# CENSORSHIP

# A WORLD ENCYCLOPEDIA

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## S–Z

*Editor*

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# SCIENCE: Contemporary Censorship

Today the main censors of scientific work are governments, corporations, and elite scientists. During the scientific revolution, the greatest threat to science came from the Church, but those years are long past. Early science was also done mainly by amateurs, alone or in small groups using simple pieces of equipment, and this model of "little science" still prevailed until World War II. Since then, science has been "industrialized": it is characteristically done by teams using expensive apparatus. This requires substantial funding, which comes primarily from governments (including militaries) and large corporations. The groups with the greatest stake in this contemporary system are governments and corporations, naturally enough, as well as elite scientists whose influence depends on satisfying their patrons, maintaining the flow of funds, and protecting their reputations. Anyone who challenges these interest groups is a potential target for censorship or reprisal.

Much scientific research is directly relevant to practical problems, such as studies of terrain mapping for ballistic missiles or genetic engineering for more profitable crops, and it is clear why there might be censorship in these areas. However, so-called "pure science" – knowledge for its own sake rather than for application – is not exempt. Much pure science has a *potential* application; that, often, is why it is funded. Powerful scientists also often develop a commitment to and a career investment in particular ideas, and react strongly against challengers.

The traditional image of censorship suggests that the primary processes are the prevention of publication and the editing of texts by censors. These certainly occur in today's science, but there are other processes at work as well that have a similar effect.

## Stopping the message

One method is "old-fashioned" direct censorship. This is commonplace in much government and corporate research. Military-related research is treated as a matter of national security and covered by laws and regulations to ensure secrecy. The continuing publicity about the leaking of nuclear weapons secrets serves as a warning to scientists who might consider revealing details of their research.

Sometimes the military passion for secrecy spills into wider arenas. Because of the importance of putting communications into unbreakable codes, militaries have classified research into cryptography, the mathematical study of codes. In the United States, the national security establishment has also tried to control publication of civilian research in cryptography, as well as banning the export of encryption software. In 1979 *Progressive* magazine planned to publish an article by Howard Morland on "the secret of the H-bomb". The US government acted to stop publication, but eventually gave up after the article was published elsewhere. Ironically, most of the information was already available in public sources. The government action can be interpreted as an attempt to restrict informed public debate over nuclear strategy. In most other countries, military secrecy is even more stringent, so that censorship is less apparent and there is less open debate about it.

Direct censorship is also prevalent in many government departments, where scientists are expected to obtain approval from superiors before publishing official reports or articles in scientific journals. In some places, this is just another round of peer review and censorship is not involved. Sometimes subtle pressures are involved, for example to tone down references to the impact of forestry on the spreading of tree diseases. In more blatant cases, entire studies are banned and scientists are prevented from attending conferences and giving talks. Another technique, used especially for policy documents, is selective promotion. Documents that are welcome to powerful groups (governments or corporations) are widely publicized, whereas unwelcome documents are released in limited quantities with little or no notification.

Corporations also exercise direct censorship of research extensively, for example by withholding results that might be damaging to profits or the careers of top managers. This is found in numerous industries, including pharmaceuticals, the motor industry, and chemicals. Corporate censorship is justified on the basis of commercial confidentiality or trade secrets even when wider public interests are involved.

A message may be stopped by obtaining a patent on a product or process as a means of preventing its development. For example, General Electric used its control of patents to retard the introduction of fluorescent lights, which were more efficient than the incandescent lights it was selling. Although patents and copyrights, as forms of intellectual property, are supposed to foster the creation of new ideas, they can be used to restrain development. Fortunately, then, scientific ideas such as formulas cannot be copyrighted. If copyright, which is valid until 75 years after an author's death, could have been applied to the theory of evolution or methods for solving equations on a computer, the negative consequences can be imagined.

A further common method of stopping the message is peer review and editorial control. To obtain scientific credibility, a viewpoint needs to be published in the scientific literature, preferably in a prestigious journal. In many fields, there is widespread consensus about what is considered to be correct. This can be called a "paradigm", which is a dominant way of thinking about the world and carrying out research within a field. For example, the current paradigm within both physics and psychology excludes the possibility that mental processes can affect physical events such as quantum decays. As a result, it is extremely difficult for parapsychology researchers to publish their findings in mainstream physics or psychology journals, no matter how rigorous their methods or dramatic their results. The same applies to a wide range of areas that are considered to be "fringe", including alternatives to relativity, non-standard cancer treatments, cold fusion, and homeopathy. The normal operation of peer review does not seem to be a form of censorship, since it is presented as a form of quality control. However, assessments of quality cannot be separated from assessments of what are valid questions and what are valid ways to carry out research. Challenges to the current paradigm are seldom seen as valid. Yet there are plenty of examples of theories, such as continental drift, that were once treated as outlandish and later became accepted wisdom. However, the crucial thing is not whether a viewpoint is ultimately judged to be correct, but rather whether it is given a fair hearing, even if it turns out to be wrong. The influence of standard ideas is powerful throughout science. Peer rejection of fundamental challenges to received ideas is the way science operates, and in this general sense science could not exist as it does today without censorship.

