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THE POLITICAL ECONOMY
OF THE MANHATTAN PROJECT
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Introduction

On September 15, 1945, exactly one month after the surrender of Japan, and less than two weeks after the ceremony on the USS Missouri ended the Second World War, Major General Lauris Norstad of the Army Air Force sent a memorandum to Manhattan Project chief General Leslie Groves. It concerned how many atomic bombs the US should aim to stock in its arsenal for “M-day,” or the start of mobilization for a new war. Its estimate of a minimum requirement of 123 and an optimum of 466 bombs was accompanied by a map showing Russia’s “population and industrial concentrations,” with figures for the number of bombs required to destroy each location. Norstad stated, “It is obvious that the immediate destruction of the complete list of 66 cities would have a … devastating effect on Russia. Therefore, an optimum requirement for atomic bomb stocks would be the number necessary to obliterate all of these cities.”

The memorandum encapsulated the logic of total war: since countries’ whole industrial capacity had been swept up in the mobilization for modern warfare, “crippling the ability of the enemy to wage war” meant the destruction of that industrial capacity, workforce, and population.1 Atomic bombs were weapons against modern industrial society. But these weapons were also the products of industrial processes and organizations, in particular the vast industrial facilities built at Oak Ridge, Tennessee and Hanford, Washington, for separating and refining Uranium-235 and for producing plutonium (Sanger, 1995; Gerber, 1992: 35–6; Thayer, 1996; cf. Herman, 2012). Producing the quantities of weapons that Norstad’s memorandum mandated meant the intensified industrialization of nuclear weapons production.

The work at Los Alamos Laboratory of designing and assembling the Hiroshima and Nagasaki bombs involved teams of elite scientific specialists. Scientists were required even for the final assembly of bomb components on the island of Tinian. Norstad wanted to routinize all of this, so that the bomb would no longer be a gift of esoteric science but could be integrated into the Army Air Force arsenal as just another weapon.

Norstad’s original wish-list of under 500 fission bombs was dwarfed by the expansion of the American stockpile, which reached a peak of 32,040 fission and hydrogen bombs in 1966 (the Soviet stockpile peaked at 45,000 in 1986) (Natural Resources Defense Council, 2006; Norris, Kosiak and Schwartz, 1998, 184–9). As Anthony Giddens observed in The Nation-State and
Violence, “Once they had first been constructed, nuclear weapons soon came to be made in batch-production, like other industrial products” (Giddens, 1985: 241).

The atomic bomb project established an organizational template for not only the direction of scientific research toward military goals, but also the integration of science with large-scale industrial production within a complex technological system (Martinez and Byrne, 1996). According to historian Thomas Hughes, “The Manhattan Project, with its systematic linking of military funding, management, contract letting, industrial, university, and governmental research laboratories, and numerous manufacturers, became the model” for such “massive technological systems” as Trident, ABM, Minuteman, and the Strategic Defense Initiative (“Starwars”) (Hughes, 1989: 442; see also Kurtz, 1988: 92–6). The Manhattan Project ushered in what Philip Mirowski calls the “Cold War regime” in science, a designation that appropriately emphasizes the domination of science funding and research agendas by the military (Mirowski, 2011: 105–14).

The Cold War regime was also, this chapter will suggest, a Fordist regime in which science was tightly coupled with mass production. Fordism was a technological and economic system, combining mass production with mass consumption, and also a set of stabilizing social relations or a mode of regulation (Aglietta, 1987; Jessop, 2002). Of particular importance was the integration of bureaucratic unions as means for managing and controlling labor. On the Manhattan Project, the disciplining of labor was achieved by securing the cooperation of unions but also through the coercive power of the military and the ideological appeal to patriotism.

This instantiates how the so-called “consensus capitalism” of the post-war period was achieved in the context of the militarization of the culture, the coercive power of the national-security state, and domestic anti-Communism (Renshaw, 1991: 125–7, 185–6). The system of ideological and social control legitimated by the Cold War was central to the social regulation of the period of “Fordist growth” and the Manhattan Project may be seen as a laboratory for militarized industrial production and social control. The crisis in 1960s and 1970s of the militarized forms of control underpinning the Fordist-Cold War regime spurred the reassertion of market discipline in the neoliberal university.

