Chapter 8
Pacing Science and Technology with Codes of Conduct: Rethinking What Works

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8.1 Introduction

Against social, political, and ethical concerns associated with developments in science and technology (S&T), continuing suggestions have been forwarded that scientists and engineers should adopt what are generically referred to as "codes of conduct."[1]

By way of understanding the utility of codes in addressing societal challenges, this chapter provides an in-depth analysis of one set of initiatives: attempts to prevent the destructive use of life science research findings and techniques. Particularly since 9/11 and the US anthrax attacks, concerns have been raised by a diverse range of organizations about whether the potential for life science fields to transform health and research techniques might facilitate the deliberate spread of disease; and if so, what responsive measure should follow to minimize these threats. For instance, reports such as the 2003 US National Academies' *Biotechnology Research in an Age of Terrorism,* the 2006 Royal Society-InterAcademy Panel-International Council for Science's *Scientific and Technological Developments Relevant to the Biological & Toxin Weapons Convention*, and the 2008 report *World at Risk* from the US Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism have suggested how developments in civilian research across a wide range of disciplines are helping to lower the barriers to and enhance the power of bioweapons.[2]

[1] Examples of code initiatives in nanotechnology include, for instance, the European Commission's 2008 Recommendation document *On a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research*, the European Nanotechnology Trade Alliance's *Developing a Nanotechnology Code of Conduct for European Industry*, the collaborative *Responsible NanoCode*.

[2] Royal Society. 2006. *Report of the RS-IAP-ICSU international workshop on science and technology developments relevant to the Biological and Toxin Weapons Convention.* London: Royal Society.

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In this way, the concern is that the knowledge derived from life science fields – such as virology, molecular genetics, neuroscience, synthetic biology and elsewhere – could *further* rather than *prevent* the spread of disease. As the potential accorded to the life sciences to revolutionize our understanding of the world for benefit are stressed in popular and policy discussions, many have identified security concerns that follow on since post-9/11. With such profound and wide ranging concerns, challenging questions have been asked about what sort of research should be done, under what conditions, and whether it should be communicated.[3]

A widespread starting presumption of these discussions has been that the said ever accelerating pace of developments and (related to this) the worldwide proliferation of life science research frustrate traditional approaches of devising formal rules and regulations. As elsewhere, but perhaps particularly pronounced in this case, "codes of conduct" have been forwarded as means of (largely) self-regulation adept enough to keep pace with the speed of developments in S&T. Codes have received significant (renewed) attention in numerous national and international settings as ways of fostering a "culture of responsibility," most notably during the 2005 and 2008 meetings of governments to the Biological and Toxin Weapons Convention (BWC). Since 2003, the author has observed and actively contributed to varied efforts along these lines.[4]

Beyond recounting one area where codes have been offered as a way to address a perceived gap between accelerating technology and lagging regulatory oversight, this paper seeks to reframe traditional approaches to codes' utility more generally. This will be done by not just asking whether bioweapons-related codes have "worked" in plugging gaps, but by questioning what "working" should be taken to mean. While codes have been portrayed as instruments to guide the behavior of practitioners, many factors have frustrated achieving this aim. As will be contended, it is in the very process of deliberating about codes that codes have had most significance in helping track S&T – such as through building of shared agendas and enabling future co-ordinated initiatives. In many respects, the outcome of codes talk has been their enactment. The limits and dilemmas of this role will lead to a consideration of the place of skepticism and belief in the policy making process.

8.2 Some Preliminary Points

Although "codes of conduct" are hardly novel, in recent decades they have increasing been offered as means of responding to and avoiding dubious practices across

[3] Rappert, Brian. 2008. Defining the emerging concern with biosecurity. *Japan Journal for Science, Technology and Society* 17: 95–116.

[4] Facilitated by a grant from by the UK Economic and Social Research Council (ESRC) New Security Challenges Program (RES-223-25-0053) running from 2004 to 2007. See Rappert, Brian. 2009. *Experimental secrets.* Lanham, NY: University Press of America.

many domains.[5,6] This term is routinely used to refer to activities with a wide range of:

– aims (for instance, aspire, educate, foster ethical debate, prescribe or proscribe behavior)[7];
– drafters (for instance, professional associations, companies and other organizations, governments, inter-organizational bodies); and
– target audiences (for instance, individuals, professional bodies, members of industrial alliances).[8]

As a result, what is labeled as a code of conduct with regard to one set of issues (for instance, corporate environmental responsibility) might be quite different in character than one for another area or even other codes addressing the same set of issues. With this elasticity, the scope for misunderstanding and cross-talk is considerable.[9]

Historically in the biosciences, efforts to devise codes have been less intense than in engineering or medicine where professional-client relations have raised recurring questions about appropriate conduct.

