Science or Security: The Future of the Free Flow of Scientific Information in the Age of Terror

GEOFF HOLLAND*

Abstract

Politically or ideologically motivated speech has been the primary focus of much of the recent political, legal, and academic debate on restrictions on speech imposed as a reaction to perceived threats to national and international security. However, restrictions imposed on informing speech as a response to the threat of terrorism raise equally serious concerns. The development of the body of knowledge relies on the free flow of information, including persuasive speech. Since the terrorist attacks of September 11 and the subsequent anthrax attacks in the US, the issue of censorship of scientific information has been subject of debate in both government and scientific circles.

This paper analyses the ways restrictions affect the dissemination of knowledge-based information arising from the censoring of scholarly scientific journals, and at what point a balance can be found between scientific freedom and national security. Is censorship the most appropriate response to the perceived threat of terrorists utilising published scientific information? Can an objective and rational assessment of the threat of terrorism be made in the current political climate? Consideration is given to alternatives to the implementation of a regime of censorship that could be tailored to limit the burden imposed on research in any trade off between scientific progress and national security concerns.

1. Introduction

Politically or ideologically motivated speech has been the primary focus of much of the recent political, legal, and academic debate on restrictions on speech imposed as a reaction to perceived threats to national and international security. However, restrictions imposed on informing speech as a response to the threat of terrorism raise equally serious concerns. The development of the body of knowledge relies on the free flow of information, including persuasive speech.[1] Since the terrorist attacks of September 11, and the subsequent anthrax attacks in the US, the issue of censorship of scientific information has

* Geoff Holland is a barrister and lecturer at the University of Technology, Sydney in the Faculty of Law, teaching and researching in constitutional, media and IP law, with a research focus on freedom of speech. He was a member of the Editorial Board of the UTS Law Review, 2003-2006, and was Co-Editor of Volume 5 of the Review, "The Public Right to Know". He is currently a member of the Review's Academic Advisory Committee, and is a member of the board of Public Space: The Journal of Law and Social Justice.

1 Restrictions on persuasive speech have been explored by other authors and are not within the scope of this paper.

been subject of debate in both government and scientific circles. The focus of this paper is on the ways in which restrictions affect speech, the purpose of which is to inform rather than persuade, specifically scientific information.

In the first section, legislative restrictions imposed on the dissemination of scientific information are considered. Included are those laws that, although in force prior to September 2001, empower U.S. and Australian governments to restrict informing speech for the purpose of national security. Of greatest concern, however, is the threat to the dissemination of knowledge-based information arising from the censoring of scholarly scientific journals.[2] It is acknowledged that restrictions on the free flow of informing speech are imposed out of commercial considerations;[3] however, this paper analyses only those restrictions imposed directly by government or as a response to government. The focus of the second section is on the way the editors of scientific publications have reacted to national security concerns. Are scholarly journals imposing, or having imposed, unreasonable restrictions on contributions to the body of knowledge because of concerns for national security? In section three, the relative importance of scientific freedom is analysed; and in the final sections, the future of scientific freedom is considered. Can, in the current political climate, an objective and rational assessment of the threat of terrorism be made? Does the threat of the use by terrorists of scientific information freely disseminated justify the imposition of a censorship regime; or are there practical alternatives to censorship?

2 Scientific research is also subject to limitations on the availability of biological and chemical agents used for research purposes. For example, see *USA PATRIOT Act* 18 USC s 175(c); *The Public Health Security and Bioterrorism Preparedness and Response Act* Pub. Law No. 107-188, 116 Stat. 593 (2002). In Australia, similar restrictions are found, inter alia, in the *Weapons of Mass Destruction (Prevention of Proliferation) Act 1995 (Cth)*, the *Criminal Code Act 1995 (Cth)*, and the *Patents Act 1990 (Cth)*.

3 Restrictions on the free flow of informing speech are imposed out of commercial considerations. However, this paper analyses restrictions imposed directly by government or as a response to government concerns over national security. Resnick considers three distinct reasons for private corporations to impose restrictions on sponsored research: Intellectual property rights; trade secrets; and data adverse to company interests. See Resnik, David B, 'Some Recent Challenges to Openness and Freedom in Scientific Publication', Michiel Korthals and Robert J Bogers, eds, *Proceedings of the Frontis workshop on Ethics for Life Scientists, Wageningen, The Netherlands 18-21 May 2003*, Chapter 6a, Wageningen UR Frontis Series, available at http://library.wur.nl/frontis/ethics/06a_resnik.pdf, accessed November 3, 2006.

2. *Legislative Restrictions on the Free Flow of Informing Speech*

'Scientists are not in the age of innocence anymore. And they should be aware of the moral implications of what they're doing.'[4]

In most western democracies, freedom of speech has generally come to be accepted as one of many rights and interests that need to be considered by both legislatures and courts, to be balanced against competing rights or interests.[5] The value of speech is often determined, both politically and legally, by reference to categories into which it has been divided. Typically based on content or by reference to the likely effect of the expression, the value given can be determinative of the weight to be attributed when in competition with other values, interests, or rights. This allows legislatures and courts to exclude or limit speech considered particularly abhorrent or harmful.[6] Researchers and academics, particularly those involved in the physical sciences, depend on the open dissemination of research and discussion of information contained therein. Researchers typically build upon the published works of others. Teachers utilise these works to broaden their scholarship. The publication and distribution of research is essential to the cumulative development of the body of human knowledge, with research outcomes published widely and available internationally. The process of scrutinising information is a necessary part of the search for scientific truths. Scrutiny by others allows for the identification of errors and omissions and for the development and refinement of information. However, information intended to benefit society by contributing to the body of knowledge can have dual or multiple use applications, beneficial and malevolent, legitimate and illegitimate, with ramifications for both national and international security, particularly if significant knowledge or technical data is communicated widely through publication, on the internet or at conferences. It is at this point that legislative restrictions become relevant.

