Part II
Scientific Communications and the First Amendment

Reconciling the maintenance of constitutional liberties with the requirements of national security poses an arduous challenge to democracy. Granted that a balance must be struck, where should the line be drawn? That is the puzzle for all who would presume to lead a free people. It implicates perhaps our most cherished contribution to social intercourse: Separation of Powers . . . . It is the undisputed responsibility of Congress and the Courts to maintain and regulate the right balance between measures necessary for the invulnerability of national security and the preservation of free expression.

–Martin L.C. Feldman, U.S. District Judge for the Eastern Division of Louisiana, Jan. 14, 1987

Chapter 4

National Security and Scientific Communications

SCIENCE, FREE SPEECH, AND NATIONAL SECURITY

Science and technology were recognized by the Founding Fathers as indispensable to the "common Defense and general Welfare."

The U.S. Constitution empowers Congress to regulate commerce, to fix the standard of weights and measures, to establish post offices and post roads, and to secure for authors and inventors the exclusive right to their respective writings and discoveries in order to "promote the Progress of Science and useful Arts."[1]

There *is* nothing else in the Constitution directly related to science and technology. It was assumed that the States would have primary responsibility for the useful arts such as agriculture, manufacturing, construction, and medicine. But the few provisions in Article I are significant, because they clearly indicate that science and technology were recognized by the Founding Fathers as indispensable to the "common Defense and general Welfare" and an appropriate subject of attention and support for Congress.

The men who wrote the Constitution were well educated in the science of their day and enthusiastic about advances in technology. James Madison avidly studied and wrote about natural history and agriculture science. Benjamin Franklin was one of the world's leading scientists. Hamilton studied medicine, chemistry, and mathematics.

[1]Article 1, Sec. 8 also provides authority for Congress to "make all Laws which shall be necessary and proper for carrying into Execution' these and other powers derived from the Constitution.

Scientific activity or communications have not in practice enjoyed the special status given political comment.

They understood well the importance of scientific freedom, as is shown by their writings. But even with the addition of the first Ten Amendments to the Constitution, in 1791, *sci*entific freedom was not singled out for special protection; it was presumed to be included with other areas-politics, religion, philosophy, economics--in the broad protections given to speech, publication, assembly or association, exercise of religion, petition and protest, all included within the First Amendment.[2]

None of these First Amendment protections is absolute under prevailing constitutional doctrine. There are times and conditions when the interests of the Nation as a whole override the right of the individual to say and do as he or she wishes. Both Congress and the Supreme Court have treated political speech as that speech most strongly protected by the First Amendment. Commercial speech-that is, advertising—is least protected; and may be regulated as to time, place, and manner.[3]

Scientific activity or communications have not in practice enjoyed the special status given political comment, although some constitu-

[2]Steven Goldberg, "The Constitutional Status of American Science, " University *of Illinois Law Forum, vol.* 1979, No. 1, 1979. pp. 1-6ff.

[3]Before *Virginia State Board of Pharmacy v. Virginia Citizens Consumer Council, Inc.*, in 1976, the Supreme Court did not treat commercial speech as protected speech; it was fully subject to State police power. The extent of, or limits on, protection for commercial speech are somewhat uncertain at this time.

Is there a potential constitutional conflict between the rights of free speech and press guaranteed by the First Amendment, and government restrictions on the communication of scientific information in the interest of national security?

tional scholars argue that this was the clear intent of the First Amendment separation of church and state.[4] It is not, indeed, clearly established that there is "a right to do research, " nor have the limits of governmental authority to restrict speech and press (publication) in the area of science and technology been clearly defined, by either Congress or the Courts.

Representative George Brown, in 1982, warned Congress:

> Recent administration actions . . . sharpen the conflict between constitutional protections and the requirements of national security. . . , The issues at stake stem from the conflicting demands of the most fundamental matters in national policy: the security of the Nation and its economic well-being, versus the rights of citizens to privacy, assembly, free speech, travel, and freedom from unwarranted Government interventions.[5]

Is there a potential constitutional conflict between the rights of free speech and press guaranteed by the First Amendment, and government restrictions on the communication of scientific information in the interest of national security? Is the balance between these two interests—both of critical importance to American constitutional government—being maintained, or is it endangered?

A fundamental tenet of scientific methodology is that basic scientific research results or new scientific theories should be published,

[4]Goldberg, op. cit., says that the Founding Fathers, as "men of the Enlightenment, " saw established churches as having been the enemy of free scientific investigation.

[5]*Congressional Record,* vol. 128, No. 16, Feb. 25, 1982, p. H511.

One issue addressed in this report is the extent to which national security and foreign trade interests have converged and perhaps in some respects may even have been confused.

widely disseminated, and thoroughly argued, and the results replicated. In part this is in order to share knowledge with other scientists for the ultimate benefit of people in general. More immediately, it provides a test and means of validation.

> Science gets at the truth by a continuous process of self-examination which remedies omissions and corrects errors. The process requires free disclosure of results, general dissemination of findings, interpretations, conclusions, and widespread verification and criticism of results and conclusions.[6]

The First Amendment

The Supreme Court has recognized in numerous cases that Congress (or State legislatures) may make laws that limit freedom of speech or press. Government must, however, sustain a substantial burden of proof to justify an interference with speech or press. As a general rule, expression may not be restricted because of its content, although some categories of expression are given less protection than others.[7] Government restrictions on free speech may however be valid under a "balancing of interests test when those restrictions are incidental to legitimate government purposes not directly related to speech or press.[8]

The protection of freedom of speech and freedom of press is therefore not absolute. Many

[6]Harold C. Relyea (ed.), "Shrouding the Endless Frontier—Scientific Communication and National Security: The Search for Balance, *Striking a Balance: National security and Scientific Freedom* (Washington, DC: American Association for the Advancement of Science, 1985), p. 76.

[7]*Police Department of Chicago v. Mosely*, 408 U.S. 92 (1972) "Fighting Words" and obscenity are generally not protected.

[8]*Adderly v. Florida, 385* U.S. 39 (1966); *Brown v. Louisiana, 383* U.S. 131 (1966); *Kovacks v. Cooper, 336* U.S. 77 (1949); *Breard v. Alexandria, 341* U.S. *622 (1951); O'Brien v. United States, 391367 (1968).*

restrictions are placed on scientific communication in the interests of national security. National security may be defined as the military, defense, and foreign relations objectives of this Nation. This definition has implicitly been broadened over time to include protection of economic and trade objectives. One issue addressed in this report is the extent to which national security and foreign trade interests have converged and perhaps in some respects may even have been confused.

Where government action involves a "prior restraint, that is, a prohibition prior to rather than a punishment after the communication, the constitutional test is much more severe. There is a "heavy presumption' against the constitutional validity of any prior restraint.[9] The seminal Supreme Court decision is *Near v. Minnesota* where it was held that with certain limited exceptions prior restraints were constitutionally impermissible.'"