Social scientists and ethicists who have examined codes in science and engineering typically have done so through asking two questions:

Do codes work?
And, could codes work?

With regard to the former, contrasting claims are often made about the utility of science codes.[10] Aspirational, educational, and advisory orientated ones have been criticized for being vague, open to multiple interpretations, ineffective to stop would-be trespassers, and often poorly known. As well, it has been argued that the provisions of codes tend to codify existing practices rather than set new standards that could change behavior.[11] Others have rejoined that rather than being a way to change behavior, they can help raise awareness about important topics, alert individuals to specific sensitive matters, foster standards and ethical reflection about

[5] See www.codesofconduct.org for many written examples.

[6] Kaptein, Muel. 2004. Business codes of multinational firms. *Journal of Business Ethics* 50: 13–31.

[7] Rappert, B. 2004. Responsibility in the life sciences. *Biosecurity and Bioterrorism* 2(3): 164–175.

[8] Royal Netherlands Academy of Arts and Sciences. 2007. *A code of conduct for biosecurity*. Amsterdam: KNAW.

[9] While a matter of speculation based on my personal experience, the uncertainty about what is meant by the term 'code of conduct' is probably highly functional in contributing to suggestions of their utility.

[10] Rappert, Brian. 2004. *Towards a Life Sciences Code: Countering the Threats from Biological Weapons*. Bradford Briefing Papers (2nd series); No. 13 See http://www.brad.ac.uk/acad/sbtwc/briefing/bw-briefing.htm

[11] Pels, P. 1999. Professions of Duplexity. *Current Anthropology* 40(2): 101–114.

emerging issues, clarify responsibilities, and increase public confidence.[12] Much of the evaluation of the sub-set of codes that include sanctionable requirements turns on the case by case commitment made to their enforcement.

With regard to the question of whether codes *could* work, some have argued that to think abstract guidelines could determine appropriate conduct for specific situations misconstrues the nature of ethical decisions.[13]

8.3 Codes and Biological Weapons: Expectations and Transformations

The potential range of initiatives that can be labeled as a "code" and of criteria that might be brought to bear in their evaluation make it rather restrictive to define in advance what counts as an instance of one. Rather, in considering their utility for pacing S&T, being open to how codes are multiply defined allows for an appreciation of the diversity of agendas being sought.

In relation to concerns associated with the destructive potential of life science research, an indication of the range of types, purposes, and changing expectations for the codes suggested is indicated by Box 8.1.

Box 8.1 Proposals for Biosecurity Codes

A Hippocratic Oath for Scientists?

Proposal: As part of attention to terrorist threats after 9/11, a 2003 report by the British House of Commons Science and Technology Committee titled *Scientific Response to Terrorism* suggested that "an overt ethical code of conduct linked to professional membership analogous to the Hippocratic Oath" be established for those working with dangerous substances or pathogens.[14] The Committee further added that if "the scientific community does not take stronger action to regulate itself then it risks having ill-judged restrictions placed on it by politicians."[15]

[12] See as well Atlas, R., and M. Somerville. 2007. Life sciences or death sciences. In *Web of prevention*, eds. B. Rappert and C. McLeish. London: Earthscan.

[13] Ladd, J. 1991. The question for a code of professional ethics. In *Ethical issues in engineering*, ed. D. Johnson, 130–136. Upper Saddle River, NJ: Prentice Hall.

[14] House of Commons Science and Technology Select Committee. 2003. *The scientific response to terrorism.* HC 415-II, Examination of Witnesses, May 14, 2003. London: HMSO.

[15] Ibid.: paragraph 211. See as well Times Higher Education Supplement. 2003. Agree ethics code or face state control. *Times Higher Education Supplement*, 14 Nov.

Result: While this suggestion was directed at learned and professional societies as well as public research funding agencies, to have linked a code to membership would have required introducing a new framework for controlling who can practice research (since, for instance, membership of a scientific society is rarely needed to conduct research). Entry into science is not licensed in the same way as fields such as engineering and medicine in the UK. No such membership ethical code was introduced along the lines the Committee proposed – either by scientists or politicians. No stronger impositions followed as warned.