The atomic bomb was co-constructed with a social order in which Fordist economic relations were interwoven with militarized social control. If the nuclear bomb was the central technology and symbol of the Cold War, the social relations in which nuclear weapons production was embedded also emblazoned the postwar American Fordist growth, suburban affluence, and patriotic consensus that are now, for some, the object of nostalgia (Freeman, 2015). This chapter shows how this was a coerced consensus, solidified in war and legitimated by the external “threat” of the Soviet Union (Nathanson, 1988). The chapter also argues that the crisis of the economic conditions and forms of social control underlying this consensus led to the emergence of the neoliberal economic and institutional forms in which science is embedded today. A deeper understanding of the social relations of science in this period requires further research into the intersections between science and the broader economic and political regime of Fordism-Keynesianism, and the political-economic foundations of military-Keynesianism (cf chapters by Edgerton; Langley and Parkinson; Schiller and Yeo). This would contribute to our understanding of the longer-term evolution of relations between political and Research & Innovation, add to our understanding of the crucial period of transition from the Fordist-Cold War regime to the neoliberal “globalized privatization regime” in the political economy of science, and illuminate the social and economic contradictions that produced this shift (see also Mirowski, 2011: 87–138).
The Manhattan Project, labor, and the social relations of Fordism

Thomas Hughes presents the Manhattan Project both as the model for later technological system-building developments and as a “continuation of the growth of large production systems” since the late nineteenth century (Hughes, 1989: 383). One precedent in the sheer scale of technology and organization was Henry Ford’s Rouge River automobile plant (Hughes, 1989: 385). Another key precedent was the Tennessee Valley Authority (TVA), an iconic site of New Deal public works, which provided electrical power to the Manhattan Project’s Oak Ridge facilities for the separation of uranium isotope (Hughes, 1989: 382–5). The Manhattan Project combined large-scale production facilities and processes, dwarfing even Rouge River, in a government-run project that, like the TVA, transformed regions and built new settlements. The relationship and contrast between the TVA and the Manhattan Project exemplify how the newly economic interventionist stance of the New Deal state was redirected for military ends, and subsumed by military organization, in the Second World War (Hooks, 1991).

Military planning of the Manhattan Project operated in a close relationship with corporate monopoly or oligopoly capital. The manufacture of plutonium at Hanford, Washington, was carried out by the Du Pont corporation, which took over the process from the Metallurgical Laboratory scientists (Gerber, 1992, 25–6; Hughes, 2002, 59–60; Hounshell and Smith 1988: 338–46; Sanger, 1995: 29–65; Hales, 1999: 41). Tennessee Eastman, Kellex (a subsidiary of Kellogg), General Electric, Union Carbide and Carbon, and Monsanto operated key processes involved in the separation and refinement of uranium (Hales, 1999: 35). These firms were employed in a web of contracts by the Army Corps of Engineers. Peter Bacon Hales describes the structure of General Groves’ Manhattan Engineer District (MED) as “an elaborate web of interconnected corporations, contracts, projects, and subprojects, all presided over by a military bureaucracy” (Hales, 1999: 35).

The sprawling project had an insatiable demand for labor. The US Army official history puts the total number employed by the project at a peak of 129,000 in June 1944 (Jones, 1985: 344; Thorpe, 2006: 1). The project had to find ways to sate its intense demand for labor within the context of the national wartime labor shortage. It not only had to compete with other industries, it also had to attract workers to secret sites, keep them there once they arrived, and keep them working. The way in which this was done, through a combination of compromise and coercion, modeled how national security culture would be a means for controlling labor within America’s Cold War “consensus capitalism” (Renshaw, 1991, 106–51).