Threats to national security can make it necessary to limit free speech. The court ruled in *Schenck v. United States,* " that impingement on freedom of speech in certain circumstances "appears to be a reasonable exercise of sovereign power . . . in the interest of the common defense and security. "

In recent years not only has scientific exchange or publication been limited in the interest of national security, but it arguably has also been limited in the interest of national trade balances. Thus the question: As we enter the third century of constitutional government, have these restrictions taken together burdened the exercise of free speech and press to a degree that may violate the First Amendment, and by so doing threatened the future advancement of science and technology?

[9]*Bantam Books v. Sullivan, 372* U.S. 58, 70 *(1973); Vance v. Universal Amusement Co.,* 445 U.S. *308, 317* (1980); *Organization for a Better Austin v. Keefe, 402* U.S. 415, 419 (1971).

[10]293 U.S. 697 (1931). Exceptions for example include obstruction of military recruiting, publication of the sailing dates of military transports or of the number and location of troops; publication of obscene matter, and incitements to violent or forcible overthrow of the government.

[11]249 U.S. 47 (191 9).

The real question is whether taken together, ***the effects of these restrictions place a limitation on scientific freedom so as to contravene the intent of the First Amendment.***

What Activities Are Restricted and How?

Scientific information includes not only publishing in professional journals or the public media, but also:

- presentation of papers or giving of lectures in professional meetings or other fora,
- distribution of unpublished papers or reports,
- participation in workshops or working sessions,
- discussions among colleagues, and
- classroom or laboratory instruction.

These activities have been restricted in the interest of national security:

- Ž under Executive Orders;
- Ž by or under legislation, including:
  - –the Atomic Energy Act,
  - –the Invention Secrecy Act, and
  - –Export Administration and Arms Export Control Acts;
- Ž by contractual agreement between researchers and government agencies; or
- Ž by self-restraint agreements of researchers and professional societies.

Each of these means is to be considered in the context of judicial precedents as to their constitutional standing. However, as already noted, the real question is whether *taken together, the effects of these restrictions place a limitation on scientific freedom so as to contravene the intent of the First Amendment and its declaration of the rights of free speech and press.*

The Background of the Issue

At least since World War II, it has been generally accepted that national security requires

After the war, the growing centrality of science-based technology both for industry and for national defense was clear.

that secrecy be imposed on some research. Government has been able without serious challenge to restrict dissemination or results of research conducted by Federal employees, even in peacetime. Beginning in 1940, a series of Executive Orders established criteria and classifications for assuring the secrecy of government documents. The first War Powers Act, immediately after Pearl Harbor, also gave the President the power to censor all communications with foreign countries.[12] Later this power to censor direct communications across national borders was expanded to encompass publication of information that would prejudice our military/defensive interests or aid an enemy.

There has been only slightly more questioning of restrictions on the dissemination of research paid for by the Federal Government but done in universities and other nongovernment institutions. Scientists have also voluntarily withheld scientific information in the interest of national security. Even before the United States entered the Second World War, a special coremittee of the National Research Council, working cooperatively with editors of professional journals, reviewed papers for possible defense-related information that should not be published. This self-restraint, it should be emphasized, applied to information with a clear tie to offensive or defensive weapons.

The Federal Government exercised tight security over scientific research during the war, most notably over the Manhattan Project and other activities related to development of atomic weapons. After the war, the growing centrality of science-based technology both for industry and for national defense was clear. As political tension grew between the Western allies and the Soviet bloc countries, there were early signs that traditional assumptions about science and the First Amendment would be challenged. In 1948, scientist and statesman Vannevar Bush noted that:

> . . . the critical point [where fundamental science gives rise to applications] may well be reached far earlier in the process than we are accustomed to think, and. . . we must be alert to it and ready at once to erect the defenses of protection and security which it demands. [13]

Even during the 1940s other leading scientists complained about excessive secrecy. They argued that restricting access to scientific knowledge might do more harm than good for America's continued leadership in science and technology. Determined collection of information by hostile nations can seldom be effectively blocked, they said, but internal flows of ideas and research results may be unintentionally obstructed.

By the mid-1970s, there was strong concern over international competitiveness in both world markets and domestic markets. The United States was no longer the unquestioned leader in all areas of advanced science and technology, as it had been in the 1950s and 1960s. Increasingly, scientific leadership translates directly into military advantage. Thus trade and technology policy clearly overlaps national security policy. Congressman Don Bonker, chairman of both the House Foreign Affairs Subcommittee on International Economic Policy and Trade and the House Export Task Force in 1986, says flatly:

> Our defense strategy rests on qualitative technical superiority over the Warsaw Pact countries, and we must insure that the Western alliance maintains this technological edge. [14]

[12] U.S. Congress, Office of Technology Assessment, *The Regulatory Environment for Science—A Technical Memorandum, OTA-TM-SET-34* (Washington, DC: U.S. Government Printing Office, February 1986).

[13] U. S Congress, House Committee on Government tions, "Availability of Information From Federal Departments and Agencies, Part 8," *Hearings,* 85th Cong., 1st sess., Washington, DC, pp. 2159-2160.

[14] Don Bonker, "Protecting Economic Interests, " *Issues in Science and Technology,* fall 1986, p. 97,

The boundary between traditional categories of "basic" and "applied" research has blurred, making it harder to restrict only the latter.

The tension between scientific free speech and national security protections has become increasingly troublesome in this decade. One reason is that there has been a significant expansion in the meaning of national security. The term no longer applies merely to direct military threat. It also means the long-term risks of change in the military, economic, and political balance of power between nations. To this balance, relative scientific and technological capabilities are deemed critical.

Many or even most areas of advanced industrial technology have potential military applications. Most nations potentially hostile to the United States and its allies make no real distinctions between government, military, and scientific institutions. Any data exchanged between U.S. scientists and scientists of those nations has also been communicated to and between government institutions of those countries.

The scope of national security restrictions has been significantly broadened in the past decade. These restrictions apply to a growing proportion of scientific activity. The high cost of research at the leading edge of science and technology has led to more of it coming from government funding. A growing proportion of that funding comes from the Department of Defense (DoD).[15] The boundary between traditional categories of "basic" and "applied'" research has blurred, making it harder to restrict only the latter. There is interdependency between government research and that done in universities and independent laboratories even without government funding.

DoD statements about national security restrictions on scientific communications are sometimes misunderstood by the unwary because of the tendency of many DoD officials to make a sharp, but sometimes unspoken, distinction between "scientific information" and "technical data, " to associate the former only with "fundamental research, " which by DoD definition is unrestricted, and to associate the latter with applied research and development, or with technology. Thus "scientific information' is by a truism, unrestricted. With regard to most areas of advanced scientific research, and particularly those that have to do with computers and communications technologies, it is increasingly difficult to understand, to defend, or to make such a distinction between scientific information and technical data.