Uniting Around a Restricting Code?

Proposal: In 2002, the Working Group of the United Nations and Terrorism recommended that "Relevant United Nations offices should be tasked with producing proposals to reinforce ethical norms, and the creation of codes of conduct for scientists, through international and national scientific societies and institutions. . .[s]uch codes of conduct would aim to prevent the involvement of defence scientists or technical experts in terrorist activities and restrict public access to knowledge and expertise on the development, production, stockpiling and use of weapons of mass destruction or related technologies".[16]

Developments: The International Centre for Genetic Engineering and Biotechnology (ICGEB) – a UN provider of training in biotechnology for countries of the developing world – was tasked by the UN Assistant Secretary for Disarmament with this responsibility. The ICGEB sought to collaborate with the Inter-Academy Panel (IAP) – an umbrella organization for prestigious national academies of science. This collaboration eventually ended as the IAP decided to produce *principles* that its member academies could incorporate into their own codes rather than the joint code envisioned by ICGEB. This was the case in large part because as an umbrella body of a diverse range of national academies, the IAP could not get all its member academies to adopt a code as such.

Result: The 2005 IAP *Statement on Biosecurity* provided five short principles to inform national academy codes.[17] By June 2005 ICGEB also

[16]United Nations. 2002. *Annex report of the policy working group on the United Nations and terrorism* A/57/273-S/2002/875, 6 August 2002. Available at http://www.un.dk/doc/A.57.0273_S.2002.875.pdf

[17]InterAcademy Panel. 2005. IAP statement on biosecurity, 7 Nov 2005 http://www.nationalacademies.org/morenews/includes/IAP_Biosecurity.pdf

decided to produce "building blocks" that others could draw on.[18] Neither set of advice included provisions setting out restrictions to access to knowledge and expertise as originally proposed.

A Universal Code?

Proposal: After the US rejection of a verification protocol for the Biological Weapons Convention in 2001, President Bush made a call for States Parties to the convention to "Devise a solid framework for bioscientists in the form of a code of ethical conduct that would have universal recognition."[19] At the US insistence, the BWC had as the topic for its 2005 meetings "the content, promulgation, and adoption of codes of conduct for scientists".[20]

Developments: By 2005, the US reversed its position to contend that a universal code would not be feasible.

Result: In 2005, possible considerations for a code were outlined in the final report of States Parties to the BWC.[21] In 2006, these states decided to re-examine this topic in 2008. As the BWC had a non-negotiating mandate for both the 2005 and 2008 meetings, no international code was agreed among states through the meetings and only several states reported on the national introduction of relevant codes.

I wish to draw out a number of observations from the initiatives in Box 8.1, points that characterize bioweapon codes discussions post-2001 more generally. One, this option has come up in various organizations as a way to guide the conduct of scientists. While professional codes with bioweapon-related components have been proposed in previous decades, the range of organizations involved and the extent of their attention to this option increased markedly after 9/11.[22] What has

[18] ICGEB. 2005. *Building blocks for a code of conduct for scientists, in relation to the safe and ethical use of biological science.* Trieste: ICGEB.

[19] Bush, G. 2001. *President's statement on biological weapons,* 1 Nov 2001, see http://www.whitehouse.gov/news/releases/2001/11/20011101.html

[20] Fifth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction. *Draft Decision of the Fifth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* BWC/CONF.V/CRP.3 6 November 2002.

[21] *Report of the Meeting of States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction* BWC/MSP/2005/3 14 December.

[22] Rappert, B. 2004. *Towards a Life Sciences Code: Countering the Threats from Biological Weapons.* Bradford Briefing Papers (2nd series) 2004; No. 13 See http://www.brad.ac.uk/acad/sbtwc/briefing/bw-briefing.htm

been sought has not been so much a list of definite do's and don'ts, but rather means of engendering a "culture of responsibility".

Two, just who should be responsible for realizing a code has been a matter of some importance, not least because of the mix of science and security-orientated organizations with a stake in the issues. As suggested by the examples in Box 8.1, those associated with science have been looked to to undertake action for themselves.

Three, the fragmented and partial manner in which science is professionally structured curtails the potential to devise the sorts of codes that exist in other domains where entry to a profession is routinely subjected to licensing requirements.

