

Mikael Hård

*Appropriating the Machine:
German Discourses on Technology
and Society, 1905-1935*

STS-arbeidsnotat 1/95

ISSN 0802-3573-98

arbeidsnotat
working paper

Appropriating the Machine: German Discourses on Technology and Society, 1905-1935¹

Mikael Hård

Progress, up to now, had had to do,
in Hans Castrop's mind, with such
things as the nineteenth-century
development of cranes and lifting-tackle.
(Mann 1969/1924: 155)

1. Introduction: The First Crisis of Technology

German history has been filled with much turmoil, but the years between 1870 and 1950 were perhaps the most dramatic period of all. During these eight decades the German people experienced a war with France, national unification under Prussian leadership, rapid industrialization, the first world war, a revolution that ended monarchic rule, financial disaster, a failure to establish a democratic form of government, the seizure of power by the Nazis, another world war, and a split into two nations. Many, if not most, historians have quite naturally been drawn to these events. German historiography in the 1970s and 80s revolved to a large extent around the question as to whether the German transformation into a modern society has to be considered exceptional or not. Their discourse focused attention on what was called the German *Sonderweg* (Kocka 1988). As Geoff Eley and David Blackbourn (1984) have pointed out, though, this concept has been colored by a liberal bias which assumes that there exists a normal way toward modern democracy, liberalism, and capitalism. Developments in Great Britain and the United States constitute a pattern which other countries should follow. Since Germany chose another path, the consequences of this *Sonderweg* approach have been to regard this country as slow and even backward. Eley and Blackbourn conclude that such Anglo-Saxon, liberal prejudice should be avoided: each country has shaped its

¹ The research for this paper was primarily made within the framework of a project, "Technology and Ideology: Cultural and Cross-Cultural Patterns in Technology Debates," run at the Department of Theory of Science at Gothenburg University, and financed by the Swedish Research Council for the Humanities and the Social Sciences.

own form of modern life, and its own traditions play an essential role in this process.

Most historical works on the modernization of Germany focus on political and economic issues. Modern technology--perhaps the most pronounced characteristic of modern life-- usually remains peripheral. It was, however, not only the notions of the liberal market economy and plebiscitary democracy that caused great distress among German intellectuals. Modern technology, its nature and alleged consequences, also bothered them. The result was a complicated struggle to find an appropriate place for "the machine" within the framework of German culture. As will be shown in this paper, one of the most commonly held positions in this struggle was to call on the state to control and direct the development and use of technology. The aim of many intellectuals, not only on the right, was to organize technology in much the same way as they wanted to imbue order into what they considered to be the chaos of unfettered capitalism and egalitarian politics. In their attempts to organize modernity they called for state intervention (cf. Wagner 1994).

The general crisis of classical, liberal modernity began already at the end of the nineteenth century. Modern technology, though, can be said to have gone through its first crisis during and shortly after the first world war.² It became a central topic in the German discursive framework at this time: "The discussion about 'technology' became fashionable," as one contemporary observer later wrote (Dessauer 1958: 27). Mustard gas and tanks proved to the critics that technology did not necessarily bring about a better world, and that it need not be an internationally unifying force. The postwar depression also proved to some commentators that capitalism had to be harnessed and directed toward common goals. Calls for planning, regulation, and control were widely heard--not least from Walter Rathenau, the multi-faceted AEG director, government minister, and essayist. Although not a typical industrialist, Rathenau was just as concerned as everyone else about the economic problems that beset postwar Germany. Like most people, he was prone to blame the victors of the war for Germany's troubles.

It was not only former enemies that were victimized in the general debate; engineers and scientists were also criticized (Forman 1971). Using the classical argument of technology's ethical neutrality, representatives of the engineering profession maintained that the engineers could not be made responsible for the cruelties of the war. In their struggle for renewed recognition, many well-educated engineers argued that their activities should be considered to be as "cultural" as that of artists and scientists. In support of this argument they claimed that technology should be integrated into the

² Perhaps "crisis" has become too common a term among scholars (just as among journalists and politicians). Dagmar Barnouw (1988) describes the years of the Weimar republic as a period of "cultural crisis" in Germany.

national cultural identity, and that engineering education include components of classical *Bildung*. In other words, traditional frames of reference were mobilized to come to grips with modern technology.

The war did not, however, make all non-engineers antagonistic to the machine system. It was generally accepted that technology was needed to reconstruct the country after the war. To the influential social scientist Werner Sombart the war showed that technology had the potential to unify Germany and turn it into a great power. For the nationalist Sombart--as for the famous doomsday prophet Oswald Spengler--a prerequisite was that the German people discard foreign technology, and instead develop their own, nationally founded technology.

In Thomas Mann's *Magic Mountain* from 1924 the young engineer Hans Castorp struggles to orient himself in a period of change. The traditional view of technology as the only truly progressive force, transforming nature for the material benefit of mankind, was no longer self-evident. Castorp had a hard time following the arguments of Ludovico Settembrini, the Italian man of letters. He could not understand that values like democracy and justice could also be seen as progressive:

But all this made a confused impression on Hans Castorp. Herr Settembrini seemed to bring together in a single breath categories which in the young man's mind had heretofore been as the poles asunder--for example, technology and morals! (Mann 1969/1924: 155f.)

The interesting thing is not only that Mann highlights the transitory character of "technology" in Germany of the 1920s. Perhaps even more exciting is that he attributes to Mr. Settembrini the idea that technological developments may have positive moral consequences. The humanist is the one who brings technical and cultural progress together--not the engineer!

The intellectuals whom we will encounter in this paper were perhaps not so eloquent as Mann's Italian man of letters. Most of them wanted to retain the beneficial aspects of modern technology while removing its negative impacts--but they did so in a quite peculiar manner. With a typical German formulation, their task became to "incorporate technology into culture" (Dessauer 1958: 62). Their aim was to *appropriate* modern technology and assimilate it into traditional society without having to adapt to the demands of the mechanical spirit. Through a domestication process, recourse was made to a traditional German discursive framework in which national *Kultur* was hailed, and international *Zivilisation* and *Amerikanismus* were denounced. They constructed a "regulation discourse" and attempted to control and organize the development of technology on a national basis (Dierkes *et al.* 1988)--from Rathenau's "planned capitalism" in the teens to Sombart's

"German socialism" in the thirties. These ideas received strong support from the engineering community and some of them were integrated into Nazi political practice (Herf 1984; Renneberg and Walker 1993).

I will below present the positions of central German engineers and their classically educated opponents, as well as the views of Rathenau, Sombart, and Max Weber. Since it is impossible to cover the entire German "struggle about technology" within the limits of this paper, I have chosen to treat these groups and individuals as representatives of distinct positions in the debate. There is, unfortunately, not enough space to treat neither socialists nor central Nazi thinkers at any length. My choice has not only been motivated by the fact that the engineer-humanist controversy was often quite dramatic, and that Rathenau, Sombart, and Weber were highly influential. These actors also initiated discourses that have since become the frameworks for contemporary academic and political discussions. The technology-culture problematique which was so central to leading engineers in the 1910s and 20s remains a topic in today's German-style philosophy of technology (cf. Section 2 and Ropohl 1991). Similarly, the question of how to regulate technology is still dealt with in the 1990s in terms that are much the same as those that emerged after World War One (cf. Section 3 and Dierkes *et al.* 1988). And, the debate over technological versus social determinism continues to be central in the social studies of technology from Sombart and Weber to Jürgen Habermas and Ulrich Beck today (cf. Section 4 and Rammert 1993).

2. Mandarins Domesticate Technology and Engineers Appropriate Culture

It is well known that German engineers constituted a self-conscious profession in the latter part of the nineteenth century (Gispen 1989). Gert Hortleder (1974) has shown that many engineers actively strove for higher social status and fought to achieve high positions in the public administration. Most active in this struggle for recognition were those who had gone through higher education at an institute of technology and had become *Diplom-Ingenieuren* (Ludwig 1974: 25).

The engineers did enjoy some success. Many polytechnics gained *Hochschule* status in the 1870s; these schools in turn were given the privilege of issuing doctoral degrees in 1899; the modern, science-based secondary schools were formally ranked on a par with the classics-oriented *Gymnasien*. This professional strategy turned out to be inadequate, however. Not every engineer could possibly become a civil servant or famous business leader at a time when ever more engineers were being educated. The cry for higher status became hollow in the face of an emerging engineering "proletariat."³ Since,

³ The total number of students at technical colleges increased from 3,000 in 1885 to 11,000 in 1911 (Ringer 1987: 60).

furthermore, the social critique of science and technology increased at the turn of the century (Hughes 1958), the engineers' situation became increasingly troublesome. They were hard pressed to find other avenues for social recognition. One such path entitled the engineers to adopt the philosophically idealist language common to those whom Fritz Ringer (1969, 1987) has called the German *mandarins*. This latter group consisted of the classically educated middle-class elite of government officials, university professors, secondary school teachers, medical doctors, and lawyers. Its members were usually politically conservative, and held German culture and classical education in high esteem. They had gone through the *Gymnasium*, and had been imbibed with Fichte, Humboldt, and Hegel. They had thereby acquired what Pierre Bourdieu (1991: Ch.2) calls a large amount of "cultural capital."

The main point in this section is that many engineers developed a new professional strategy after the turn of the century, and that they did so in order to become accepted by the learned elite. Many engineers attempted to derive "symbolic profit" by adopting the mandarin discourse. Instead of primarily struggling for positions in the state administration and higher salaries, they chose a complementary strategy: to make modern technology palatable to the intellectual elite. They did so by adapting their vocabulary to the mandarin standard. The mandarins' power depended to a large extent on their ability to control and define what should be regarded as acceptable language (Ringer 1987: 21). Influential engineers attempted to foster the intellectual and cultural assimilation of modern technology by accepting the mandarin discursive framework, where a term like *Kultur* played a central role. The engineers' attempts to give technology a cultural meaning can be seen as a "strategic turn on the conceptual level" (Ropohl 1991: 200). As Werner Koenne (1979), Karl-Heinz Ludwig (1974), and Hans Lenk (1982) have observed, the result was that some segments of the German controversy over modern technological developments came to be couched in the idealist language of the human sciences. What these scholars have not discussed, however, is that the engineers' adoption of a mandarin vocabulary also affected the meaning of the terms being used. The machine entered the mind as an idealized entity, and thus were sown the first seeds of what would become *Technikphilosophie*. The discourse to which scholars like Ropohl himself belongs was framed at this time.

The Mandarin Discursive Framework

The concept of *Bildung* was central in the mandarin ideology (Bollenbeck 1994). It had its roots in the writings of Wilhelm von Humboldt, and consisted of three interrelated elements (Ropohl 1991: 217). It emphasized the importance of individual, personal development, prescribed that Greek and Roman studies were the best training for the individual mind, and stressed that the spiritual rather than the material aspects of the world were most important.

This idealism was, however, not contemplative and passive, but valued the constructive creativity of the human being (Ringer 1987: 28). Not only the intellectual, but also the material outcomes of a truly creative existence could be called *Kultur*--and this was something that the engineers were eager to get.

The mandarins were very positive to the German state. Throughout the centuries, strong mutual ties had evolved between the state and the academically trained intellectuals. The state had provided the intellectuals with certain privileges and had been able to mobilize administrative and rhetorical skills in return. This privileged position--their cultural capital--was at the turn of the century threatened by a stronger currency. In the face of intense material, political, and socio-economic changes the mandarins felt that their position as the carriers of spirit and culture was endangered (Ringer 1987: 12f., 50). The mandarins saw themselves being attacked by materialist engineers and scientists, inhuman industrialists, and (sometimes Jewish) businessmen. But, even if the latter groups had acquired pecuniary strength, the mandarins still maintained that they should be entrusted with the preservation of classical values. Only they should be *Kulturträger*.