Legislative restrictions on the flow of informing speech in both the United States and Australia have focussed on information seen as the

---

4 Garrett, L, *Scientists Advocate Greater Security*, Newsday. October 14, 2001.

5 Eg. New Zealand, Canada, UK, USA. In contrast with these nations, where freedom of speech receives some degree of constitutional protection, free speech in Australia is merely a residual right. That is, the freedom to speak exists only to the extent that it is not restricted by operation of the common law or statute. This is modified to a degree by the implied constitutional freedom to discuss matters of political and governmental concern, as recognised by the High Court. See *Lange v Australian Broadcasting Corporation* (1997) 189 CLR 520, [1997] HCA 25; *Coleman v Power* (2004) 220 CLR 1; [2004] HCA 39.

6 This includes censorship of hate speech, politically motivated speech and offensive speech.

property of the government, or that having implications for national security or defence.[7] In the US, the Congress, in 1911, enacted the *Defense Secrets Act*. This statute was quite similar to the British *Official Secrets Act*,[8] imposing penalties on possession *of* 'information respecting the national defense' and presuming the existence of 'national defense secrets', but not providing a further definition.[9] *The Espionage Act*, introduced in 1917, replaced the *Defense Secrets Act*, and prohibited the gathering and/or dissemination of information relating to 'national defense'.[10] In 1917, the *Trading with the Enemy Act* was passed by Congress to allow strict controls over trade with nations at war with the US.[11] Most controversial of the powers granted to the Executive was the authority of the President to designate as a national secret patents whose publication might 'be detrimental to the public safety or defense, or may assist the enemy or endanger the successful prosecution of the war'[12], including information developed through

---

7 Developments in cryptography have also been subject to international agreements, such as *The Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies*, requiring legislative restrictions on the export of proscribed forms of information. However, in recent years legislative restrictions on the dissemination of research into cryptography have also been imposed to prevent the circumvention of Digital Rights Management technologies. See the *Digital Millennium Copyright Act 1998* (Cth).

8 Restrictions on speech having defence or security implications were first introduced by the United Kingdom during the Crimean War in the late 19th century. In August 1889, the *Official Secrets Act* was passed by Parliament, imposing prohibitions on the disseminating information about British military facilities, warships, and weapons. In 1911 the scope of the Act was broadened to give the government full discretion over what information would be considered secret or confidential. Arvin S Quist, *Security Classification of Information*, Volume 1. 'Introduction, History, and Adverse Impacts', at 21 available at http://fas.org/sgp/library/quist/chap_2.html, accessed February 15 2007. See also Andrew Patterson, Jr., *"CONFIDENTIAL"--The Beginning of Defense-Information Marking*, Sterling Chemistry Laboratory, Yale University, New Haven, Conn., unpublished manuscript, April 30, 1980, at 6, cited in Quist, above.

9 Ericson, Timothy L., 'Presidential address to Society of American Archivists', 68th Annual Meeting, Boston, August 5, 2004. The published version appeared in the *American Archivist*, Vol. 68 (Spring/Summer 2005), pp 18-52., available at http://www.archivists.org/governance/presidential/ericson.asp, accessed October 22, 2006.

10 Section 1. See 18 USC Ch 37 s 793. Additional prohibitions on the disclosure of information created by the government are to be found in 50 USC, s 421, prohibiting the disclosure of the identity of covert intelligence personnel.

11 *Trading with the Enemy Act* of October 6, 1917, Ch. 106, §10(i), 40 Stat. 422. Prior to this statute, the Commissioner of Patents had the discretionary power to refuse the granting of patents on the basis of 'national interest'. See Quist, above n 8 at 22.

12 Ibid.

privately funded research.[13] This Presidential authority lasted only for the duration of the First World War, but the authority was again invoked in October 1941, shortly before the US's entry into World War II. Secrecy orders remained effective for two years, at which time they were renewable.[14] The extension of this executive power came with the passage of the *Invention Secrecy Act* in 1951, which granted authority to the Commissioner of Patents, in consultation with the heads of a number of Federal agencies, to designate as secret those patents for inventions and technologies perceived to create a risk of threat to the 'national security' of the United States.[15] A secrecy order prohibits the granting of a U.S. patent and the filing of foreign patent applications. Also prohibited is the disclosure or publication of any information or ideas contained in the patent application.[16] The order can be issued over both patents in which the government has a proprietary interest, and privately developed inventions in which the government has no proprietary interest. If it is determined that publication or disclosure by the grant of patent poses a threat to national security, the Patent Commissioner must issue an order that the invention be kept secret, and 'shall withhold the grant of a patent ... for such period as the national interest requires....'.[17] The invention is then deemed secret for one year, but this is renewable if an ongoing need for secrecy is considered necessary.[18] Secrecy orders issued during a time of national emergency remain effective for the duration of the emergency plus six months.[19] To ensure full compliance with the secrecy order, approval of the Patents Commissioner must be granted before a U.S.-based inventor files a foreign patent application or registers a design or model with a foreign patent office. Penalties for breaching a secrecy order issued under the legislation include a fine of up to $10,000 or imprisonment for not more than two years, or both.[20] By July 2006, there were 4942 patent secrecy orders in effect.[21]

13 Quist, above n 8 at 22.

14 Ibid

15 35 United State Code (USC) - Patents, Part II - Patentability Of Inventions And Grant Of Patents, Chapter 17, s181.

16 Ibid.

17 Ibid.

18 Ibid.

19 Ibid.

20 Ibid.

21 Federation of American Scientists Project on Government Secrecy, result of Freedom of Information application to the U.S. Patents and Trade Office, October 2006, available at http://www.fas.org/sgp/ othergov/invention/stats.pdf, accessed February 18, 2007.

The *Atomic Energy Act*[22] saw the legislative implementation of a 'born secret' policy, with most information concerning nuclear technology classified from the time of its inception, by creating a category of "Restricted Data".[23] Both the *Invention Secrecy Act* and the *Atomic Energy Act* came about at times of advances in technologies that had potential military applications and the increased fear of threats to national security from hostile nation states. By the late 1990s, fear of terrorism, from both state and non-state actors, domestic and foreign, led to the passage of the *Antiterrorism and Effective Death Penalty Act*,[24] a suite of laws that aimed at preventing terrorism. Included in the legislation was a prohibition on the provision of material support or resources, including information that could be used in the making of bombs or other weapons, to any person knowing or intending that it be used in preparing for, or carrying out, a specified list of terrorist offences. An additional restriction was imposed in September 2003 when the Federal Office of Foreign Assets Control (OFAC), acting under the authority of the *International Emergency Economic Powers Act*[25], issued an embargo on the peer review or editing of scientific publications by authors resident in countries under a U.S. trade embargo.[26] Penalties imposed under this Act included fines of up to $50,000 or 10 years imprisonment.[27] In April 2004, the OFAC lifted the prohibition on the editing and peer reviewing of manuscripts submitted to publications of the Institute of Electrical and Electronics Engineers (IEEE),[28] acknowledging that IEEE's publishing activities came within trade law that exempted the exchange of information from sanctions, although there is doubt that this exemption extends to other scientific publishers.[29]

---

22 42 USC 2011, Chapter 12. See also James C Goodale, 'Born Classified' – The 'Progressive' Magazine Case, *New York Law Journal*, March 23, 1979, Page 1, Column 1.