Four, different threats in need of attention have been identified. While some activities have focused on fairly traditional matters such as physical access to pathogens, others (such as the Working Group of the United Nations and Terrorism) have gone beyond this to include publication practices. Determinations of what needs to be included have turned on contentious matters such as the extent of (terrorist) threats from biological weapons and feasibility of (often basic) research findings facilitating new capabilities.

8.4 What Has Been Accomplished?

For those looking for evidence of codes working as guides for conduct across the troubling waters where science and security intersect, experience in recent years might well be regarded as worrisome.

8.4.1 Codes As Exercises in Deferral

A possible source of concern would be the widespread practices evident of what might be called organizational "deferral". One way this manifested itself is in the secondary, advisory quality of many "codes". As alluded to in Box 8.1, prominent international players – such as the IAP, ICGEB, OECD, the BWC as well as the International Committee of the Red Cross and the International Union of Microbiological Societies – elected not to bring about a code but to provide advice to others about possible content for one. While this can be regarded as a prudent step to leave specific codes to those bodies closer to day-to-day research, it has had problems as well. Not least, it is not clear that many other organizations have acted on the advisory calls of these organizations. The only exception known to the author is the IAP *Statement on Biosecurity*. To date, among the nearly 100 member academies of the IAP, one follow-on code has been produced by the Royal Netherlands Academy of Arts and Sciences.[23] Technically, however, that biosecurity code is itself not a code as such, but again a set of provisions that research and business organizations

[23]Royal Netherlands Academy of Arts and Sciences. 2007. *A code of conduct for biosecurity.* Amsterdam: KNAW.

in that country could draw on for their own code – though again, it is not clear any have done so.

Deferral is evident in other respects. Consider the example of the National Advisory Board for Biosecurity (NSABB). It was set up in 2004 to provide advice to the US federal government about responses to concerns about how the findings and techniques of modern research might be misused. NSABB established a number of Working Groups to deliberate options and provide recommendations on a national institutional oversight framework, science communication, codes, synthetic biology, and international outreach. At the 13 July 2006 meeting of NSABB, *Considerations in Developing a Code of Conduct for Dual Use Research in the Life Sciences* was agreed by members of the Board.[24] As suggested by the title, this document does not provide a code or even recommend that one be adopted by relevant US agencies. Rather, as with the initiative mentioned above, it outlines considerations others could take up. As above, as far as is known to the author, no organization has acted on this to date.

Moreover, through the *Considerations* document, the NSABB Codes Working Group deferred responsibility to the other working groups. This was because the "shoulds" given almost wholly consisted of reiterations of the need for measures that were to be advised upon by the other Working Groups as specified in the Board's original 2004 charter. For instance, researchers were asked to assess the dual use potential of their research, which another working group in NSABB was devising advice about, and so on. Rather than adjudicating on any thorny matters, the provisions in *Considerations* restated the need to address them.

8.4.2 Follow Through?

A number of codes have sought to provide specific guidance on contentious issues. For instance, a group of NGOs lead by the Federation of American Scientists delineated what was permissible in biodefense programs.[25] Somerville and Atlas' nine-point *Code of Ethics for the Life Sciences* provides succinct ethical points intended to promote reflection about what constitutes responsible science.[26] Yet, none of these advocacy-orientated codes have been adopted more widely.

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[24] http://www.biosecurityboard.gov/pdf/NSABB%20Draft%20Guidance%20Documents.pdf

[25] In November 2002 the Federation of American Scientists, Stockholm International Pease Research Institute, Verification Research, Training and Information Center, International Network of Engineers and Scientists for Global Responsibility, Acronym Institute for Disarmament Diplomacy, Sunshine Project, Pax Christi International, Physicians for Social Responsibility, and 20/20 Vision agreed draft recommendations for a code of conduct for biodefence programs. These were published as an Annex to Barbara Hatch Rosenberg, Defending against biodefence: the need for limit. *Disarmament Diplomacy*, Issue No. 69, February – March 2003. Available at: http://www.acronym.org.uk/dd/dd69/69op03.htm

[26] Somerville, M., and R. Atlas. 2005. Ethics: a weapon to counter bioterrorism. *Science* 307: 1881–1882.

