Daniel Bell: Science as the Imago of the Future Society

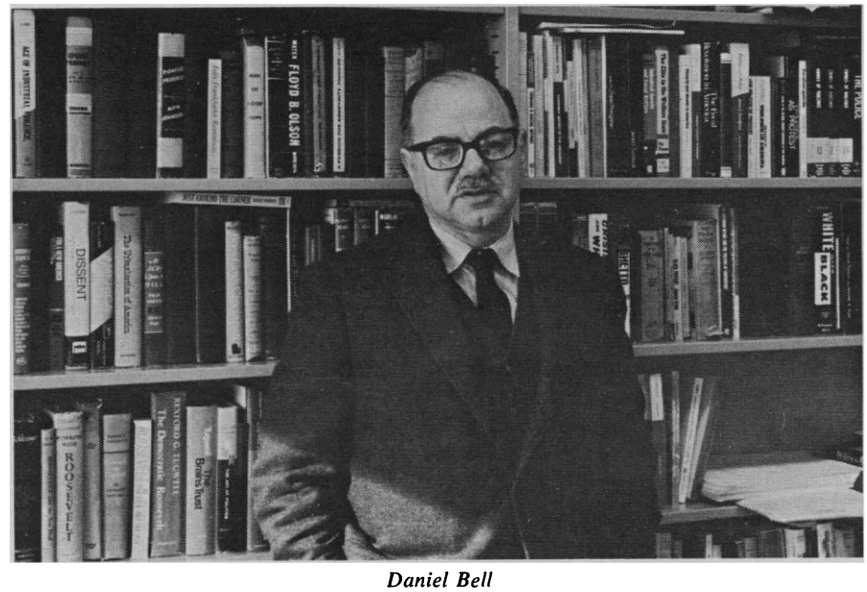
Just as the businessman has been the dominant figure of the last 100 years, scientists will be the leading actors of the next. We are in the first stages of the "post-industrial society," which will be characterized by the centrality of theoretical knowledge, and in which scientists and engineers will be the key group, the most esteemed, and maybe the most highly paid.

Such, at least, is the expectation of Daniel Bell, professor of sociology at Harvard and author of *The Coming of Post-Industrial Society*.* Through his editorship of magazines such as the *New Leader* and *Public Interest*, Bell has been a major influence in literary and intellectual circles in the United States. *Public Interest* has become an important forum for political writers of moderate hue such as Daniel Moynihan, James Q. Wilson, and Bell himself, who, whether because the world has moved leftward or he to the right, is nearer to being a moderate liberal democrat than to the socialism of his younger days. A recent sociological survey (published in *Public Interest*) ranked him among the ten most prestigious American intellectuals, along with such mixed company as J. K. Galbraith, Mary McCarthy, Norman Mailer, and Lionel Trilling.

Bell's views on science, as expressed in *The Coming of Post-Industrial Society*, in recent articles and in an interview, are of interest both because of his own breadth of vision and because he considers science as central to the future direction of society. The leading role of science is evident in the five dimensions by which he defines the post-industrial society—the change from a goods-producing to a service economy; the pre-eminence of the scientific and technical class; the centrality of theoretical knowledge as the source of innovation and policy formulation; control of technology and technological assessment; and the creation of a new "intellectual technology"—methods such as systems analysis, operations research, decision theory—for dealing with problems of organized complexity. Technology, Bell says, has been one of the chief forces in severing the past from the present. It has raised living standards and reduced inequality in Western society; it has created a new class, that of the engineer and technician; it has altered our perceptions of space and time; and it has called into being a new definition of rationality, one that emphasizes functional relations and the quantitative.