The balance of coercion and cooptation also reflected broader features of Fordism as a regime of accumulation. At the level of the production process, Fordism meant Taylorist methods of exerting managerial control over the labor process, combined with mechanization as represented by Ford’s mobile assembly line (Braverman, 1974; Beynon, 1984). As he implemented these changes to his factory system, Ford obliterated the older form of craft control of labor, and was faced with the problem of how to exert discipline over the labor force. The broader social regime that the Regulation School and others describe as “Fordism” is associated in particular with Ford’s “five-dollar day,” a doubling of worker’s pay rate introduced in 1914, and the high wage as the basis for mass consumption. Crucially, the “five-dollar day” was linked to the surveillance and regulation of the non-working life of labor by the Ford Company’s “Sociological Department” (Meyer, 1980; Hooker, 1997).

According to Massimo de Angelis, the Sociological Department prefigured the broader Keynesian forms of the social regulation of Fordism in wartime and postwar America (De Angelis, 2000: 49). But the five-dollar day did not solve Ford’s problems of controlling and retaining labor. Huw Beynon notes that “The paternalism of the Sociological Department was soon to give way
to the brutality of the Service Department” (Beynon, 1984: 39). Workers in the River Rouge site were in a Panopticon prison-like regime in which fraternizing was banned and these rules were enforced by an army of Service Department spies (Beynon, 1984: 42–7). It was only when River Rouge was finally unionized by the United Auto Workers (UAW) as a result of a strike in 1941 that there emerged the kind of accommodation between management and bureaucratic unions that has come to be seen as characteristic of “Fordism” (Beynon, 1984: 49–50).

The Fordist “factory-society,” in which “the disciplinary capitalist regimes are extended across the entire social terrain” (Hardt and Negri, 2000: 243), was reflected in attempts to create planned communities on Manhattan Project sites, as well as in attention to the nonworking lives and desires of workers, both as a necessary corollary of creating communities from scratch and as an attempt to combat turnover and absenteeism. Unions were also incorporated to some extent as means for controlling labor on the project, as well as in facilitating recruitment.

There are also clear parallels between Ford’s Service Department and the militarized security regime that was used to stymie union organizing and intimidate labor at Oak Ridge and Hanford. Anti-Communism, patriotism, and national security were ideological forms that facilitated the disciplining and incorporation of labor on the Manhattan Project, prefiguring the forms of ideological control that coercively enforced “consensus capitalism” in the Cold War.

Attracting workers to secret and remote sites under conditions of a national labor shortage was a continual problem for the MED (Goldberg, 1998: 56–7). The project’s high wages (at least in comparison with pre-war levels) and lucrative overtime attracted migrant labor from the mid-West (Olwell, 2004: 13; Hales, 1999: 172). Over time, Groves was able to win greater powers from the War Manpower Commission (WMC) for the District, ensuring the project’s priority for labor recruitment. Eventually, the WMC “simply wouldn’t allow workers needed by the District to take non-MED work anywhere in the nation where there was spare labor” (Hales, 1999: 167).

Coercive methods of recruiting combined with draconian methods for controlling and retaining labor (Olwell, 2004: 34). According to Hales, “Spies and ‘informants’ riddled every part of the District’s culture, and labor was not immune” since informants would report on attempts at union organizing (Hales, 1999: 180). “Public information officers” would plant stories that the District would have dissidents fired and immediately drafted and sent to the war front. When the pipefitters union sought to organize in the summer of 1944, the District began employing soldiers as replacement workers (Hales, 1999: 178). During a spontaneous work stoppage and protest march at Oak Ridge “the men found that the guards had set up machine guns and had tear gas so the workers caused little disturbance” (Manhattan District files, quoted in Hales, 1999: 180).

Labor policies on the Manhattan Project were developed in the context of the growing strength of unions in the Second World War. The 1930s saw the development of national industrial unionism in the Congress of Industrial Organizations (CIO). The Wagner Act, upheld by the Supreme Court in 1937, secured the rights of unions to organize, and engage in collective bargaining on behalf of the workforce. The creation of the National Labor Relations Board (NLRB) represented the bureaucratic institutionalization of this recognition of unions as bargaining agents, a key component of the development of the broader social-institutional regime of Fordism and “Keynesian” modes of regulation. During the war, relations between labor and capital were mediated by bureaucratic agencies such as the NLRB and the WMC (Renshaw, 1991: 53–7; Levine, 1988: 133–6; Hales, 1999: 164–5). An aspect of this regime was that the right to strike, cemented in the New Deal, was undercut by the wartime “no strike pledge” between the federal government and national unions (Renshaw, 1991: 57–9, 64–7).