The aforementioned paragraphs should not be taken to imply that no science organizations have adopted a bioweapons-related code. Yet, summary comments can be made about these initiatives that raise questions about their ultimate importance. One, such science codes have tended to consist of very short statements that provide little extension of current accepted standards, national regulations, or international laws. For example, in 2005 the International Union of Biochemistry and Molecular Biology agreed to a *Code of Ethics* which stipulated that members would not "engage knowingly in research that is intended for the production of agents of biological warfare or bioterrorism, nor promote such agents."[27] The 2005 *Code of Ethics* of the American Society for Microbiology underscored that bioterrorism was abhorrent.[28]

Two, where adopted codes have been more elaborated, it is not clear that many have been implemented with any conviction. So while the American Medical Association's *Guidelines to Prevent Malevolent Use of Biomedical Research* within its professional codes makes relatively detailed recommendations for new safeguards and oversight mechanisms for research,[29] their adoption and enforcement seems to have received little prioritization within the Association.

8.5 Reframings

To summarize the argument so far, against the said revolutionary advances taking place in the life sciences, codes have been forwarded as a central component of the policy responses. Numerous organizations associated with the governance of research have deliberated the whys and hows of bringing in a code since 2001. And yet, for all the activity that has taken place, little by way of concrete accomplishments relevant to practitioners can be identified. Judged on the basis of the number of codes, their effects in changing behavior, or their importance for the refinement of normative standards, progress to date would almost assuredly be found wanting. "High input for low output" would be one précis. As a result, the suggestion that codes have helped scientists kept pace with concerns about the potential of research to spread disease seems rather fanciful.[30]

Such a product oriented evaluation marginalizes the wider functions served by codes. Rather than looking at code documents and then asking whether they

[27] http://www.iubmb.unibe.ch/Standing_Orders/Code_ethics.htm

[28] http://www.asm.org/ASM/files/ccLibraryFiles/FILENAME/000000001596/ASMCodeofEthics05.pdf

[29] See Green, S., S. Taub, K. Morin, and D. Higginson. 2006. Guidelines to prevent malevolent use of biomedical research. *Cambridge Quarterly of Healthcare Ethics* 15: 432–439.

[30] For another instance of the reading of responsive measure as an effort in the 'simulation of control', in this case the risk-benefit analysis of the security implications of research, see Rappert, B. 2008. The benefits, risks, and threats of biotechnology. *Science and Public Policy* 35(1): 37–44, Feb.

have helped direct the behavior of practitioners, the process-oriented aspects of the deliberation about codes can be highlighted – what can be coined "codes talk".

This talk has served to enroll individuals and organizations into a certain (and for some rather novel) set of issues. For instance, the deliberation about codes within the IAP has acted to signal a level of unease within and outside of it regarding the potential destructive use of science. This, in turn, has provided an opportunity for those concerned within member academies to make a place for the biosecurity issues within crowded agendas. So, while preciously few codes have been produced, the author has collaborated with those in the science academies of Ukraine, United Kingdom, Israel, Uganda, and elsewhere, all of which have internally cited the IAP's *Statement on Biosecurity* to justify dedicating time and energy to this topic.

Further to these process benefits of "codes talk," as mentioned previously, the Royal Netherlands Academy of Arts and Sciences is the only national academy to date that has formally adopted a code on the back of the IAP's *Statement on Biosecurity* – in fact, a "code" better characterized as a set of considerations for others' codes. And while little has emerged in the way of follow-on outputs, the issue of devising a code has provided the focal topic for a series of consultations with practicing scientists and others held in the Netherlands by the Dutch academy.[31] Within these settings, awareness raising about the security dimensions of science has been a prime goal.

Much the same process aspects could be said about the 2005 and 2008 meetings of the BWC where science organizations with previously little engagement in international arms control participated in discussions about the security issues associated with life science research. In these settings, the topic of codes for *scientists* had the additional benefit of making the case for opening access to the BWC proceedings beyond those in government traditionally concerned with national security.

The previous claims suggest a certain placeholder function being fulfilled in recent years: the topic of codes provides a convenient one for bringing varied people together to discuss how to prevent the destructive applications of research. In this sort role, "codes" open a curious space. It is a space in which "everything" and "nothing" is at stake. With regard to "everything" – in raising questions about what constitutes proper conduct, codes talk provides an envelope for speaking to a wide range of issues and invites questions about how to set normative standards. Most people can find something to contribute regarding what should count as standards for conduct. Animated conversation can quickly turn into heated disagreement though as different ethical presumptions and pragmatic goals are traded.[32] To the extent code talk is treated as an occasion for trying to settle debate about what does and does not constitute acceptable conduct, then it is about a great many things.