[15]The Federal Government supported about 48 Percent of all R&D in the United States in 1986 (industry support accounts for another 48 percent). The average annual rate of growth in constant dollars is 5.9 percent for all R&D spending, 5.8 percent for industry, and 7.3 percent for the Federal Government. DoD's R&D obligations increased by 13 percent annually from 1982 to 1986, and by 20.9 percent for 1986 to 1987. Government provided 63 percent of funding for academic research in 1986. Defense R&D in 1986 probably accounted for 73 percent of all Federal R&D support. National Science Foundation, *Science and Technology Data Book*, NSA 86-311 (Washington, DC: National Science Foundation, 1986).

THE EXECUTIVE BRANCH AND CLASSIFICATION OF DOCUMENTS

The classification of information, in categories ranging from "confidential" up through increasingly stringent classes of 'secret" and "top secret, "16 is done under a series of Presidential Executive Orders. It is intended to apply to information that would create or increase

[16]Within the Secret and Top Secret categories there are many "compartments' or "special access programs" or subcategories to further restrict access to information to those with a need to know, defined with appropriately varying degrees of rigor. These special access programs may be set up by designated agency heads (primarily DoD, the intelligence agencies, and the Department of Energy [DOE]) to provide greater protection for certain kinds of information or to conceal the means and channels through which information is acquired, or for similar reasons. See Sec. 4.2 of Executive Order 12356, Apr. 2, 1982. Access to restricted information defined by the Atomic Energy Act, as described later, is governed by DOE Q Clearance and is also compartmentalized.

a military risk to the United States or prejudice its foreign policy objectives. The President, as Commander-in-Chief, is considered to have full authority to classify information generated by the government.

In 1970, a Defense Science Board task force concluded that too many documents were classified.[17] It recommended revision of the security classification process to declassify as much as 90 percent of classified information. As a general rule, the task force said, basic research should never be classified. Even "confidential" or special access limitations were inappropriate for basic research and likely to seriously impede technical programs. Security is most essential for information at the applied end of the spectrum, that is, close to design and production. Throughout the 1960s and most of the 1970s, the trend was toward classifying less material.[18]

Executive Order 12356 and the Corson Panel

Executive Order 12356,[19] issued in April 1982, reversed a 30-year trend toward narrowing the scope of classification and the discretion of bureaucrats in assigning secrecy classifications.[20] It eliminated an explicit provision, which appeared in earlier classification orders, forbidding classification of information in which the government has not acquired a property interest. It lowered a standard, adopted in 1978, that required an identifiable harm to national security from disclosure. It added two new categories, for cryptology and for information bearing on systems vulnerability .[21] The order instructed classifiers, when in doubt, to err on the side of classification,[22] whereas the

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policy of several preceding Administration had been to lean toward not classifying or toward a lower classification. For these reasons, and because the order had been developed in a particularly closed and secretive manner, it was widely criticized in Congress. [23]

The number of decisions made in one year to classify documents probably hit an all-time peak in 1982 of over 1 million. By comparison, there were approximately 900,000 new classifications in 1985.[24] In the Department of Defense, 2,300 officials now have the authority to make classification decisions.[25] The total volume of classified documents is huge and growing rapidly.

Most of these are not from university-generated information. A DoD study in 1984 sur-

[17] U.S. Department of Defense, *Report of the Defense Board Task Force on Secrecy* (Washington, DC: July 1970).

[18] Harold C. Relyea, *National Security Controls and Scientific Information*, Congressional Research Service Issue Brief B82083, updated June 17, 1986, p. 6.

[19] 47 Fed. Reg. 14874-14884 (Apr. 6, 1982).

[20] Harold C. Relyea, *National Security Controls and Scientific Information*, Congressional Research Service Issue Brief B82083, updated June 17, 1986, p. 6.

[21] These categories were listed explicitly in Executive Order 12356; some national security experts had argued for some time that such information was implicitly subject to classification.

[22] Sec 1.1(c) says: If there is reasonable doubt about the need to classify information it shall be safeguarded as if it were classified pending a determination by an original classification authority, who shall make this determination within thirty (30) days. If there is reasonable doubt about the appropriate level of classification, it shall be safeguarded at the higher level of classification pending a determination by an original classification authority, who shall make this determination within thirty (30) days.

[23] U.S. Congress, House of Representatives, Committee on Government Operations, *Executive Order on Security Classification, Hearings*, 97th Cong., 2d sess., Mar. 10 and May 5, 1982. Also House Report 97-731. Representative Glenn English, Chairman of a House Subcommittee on Government Information and Individual Rights, said, "The basic message to bureaucrats would be: When in doubt, classify." Morton Halperin, director of the Center for National Security Studies, said that the order would eliminate key provisions intended to prevent national security concerns from encroaching on scientific research.

"According to Steven Garfinkel, the chief of the U.S. Information Security Oversight Office, in a talk at the annual meeting of the American Association for the Advancement of Science, Feb. 18, 1987, as reported in *The Institute*, a publication of the Institute of Electrical and Electronic Engineers, Inc., vol. 11, No. 4, April 1987, p. 1.

[25] The count was made by the Security Review Commission, a group created by the Secretary of Defense in 1985 and headed by General Richard G. Stilwell; according to information provided to OTA by the Office of the Secretary of Defense, May 7, 1987, citing S.F.311. For further discussion see "Espionage and Security Leaks: Diagnosis and Therapy, by Harold P. Green, of the National Law Center and the Graduate Institute for Policy Education and Research, The George Washington University, 1986.

veyed over 123,000 DoD research reports. Only 19 percent came from university researchers; 3.5 percent of these fell under distribution limitations, and only 1.3 percent were classified.[26] Many universities will not do classified research, which explains the low volume. Some, however, do permit classified research if approved by the school's administration. An unknown number of papers are probably "sanitized" before publication, and many researchers argue that the possibility of classification has a strong "chilling effect" on scientific communications in general.

A special panel of the National Academy's Committee on Science, Engineering, and Public Policy was formed in 1982, before Executive Order 12356, at the request of DoD and intelligence agencies. The panel, chaired by Dale R. Corson, president emeritus of Cornell University, conceded that there had been much "involuntary technology transfer" from the United States to potentially hostile countries. But the panel also said that relatively little of the deleterious leakage came from universities or from open scientific literature.

The panel recommended that there be no restrictions limiting access to any area of university-performed basic or applied research, unless:

- the area is developing rapidly, and the time from basic science to application is short;
- the information has identifiable, direct military applications or is dual-use, involving process and production techniques;
- the information would give the U.S.S.R. a significant near-term military benefit; and
- the United States, or other friendly nations with secure control systems, is the only source of the information.