Groves reluctantly allowed American Federation of Labor (AFL) construction unions on the project, but he managed to get special dispensation from the NLRB to prevent unions from
organizing the project’s production or “operator” workforce (Olwell, 2004: 29). John M. Findlay and Bruce Hevly write that at Hanford “The army and Du Pont regarded organized labor as a threat to both efficiency and secrecy” (Findlay and Hevly, 2011: 29).

The Army’s history of the Manhattan Project praises the “effectiveness of the project’s labor policies” as indicated by the “almost complete absence of work stoppages from late 1944 until the end of the war” (Jones, 1985: 375; Olwell, 2004: 35). Russell Olwell notes that the walkouts that did occur were wildcat strikes “in defiance of the army, their managers, and their unions” (Olwell, 2004: 34). Manhattan District officials found the large national unions to be a useful conduit for labor recruitment. This meant, Hales writes, that “With the war as justification, and with patriotism as the goad, the District was effectively asking that the national offices of the largest unions became managerial entities – labor recruiters and suppliers, smoothly expediting labor flow” (Hales, 1999: 168; see also Jones, 1985: 370). Hales contextualizes this move within the broader shift in relations between labor, capital, and the state: the District’s relationship to organized labor “continued to replicate the New Deal vision, whereby government agencies (the WMC, the Labor Relations Board) intervened between the hostile forces of labor and management” (Hales, 1999: 169). But in the context of wartime, the Manhattan District’s incorporation of the unions was also “part of a larger attempt to expand military culture beyond the sites and into the institutions of civil life” (Hales, 1999: 171; see also Mackaman, 2014).

Secrecy and “Patriotic Consensus”

On the Manhattan Project, the industrial-capitalist control of the labor process was achieved by the military-security regime of compartmentalization. This meant that communication was channeled up the hierarchical line of supervision and horizontal communication between workers was strictly limited. The scientists at Los Alamos had sufficient clout that they were able to insist on the weakening of compartmentalization within that laboratory (Thorpe, 2006: 99–108, 131). But most Manhattan Project workers had little or no idea what went on outside the plant, or even room, in which they worked (Olwell, 2004: 42–3; Hales, 1999: 117–19, 131–50).

Hales describes how compartmentalization meant that most Manhattan Project workers had no understanding of what they were making, nor the reasons for it: “Theirs was truly labor alienated from its product” (Hales, 1999: 163; see also Olwell, 2004: 45). The Y-12 electromagnetic separation plant atOak Ridge used calutrons, cyclotrons modified for separating out uranium isotope. The dials had false readings and the female operators had no idea what the machines were or what was their product (Olwell, 2004: 46; see also Kiernan 2013). Compartmentalization exacerbated danger to workers. Pipefitters, for example, would be charged with fixing leaks in pipes containing toxic or radioactive material about which they were kept ignorant (Olwell, 2004: 48; Hales, 1999: 132).

The Manhattan Project was highly dependent on skilled labor, such as pipefitters, welders, and electricians who were in short supply (Sanger, 1995: 73). It was also highly dependent on scientific workers who were in many cases “indispensable.” In terms of their level of skill and knowledge, these workers were not Fordist “abstract labor.” But compartmentalization provided a way of imposing control on this kind of highly skilled and educated labor force. They would be carrying out skilled and complex work, but in a fragmented way, isolated (to a varying degree depending on the type of worker) from other workers and from knowledge of the system as a whole.

Groves acknowledged that compartmentalization had functions other than just security. In his biography, he recalled that compartmentalization was a way of making the scientists “stick to their knitting” (quoted in Thorpe, 2006: 100). This system of secrecy also hindered union organizing. Compartmentalization limited social interaction, and therefore solidarity, between
different plants of the project and made it hard for labor organizers to get information on conditions in different parts of the project.

