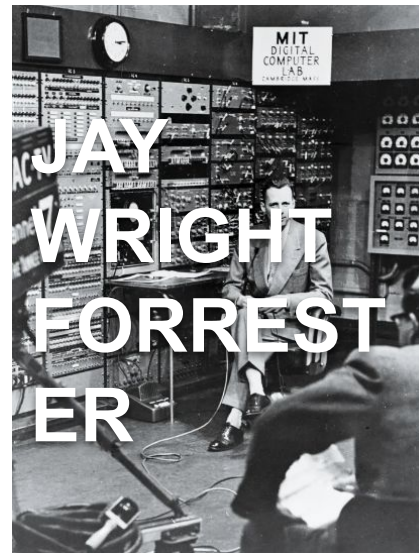
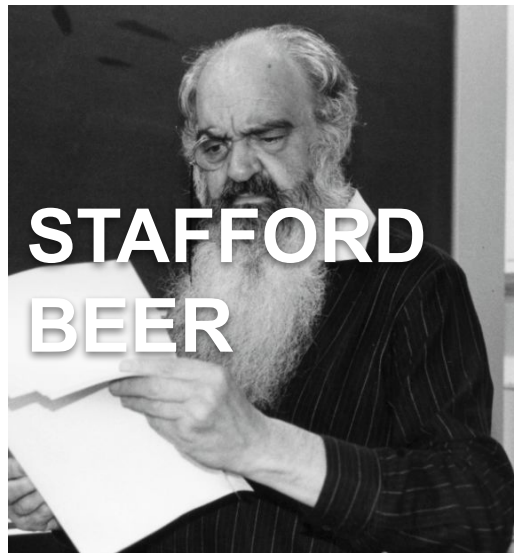
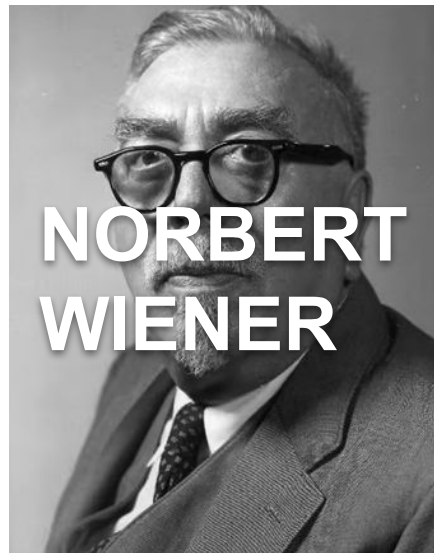


Systems and Simulations

a technological history told through four weird guys,
plus contemporary artist practice applications