[26]Mitchel B. Wallerstein and Lawrence E. McCray, "Scientific Communication and National Security: Issues in 1984, " *NAS News Report* (Washington, DC: National Academy of Sciences, April 1984). The study did not say what proportion of university research is restricted.

The power of government to protect State and military secrets has always been regarded as inherent and fundamental.

Information that meets all of these criteria should be classified. But since most universities will not do classified research, the Panel recommended as an alternative, written agreements between the university and the government that (a) prohibit participation by nationals of some foreign countries in such research, and (b) require pm-publication review of articles by the Federal agency.

DoD concluded that the Corson panel criteria were 'too difficult to translate into operational considerations' and decided simply to "retain its black/white policy towards university research-i. e., if not classified, then no restriction. '[27]

The present Administration continues to emphasize classification of government documents. It has, in addition, made increasingly explicit and forceful use of other means of restricting scientific communication.

The Authority for Presidential Classification of Documents

The power of government to protect State and military secrets has always been regarded as inherent and fundamental. Although military and State secrets have been protected in the United States at least from the time of Washington's Presidency, there is little clear statutory authority, aside from the atomic energy area, for classification of information." The closest approach to a statutory basis is probably Section 161 of Revised Stat-

[27]The quotations are from a review of an OTA draft of this report by officials in the Office of the Secretary of Defense, May 1987.

[28]*Constitutional Implications of Federal Restrictions on Scientific Research and Communication*, March 1987, by Harold P. Green, The George Washington University National Law Center, Washington, DC.

utes,[29] dating back to the early days of the Republic. As originally written, it authorizes the head of each government department:

> to prescribe regulations . . . for the distribution and performance of its business, and the custody, uses, and preservation of the records, papers, and property appertaining to it.

The basic authority for classification of information has been the President via a series of Executive Orders—not grounded on explicit statutory authority but on the authority vested in the President by the Constitution and laws of the United States. The first of these Executive Orders was No. 10290, promulgated by President Truman in 1951, which limited "classified information' to "official information,"[30] assumed to be information in which the government has some kind of proprietary interest. In President Eisenhower's Executive Order 10501,[31] use of the word "official" again connoted that classification was limited to information that in some way belonged to the government. President Carter's revision, in Executive Order 12065,[32] made this explicit by specifying that a product of nongovernment research and development accomplished without access to classified information was not subject to classification 'until and unless the government acquires a proprietary interest. . . "

President Reagan's Executive Order 12356,[33] however, includes no such limitation, but brings within its ambit any information that "is owned by, produced by, produced for, *or is under the control of* the United States Government" (emphasis added). This provides some "color of authority" for classification of information that is privately developed without any involvement or funding by the government.[34]

The Atomic Energy Act of 1946 added a new concept to traditional classification procedures—the idea that some information was "born classified."

Troubling First Amendment issues are presented if government attempts to restrict the freedom of scientists to do independent, private research or to communicate information that is privately generated. Except in the area of atomic energy, however, the government has not generally attempted to extend classification to scientific endeavors conducted without government involvement, although recent actions to be described below have introduced some uncertainty about this policy.

The Congress and Legislated Secrecy

The Atomic Energy Act

The Atomic Energy Act of 1946, modified in 1954,[35] added a new concept to traditional classification procedures —the idea that some information was "born classified. " The 1946 Act included provisions, frankly headed "Control of Information,"[36] which established a category of information called "Restricted Data, " defined to mean" . . . all data concerning (1) design, manufacture, or utilization of atomic weapons; (2) the production of special nuclear material; or (3) the use of special nuclear material in the production of energy . . . ;" except when such data has been expressly declassified. Misuse of Restricted Data was subject to heavy criminal penalties that paralleled the more universal provisions of the Espionage Act.[37]

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subsequently incorporated into 5 U.S.C. 22; and since 1966 found at Sec. 301 of Title 5.

[30] 16 Fed. Reg. 9795, et seq. (Sept. 27, 1951).

[31] 18 Fed. Reg. 7049, et seq. (Nov. 10, 1953).

[32] 47 Fed. Reg. 14874, et seq. (Apr. 6, 1982).

[33] 47 Fed. Reg. 14874, Sec. 6.1(b)

[34] These Executive Orders all provide that authority under the Atomic Energy Act pertaining to Security regulation of private information (discussed below) is not affected by Executive Orders.

[35] The 1954 Act, 68 Stat. 919; 42 U.S.C. 2011-2296, relaxed the provisions of the 1946 Act in some regards to allow private sector development of atomic energy.

[36] 42 U.S.C. 2004(y). The Atomic Energy Commission (AEC) was given explicit authority to promulgate regulations and issue orders for the protection of Restricted Data. The Act required, or at least was interpreted as requiring, that no person could be given access to Restricted Data without a prescribed investigation into his/her character, associations, and loyalty on the basis of which Security clearance was to be granted.

[37] 42 U.S.C. 2275-2277. Unlike the situation with respect to ordinary classified information, there is an explicit nexus between Restricted Data and those special espionage-type provisions.

A provision of the Act authorized the issuance of court injunctions to restrain any threatened violation of any provisions of the Act or its implementing rules or regulations. Since the injunction provision was applicable to the information control provisions, it can be read as encompassing prior restraints on the communication of Restricted Data.

These provisions are unique in a number of respects. No other Federal statute has ever purported to control information in this way. The definition of Restricted Data is extremely broad and could embrace a great deal of information contained in conventional textbooks on physics and chemistry. Normally, classification of information requires an affirmative determination that it needs security protection, but Restricted Data is "born classified"[38] if it falls within the statutory definition. While ordinary classified information (at least until issuance of President Reagan's Executive Order) has always been limited to "official" information, the definition of Restricted Data includes "all' data, thereby raising the question of whether it includes data generated wholly in the private sector without any government support or involvement.[39]

The answer to this question is not entirely clear. Legal arguments can be constructed for both positions. Under the Atomic Energy Act of 1954, Congress accepted at least implicitly the proposition that Restricted Data included some data generated wholly outside the government, since one provision of the Act explicitly treats information developed in other countries as Restricted Data.[40]

Moreover, the authors of the 1946 Act seem to have intended that the information controls extend to privately developed information; Senate staff members who played a major role in drafting the 1946 Act[41] later wrote:

> It does not matter whether these (Restricted) data are discovered or compiled in a government laboratory or in connection with the private research of an individual scientist.