According to Olwell, “limits on unions’ access to information and right to strike at Oak Ridge facilities would weaken union power from the beginning” (Olwell, 2004: 81). Despite such restrictions, 1946 saw both the AFL and the CIO begin organizing production workers at Oak Ridge, and unions organized two of the three production facilities at the site (Olwell, 2004: 84–5). Still, security continued to provide the corporations ammunition against the unions. For example, Union Carbide and Carbon told the CIO’s United Gas Coke and Chemical Workers (CIO-UGCCW) that it would only agree to a contract with a clause making any “stoppage or slowdown” cause for immediate dismissal (Olwell, 2004: 105). When, in 1947, the Manhattan District was taken over by the new Atomic Energy Commission (AEC), unions found that the AEC put pressure on its contractors to take a hard line in their labor negotiations (Olwell, 2004: 106, 108). The development of the Cold War saw the tightening of security restrictions at the atomic sites and workers fired under security rules for minor infractions. Olwell describes how, when UGCCW of Oak Ridge held a strike vote in March 1947, the New York Times headline was “Strike vote perils U.S. atomic output.” Olwell writes, “The rhetoric of impending crisis … made workers appear selfish and unpatriotic for exercising their right to strike” (Olwell, 2004: 109; see also 109–12, 118, 120).

In his history of the post-war American labor movement Patrick Renshaw emphasizes how the Cold War ideology of anti-Communist patriotism was used to police the postwar accommodation between capital and organized labor (Renshaw, 1991: 99–100, 105–6, 114). So even as union membership reached a high-point, the establishment of patriotic hegemony was a means of controlling working-class demands through the culture and organization of the union. The Second World War involved, as Vaclav Smil puts it, “the deployment of just about every employable worker” (Smil 2013: 79; see also Freeman et al., 1992: 445–6). In this full-employment context in which workers were potentially in a very strong position to demand improvements in wages and conditions, national security and patriotic consensus provided significant means for disciplining workers and unions and attacking radicalism in the labor movement (De Angelis, 2000: 4; Midnight Notes Collective, 1984: 20–1). The legal and ideological resources of the national security state were similarly deployed to undermine the new social and political authority that scientists gained from their indispensable wartime role.

The mass scientist

According to Thomas Hughes, “The Manhattan Project set a precedent” for future technological system building in “the extensive employment and the influence of highly trained physicists and chemists, who interacted creatively with industrially experienced engineers, metallurgists, and skilled machinists” (Hughes, 1989: 385). However, as the Manhattan Project melded science with large-scale industrial production, it also changed the character of scientific work so as to integrate it with the organizational patterns of large-scale industry.

Even though the Los Alamos scientists, under the leadership of J. Robert Oppenheimer, tried to insist on academic practices against military norms, as fissionable material began to arrive from the industrial sites, and pressure built to “freeze” the design of the bomb, work patterns at Los Alamos began to be more industrialized. This was felt most intensely in the pressure to meet schedules. These schedules tied activity at Los Alamos to the pace of production of fissionable material coming from the production sites, since the pressure was for Los Alamos to be ready with a bomb mechanism as soon as there was sufficient fissionable material available (Thorpe, 2004; Thorpe, 2006: 128–59; Norris, 2002: 211–12, 361–72; Goldberg, 1998: 61–5).
A new model of the scientist was being developed in the Manhattan Project. It was a scientific role that contrasted greatly with the elite autonomy and self-image as independent scholar that was held to, especially by European émigrés such as Leo Szilard and Eugene Wigner, who worked at the Chicago Metallurgical Laboratory (Hughes, 1989: 394–6; see also Sanger, 1995: 42; Goldberg, 1998: 48–9). The kind of scientific role that was being worked out in the Manhattan Project was encapsulated in the title of a memo circulated by General Eisenhower in 1946: “Scientific and technological resources as military assets” (Hughes, 2002: 100).

The view that scientists themselves were resources of the state was symbolically institutionalized by the Oppenheimer loyalty-security hearing in 1954. If Oppenheimer’s opposition to the development of the hydrogen bomb was illegitimate, this suggested that scientists working on government projects should be in service to whatever goals were set by agencies like the AEC (Thorpe, 2002; Thorpe, 2006: 200–42; McGrath, 2002: 158–95; Cassidy, 2005: 328–34).