Toward the end of the nineteenth century the mandarins found their position ever more precarious, and they developed various responses to retain their socio-cultural advantage. This challenging situation forced them to review, rethink, and reformulate their ideology. Some mandarin "reformers" realized that they now lived in "the era of technology," and were willing to assimilate some components of modern life into the lower and middle levels of the educational system (pp. 52f.). But, more common reactions were to reject many constituents of modern society, and to call for more state support. Most mandarins attacked rational technology and utilitarian science, as well as the mediocrity of democratic mass-society, for being exponents of *Zivilisation*. To be civilized was, in the mandarin world-view, to be superficially concerned only with the external world. The mandarins sharply contrasted this materialism with what they saw as the deep, inward-looking orientation of *Kultur*. They detested modern education, which implied the simple transfer of information and an orientation toward technological development and economic growth. Instead, they protected classical education as a means for cultivating self-development and personal growth. They wanted *Bildung* instead of *Ausbildung*. The right-wing Moeller van der Bruck summarized this position eloquently when he said that civilization belonged to the stomach and culture to the spirit (Stern 1961).

Toward the end of the nineteenth century the mandarins began to defend culture also for nationalist reasons. They started to regard themselves as the carriers not only of inner culture, but also of German culture. While civilization was denounced as a depraved Anglo-Saxon and French phenomenon, culture was praised as something genuinely German. The term

Kultur thus had no fixed meaning.⁴ By transforming its connotation from something spiritual and individual to something national and collective, the mandarins' chances to defend their position within a rapidly changing society increased. In the process, they reinvented a century-old tradition and modified it to fit a new era. As we will see below, many engineering spokesmen began to do the same--but from another direction.

The "Struggle about Technology" Begins: Mayer and Dessauer

The cleavage in the German discourse between civilization and culture is well known. Less familiar are those parts of the debate which were directly concerned with technology as a socio-cultural phenomenon.⁵ This discourse began to take shape a few years after the turn of the century, when the conservative mandarin writer Eduard von Mayer published a book with the title *Technik und Kultur* (1906), and when the X-ray engineer Friedrich Dessauer began to issue articles on this topic (Dessauer 1908). It was Dessauer who would later name this debate "the struggle about technology." This struggle did not primarily concern the positive or negative effects of certain innovations--as had the nineteenth-century discourse about "the machine." Rather, combatants from both camps maintained the traditional discursive framework, attempting to find a place for modern technology within the bounds of a classical and national culture.⁶

Mayer was opposed to much but not all of modern technology, but he nevertheless did not uphold the traditional division between technology and culture. Through a concerted act of appropriation, he redefined the technology concept in order to make it possible to incorporate what he found to be acceptable technologies into German culture--while defining away and rejecting unacceptable technologies. Mayer did not embrace the classical standard definition of technology as identical with material artifacts and machine systems.⁷ Instead, he counted all outcomes of genuinely human activity as *Technik* (Zschimmer 1937: 27-37). Tools, factories, books, and even social systems belong to technology--granted that they are the product of a true personality. Mayer followed the ideal of individual *Bildung*, and argued that the best technology would enable everyone to develop his or her own

⁴ Georg Bollenbeck (1994: 29ff.) shows how the term *Kultur* around the turn of the century became connected to all kinds of human activity, *Technik* included.

⁵ Fairly recent scholarly accounts of parts of this debate include Herf (1984), Pot (1984), Ropohl (1991: Ch. 10), and Sieferle (1984).

⁶ Ropohl's (1991: 198f.) assumption that all non-engineers subscribed to the technology-culture dichotomy is thus not correct, nor are his claim that this dichotomy belongs to a "particular 'German ideology'" and his suggestion that only non-Germans like Lewis Mumford have fully developed the idea of technology as a cultural product.

⁷ This definition was the ordinary one in the nineteenth century both in Germany (Dessauer 1958: 18f.) and the United Kingdom (Helldén 1986).

abilities. His view was, however, not individualist in the liberal sense. It was, rather, inspired by communitarian ideals, and Mayer demanded that technology contribute to social and cultural unification. The problem is, though, that modern technology does not aim in any of these directions. Instead, this technology creates an atomized and inhuman world, where there is no room for personalities to develop.⁸ Mayer did not least criticize the destructive and demoralizing power of the modern factory system. He criticized the modern "technical spirit" for causing "alienation" and for constructing a society where uniqueness and individual needs are run over by standardized solutions for the masses (Mayer 1906, quoted in Dessauer 1958: 122).

For vocal engineers like Dessauer, such attacks had to be opposed. Because the debate was no longer about directly political, legal, and administrative issues like government openings or university degrees, a more intellectually and cognitively oriented strategy was called for. In his subsequent responses to people like Mayer Dessauer went out of his way to make his arguments fit into the discursive framework of the mandarins, to meet them on their own turf, so-to-speak. He began to publish articles and pamphlets, where he tried to accommodate his language to the mandarin type of discourse. In the process, however, he (like Mayer) also tried to affect and modify the content of this framework. When debating the relationship between technology and culture with a cultural historian, one part of Dessauer's strategy was to expand the connotation of the term *Technik*. He wanted to give the term a spiritual dimension. Paraphrasing modern discourses, we could say that Dessauer (like Mayer) did not want to limit the term *Technik* to hardware. He accepted the mandarin idea that *Geist* was an integral part of true *Kultur*, but claimed that technology also contained *Geist*. Technology was given both a material and a spiritual side with this move.⁹

The expansion of the technology term was more than a play with words. Since it enabled the engineers to claim that engineering was just as spiritual an activity as studying history or reading the Bible, it may be seen as an attempt toward making technology accepted by the learned elite. During the following decades, several attempts in the same direction were made (e.g., Coudenhove-Kalergi 1922; Stodola 1932; Zschimmer 1914).

⁸ Eberhard Zschimmer would more than thirty years later launch a full-scale attack on Mayer. Zschimmer (1937: 37) sees Mayer as a representative of the so-called cultivated (*gebildete*) thinkers who have departed so far from reality that they have become deformed (*verbildete*).

⁹ Please note that the discussion is here about *Technik* and not about *Technologie*, the latter being an epistemological and educational term which--from Johann Beckmann onward--has had to do with knowledge about Technik (Müller and Troitzsch 1989).

The Spirit Meets the War and Domesticates Technology: Schweitzer and Schröter

The reactions of German intellectuals to the first world war were divided. Sombart and Spengler were not alone in finding that the war disclosed the hidden potential of German culture and the German nation. The young, right-wing writer Ernst Jünger regarded the war as a purge that ultimately strengthened the vital sides of Germany. Jünger was not a traditional mandarin, but an independent writer and a hard-core representative of what Detlev Peukert (1987: 26ff.) has called the "frontier generation." He volunteered to fight in the war, an experience that proved to him that modern technology was one of the principal means to select out the strong from the weak members of society (Herf 1984: Ch.4). Jünger wrote in a futuristic manner: "Ours is the first generation to begin to reconcile itself with the machine and to see in it not only the useful but the beautiful as well."¹⁰

Other intellectuals were not so positive. During the war years the mandarin theologian and medical doctor Albert Schweitzer formulated a radically pacifist ethic, which included a fundamental critique of modern technology.¹¹ His view was not, however, that the war was the root of the present crisis. Schweitzer (1923-24: II: 2) held that both the war and modern technology were the outcomes of imbalanced cultural developments: "the destiny of our culture is that its material side develops much more strongly than its spiritual side." This imbalance is manifest both in the cruelties of the trenches and the prison-like working conditions in the modern factory. Schweitzer denounced modern technology for treating in an instrumental manner human and other living beings like things, and instead called for a technology based on ethical considerations. In Weberian terms we could say that Schweitzer wished to substitute a value-rational technology for the dominant purposive-rational technology. Schweitzer (1923-24: I: 21) wanted a technology that relieved both "individuals and collectives" from the struggle of immediate survival. He followed the *Bildung* tradition, and asked for a technology that makes people free to cultivate their own abilities.

Schweitzer's writings do not support Günter Ropohl's (1991) statement that non-engineers tend to separate technology from culture. Like Mayer and several other mandarins, Schweitzer redefined the concept of *Kultur* to meet a new situation. Individual freedom had always been an important ingredient in the mandarin frame of reference, but Schweitzer now reformulated this frame to fit his pacifist and non-elitist ideology. His critique of elitism is noteworthy, since most mandarins were elitists. He defined *Kultur* as an ethical position

¹⁰ Quoted from Herf (1984: 70); the original passage is in Jünger (1929).

¹¹ Schweitzer is most well known for his work as a medical doctor in Africa, for which he received the Nobel Prize for peace in 1952. He had, however, started his career as a theologian at the university in Strasbourg.

which guarantees all living beings both freedom and due respect. A truly cultural technology would liberate humans and animals, rather than exploit and threaten them. Schweitzer's *Kulturphilosophie*, which was written during the war but first published five years after it had ended, can be read as a full-scale attack on the war effort in general and military technology in particular (see Schweitzer 1923-24: II: 270). But his book can also be seen as an attempt to gain cultural control over technological development, and to lead it in new directions. Schweitzer did not reject technology, but wanted to appropriate it for new, more spiritual purposes. He wished to domesticate it in order to liberate all living beings.

Not only the mandarins were scared by the enslaving and brutal character of military technology and the factory system. Even though most engineers probably were not directly afraid of the present technological trajectories *per se*, several of them were definitely concerned about the strong critique that the negative consequences gave rise to. If the painful impacts of technology became more pronounced in the debate, and if the critique consequently grew stronger, then their profession and cause could be in danger. Manfred Schröter was one writer who realized this (Herf 1984: 164ff.). He was the son of an engineering professor, and developed in the 1910s a philosophy which treated technology as a cultural product. In contrast to the traditional mandarins, Schröter (1920: 49) did not regard only philosophy, art, and religion as *Kultur*, but assigned also science and technology to "the totality of culture." In his redefinition of culture he picked one aspect that had always been inherent in the humanistic tradition: *Kultur* and *Bildung* as creative rather than contemplative activities. Schröter defined culture as all actions that bring order and meaning into human life (p. 1). Religion and philosophy used to be means to create such order, but in modern society their tasks are increasingly fulfilled by science and technology. Schröter consequently did not limit *Technik* to tools and machines but makes it encompass all "creative, productive work" that aims at giving life meaning by material means (pp. 56f.). In other words, he made use of the mandarin discursive framework to appropriate technology into a redefined concept of culture.

Schröter was not altogether positive toward the developments in his own time. Interestingly enough, his criticism of the enslaving character of much modern technology echoed Schweitzer's views. If technology is not governed by spirit, then it may take a dangerous turn. The "functionalist" pro-engineering writer and the humanist mandarin could indeed find some common ground.¹²

¹² Schröter's functionalism comes out more clearly in his "Philosophy of Technology," published in 1934.

Spengler's influence on the public debate was greater than that of anybody else at this time. His "Decline of the West," the first volume of which was first issued in 1918 and the second in 1922, triggered an intense debate both inside and outside Germany. In defense of Spengler Manfred Schröter (1922) even wrote a book that summarized this "struggle." Spengler was an independent writer rather than an established mandarin, and many mandarin thinkers criticized his historiographic approach. But several of his ideas and conclusions did nevertheless fall into fertile ground, especially among orthodox mandarins (Ringer 1987: 204). Spengler adhered well to the mandarin discursive framework. He picked up and reformulated the Goethean tradition, and was heavily influenced by Nietzsche. He rehearsed the familiar dichotomy between *Kultur* and *Zivilisation*, and blamed the corrupt Western civilization for most of the depravities of modern society. Like Walter Rathenau, he detested *laissez-faire* liberalism and argued for an orderly and controlled economy (see Section 3 below). Like Werner Sombart, he wanted a new kind of socialism based on German virtues (see Section 4 below).

