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Scientific Freedom, National Security, and the First Amendment

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Summary. The Supreme Court may soon be asked to decide an important issue of First Amendment law arising from the government's efforts to restrict the dissemination of "militarily critical" technological knowledge. To resolve the issue, the Court will first determine whether technological knowledge qualifies for a full measure of protection under the free-speech clause of the First Amendment. The Court will then address the government's stated justification for restricting the contested information. This inquiry will evaluate both the gravity of the asserted danger to national security and the likelihood of its occurrence.

It is now apparent that the American scientific community is approaching a critical point in its relations with the federal government. Until recently, the conduct of most scientific work in this country proceeded on a well-founded assumption that it would remain free from official intrusion or state regulation (*1*). Since 1979, however, the federal government has frequently acted in the name of national security to impose restraints on important aspects of the scientific endeavor. Most notably, in an effort to curb the export of "militarily useful" technologies, the Administration has applied the existing set of export controls to domestic scientific symposiums, university research programs, and even the presentation of scientific papers (*2*, pp. 97–107; *3–5*).

This effort to restrict the dissemination of applied scientific knowledge has sparked heated debate. The government maintains that the normal avenues of scientific communication often contribute to a "technology leakage" that enhances the military capabilities of the Soviet Union (*6, 7*). What underlies this view is the belief that the American military must depend on the technological superiority of its weapons systems to offset the quantitative superiority of the Soviet Union (*6, 7*). The critics charge that restraints on scientific expression are both ineffectual as a means of curbing the transfer of technology and inconsistent with the requirements of scientific progress (*2*, pp. 42–45; *4, 8*). In this view, America's technological supremacy is due in large part to policies that promote the free circulation of scientific and technological information.

The debate has thus far addressed the government's effort to control the export of applied scientific knowledge as a broad question of public policy. It seems likely, however, that the major issues in the controversy will soon be tested under narrower, legal principles in a court of law. If so, the government will almost certainly rely on one of two congressional statutes as authority for its restraints on the transmission of technological knowledge.

One of the statutes is the Arms Export Control Act (*9*), which empowers the State Department to license the export of all military articles listed in the International Traffic in Arms Regulations (*10*). As defined by those regulations, the relevant articles consist not only of war-making devices such as aircraft and explosives but also of "any information" used in the production of military arms (*10*, sect. 125.01). Equally important, the regulations broadly construe the term "export" to include the noncommercial transmission of information in domestic settings such as scientific symposiums (*10*, sect. 125.03; *11*).

The other statute is the Export Administration Act of 1979 (*12*), which differs from the arms regulations in two respects. First, it authorizes the Commerce Department to license the export of "dual use" technologies that are subject to both military and civilian applications. Second, it deals principally with the export of technologies to "controlled countries" such as the Soviet Union, Poland, and East Germany. Like the arms regulations, however, the Export Administration Act restricts the domestic release of any information used in the production of commodities having a military value (*13*). Furthermore—and again like the arms regulations—the Export Administration Act imposes stiff criminal penalties on those who willfully violate its licensing requirements (*12*, sect. 2410).

In these statutes Congress has provided considerable authority for governmental restraints on the export of "militarily useful" technologies. This fact alone, however, will not end the legal inquiry in cases where the government has invoked the statutes to restrict the open, domestic communication of applied scientific knowledge. On the contrary, in such a case, a major issue will arise concerning the validity of the legislation under the free-speech clause of the First Amendment.

To resolve this type of issue, the Supreme Court has consistently relied on a well-defined analytical framework designed to determine whether the state's interest in regulation is sufficiently im-

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portant to justify an abridgment of First Amendment freedoms. In the rest of this article, I will examine the ways in which the Court's mode of analysis can accommodate the difficult First Amendment issues arising from the imposition of restraints on the open, domestic communication of technological knowledge (*14*).