### Stopping the messenger

A scientist who does research or speaks out and is seen as a threat by vested interests may come under various forms of attack. The scientist may be ostracized by colleagues, a potent form of reprisal given the importance of peer opinion to most scientists. Other responses include harassment, formal disapproval from superiors, threats, formal reprimands, denial of grants or other funding, denial of promotion or jobs, punitive transfers, legal actions, dismissal, and blacklisting. Some of these responses are direct and open, such as reprimands and dismissal. Others are subtle. Mild forms of harassment can include not being told when meetings are held, delays in approving equipment, inconvenient lab arrangements, extra administrative duties, heavy teaching loads, and letters demanding excessive details about research.

Under repressive regimes, these sorts of responses are to be expected, but they are also found in nominally freer societies. In the 1940s and 1950s there was a strong anticommunist movement in the US and some other countries, and many left-wing scientists were harassed, dismissed, and hounded. Similar processes are used in other fields. A government or corporate researcher who releases findings or speaks out in any way critical of the organizational view – or who takes any action that challenges the line of command – is a prime target for attack. In the area of forestry, for example, government researchers who question the official position have had research papers censored, been blocked from attending conferences, been denied access to forests, and been denied promotions and jobs. Critics of the standard view about pesticides, nuclear power, fluoridation, cancer treatment, and car safety are also prime targets for attack.

Scientists who try to report scientific fraud by colleagues or bosses can also be put under pressure. Such reports can threaten the scientific hierarchy and throw an unsavoury light on the ethics of all scientists. Two junior researchers who discovered that the Australian medical scientist William McBride had altered data in a published paper voiced their concerns to the director of the research foundation that employed them. Getting no satisfactory response, they resigned. Seven other researchers wrote a letter about the allegations; they were retrenched. In the US, a junior researcher, Margot O'Toole, raised questions about the evidence for results published in the journal *Cell*; one of the coauthors of the *Cell* paper was a Nobel Prize winner, David Baltimore. The scientific establishment rallied around Baltimore, and O'Toole's career was virtually destroyed.

It is important to note that such attacks almost always purport to be justified by normal scientific criteria, such as that the critic's research is not up to scratch. To determine whether a scientist is being suppressed because of his or her views, it is useful to apply the "double standard" test: is the scientist being treated in the same way as others who have the same record of performance but who have not done anything that threatens vested interests?

Some scientists have little choice in their research, since they are funded to undertake certain types of studies; they are very unlikely to pursue topics that threaten the interests of their funders. Those scientists who have an opportunity to choose their research topics can also be inhibited from pursuing studies in controversial areas, since they may fear, realistically, difficulties in obtaining funding, attacks on their credibility, and problems in gaining promotion or a new job. Furthermore, scientists are quite sensitive to the attitudes of peers, including immediate work colleagues and others in the field. Through their long socialization, they become attuned to what is considered acceptable and what is not. Most scientists either accept standard views without question or, if they have reservations, keep quiet about them. If researching certain areas is risky for one's career, most scientists prefer to stay away. The ethos of the scientific community thus leads to a pervasive self-censorship. This can be by choosing to stay out or get out of certain research areas or it can be by downplaying certain results. Scientists who work in organizations where studies are vetted by superiors may unconsciously tone down or reorient their findings in order to reduce the chance of rejection. Self-censorship is the most insidious form of censorship because it is seldom recognized by the person engaging in it and it leaves no trace. Reinforcing the timidity of most scientists are the occasional dramatic cases of dismissal and serious harassment, which serve as an object lesson for others who might consider bucking the system.

For example, after the initial burst of research on cold fusion by Martin Fleishmann and Stanley Pons, the scientific consensus was that cold fusion did not and could not occur. Those who persisted came under attack. Mainstream researchers realized that to continue studying cold fusion was a career dead end – their chances of research funding were small, getting published would be difficult, peers would look down on them, and perhaps access to equipment would be difficult. Only those who had little or nothing to lose – some young researchers, and senior scientists who were not seeking funding, promotion, or honours – were likely to persist.