Spengler devoted the very last chapter of his well-known book to "the machine," and he would later return to this topic a book entitled "Man and the Machine" (Spengler 1931). He defined technology very broadly as every ability to act; even the ability of an animal to run is a *Technik* (Spengler 1991: 1183). Technology is not in itself a problem, only capitalist technology is. When the "*idea of the machine*" emerged in the Renaissance, it had the potential to transform the world into something great, something that incorporated the truly creative soul of mankind (p. 1187; orig. emph.). Due to the devastating influence of merchants and business leaders, it had subsequently run amuck, however. The inhabitants of the West had become technology's slaves rather than its rulers. Also the otherwise creative engineer, "the enlightened priest of the machine" (p. 1191), had become its victim.

One reason that Schröter, the engineer, felt a need to defend Spengler was that "The Decline of the West" was commonly read as anti-technological through and through. Passages like "[t]he machine belongs to the devil..." were broadly misunderstood--both by his contemporaries and by later scholars (e.g., by Hortleder 1974: 86ff.). As the American historical sociologist Jeffrey Herf (1984: Ch.3) has pointed out, it was generally not observed that Spengler tended to locate the worst sides of modern technology in the most overtly capitalist countries in the world, and that his book included a plea for a technology not governed by Mammon. Spengler's traditional heroes were the farmer who cultivates the land and the blacksmith who brings forth goods that incorporate the soul of their maker. Their activities are extracting (*erzeugend*) and refining (*verarbeitend*), as opposed to that of the "exploiting" merchant, who only transmits (*vermitteln*) goods (pp. 1158ff.). Spengler's ideal was a technology which is controlled by the really productive people, such as the

craft worker and the engineer (the heirs of the blacksmith). He wanted a technology that grows out of concrete experience and is the result of a creative soul rather than an exploiting mind. Only such technology could be truly cultural. For the German people this implied that it had to reject the technology of France, Great Britain, and the United States, and create its own, based on German *Kultur*.

It is possible to interpret Spengler's work on two levels. First, Spengler tried to *domesticate* and tame modern technology by incorporating it into German culture. Second, he attempted to bring order into capitalist modernity by creating a new kind of communitarian order (Wagner 1994; see also Section 3 below).

Spengler and many mandarins were by no means alone in expressing a fear of foreign technology and arguing in favor of a nationally oriented technology. Even some influential engineers did so. The *Diplom-Ingenieur* Carl Weihe asked his colleagues in 1919 not to sell out to international technology, and warned his countrymen of the dangers of "*Amerikanismus* and all its detrimental effects on the people's soul"--whereby he meant the soul of the German people (Weihe 1919: 86). This fear of what was considered U.S. ideals and technology started to become quite widespread after the first world war (Hermund and Trommler 1988: 49-58). Weihe (1919: 86) implied that modern technology could indeed be a threat, if it were not founded on "socio-ethical thoughts." He urged the men of technology and industry to do anything in their power to develop a humane technology and to propagate knowledge about the benefits of technology to the citizens.

A couple of years later Weihe would become the editor of *Zeitschrift des Verbandes deutscher Diplom-Ingenieure*, the name of which he changed to the less boring *Technik und Kultur* in 1922 (Herf 1984: 171-78). He used this journal very effectively as a platform for an intensified fight for public acceptance of engineering as a cultural endeavor, and he became one of the most influential and prolific spokesmen for the engineering corps in the interwar period. His attempts to make technology "the darling of the people" had begun directly after the war as a reaction to the anti-technical sentiments at that time (Weihe 1919: 87). He agreed with many critics that "guns, cannon, airplanes, men-of-war, and submarines" were terrifying, but argued that they could not be taken to be representative for technical products as a whole (Weihe 1918: 330). On the contrary, history showed that technology incorporates cultural values and contributes to spiritual liberation, since it frees people from some of the drudgeries of hard labor (p. 331).

Weihe supported the engineers' cause in two ways. He tried to domesticate modern technology by making it more German and more ethically acceptable, and he adopted the mandarin discursive framework by analyzing technology in terms of *Kultur* and *Geist*.

Conclusion: Mandarins Defend and Engineers Acquire Symbolic Capital

When many engineers began to adjust themselves to the mandarin discursive framework after 1905, their reasons for engaging in public discourse were the same as they had been at the end of the previous century. Professional interests still guided their struggle. Dessauer (1958: 22) declared very explicitly that his activities as a writer and speaker had always aimed to enhance the social status of the engineering profession.¹³ If we apply a Bourdieuan analytic perspective, then we could say that the engineers continued to try to gain recognition from the traditionally dominant groups in society (Bourdieu 1991: Ch.2). The new strategy was that they now attempted to acquire symbolic capital and symbolic power by adjusting their language to the currency standard set by the mandarins (Bourdieu 1990, 1991: Ch.7).

Bourdieu's analysis of language as a power resource takes J.L. Austin's (1962) speech-act theory as its point of departure. Both bring out the contingent character of speech, but Bourdieu develops speech-act theory into a social theory of language as *praxis*. In a number of articles written in the 1970s and early 80s the Frenchman attempted to show that neither Austin himself nor most socio-linguists have appreciated the far-reaching social implications of their own thinking.¹⁴ Bourdieu claimed that speech-acts cannot be analyzed by abstract, linguistic means alone; a social and cultural analysis is also called for. It is not enough to deal with connotation, style, and rhetoric; the institutional framework has to be discussed, as well.

Bourdieu's theory is one of conflict and practice. Bourdieu discusses speech in terms of symbolic power that is exercised in a field with symbolic capital being exchanged on a market. Like access to money, the ability to use language effectively is not equally distributed throughout society; like military power, language may be a means of control. Bourdieu (1977: 646f.) criticizes Noam Chomsky's (1965) notion of linguistic *competence* for focusing too narrowly on the ability to use language in a grammatically correct way. To get a message across it is not enough to be linguistically competent--to speak in accordance with certain rules. One also has to speak in the right tone of voice, at the right time, and address the right people. In addition to speaking properly, one has to speak "*appropriately*" (Bourdieu 1977: 646; orig. emph.). Bourdieu's concepts of symbolic and linguistic capital are intended to encompass the practical ability to control a situation by means of culture and language. This is in my view what the engineers tried to do when they adopted the mandarin discursive framework. Instead of discussing in pragmatic and

¹³ I follow Thomas Childers' (1990) suggestion that the German engineers acted as a profession in the modern, Anglo-Saxon sense, although they adopted a pre-modern vocabulary in that they characterized themselves as a *Stand* (estate).

¹⁴ The majority of these articles were published in the book *Ce que parler veut dire* (1982) and later translated into English and collected in the volume *Language and Symbolic Power* (1991); see also Bourdieu (1977).

utilitarian terms, they chose a language which they hoped the learned elite would find more appropriate. Simultaneously, the engineers tried to appropriate¹⁵ and occupy rather than reject culture, and they did so by trying to incorporate *Technik* into the world of *Kultur*.

Bourdieu's theory of language has strong political implications. There are no neutral means of communication. Whereas those who control the material production in a society have economic power, those who control the formulation of ideologies and other world-views have symbolic power (Bourdieu 1991: Ch.7). The ruling classes are able to use language and other types of symbols as highly efficient means to dominate other groups. Symbolic power will remain in force as long as the subordinated groups can be made to believe in the ideologies produced by the ruling classes. Here is the problem that faced the mandarins at the turn of the century. Their ideological monopoly was challenged, and only some modernist reformers understood that it could be self-defeating to cling stubbornly to all of the classical ideals. Instead of rejecting modernity outright, people like Mayer and Schweitzer chose to make some of its aspects fit into a redefined version of *Kultur*. One part of this strategy was to domesticate and tame modern technology, by bringing out those constituents which were found to be specifically German or particularly liberating. The result of this strategy was the formulation of an originally German discourse which is still with us today as *Technikphilosophie*.

3. Community, Order, and Planning:

Walther Rathenau's "New Society," "New State," and "New Economy"

Walther Rathenau symbolized more than anyone else the German struggle for postwar recovery and rectification. He fought to survive in a situation of scarcity and hardship as director for the large electrotechnical company of AEG, as responsible for organizing the national supply of natural resources during World War One, and as Minister for National Reconstruction in a postwar government. His activities as administrator, businessman, and politician are fairly well-known and will not be the focus here. Instead, attention will be directed at the visions of a future society which Rathenau sketched after 1915, and which have been rather categorically dismissed by Dagmar Barnouw (1988: 48, 66) as "flawed" and "utopist in the old static meaning of the concept." Rathenau tried to come to grips with wartime chaos and postwar depression by means of rational planning toward common goals. He envisioned, from his position at the very top of German society, a strong

¹⁵ This is not a simple play with words. It is hardly possible to express oneself in a manner which others find *appropriate*, unless one has *appropriated* their ways of expressing themselves, incorporated central parts of their frames of references, and made oneself familiar with their discursive framework.

state and a nation where the power of special interest groups had disappeared. Although investing his hope in the youth (Rathenau 1918), his heart was still with the ideals of Bismarck and the *Kaiserreich* like so many others in the "Wilhelminian generation" (Peukert 1987: 26).

Rathenau formulated his vision in a large number of books, pamphlets, and articles which he wrote in the second half of the 1910s. Titles like "The New Society," "The New State," and "The New Economy" reveal that his goal was a new start (Rathenau 1918a, 1919b, 1922). He had made for himself a name as a successful essayist already in the first decade of this century, but it is clear that the war affected him profoundly. Whereas Rathenau shortly before 1914 had written two philosophical critiques of the contemporary *Zeitgeist*, his writings during and after the war highlighted economic and political matters. It is true that he began his book "In Days to Come" of 1917 by claiming that material phenomena are of no inherent value, and that their only purpose is "to foster the development of the soul and its realm" (Rathenau 1917: 5). However, there was in his subsequent analyses remarkably little talk about the soul and the spirit. Instead of delivering an Idealist "Critique of Our Age" or a Bergsonian analysis of "The Mechanics of Spirit"--as Rathenau had done before the war (Rathenau 1912, 1913), he now discussed how Germany should be organized to meet the economic, political, and social challenges that followed in the wake of the war. Rathenau wanted to guide Germany through a disastrous situation, in which its national finances were in ruins, its constitution was being questioned, and its population had been substantially reduced (Rathenau 1918c, 1918d: 57). And in such a situation Rathenau found that a pragmatically economic discussion was most pertinent.

Organized Capitalism Under State Supervision

Rathenau was a prominent figure in German high society. This does not mean, however, that his ideas always squared with those of the political, military, and business elites. A person's views are not a simple function of his or her social position (Liedman 1986). Barnouw (1988) and Hans Dieter Hellge (1990) contend that Rathenau was an outsider who both embraced and rejected several of the views of his peers. He was a civilian, but became responsible for the mobilization of natural resources for the war effort; he was a capitalist (for instance, a member of numerous boards of directors), but argued for more state power; he was a Jew, but a devout German nationalist; he was an engineer, but warned of the dangers of mechanization.

Against this background it is not surprising to see that one of Rathenau's main targets in his postwar writings was the liberal economy organized according to *laissez-faire* principles. The "uncontrolled struggle" between German firms only leads to chaos and a mismanagement of resources (Rathenau 1918d: 67). Rathenau found it appalling that "hundreds of thousands of men travel about on railroads only to carry out competitive

struggles between various trading companies" (Rathenau 1918d: 75). Competition is generally disastrous to the wealth of a nation. It is morally irresponsible that each individual strives for his or her own benefit in a situation where Germany is bleeding to death. Rathenau's critique of an overly liberal economic system thus had a distinctly nationalist bias. He disliked superfluous struggles within Germany, but accepted economic competition among nations.