First Amendment Fundamentals

Like other guarantees in the Bill of Rights, the free-speech clause of the First Amendment stakes out a zone of individual freedom by identifying a specific activity to be protected against unwarranted governmental intrusion. The enforcement of such guarantees is left to the Supreme Court, the branch of government removed from public accountability and vested with the power to invalidate official acts that encroach on the protected freedoms. This power of judicial review, however, carries the risk that the Court will frustrate the democratic process by freely substituting its own preferences for the enacted will of the public's elected representatives. Accordingly, under prevailing constitutional theory, the Court's power is properly exercised only when its decisions are rigorously based on principles derived from the text of the Constitution (*15, 16*).

These larger considerations have often guided the Court in deciding cases arising under the free-speech clause of the First Amendment. Rejecting the notion that all speech is absolutely immune from official regulation, the Court has determined the degree of protection to be accorded to various categories of expression by looking to the major values that underlie the free-speech guarantee. These values, according to the Court, can be summarized in three propositions. First, the right of free speech advances the citizen's interest in self-fulfillment by enabling him to realize his full potential through the free expression of opinions, beliefs, and ideas. Second, the guarantee of free speech serves an important social function by promoting the widest possible circulation of socially useful information. Finally, the right of free speech is essential to a democratic form of government, for it ensures that all information bearing on various policy issues is fully disseminated to the public (*17, 18*).

Though the Court has not yet adjudicated the issue, it seems clear that scientific communications contribute to each of these interests and thus warrant as much protection as political tracts, literary works, or any other variety of speech. Indeed, a system of free scientific expression not only enables scientists to draw on the work of colleagues but also tests the validity of hypotheses against current data and opposing views. In these ways, it promotes the discovery of scientific truth and fosters the intellectual advances that contribute to the collective wisdom (*2*, pp. 42–45; *19, 20*).

In the case of purely technical data, however, more difficult questions arise. For example, does technical information having only military uses warrant the same degree of constitutional protection as political speech or basic scientific knowledge? In all likelihood the Court will answer in the negative, for it has previously held that analogous "lesser" forms of expression do not stand on the same constitutional footing as more traditional varieties of speech. For example, the Court has held that commercial advertising occupies a "subordinate position in the scale of First Amendment values" and thus warrants only a "limited measure" of constitutional protection (*21; 22*, pp. 651–656).

Most forms of technological knowledge, however, are subject to a wide range of uses, some of which have military value but most of which contribute directly to the material welfare of the community. This point is clearly illustrated by many of the "militarily critical" technologies that have been cited by the Department of Defense—for example, laser technology, semiconductors, computer hardware, and infrared technology (*23*). Given the obvious social value of such technological achievements, the Supreme Court will probably hold that the broad category of technological knowledge warrants a full measure of constitutional protection, while noting an exception for information that is subject only to military applications (*19*).

Once this larger question is decided, the Court will not assess the social value of the technical data at issue in a given challenge to a governmental restraint. Rather, it will simply note that the information in question falls within the category of fully protected speech and will then turn its attention to the government's countervailing interest in regulation. At this point, a crucial issue will arise: given the strong constitutional presumption in favor of free speech, just what burden of proof must the state carry to justify its imposition of restraints on the information? Or, to put it in legalistic terms, what standard of review will the Court apply to the government's stated justification for the challenged restrictions?

Determining the Standard of Review

To determine the relevant standard of review, the Court will focus on two broad questions. First, does the government have a possessory interest in the underlying information? If so, the Court will apply a mere "reasonableness" standard to any governmental restraints imposed on government employees in an effort to preserve the secrecy of the data. Thus, for example, in *Snepp* v. *United States*, a recent case involving a book published by a former CIA agent, the Court broadly upheld the state's power to impose "reasonable restrictions" on the dissemination of governmental information obtained by government employees (*24*). In addition, the Court pointedly noted that this general principle applies "even in the absence of an express agreement" between the government and the employee (*25*, p. 507).

In like manner, the Court will probably sustain any reasonable restraints imposed on the dissemination of information resulting from the government-funded research of private parties. Indeed, in such a case, the government's restraints will likely be upheld on either of two grounds: (i) the state, by financing the underlying research, acquires a property interest in the resulting information or (ii) the researcher, by accepting the public financing, agrees to restrictions that might otherwise be constitutionally impermissible (*19, 26*).