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[31] Van der Bruggen, K. 2009. Science of mass destruction. In *Biosecurity,* eds. B. Rappert and C. Gould. London: Palgrave.

[32] As in the debate codes in synthetic biology. See Check, Erika. 2006. Synthetic biologists try to calm fears. *Nature* 441, 388–389 and Etc. 2006 'Global Coalition Sounds the Alarm on Synthetic Biology' News Release 19th May. Available at http://www.etcgroup.org/en/issues/synthetic_biology.html.

With regard to "nothing" – given the modest accomplishments with codes in the past and the lack of significant prospects for them in relation to bioweapons, the talk is not likely to be consequential either. As a series of discussions rather than a movement towards binding proscriptions, codes talk has been rather limited too.

8.6 Evaluating the Process

Just what assessment should be given of the process-based dimensions of codes is a matter open to interpretation. On the negative side, the failure of the focus on codes to live up to the promise of guiding behavior and the lack of policeable standards agreed upon could be seen as quite problematic.[33] Against the suggestion that codes talk has served as a basis for achieving alternative aims – such as raising awareness – it could be countered that it would be more appropriate to undertake activities that directly set out to achieve these goals. The attention to codes in recent years could be said to be not a very efficient means to achieve notionally secondary ends or, more critically, a distraction eating up limited resources.

In contrast, the sympathetic reading could treat codes talk as part of an iterative effort to enroll more groups in attempts to counter threats from biological weapons. Given the relative absence of engagement by many science organizations into this matter in the past, any efforts that achieved significant traction could be judged as positive. In the case of the BWC, the active participation by groups traditionally outside of diplomatic arms control had the additional benefit of reinvigorating that convention. With the building up of community commitment achieved to date, it is possible to move further ahead in the future.

A major impediment to choosing between these negative and positive evaluations is uncertainty about what will happen in the future. What codes talk has enabled is still to be decided. Whether with the hindsight of history codes deliberations will be judged a sterile dead end or a stepping stone that (eventually) lead to highly significant activities cannot be resolved now; it depends on the twists and turns of what is to come.

Yet this situation presents an awkward trouble for those deciding about their participation in codes talk *now*: how is it possible to decide whether to press on with current efforts? In other words, when can it be said codes talk has degraded from a useful enrolling prelude that should be nurtured to instead become a stifling spinning of wheels that has gone on too long? Consider Box 8.2 in this regard. It characterizes and quotes some of the summarizing statements from controlled access meetings primarily dedicated to codes in the UK organized by the Foreign Office.

[33]Though at the time of writing, an industry association for the five leading German companies in the field of synthetic biology (Industry Association Synthetic Biology) issued a *draft* 'Code of Conduct'. See http://daccessdds.un.org/doc/UNDOC/GEN/G08/644/46/PDF/G0864446.pdf?OpenElement

Box 8.2 Meetings About Codes in the British Foreign Office

2003 – Initial seminar of those across government, academia and industry in the UK to discuss "utility, scope, promulgation, implementation, reactions, enforcement and next steps." A background note to that seminar indicated that "The starting premise of this note is that a code of conduct *is* a desirable objective because it can play a significant role in raising awareness of the [BWC's] prohibitions among the scientific and engineering community. . .A code of conduct is not a panacea, but one tool amongst many for combating BW proliferation. . . .The main issues here are what might a code contain and how might it be taken forward."[34]

2004 – Follow up seminar wherein a key message was that "further work on codes should build on existing systems, but that an overall statement of core principles could be developed as a guide for such continuing work."[35]

2005 – Meetings of the Biological and Toxin Weapons Convention that lead to advisory provisions by States Parties for organizations to take up as deemed appropriate.

2006 – Meeting in which it was decided "The imperative was to keep the issue alive and under discussion. It was encouraging to know that the general consensus was that, if embedded in existing systems and both feasible and proportionate, codes of conduct had a utility."[36] The summary of the session indicated that future work still to be undertaken would "ensure the appropriate progress continued."[37] This included that "there might be some role for Government in the production of suitable educational material but that the process of raising awareness and education in the science community should not be led by Government in the UK."[38] It also included that "the participants thought it would be useful to have a repetition of the seminar next year, possibly including international partners."[39]

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[34]Emphasis in original. See FCO. n.d. *FCO Discussion Paper on a Possible Biological and Toxin Weapons Convention (BTWC) Code of Conduct.*

[35]FCO. 2004. *Biological and toxin weapons convention: Code of conduct. Lancaster house seminar 15 December 2003 Main Points.* London: FCO: 2.