Rathenau was in favor of most kinds of domestic monopolies and had argued for organizing the German economy in cartel-like bodies during the war. He found it quite correct that "the owner of a railroad, a waterworks, a harbor receives monopoly rights directly from the state or the municipal authorities" (Rathenau 1917: 107). Some people may believe that such monopolies--as well as patent rights and cartels--are unjust and inefficient, but Rathenau argued that the opposite is indeed the case. At best, competition is a zero-sum game. The "monopoly of technological advance" is particularly important for the creation of common wealth (Rathenau 1917: 108). Competing companies may dislike not being able to share the fruits of new inventions, but patent rights enable their holders to utilize innovations in a way that is economically rational to society as a whole.

Rathenau realized that a prerequisite for his economic system was either that it be imbued with "a moral sense of responsibility" or that it be controlled in detail (Rathenau 1918d: 67). Monopolies may otherwise be misused, and people would work only for their own benefit. Each individual and firm had to feel obliged to work for the common good of the nation. Indeed, only the sick and the elderly ought to be allowed to remain idle (Rathenau 1917: 131). Laziness, speculation, and shortsighted egotism must be banned.

Despite these restrictions, Rathenau never questioned "the law of capital" (p. 70). He sometimes called himself a socialist, but he did not see Soviet communism as an alternative to liberalism. Rathenau did not want to socialize the means of production, but he wished to prevent private companies from acting against the interests of the country as a whole. He did not want to do away with the right of private ownership, but he disliked inherited wealth and privileges (Rathenau 1918b: 38). He did not want to strangle world trade, but he argued in favor of substantially increased customs duties. Rathenau's vision included a system with private, but "not unfettered" business (Rathenau 1918d: 67).

Rathenau was well aware that materials, energy, and labor are limited in supply, and he regarded the utilization of these resources to be a common, societal concern (Rathenau 1917: 247). Every citizen has the right to a certain share of natural resources and the fruits of industry. For reasons of both economy and equality, he thus wanted to reduce the consumption of unnecessary items. He stigmatized the vanity of the upper classes and claimed that their greed contributes to the increasing poverty of the lower classes: "all

those years of work, which are required to produce an expensive piece of embroidery or a magnificent tapestry, have forever been withheld from the clothing of the poor" (p. 78). While some people immersed themselves in luxury, others did not have enough to eat. This situation was especially disastrous in the case of imported goods, when resources are not only taken away from the poor but also taken out of the country. The import of luxury items had made Germany poor and should be avoided (Rathenau 1918c: 26, 1918d: 55).

Unfortunately, the indulgence in luxury is not limited to the most well-off segments of society. Rathenau claimed that soulless hedonism was spreading. Many people are ashamed of yielding to "conspicuous consumption"--to adopt Thorstein Veblen's term, but they nevertheless "try to cover this shame by weaving some feeling into the miserable technology of today's life and its products" (Rathenau 1917: 8). People of our age demand products with a "colored surface" in order not to be criticized for being overly materialist (p. 9). In other words, superfluous design had become a means of making up for unlimited consumption. It seemed to be out of the question to reduce the demands for new goods.

The main carrier of Rathenau's almost revolutionary vision was to be the German state. He was unusually poetic when describing this state:

...we see beams of light touching the picture--beams from the sun of the state. We do not have the socialization of the economy very much at heart, nor a mania for state intervention, where such is not needed. But the feeling grows ever stronger that we are not only economically responsible for ourselves but also for each other, and that we and the state are mutually responsible. A more thorough feeling of community between the state and industry is not frightening, granted that the state is able to liberate itself from one-sided and bureaucratic methods...and grow to the highest and most genuine organ of the common will and spirit. (Rathenau 1918c: 28)

Only the state, in Rathenau's view, could guarantee that common needs are able to match private interests. It would regulate economic matters, while still allowing freedom of thought, speech, and religion. The new state would make sure that production and distribution are efficiently executed and that excessive consumption is avoided. It would, for instance, introduce high import duties, increase taxes on luxury items, and give each citizen a minimal share of the common wealth (Rathenau 1917: 103). Sales taxes ought to increase and income taxes be reduced. Rathenau's "new state" included both paternalist and, in his own words, "neo-mercantilist" elements (p. 251).

Rathenau regarded the great enemy of his state to be the massive number of special interest groups that fight only for their own benefit. Particularism was dysfunctional to the organic unity of any people and to the collective wealth of any nation. However, this should not be taken to imply that Rathenau was opposed to all kinds of group influence. He valued "*Sachlichkeit*"--impartial matter-of-factness--highly, and wanted each professional group to be able to affect the organization of their area of expertise (Rathenau 1922: 29). For instance, it is quite natural that professors and other teachers have a say in educational matters, but they have to do so as experts rather than special interest group (p. 39). Since Rathenau regarded objective *Sachlichkeit* as an integral part of "the true German spirit," he was convinced that it would be possible to separate expert knowledge from subjective interests in Germany (p. 9). His state would not only be paternalistically organic; it would also be technocratically corporate: "We will erect a state which is more impartial, organic, righteous, free, and efficient than any other state. [...] That is the New state" (p. 71).

Rathenau's state would rest on the shoulders of the German people in order to function. The problem for Rathenau was that the people were socially disunited and had become "mechanized in spirit and ways of living" (Rathenau 1918d: 72, 1922: 16). It thus became necessary to unite the people. Although a Jew, Rathenau never ceased to emphasize the unity of the German people--regardless of Teutonians or Jews.

The state thus played a paramount role in his future society, but Rathenau was well aware that the material basis of this society could only be based on industry and agriculture. A severe problem, however, is that industrial production is generally wastefully organized; a "science of industry" was required (Rathenau 1918d: 76). As long as most firms were able to sell whatever they produced with great profit, industrialists had few incentives to save resources. Carried by well-educated engineers, a "scientific technology" only made its way into a few branches of industry--the power industry, where Rathenau himself was most active, being one of them (p. 78). The passive attitude of most firms was understandable in a situation with a booming economy but cannot be accepted anymore: "all losses and waste are now of common concern" (*ibid.*). The resource scarcity that had become so obvious during the war had made it immoral not to modernize production.

Numerous interpretations of Rathenau's writings and deeds exist. Ursula Mader (1974) has called him a "functionary of finance capital." The historian of technology Thomas P. Hughes (1990) has suggested that Rathenau was a "system builder" that erected not only technical systems, but also tried to organize firms and whole branches of industry in a systemic fashion. Paradigmatic in Hughes's interpretation is Rathenau's attempt to coordinate the German electrotechnical industry by means of state intervention; Rathenau tried to create a national monopoly in this sector for the sake of optimal efficiency. Hughes's explanation of Rathenau's centralization policy has

subsequently been criticized by Hellige (1990), who claims that Rathenau's attempts to regulate industry had to do with the negative experience he had had in his youth of unrestricted competition in the chemical industry. Rathenau becomes in Hellige's analysis an "organizer of capitalism" rather than a "system builder;" he comes closer to the U.S. engineer and socialist Charles Steinmetz and his "corporate collectivism" than to Thomas A. Edison and his system-building strategy.

Another, similar way of interpreting Rathenau's project could be to say that it fitted into what John K. Galbraith (1967) has called "organized capitalism," or, that he tried to introduce a "visible hand" onto the market (Chandler 1977).

However, I believe that all these interpretations are somewhat skew, in that they take Rathenau's business experience as their point of departure. As will be made clearer below, Rathenau's perspective involved not only a business policy; his vision encompassed not only the world of production, but society as a whole. It is certainly no coincidence that his writings and his wartime planning policy inspired Lenin and other Bolsheviks in their plans for the Soviet Union (Maier 1987: 43). We have to look closer at the political dimensions of his vision. I would like to argue that Peter Wagner's (1994) recent analysis of the demise of "liberal utopia" at the turn of the century is a more appropriate basis for an interpretation of Rathenau's work. Wagner (1994: Ch. 5-6) suggests that classical modernity in general and classical liberalism in particular were replaced by "organized modernity" and various statist projects during the interwar period. The visionary ideas of the French revolution had failed. Free enterprise, true democracy, and impartial science had proven impractical. Instead, various actors tried to curb business, politics, and science. The liberal idea of free human beings gave way to collective notions like class and *Volk* (cf. Stråth 1990). Of course, Soviet Communism and German National Socialism came to epitomize these trends, but less extreme attempts to control modernity also developed. In Sweden the *folkhem* vision was formulated by both right-wing intellectuals and leading Social Democrats. In the United States we got The New Deal. Wagner (1994: 67) writes:

In fact, all these proposals were responses to the perceived instabilities of the postliberal regimes. They were all based on the definition of a, mostly national, collective and on the mobilization of the members of such a collective under the leadership of the state.

My conclusion is that Rathenau's ideas and activities during and after the first world war constituted a concerted act to regulate the modern project--without rejecting it. Rathenau strived to bring industries and individuals onto a path, whereby their efforts were collectively organized and directed toward common

goals. He wished to substitute discipline for liberty and community for ego.¹⁶ His policy aimed at the assimilation of modern technology into familiar structures rather than the adaptation of these structures to the demands of technology.

The First World War as the Great Divide in History

The war opened up in Rathenau's mind the door to a world without egotism. Its cruelties notwithstanding, it had some positive consequences: "...the world fire has borne fruits that--in the face of cold egotism and indifference--otherwise might have taken centuries to grow ripe" (Rathenau 1918d: 71). Rathenau (1917: 77) observed already in 1915 that the resistance of the liberals toward state intervention began to weaken as a result of the war. He hoped that the war would ultimately convince each individual and firm of the necessity of state coordination, national cooperation, and hard labor toward common goals. Only those countries which are imbued with "planned order, conscious organization, scientific thoroughness, and a loyal feeling of responsibility" (Rathenau 1918d: 67) will survive in the long run. The rest, "the dross," will disappear (p. 72).

Rathenau thus attributed to the world war the role of a Great Divide in history; he regarded it as an event with ultimately positive results. Unlike Ernst Schulin (1990: 55) I cannot see that Rathenau was "unsure" of whether the war would contribute to the "revolutionary changes of the modern world" which he had been waiting for. Rathenau was quite certain that the war would have drastic consequences. The war had led to the introduction of new production methods and the construction of new plants in the chemical, metallurgical, and ship-building industries (Rathenau 1918d: 50). But, more importantly, it brought forth the foundation of a new society. A new global economy, a new industry, and a new Germany would rise out of the ashes of the war. "Property, consumption, and demands are no private issues" in this world (Rathenau 1917: 75). Due to the scarcity of natural resources, the German people would have to learn to economize. This did not mean that Germany should turn its back on modern industry, but rather that it had to make industrial production more efficient. Better planning and improved organization were needed. At the center of Rathenau's vision were the concentration of production to fewer but larger units, the standardization of products in order to limit unnecessary large varieties, the mechanization of production, and the application of scientific knowledge (Rathenau 1918c: 27f.). Here, it was not only the state which had important tasks. Firms within the same branch of business ought to cooperate rather than take part in

¹⁶ The subtitle of Wagner's book is *Liberty and Discipline* (1994), and he regards the struggle between representatives of these two principles to be the main contenders in the history of modernity.

meaningless competition. They ought to carry out programs of structural rationalization in order that production be made optimally efficient. Through such programs a "scientifically organized group-division of labor" between firms should be arranged (Rathenau 1918d: 80). Rathenau (pp. 111ff.) praised the chemical industry for having gotten farthest in this regard.

The war gave Rathenau good reasons to argue in favor of various rationalization measures. Although he did not himself employ the term "rationalization" when discussing ways to make the economy more efficient, many of his ideas squared well with those of the emergent "rationalization movement" (De Geer 1978). At the core of this movement were Frederick Taylor's "scientific management," Henry Ford's assembly-line, and various forms of corporate restructuring like cartel formation. All these measures were beneficial to industry in general and to the large companies in particular--not least to Rathenau's own AEG. My interpretation is that the war made it possible for Rathenau to present these special interests in the guise of common, general interests. Such a strategy was quite persuasive in the German discursive framework, once its American roots were played down. The largest part of the upper and middle classes in Germany--not only the mandarins--found the state to be both objective and fair. If anyone had the ability to make sure that modern industry be organized and tamed in an acceptable way, it would be the state (Wagner 1994: Ch. 4).