On July 21, 1947, the Attorney General wrote the Chairman of the Atomic Energy Commission (AEC) stating that there was "considerable indication" that Congress meant the information control provision of the Act to apply to nongovernment information, but recommending a' 'simple amendment "of the Act to remove any doubt. [42]

Nevertheless, there *is* no statutory provision that *explicitly* authorizes restrictions on privately developed information. Some experts hold that merely inferring such authority from statutory provisions would not pass constitutional muster.[43]

The AEC and its successors, the Energy Research and Development Administration (ERDA) and later the Department of Energy (DOE), have proceeded on the assumption that privately developed information is subject to the full array of controls.[44] The information control provisions have been invoked for regulatory purposes—such as retarding activities in the United States that could lead to proliferation of nuclear weapons in other countries .[45]

[38] Richard Hewlett, " 'Born Classified' in the AEC: A Historian's View, and Harold Green, "A Legal Perspective, *Bulletin of Atomic Scientists*, December 1981, pp. 20-27 and 28-30,

[39] One provision, 42 U.S.C. 2201(i), authorizes regulations "to protect Restricted Data received by any person in connection with any activity authorized pursuant to this Act." This is probably not sufficiently broad to reach privately generated information. Another provision, 42 U.S.C. 2201(p) authorizes regulations "necessary to carry out the purposes of this Act." It is this latter authority that the AEC relied on for the proposed Part 26, to be discussed.

[40] 42 U.S.C. 2162(e).

[41] J. Newman and B. Miller, *The Control of Atomic Energy*, (New York: Whittlesey House, 1948), p. 15 ff. Newman and Miller were on the staff of the Senate Special Committee on Atomic Energy when the Act was drafted. Newman and Miller wrote, "... if the Act does not restrict the liberty of scientific thought, it without question, abridges freedom of scientific communication. The controls on information were deliberately designed to regulate the interchange of scientific ideas . . ." (p. 208).

[42] According to professor Harold P. Green, of the George Washington University National Law Center; documentation is available in Department of Energy Archives.

[43] *Greene v. McElroy*, 360 U.S. 474, at 506-608 (19591.

[44] Draft memorandum, "Authority To Control Dissemination of Privately-Developed Restricted Data," Feb. 28, 1966, from Franklin N, Parks, AEC Assistant General Counsel, to Joseph F. Hennessey, AEC General Counsel, available in DOE Archives.

[45] Richard Hewlett, " 'Born Classified' in the AEC: A Historian's View," *Bulletin of Atomic Scientists*, December 1981, p. 22.

The AEC on several occasions declared wholly private scientific information to be Restricted Data.

In congressional hearings in 1955,[46] the AEC General Counsel asserted that a scientist working in his own laboratory, with no government connection, could be compelled to submit to AEC security requirements, including classification and personal clearance, if he was creating data that would be regarded as Restricted Data if created in an AEC facility.

The AEC on several occasions declared wholly private scientific information to be Restricted Data.[47] In these cases the applicability of atomic energy information control provisions has affected primarily profit-seeking business organizations rather than universities. Although in each case the affected company sustained real economic injury, there has been only one judicial challenge. The corporations apparently concluded that private business interests would not prevail in court over government's national security claim.

In the only case in which a court has considered the constitutional issue,[48] the Court of Claims rejected a contention that the classification of an industry process was a "taking of property" entitling the corporation to just compensation under the Fifth Amendment.

[46] *Hearings on S. J. Res. 21 to Establish a Commission on Government Security,* Subcommittee on Reorganization, Senate Committee on Government Operations, 84th Cong., 1st sess. (1955), pp. 240-241, 267-271.

[47] Richard Hewlett, " 'Born Classified' in the AEC: A Historian's View," and Harold Green, "A Legal Perspective," *Bulletin of Atomic Scientists,* December 1981, pp. 22,27 and 29. One example involved a corporation attempting to use gas centrifuge technology for separating uranium isotopes. The most explicit assertion by the AEC of the right to control private information came in 1967, when the AEC proposed a new regulation, Part 26, dealing with "Private Restricted Data, " whereby in effect private research and development in the fields of nuclear explosives and gas centrifuge technology for producing nuclear fuel, was totally prohibited. Eventually, this AEC proposal was withdrawn. Proposed 10 CFR Part 26, App. A, 32 Fed. Reg. 6707.

[48] *Radioptics, Inc. v. United States,* 621 F. 2d 1113!223 Ct. Cl. 594 (1980).

Where government action involves a "prior restraint" on communication, the constitutional test is most severe.

The Court said that classification did not absolutely prohibit the plaintiff use of the concept but only regulated its use, and was thus not a taking. Further, when the purpose of a regulation is to prevent injury to the public, compensation is generally not constitutionally required.

The Federal Government bases the restriction of privately generated information on the *Schenck v. United States*[49] finding that impingement on freedom of speech "would appear to be a reasonable exercise of sovereign power . . . in the interest of the common defense and security."[50] The provisions of the Atomic Energy Act taken together seem to authorize a Federal court to issue an injunction restraining a defendant's communication or publication of even privately developed information, which would be prior restraint.[51] Is this authority constitutional?

As already noted, where government action involves a "prior restraint" on communication, the constitutional test is most severe. The government sought an injunction to restrain publication of the Pentagon Papers by *The New York Times* and *The Washington Post.* In *The New York Times Co. v. United States,"* the Supreme Court held in a 6-3 decision that this burden was not met.

In 1950, the AEC ordered *Scientific American* not to publish, without specified deletions,

[49] *249* U.S. 47 (1919).

[50] According to Richard Hewlett, " 'Born Classified' in the AEC: A Historian's View, " *Bulletin of Atomic Scientists,* December 1981, pp. 23-25. Hewlett notes that this reasoning was plied to AEC's proposed "Part 26" (see footnote above) in 1966. The Atomic Energy Committee of the Bar of the City of New York sent the AEC a detailed brief challenging the constitutionality of the proposed rule.

[51] Such an injunction was in fact issued in the *Progressive* case, to be discussed. 467 F. Supp. 990 (W.D. Wise. 1979).

[52] 403 Us. 713 (1971).

an article on thermonuclear weapons. The article, which had already gone to press, was by Dr. Hans Bethe, an eminent theoretical physicist long involved in the nuclear weapons program. The publisher protested that all of the technical information in the article "was well known to physicists . . . and had been widely published. " The AEC insisted that Bethe's authorship confirmed the authenticity y of previously published information. *Scientific American* capitulated under the AEC's threat to seek an injunction, and AEC security officers supervised the destruction of the type and plates and the burning of 3,000 copies of that issue.[53]

Until 1979, 33 years after the enactment of these information control provisions, there was no litigation challenging the constitutional validity of prior restraint on publication of Restricted Data. *United States v. The Progressive (1979)*[54] made a weak case for the challenge. *The Progressive* proposed to publish an article[55] in which a journalist purported to describe how hydrogen bombs are made and work. The intent was to alert the public to the "false illusion of secrecy" created by the government and the necessity for decisive action to halt the proliferation of nuclear weapons. The information was derived entirely from the public domain. The government held that:

> When drawn together, synthesized and collated, such information acquires the character of presenting immediate, direct, and irreparable harm to the interests of the United States.