It is revealing to look at the membership of the panels tasked with making the Oppenheimer judgment. Apart from the scientists, chemistry professor Ward Evans on the Personnel Security Board, and Henry Smyth on the AEC, these were business, financial, and bureaucratic-administrative figures, often with ties to the military (Stern, 1969: 259–62). This suggests that the hearing can be seen as the scientific elite being subject to discipline by other more powerful elite groups – business, financial, military and governmental-bureaucratic (Thorpe, 2002; Thorpe, 2006: 214; see also McGrath, 2002: 129–93).

Even before the Oppenheimer hearing, the security system imposed a narrow hegemonic middle-class Americanism on the scientific community. Obtaining clearance, a vital rite of passage for physicists whose employment opportunities were dominated by military-related research, meant foregoing any behavior, friendships, or political interests that might put one on the wrong side of the opaque and Kafkaesque clearance system (Wang, 1999; Kaiser, 2005; Mullett, 2008).

The normalizing effects of the security system reinforced the way in which physics was becoming routinized as a path to secure employment within the military-industrial complex. David Kaiser has documented the massive growth of the physics profession after the Second World War as returning veterans drove an expansion of higher education, and as the expansion of the military-industrial complex created demand for physicists. He describes the “suburbanization of physics” as the subject became a route to a middle-class affluence and stability (Kaiser, 2004; see also Freeman, 2015; Brown, 2013; Markusen, 1991).

Los Alamos was a model for the post-war suburban communities of scientists and engineers working in the military-industrial complex (Hunner 2004: 108; Markusen, 2001). The suburbanized physicist described by Kaiser was also the scientist as “organization man,” in what C. Wright Mills called “Brains Inc.” (Kaiser, 2004: 851–3, 856; Mills, 2002: 142). Physics departments were producing PhDs, specializing in fields with military-industrial applications, who “moved easily between industry and the academy” (Kaiser, 2004: 879).

As physics became a mass profession involving large sums of money and large-scale equipment (Hughes, 2002: 100–121), how to promote and manage growth was a problem for science policy, just as it was for macro-economic policy under Keynesianism. The early post-war period saw consistent growth in federal science budgets. Elizabeth Berman notes that “Between 1953 and 1967, federal support for academic R&D increased an average of 15.8% per year in real terms” (Berman, 2012: 35). Derek de Solla Price’s influential Little Science, Big Science, published in 1963, was devoted to tracking the growth of “scientific manpower” and scientific production, in numbers of journals, abstracts, machines, and energy used (e.g. “the rate of increase of operating energy in particle accelerators”) as well as the share of science (e.g. citations) between different countries (Price, 1963: 12, 18, 28). Price’s development of indicators for science, establishing the field of scientometrics, mirrored the development of new economic
indicators, such as Gross National Product, that facilitated economic planning in the New Deal and the Second World War (Furner, 2003; Hart, 1998: 23).

The new suburbanized physicist, or physicist as “manpower,” was a corollary of the growth of the military-industrial complex. But the expansion of the ranks of scientists, and the integration of science into government and industry as a form of white-collar labor, can also be seen as a feature of deeper and longer-term structural shifts in the capitalist economy. The mass scientist was the corollary and accompaniment of the Fordist mass worker. The expansion of higher education and the ranks of the scientifically trained was part of the general expansion of bureaucratic, managerial and accounting work that accompanied the routinization, control, and mechanization of labor (Clawson, 1980; Noble, 1977). An increasingly technologized production process was also increasingly energy-dependent, again giving weight to the expertise of physicists, holding the promise of nuclear energy as “energy too cheap to meter” (Welsh 2000: 42; Keefer, 2010; Sovacool and Brossmann, 2013: 208–10). The expansion of the scientific workforce meshed with the needs of corporate capital and the emerging economy of mass production and mass consumption.