Since the new economy would be nationally organized, it would be possible once again for national characteristics to affect technological developments. Rathenau (1918c: 20) lamented that mass production had led to an increasingly uniform technology:

Goods flooded the Earth. The old, beautiful differences that used to encounter anyone visiting distant cities and countries have been lost in our age. No longer is the traveler able to experience and appreciate the fruits of new soils, art, and labor.

Rathenau concludes that if production became less international, then local styles might reemerge, and it would be easier to resist the American influence on technology. German technology would to a larger degree reflect the German mentality, and it would thus be more familiar to the German people.

Rathenau thus tried to come to grips with resource scarcity and uncontrolled competition by means of a strong state, and attempted to make modern production technology and capitalist exploitation acceptable by means of nationalistic lines of argumentation. Bismarck had seen a strong state as a tool for the unification of the German people a half-century earlier, and Paul von Hindenburg had used the state machinery to provide the armed forces with material resources during the war. Rathenau, however, regarded the state as a means for making modern industry attractive. Under the wings of the German

state and imbued by a nationalist spirit, modern technology would be domesticated.

The Impact of the War

The first world war challenged Western intellectuals in profound ways, and that they met this challenge by making recourse to familiar, but reformulated concepts and themes. A comparison of Rathenau's postwar writings with two essays he had published just before the outbreak of the war will support the thesis.¹⁷

The main target of Rathenau's emotionally engaged *Zur Kritik der Zeit* (1912) and *Zur Mechanik des Geistes* (1913) is the soulless, mechanical character of modern life. It had become necessary to make the production of basic goods more efficient, but "the contemporary technical habitus" has spread also to other areas of human activity (Rathenau 1918e: 4). The "soul" had become increasingly marginalized in a world ruled by "business, diplomacy, technology, and transportation" (Rathenau 1918f: 37). Rathenau argued by means of classical dichotomies from *Lebensphilosophie* and claimed that the world rests on rationalism and intellectualism rather than idealism and intuition; it is driven by spirit rather than soul; its central values are efficiency and utility rather than quality and truth. It is a mechanical world.

The root of the developments toward a mechanized society was the rapid population growth that had taken place in recent centuries:

It is important to notice in passing that technology or transportation are not the cause of mechanization and our contemporary forms of life. Rather, increasing population density has driven mechanization forward, and the mechanization process has given birth to new needs and created new aids. It would be wrong to claim that the railroad has brought to life large traffic flows, or that the rifle has led to mass war. (Rathenau 1918e: 30)

Rathenau's analysis was thus directed against all forms of technological determinism, even though it had an historically materialist bent. As a result of population growth, resource utilization had had to improve. Organizational and technical innovations that ensured a continuously increasing degree of efficiency had developed. Fired by competition for limited resources, the capitalist "law of production" had proven to be especially efficient and led to an ever higher speed and turnover (Rathenau 1918e: 39). The result was not only the industrial manufacturing of large amounts of identical products of bad

¹⁷ Cf. also Schulin (1990: 55), who writes that the war caused Rathenau to "question his previous ideas, plans, and focuses."

quality. Capitalism had also brought about specialization and abstract thinking, "a spirit which also in emotional terms deserves the name mechanization" (p. 33). Man had become both "machinist and machine" (p. 70).

Modern society in Rathenau's analysis was an instrumental society, where everything--including fellow human beings--were reduced to tools. Modern man is a "man of purpose," not a "man of soul" (Rathenau 1918f: 30, 49). We could paraphrase his contemporary Max Weber and say that Rathenau attempted to show that the world is characterized by an ever-expanding purposive rationality. People in modern society set up goals and try to organize their lives in such a way that they reach these goals with a minimum of effort. The problem, however, was that their goals were flawed. The relationship between means and ends had been reversed, and "mechanical production has raised itself to an aim in its own right" (Rathenau 1918e: 44). Technology and technological development were no longer neutral tools in the pursuit of various purposes; higher productivity and increased production had become goals in themselves.

Rathenau's prewar analysis of the modern condition was thus in certain respects clearly different from his later message. His main point during and after the war was partly at odds with what he had preached before the war. From 1915 onward he called for increased productivity, but before the war he had distastefully rejected the modern concern with material production. In 1913 he had not argued in favor of corporate restructuring measures and large-scale industry, but praised "the artisan of the old kind, who manufactures household items for their own sake, with perfection as his goal..." (Rathenau 1918f: 65). While the industrial mode of production had been at the focus of Rathenau's critique in 1912-1913, the same phenomenon was seen to be the savior of Germany a couple of years later.

Rathenau's discussion of the German state went through a similar reassessment. Rathenau had not attributed a great deal of importance to the state before the war. Its role was in fact to be limited to "foreign policy, national defence, legislation, and legal protection" (Rathenau 1918e: 50). Such a typical nightwatch state is of course light-years away from the strong, paternalist state that Rathenau depicted after the war. How can such a radical change of positions be accounted for? The answer, I believe, can be found both in his texts and his contemporary context. Rathenau did not anticipate the war and its consequences; in 1912 he even thought that all nations would be able to dispose of the military in a not too distant future. The problem in a situation of increasing wealth and productivity was not how to rationalize industry, but to restrict the impact of the mechanical spirit. New and unexpected challenges came with the war: How to save Germany from military defeat? How to save the German people from economic ruin and even starvation? Rathenau then turned to an idea that he had developed in several prewar publications, to the concept of *Euplutism* (Rathenau 1918e: 60f.).

The term "Euplutism" literally means the well-being of the many. Rathenau used it in 1912 to describe a society where collective needs are more important than individual needs. In this society there were no monopolies, no inherited wealth, and no unjust distribution of wealth--just as in his postwar vision of the New Society. The main difference is that it took the war for Rathenau to find the carrier of the idea of Euplutism. Whereas before the war he had hoped that an ethical resurrection of communal values would be carried by the individuals themselves, during and after the war he placed all his confidence in the state. In doing so, he revived what William H. McNeill (1983: 339) has called "principles [that] had deep roots in the Prussian past. Rulers from the Great Elector to Frederick the Great in moments of crisis had commandeered supplies as needed, subordinating private interest ruthlessly to the collective, military effort."

Rathenau became a symbol for both postwar recovery and the young Weimar Republic (Volkov 1990), and--like the republic--he largely failed. After all, he was too much of an outsider to have the power to affect German society in the direction he wanted to. His ideas about how to organize industry were too radical and arose intense opposition from business circles (Schulin 1990: 64). Simultaneously, his foreign policy was not radical enough to appease the extreme right, and his life ended in 1922 with a bullet from the hand of one of the representatives of the right.

4. Charismatic Liberalism and Disciplined Technology: Max Weber's and Werner Sombart's Solutions to the First Crisis of Modernity

In October 1910 the German Society for Sociology held a national conference in Frankfurt am Main. On this occasion Werner Sombart, professor at the Berlin Business School, gave a speech with the brief title "Technology and Culture" (1911). It is not known whether he knew of Mayer's book with the same title, or if he was aware of the struggle between Mayer and Dessauer. It is, however, very interesting to see that the technology/culture theme had made its way into the center of German intellectual life already before World War One. Although the war certainly intensified and changed the content of the technology debate, it did not start the "struggle" about technology. No less a person than Max Weber took part in the debate following upon Sombart's speech. The German discursive framework on technology and culture which has been described in Section 2 was not limited to a few marginal mandarins and engineers. As we will see in this section, however, it received a different formulation in these sociological circles--a difference that is still obvious today. Philosophers of technology to a large extent carry out analyses which are quite different from those done by sociologists of technology. Whereas the former tend to focus on ethical and epistemological aspects of technology, the

latter more often discuss the relationship between technology and various sections of modern society (Bijker *et al.* 1987).

Sombart's contribution to the emerging discourse was later published in the "Archives for Social Science and Social Policy," a journal that he at this time edited together with Weber and Edgar Jaffé. Since this sober-minded account of the relationship between technological development and cultural life has been dismissed in passing by Herf (1984: 133) as a "fairly conventional sample of cultural despair," it deserves a new reading.

It is true that Sombart was concerned with the excessive and unreflective technological optimism that he finds among most of his contemporaries. In his analysis of the negative consequences of modern technology, he chose to focus on its effects on music:

The progress of technology enables us to make the theater and the concert-halls ever larger and brighter illuminated. No wonder that the music is also adjusted to these new creations, and that it ends up as far away from coziness and "intimate" familiarity as the rooms in which it is performed. (Sombart 1911: 346)

Sombart also regretted that the rapid means of modern transportation have led to global uniformity and to the successive disappearance of local musical traditions. However, he acknowledged that the existence of these means made it possible for people who did not live in the cultural centers of the world to enjoy good concerts. "Music machines" like the record-player had the same Janus face (p. 347). On the one hand, they spread a terrible noise that "shakes the nerves" of the bar-visitors in all big towns, whereas, on the other hand, they made music accessible to the average citizen (p. 345). In fact, Sombart suggested that such machines may very well refine and cultivate "the masses," and did not consider it impossible that they could "lead to a complete revolution of our social and cultural relations" (p. 347).

Herf's conclusion must be considered premature. Sombart's speech was not simply one of cultural despair, but a very early attempt to lay the foundation for something that nowadays is called *Techniksoziologie*. Sombart did not use that term, but his stated purpose was to propose a methodology and some concepts for the analysis of the complex relationship between *Technik* and *Kultur*. He did so by presenting a number of definitions and by giving some examples of how such an analysis could be carried out. Sombart's discussion of technology and music appeared at the end of the speech and was intended to illustrate his approach in a "paradigmatic" manner (p. 342).

Although Sombart primarily discussed the dependence of culture on technology, it is clear that he was very much aware of the reverse relationship.

A complete analysis would have to determine:

how a particular cultural trait... influences the quantitative and qualitative formation of technology... and... how, in certain areas of culture, interests emerge that have an impact on technical developments. (p. 313)

Sombart mentioned a large number of social factors that affect the content and direction of technology: the policy of the state, the level of scientific knowledge, the degree of religiosity, and the demands of the workers. The impact was most obvious in the economic sphere, and Sombart rehearsed the famous difference between the handicraft and the capitalist system when it comes to their interest in technical change.

Quite naturally, it would be anachronistic to call Sombart a social or cultural constructivist, or an anti-technological-determinist for that matter (Smith and Marx 1994)--even though his thinking contained strands that we can put into both camps. From a more historically correct perspective it is interesting to note that he categorically rejected what he found to be Marx's "technological view of history" (Sombart 1911: 314). Sombart quoted a passage from *Capital*, and concluded that Marx in a faulty manner regarded the productive forces to be the ultimate roots of all economic, political, and spiritual life. Sombart claimed that Marx wrongly saw technology as an independent variable, and went on to say:

No technology exists in a (socially) empty space; it is also impossible for a technology to exist in an Archimedian point outside of human culture, and to exercise influence from there. The interaction theorist is (in this case) correct when saying that "Everything causes (and influences) everything." (p. 316)

For Sombart, technology was not an autonomous realm of society (Winner 1977). Instead, he talked about the relationship between technology and other spheres of society in terms of a "cultural carpet" (Sombart 1911: 311)--a concept that sounds strikingly similar to the latter-day historian of technology Thomas P. Hughes's (1987) "seamless web."