The court found "no plausible reason why the public needs to know the technical details about hydrogen bomb construction to carry on an informed debate' on the issue of proliferation. With respect to prior restraint, the court returned to Near v. *Minnesota,* in which the Supreme Court had spelled out certain situations in which restraints on expression might be constitutionally permissible; and said that publication of technical information on the hydrogen bomb was "analogous to publication of troop movements or locations in time of war, " thereby falling within the "extremely narrow exception to the rule against prior restraint. '[56]

The decision was never subjected to review by higher courts, since it was mooted by publication of essentially the same information in another journal. According to Congressman George Brown:[57]

> . . . [because] the Supreme Court had ruled in the Pentagon Papers case that prior restraint was not tenable, it is not clear what would have happened to the *The Progressive* case if it had been reviewed by the Supreme Court.

Professor Harold Green of the National Law Center says:

> [T]he case stands as vivid testimony to the potential impact on scientific freedom of the information control provisions of the Atomic Energy Act.

The Invention Secrecy Act

The Invention Secrecy Act passed in 1951[58] allows the Federal Government (through the Commissioner of Patents) to block the granting of a patent or the disclosure of technological information by an inventor, when this disclosure "would be detrimental to national security, " even where the government has no property interest or right in the invention.[59] In the 1970s the National Security Agency (NSA), for example, frequently asked for "secrecy orders" for cryptographic inventions, but this decreased sharply in the late 1970s

[53] *Scientific American*, May 1950, p. 26.
[54] 467 F. Supp. 990 (W.D. Wise. 1979).
[55] The article, not published, was Howard Morland, "The H-Bomb Secret: How We Got It, Why We're Telling It. "
[56] *United States* v. *The Progressive, Inc.*, 467 F. Supp. 990 (W.D. Wise. 1979), 996.
[57] *Congressional* Record, vol. 128, No. 16, Feb. 25, 1982, H511.
[58] "Invention Secrecy Act of 1952 (35 U.S.C. 181-188).
[59] There are two categories of inventions subject to this act. In the first, government has a property interest, and the invention is therefore already subject to classification; in the second, government does not have a property interest. Patent officials estimate that roughly 4,800 inventions are the subject of invention secrecy orders at any one time; that about 1,000 of them are foreign inventions covered under reciprocal agreements with various friendly nations; and that of the remainder, approximately 20 percent fall into the second (nongovernmental property interest) category.

when the procedures for requesting secrecy orders were changed and made more rigorous.

Secrecy orders are effective for only one year, but may be renewed. However, although this limitation was written into the Invention Secrecy Act when it was passed in 1951, for the next 27 years it was inapplicable. The law contained an "exception" clause to the effect that the yearly renewal requirement was not operative for the duration of a war or national emergency, and for some months thereafter; and the National Emergency proclaimed during the Korean War was not officially terminated until 1978. The annual renewal cycle has been in effect since that time, but has been protested by national security officials, at least as it applies to inventions already subject to periodic reexamination for classification downgrading (i.e., those in which government has a property interest).

Many secrecy orders are issued in connection with already classified patent applications. Sometimes, however, the patent application has been filed by persons who developed the invention without any government involvement.

In February 1987 the Army requested and the Patents Commissioner granted a secrecy order on an application for an American patent in the field of 'zero-knowledge proofs, " by an Israeli mathematician, working in an Israeli institute.[60] While such proofs are used in cryptology, they are generally regarded as advances in theoretical or "pure" science. The applicant was ordered to 'recover and destroy' all related materials. The secrecy order was quickly withdrawn, since the government cannot classify work done by foreigners in their own country, but not before there were many protests from mathematicians. This episode was taken to indicate that American achievements of the same kind might be restricted.

The constitutionality of the Invention Secrecy Act has never been tested. Since the grant of a patent secures a property right conferred by the government, a patent applicant

The constitutionality of the Invention Secrecy Act has never been tested.

is subject to the conditions established by the government. Some experts have held that constitutional objections are further obviated by the statutory requirement that the patent applicant receive just compensation for any loss that might be suffered by reason of the secrecy order.

However, a House of Representatives Report in 1980[61] noted that:

> No secrecy order ever underwent judicial review for appropriateness. There has been no First Amendment judicial test of the Invention Secrecy Act, and the statutory right of an inventor to just compensation for secrecy order damages appears more illusionary than real.

The report noted that from 1945 to 1980 there had been 29 claims for compensation, one claim for every 1,000 secrecy orders; 6 were settled before or during litigation by DoD and 1 by a private relief bill, 10 were terminated by denial, and the rest were still pending. As the report also noted, "Agencies have little or no incentive to settle a claim, and claimants, frustrated, often drop the matter. The House Committee on Government Operations, which prepared the report, found "little judicial guidance on First Amendment questions. " It quoted an official of the Department of Justice on the question but was told that the Department "has thought it wise to follow a rule of self-restraint in expressing public views on constitutional questions presented by the statutes we are called upon to enforce."[62]

[60] "" Brief U.S. Suppression of Proof Stirs Anger, " *New York Times*, Feb. 17, 1987, p. C3.

[61] *The Government Classification of Private Ideas,* Thirty-Fourth Report by the (House of Representatives) Committee on Government Operations, House Report No. 96-1540, 96th Cong., 2d sess., Dec. 22, 1980, p. 2.

[62] Ibid., p. 27.

This authority must be considered as part of the total burden on the exercise of free speech.

Imposition of a secrecy order can be avoided simply by not seeking a patent. (The information may nevertheless be subject to control as Restricted Data or under export controls.) Nevertheless, imposition of a secrecy order does operate as a restriction on traditional freedom of scientific communication. This authority must therefore be considered as part of the total burden on the exercise of free speech.

EXPORT CONTROLS

Export controls are also a form of legislated restraint on scientific communication. They are considered separately because national security is only one objective of these controls.

The Arms Control Act

This Act provides authority for restricting or prohibiting export of technical data related to defense articles.[63] It applies to blueprints, drawings, photographs, plans, instructions, software, and documentation. This Act is one of the U.S. Statutes used to restrict unclassified information.

Under the Arms Control Act, International Traffic in Arms Regulations (ITAR) are developed and a U.S. Munitions List is maintained by the Department of State, with the help of DoD. The regulations" operate in much the same way as regulations under the Export Administration Act, discussed below. ITAR, does not specifically exclude 'fundamental research, " but it does exempt general mathematical and engineering information that is only indirectly useful to military purposes. It is not clear whether any information exempted from Export regulations is restricted under ITAR.

The Export Administration Act

In 1976 a Defense Science Board panel headed by Fred Bucy reexamined the need for secrecy in scientific research, with special attention to the problem of "involuntary technology transfer" to hostile or competitive nations. The Bucy panel argued that the knowledge most vital to protect is not embedded in military weaponry per se, but knowledge that conveys design and manufacturing know-how. The export of technological information contained in scientific publications in some areas is harmful to the United States. These areas were "arrays of design and manufacturing know how, " "keystone" manufacturing processes, inspection and test equipment, and products requiring sophisticated operation, application, and maintenance.

