

Plenary Talks

Heisenberg and the Framework of Science Policy

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Abstract

In the decades after 1945, new structures were created for science policy in the Federal Republic. To the establishment of the postwar framework Heisenberg contributed as much as any other figure. This was true even though, on the whole, he took no great pleasure in the venture, nor was he always particularly adept at it. His conceptions revolved around certain key notions: autonomy and centralization, elite advisory bodies and relationships of trust, modernization and international standards. These show up at many levels of his activity, from the Max Planck Society to national and international advisory committees to the Humboldt Foundation itself. His opinions were shaped by encounters in the Federal Republic, but they also grew out of his experience of the Third Reich. At a moment like the present, when the postwar settlement is under review, it is interesting to reflect on the inherited system: on the extent to which it reflects the situation of the postwar decades and the intuitions of those who, like Heisenberg, created it.

Speaking on the history of science policy, which is often thought boring, is a dangerous undertaking in the late afternoon. Dangerous, too, is speaking about it before so many listeners with personal experience. Yet for a symposium for Heisenberg's centennial, the topic is important. In the decades after 1945, Heisenberg and his colleagues faced a one-time opportunity to shape a new system in creation. The science policy of the Third Reich, if such had existed, had been a disaster. At a moment when a new political order was being formed, science was the rising star on the international horizon. The science policy system was not created from scratch. Nonetheless, it confronted a new state and new options. Even though Heisenberg often thought of the task as a burden, he contributed to defining its framework as much as any other single person.

Thus there is historical interest in examining the postwar settlement under construction. The topic is also significant for us in the present, because that postwar settlement has since come under review. The world has changed since Heisenberg's times. Principles that seemed persuasive in his day have seemed less so to his successors. In the years since those criticisms were first articulated, we have seen the framework gradually being rethought. Thinking over those more recent experiences, we can gain by examining the structures he helped put into place.

This contribution will proceed by laying out Heisenberg's contribution to the framework of science policy [1, 2]. Moving quickly and schematically, it will focus on institutional and structural presuppositions and legacies, giving less emphasis to moments of decision. (History need not proceed chronologically.) The account will deal with Heisenberg's two main concerns, advising and institution-building, and offer reflections on what he accomplished.

1. Advising

Heisenberg's first concern was science advising. What made it necessary? That seemed obvious. A science policy was to his mind the hallmark of a modern state. Scientists had a responsibility to contribute, as they were often expert where politicians were not. The obligation fell particularly on the famous names in the scientific community, who would be more readily listened to beyond it. Important to Heisenberg was a form of advising that was not simply lobbying for science or securing funding for research. That meant scientific input on broader concerns of society and politics. Important, too, was that initiative remain on the side of the scientists, serving the government but remaining autonomous.

Heisenberg's advisory efforts: an overview

Postwar optimism (late 1940s)

German Research Council

Becomes Senate of DFG

High ambitions basically fail

The nuclear era (1950s)

Federal ministry for atomic affairs

German Atomic Commission

And its subcommissions and panels

High ambitions disappointed, but practical work succeeds

Restructuring (1960s on)

Federal ministry for research

Hopes rise and fall as chancellors come and go

Advisory committees formed and dissolved

Advising becomes a desideratum, but not on Heisenberg's terms

Heisenberg looked to models of advising like those put into place by World War II in countries like Great Britain and the United States. The question was how these would translate to Germany. The governmental structure was different, the scientists were different, and the prehistory was different, too. From the start Heisenberg took federal leadership as the order of the day. This entangled him, of course, in the ongoing battles of the Bund versus the Länder.

How was advising to be carried out in practice? He imagined it emerging from small circles of first-rate individuals. Heisenberg was indeed a man of small circles and face-to-face meetings (also, one may note, quite skilled at leading them). He wanted to work with individuals who spoke their minds, independent of disciplinary or institutional affiliation. This seemed to him the model for how science policy should be made. It depended upon the building up of relationships of trust with the government, often based upon personal contacts between high-level scientists and high-level officials.

