

## BIG SCIENCE THREATENS DEMOCRACY

### The Urgent Need for New Examples of Conducting Scientific Research

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*[T]he time is overdue for adding the separation of state and science to the by now quite customary separation of state and church. Science is only one of the many instruments people invented to cope with their surroundings. It is not the only one, it is not infallible and it has become too powerful, too pushy, and too dangerous to be left on its own. Paul Feyerabend (1)*

In his masterpiece *Democracy in America*, Alexis de Tocqueville warned more than 170 years ago that tyranny of conformity constitutes a major threat to democracy in America (2). "I do not know any country," he wrote, "where, in general, less independence of mind and genuine freedom of discussion reign than in America. ...In America the majority draws a formidable circle around thought. Inside those limits, the writer is free; but unhappiness awaits him if he dares to leave them." Sadly, Tocqueville's tyranny of conformity has taken over institutional America, in particular its institutions of academe and science (3,4).

During my 25 years as a scientist I have watched science go from being one of the most ennobling and enriching of human activities to being a dangerous and ineffective machine that has become a threat to democracy.

Science was once one of the most democratic of human activities. It was the product of individuals working alone or with a small group of collaborators. Good science was found in every region of the world, irrespective of political, religious, or ideological beliefs. Since creative scientists tend to work best alone they have much more in common with artists than engineers. Consequently, creative, democratic science is the activity of independent individuals.

Regrettably, institutional science has replaced the individual search for enlightenment and understanding, which is the true domain of science, with the limited, special goals and interests of government and industry. "In most cases," lamented Paul Feyerabend, philosopher and historian of science, "modern science is more opaque, and more deceptive, than its 16<sup>th</sup>- and 17<sup>th</sup>-century ancestors have ever been" (1). Most alarming of all, multi-billion dollar institutional science has murdered freedom of thought and discourse in America.

As he was leaving office, President Dwight Eisenhower expressed concern about the emergence of institutional science. "Yet, in holding scientific research and discovery in respect, as we should," Eisenhower warned, "we must also be alert to the equal and opposite danger that public policy could itself become the captive of a scientific-technological elite" (5). Confusing science with engineering has contributed to the half-century shift towards institutional science that began with the Manhattan Project and the development of the atomic bomb that

triggered Eisenhower's warning. The uncritical—often reverential—praise of institutional science by the New York Times, and virtually all American media, reinforces the prevailing misconception that science and engineering are not very different.

In order to understand and deal with the threat to democracy that institutional science represents, it is essential that citizens recognize and celebrate the profound difference between science and engineering. For the most part, engineers know what they are doing and scientists don't. The best engineers dazzle us with their productions, while the best scientists, without fanfare and little ceremony, ask grand questions. As *Star Trek* put it so aptly, the purpose of science is "to boldly go where no one has gone before".

The layman can easily judge when an engineer has failed—the bridge collapses, the plane falls out of the air, the phones don't work—but there is almost no way for him to know for sure when a scientist is more right than wrong: Are there really cancer genes? Did the universe really begin with a Big Bang? Does HIV really cause AIDS? Is the global environment really getting worse or actually getting better? Did Darwin really produce a theory of evolution? Scientists themselves hotly debate these questions when forced to consider them.

However, the debates nowadays are rarely public because to ask questions of institutional science has become dangerous to one's career and reputation (3,6,7).

For hundreds of years scientists recoiled from arguments based on authority. For example, in 1904 when the opinions of a dozen leading French scientists were

put forward as proof of the existence of N-rays, the reaction of celebrated inorganic chemist Henri Moissan was swift: "Do you think scientific questions can be resolved by plebiscite?" he asked (8). In recent years, the answer to Moissan's question is increasingly yes. In a parody of the democratic science that it has replaced, institutional science preaches consensus is the road to scientific truth. But most disturbing of all, as Tocqueville warned, institutional science uses the weight of its authority to set the limits of permissible scientific discourse. The authoritarian, even totalitarian, nature of institutional science has led to colossal blunders that grow like cancer in the absence of the self-correcting mechanisms of democratic science.

Three examples provide a glimpse of how institutional science undermines democracy. Let's begin with the biggest blunder of them all—the unfounded belief that AIDS is contagious and caused by HIV. In 1988, Kary Mullis, winner of the Nobel Prize in chemistry for inventing the polymerase chain reaction (PCR), needed a reference to support the statement he had just written: "HIV is the probable cause of AIDS" (9). He wanted to cite the person who had demonstrated that HIV was indeed "the probable cause of AIDS." He soon learned to his dismay that the name of that individual(s)—who would surely be Nobel material—was on the tip of no one's tongue. Eventually, Mullis had the opportunity to ask Luc Montagnier, the discoverer of HIV, who to cite. Montagnier did not know. To date, no one has been given or taken credit for showing that HIV causes AIDS.

When professor Peter Duesberg, a world famous expert on retroviruses and a member of the National Academy of Sciences, questioned the validity of the HIV hypothesis of AIDS in an article published in *Cancer Research* in 1987 (10), his assault on HIV went completely unchallenged, a tacit admission among scientists that his arguments were at the very least compelling and most likely irrefutable. Faced with this embarrassing situation, institutional science decided to contain Duesberg's ideas and keep the public from finding out that the emperor was no better clad than the day he was born (11). Shortly after Duesberg's paper appeared, a memo was sent out from the office of the secretary of Health and Human Services under the heading "MEDIA ALERT". The memo noted that, "[t]he article apparently went through the normal pre-publication process and should have been flagged at the NIH" (11). No one bothered to ask: what business does a government agency have flagging any scientific paper? The memo pointed out the threat Duesberg posed for the government:

"This obviously has the potential to raise a lot of controversy (If this isn't the virus, how do we know the blood supply is safe? How do we know anything about transmission? How could you all be so stupid, and why should we ever believe you again?) and we need to be prepared to respond. I have already asked NIH public affairs to start digging into this." (12)

Copies of the memo were addressed to the secretary, under secretary, and assistant secretary of Health and Human Services, as well as the assistant

secretary of public affairs, the chief of staff, the Surgeon General, and the White House (11).