Though science is a shaping force of the post-industrial society, Bell does not share the visions of technocrats such as Saint-Simon and Veblen, who saw scientists riding into power on the strength of their newfound importance. The relationship of knowledge to power is "clearly a subservient one." It is not the scientist who ultimately holds power, Bell admits, but the politician. Science as the savior of society, scientific method used to resolve political issues, is a theme that has received powerful literary attention, but the messianic aspect of science has never tempted many scientists. In any case, Bell observes, the venture into politics to control the development of nuclear power was closed by the Oppenheimer case. Political power, the "technocratic potential" inherent in the growing influence of science, is minimized in the American system; science has "simply become a constituency," with no greater inherent unity than other professional groups. Nonetheless, Bell considers it evident that the technical intelligentsia, as their skills increasingly provide the base of the post-industrial society, "now have to be taken into account in the political process, though they may not have been before."

Just how scientists may translate their growing influence into political account Bell does not say, but it will depend in part on how scientists themselves are organized. The task of creating representative political structures will be "one of the most difficult political problems for scientists in the coming decade," Bell believes. At present, science is represented by three different kinds of spokesmen—by eminent individuals such as Nobel laureates; by those who speak for scientific movements, such as the young radicals or ecological reformers; and by the leaders of institutions such as the National Academy of Sciences. The first two in particular invoke the institutional charisma of science to support their public utterances. Bell believes that tensions will inevitably arise "between the bureaucratic tendencies of large scale science and the charismatic dimension of science, which sees its activities as ends in themselves which should not be subordinated to other goals." The relation between the charismatic community and the bu-



Daniel Bell

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reaucratized institutions of science will in fact be "the major problem for science in the post-industrial society."

The notion of charisma is central to Bell's understanding of science. He means it not in the hackneyed modern sense of political charm but as the moral authority that sanctions the overthrow of established traditions. In religion and politics the charisma that justifies the original revolution usually becomes routinized into an establish-

Briefing

Biomedical Leadership and the Waiting Game

According to a familiar saying, all things come to those who wait. Well, it looks as though official leadership of the biomedical community may one day come to Theodore Cooper and Donald S. Fredrickson, if they are prepared to wait long enough. It is common knowledge around Washington that Cooper is slated to become assistant secretary for health in the Department of Health, Education, and Welfare (HEW) and that Fredrickson is first in line for the directorship of the National Institutes of Health (NIH).

For the past couple of weeks, the FBI has been calling on the two men's friends and colleagues as part of the investigation that is made of any potential presidential appointee. Because each has passed FBI scrutiny in the past, everyone is presuming that they will again. And everyone is presuming that the only thing now standing in the way of an official announcement from the White House is completion of the FBI check. However, political observers also know that until the President actually sends the nominations to the Senate, which will have to confirm both appointments, there is always the possibility of a change of plan. So, the waiting game goes on and the vacuum at the top of the biomedical ladder persists.

Cooper, who for several years was director of the National Heart and Lung Institute at NIH, left that job in April 1974 to become deputy assistant secretary for health under Charles C. Edwards. Edwards resigned the assistant secretaryship in January of this year.

During the year he has been at HEW, Cooper has acquired a reputation for being a highly efficient administrator with a detailed understanding of the issues with which he is involved. Although reportedly he had the backing of HEW Secretary Caspar Weinberger for promotion, it is apparent he was not the first choice of White House recruiters for the job. A number of individuals, among them Lewis Thomas, president of the Memorial Sloan-Kettering Cancer Center, and, reportedly, Fredrickson, himself, were asked to consider the post of assistant secretary for health. Among other things, persons outside the government are reluctant to take a job they cannot reasonably expect to hold for more than 18 months, since it is entirely likely that the person in the post will change after the 1976 presidential election.

It is not clear what the White House recruiters had against simply naming Cooper right after Edwards left, except that he is a registered Democrat. (Fredrickson is a Republican.) At one point, Cooper, who has an evident distaste for endless delays, was ready to pack his bags if the recruiters could not make up their minds.

At present, Fredrickson is president of the Institute of Medicine–National Academy of Sciences, a position he has held for the past 9 months. Prior to going to the IOM, he was scientific director of the heart institute under Cooper. In fact, Fredrickson has spent most of his career at NIH where he gained scientific stature for his work on lipid metabolism and the role of genetics in lipid disorders. Last year, he was elected to membership in the national academy.