On the other hand, if the state attempts to regulate the dissemination of nongovernmental information by private parties, the Court will apply a far more demanding standard of review. In such a case, the weight of the state's burden will be determined by a second line of judicial inquiry focusing on the precise way in which the government has restricted the free-speech right.

On this issue, there are two major possibilities: either the state has imposed a "subsequent punishment"—usually in the form of criminal penalties—on individuals who have already published the restricted information, or it has blocked the dissemination of the data by issuing a "prior restraint." In the case of a subsequent punishment, the Court will uphold the action only if the state can demonstrate a "compelling" interest in regulation (*22*, p. 602; *27*)—a burden of proof that stands as the modern analog of the well-known "clear and present danger" test formulated by Oliver Wendell Holmes (*28*). In the case of a prior restraint, the Court will apply an even more demanding standard of review, since the government is seeking to block

the timely dissemination of information and ideas. Indeed, on the evidence of the so-called *Pentagon Papers* decision (*New York Times* v. *United States*) the Court will uphold the restraint only if the government can show that a "grave" and "irreparable" harm will almost surely result from publication of the data in question (*29*).

Clearly, under either standard of review the state is faced with an exceedingly difficult task. Nevertheless, the Court has indicated that in some "exceptional" cases, principally in the area of national security, the government's interest in regulation may be sufficient to warrant a direct infringement on fully protected speech (*29*). The remaining question, therefore, is: Just how will the Court assess the importance of the state's concerns to determine whether they are adequate to justify an abridgment of First Amendment freedoms?

Weighing the State's Interest in Regulation

The Court has held that the strength of the government's interest in regulation is determined in large part by two independent factors: the nature of the harm that the state is seeking to avert and the likelihood of its occurrence (*30*, p. 843). In particular, the crucial inquiry centers on whether the "gravity of the 'evil,' discounted by its improbability, justifies such invasion of the free speech right as is necessary to avoid the danger" (*31*). With this approach, the seriousness of the threatened danger will affect to some extent the showing required of the government on the "likelihood of occurrence."

The Court has long recognized that "no governmental interest is more compelling than the security of the Nation" and that this interest sometimes requires the state to protect the secrecy of certain kinds of information (*24*). On the facts of a given case, however, the state could not rely on the mere assertion of a national security threat, for the Court will make its own inquiry into the nature and magnitude of the harm said to result from publication of the data at issue (*30*, p. 843).

The state's argument on this score will undoubtedly stress the unique nature of technical knowledge and, in particular, the unique way in which this variety of speech can harm the public. Under classic First Amendment theory, most forms of human communication contribute to the larger social exchange of opinions, beliefs, and ideas and do not threaten in any way the material welfare of the society. Indeed, on this theory, the speech of an individual generally cannot cause any harm to the community except by influencing others to adopt an erroneous or misguided position. The theory further holds that the government has no genuine interest in suppressing a "dangerous" idea, since the alleged error or fallacy can be exposed through an additional exchange of views (*22*, pp. 605–606; *32*).

These general considerations, however, do not always apply to technological knowledge, which often gives rise to dangers of a more immediate and tangible kind. In particular, technical know-how, although rarely contributing to the general exposition of ideas, often confers the power to alter the material conditions of life in important new ways, some of which may prove harmful (*19, 20, 33*). For example, in the case of new technologies having military applications, the underlying know-how can provide a hostile nation with the capability of committing harmful acts it would not otherwise be able to commit.

This point was clearly underscored by the decision of a federal district judge in *United States* v. *The Progressive* (*34*). In that case, the government asked the judge to enjoin a magazine from publishing an article outlining the design of a hydrogen bomb. In granting the injunction, the judge stressed that the case differed in important ways from the *Pentagon Papers* case, which dealt with a classified history of the Vietnam War (*29*). Most notably, according to the judge, the case before him concerned "information dealing with the most destructive weapon in the history of mankind, information of sufficient destructive potential to nullify the right to free speech and to endanger the right to life itself" (*34*). Thus convinced that publication "could pave the way for thermonuclear annihilation of us all," the judge found that the government had met its heavy burden of justifying a prior restraint (*34, 35*).