This recommendation was a significant expansion of the term "militarily useful. " The transfer of design concepts and manufacturing processes can relate directly to the manufacture of weapons." But a further, and ultimately more important point, may be the recognition that modern concepts of national security depend at least as much on the strength of the Nation's industrial base as on the stock of military weapons. There is a close tie between scientific information and industry strength and competitiveness.

[63] 22 U.S. C. 2751.

[64] A revised version of ITAR became effective Jan. 6, 1985.

[65] A high government official noted to OTA, "The information used in manufacturing high-tech products used in weapons systems diffused into the civilian private sector and could no longer be controlled by DoD, at least to the extent that it once was. This recognition, above everything else, forced us to redefine what was militarily useful. (Private communication, June 19, 1987.)

There is a close tie between scientific information and industry strength and competitiveness.

The Bucy panel recommendations set in motion more vigorous efforts to control dissemination of technical knowledge related to militarily useful advanced technology, and led to the strengthening of export control laws in the following years.[66]

The Export Administration Act had already been passed in 1969, and was amended in 1979, 1981, and 1985. It controls the export of "goods and technology which would make a significant contribution to the military potential of countries which would prove detrimental to the national security. . . "[67] Technology is defined to include "information and know how, whether intangible form. . . or intangible form, that can be used to design, produce, manufacture, utilize, or reconstruct goods, including computer software and technical data . . "[68] The Export Administration Act not only applies to information passing across our borders, but also limits access of foreign nationals to information in this country.

Regulations for administering and enforcing the Export Administration Act are promulgated by the Department of Commerce (DOC), and the products or areas covered are identified in a Commodity Control List, which is maintained by DOC with the help of DoD and DOE. The list specifies the countries to which each of about 100,000 items (in 1984) cannot be exported without a validated license. All export of unpublished technical data to Communist bloc countries requires a license. The United States is also a founding member of the multinational Coordinating Committee on Multilateral Export Controls (CoCom), which under multilateral agreements and procedures provides for cooperative control of exports to the Soviet bloc with restrictions on munitions, nuclear energy, and some other dual-use technologies. Many but not all of the items on the U.S. Commodity Control List are also on the International (CoCom) List.

The early use of export controls emphasized products more than information as such. Thus, when the Commerce Department halted shipment of magnetic computer tapes to Eastern bloc countries in 1982, "the action was taken to ban the medium, not the message."[69] Although these were standard IBM computer tapes, DOC said that Eastern European countries could not manufacture such high-quality tape and should not learn how from U.S. products.[70]

For U.S. exporters, restrictions on trade with the Eastern bloc nations may be less important than the effects of unilateral restrictions on trade with other Western nations. The Administration insists on such restrictions to curb the indirect flow of technology to the Soviet Union, because once information is outside the country it is outside of our control.[71] This imposes costs on U.S. exporters and causes friction with our trading partners. Some

[66] Stephen B. Gould, "Secrecy: Its Role in National Scientific and Technical Information Policy," *Library Trends,* summer 1986, p. 72. Gould was until mid-1987 Director of the Project on Scientific Communication and National Security, of the Committee on Scientific Freedom and Responsibility of the American Association for the Advancement of Science.

[67] 50 U.S.C. 2402(2)(A) App.

[68] 50 U.S.C. 2415 App.

[69] Roland W. Schmitt, "Export Controls: Balancing Technological Innovation and National Security," *Issues in Science and Technology*, vol. VI, fall 1984, p. 117. Schmitt is head of the General Electric Research and Development Center.

[70] Ibid. See also *Chemical & Engineering News, "U.S.* Bans Tape Exports to East Bloc," Sept. 20, 1982, p. 6. As a result, *Chemical Abstracts,* which had supplied its bibliographic tapes to Warsaw Technical University since 1974, did not get its export license renewed. The Institute for Scientific Information, a commercial firm providing bibliographic services, could no longer send its standard tapes to customers in Poland, the U. S. S. R., and Hungary, but could send the same information on low-quality tapes.

[71] Export Administration Regulations require priOr authorization from the Office of Export Licensing in certain situations before foreign products that incorporate parts, components, or materials of U.S. origin, can be exported from one foreign country to another. Until recently, all foreign companies needed permission from DOC before reexporting a product that contains any U.S. components, even a microchip. New regulations effective in 1987 somewhat simplified the procedure for requesting such authorization and exempted foreign-manufacturer products destined for some countries when the U.S. content is no more than 20 percent by value. (15 CFR Parts 376 and 385; *Federal Register* 51, No. 129, July 7, 1986, 24533.)

foreign companies have notified their U.S. suppliers that they are "designing out" U.S. parts to avoid this additional effort; others consider this additional cost in deciding on suppliers.[72] Many U.S. industry leaders have protested export controls.[73]

Export controls apply not only to commercial products but to technical data, research reports, and some other kinds of information as well. A Defense Science Board Task Force on University Responsiveness to National Security Requirements, in early 1982, found that the shift in emphasis in export controls from products to technological information was seriously disturbing the relationship between the government and universities.[74] The Task Force recommended that "clearer guidelines," not overly restrictive, be formulated for DoD-funded university research with the help of universities. This recommendation however led to new confusion and dispute over the basis for applying either classification or export controls. In theory, they involve quite different objectives, standards, and procedures, but in practice they are often seen as alternatives.

When the 1979 Export Administration Act was about to expire in 1983, efforts to rewrite the bill revealed sharply divergent concerns. Some in Congress sought to strengthen export controls, while others argued that excessive controls reduced the competitiveness of U.S. companies and contributed to our trade deficit.[75] There were hearings in both the Senate and House. The House accepted a provision proposed by the Committee on Foreign Affairs, which read:

> It is the policy of the U.S. to sustain vigorous scientific enterprise. To do so requires protecting the ability of scientists and other scholars freely to communicate their research findings in accordance with applicable provisions of the law, by means of publication, teaching, conferences, and other forms of scholarly exchange. [76]

Although the House wished to avoid "overly broad interpretation" of the Export Administration Act, the Senate Committee on Banking added a provision making academic institutions subject to requirements of the commercial agreements provision. This meant that university agreements with certain foreign countries must be reported to the Department of Commerce. Some believe that this gives government a "ready opportunity to regulate, through the application of export controls, the content of lectures, conference presentations, teaching, and publications by U.S. academics in certain foreign countries. "[77] Others insist that there is no necessary connection between "recording commercial transactions after the fact, " and "controlling scientific information before the fact. "

The House and Senate failed to agree on reauthorization of the Act in conference. The President then issued Executive Order 12470 (Nov. 14, 1983), declaring a national emergency and activating the same powers under the International Emergency Powers Act.