23 This included '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.' See *Atomic Energy Act 1954*, ch. 1073, § 11(r). See also Goodale, above n 22.

24 *Antiterrorism and Effective Death Penalty Act*, Pub. L. No. 104-132, § 323, 110 Stat. 1214, 1255 (1996).

25 50 USC Sections 1701-1707.

26 *Science and Security in the Post-9/11 Environment*, Scientific Publication Policies, The American Association for the Advancement of Science, available at http://www.aaas.org/spp/post911/publishing/, accessed 2 Nov 2006.

27 International Emergency Economic Powers Act, United States Code Title 50, Chapter 35, s. 1705.

28 Above, n 26.

29 Ibid. Also see Jean Kugamai and William Sweet, *U.S. Treasury Department Issues Free Press Ruling*, Spectrum Online. 12 April 2004, available at http://www.spectrum.ieee.org/apr04/inthisissue.

Like the US, legislative restrictions on informing speech in Australia have focused on the disclosure of information owned by the government or that is seen as having direct implications for defence or national security. In Australia, there is no 'Official Secrets' legislation per se.[30] Sections 78-80 of the *Crimes Act 1914* (Cth) cover unauthorized disclosure of Commonwealth information classified as confidential.[31] However, like the US, the principle source of federal legislative power to restrict the flow of informing speech is patents law. The *Patents Act 1990* (Cth) contains two separate sources of power enabling the Commissioner of Patents to apply prohibition orders against information about inventions. Chapter 15 of the *Patents Act* empowers the Commissioner to prohibit or otherwise restrict the publication of information contained in a patent application where the information is considered primarily concerned with 'associated technologies'. That is, the design, production, operation, testing or use of equipment or plant for the enrichment of nuclear material, the reprocessing of irradiated nuclear material, the production of heavy water or nuclear weapons or other nuclear explosive devices.[32] This definition of 'associated technologies' in the *Patents Act* is taken from the *Nuclear Non-Proliferation (Safeguards) Act 1987 (Cth)*, which also restricts the possession of information on nuclear energy and weaponry without Government authority.[33]

---

30 For an analysis of official secrecy in Australian information policy see G Terrill , *Secrecy & Openness: The Federal Government From Menzies To Whitlam & Beyond*, Melbourne University Press, Melbourne, 2000.

31 An informal, non-enforceable arrangement between the Commonwealth and the media, based on the UK's DA Notice system, operates to restrict the publication of certain information. D notices are issued to the media by the Defence, Press and Broadcasting Committee on subjects which are considered to have a bearing on Australia's defence or national security. Four D Notices are considered operative, including a prohibition on the disclosure of information about the Australian Security Intelligence Service or its employees. However, the Defence Press and Broadcasting Committee has not met since 1982 and attempts by the Keating Government to revive the Committee did not proceed. See Dr Pauline Sadler, *The D-Notice System*, at http://www.presscouncil.org.au/pcsite/apcnews/may00/dnote.html, accessed March 14, 2007. Additionally, prohibitions on the disclosure of information about the Australian Security Intelligence Organisation or its employees are to be found in section 18 of the *Australian Security Intelligence Organisation Act 1979* (Cth).

32 *Patents Act 1990* (Cth), Section 151.

33 Section 4 of the *Nuclear Non-Proliferation (Safeguards) Act 1987* (Cth) defines ***associated technology*** as:
any document that contains information (other than information that is lawfully available, whether within Australia or outside Australia and whether for a price or free of charge, to the public or a section of the public):
(a) that is applicable primarily to the design, production, operation, testing or use of:
(i) equipment or plant for:

The combined effect of the *Patents Act 1990* and the *Nuclear Non-Proliferation (Safeguards) Act 1987* is that all information concerning nuclear science is, again like the US, subject to restriction from the moment of its inception. Additional restrictions on information arise through the *Weapons of Mass Destruction (Prevention of Proliferation) Act 1995* (Cth), which prohibits the 'supply or export of goods that will or may be used in, and the provision of services that will or may assist, the development, production, acquisition or stockpiling of weapons capable of causing mass destruction or missiles capable of delivering such weapons.'[34] Section 4 of the Act defines 'goods' as including documents. A second, broader, power of prohibition exists in the *Patents Act 1990*. Similar to the power granted under the US' *Inventions Secrecy Act*, section 173 of the *Patents Act 1990* authorises the Commissioner of Patents to prohibit or restrict the granting of a patent and the publication of information about the subject matter of the application where it is deemed to *be* 'necessary or expedient in the interests of the defence of the Commonwealth.'[35] The patent application is checked after filing, and if it is considered necessary, a prohibition order is placed on it. The application then continues through the normal examination process, and may be accepted, but it is never published and can therefore not be sealed (i.e. cannot be 'granted'). Once issued, a prohibition order prevents information about the patent, including any specifications, being made public, and the patent application must be refused.[36] The penalty for a breach of a prohibition order is a maximum of 2 years imprisonment.[37] If the prohibition order is revoked, it can then be published, and may be sealed (assuming all the other requirements have been met). There are currently 40 patent applications with a prohibition order placed on

(A) the enrichment of nuclear material;
(B) the reprocessing of irradiated nuclear material;
or
(C) the production of heavy water; or
(ii) nuclear weapons or other nuclear explosive devices; or
(b) to which a prescribed international agreement applies and that is of a kind declared by the Minister, in writing, to be information to which this definition applies; and includes any photograph, model or other thing from which such information may be obtained or deduced.