There is another, perhaps curious, parallel to be found between Hughes and Sombart; both of them talk about technology in terms of temporary or geographically delimited "styles." Whereas Sombart discussed what he called the "cultural style" of technology, Hughes (1987) more than seventy years later applied the concept of "technological style" to designate regional or national differences in the way that technical systems or artifacts are designed. In trying to find the core characteristics of modern technology Sombart (1911: 309) argued that: "...the technology of our times is rational, in opposition to earlier technology that was empirically oriented; ... it... goes beyond the limitations imposed by organic nature..." If we want to understand the

character of modern technology, then we have to inquire into the demands posed upon it by capitalism. Indeed, Sombart claimed that: "...it is the very nature of capitalism to strive for rational technology, mechanical technology, technical progress" (p. 314). This did not mean that modern technology is a direct function of the capitalist economic system, but it implied that capitalism tends to foster a rational type of technology and a particular style that contains a large amount of scientific knowledge.¹⁸ No doubt, Sombart's terms of analysis have much in common with those that Weber would later use in his speech "Science as a Vocation" (1958a/1918) and his *General Economic History* (1981/1923) (cf. Hård 1994).

Sombart received much support from Weber in the ensuing discussion, especially in the critique of Marx. This is not unexpected. Marx's materialist view of society and history had for a long time been and would remain one of Sombart's and Weber's main targets (Krause 1960; Mitzman 1971). In the discussion Weber (1924: 450) not only claimed that Marx's famous technological determinist statement--that the handmill creates a feudal society, whereas the steam mill creates a capitalist society--"is simply false." He also attacked those contemporary engineers who seem "seriously to believe that technological evolution is the ultimate driving force in the development of culture" (p. 451f.). Like we have seen Sombart do, Weber (1924: 456) went on to argue that it is, in principle, impossible to find any final cause in human history:

I would like to lodge a protest against... the notion that something--be it technology or economy--can be the "last" or "final" or "true" cause of anything. When we analyze a causal chain, we always find that it runs first from technical to economic and political things and then from political to religious and economic things. Nowhere do we find a point of rest.

This Weberian anti-determinism--which by no means was limited to the realm of society and technology--has been observed by a large number of scholars. For instance, Randall Collins (1986: 25) has noted: "In Weber's scheme, technology is essentially a dependent variable" (cf. Abramowski 1966; Schmidt 1981; Schluchter 1989).

In his contribution Weber came back to Sombart's example of the relationship between music and technology, and suggested that modern instruments have, to a large extent, been developed as a direct response to the needs expressed by composers. Weber here implicitly attacked Sombart for, allegedly, having put too much emphasis on the (negative) impacts of

¹⁸ Please observe that Sombart, just like Dessauer and others whom we met in Section 2, had begun to expand the *Technik* term beyond mere machines at this time.

technology on musical forms.¹⁹ Weber (1924: 455) claimed that it is incorrect to say that the music of a certain time period is "a product of the technical situation."²⁰ In the case of chemistry, it may be possible to talk about a direct dependence on technical and economic developments, but in the case of music it would be more appropriate to say that the composer makes use of whatever technological possibilities are at hand, and acts within their limits. In short, both Weber and Sombart went out of their way to defend an irreductionist view of history in general, and an anti-determinist view of the relationship between technology and culture in particular. They agreed that technological developments did have effects on social life, but they never claimed that this was the whole story. In short, they picked up themes that are still at the core of the social studies of technology, contributing to the foundation of a discursive framework for this academic field of investigation.

The Taming of Modern Technology

Peter Wagner (1994: 68f.) describes National Socialism as an ideology that, first and foremost, attempted to organize modern life. He refers to Zygmunt Bauman (1989), and concludes that, although the Nazi movement went to extremes in this endeavor, it must not be considered different in principle to "Stalinism, People's Front (and later Vichy), people's home and New Deal" (Wagner 1994: 68). These movements or projects felt uneasy with the liberal Utopia of classical modernity and its emphasis on individual freedom and *laissez-faire*. Instead, they wanted to control the economy for the benefit of the many, steer science in a socially and politically acceptable direction, and put the collective in front of the individual. The interesting thing is that they all made extensive use of up-to-date technology in these endeavors. In other words, they applied modern means to control modern life.

It is probably no coincidence that the term "technocracy" reached wide popularity in the heyday of the above-mentioned movements and projects (Layton 1971: Ch. 10), and that concerted attempts to create what has later been called "social engineering" were made at this time. Many engineers and social scientists felt in the 1930s that the time was ripe for their expertise to influence politics. In Germany the Nazi seizure of power was regarded by several engineers as a heaven-sent opportunity to affect the development of society at large. Monika Renneberg and Mark Walker (1993: 8) have observed that "...technocratic enthusiasts flooded into the [Nazi] Party or ancillary organizations after 1933..." Some of these enthusiasts went a little too far in

¹⁹ It seems to me that Weber is somewhat unfair here. Sombart had very early in his speech made it clear that he would focus on technology's impacts in order not to make his speech too long. He had also said that "music life is connected to technology with thousands of threads" (Sombart 1911: 342).

²⁰ As far as I can tell, Sombart had never claimed this.

their attempts to gain influence, however, and the party in 1935 ordered the closing of the journal *Technokratie*, "ironically just when opportunities for technocrats within the National Socialist state began to improve" (p. 5). Renneberg and Walker (p. 9) agree with Herf's (1984) assertion that the Nazis were not generally opposed to modern technology, and contend that "...the common assumption that the National Socialist movement deliberately set out to purge science or engineering in particular is questionable."

Even though this "common assumption" is usually based on a few cases like the Nazi attempts to curb post-Newtonian physics and their inability to appreciate the potential of the atom bomb, it does seem understandable. Indeed, the Nazi view of technology was not very clear even to their contemporaries. One year after the National Socialist party came to power Sombart published a book that vindicates this observation. His *Deutscher Sozialismus* (1934), which must be considered an overt flirtation with the new government, included an elaborate plan for how modern technology should be controlled and how science should be disciplined (cf. Herf 1984: 148ff.). Sombart's ideas did not fall on fertile ground. A Nazi reviewer of the book wrote distastefully:

The National Socialist position vis-à-vis technology has nothing whatsoever to do with Sombart's. [...] Modern technology is for us a child of the Northern spirit, and expresses the power of our mankind.²¹

Obviously, Sombart had misinterpreted the Nazi ideology on this score.

Sombart viewed modern technology more critically than did both the Nazis and Rathenau. With his ideas about the "taming of technology" he did not merely want to organize modern society along rational lines--as the others also did; but he wanted also to reject certain outcomes of modernity as such (Sombart 1934: 264). Sombart had attacked the notion of autonomous technology already immediately after World War One (Sieferle 1984: 215), and in his book *Die Zukunft des Kapitalismus* (1932) he, in Werner Krause's (1960: 175) words, had argued in favor of "an orderly, tamed, domesticized, meaningful, and organized economy." In 1934 he finally felt that the time had come to put forth a fully-fledged program for how the development and use of inappropriate technologies should be checked:

Each invention has to be approved by a supreme cultural council [*oberster Kulturrat*], where technologists have an advisory function. The cultural council decides if the invention should be discarded, handed over to a museum, or implemented. (Sombart 1934: 266)

²¹ Review by a certain Nonnenbruch in *Völkischer Beobachter*, No. 278, 3 Oct. 1934; quoted from Krause (1960: 189f.).

It is no wonder that Sombart made engineers and others with technocratic inclinations irritated.

In their analysis of the interwar "regulation" discourse Meinolf Dierkes, Andreas Knie, and Peter Wagner (1988: 13f.) explicitly refer to Sombart's "German Socialism." Sombart's ideas about how to tame technology must be considered an extreme manifestation of this discourse--which we nowadays find in various discussions about how to "regulate," "assess," and "evaluate" technology. He not only suggested that the government appoint a body to decide what new inventions should be developed. He also called on the police to prohibit the use of those existing technologies that disturbed the common citizen or threatened the health of workers. He referred with approval to the earlier decision of the Swiss canton of Graubünden to ban the use of automobiles and motorcycles. And, as a final point in his plan to control technology, he called for the foundation of a government research institute. The state, and not the market, should decide in what directions scientific and technological research should move.

The main reasons for Sombart's suggestions are to be found in his dislike of unfettered capitalism. Sombart had never reconciled himself fully with liberalism, and in his later writings he grew increasingly critical of the liberal market economy (Harris 1958: Ch. 6). No doubt, the German experience with ultra-high inflation in the early twenties and economic hardship around 1930 triggered these reactions. In the third volume of his monumental work "Modern Capitalism" (1927) he prophesied the downfall of capitalism, and in *Die drei Nationalökonomien* (1930) he sought to substitute a new economic theory for the narrow neo-classical theory. In "The Future of Capitalism" he argued in favor of a kind of organized capitalism with cartels and monopolies instead of short-sighted, cut-throat competition. Responsible planning ought to replace egotistic profit maximization. In 1934 Sombart was ready to develop the consequences of this thinking for the area of technology. Technological development should not be guided by profit motives and private business interests (Sombart 1934: 257). Instead of passively observing how "the formation of our material culture is at the mercy of a group of inventors and smart business people" (p. 264), the state should actively intervene in the development process. Only then would it be possible to "put order into the chaos" (p. 266). If technology were left to the market forces, then it would most certainly continue to develop in a direction that did not serve the many.

Similar Diagnoses, Partly Different Remedies

Sombart's formal definition of technology did not change between the early 1910s and the 30s. *Technik* is "all systems (complexes, totalities) of means,

that are suited... to fulfill a certain purpose" (Sombart 1934: 245).²² Technology retained its instrumental definition, but in 1934 Sombart was more explicit about the consequences of this definition. First of all, it meant that: "...technology is always culturally neutral and morally indifferent: it may serve either the good or the bad" (p. 262). Secondly, it meant that technology cannot have any inherent value. It was, for instance, impossible to construct a scale by which different technologies could be measured (p. 252).

Against this conceptual background it may, of course, be asked what criteria Sombart's cultural council could use when approving or rejecting different inventions. Sombart never seemed to realize this problem. Instead, he chose to attack those of his contemporaries who had turned the means-end dichotomy on its head and made technology an end in itself. The phrase "l'art pour l'art" is symptomatic for our whole "technological age" (pp. 255, 252). Technology has reached such high esteem that everything that is possible to make also appears to be worth making, "without asking about the purposes that it should fulfill..." (p. 254). This unreflective and dangerous view was not least to be found among the youth, and lead to an undue respect being shown to "...the engineer and his ways of thinking: the word 'technocracy' could only appear in our age" (p. 253).

The liberal economy was thus not the only target of Sombart's critique. His call for an institutional form of technological assessment can be read as a reaction to what he saw as an increasingly aggressive engineering corps. Although Sombart's solution was clearly elitist, it was one where the engineers should not have the final say. Like the "leader council" (*Führerrat*) that was to get the last word in all important political matters (Sombart 1934: 214), the cultural council was a body of first-rate experts and politicians that fitted well into the contemporary regulatory discourse. Like so many others in the first four decades of this century, Sombart tried to *organize* the modern experience.

Sombart's diagnosis about the reversal of the means-end relationship echoed something that Weber had begun to discuss thirty years earlier. Weber's famous phrase at the end of "The Protestant Ethic and the Spirit of Capitalism" (1930/1904-1905) about "the iron-cage" of our modern, materialist world was meant to depict a situation where the originally purposive-rational means of technology and bureaucracy had reached autonomy and begun to threaten the freedom of the individual (Habermas 1981: I: 337). Instead of being means, the instruments tended to become ends in themselves.

Like Sombart, Weber (1964/1922: 160) gave technology an instrumental definition: "The term 'technology' applied to an action refers to the totality of means employed as opposed to the meaning or end to which the action is, in the last analysis, oriented." Bureaucracy was discussed along similar lines:

²² The only difference between the 1911 and the 1934 texts is that the word "totality" has been added in the latter.