In the case of nonnuclear technologies, the government has also invoked the name of national security to limit the dissemination of technical information having possible military applications. For example, at a recent international symposium on optical engineering, the Department of Defense blocked the presentation of a large number of unclassified papers on topics ranging from microelectronics to infrared technology (*2*, pp. 106–107; *36*). In so doing, the department underscored its concern that advanced work in "critical" technologies could aid a foreign adversary in the development of more effective weapons systems (*36*). The National Security Agency has recently monitored the efforts of research cryptographers to develop undecipherable computer communication codes (*2*, pp. 120–125). According to agency officials, the free publication of this work could threaten the inviolability of codes used by the American military or provide a hostile power with an impenetrable communication system (*2*, p. 123; *7*).

In the light of these examples, it is useful to rank the various types of national security information according to the nature and magnitude of the dangers posed by the resulting capability. This effort applies, however, only to those cases in which the government has first demonstrated two important points: (i) that the information at issue is indeed subject to the asserted dangerous use and (ii) that the information is not currently available to the receiving nation from another source (*19*).

Assuming these facts can be established, the most serious danger would arise from technical capabilities that could alter in major ways the current balance of international military power. This category would include technologies that directly conferred on the Soviet Union a new offensive capability or an effective countermeasure to American weapons systems. It would also include technologies that exposed the United States to new threats by providing a smaller adversary with a destructive power that it had not possessed before.

These are examples of "sudden and disastrous giveaways" (*37*). There are other capabilities that, if acquired by a hostile nation, could result in a number of lesser harms to the nation's security. Most significant is the wide range of militarily useful technologies that could enable a foreign adversary to add incrementally to its current military strength by (i) directly improving the performance of its weapons systems, (ii) enhancing its communications network, or (iii) increasing its knowledge of American military capabilities (*38*). Examples of such technologies are electrooptical sensors, solid rocket propulsion systems, satellite technology, navigation and guidance subsystems, microprocessors, and microelectronics (*2*, pp. 18–20; *6*, pp. 5–15).

A less immediate harm would result from technologies that enabled a foreign adversary to improve its military research and development. The most significant are technologies associated with the use of the computer for correlating

experimental data with theoretical models (*39*). Other well-defined technical methodologies are used to "guarantee reliability, explore the limits of design, and reveal new phenomena that can affect the next generation of weapons" (*39*).

A slightly different harm to national security would result from technologies that enabled a foreign power to upgrade its manufacturing capability in industries of military importance. For example, microelectronics and computer technologies are important in the development of in-flight guidance systems (*6*, p. 13), while precision ball bearings are important in the production of missiles and other military hardware (*6*, p. 7).

Finally, it is possible that the export of some technical capabilities could undermine foreign policy goals that are closely linked to the nation's security. The export of some types of technical knowledge, for instance, might undermine a trade embargo designed to influence the international behavior of the Soviet Union.

Turning to the question of the likelihood of occurrence, the Court will address the probability that a third party will use the information at issue to develop the new capability. This line of inquiry will consider both the complexity of the technology and the skills of the receiving nation. The need for the inquiry arises in part from the fact that the impersonal transmission of technical knowledge is rarely an effective method of transferring technology (*38*; *40*, p. 29). As a general rule, the normal channels of intellectual communication convey only the broad outlines of technical design and theory (*40*, pp. 67–73). What is usually not published or codified is the body of associated know-how that constitutes the art of the technology (*40*, p. 73), typically including methods of operation, organization, and manufacturing procedures. This is particularly true of emerging technologies with few previous applications (*40*, pp. 73–74).

Accordingly, the Court's inquiry into the likelihood of occurrence will focus on the ability of the receiving nation to absorb the knowledge at issue and put it to use. For example, if the receiving nation has a high level of technical expertise in the relevant area, the government could show with virtual certainty that that nation will put the information to an immediate military use. If the receiving nation lacks any of the needed skills or resources, the state could show only a possibility that the knowledge will be put to a significant use in the foreseeable future.