Progression of simulation

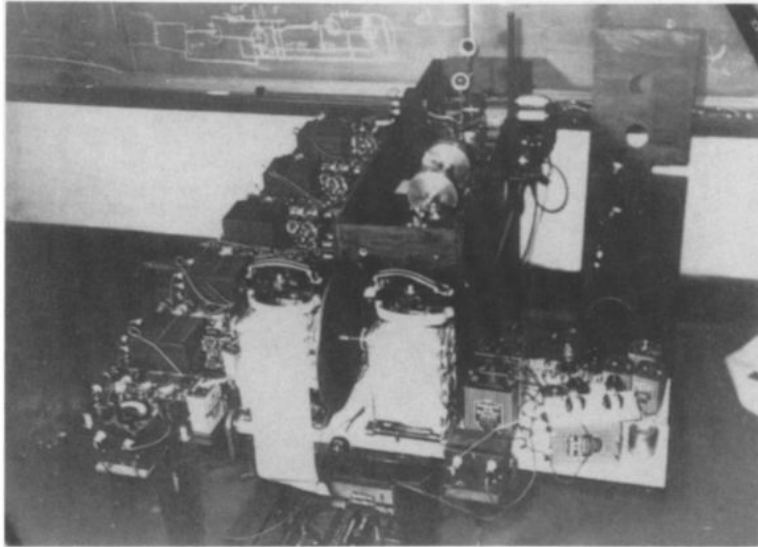
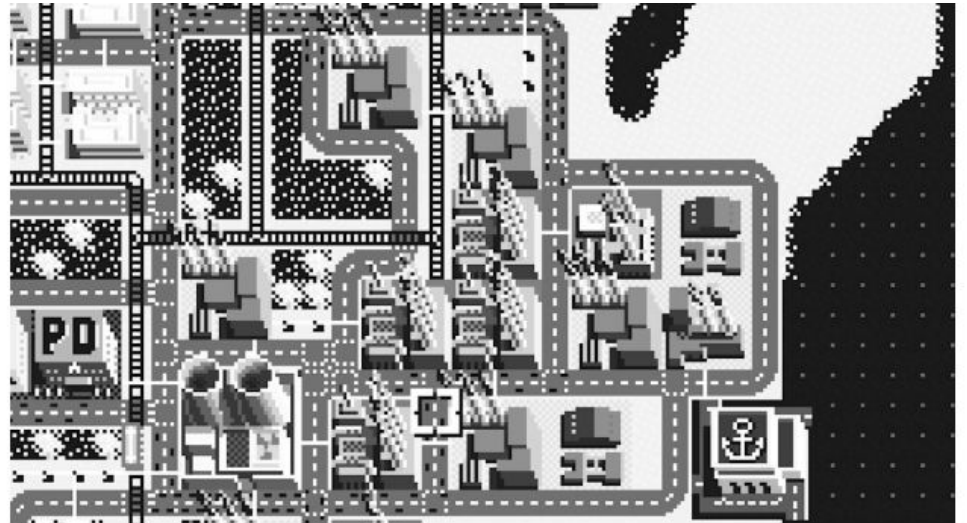
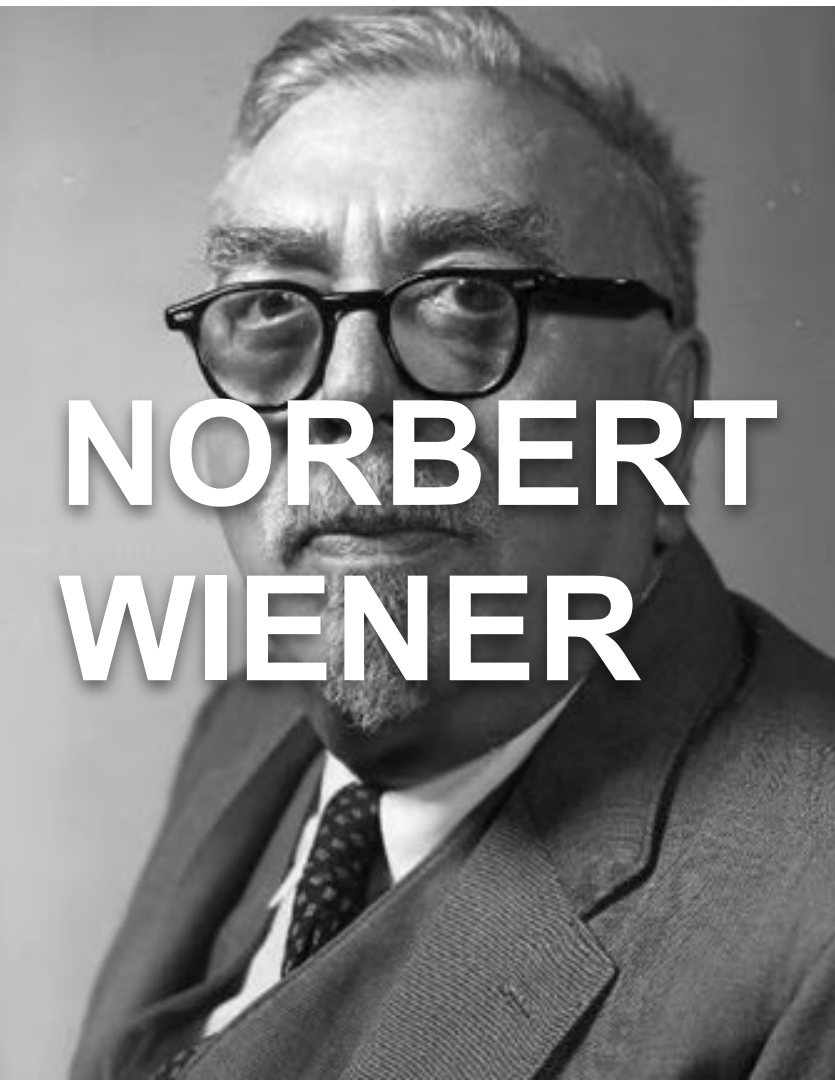