The decisive reason for the advance of bureaucratic organization has always been its purely technical superiority over any other form of organization. The fully developed bureaucratic mechanism compares with other organizations exactly as does the machine with the non-mechanical modes of production. (Weber 1958/1922: 214)

The key terms in Weber's analyses of both technology and bureaucracy were "predictability" and "control" (Collins 1986). The scientific basis of modern technology and the bureaucratic structure of modern organizations made it particularly easy for the industrialist to predict the outcome of the production process and for the corporate director or the minister to control his employees or officials. However, the contemporary problem was that these structures showed a tendency to become increasingly self-contained as they grow in size. The more powerful the tools, the more difficult they were to govern.

During his life-time Weber experienced both the emergence of the political party apparatus and the growing power of cartels and trusts, and interpreted these processes in terms of the bureaucratization of politics and business. Despite Weber's attempts to produce "objective" and disinterested science, it is clear from his writings that he bemoaned these developments (Abramowski 1966: 161ff.; Marcuse 1968: 224f.). Weber regarded the growth in the Occident of this kind of rationality as "tragic" (Åmark 1990), and "showed himself to be critical of the extension of formal rationality as an end in itself" (Beetham 1985: 274). The solution that he offered to the means-ends problem was partly similar and partly different from Sombart's.

Like Sombart, Weber wanted clearly stated values and ideologies to influence not only politics but also to some extent business and technology. Neither of these areas of modern life should be excluded from what Weber (1964: 115, 185) called "value rationality" and "substantial rationality." That is, it had to be possible for values like "national grandeur" to bear on politics and, at least in principle, for "equality" to influence the domain of business. As David Beetham has indicated, though, Weber's value-neutral methodology forced him--at least in his scientific writings--to postpone more elaborate discussions about how the capitalist system could be made more substantially rational. Furthermore, Weber's ideological leanings led him to believe that the economic efficiency of capitalism would, in the end, make it easier for a capitalist than a socialist society to improve the conditions of the poorer classes:

Despite all the bureaucratisation of modern society, which was itself a consequence of capitalism, Weber still believed that the accumulation of profit in 'rational'

undertakings could be given an ethical significance.
(Beetham 1985: 273)

Unlike Sombart, who disliked pure profit motives, Weber remained too much a bourgeois liberal to put his faith in any other economic system than capitalism (Mommsen 1984/1974).

In another respect, however, Sombart and Weber were not very far apart. They both called for a powerful state and a strong leader, although for different reasons. Where Sombart saw the state as a neutral power that could mediate between the classes, bring social ideals into capitalism, and tame technology (Krause 1960), Weber wanted a united Germany and a potent state primarily for reasons of international prestige and strength (Mommsen 1984: 394). Where Sombart (1934: 224) did not hesitate to call for "a total social order within the state," Weber was afraid that the expansion of state influence into too many areas of social life would further reinforce the iron-cage. Weber's aversion to social democrats and communists was in part based on what he found to be their predilection for bureaucratic structures. In order to escape the cage, it was necessary to place faith in a strong personality rather than in a cultural council. We would have to turn to someone with "charismatic authority" rather than to a strong bureaucracy (Weber 1958b/1922). A charismatic person would be able to break with old traditions and lead people and organizations onto new revolutionary paths by his sheer "specific and exceptional sanctity, heroism or exemplary character" (Weber 1964: 328) (not surprisingly, Weber never discussed women in this connection).

Weber's faith in the persuasive powers of certain individuals was not opposed to his belief in the state. The existence of an effective state was necessary for the idea of the charismatic politician to materialize and gain legitimacy. In much the same way that a machine can continue to be used even if a factory receives a new director or owner, a well organized bureaucracy should be able to serve a new lord.

5. Conclusion: The Mobilization of Tradition in Periods of Crisis

We have in this paper encountered several intellectual reactions to the problems associated with the first crisis of modernity. Two interconnected responses stand out. One made recourse to the notion of German culture and one to the German state, and both share a strong nationalist bias. I would like to argue that German intellectuals by and large tried to come to grips with the threats of modern technology by taking refuge in nationalist ideas of a superior German culture and a powerful German state. Both *die Kultur* and *der Staat* should save the German people from the most devastating effects of mechanization and Americanization. There were, of course, both

cosmopolites, liberals, and futurists in Germany, but a strikingly large segment of German intellectuals chose to meet modernity by returning to traditional but redefined ideas of German particularity. In so doing, they attempted to assimilate modern technology into German culture, thus domesticating it. They tried to make modern life acceptable by carving out an appropriate place for it within existing structures, and by arguing that the German state had to play a central role in this process.

Otto Dann (1993) has shown how the idea of a united German realm or nation has been a powerful constituent in German thinking from the late eighteenth century onward--with traces back to the Holy Roman Empire of the German Nation. The idea can be found among groups of various political colorations and has taken on partly different meanings in different circumstances. It has appeared under several disguises, each with a slightly particular connotation: *Reichsnation*, *Nationalstaat*, *Kulturnation*, and, of course, *Das dritte Reich*. I suspect that the flexibility of this notion explains why it has been possible for intellectuals and politicians from various ideological camps to redefine and make use of it in new situations.

For instance, Weber and Sombart picked up this German tradition in their positive evaluation of the state. Both Weber's parliamentary-democratic state under charismatic rule and Sombart's elitist, German Socialist state built on ideals that have a long history in their country. Similarly, Rathenau's whole program of postwar restructuring was nationalist at root. His "New State" was in a sense not very new at all, but rather a reformulation of ideals that had been held in high esteem in Prussia--since well before the days of Bismarck. Finally, mandarins like Mayer and engineers like Weihe went out of their way to reinvent the old notion of German culture so that it could accommodate and encompass also modern technology.

The story does not end here, though. Indeed, the three central sections of this paper have only portrayed the first scenes in what would develop into three different documentaries. As indicated in the beginning, the modes of addressing the question of technology that developed in the first decades of this century became paradigmatic for at least three different discourses. First, the originally German version of *Technikphilosophie*--which after World War Two would develop further also in a country like the United States--received momentum in this period. When a recent philosopher like Günter Ropohl writes a book on "Technological Enlightenment" (1991), he deals with several of the same themes and makes use of several of the same concepts as Dessauer and Weihe. Second, pioneering programs in what later would be termed technology policy and technology assessment (*Technikfolgenabschätzung*) were made in this period. When the authorities of the BRD evaluate the future of the former GDR nuclear-power plants, they act--as it were--like Sombart's cultural council, deciding whether or not an alien technology should be allowed to be integrated into the "New State" of reunified Germany (Dierkes, Knie, and Wagner 1988). Third, the fashionable academic field of

Techniksoziologie can in certain respects trace its roots back to the early decades of this century. When the German sociologist Werner Rammert (1993) argues against technological determinism and in favor of an understanding of technology as a social and cultural product, he echoes not least Weber's way of posing his research problem (Collins 1986; Hård 1994).

The argument should not be misconstrued. The fact that the discursive frameworks were set at this time does not mean that the debates have remained the same ever since. New contingencies and contexts enable new understandings. Traditions are not only straightjackets; they also give actors leeway and freedom. However, it is presumably no coincidence that the three discourses mentioned in the previous paragraph have such strong positions in Germany; here, they have been formed and reformed continually through almost an entire century.

References

Abramowski, Günter. 1966. *Das Geschichtsbild Max Webers. Universalgeschichte am Leitfaden des okzidentalen Rationalisierungsprozesses*. Stuttgart: Ernst Klett.

Åmark, Klas. 1990. "Anteckningar om Max Weber, politik och professioner," *MS*, Uppsala: SCASSS.

Austin, John L. 1962. *How to Do Things with Words*, Oxford: Clarendon.

Baark, Erik, and Jamison, Andrew. 1986. "The Technology and Culture Problematique," in *idem.*, eds., *Technological Development in China, India and Japan: Cross-Cultural Perspectives*. Houndmills, Basingstoke, Hamps.: McMillan, pp. 1-34.

Barnouw, Dagmar. 1988. *Weimar Intellectuals and the Threat of Modernity*. Bloomington and Indianapolis: Indiana University Press.

Bauman, Zygmunt. 1989. *Modernity and the Holocaust*. Ithaca, NY: Cornell University Press.

Beetham, David. 1985. *Max Weber and the Theory of Modern Politics*. Cambridge: Polity.

Bijker, Wiebe E., Hughes, Thomas P., and Pinch, Trevor J., eds. 1987. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge, MA: The MIT Press.

Bollenbeck, Georg. 1994. *Bildung und Kultur. Glanz und Elend eines deutschen Deutungsmusters*. Frankfurt a.M. and Leipzig: Insel Verlag.

Bourdieu, Pierre. 1977. "The Economics of Linguistic Exchanges," *Social Science Information*, 16: 645-668.

- . 1977a/1972. *Outline of a Theory of Practice*. Cambridge: Cambridge University Press.

- . 1982. *Ce que parler veut dire. L'économie des échanges linguistiques*. Paris: Arthème Fayard.

- . 1988. *Homo Academicus*. Cambridge: Polity.

- . 1990/1980. *The Logic of Practice*. Stanford: Stanford University Press.

- . 1991. *Language and Symbolic Power*. Cambridge, MA: Harvard University Press.

Chandler, Alfred D. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: Belknap.

Childers, Thomas. 1990. "The Social Language of Politics in Germany: The Sociology of Political Discourse in the Weimar Republic," *American Historical Review*, 95: 331-358.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: The MIT Press.

Collins, Randall. 1986. *Weberian Sociological Theory*. Cambridge: Cambridge University Press.

Coudenhove-Kalergi, Richard Nikolaus. 1922. *Apologie der Technik*. Leipzig: Der neue Geist Verlag.

Dann, Otto. 1993. *Nation und Nationalismus in Deutschland 1770-1990*. Munich: C.H. Beck.

De Geer, Hans. 1978. *Rationaliseringsrörelsen i Sverige. Effektivitetsidéer och socialt ansvar under mellankrigstiden*. Stockholm: Studieförbundet näringsliv och samhälle.

Dessauer, Friedrich. 1908. *Technische Kultur*. Kempten: Kösel.

- . 1958. *Streit um die Technik*. Frankfurt a.M.: Josef Knecht.

Dierkes, Meinolf, Knie, Andreas, and Wagner, Peter. 1988. "Die Diskussion über das Verhältnis von Technik und Politik in der Weimarer Republik," *Leviathan*, 16: 1-22.

-
- Forman, Paul. 1971. "Weimar Culture, Causality, and Quantum Theory," *Historical Studies in the Physical Sciences*, 3: 1-116.
- Galbraith, John K. 1967. *The New Industrial State*. New York: New American Library.
- Gerth, H.H., and Mills, C. Wright, eds., *From Max Weber: Essays in Sociology*. New York: Oxford University Press.
- Gispen, Kees. 1989. *New Profession, Old Order: Engineers and German Society, 1815-1914*. Cambridge: Cambridge University Press.
- Habermas, Jürgen. 1981. *Theorie des kommunikativen Handelns*. 2 vols. Frankfurt a.M.: Suhrkamp.
- Hård, Mikael. 1990. "Teknik-och-kultur-diskursen. Ett utsnitt ur den tyska moderniseringsdebatten, 1906-33," in *idem.* and Conny Mithander, *Teknik som diskurs. Moderniseringsdebatter i Tyskland och Sverige, 1905-35, s.t.i.c.*, Vol. 3. Gothenburg: Department of Theory of Science, Gothenburg University, 7-47.
- . 1994. *Machines are Frozen Spirit: The Scientification of Refrigeration and Brewing in the 19th Century--A Weberian Interpretation*. Frankfurt a.M. and Boulder, Col.: Campus Verlag and Westview Press.
- Harris, Abram L. 1958. *Economics and Social Reform*. New York: Harper & Brothers.
- Helldén, Arne. 1986. *Maskinerna och lyckan. Ur industrisamhällets idéhistoria*. Stockholm: Ordfront.
- Hellige, Hans Dieter. 1990. "Walther Rathenau: ein Kritiker der Moderne als Organisator des Kapitalismus," in Hughes *et al.*, 32-54.
- Herf, Jeffrey. 1984. *Reactionary Modernism: Technology, Culture, and Politics in Weimar and the Third Reich*. Cambridge: Cambridge University Press.
- Hermant, Jost, and Trommler, Frank. 1988. *Die Kultur der Weimarer Republik*. Frankfurt a.M.: Fischer Taschenbuch Verlag.
- Hortleder, Gert. 1974. *Das Gesellschaftsbild des Ingenieurs. Zum politischen Verhalten der technischen Intelligenz in Deutschland*. Frankfurt a.M.: Suhrkamp.
- Hughes, H. Stuart. 1958. *Consciousness and Society: The Reorientation of European Social Thought 1890-1930*. New York: Knopf.
- Hughes, Thomas P. 1987. "The Evolution of Large Technological Systems," in Bijker *et al.*, 51-82.