The process of stopping the messenger thus has two main components. One is the attitudes in the scientific community that lead to self-censorship. The other is attacks on those few who persist in going against the system. The result is that certain areas are seriously under-researched, and the net effect is similar to formal censorship.

### Establishing research priorities

Funding for research comes primarily from governments, corporations, and universities. If vast amounts of money are available for certain areas, then more scientists will decide to work in those areas, and other areas will be neglected by comparison. Heavy funding also influences what are seen as significant problems in the field, so that even those who are formally independent may end up pursuing puzzles that are mainly of interest to the funders.

Military research is a vast enterprise, supporting hundreds of thousands of scientists and engineers and shaping research agendas in computing, meteorology, psychology, aeronautics, and oceanography, among other fields. By comparison, there is almost no funding for developing methods of nonviolent struggle, for example communication systems to support rallies, boycotts, and sit-ins. Formal censorship of research into science and technology for nonviolent struggle is not necessary, since military funding has captured so many researchers and set the agenda for studying what counts as an effective method of "defence".

Similar imbalances are found in other areas. There has been vast funding for research into nuclear power and fossil fuels, and comparatively little for energy efficiency and small-scale renewable energy sources. There has been a vast investment into the automotive mode of transport, including cars, roads, and petrol, and relatively little into bicycles and town planning to reduce transport needs. There has been enormous funding for research into patentable drugs and far less for natural remedies. In each of these areas, mainstream researchers can look forward to grants, jobs, and promotions. Some of those who continue to research against the tide in funding can make a reasonable career, but others encounter difficulties, such as harassment, loss of job opportunities, and problems getting published. Both these processes – funding that establishes research priorities, and attacks on those who undertake research that goes against these priorities – operate in a way that produces a *de facto* censorship.

### Resistance

There are various ways to oppose censorship and suppression in science. One of the most fundamental is to go ahead and speak out – after proper preparation to build support. Hugh DeWitt, a physicist at the Lawrence Livermore National Laboratory, which designs nuclear weapons, has spoken out critically about the US nuclear weapons policy. He has survived in his job only because of his visibility and support outside the lab. In the case of US government controls over encryption algorithms, a highly effective response has been open release of PGP (Pretty Good Privacy), which has been distributed worldwide in the face of export controls.

Another technique is to expose censorship for what it is. This is effective because much censorship, such as denial of publication for certain types of articles, hides behind the guise of "quality control". Well-documented analyses of the double standards involved in rejecting some submissions or not funding certain research can be effective in helping the suppressed view to gain visibility.

Leaking research findings or reports can be effective in sidestepping controls over government or corporate research, especially when there are interested journalists or social activists. Science is often touted as a process of open enquiry or as "public knowledge", so in some cases secrecy can be portrayed as unscientific.

When certain ideas are prevented from publication due to peer review and editorial stands, one strategy is to set up journals specifically designed for unconventional ideas. Two examples are *Speculations in Science and Technology* and *Medical Hypotheses*. However, such journals have to establish their own criteria, thereby ruling out some submissions, and they lack the credibility of mainstream outlets. Another option is to publish in books or on the World Wide Web, thereby avoiding the usual editorial controls.

When attacks are made on individual scientists, it can be very difficult to survive. The best chance for success comes from documenting one's case meticulously and building support, for example through colleagues, professional associations, social movements, or politicians. Formal channels such as grievance procedures or the courts are seldom effective for opposing attacks on scientists, since matters are debated in terms of technicalities. By taking the issue to a wider audience, the issues of free speech and the public interest can be highlighted.

The *de facto* censorship that comes from a gross imbalance in funding is best tackled by social action. For example, campaigning for energy efficiency and renewable energy has some chance of addressing the bias in funding towards nuclear power and fossil fuels. However, this is obviously a major task, suggesting that systematic imbalances in research funding are a more effective and pervasive way of marginalizing certain views than *ad hoc* attempts to censor publications or to suppress scientists.

Because many scientific issues involve a complex interplay between vested interests, experts, and citizen groups, the traditional picture of censorship – in which governments, employers, or other dominant groups prevent publication – is insufficient to capture the full dynamics of the attempts to control information. Censorship of this traditional sort certainly occurs, but is supplemented by other processes including provision and withdrawal of funding, bias in peer review, harassment and intimidation, legal actions, front groups, payoffs, disinformation, and public relations, plus self-censorship as a result of these and other threats and inducements.

