized can only be realized if the necessary foundation is given, either in the shape or in the ideas of Mr. von Weizsäcker or the institute's director."[25]

As a response to the doubts that had been voiced concerning the feasibility of von Weizsäcker's program, Lotz called upon Max Weber's spirit for support: "I think that if Mr. Max Weber was with us right now, he would also vote in favor of this institute, because it seems to me that the path that Max Weber has laid out with his work is leading directly to the issue at hand."[26] Apparently, basic research in the humanities remained inseparably linked to the imposing intellectual stature of the heroic researcher to whom it was ascribed and who could claim it exclusively for himself. This claim of von Weizsäcker's was recognized among the members of the MPG, yet did nothing to reveal anything about the type of research programs that would be implemented in Starnberg in the future. Above all, his claim by no means ruled out practical policy counseling, the way, for example, the MPI director von Weizsäcker practiced it from 1974 to 1977 as chairperson of the advisory committee of the Federal Minister of Research and Technology.[27]

Conclusion

For the English-speaking context, Clarke and other authors have shown how specific science policy constellations in the United States and Great Britain resulted in the introduction of the terms "fundamental research" and "basic research" around the turn of the twentieth century. In this context, the terms formed a hybrid concept that oscillated between notions of pure and applied research. At that time, however, the German term *Grundlagenforschung* was used rather incidentally, even though in the 1930s it became more common. Under the very different, but yet again very specific, conditions of the mid-1940s, which historically spanned both the end of the Second World War and the beginning of the Cold War, and which saw the Western part of the former German Reich become the junior partner of the Western alliance, the hybrid understanding of basic research evolved into a dichotomous concept: mainly due to the influence of the contemporary U.S. discourse, basic research was then contrasted conceptually with applied research and described as clearly distinguishable from the latter. At the same time, "basic research" was enriched with allusions to former conceptualizations of "pure science." It was presented as a symbol of freedom, for which the Western democracies stood firm against the only remaining totalitarian enemy: the Stalinist system. Basic research was now understood as being far from application, not immediately relevant to political or military purposes, and autonomous or free in the sense of the Western democratic self-conception.

It was in this particular political constellation and with this semantic conceptualization that basic research became programmatic for the KWG/MPG. After 1945, the concept contributed to the process of the MPG's reorganization in three different ways: first, regarding the society's struggles of dealing with its recent past, references to "basic research" helped to obscure the character of the more or less hybrid research, particularly within the field of armament research, with which the KWG had proved itself as a part of the NS regime. Second, in the postwar constellation, the new concept was the key to recovering the MPG's organizational integrity, to defending its institutional independence, and to maintaining the scientific autonomy of its members. Third, when it came to the formulation of future directions, the commitment to basic research remained a perennial mission. As we have seen in the discussions from the first two decades of the new MPG as exemplified above, it was by no means always transparent to the respective actors how exactly this commitment was to be implemented, for instance in the conceptualization of institutes, research fields, and projects.

One could be inclined to dismiss the strenuous conceptual efforts presented above as simple entries in a collection of stylistic blunders concern-

ing the topic of basic research in the first decades of the Federal Republic of Germany. Each of the speakers cited here did understand basic research in another way. Even those, however, who openly articulated their puzzlement as to what basic research really meant when applied to the concrete case of a person doing research, or a department, or a whole institute, did not question the self-commitment of the MPG, its institutes, and its current and especially its prospective future members to basic research. In the debates presented in this chapter, concerning the shutdown, reorganization, or foundation of institutes or departments, the respective research proposals were measured against the standard of "basic research" without ever having established a binding definition or scale. For the early postwar years, a common understanding was hardly to be expected. As far as the debate concerning the foundation of the Starnberg institute can be interpreted as symptomatic of this conceptual uncertainty, it can be postulated that even two decades later, the MPG members and bodies had not come to a satisfactory and reliable agreement about the exact nature of what was still undisputedly regarded as the decisive parameter in such decision-making processes. It is up to future investigations to explore what kind of understanding of basic research substantiated in the research practices of the MPG's members and institutes in the 1970s—when debates about science and its social responsibilities reemerged and public funding became less self-evident.