-
- . 1990. "Walther Rathenau: 'System Builder,'" in Hughes *et al.*, 9-31.
- , *et al.* 1990. *Ein Mann vieler Eigenschaften. Walther Rathenau und die Kultur der Moderne*. Berlin: Klaus Wagenbach.
- Jünger, Ernst. 1929. *Feuer und Blut. Ein kleiner Ausschnitt aus dem grossen Schlacht*. Berlin: Frundsberg Verlag.
- Kocka, Jürgen. 1988. "German History Before Hitler: The Debate about the German Sonderweg," *Journal of Contemporary History*, 23: 3-16.
- Koenne, Werner. 1979. "On the Relationship between Philosophy and Technology in the German-Speaking Countries," in George Bugliarello and Dean B. Doner, eds., *The History and Philosophy of Technology*. Urbana, Ill.
- Krause, Werner. 1960. "Werner Sombarts Weg vom Kathedersozialismus zum Faschismus." *Unpublished dissertation*. Berlin: Humboldt-Universität.
- Lambourne, Robert, Shallis, Michael, and Shortland, Michael. 1990. *Close Encounters? Science and Science Fiction*. Bristol and New York: Adam Hilger.
- Lenk, Hans. 1982. *Zur Sozialphilosophie der Technik*. Frankfurt a.M.: Suhrkamp.
- Liedman, Sven-Eric. 1986. *Den synliga handen. Anders Berch och ekonomiämnena vid 1700-talets svenska universitet*. Stockholm: Arbetarkultur.
- Ludwig, Karl-Heinz. 1974. *Technik und Ingenieure im Dritten Reich*. Düsseldorf: Droste.
- McNeill, William H. 1983. *The Pursuit of Power: Technology, Armed Force, and Society Since A.D. 1000*. Oxford: Basil Blackwell.
- Mader, Ursula. 1974. *Walther Rathenau als Funktionär des Finanzkapitals. Beiträge zu einer politischen Biographie 1887-1917*. Berlin: Humboldt-Universität.
- Maier, Charles S. 1987. *In Search of Stability: Explorations in Historical Political Economy*. Cambridge: Cambridge University Press.
- Mann, Thomas. 1969/1924. *The Magic Mountain*. New York: Vintage Books.
- Marcuse, Herbert. 1968. *Negations: Essays in Critical Theory*. London: Allen Lane, The Penguin Press.
- Mayer, Eduard A. von. 1906. *Technik und Kultur*. Berlin: Hüpeden & Merzyn.

-
- Mitzman, Arthur. 1971. *The Iron Cage: An Historical Interpretation of Max Weber*. New York: Knopf.
- Mommsen, Wolfgang J. 1984/1974. *Max Weber and German Politics, 1890-1920*. Chicago and London: University of Chicago Press.
- Müller, Hans Peter, and Troitzsch, Ulrich, eds. 1992. *Technologie zwischen Fortschritt und Tradition. Beiträge zum Internationalen Johann Beckmann-Symposium Göttingen 1989*. Frankfurt a.M.: Peter Lang.
- Peukert, Detlev J.K. 1987. *Die Weimarer Republik. Krisenjahre der klassischen Moderne*. Frankfurt a.M.: Suhrkamp.
- Pot, Johan Hendrik Jacob van der. 1985. *Die Bewertung des technischen Fortschritts. Eine systematische Übersicht der Theorien*. Assen: van Gorcum.
- Rammert, Werner. 1993. *Technik aus soziologischer Perspektive*. Opladen: Westdeutscher Verlag.
- Rathenau, Walther. 1912. *Zur Kritik der Zeit*. Berlin: S. Fischer.
- . 1913. *Zur Mechanik des Geistes. Oder vom Reich der Seele*. Berlin: S. Fischer.
 - . 1916. *Probleme der Friedenswirtschaft*. Berlin: S. Fischer.
 - . 1917. *Kommande tider - kommande ting*. Stockholm: Hugo Gebers.
 - . 1917a. *Von kommenden Dingen*. Berlin: S. Fischer.
 - . 1918. *An Deutschlands Jugend*. Berlin: S. Fischer.
 - . 1918a. *Die neue Wirtschaft*. Berlin: S. Fischer.
 - . 1918b. *Framtidens näringsliv*. Stockholm: Hugo Gebers.
 - . 1918c./1916 "Fredshushållningens problem," in Rathenau 1918b: 9-43.
 - . 1918d. "Den nya hushållningen," in Rathenau 1918b: 45-125.
 - . 1918e/1912. *Nutidens väsen*. Stockholm: Hugo Gebers.
 - . 1918f/1913. *Själens krafter. Bidrag till nutidens psykologi*. Stockholm: Hugo Gebers.
 - . 1919. *Autonome Wirtschaft*. Jena: Eugen Diederich.

-
- . 1919a. *Kejsaren och andra studier*. Stockholm: Hugo Gebers.
 - . 1919b. *Die neue Gesellschaft*. Berlin: S. Fischer.
 - . 1922/1919. *Der neue Staat*. Berlin: S. Fischer.

Renneberg, Monica, and Walker, Mark. 1993. "Scientists, Engineers and National Socialists," in *idem.*, eds., *Science, Technology and National Socialism*, Cambridge: Cambridge University Press, 1-29.

Ringer, Fritz. 1969. *The Decline of the German Mandarins: The German Academic Community, 1890-1933*. Cambridge, MA: Harvard University Press.

- . 1987/1969. *Die Gelehrten. Der Niedergang der deutschen Mandarine 1890-1933*. Munich: Deutscher Taschenbuch Verlag.

Ropohl, Günter. 1991. *Technologische Aufklärung. Beiträge zur Technikphilosophie*. Frankfurt a.M.: Suhrkamp.

Schluchter, Wolfgang. 1989. *Rationalism, Religion, and Domination: A Weberian Perspective*. Berkeley, CA: University of California Press.

Schmidt, Gert. 1981. "Technik und kapitalistischer Betrieb. Max Webers Konzept der industriellen Entwicklung und das Rationalisierungsproblem in der neueren Industriesoziologie," in Walter M. Sprondel and Constans Seyfarth, eds., *Max Weber und die Rationalisierung sozialen Handelns*. Stuttgart: Ferdinand Enke, 168-188.

Schröter, Manfred. 1920. *Die Kulturmöglichkeit der Technik als Formproblem der produktiven Arbeit. Kritische Studien zur Darlegung der Zivilisation und der Kultur der Gegenwart*. Berlin and Leipzig: Walter de Gruyter.

- . 1922. *Der Streit um Spengler. Kritik seiner Kritiker*. Munich: C.H. Beck.
- . 1934. "Philosophie der Technik," in A. Baeumler and M. Schröter, eds., *Handbuch der Philosophie. Abteilung IV: Staat und Geschichte*. Munich and Berlin: R. Oldenbourg.

Schulin, Ernst. 1990. "Krieg und Modernisierung. Rathenau als philosophierender Industrieorganisator im Ersten Weltkrieg," in Hughes *et al.*, 55-67.

Schweitzer, Albert. 1923-24. *Kulturphilosophie*, 2 Vols. Munich: C.H. Beck.

Sieferle, Rolf Peter. 1984. *Fortschrittsfeinde? Opposition gegen Technik und Industrie von der Romantik bis zur Gegenwart*. Munich: C.H. Beck.

Smith, Merritt Roe, and Marx, Leo. 1994. *Does Technology Drive History? The Dilemma of Technological Determinism*. Cambridge, MA: The MIT Press.

Sombart, Werner. 1911. "Technik und Kultur," *Archiv für Sozialwissenschaft und Sozialpolitik*, 33: 305-47.

- . 1927. *Der moderne Kapitalismus. Band III. Das Wirtschaftsleben im Zeitalter des Hochkapitalismus*. Munich: Duncker & Humblot.

- . 1930. *Die drei Nationalökonomien. Geschichte und System der Lehre von der Wirtschaft*. Munich: Duncker & Humblot.

- . 1932. *Die Zukunft des Kapitalismus*. Munich: Duncker & Humblot.

- . 1934. *Deutscher Sozialismus*. Berlin: Buchholz & Weisswange.

Spengler, Oswald. 1931. *Människan och tekniken. Bidrag till en livsfilosofi*. Stockholm: Hugo Gebers.

- . 1991/1918-22. *Der Untergang des Abendlandes. Umriss einer Morphologie der Weltgeschichte*. Munich: Deutscher Taschenbuch Verlag.

- Stern, Fritz. 1961. *The Politics of Cultural Despair: A Study in the Rise of the German Ideology*. Berkeley: University of California Press.

Stodola, Aurel. 1932. *Gedanken zu einer Weltanschauung vom Standpunkte des Ingenieurs*. Berlin: J. Springer (2nd ed.).

Stråth, Bo, ed. 1990. *Language and the Construction of Class Identities. The Struggle for Discursive Power in Social Organisation: Scandinavia and Germany after 1800*. Gothenburg: Department of History, Gothenburg University.

Volkov, Shulamit. 1990. "Überlegungen zur Ermordung Rathenaus als symbolischem Akt," in Hughes *et al.*, 99-105.

Wagner, Peter. 1994. *A Sociology of Modernity: Liberty and Discipline*. London and New York: Routledge.

Weber, Max. 1924/1910. "Diskussionsrede zu W. Sombarts Vortrag über Technik und Kultur. Erste Soziologentagung Frankfurt 1910," in *idem.*, *Gesammelte Aufsätze zur Soziologie und Sozialpolitik*. Tübingen: J.C.B. Mohr, 449-56.

- . 1930/1904-1905. *The Protestant Ethic and the Spirit of Capitalism*. London: George Allen & Unwin.

- . 1958/1922. "Bureaucracy," in Gerth and Mills, 196-244.

- . 1958a/1919. "Science as a Vocation," in Gerth and Mills, 129-156.

- . 1958b/1922. "The Sociology of Charismatic Authority," in Gerth and Mills, 245-264.

- . 1964/1922. *The Theory of Social and Economic Organization*. New York: Free Press.

- . 1981/1923. *General Economic History*. New Brunswick and London: Transaction Books.

Weihe, Carl. 1918. "Der Kulturwert der Technik," *Technik und Wirtschaft*, 11: 329-339, 406-13.

- . 1919. "Geistige Sozialisierung (Technik und Volksbildung)," *Zeitschrift des Vereines deutscher Ingenieure*, 63: 86f.

Winner, Langdon. 1977. *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*. Cambridge, MA: The MIT Press.

Zschimmer, Eberhard. 1914. *Philosophie der Technik. Vom Sinn der Technik und Kritik des Unsinnns über die Technik*. Jena: E. Diederichs.

- . 1937. *Deutsche Philosophen der Technik*. Stuttgart: Enke.