FIG. 4.—The anti-aircraft predictor. From Wiener to D. I. C. 5980 A. A. Directors, "Summary Report for Demonstration."



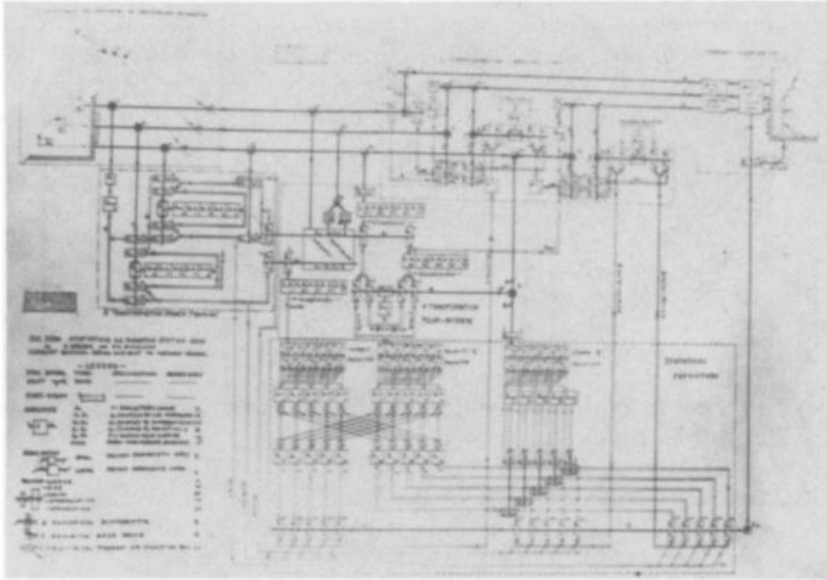
A black and white isometric view of an early SimCity cityscape.

A black and white portrait of Norbert Wiener, an older man with glasses, a mustache, and a goatee, wearing a suit and tie. The text "NORBERT WIENER" is overlaid in large, white, bold, sans-serif capital letters on the left side of the image.

NORBERT
WIENER

*“Information is
information, not
matter or energy”*

Anti-Aircraft Predictor



We realized that the “randomness” or irregularity of an airplane’s path is introduced by the pilot; that in attempting to force his dynamic craft to execute a useful manoeuvre, such as straight-line flight or 180 degree turn, the pilot *behaves like a servo-mechanism*, attempting to overcome the intrinsic lag due to the dynamics of his plane as a physical system, in response to a stimulus which increases in intensity with the degree to which he has failed to accomplish his task. A further factor of importance was that the pilot’s kinaesthetic reaction to the motion of the plane is quite different from that which his other senses would normally lead him to expect, so that for precision flying, he must disassociate his kinaesthetic from his visual sense.²⁰

FIG. 3.—Wiring circuit for Wiener’s antiaircraft predictor. From Norbert Wiener to D. I. C. 5980 A. A. Directors, “Summary Report for Demonstration,” 10 June 1942, Record Group 227, Office of Science and Research Development, National Defense Research Committee Contractors’ Technical Reports, Division 7, MIT, NDCrc-83, National Archives, Library of Congress, Washington, D. C..