Scientists in the military-Keynesian state

Even though the promises of “energy too cheap to meter” failed to materialize, the prestige of science was crucially important in the ideological framework of the period. As working-class aspirations were co-opted through economic growth, the idea of progress, driven by science and technology, was a key feature of the culture of the post-war period: science would bring about the better tomorrows for which sacrifices were made during the war (Boyer, 1994: 109–21; Welsh, 2000). If the future was the atomic age or the space age, and better lives would be delivered by the technocrats and experts, this was not something to be won through political struggle.

A key issue in the relationship between science and the state in the post-war decades was whether scientists were to be “on top or on tap,” visionary shapers of policy or neutral technicians (Shapin, 2001; Shapin, 1999; Shapin 2008: 70–1; King and Szelenyi, 2004: 194–5). The New Deal brought an influx of economic advisors into government and, as Brian Balogh argues, the war forged a more permanent link between expertise and the state: “The federal government bankrolled the production of record numbers of experts... Agencies courted experts: they were now an essential political resource” (Balogh, 1991: 12–13). The New Deal had seemed to open up a more powerful new role for experts within the polity, with the potential to realize the vision, put forward by Thorstein Veblen and the technocracy movement, of the carriers of knowledge as a “new class” able to challenge the power of the owners of capital (Hooks, 1991: 219; Segal, 2005; Brick, 2006; King and Szelenyi, 2004). The activist role of experts and bureaucrats in reshaping society and economy in the New Deal may be seen as part of the background and inspiration for the new politicization of scientists in the 1930s in groups such as the American Association of Scientific Workers and for the emergence of the scientists’ movement after the end of the Second World War, with its vision of the international control of atomic energy (Kuznick, 1987; Smith, 1970; Thorpe, 2006: 165–88).

In his account of the American proposals for international control of atomic energy, Gregoire Mallard has emphasized the role of what he calls “New Deal lawyers” such as David Lilienthal and Dean Acheson (Mallard, 2009: 90–1). Plans for international control of atomic energy could be seen as an example of what Hardt and Negri have called “A New Deal for the World”: the generalization of the New Deal as a model for governance. They write, “In the aftermath of the war, many viewed the New Deal model as the only path to global recovery (under the pacific powers of U.S. hegemony)” (Hardt and Negri, 2000: 241–4, quoting 244). But, contrary to the expectations of liberal scientists, the reality was that the US had no intention of giving up its “winning weapon”
and the atomic bomb did not end, but became part of, imperialist power politics (Herken, 1988; Alperowitz, 1995; Gerson, 2007; Saccarelli and Varadarajan, 2015: 119–64).

The continuity and ultimate break with the New Deal can be seen in Lilienthal’s trajectory from head of the TVA to his role as Chairman of the AEC. Initially, Lilienthal presented the AEC as having the potential to be a nuclear TVA, harnessing nuclear energy for social good. But these hopes were dashed and this broad vision abandoned with the beginnings of the Cold War and the emphasis on nuclear armament at the expense of civilian nuclear power (Neuse, 1997; Hughes, 1989: 426). Oppenheimer understood the defeat of the internationalist hopes of the Acheson–Lilienthal report as meaning also the defeat of the domestic legacy of the New Deal: “this will fit perfectly into the planning of that growing number who want to put the country on a war footing, first psychologically, then actually. The Army directing the country’s research; Red-baiting; treating all labor unions, CIO first, as Communist and therefore traitorous, etc.” (quoted in Thorpe, 2006: 182).

The failure of internationalism also led Oppenheimer to embrace, or at least accede to, a more narrowly instrumental and technical role for the scientist (Thorpe, 2006: 188–99). When Truman gave the go-ahead for the development of the hydrogen bomb, Lilienthal said that the AEC was now “nothing more than a major contractor to the Department of Defense” (quoted in Thorpe, 2006: 195). As the AEC was more and more geared toward military purposes, the broader role for experts that arose in the New Deal, and that internationalist scientists and allied New Deal liberals like Lilienthal hoped to carry over into the atomic age, gave way to a circumscribed instrumental-professional role. The trajectory of the AEC reflects the broader fate of the New Deal apparatus of government planning and public projects, which was increasingly taken over and absorbed by military planning during the Second World War (Hooks, 1991: 163).