Carola Sachse is full professor (em.) for contemporary history at the University of Vienna. She previously served as research director of the Max Planck Society's program on the "History of the Kaiser Wilhelm Society under National Socialism." She is currently working on the history of the Pugwash Conferences on Science and World Affairs. Recent publications include *Kernforschung in Österreich: Wandlungen eines interdisziplinären Forschungsfeldes 1900–1978* (coedited with Silke Fengler, 2012) and *Science, Peace and Communism: The Pugwash Conferences on Science and World Affairs in the Early Cold War Years* (coedited with Alison Kraft, forthcoming).

Notes

1. Archive of the History of the Max Planck Society (MPA, *Archiv zur Geschichte der Max-Planck-Gesellschaft*), II/IA-1, 1/1, 1/2.
2. In 1948, when the MPG was reestablished, twenty-three MPIs were counted (apparently not including the institutes in Berlin and the Soviet and French zones of occupation); in 1960, forty (including the institutes in Berlin-West and the former French zone of occupation); in 1972, fifty-two; in 1984, fifty-eight; in

1990, sixty-one; in 2002, eighty (Gruss and Rürup 2010, 14). On the MPG's reorganization see Hachtmann 2007: 1041–1156; and Sachse 2009.

3. See "A Portrait of the Max Planck Society," Max-Planck-Gesellschaft website, retrieved 2 June 2015 from http://www.mpg.de/short-portrait.
4. Lucier (2012: 535) recently declared the linear model to be "entirely dead" and referred to Grandin, Worbs, and Widmalm 2004. See also final chapter in this volume.
5. For further discussion of relevant literature see the introduction and the other case studies in this volume.
6. According to Clarke (2010: 205), the DSIR has been using the adjective "basic" as a synonym for "fundamental research" ever since its 33rd Annual Report (1947–48).
7. For a more detailed analysis of the importance and use of "basic research" in Interwar Germany, see Schauz 2014 and chapter 2 in this volume.
8. A precursor to this debate can be found in arguments between the Marxist-oriented British scientists close to John Desmond Bernal (see particularly Bernal 1939) and the *Society for Freedom in Science,* which was founded by Michael Polanyi and John Randall Baker in 1940 (McGucken 1978; Werskey 1988; Clarke 2010: 307–310). It was continued in the United States' *Congress for Cultural Freedom* (Polanyi 1954: 17–27; Berghahn 2004: 175, 178).
9. On the role of the Rockefeller Foundation as a moderator with regard to the U.S. view of the KWG and on the following, see Sachse 2009. On the reconstruction of West Germany's scientific landscape, see Osietzki 1984; Eckert and Osietzki 1989; Trischler and vom Bruch 1999; Weingart 2001; Carson 2010; Walker et al. 2013; and the series *Studien zur Geschichte der Deutschen Forschungsgemeinschaft,* edited by Rüdiger vom Bruch, Ulrich Herbert, and Patrick Wagner, vol. 1–10 (Stuttgart: Franz Steiner Verlag, 2007–2015).
10. On the transformation from KWG to MPG, see Hachtmann 2007: esp. 1159–1168.
11. MPA, II/1A/(5–5)12: Denkschrift, 14 February 1947. All following citations are taken from this document, transl. C. S.
12. All citations: MPA, II/1A/(5–5)12: Denkschrift, 14 February 1947.
13. DFG report (4 April to 31 March 1954: 18), here cited (with the author's kind permission) from Heiko Stoff's paper presented at the conference "Anwendungsorientierung in der universitären Forschung. Historische Perspektiven auf eine aktuelle Debatte," Münchener Zentrum Wissenschafts- und Technikgeschichte, March 2011 (Lax 2011).
14. Butenandt 1941: 20: "die heilige Flamme des reinen Erkenntnistriebs (…) hüten"; Citation taken from Gausemeier 2005: 287.
15. MPA: Niederschriften von Senatssitzungen, No. 4–6, 1949, meeting on 18/19 March 1949: 4.
16. These included MPI für Zellphysiologie (Cytophysiology) in 1970; MPI für Eiweiß- und Lederforschung (Protein and Leather Research) in 1973; MPI für Tierzucht und Tierernährung (Stock Breeding and Animal Nutrition), handed