34 Preamble to the *Weapons of Mass Destruction (Prevention of Proliferation) Act 1995*.

35 Section 173 (1) *Patents Act 1990*. This section also enables the prohibition of access to micro-organisms deposited for a patent application. Information subject of a prohibition or restriction order under this section is exempt from the provisions of the *Freedom of Information Act* 1982 (Cth). See Schedule 3, FOI Act.

36 Section 174 *Patents Act 1990*.

37 Section 173 (2) *Patents Act 1990*.

them, of which 20 are still 'alive' and have been accepted.[38]

3. *National Security, Censorship and Scientific Journals*

Advances in society are generally reliant upon the knowledge base developed from information provided by others, which typically come about through a process of review, testing, and evaluation, mostly by peers in the same field. Information from a variety of disciplines often provide for the cross fertilization of ideas, and information developed in one field or for a specific purpose may influence a variety of fields. The sharing of research outcomes has generally been free from the imposition of censorship, both imposed by government or self-censorship, although, as discussed above, there are notable exceptions where information falls within a limited category where the knowledge is of relevance to nuclear energy, and nuclear, chemical, or biological weaponry.[39] In the late 1930s, physicists involved in research on nuclear fission willingly entered into an agreement to self-censor the publication of their research to prevent the information being utilised by Germany.[40] This led, in the early 1940s, to the establishment of the National Academy of Sciences' National Research Council Advisory Committee on Scientific Publications, which voluntarily imposed, with the cooperation of the publishers of scientific journals, a prohibition on the publication of information relating to nuclear physics produced within the private research sector.[41]

The publication of research which has received funding, or other material support, from the U.S. Government has traditionally been free from government interference unless it has a *Classified* status for national security or defence purposes.[42] This policy was confirmed in 1985, with the release of *National Security Decision Directive* (NSDD) *189*, establishing a 'national policy for controlling the flow of science, technology, and engineering information produced in federally-

---

38 Information provided November 9 2006 by Jackie Carroll, Assistant Director, Ministerial Support, Research & Projects, IP Australia, contactable at Jacqueline.Carroll@ipaustralia.gov.au. Historical and statistical data about the number of patent applications that have had a prohibition order placed on them is not generally available. However, to give some context to these figures, in the year July 1993 - June 1994 20,000 patent applications were lodged in Australia. By the year July 2004 - June 2005 that figure had increased to over 32,000.

39 Laura K Donohue, 'Terrorist Speech and the Future of Free Expression' (2005) 27:1 *Cardozo Law Review* 272.

40 Peter J Westwick, *In the Beginning: The Origins of Nuclear Secrecy*, Bulletin of the Atomic Scientists, Vol 56, (Nov/Dec 2000), pp 43-49.

41 Dana A Shea, *Balancing Scientific Publication and National Security Concerns: Issues for Congress*, Congressional Research service, Washington, 2003 at 6.

42 Ibid at 7.

funded fundamental research at colleges, universities, and laboratories.'[43] NSDD 189 formalised Government policy, stating:

It is the policy of this Administration that, to the maximum extent possible, the products of fundamental research remain unrestricted...No restrictions may be placed upon the conduct or reporting of federally-funded fundamental research that has not received national security classification, except as provided in applicable U.S. Statutes.[44]

However, the threat of terrorism has sparked renewed debate on the need for the imposition of legal restrictions on the publication of scientific and technical information. In February 2001, the *Journal of Virology*[45] published a paper outlining the research findings of a group of scientists at the Co-operative Research Centre for the Biological Control of Pest Animals (CRC) at the Australian National University.[46] The purpose of the research had been to develop a means causing infertility in mice by infecting them with a modified strain of the mousepox virus. The published paper reported that the researchers had inadvertently found that previously immune mice were again susceptible to mousepox when injected with a genetically modified strain of the virus.[47] Discussion of the publication of the paper outside the scientific community was limited to some minor newspaper coverage until late 2001.[48] Concerns over the availability of scientific information, particularly in the field of microbiology, then became an issue of public debate. This caused a shift in the political spotlight onto the dangers to national security posed by scientific publications. Despite the U.S. Government's awareness of the development of biological and chemical weaponry by several states, including Iraq, it was not until the attacks of September 11, and the subsequent use of anthrax to attack targets within the US, that the U.S. Government prioritised the threat posed by the hostile use of biological agents. By December 2001, the U.S. Government had begun to question editorial decisions to publish articles that may contain scientific or technical information that could be beneficial to terrorists, with the White House expressing their displeasure over the publication.[49]

---

43 *National Security Decision Directive 189*, issued September 29, 1985 by President Ronald Reagan.

44 Ibid.

45 Published by the American Society for Microbiology.

46 Ronald J. Jackson et al., 'Expression of a Mouse Interleukin-4 by a Recombinant EctromeliaVirus Suppresses Cytolytic Lymphocyte Responses and Overcomes Genetic Resistance to Mousepox', 75 *Journal of Virology* 1205 (2001).

47 Resnik, above n 3.

48 Donohue, above n 39.

49 Ibid.

By March 2002, the Department of Homeland Security had begun to implement an information security policy, and Government concern over the impact of the publication of research findings increased when two further publications appeared in scientific journals in 2002. In May 2002, the National Academy of Sciences published the findings of a study on a protein used by the smallpox virus to evade the human immune system.[50] The journal's editors stated that they had decided to publish despite some demands not to publish because of the potential misuse of the information by terrorists.[51] The following July, the American Association for the Advancement of Science (AAAS) published a paper in their journal, *Science,* reporting how a group of scientists in New York had recreated the polio virus in the laboratory from DNA bought on-line.[52] This publication stirred considerable political controversy, with a motion censuring the AAAS being introduced into the House of Representatives, referring to the publication in Science *as* 'a blueprint that could conceivably enable terrorists to inexpensively create human pathogens for release on the people of the United States.'[53] Additionally, the resolution called upon the Executive to exercise greater control of publication restrictions on any research receiving any Federal funding.[54] In response to growing criticism from the Government, in October 2002 the National Academies[55] issued the *Statement on Science and Security in an Age of Terrorism,* supporting editorial censorship of a 'narrowly defined class of information',[56] however no attempt was made to define what would constitute that category of information. In response to the issue of the imposition of government censorship, the National Academies reiterated their belief that the government should

---

50 *Proceedings of the National Academy of Sciences,* June 25, 2002, vol. 99 No. 13, 8808-8813 available at http://www.pnas.org/cgi/reprint/99/13/8808?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=1&andorexacttitle=and&andorexacttitleabs=and&fulltext=smallpox&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&resourcetype=HWCIT, accessed November 2 2006.