BRIAN MARTIN

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# SCIENCE FICTION

Science fiction, at least in its early phase, appears to have attracted little overt censorship. Along with action-adventure, fantastic tales, and mystery stories, science fiction began appearing in the late 1880s, in pulp fiction magazines published in Britain and the United States. Traditions of free expression offered writers and editors a wide range for speculation. Until the middle of the 20th century, science fiction existed mostly in magazine form and had a relatively small audience. Still literary critics, book reviewers, editors of newspapers, and teachers thoroughly established in the public mind a negative view of science fiction as juvenile-level fiction for readers of undeveloped literary taste. The social prejudice exhibited toward it has amounted to a potent form of censorship.

In April 1926 Hugo Gernsback, a naturalized American born in Luxembourg, published the first of the magazines devoted to science fiction, *Amazing Stories*. He distinguished science fiction as a category of literature, drawing upon the works of Jules Verne, H.G. Wells, and Edgar Allan Poe, as well as contemporary writers such as George Allen England, Austin Hall, and Murray Leinster (W.H. Jenkins). He regarded it as a form of thoughtful or instructional entertainment, using fiction to popularize science. Gernsback maintained a fundamental optimism toward science and technology, despite a general revulsion brought on by World War I. *Astounding Stories*, founded in 1930, was the first of the many important magazines that followed *Amazing Stories*. The magazines emphasized scientific plausibility, marvellous inventions, and speculation concerning the social implications of scientific discoveries and the advancement of technology. They reached their high point during the 1950s, publishing fiction that might concern itself with all time, all space, and all possibilities, unlike traditional fiction that concerns human beings dealing with themselves, with others, or with their terrestrial environment. The magazines gave such impetus to science fiction as a category of popular art that it became a highly developed, multi-media field, despite ongoing social prejudice. France, Germany, Russia, and Japan each have their own traditions of science fiction. The dominant influence, however, remains Anglo-American, a fact owing to the preponderance of publishing and perhaps to the status of English as the preferred language of international science. A sketch of censorship in science fiction might therefore direct primary attention to work written in English.

Before the mid-1940s, editors of major magazines emphasized the physical sciences and technology, demonstrating little concern with traditional taboos, notably sex and religion. Although editors published fantastic, occasionally lurid cover art, and stories tinged with sex, they thought that such matters diverted attention from projections based on science, unless a work specifically concerned biology. Editorial policies, for instance, those of Gernsback and John W. Campbell, Jr, an editor of *Astounding Stories* (later titled *Astounding Science-Fiction* and subsequently *Analog Science Fiction*), probably deterred writers from submitting work involving human sexuality. In both Britain and the US editors suppressed works in the interests of traditional morality, ethics, politics, and religion. Some writers avoided philosophically and intellectually exciting subjects such as cosmology and evolution: life might exist elsewhere on different chemical and physical levels and thus raise complex questions. Two British works, *The Cheetah Girl* (1923) by Edward Heron-Allen and *Sirius* (1944) by Olaf Stapledon, which both described relations between human beings and non-human beings, have publication records that indicate editorial censorship. In addition, editors of major American magazines rejected Clifford Simak's story "The Creator" because it implied that God did not create the universe. William L. Crawford later published it privately in *Marvel Tales*, in 1935. Three years later, Orson Welles had to appear before the United States Congress to explain his radio broadcast of H.G. Wells's *The War of the Worlds* which frightened millions of people.

Governmental censorship during World War II, at least in the United States, seems to have been limited to a few works. For example, Cleve Cartmill's story "Deadline", published in 1944 in *Astounding Science-Fiction*, led to an investigation by the United States government because it described the atomic bomb a year before it was used. Also, the United States government delayed publication of Philip Wylie's story "The Paradise Crater", written before 1945, because it too anticipated the atomic bomb. For the same reason, the government inquired into Murray Leinster's story "Four Little Ships". The Australian government, according to some science fiction editors and readers, banned American science fiction magazines during World War II and into the early 1950s.

Beginning in the mid-1940s, writers and editors began to challenge earlier views of science fiction. They developed ideas based not only on the physical sciences, but also on the social sciences, stressing cultural and moral immediacy or frankness. Several British and American writers, including Isaac Asimov, Arthur C. Clarke, Robert Heinlein, Frederik Pohl, Brian Aldiss, and Lester Del Rey, responded to the ever-increasing pace of technological advancement and to subsequent or possible changes in standards of value and patterns of thought or behaviour. In 1967 the American Harlan Ellison called attention to the shift of emphasis in science fiction. He commissioned *Dangerous Visions*, a collection of new science fiction stories by various American and British authors. He sought to break