over to the Bundesforschungsanstalt für Landwirtschaft (Federal Research Institute for Agriculture), in 1974; MPI für Landarbeit und Landtechnik (Agricultural Labor and Technology) in 1976; and MPI für Pflanzengenetik (Plant Genetics) in 1978. The only nonagricultural institute that was passed on to a new sponsor was the MPI für Silikatforschung (Silicate Research), which was handed over to the Fraunhofer-Society in 1970. In the research area of physics, however, institutes were not closed, but older institutes that covered a broad range of topics were split up into separate branches and remained within the MPG (Henning and Kazemi 2011). I am grateful to Florian Schmaltz for a list of former and closed MPIs.

17. MPA Vc/4, KWG Nr. 1: Geschichte der Kaiser-Wilhelm-Gesellschaft und der Max-Planck-Gesellschaft 1945–1949, Göttingen 1949 (=Festschrift zum 70. Geburtstag des MPG-Präsidenten Otto Hahn), 259 (transl. C. S).
18. MPA Niederschrift von Senatssitzungen, Nr. 4–6 (1949), meeting on 18/19 March 1949: 5 (transl. C. S).
19. MPA II/1 A-IB, MPIVEE, Kaudewitz, vol. 1, Thomas to Ballreich, 12 May 1961 (transl. C. S.).
20. For Nachtsheim's comment on this discovery, see Sachse 2011: 44–45.
21. All citations: MPA II/9/13: Vorschlag zur Gründung eines Max-Planck-Instituts zur Erforschung der Lebensbedingungen der wissenschaftlich-technischen Welt, 11 November 1967, signed by Carl Friedrich v. Weizsäcker, Wolfgang Bargmann, Klaus v. Bismarck, Hermann Heimpel, Walther Gerlach, and Werner Heisenberg (transl. C. S.).
22. MPA II/9/13: Vorschlag zur Gründung eines Max-Planck-Instituts zur Erforschung der Lebensbedingungen der wissenschaftlich-technischen Welt, 1 November 1967, signed by Carl Friedrich v. Weizsäcker, Wolfgang Bargmann, Klaus v. Bismarck, Hermann Heimpel, Walther Gerlach, and Werner Heisenberg (transl. C. S.).
23. MPA II/1A-IB, IL1/Lebensbedingungen: Abschrift der Tonaufzeichnung der Sitzung der Geisteswissenschaftlichen Sektion 11 February 1969, 65 (transl. C. S.).
24. MPA II/IA 76. VP, Bd. 2: Niederschrift über die Sitzung des Beratungskreises über die Errichtung eines MPIL, 2 February 1968; Niederschrift über die 76. Sitzung des Verwaltungsrats und des Vorstands der MPG, 4 March 1968 (transl. C. S.).
25. MPA II/1A-IB, IL1/Lebensbedingungen: Wortprotokoll der Sitzung der Geisteswissenschaftlichen Sektion, 11 February 1969, 61–62 (transl. C. S).
26. MPA II/1A-IB, IL1/Lebensbedingungen: Wortprotokoll der Sitzung der Geisteswissenschaftlichen Sektion, 11 February 1969, 74 (transl. C. S).
27. MPA II/9/20: MPG-Spiegel 4/1974, 20; Beratungsplan des Bundesministeriums für Forschung und Technologie 1974; Gottstein to Weizsäcker, 24 June 1974, Weizsäcker to Gottstein 1 July 1974 (see also Leendertz 2010, 2014).

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