51 Richard Monastersky, 'Publish and Perish? As the nation fights terrorists, scientists weigh the risks of releasing sensitive information', *Research and Publishing, The Chronicle of Higher Education,* October 11, 2002 available at http://chronicle.com/weekly/v49/i07/07a01601.htm, accessed November 1 2006.

52 Ibid.

53 Ibid. See also House Resolution 514. 2002. 107th Congress, Introduced by Rep. Dave Weldon, July 26, 2002.

54 Jennifer Couzin, 'Bioterrorism: A Call for Restraint on Biological Data', *Science,* 297 (5582), 2 August 2002, 749 - 751.

55 Representing the National Academies of Science, Engineering and Medicine and the National Research Council. The National Academies acts as advisor to the government on matters of science, engineering, and medicine.

56 *Academic Freedom and National Security in a Time of Crisis,* Academe, Washington, Nov/Dec 2003,Vol. 89, Iss. 6, at 34.

focus on restriction of information the subject of government classification.[57] However, the policy of the National Academies does not address the question of overclassification of information by the government. In January 2003, members of the Journal Editors and Authors Group, representing the American Society for Microbiology, the National Academy of Sciences, and the Centre for Strategic and International Studies, issued a statement on the publication of research. Included was a new editorial policy whereby submitted papers would in future be vetted by editors, who could reject manuscripts if they 'conclude that the potential harm of publication outweighs the potential societal benefits.'[58] Several researchers reportedly felt the need to edit papers submitted for publication, or withdraw them in light of this policy.[59] The result was that by the end of 2003 the editorial boards of all scholarly scientific journals had imposed a self-censorship regime in an attempt to avert further government intervention.

Governmental concern in Australia over the content of scholarly journals has, since 2001, largely focussed on the publication of persuasive speech. Schedule 7 of the *Anti-Terrorism Act (No 2) 2005* (Cth) repealed the previous sedition offences, replacing them with a range of new offences in Part 5.1 of the *Criminal Code* (Cth), including that of urging violence within the community.[60] A number of factors can possibly explain the apparent lack of concern over the content of scientific publications. As discussed earlier, the publication of information relating to nuclear energy, and nuclear, chemical, or biological weaponry is already subject to legislative restrictions on publication. Additionally, the fields of scientific publication in Australia are limited, many specialising in plant and marine biology.[61] Researchers seeking dissemination and recognition of their work will often opt to submit research papers to international journals rather than locally published journals.[62] In 2005, the first signs of interest by the Australian Government in the content of scientific publications arose when the National Health and Medical Research Council

---

57 Ibid; also see Kelly Field, 'Federal Officials Ask Journal Not to Publish Bioterrorism Paper', *Chronicle of Higher Education*, July 17 2005, 11.

58 Journal Editors and Authors Group, *Proceedings of the National Academy of Sciences*, Vol 100, 1464.

59 Monastersky, above n 51 at 8.

60 *Criminal Code* (Cth) s 80.2(5)-(6).

61 For example, of 23 scholarly scientific journals published by the CSIRO, 14 were in the fields of plant and environmental biology or marine biology.

62 This is evidenced by the fact that the Australian mousepox research was published in the Journal of Virology in the U.S., even though it was the result of a cooperative research project between the Australian National University and the CSIRO. This is likely to be attributed to the greater reach of internationally published journals and the greater prestige typically attributed to internationally published journals.

(NHMRC), the Australian Vice Chancellors' Committee (AVCC) and the Australian Research Council (ARC) established a working group on responsible research practices to review the joint *NHMRC/AVCC Statement and Guidelines on Research Practice.*[63] Submissions on the publication of potentially sensitive information were made by the Departments of Foreign Affairs and Trade (DFAT), Defence, and Prime Minister and Cabinet (PMC), and the Australian Safeguards and Non-Proliferation Office (ASNO).[64] In the first consultative draft released in February 2006, the issue of the publication of potentially sensitive research is not addressed. However, in the introduction to Chapter 5, 'Publication and Dissemination of Research Findings', the working group restated the importance of the free dissemination of research results:

Publication and dissemination of research findings are essential parts of the research process and are required to inform other researchers, professional practitioners and the wider community. The research process is not complete until the results have been made available to others as widely as possible in an accessible form."[65]

Early in 2006, the AVCC was informed that the Commonwealth was considering whether legislative restrictions on exporters of prescribed goods, which are administered by the Department of Defence, should be expanded to cover 'intangible technology transfer'.[66] This position was again adopted in a paper presented to the Australian Vice-Chancellors' Committee, Deputy and Pro-Vice-Chancellors (Research) Meeting in July 2006, prepared jointly by DFAT, ASNO, Defence and PM&C.[67] In this paper, the Government warned of the dangers of making information that could have possible implications for national security freely available. Citing the U.S. National Academy of Sciences' decision to self-censor scientific publications, the Government's submission warned that:

Academics and researchers need to be aware of the possible security implications of their work and discoveries... Researchers will need to consider security issues from the conceptual stage of work programs -

---

63 The NHMRC & AVCC represent major institutional research bodies, including universities. The ARC is the major distributor of government funding of research in Australia.

64 Information provided November 7 2006 by Ros Engledow, Assistant Director – Coordination, Australian Vice-Chancellors' Committee, contactable at rxe@avcc.edu.au.

65 The second draft of the revised Statement, Chapter 5, p 25, available at http://www.nhmrc.gov.au/publications/_files/acrcr.pdf, accessed October 30 2006.