For years, Cooper and Fredrickson were considered to be among the top science administrators at NIH, the kind of people who were likely candidates for the director's job. Cooper was a strong contender for the job last time around (it went to Robert Stone who held it from May 1973 until December 1974 when he was fired), and Fredrickson has been asked in the past if he would consider taking the directorship but has declined in order to stay closer to the laboratory.

If and when the appointments come through, it is expected that Cooper and Fredrickson will be able to work together satisfactorily, as they have in the past. Cooper has said he would like to see strong leadership at NIH and Fredrickson is, presumably, prepared to give it.—B.J.C.

Congress Reclaims Strip-Mine Law

On its second major try, Congress appears close to putting a tough federal strip-mining control law on the books. Both the Senate and House have passed strip-mining bills by margins large enough—84–13 in the Senate, 333–86 in the House—to indicate the potential for the two-thirds majority necessary to override a presidential veto. The two houses are expected to reconcile differences in the two versions of the bill in conference when Congress reconvenes after the Easter recess.

Congress passed a similar strip-mining bill late in the last session (*Science*, 27 December 1974), but the bill perished after adjournment by a pocket veto by President Ford. The measure has been doggedly opposed by the coal industry and its allies on the grounds that its effects would be to increase fuel costs and substantially reduce coal production.

Environmentalists have been particularly active in supporting two main aims of the legislation—protection of water resources in ecologically vulnerable Western coalfields and reclamation of strip-mined areas in hilly Eastern coal regions.

The House version of the bill carries stiff provisions for safeguarding subsurface water resources which could prohibit strip-mining planned in much of coal-rich Montana, North Dakota, and Wyoming. The House bill would also forbid mining practices which result in leaving exposed "high wall" expanses on abandoned, hilly strip-mined areas, thus causing erosion and stream pollution through acid mine drainage. The bill also calls for a reclamation program paid for by the industry through a tax on coal production.

Restrictions in the House bill are by and large more severe than in the Senate version; observers on the Hill feel that the conference version will lean to the House side.—J.W.

ment of its own, as has been the case with Christianity and Marxism. This is not so in science, where each practitioner expects to be outmoded by his students, and where the accepted norm is permanent revolution. The real problem now, Bell believes, is that as science becomes involved in public policy, the charisma may become less.

"Ethos" is another of Bell's terms for describing the scientific community, defined in an eloquent celebration of science that bears quotation at length. The community of science, he says,

> is a unique institution in human civilization. It has no ideology, in that it has no postulated set of formal beliefs, but it has an ethos which implicitly prescribes rules of conduct. It is not a political movement that one joins by subscription, for membership is by election, yet one must make a commitment in order to belong. It is not a church where the element of faith rests on belief and is rooted in mystery, yet faith, passion and mystery are present, but they are directed by the search for certified knowledge whose function it is to test and discard old beliefs. Like almost every human institution, it has its hierarchies and prestige rankings, but this ordering is based uniquely on achievement and confirmation by peers rather than on inheritance, age grading, brute force, or contrived manipulation. In totality, it is a social contract but in a way never foretold by Hobbes or Rousseau, for while there is a voluntary submission to a community and a moral unity results, the sovereignty is not coercive and the conscience remains individual and protestant. As an imago, it comes closest to the ideal of the Greek *polis*, a republic of free men and women united by a common quest of truth. . . . The dedication to science has a hallowed quality, and because this partakes of the "sacred" we can say that the ethos of science describes a "charismatic community."

The ethos of science, Bell believes, is the emerging ethos of post-industrial society; the scientific estate "is the monad that contains within itself the imago of the future society." Yet the ethos may become ossified. Just as in capitalism the Protestant work ethic has been transmuted into hedonism and mundane acquisitive drives, so too the ethos of science could turn into a set of formal justifications masking a reality rather than imperatives for conduct. "Formulated in an age of innocence, it risks becoming the ideology of post-industrial society: a creed which establishes the norm of disinterested knowledge, but which is at variance with the reality of a new bureaucratic-technological order. . . ."