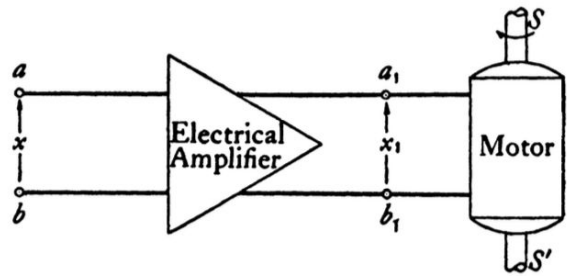


FIG. 1.—Sensor that actuates a motor. From Le Roy A. MacColl, *Fundamenta Servomechanisms* (New York, 1945), p. 5.

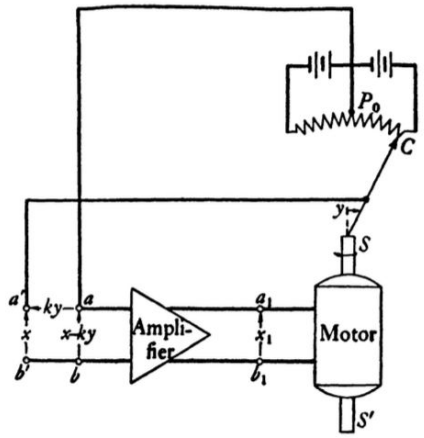
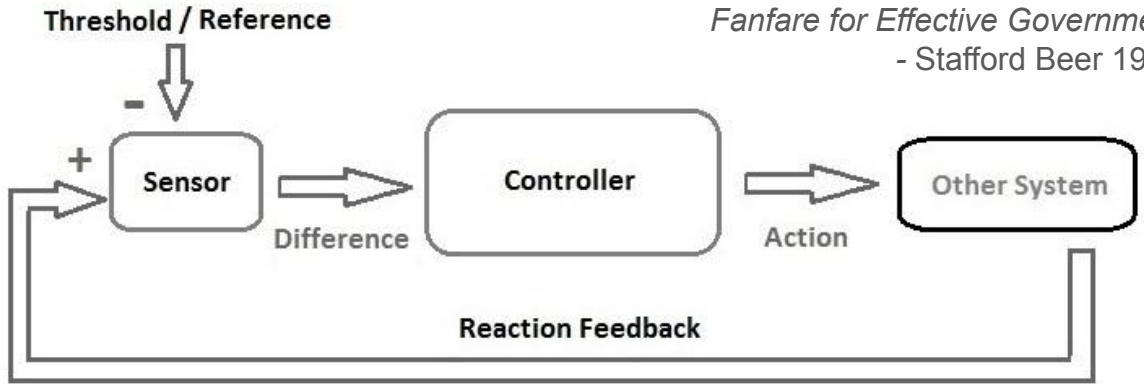