66 Sophie Morris, 'Ideas come under anti-terrorism review', *Australian Financial Review*, 18 September 2006, 33.

67 *Sensitive Technologies: The Tertiary Sector's Responsibilities*, September 2006, available at http://www.asno.dfat.gov.au/publications/2006_060901_sensitive_technologies.pdf, accessed October 1 2006.

and keep it under periodic review, since initial objectives may change as the research progresses. Further, researchers could consider sharing the findings of their work with government before publishing to manage the risk of the proliferation of critical knowledge."[68]

The completed *NHMRC/AVCC Statement and Guidelines on Research Practice* has not yet been released, and it remains uncertain if, or the extent to which, the final guidelines will address the Government's concerns through the implementation of a self-censorship regime.

4. *Do Restrictions Matter?*

If we value the pursuit of knowledge, we must be free to follow wherever that search may lead us. The free mind is not a barking dog, to be tethered on a ten-foot chain.[69]

Is the free flow of informing speech important to either individuals or society? The freedom to pursue and advance knowledge as a public good is a view held since the time of Socrates' advocacy of freedom of the academy.[70] The modern concept of scientific freedom can be traced to the 1850 Prussian Constitution, which declared that 'science and its teaching shall be free', and applied to universities, academics, and students. Broadly, it refers to the right of teachers, students, researchers, scientists and academic institutions to be independent in the pursuit and dissemination of knowledge, with the intention of protecting the objectivity of scientific and social inquiry.[71] Like academic freedom, the freedom of scientists to publish research enables the creation, preservation, and dissemination of knowledge. However, the issue of censorship of scientific or technical publications is not new. As discussed above, both the U.S. and Australian governments have found the necessity to classify even the most basic discoveries in certain prescribed fields, such as nuclear energy, and prohibited the dissemination of information for the purpose of the development of weapons of mass destruction, such as biological or chemical weapons. Non-military applications of nuclear technologies, however, are generally limited to nuclear power generation or medical applications, where developments generally occur within a framework of government supervision or regulation. Advances in communications and computer technologies in recent decades have brought about debate over the publication of research in

68 Ibid, at 4.

69 Adlai E. Stevenson Jr. (1900 - 1965), speech at the University of Wisconsin, Madison, October 8, 1952.

70 To Socrates the pursuit of truth was a divine mission. The Socratic freedom of the scholar and student was rooted in the belief that the pursuit of truth was a calling, which transcended the reach of any earthly authority. See generally Gerasimos Santas, *Xenophon, Socrates*. Routledge, Kentucky, USA, 1999.

71 *Report Of The First Global Colloquium Of University Presidents*, Columbia University, January 18-19, 2005.

cryptography. Pressure was brought to bear on researchers and publishers in this field to self-censor scholarly papers and conference presentations, and eventually the American Council of Education agreed to a voluntary self-censorship regime with respect to cryptography.[72]

Researchers across the sciences are at odds over the point of balance between scientific freedom and issues of national security. The notion of 'scientific freedom' as a public good has been criticised as 'employing unrealistic notions and descriptions of the contemporary practice of science',[73] ignoring the realities of commercial and security considerations.[74] However, competing interests do not negate the public's interest in having a free and open flow of scientific information. The progress of scientific development is likely to slow if restrictions are imposed, either by governments or editorial boards. Advances in diverse fields of science typically arise from the development of information contributed to the body of knowledge by other researchers,[75] and the primary effect of censoring the publication of scientific research will be a reduction in the amount and type of data available to international and domestic research communities.[76] The importance of international cooperation and collaboration in scientific research has long been acknowledged: 'In one country..there is always a certain inbreeding of ideas'.[77] Many governments have indicated their intention of promoting the development of biotech industries, with Singapore currently developing a 'Biopolis', an international research and development centre for the biological sciences.[78] Censorship has the potential to

---

72 Monastersky, above n 51, at 5.

73 CA McLeish, *Reactions to Self-censorship*, 20th Pugwash Workshop Study Group on the Implementation of the CBW Conventions, Geneva, November 2003, at 2, available at http://www.pugwash.org/reports/cbw/cbw20/cbw20-mcleish.htm, accessed November 3, 2006.

74 Ibid.

75 Arvin S Quist, above n 8, at 142.

76 In a 1980 study over 63% of significant scientific and technical information was produced and published outside the US, increasing from 25% in the 1950s and 1960s. P. Hernon and C. R. McClure, *Federal Information Policies in the 1980s: Conflicts and Issues*, Ablex Publishing, New Jersey, 1987, at 219, citing the U.S. Congressional Research Service. A 1984 study by the same authors, indicated that over 44% of the citations found in U.S. scientific and technological publications were from foreign sources.

77 J von Neuman, Atomic Energy Act of 1946, Hearings before the Special Committee on Atomic Energy, U.S. Senate, on S. 1717, A Bill for the Development and Control of Atomic Energy, Part 2, 79th Cong., 2nd Sess., Jan. 25, 28-31, and Feb. 1, 1946, U.S. Government Printing Office, Washington, D.C., pp. 210-211 (1946)].

78 See http://www.biomed-singapore.com/bms/sg/en_uk/index.html.asp, accessed June 1, 2007.

keep researchers oblivious to other's work in the same field, which can then lead to the duplication of effort and ultimately the wasting of limited resources.[79] The dissemination of scientific information has, like other scholarly works, both formal (publications, conference presentations, etc) and informal processes (discussions, correspondence, etc).[80] The exchange of ideas and information within scientific communities can also result in contributions to developments made in other fields of science, with restrictions on the communication of ideas and information likely to have an adverse impact on scientific progress generally,[81] and may in fact be counter-productive. Restrictions on scientific information may have the effect of inhibiting the development of measures that can be applied to counter biological threats that arise from terrorists and that occur naturally.[82]

In addition to depending upon a knowledge base developed from others' contributions, science, like other disciplines relies on free and open discussion of theories and findings throughout the development of research output. 'Free dissemination of information and open discussion is an essential part of the scientific process. Each separate study of nature yields an approximate result and inevitably contains some errors and omissions. Science gets at the process of 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.'[83]

As with most disciplines, researchers in the sciences place heavy reliance on the process of review of research work by peers with publication of research and conference presentations allowing research to be subjected to the scrutiny of a wide range of experts in the field of work.[84] The possibility of inaccuracies, increased costs, and delays in research are likely to arise from an inadequate process of peer review, with the process of peer review likely to be undermined if restrictions are imposed, whether by government or editors. Inadequate scrutiny of research findings by others can

79 Gelhorn W, *Security, Loyalty, and Science,* (1950), at 44.

80 Quist, above n 8 at144.

81 Ibid, 143.

82 Donohue above n 39 at 334. Naturally occurring biological threats, such as AIDS, SARS, influenza, and food borne pathogens arguably pose a far greater risk to national and international security, than the threat posed by terrorist use of pathogens.