The decay of the Protestant ethic is a theme to which Bell returns in order to explain what he describes as the "widening disjunction" between social structure and culture. Unlike the single value system that prevailed in the bourgeois society of the 19th century, modern capitalism requires not only honest production but hedonistic consumption—in other words, that people should be square by day but swingers by night. Contemporary culture, defining itself in opposition to bourgeois values, has become anti-institutional and antinomian. Hence, says Bell, there has developed "a deep and growing split between the technical intelligentsia who are committed to functional rationality and technocratic modes of operation, and the literary intellectuals, who have become increasingly apocalyptic, hedonistic and nihilistic."

A notable symptom of this disjunction is the anti-science movement. It is a school of thought with which Bell has little sympathy. "Many of the criticisms of technology today," he says in a recent essay in *The American Scholar*, "remind one of Goethe, who rejected Newton's optics on the ground that the microscope and telescope distorted the human scale and confused the mind. . . . The difficulty today is that it is the critics of technology who absolutize the dilemmas and have no answers, short of the apocalyptic solutions that sound like the familiar comedy routine—stop the world, I want to get off."

Science Oversold

Bell describes himself as neither pro-science nor anti-science. In a populist sense, he believes, science has clearly been oversold—"People expected too much of it—the notion that if scientists can go to the moon, why can't you have better schools, hospitals. But science is a game against nature, which is not the same thing as a game against persons." Bell is not without uneasiness at the present drift of scientific inquiry. "I am old fashioned enough to believe that the genuine questions are philosophical questions," he said in an interview last month, "but to some extent science has moved away too much from philosophy." As an example he cites how physicists have put more effort into searching for the smallest unit of matter than in asking whether or not any such unit should exist. "The mode of science is analytic, philosophy is synthetic. The scientist's interest is always to duck away from looking at the big picture, to look instead for the tractable problem."

Bell believes that scientists have a social responsibility in the sense that, like everyone else, they are individually responsible for their actions. (He led the fight against the decision by the American Academy of Arts and Sciences to give an award to Ezra Pound.) But he notes that the radicals, who are the usual source of the call for social responsibility in science, take a different line when it comes to the consequences of art, which they believe should be autonomous. The radicals want science too to be autonomous, but they also want it to serve the people. "They assume the pure truth and the people are the same—which is not always the case." The real problem, says Bell, "is how do you have a form of science that is responsive to social needs but also allows some degree of autonomy and breathing space."

In conversation Bell dispenses abstract ideas with machine gun rapidity. His view of the world is comprehensive and tightly constructed; he is happy dealing with big questions, although those that imply other views of reality he tends to redefine in his own terms, sometimes to the vanishing point. Have the events of the last 2 years disrupted the schedule for the advent of the post-industrial society?—Bell dismisses the Arab oil embargo as a success that cannot be repeated and the rise in oil prices as a "momentary dash of cold water." There is no shortage of energy, and the notion of a shortage of raw materials "doesn't make any sense to me."

Nineteenth century historians such as Macaulay liked to portray science as the great engine of progress, impelling society forward to new levels of freedom and material wealth. Such ideas may no longer be fashionable, but a belief if not in progress, at least in the sustaining capabilities of science, is strongly reflected in Bell's writings. Central to the theme of his book is the assumption that the existing order of things will endure and evolve peacefully, unshaken by catastrophe or major discontinuity. Bell, however, refuses to be called an optimist. If his visions of the future appear roseate to some, "It is not an optimistic bias in me, it is an optimistic bias in science and technology."—NICHOLAS WADE

Erratum. The article on the International Conference on Recombinant DNA Molecules (14 March, p. 931) should have mentioned that Richard O. Roblin (Harvard Medical School) was one of the members of the organizing committee who was also a member of the ad hoc NAS committee that invoked the moratorium.