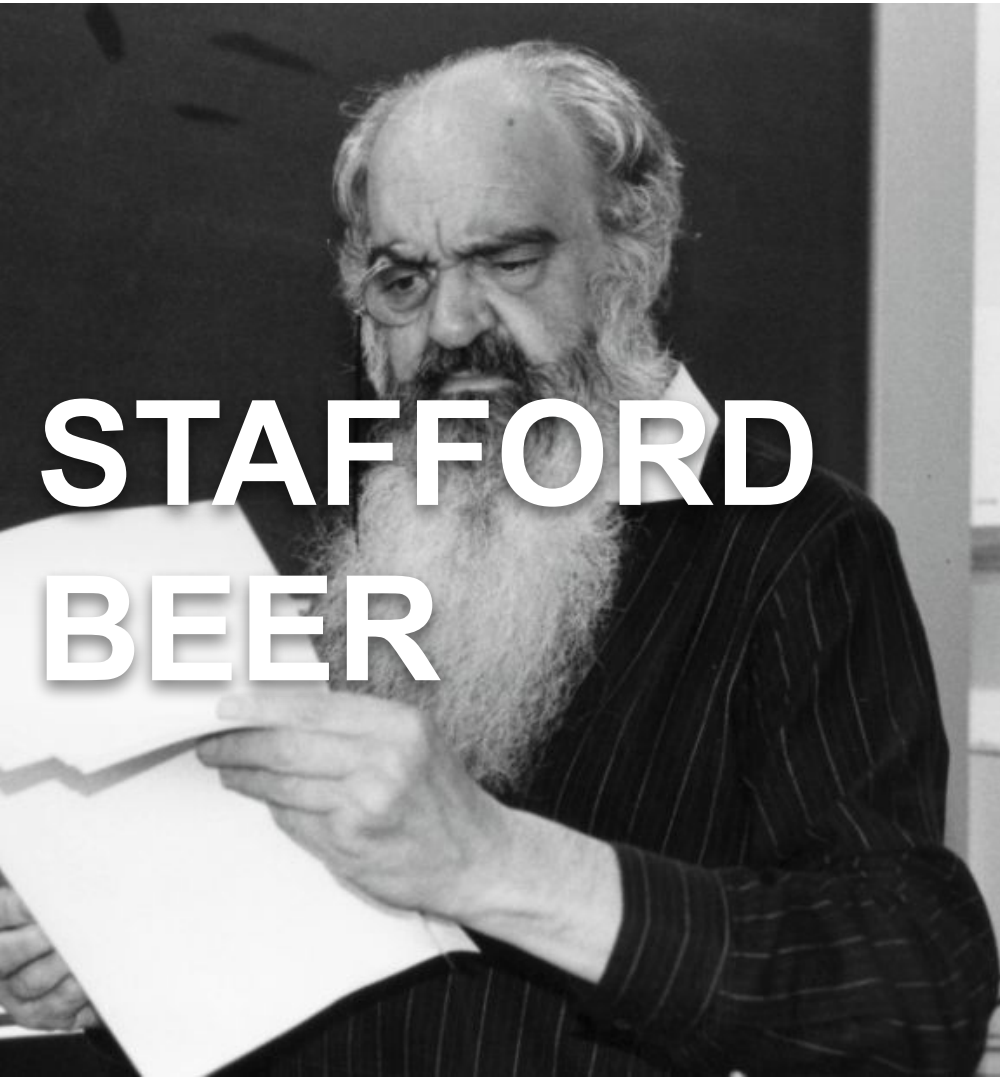
FIG. 2.—Sensor with feedback. According to most writers at the time, including MacColl and Wiener, a servomechanism was defined by the inclusion of feedback. From MacColl, *Fundamental Theory of Servomechanisms*, p. 6.

WHAT IS CYBERNETICS, that a government should not understand it? It is, as Wiener¹ originally called it twenty-five years ago, 'the science of communication and control in the animal and the machine'. He was pointing, in that second phrase, to laws of complex systems that are invariant to transformations of their fabric. It does not matter whether the system be realized in the flesh or in the metal.