The absorption of planning by the Pentagon was mirrored in the fate of science. As Philip Mirowski puts it, the military was given a “free hand … in orchestrating and subsidizing science in the immediate postwar period” (Mirowski, 2011: 60). To the extent that Cold War science operated under a Keynesian regime of public funding, it was decidedly military Keynesianism (Melman, 1970; Baran and Sweezy, 1968: 178–214; Block, 1977: 10, 103–9, 122; Prins, 1983: 133–68; Harman, 2009: 165–68). Science funding instantiates Hooks’s point that the apparatus of planning built up in the New Deal had been absorbed into war planning in the Second World War and carried on in the defense sector after the war as military planning (Hooks, 1991; Mirowski, 2001: 110; see also Berman, 2012: 22).

Crisis of the Fordist-Cold War regime

In the 1960s, the disciplinary structures of the Cold War began to break down. One marker of this might be the strike called in January 1969 by 48 MIT faculty members who signed the March 4 manifesto against the militarization of American science (Leslie, 1993: 233). While the Cold War funding regime assumed the cooperation of universities with the military goals of the federal government, in the 1960s that ceased to be taken for granted:

the anti-Vietnam protests erupting on college campuses were creating a backlash among policymakers who, like most of the public, continued to support the war. This led to a variety of proposals to punish universities who let the unrest go too far, like a 1969 bill that would have cut off all federal funds to universities that did not maintain discipline on campus.

(Berman, 2012: 36; see also Walshok and Shragge, 2014: 99–101; Moore, 1999; Moore, 2013)
The mass production of scientific experts through expanded higher education was undermining the controlled, hierarchical and insulated world built up in organizations like the AEC. Balogh writes that “Longstanding safety questions within the nuclear community … were now played out in crowded and politically charged arenas” (Balogh, 1991: 288). The environmental movement brought attention to the environmental degradation that was a hitherto unacknowledged corollary of Fordist growth and challenged the technocratic ideology and unaccountability of Cold War government agencies (Egan, 2007).

The social and institutional crisis of American universities in the 1960s and early 1970s was an aspect of the wider corrosion of the linked disciplinary structures of the Cold War and Fordism in the face of new political demands and aspirations of youth (Renshaw, 1991: 152–70; Downs, 1999; Caffentzis, 1975). The notion that the universities were the breeding ground for radicalism was a central plank of the New Right’s response to the sixties’ movements and counter-culture (see also Nik-Khah chapter), and motivated Ronald Reagan’s attacks on the University of California (Juutilainen, 2006). The “Powell memorandum” of August 1971, written by Virginia corporate lawyer Lewis F. Powell for the US Chamber of Commerce, was particularly important, a pivotal moment, in setting out a view of the university as a politically dangerous center for what Powell called the “attack” on the “American Free Enterprise System” (Newfield 2008: 52–3). What the memorandum marked was an emerging shift in the mode of control over scientists and intellectuals: from the disciplinary structures of the national-security state to the market itself as a disciplinary structure which imposes constraints in a more impersonal and pervasive way (Hollinger, 2000: 161).

In the 1970s, the American economy was stagnating in the face of increasing international economic competition. As Chris Harman puts it, “The dynamic of market competition was relentlessly undercutting the dynamic of military competition” (Harman, 2009: 200). This changed political-economic context spurred the emergence of the neoliberal “globalized privatization regime” in which research would be geared to the service of private industry and the university legitimized primarily as an “economic engine” (Mirowski, 2011: 114–38; Berman, 2012; Shapin, 2008: 213–14; cf Edgerton, this volume). The mass scientist produced by the Manhattan Project was to be transformed into the entrepreneur, or the flexibilized knowledge-worker, of the post-Fordist “knowledge economy,” whose problems are now, in turn, increasingly evident (Kleinman and Vallas, 2001; Barley and Kunda, 2011; see also the Introduction to this volume and chapters by Pagano and Rossi; Schiller and Yeo; Lazonick et al.; Tyfield).

Note

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The Manhattan Project


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