[36]United Kingdom. 2006. *Codes of Conduct for Scientists* Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction BWC/CONF.VI/WP.23 Geneva, 13–24 June 2005: 22 November: 2.

[37]Ibid., 2.

[38]Ibid., 2.

[39]Ibid., 2.

2008 – Meeting considering "lessons from history; current activities in academia and industry; government initiatives; international aspects; and lessons from [chemistry] on educational aspects that might be relevant for the BTWC."[40] It was concluded that "The UK recognises that codes of conduct for scientists and awareness raising campaigns do not offer a foolproof defence against the misuse of the life sciences for hostile purposes. But what they can do – along with measures on oversight and education – is to heighten the levels of awareness in the academic and research communities of the need for care; highlight the nature of the Convention's legal prohibitions; and promote the need to address issues such as technology governance on a continuing basis. Such issues cannot be dealt with quickly; sustained efforts by a broad range of stakeholders are required over an indefinite period of time."[41]

Three elaborations can be offered that extend the points raised in Box 8.2 and also relate the points to the broader themes of this chapter. One, in a certain respect the developments read in the reverse order of what would be expected if the process were advancing ahead toward some significant achievement. In 2003, the premise was that a code for (British) life science was a good idea that should be taken forward. The question was how. By 2008, the discussion focused on what might well be taken as groundwork lessons that could be drawn from elsewhere. Yet, despite this reversal in fortunes, the topic of codes continues to function as a focal point.

Two, not so apparent from the quotes themselves but key to enrollment dimensions of codes talk has been the changing audience participation in the meetings. Particularly the 2006 meeting brought the attendance of individuals new to the topic (i.e., practicing researchers). Even if the themes across years were notably similar and the prospects for achieving the systematic code first envisioned in 2003 were markedly receding over time, a broadening range of individuals were being brought into deliberations. As such, at any stage there was always a sense of a justification for continuing a conversation, even if it had become repetitive for some participants.

Third, what achievements could be realized have had an overtly "to-be-decided" flavor that could not be limited by what had come so far. Much of the prospects still lay in the future. While it seems rather unlikely to the author to believe any additional code achievements will take place in the UK beyond what has happened to date,[42] this cannot be completely ruled out either. Future world events are likely

[40] United Kingdom. 2008. *Oversight of ewmerging technologies: Examples of UK approaches to responsible development of science.* BWC/MSP/2008/MX/WP.11 12 Aug, available at http://daccessdds.un.org/doc/UNDOC/GEN/G08/626/54/PDF/G0862654.pdf?OpenElement

[41] Ibid., 6.

[42] As in the Health Protection Agency. 2005. *Principles of good scientific practice.* London: HPA, Aug.

to determine to what extent the codes talk in the UK to date has set the conditions for noteworthy accomplishments.

As an additional point complicating assessments of activities in the UK, the "mutually reinforcing" benefits of code activities have gained greater prominence over time. Codes are not seen as an achievement in themselves so much as part of wider set of developments being nurtured now and that will need to be sustained into the future. Not only does this contextualizing complicate making evaluations of what has been achieved with codes specifically, it also signals how attention to the process importance of "codes talk" is becoming explicitly recognized within deliberations. "Keeping the conversation going" is being portrayed as part of what needs to be done to keep attention on the potential for hostile use of the life sciences within a range of audiences.

8.7 A Disruption

The previous argument might be taken to affirm a prime contention that has been made by others studying codes of conduct: the process aspects of devising them are often central. Gotterbarn spoke in highly evocative terms to the importance of their consultative dimensions with the remark that *a code is nothing, coding is everything*.[43] Thus, one lesson that might be drawn is that what might be termed the "informal" dimensions of codes need to be central in any evaluation.

Such a message sensitizes us to a set of issues that might otherwise be passed over in evaluating how codes help to pace S&T developments. Yet for me as a policy analyst who has partaken in many deliberations about codes around the world, this conclusion and the argument of the previous section misses a major consideration: the rife doubt evident within international deliberations about the prospects for what can be achieved through codes – either by the codes themselves as instruments for guiding behavior or by codes talk acting as a springboard for follow up activities.