83 American Association for the Advancement of Science, Committee on Science in the Promotion of Human Welfare, 'The Integrity of Science', *American Scientist* 53, 174-198, June 1965, p. 177.

84 Ibid. at 144 – 145.

ultimately result in a lowering of scientific and technical standards in a given field.[85]

5. *The Trade-off between Science and Security – The Future of the Free Flow of Scientific Information*

As with any free speech debate, the extent that censorship of scientific information is justifiable is fundamentally determined by balancing the competing interests, in this case raising the question of the proportionality of responses to the perceived threat to national security. Debate over the proportionality of responses to the threat of terrorism has been central to the broader legal and political debate over the limits of democratic governments' legitimate actions in the fight against terrorism. A proportionate response requires a rational connection between a legitimate aim and the means adopted to achieve that aim, and assessment of the effectiveness of the measure(s) adopted and of the cost or burden imposed in order to achieve it.[86] Roach argues that 'proportionality analysis is not a simple matter of declaring a security strategy to be proportionate or relying on a crude evaluation of the comparative harms of terrorism and rights infringement',[87] and that a proper analysis of the proportionality of any particular response to the threat of terrorism requires a 'calm assessment of the effectiveness of each measure'.[88]

The difficulty in determining the proportionality of any response to threats to national security is that an assessment of the reasonableness of these responses requires an objective evaluation of the threat or potential harm. The reasonableness of any restriction on scientific publications, whether imposed by government or applied by editors in response to governmental pressure, can only be measured with an understanding of the actual threat presented and the risks associated with this threat. However, because of restrictions on the availability of information concerning matters of national security, this is not possible for those outside of some limited government circles, who may ultimately have a vested political interest in maintaining an atmosphere of fear within society. For those outside of these circles, reliance has to be placed on perceptions formed from the limited available information from governments. Although the risks from and potential consequences of the malicious use of scientific information may be high, there is very little information available on the actual threat. Donohue argues that the actual threat of the malicious use of biological sciences by terrorist is bounded, with few

85 Ibid.

86 Kent, Roach, 'Terrorism, Globalization and the Rule of Law: Must We Trade Rights For Security? The Choice Between Smart, Harsh, or Proportionate Security Strategies in Canada and Britain' 27 *Cardozo Law Review* 2151, at 2172.

87 Ibid.

88 Ibid

terrorists having the knowledge, capability, or access to materials to pose a high probability threat:

While, then, terrorism using CBNRW remains a low probability/high consequence event, any number of other threats—not least of which is naturally-occurring outbreaks of disease—represent high probability/high consequence threats. By cutting off research in microbiology, the state limits its ability to fend off possibly more likely, and just as devastating, disease.[89]

Does the perceived threat justify the application of restrictions on the free flow of informing speech? Is the application of legislative restrictions, or the imposition of self-censorship, on the free flow of informing speech reasonably necessary for the preservation of a civil and ordered society? Among the difficulties that arise from these issues is that much of the information has multiple uses, both legitimate and illegitimate. Critics of the publication in the U.S. of the findings of the Australian research into the mousepox virus warned of the risks of making information on how the virus could be made more virulent available for military or terrorist purposes.[90] Those who defended the publication warned of the risks, including those from naturally occurring pathogens, to the broader community from not having the information available to other researchers.[91]

Numerous scientific authors and U.S. publishers have reportedly felt pressured into self-censoring in an attempt to avert government regulation, seeing 'governance rather than curtailment as the correct course of action.'[92] However, in adopting a policy of self-censorship, a central issue is whether the competing interests are given the appropriate weighting. Critical to this question is the context in which publishers have reacted. Is the perceived threat reasonable? Publishers of scientific journals may, by imposing a system of self-censorship, identify with, and validate a threat model, 'with unreasoned methods susceptible to international, institutional, and political biases.'[93] Fundamental to this argument are the assumptions that publication of multi purpose scientific or technical information increases the likelihood that that information will in fact be used for terrorist or other offensive purposes,[94] and that the threat is sufficiently reasonable to justify the impact on the body of scientific knowledge. Donohue questions the assessment of the risk of terrorists utilising publicly available scientific information that is accepted by scientific publishers:

89 Donohue, above n 39 at 334.

90 Monastersky, above n 51 at 8.

91 Ibid; Donohue, above n 39 at 333.

92 McLeish, above n 73, at 9.

93 Ibid 4.

94 Ibid.

What frequently falls off the table in consideration of counterterrorist provisions is that, although terrorism attracts a great deal of attention, the actual threat is bounded. Fewer terrorist organizations than one otherwise might think have the intent, knowledge, and capability to execute an attack using a weapon of mass destruction. Moreover, there are limits on even these groups' ability to use such weapons.[95]

The reasonableness of the decision by the Journal Editors and Authors Group has been called into question because of the haste with which the decision was made, and the unscientific approach adopted by not testing the threat model presented by the government before accepting it.[96] Unlike their U.S. counterparts, Australian research organisations and publishers have not, as yet, felt the need for the tightening of publication guidelines to meet national security demands, although it remains to be seen whether there will be further pressure applied by the government. It is important to recognize that the application of restrictions on the dissemination of scientific information is not the only mechanism of control available to governments. Is censorship the most appropriate response to the perceived threat of terrorists utilising published scientific information? What other options are available that minimises the threat of a malicious use of scientific research whilst maintaining a reasonable degree of scientific freedom? Several options, discussed below, are worthy of consideration.