The outcome did not match Heisenberg's expectations. Science advising was established on a small scale, an example being the agenda-setting power around 1960 of the nuclear physics panel of the German Atomic Commission. On the larger scale, however, despite multiple tries, Heisenberg had to admit he never fully succeeded. This assessment held from his initial proposal of a German Research Council of the late 1940s through his arguments for advisory bodies to the chancellors of the 60s. His ambitions failed, first of all, to gain the support of his colleagues, then ran into contrary demands within the government. So while funding was secured (particularly for nuclear and particle physics), advising was

less well institutionalized. Exemplarily, the government set up its own atomic commission, only to bypass it when considering nuclear weapons for the federal armed forces. Still, the idea of high-level advising by scientific leaders has continued to exercise appeal.

2. Institution-building

The other domain in which Heisenberg invested his time was the construction and strengthening of the institutions of science. Institutions have some permanence; once they are in place, they are not easy to move, change, or dissolve. With an institutional landscape in flux after the war, individuals had opportunities to make long-lasting contributions. Heisenberg took full advantage. A few examples, selected from a wider spectrum, give a sense of his concerns.

His efforts began with laboratories and research facilities, with CERN as a prime example. (CERN had the added advantage of international connections, crucial for West Germany after the war.) Despite being a theorist, Heisenberg was the first head of CERN's Scientific Policy Committee. He proved adept at working out compromises when his own interests were not at stake. He also was good at collaborating with politicians to get the laboratory funded, even as it repeatedly exceeded expectations for its financial commitments. (That Heisenberg came to take the financing seriously was part of the reason why, by the late 1960s, he preferred storage ring plans to the SPS. Part of the reason was also his unified field theory, but that was not all of the story.)

A further locus of his efforts was the Max Planck Society, as it reconstituted itself out of the Kaiser Wilhelm Society. Heisenberg used his position as institute director to launch new institutions for big science: parts of the Karlsruhe Research Center, the Institute for Plasma Physics, and the Max Planck Institute for Extraterrestrial Physics. More generally, he grew by the late 1950s into a major power within the MPG. Along with others, he was in discussion to succeed Otto Hahn as president — which would have been for him a mistake, as he surely realized. Instead, in line with his personal inclinations, he continued to work behind the scenes, helping push through Adolf Butenandt's reforms of the early 1960s. Heisenberg's interest was in modernizing the MPG and ensuring its international standards. If German science was to hold onto such a remarkable institution — remarkable in quality, of course, also remarkable in structure and autonomy vis-à-vis the state — it would have to be defended and kept up to date by deliberate processes of self-renewal.

A final example of Heisenberg's activity is of course the Alexander von Humboldt Foundation. The Foundation was resurrected after the war, and starting in 1953 Heisenberg served it for more than two decades as its first postwar president. The pair of Heisenberg and Heinrich Pfeiffer, his long-time General Secretary, decisively shaped the Foundation's agenda and structures. Little needs to be said about its program, except to point out that the atmosphere with which Heisenberg helped endow it, an environment of personal relationships and face-to-face encounters, was of a piece with his views on science policy more generally.

The principal interest here is in the Humboldt Foundation's structure, which can be seen in many ways as a model. The Foundation was to operate in a free space outside the federal bureaucracy, a free space that the government had carved out voluntarily. The state's interest was in creating international scholarly connections, for which a government office seemed ill-suited in a world suspicious of Germany. Most of the Humboldt Foundation's funding came from the Foreign Office, but it was given to the scholars to dispose of by their own criteria. Thus the body was set up as a foundation, despite its limited endowment. This secured it leeway in defining its own organs, with fewer bureaucratic constraints. It also allowed it to accept government funding and public responsibilities while explicitly maintaining formal autonomy. In this respect, along with the Max Planck Society,

the Humboldt Foundation was the venture in which Heisenberg was most successful in realizing his ideals. It is no surprise that he took so much pleasure in it.

