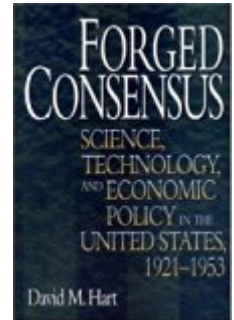


**David M. Hart.** *Forged Consensus: Science, Technology, and Economic Policy in the United States, 1921-1953.* Princeton, N.J.: Princeton University Press, 1998. xiv + 267 pp. \$39.95, cloth, ISBN 978-0-691-02667-1.



**Reviewed by** mark aldrich

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This slim volume, the result of the author's Ph.D. thesis, reveals impressive research in archives and other primary materials as well as wide reading in the secondary literature on science and technology policy. In the Preface, the author states that his goal is "to undermine the field's creation myth" (p. ix), which says "postwar science and technology policy sprang full blown from the mind of Vannevar Bush." The consensus on policy was, he claims, a forgery. Hart stresses that policy explanations resting on transactions cost economics or the "liberal society tradition" are inadequate, and he argues instead that policy evolved from the interplay of five alternative visions of the liberal state that he labels conservatism, associationalism, reform liberalism, Keynesianism, and the national security state.

Hart's analysis of these events tends to be externalist. That is, economics and broader policy visions, rather than scientific or technological discoveries, are the primary forces shaping policy. He begins with the "New Era." From 1921-1932, the conservative vision was paramount, of course. But Hart also traces the influence of Hoover's as-

sociationalist ideas, discussing a range of policy initiatives such as the efforts of the Bureau of Standards to encourage research and rationalization in textiles, housing, and lumber.

Concerning the early 1930s, Hart tells a complex story, interweaving the technocracy movement, associationalist schemes of Gerard Swope and others, and the efforts of reform liberals such as Rexford Tugwell and David Lilienthal. Such a disparate group of actors led to both profusion and confusion as policy initiatives ranged from share-the-work efforts and NRA codes, to the abortive Committee on National Railway Research, to TVA. In the late 1930s, Hart turns the spotlight to the efforts of reform liberals such as Thurman Arnold, and the TNEC to prevent patent holders from suppressing new technology. He also traces a brief alliance between the liberals and Keynesians to reform housing.

After 1940, Hart describes the rise of military R&D and the role of Vannevar Bush in the National Research Defense Committee and Office of Scientific Research. He also chronicles the abortive efforts of Maury Maverick and Henry Wallace to

develop an expansive program of government funded civilian R&D service.

The end of the war brought a "convergence"--a term Hart prefers to consensus (p. 147)--in science and technology policy. Reformers and associationalists allied to push through the National Science Foundation in 1950 and to campaign for federal support of venture capital--which led to the Small Business Investment Act of 1958. The massive postwar commitment of resources to military R&D Hart traces to a complex of causes. The memory of wartime strategic bombing as effectively articulated by General Curtis LeMay and others, along with conservative fears of regimentation and giant spending programs, led to the gradual triumph of massive retaliation and the militarization of the AEC. Oddly, however, he devotes relatively little time to the Manhattan Project or to groups such as the Federation of American Scientists who would ultimately prove important in mobilizing the anti-nuclear movement.[1] Then, in 1950, Korea relaxed the budget constraints and the national security state was born, propped up by military spending and fed by the technological spillover from military R&D.

This thumbnail sketch omits much detail, for Hart's analysis is far richer than one can summarize in a few paragraphs. The analysis of events is usually persuasive; no one writing on American science policy can afford to ignore it. For me, the most valuable insight was his stress on the continuing role of associationalism long after its heyday in the 1920s. Of course, there are weaknesses, and I have several quibbles and comments on ways I think the analysis could have been strengthened.

First, the quibbles. No one I have read, including Bruce Smith, ever claimed that post war policy was entirely the creation of Vannevar Bush.[2] Hyperbole aside, it would also have helped if Hart had stated the elements of the "consensus." As Bruce Smith summarized it, there were four tenants: 1) basic research was a federal responsibility, 2) applied research would also be an important

government responsibility, 3) commercialization would be virtually automatic, and 4) some minimal regulation would be necessary.[3]

There are, however, several more serious weaknesses. Despite Hart's claim that he has cast a broader empirical net than earlier authors, there are curious omissions. There is no discussion at all of science in the Department of Agriculture or of the Public Health Service (PHS) or of the founding of the National Institutes of Health (NIH). Moreover, the long campaign that culminated in the NIH, as recently described by Victoria Harden, both confirms and qualifies Hart's analytic scheme. She too depicts the interplay of associationalists, reformers, and others in the origin of NIH, but she casts an even broader net to include agency scientists, bureaucrats, scientific associations, women's groups, individual companies, and others.[4] Nor does Hart discuss the impact of the regulation (except for anti-trust). Yet work on the ICC, FDA and other agencies suggests that regulation significantly shaped technological change.[5]

I am also skeptical that Hart's category "Keynesian" is very useful. As he acknowledges at one point, "Science and technology played an ambiguous part in Keynesian thought" (p. 22). He then goes on to note that "WW II... detached Keynesianism from reform liberalism" (p. 23), and in the post war years it came to rationalize military spending. I would go a good deal farther: there is nothing in Keynesian analysis to lead one to any particular view of science and technology policy or any other sort of spending. Some who called themselves Keynesians no doubt urged a more ambitious role for Federal R&D spending. But no doubt so did some who called themselves Presbyterians. As Hart notes, tax cuts and military spending are just as compatible with Keynesian analysis. In fact, macro economists in general ignored technology until Robert Solow's famous 1957 paper--done in the neoclassical mode and cited by Hart--pointed to its importance.

Finally, although Hart briefly notes the technocracy movement of the 1930s, there is little in his analysis to foreshadow the rise of environmental concerns and the anti-technology counter-culture of the 1970s. This results, I think, from his omission of the work of the Public Health Service and Food and Drug Administration (FDA) as well as the origins of anti nuclear activism in the FAS. Yet as Christopher Sellers has argued, there are direct links between PHS-FDA scientific investigations of workplace toxics in the 1930s and environmental movement in the postwar years.[6]

#### Notes

[1]. For the early efforts of the Federation of the American Scientists to prevent military domination of atomic power see Daniel Kevles, *The Physicists* (Vintage, 1979), Chapter 22.

[2]. Bruce Smith, *American Science Policy Since World War II* (Brookings, 1990). What Smith actually said (p. 36) was "The Bush report...perhaps comes closest to summarizing many elements of the consensus, but even it is incomplete."

[3]. Smith, *American Science Policy*, pp. 36-37.

[4]. Victoria Harden, *Inventing the NIH* (Johns Hopkins, 1986).

[5]. On the role of the Bureau of Mines see Joseph Pratt, "Letting the Grandchildren Do It: Environmental Planning During the Ascent of Oil as a Major Energy Source," *Public Historian* 2 (Summer 1980: 28-61). For the effects of regulation in shaping more recent technological change, see William Capron, *Technological Change in Regulated Industries* (Brookings, 1970) and Paul MacAvoy, *The Regulation of Transport Innovation: The ICC and Unit Coal Trains to the East Coast* (Random House, 1967).

[6]. Christopher Sellers, *Hazards of the Job: From Industrial Disease to Environmental Health Science* (University of North Carolina, 1997).

This review was commissioned for H-Pol by Lex Renda <renlex@uwm.edu>

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