The Export Administration Act was finally reauthorized in April 1985. The new law attempted to streamline its procedures but did not reduce the number of items covered. GAO has said that "The government continues to require export licenses for more dual-use items than is necessary to protect national security."[78] Dual-use items are devices, systems, or "know-how" that have both military and nonmilitary applications.

Revisions to the implementing regulations under the Act in 1986 exempted "fundamen-

[72] Don Bonker, "Protecting Economic Interests, " *Issues in Science and Technology,* fall 1986, p. 100.

[73] According to officials in the Department of Commerce Export Administration Program Review Staff, "The possibility of reverse engineering [indirect leakage of useful information as a result of West-West trade] has been discounted by many exporters who claim that their manufacturing techniques cannot be derived by examining the finished products. " (Direct communication to OTA project staff, June 19, 1987.)

[74] U.S. Department of Defense, *Report of the Defense Science Board Task Force on University Responsiveness to National Security Requirements* (Washington, DC, 1982).

[75] Don Bonker, "Protecting Economic Interests, " *Issues in Science and Technology,* fall 1986, p. 100.

[76] 50 U.S.C. 2402 (12) App.

[77] Harold C. Relyea, *National Security Controls and Scientific Information,* Congressional Research Service Issue Brief B82083, updated June 17, 1986, pp. 12-13.

[78] U.S. Congress, General Accounting Office, *Export Control Regulation Could Be Reduced Without Affecting National Security*, May 26, 1982.

In January 1987 the National Academy of Sciences and the National Academy of Engineering issued a report sharply critical of the implementation of export controls.

tal research" from export controls, using the definition of fundamental research introduced in NSDD 189, September 1985, which is discussed below.[79] University research is normally considered "fundamental' unless scientists have accepted prior restrictions on publications through contract agreements.[80]

The DoD Appropriations Act for fiscal year 1984 gave the Secretary of Defense authority to withhold from public disclosure, under the Freedom of Information Act (FOIA), any technical data with military or space application already under control of DoD, if that data would fall under Export Acts. DOE policy is to use this authority only if the data has "military centrality, and requires the recipient to promise not to reveal the information to the public. This avoids releasing the data from effective government controls.[81]

In January 1987 the National Academy of Sciences and the National Academy of Engineering issued a report sharply critical of the implementation of export controls. It said that the Administration had "tended to focus on tightening controls while giving little attention to their effectiveness and cost"; by trying to impose its own export restrictions on countries that import U.S. technology, the Administration had injured both U.S. competitiveness and relations with our allies. The Department of Defense has been given too large a role in export policy, the panel implied, being more concerned with national security than with the competitive strength of American industry."

The Export Administration Act has a legitimate government purpose other than restricting speech.

Many question the effectiveness of export controls. One expert has been quoted as saying that 'the avenues for transfer open to Russia are so broad that they are almost impossible to control," adding that the primary avenue is probably through Western plant workers and junior executives recruited over the past 30 years in the United States and Western Europe.[83]

The Constitutionality of Export Controls

It is assumed that any impingement on First Amendment rights under the Arms Export Control and Export Administration Acts is incidental, because these regulations have a legitimate government purpose other than to restrict speech and press.[84] The Court might

[79]15 CFR 379, May 16, 1986. The regulations say that information resulting from fundamental research qualifies for unrestricted export to any destination under a General License GTDA, that is, a "general license for technical data available to all destinations. "

[80]Unclassified contract research funded by DoD under budget category 6.1 is considered fundamental research, and most unclassified research at universities funded under budget category 6.2 is also considered fundamental research. Contract research done in off-campus university facilities and not supported under budget category 6.1 is however generally not automatically considered fundamental research, but may still be free of restrictions. Research done by business or industry is considered fundamental research only if the researchers are free to make it available without pay or restrictions (i.e., it is not proprietary) and it is not classified.

[81]communication to OTA from officials in the Office of the Secretary of Defense, May 1987.

[82]National Academy of Science, Panel on the Impact of National Security Controls on International Technology Transfer, *Balancing the National Interest: U.S. National Security Export Controls and Global Economic Competition,* Washington, DC, 1987. The report was prepared by a panel chaired by Lew Allen, Director of the Jet Propulsion Laboratory. The panel recommended that the United States rely on, and seek to improve, the Multilateral Export Controls Coordinating Committee (CoCorn) consisting of the NATO countries plus Japan and France.

[83]Frederick Kempe, "Losing Battle: Keeping Technology Out of Soviet Hands Seems To Be Impossible, " *Wall Street Journal,* July 24, 1984, p. 1.

[84]*Adderly v. Florida,* 385 U.S. 39 (1966); *Brown v. Louisiana,* 383 U.S. 131 (1966); *Kovacks* v. *Cooper,* 336 U.S. 77 (1949); *Breard v. Alexandria, 341* U.S. 622 (1951); *O'Brien v. United States, 391* U.S. 367 (1968).

tend to give them the benefit of the doubt, as in the only case[85] so far that directly challenged the applicability of the Arms Export Control Act to unclassified data. This case involved business rather than scientific interests. Edler provided technical assistance to French companies on tape-wrapping techniques that had both commercial and military applications, despite rejection of Edler's application for an export license. The U.S. Court of Appeals said that Edler had some First Amendment rights with respect to the transaction, but concluded that the Arms Export Control Act was a' 'general regulatory statute, not intended to control the content of speech but incidentally limiting its unfettered exercise,"[86] and might, therefore, be constitutionally permissible.

Observing that a broad interpretation of "technical data" would "seriously impede scientific research and publishing and the international scientific exchange, the court adopted a narrow construction that limited technical data to that which "relates in a significant fashion to some item on the Munitions List, " as opposed to being "merely vaguely useful for the manufacture of arms. Moreover, it is necessary that the relationship to that item be clear and that the defendant know or have reason to know that the data was intended for a prohibited use.[87]

The court explicit sensitivity y to the necessity for protecting open dissemination of scientific knowledge offers hope that the statute cannot be applied in a manner that interferes with traditional modes of scientific communication. The Office of Legal Counsel of the Department of Justice addressed this issue in separate communications to the Secretaries of Defense and Commerce in July 1981, asserting that export control regulations may not impinge on scientific communication unless the " speech" is directly related to a business transaction.[88] Nevertheless, some critics maintain that this distinction has not been adhered to in the ensuing 6 years.

[85] *United States* v. *Edler Industries, Inc.*, 579 F.2nd 516 (9th Cir., 1978).

[86] Ibid. at 520, citing *Konigsberg* v. *State Bar*, 366 U.S. 36, 50-55 (1961).

[87] Ibid., pp. 520 and 521

[88] Harold C. Relyea (cd.), "Shrouding the Endless Frontier - Scientific Communication and National Security: The Search for Balance, *Striking a Balance: National Security and Scientific Freedom* (Washington, DC: American Association for the Advancement of Science, 1985), p. 90-92.