5.1 Control of access to biological materials

The application of restrictions on the availability of the biological materials is an alternative that should be further considered. Both the U.S. and Australian governments have utilised this approach with the availability of nuclear materials and, in recent years, the supplies necessary for the manufacture of prohibited drugs. The growth in the manufacture of so-called designer drugs has coincided with the availability of chemical formulae through the internet, making restriction of information needed difficult, if not impossible.[97] Governments have limited the likelihood of harm through regulation of the availability of the materials necessary to manufacture the illegal substances.[98] Restrictions of constituent materials also form a part of the control of nuclear technologies and weapons of mass destruction. This is, arguably, a more effective means of limiting the likelihood of an illegitimate use of the information, whilst not restricting legitimate use for scientific research. However, the difficulty then becomes a

95 Donohue, above n 39 at 332.

96 See p. 10 supra; also see McLeish, above n 73, at 9.

97 For example, see www.erowid.org/chemicals/mdma/mdma_chemistry.shtml; http://www.erowid.org/chemicals/lsd/lsd_chemistry.shtml; http://leda.lycaeum.org/index.pl?ID=8731.

98 For example see *Drug Misuse and Trafficking Act 1985* (NSW) s 24A.

question of access by scientific researchers to the necessary resources for legitimate purposes.

5.2 Restricting research in high-risk areas

One of the fundamental approaches to the control of nuclear technologies and the information associated with it has been to impose strict controls on research in this field. The application of this approach to biological sciences may limit the threat of a malicious use of biological resources, although unlikely to eradicate it altogether.[99] Tailoring restrictions to limit the burden imposed on research could limit the potential for malicious use, for example, applying restrictions based on type of disease, type of research or purpose of research.[100] However, there are difficulties in applying this approach to the biological sciences. It requires categorisation of the biological sciences. Compartmentalisation of this type requires an ability to neatly categorise the research conducted. However, as discussed earlier in this paper,[101] compartmentalisation of the biological sciences is not a simple matter, with advances often arising from unrelated research. Additionally, biological sciences are fundamental to the advancements in public health.[102] Donohue argues that, 'While it is in the national interest to prevent terrorist organizations from obtaining biological weapons, it is not in the national interest to stunt research into (more likely) naturally occurring disease.' Furthermore, the biological sciences have now become central to progress in a number of diverse industries, including pharmaceuticals, oil, and plastics.[103]

Applying restrictions on who can be involved in specific areas of research is no guarantee that the information will not be used maliciously. Federal authorities in the U.S. traced the strain of the anthrax used in the 2001 attacks in the U.S. to a U.S. Army research facility. In May 2002, *New Scientist* reported that:

The DNA sequence of the anthrax sent through the U.S. mail in 2001 has been revealed and confirms suspicions that the bacteria originally came from a U.S. military laboratory...The two reference strains that appear identical to the attack strain most likely originated at the U.S.

---

99 Donohue, above n 39 at 332. In spite of government efforts to prevent information on the atomic bomb from being published information was widely available, including an article by Edward Teller, one of the creators of the weapon, published in *Encyclopedia Americana.* See L.A. Powe 'The H-Bomb Injunction', (1990) 61 *University of Colorado Law Review*, 55, at 62

100 Donohue, above n 39 at 332.

101 Above, Part 3 *Do Restrictions Matter.*

102 Ibid 330. This argument has been central to recent debate in the U.S. and Australia over the conduct of stem cell and embryonic research.

103 Ibid.

Army Medical Research Institute for Infectious Diseases at Fort Derrick, Maryland.[104]

Although no prosecution was ever commenced, the U.S. Attorney-General subsequently announced that the principal suspect was a former employee of the research facility.[105]

5.3 Self-regulation

As has been previously acknowledged national security interests can, and do, require the imposition of reasonable restrictions on information where it is judged that the risk of harm outweighs the benefits that may be obtained from its distribution. The restriction of multiple purpose information is arguably more easily justifiable where the 'legitimate' purpose has limited application, such as nuclear technologies, where prohibition rather than regulation is desired.[106] However, this is not so clear where the information has a broader range of legitimate uses, such as microbiology and other biological sciences. The difficulty here is identifying possible illegitimate uses of information:

The assumption that dual use technology will fulfil its potential and be used for hostile purposes is both linear and deterministic and is incompatible with the normative structure of the model of scientists which sees pursuit of science as a social good.[107]

While self-censorship may be seen as a preferable means of vetting the dissemination of scientific information, the reasonableness of this will depend on the extent to which authors and publishers are able to establish a method by which appropriate criteria are used to judge the potential harm that could arise from publication. However, what criteria are appropriate? Although there may be difficulty in establishing criteria that are applicable in all circumstances, there are certain factors that researchers and editors could take into consideration. These include the availability of the necessary biological components to utilise the information, current research in a given field, an objective assessment of the possible beneficial uses of the information contained in the research, and an objective, and rational assessment of the threat posed by the possible malicious use of that information.

Although many see the advancement of knowledge, particularly scientific knowledge, as a supreme human value, political realities

---

104 Available at http://www.newscientist.com/article.ns?id=dn2265, accessed June 1, 2007.

105 Marilyn W Thompson, *The Pursuit of Steven Hatfill*, available at http://www.ph.ucla.edu/epi/bioter/pursuithatfill.html, accessed June 1, 2007.

106 McLeish, above n 73 at 9.

107 Ibid.

dictate that this objective is no longer practicable. It is undeniable that we have entered a new era of international insecurity caused by the threat of terrorism, with governments, researchers, and publishers all faced with the need to consider a fundamental trade off between scientific progress and national security concerns, and finding where the appropriate balance lies. National security has long been used by governments to justify the imposition of restrictions on various forms of speech. Legislative and executive authority is used to censor, or impose criminal penalties on, speech, justified by the perceived need to protect national interests. Restrictions imposed on the dissemination of information from nuclear research have been a contributing factor in constraining the development of nuclear weaponry, particularly by non-state actors. However, the biological sciences pose a different challenge. In addition to the broader legitimate uses of information within the biological sciences, the past application of restrictions has generally arisen through a process of reasoned consideration of all factors, including the objective risk from improper use of information. This has been difficult in the current political climate. The unquestioning acceptance of a politically influenced risk assessment, although expedient, should not be assumed to contribute to any real reduction in the threat of terrorism. The risks involved in not publishing are too great to allow decisions like this to be made without an objective assessment of the threat that is purported to justify the restriction. To do so jeopardises not only the independence of researchers (already threatened by commercial interests), but also the quality and quantity of information contributed to the body of scientific knowledge.