3. Reflections

Much of Heisenberg's thinking came from international models, so these developments belong to a global story. But at least as much of the impulse came from experiences of the Third Reich, from which Heisenberg learned in senses both positive and negative. Despite his troubles with the Nazis, Heisenberg also started on science policy in the Third Reich. This was when he began to learn how to work within a system, deal with politics, and make use of his prestige. Yet he distinctly reacted against the experience of subordination, which goes some way towards explaining his postwar stress on autonomy. Autonomy could be a direct response to the Third Reich, exhibited in a desire to maintain a balance vis-à-vis the state. It also resonated with liberal cultural values that were resurrected, too, after 1945. Those values stressed the autonomous personality given space to develop creativity and exercise talents. They were the same cultural values stressing personal contact that shaped the Humboldt Foundation, too.

In science policy, autonomy is a tricky notion. Scientific leaders and political theorists sometimes call it intrinsic to science. Sometimes, in a more concrete vein, they point to the clause anchoring freedom of research in the Federal Republic's Basic Law. Historians are skeptical about timeless arguments, and they want to understand how clauses like this one find their way into constitutions at all. In the fact of the matter, autonomy has been called into question for many observers since Heisenberg's day. With science dependent on public funding, government and society proved more inclined by the 1960s highlight accountability instead. That has meant that the choice of field and research method has been less and less left to the individual's wishes. One result has been a series of protests from the side of scientists objecting to interference with researchers' programs and the shrinking free space for research in general [3]. In these complaints, Heisenberg's era of visionary individuals appears as a golden age. But perhaps the principle of autonomy bears rethinking from within the community of researchers. Other notions from Heisenberg's day have already been reworked. An example is the idea that scientific advisory bodies are not also, simultaneously, the voice of an interest group; Heisenberg already took his leave of that notion. Similarly, the early insistence has faded that members of advisory boards are there purely as individuals, not as representatives of different fields or organizations. Institutions like the Humboldt Foundation have found ways to coordinate their independent initiative with the needs of their sponsors. Practices have adapted, even if basic notions have not.

The historian speaking here would not want to be misunderstood: I like autonomy; indeed, in my nostalgic moods, I wish I had more of it. But as a basis for argumentation it feels (to this historian) heavily imbued with the spirit of the late 1940s and 50s. In the late 1940s and 50s, in that historical setting, it may have been broadly compelling. It has not proved so compelling anymore for outsiders who do not get to share the individual's pleasure in independent scholarly work. The world has changed. This historian's experience, in academia and the world at large, has been that absolute autonomy is nowhere realized. When only the absolute notion is available, thoughtful reconsideration is blocked.

Positive suggestions are not easy to come by. Yet thinking about the postwar transformation of liberal individualism, the notion of autonomy could be refined, too. Very schematically, stressing a process instead of a state of affairs would allow a twofold rethinking. First, an emphasis on pluralism, a tolerance for idiosyncrasy, would still authorize individuals to follow their peculiar paths. This could be justified by a standard liberal presumption that a variety of starting points leads to a richer appreciation [4]. Second, the course and pace of research can be understood as developing by a logic set in part by the matter at

hand, constrained by the resistances of the domain under study. This shift offers alternatives to demands for short-term results or progress demonstrable by purely external criteria. So pluralism is allied to autonomy, but without its completely individualistic perspective. The logic of the matter at hand has similar allegiances, but locates the motor in the domain under study and outside the individual's wishes. These paired concepts give us room to rethink in a world that has changed. They do not offer absolute autonomy, but that strong notion may be a mirage.

All this is speculative, an attempt to put historical perspective to work. What it suggests, however, is that the historical constitution of the framework of science policy can open up questions for us today. Many of the structures of Heisenberg's era are with us still: some still honored, others now questioned. Trying to understand their origins, we gain some insight into their prospects.

References

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- [4] JOHN STUART MILL, *On liberty* (London: Penguin, 1974).