Together with the gravity of the threatened harm to national security, the Court's finding on the likelihood of occurrence will generally determine whether the state's interest in regulation is sufficient to warrant the restriction of First Amendment rights. Assume, for instance, that the government can show that the Soviets have sufficient skills to acquire a new military capability by exploiting an American breakthrough in directed energy weaponry. On these facts, the Court will no doubt agree that the government's concerns are sufficiently compelling to warrant an abridgment of First Amendment freedoms. This will probably hold true, moreover, even if the government concedes that the Soviets will eventually acquire the capability anyway, since the maintenance of a military lead time can be highly advantageous (*41*). On the other hand, if the threatened harm to the nation's security is less serious, the state's case will be correspondingly weakened, and all the more so if the receiving nation is shown to lack the requisite skills or resources to absorb the technology.

Less Restrictive Alternatives

The crux of conventional First Amendment analysis lies in the Court's effort to determine whether the restricted information gives rise to a substantial danger and thus warrants governmental regulation. However, if this issue is resolved in the state's favor, the Court will pursue a further line of inquiry focusing on the government's regulatory technique. In particular, the Court will determine whether the restraints on speech imposed by the state are more extensive than necessary to serve its underlying concerns (*42*). Accordingly, even if the government can demonstrate a "compelling" interest in regulation, the Court will invalidate the challenged restraints if it finds that a "less restrictive alternative" could serve the asserted interest equally well.

A useful illustration of this principle is offered by *Central Hudson* v. *Public Service Commission of New York* (*43*). In that case, the Public Service Commission of the state of New York issued an order prohibiting all public utilities from promoting the use of electricity. The commission reasoned that such a ban would decrease the demand for electricity and thus further the state's interest in the conservation of energy resources. The Supreme Court agreed that this interest was sufficient to warrant some restriction of commercial speech but found that the state's blanket prohibition was more extensive than necessary to further that interest. The Court noted, for example, that the commission's order prevented utilities from promoting electrical services that would reduce energy consumption by diverting demand from less efficient sources. On this ground, therefore, the Court found that the commission's order was unconstitutional.

This type of inquiry might well become relevant if recent proposals to alter the export control statutes are passed into law. For example, under one such proposal (*44*), the Arms Export Control Act would be amended to cover communications of any kind—technical or otherwise—dealing with any of a broad range of restricted technologies (*4*). This type of regulation, however, would clearly be more extensive than necessary to safeguard the nation's security, since many communications dealing with the restricted technologies have no military value. Consequently, any regulatory scheme based on this proposal would be subject to a stern First Amendment challenge on the grounds that there are less restrictive alternatives.

Conclusion

What is most striking about the Court's method of First Amendment adjudication is that it takes into account virtually all the commonsense perceptions that have informed the general policy debate on the government's effort to control the export of scientific and technical knowledge. Indeed, if the Court applies its standard analysis to this issue, it will not only give due weight to the value of scientific freedom but will also examine critically the nature and magnitude of the threatened harm to national security. In addition, it will address a variety of other considerations, such as the technical skills of the receiving nation and the reasonableness of the regulatory technique. By incorporating each of these factors into a method of adjudication that formally allocates the burden of proof, the Court's approach provides a well-defined analytical framework for accommodating the claims of scientific freedom with the legitimate interests of national security.

References and Notes

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24. *Snepp* v. *United States*, 444 U.S. 507 (1980). See also *Haig* v. *Agee* 453 U.S. 280 (1981).
25. *Snepp* v. *United States* (*24*). One caveat should be noted here. The Court will apply a more rigorous standard of review to governmental restraints imposed on a publisher who has received confidential information from a government employee (*30*).
26. Given the government's current emphasis on curbing the transfer of technology, it seems likely that the Department of Defense will be placing an increasing number of contractual restrictions on research that it supports (*3*).
27. *First National Bank of Boston* v. *Bellotti*, 435 U.S. 765 (1978).
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