Fanfare for Effective Government
- Stafford Beer 1973



A Cybernetic Loop



STAFFORD
BEER

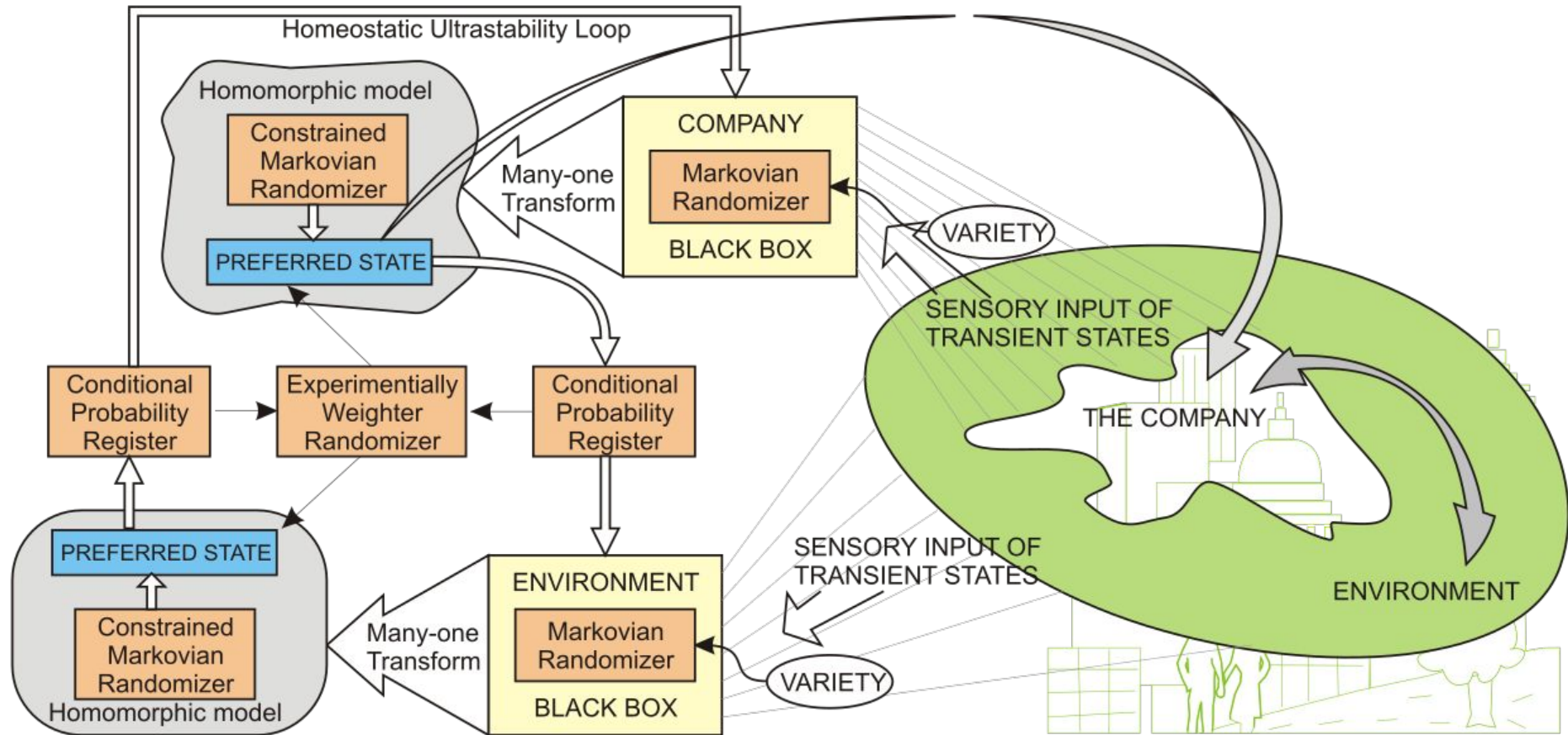
*“The purpose
of a system is
what it does”*

Operations Research



reduce the number of [anti-aircraft artillery](#) rounds needed to shoot down an enemy aircraft from an average of over 20,000 at the start of the [Battle of Britain](#) to 4,000 in 1941.^[17]

Management Cybernetics



Cybersyn

aimed to use computers and a [telex](#)-based communication network to allow the government to maximise production while preserving the autonomy of workers and lower management.



The futuristic operations room was designed by a team led by the interface designer [Gui Bonsiepe](#).

about the people they represent, making the point:

I am a scientist; but to be a technocrat would put me out of business as a man. Yet there I was, eighteen months ago, intent on creating a scientific way of governing. And here I am today, proud of the tools we have made. Why? Because I believe that cybernetics can do the job better than bureaucracy — and more humanely too. We must learn how to expunge technocracy, without rejecting science — because the proper use of science is really the world's brightest hope for stable government. Some people in Chile share that view; and they reject technocracy as strongly as do I. All of us have already been misrepresented in that respect, just as the scientific work we have done has already been misrepresented as analogous to other management control systems that have failed. Both comments miss out the cybernetics, to discuss which we are here — and a subject which, for government in general, is not at all understood.

made decisions every five years.