Institutional science's strong arm tactics are not restricted to AIDS. Just as HIV has become the axiomatic cause of AIDS, the Big Bang origin of the Universe is unquestioned dogma in virtually every classroom in America. Big Bang dogma forces cosmologists to devalue observations that clash with it. "Such observations are delayed at the refereeing stage as long as possible with the hope that the author will give up. If this does not occur and they are published the second line of defense is to ignore them. If they give rise to some comment, the best approach is to argue simply that they are hopelessly wrong and then, if all else fails, an observer may be threatened with loss of telescope time until he changes his program" (13). The problem is so pervasive that Halton Arp bemoans, "Sometimes I think that Astronomy is not so much a science as a series of scandals" (14). Faced with the pervasiveness of censorship, Arp concludes that, "the foremost obligation of the editor to publish valid scientific data was even more important than communicating the data."

Cancer research provides an especially well documented example of the hubris and abject failure of institutional science. The preface of Edith Efron's book *The Apocalypitics: cancer and the big lie* sums up the quarter-century debacle known as the War on Cancer.

"...I discovered a cultural crime which should not be possible in a free society: a complex corruption of science and a prolonged

deception of the public. ...It has been committed under our very eyes, its details are publicly recorded in documents which are within hand's reach, and yet it remains invisible to most people of this country who are the victims. ...The cultural crime I discovered was perpetuated by ideology in a white smock. ...It is a manifestation of a much wider cultural problem—an insidious assault on reason, science, and the value of objectivity, which has taken place in every field of scholarship since the 1960s. ...These trends are now institutionalized and are well known to a generation of scholars... . In my reading in the environmental sciences and later in environmental cancer, I bumped into evidence of such hostility to the objective disciplines of science, evidence of so aggressive a rejection of facts and logic, that I could scarcely credit my senses" (15).

The War on Cancer was not the product of science but of alarms and doomsday prophecies. "After three years of aggressive lobbying by wealthy political strategist Mary Lasker, plus a Senate-created National Panel of Consultants on the Conquest of Cancer, public drum-beating by columnist Ann Landers, self-serving testimony by medical scientists, and even a procession of cancer victims before Congress, the National Cancer Act was passed in 1971 and signed at a large press conference by Richard Nixon two days before Christmas. Some lobbyists had openly boasted this would bring about a cure for cancer by 1976" (11). Others made the mistake of confusing cancer research with engineering and

“drew the analogy with the moon landing, persuading legislators that the shower of money would work similar miracles for medicine.”

The hastily conceived War on Cancer and the subsequent multi-billion dollar mobilization manufactured a litany of myths and blunders that persist to this day. Cancer is clearly not contagious (16) but the fortunes of more than one cancer diagnostic company are staked on the belief that viruses cause certain human cancers—predominantly in women. However, the prevailing dogma before which cancer researchers must genuflect if they want to stay in the game is that cancer is caused by mutations in normal genes. A quarter-century of effort has failed to demonstrate that mutant genes cause cancer, yet this hypothesis continues to consume billions of taxpayer dollars annually to the exclusion of alternative approaches (17). The voluminous regulations governing substances that are purportedly dangerous to human health are based on “science” that is at best shaky and at worst invalid. Extrapolations from animal data to humans “are mired in untestable hypotheses, logical fallacies, and unresolvable controversies. ...[T]he cancer bureaucracy solves the problem of cancer prediction with a set of arbitrary policies that are actually political decisions, unproven and indeed unprovable by the standards of the scientific method” (15).

To paraphrase Tocqueville (8), “when [science] is slave to a particular fashion of thought or the interests of government and industry, it becomes almost as fragile as all the other powers on earth. Alone, [science] can hope for immortality; bound to ephemeral powers, it follows their fortune and often falls with the passions of the day that sustains them. In uniting with different political powers,



[science] can therefore contract only an onerous alliance. It does not need their assistance to live, and in serving them it can die.”

But, there is hope that things can change. Last year, the board of directors of an Italian organization called Second Renaissance struck a small but courageous blow against institutional science’s control over what research gets funded and published. Second Renaissance announced the establishment in northern Italy of a new research academy committed to restoring democratic science. To accomplish this objective, the academy will attract and support those scientists who have demonstrated professional courage in the face of persecution.

In contrast with institutional science, the scale of the new academy will be of human dimensions. The maximum population will be 50, including the head, scientists and other scholars. Since the evils of institutional science are proportional to the billions of dollars being poured into it, a guiding principle of the new academy will be moderate funding through independent sources. This will free the Academy’s scholars to pursue big questions instead of big interests.

To protect the new academy from becoming rigid, stale, a center of dogma and political power, a gatekeeper that rewards conformity and punishes dissent, the head and board of directors will be appointed for no more than five years.

Likewise, resident scientists and other scholars will be supported for no more than three years at a time. There will be continual reassessment and evaluation of what the academy is, what it should be doing and how it goes about its business.

Towards this end, the new academy will attract journalists, political scientists, artists of all types, and others as appropriate, and support them on equal terms with the scientists. These non-scientific professionals will observe all activities of the institute. They will be free to criticize or praise, to report and analyze. Their primary function is to find out what is going on and freely communicate that to the world through their skills and art. They will be expected to make the resident scholars justify and explain in plain language what they are doing. If the new academy succeeds, it will be one example of how to conduct scientific research that benefits all mankind.

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