Allende, too, as soon as he was familiar with precisely how the system worked, pushed Beer further to expand its “decentralising, worker-participative and anti-bureaucratic” possibilities. Allende’s desire that Proyecto Synco not be a technocratic answer to economic planning along Soviet lines, but a tool in the hands of workers on the shop floor to engage in decision making themselves, impressed Beer and hinted at a much-wider application of the system than just the nationalized sector. But then, Beer was also being radicalized by events in the country beyond the consulting work he was performing for CORFO. Allende was pushing at an open door.

October 1972



Truckers/Bosses' Strike



In October members of the Chilean economic elite found the moment they had been waiting for. A provincial truck owners' *gremio*, or business association, in the small southern province of Aysén went on strike to protest the government's creating a parallel state-owned trucking firm in the province, which the government claimed was meant to increase transportation to an isolated part of the country. The economic elite saw the strike as the moment to put more than a year's worth of planning and organization into action. They joined forces with middle-class *gremios* across the country, and within days truck owners throughout Chile struck in sympathy.

By 10 October 1972, twelve thousand truck owners were on strike, and that number quickly grew to forty thousand nationwide, a pace that shows the level of organization behind this national stoppage.¹⁰ While the opposition promoted the strike as an effort to defend the private sector and ensure its continuance, the bourgeoisie was using the strike as a public demonstration of class power.

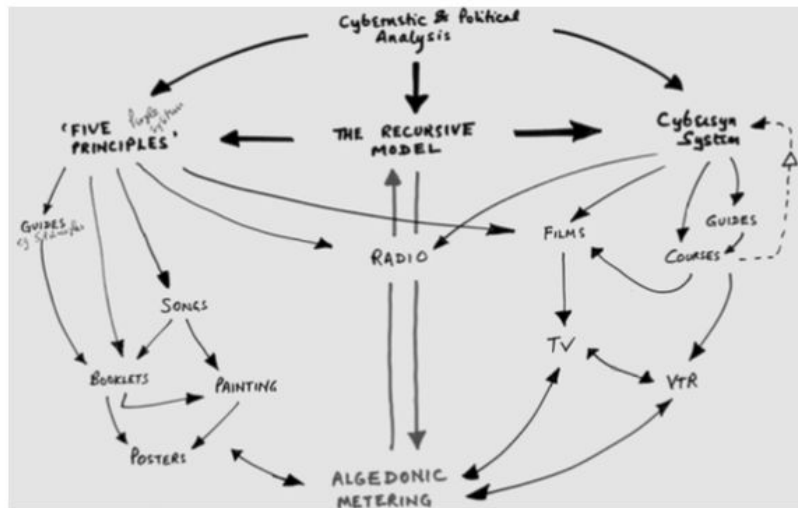


Figure 5.2

Diagram showing how Beer envisioned the scope of his work in Chile and its connection to the political context. Image reproduced with permission from Constantin Malik. Original kept at Liverpool John Moores University, Learning and Information Services, Special Collections and Archives.

Moreover, a cybernetic history of the October Strike shows how technological systems can influence the direction of political events by giving governments opportunities that they may not have had otherwise. The telex network created for Project Cybersyn enabled the Allende government to construct a partial map of national economic activity that was based on current information. These data helped the government to make informed decisions in a time of crisis, to convey them with an extreme rapidity that would have been impossible otherwise, and ultimately to survive. The history of Project Cybersyn thus moves us beyond a framework of social construction, where social considerations influence technology, and draws our attention to the way that technologies matter in shaping the course of history.

September 11 1973