The summary given of the British Foreign Office deliberations gives just one indication of how the starting value attached to codes post-9/11 rather quickly faded. And yet, despite recognized limits, the attention to codes has continued all the same.

In my estimation there are few candidates that could be nominated as "believers" about the importance of codes to prevent the hostile use of the life sciences, even fewer if one moves away from prepared statements to engage people in private dialogue. While governments of varied stripes and science organization representatives presenting official position papers in fora such as the 2005 BWC meetings might attribute codes with much importance,[44] in my experience this has not been matched in policy meetings with a less public face. Indeed, with the lack of evangelicals, the author as someone studying this option has been extended numerous invitations to assume such a role. My repeated experience of being positioned as an advocate

[43] Gotterbarn, D. 1999. Not all codes are created equal. *Journal of Business Ethics* 22: 81–89.

[44] Rappert, Brian. 2009. *Experimental secrets.* Lanham, NY: University Press of America.

was, in fact, a prime inspiration for writing an autobiographical-style monograph, a book that examined my history of engagement with recent code activities in order to comment on the dilemmas that can arise for social researchers in trying to undertake "policy relevant" research.[45]

With this observation about the widespread disbelief evident, some follow-on clarifications are worth making. The earlier proposal to examine "codes talk" as a process of enrollment might well be taken by some readers of this chapter to imply a certain type of orientation has been evident in policy discussions to date. So, for instance, it could be taken to suggest that a commonplace sentiment echoed is that with just a little more sustained effort, significant achievements could be obtained. Or that the argument is often put that codes provide especially fruitful foci for international discussions. Yet, certainly as part of the interactions I have participated in, such promissory and exceptionary claims are rarely made.

After the several years in which bioweapon-related codes have been debated, for me the matter in need of consideration is not just why potential is still invested in them despite the limited achievements to date, but also why have they been discussed this long despite the early and frequently expressed personal doubt expressed by individuals about their likely potential.

8.8 A Reconsideration

How can this situation be made sense of and what does it tell us about the policy process? Some might seek to explain the continuing attention despite the limited hopes for progress. This could be related to institutional inertia, geopolitics, the play of personalities, or a host of other factors.[46]

In the remainder of this chapter, instead of pursuing such lines of explanation, I want to use the consideration of codes as an occasion for reflecting on wider issues about the place of doubt within policy-making processes. These comments are speculative in nature, but they are based on my experience of partaking in numerous code-related initiatives over several years and across various national contexts.

The inspiration for the comments that follow comes from an analysis by the anthropologist Michael Taussig of the role of disbelief within shamanism.[47] As with many others studying religious faith, his starting point is seeking to understand how skepticism and belief are intertwined. Across various contexts, he suggests how shamans often foster doubt in their own power. Ways of healing are continually exposed as fraudulent. Yet, in practice, this did not have the effect of weakening

[45] Ibid.

[46] For an example of an analysis that attempts to determine why so much attention has been given to codes given their shortcomings, see Lentzos, Filippa. 2006. Managing biorisks: Considering codes of conduct. *Nonproliferation Review* 13(2) July: 221.

[47] Taussig, M. 2003. Viscerality, Faith, and Skepticism. Another Theory of Magic. In *Magic and Modernity,* eds. B. Meyer and P. Pels. Stanford, CA: Stanford University Press: 272–306.

belief in shamanism overall. Rather, the exposure of practices as "mere tricks" is part of a cyclic process. The unmasking of certain shamanistic practices as fakes encourages a search for the real secrets which are later exposed as fakery which then sets off a further search for authentic secrets, etc. With this complex treatment of faith, those taking part in shamanistic practices have a similarly complicated status. As Taussig contends, shamanism:

> relies on corrosive scepticism [. . .] in which scepticism and belief actively cannibalize one another so that continuous injections of recruits [. . .] are required. They are required, so it would seem, to test and therewith brace the mix by serving not as raw material of doubt positioned to terminate as believers, nor yet as cynical manipulators, but as exposer vehicles for confession for the next revelation of the secret contained in the trick that is both art and technique and thus real and really made up.[48]

The "judicious and intricately moving medleys of scepticism and faith" act to continuously defer the resolution of the ultimate power of shamanism.[49]

In suggesting how doubt can co-exist with belief (and even how it might be necessary for belief), Taussig provides a provocative way of understanding what is taking place with bioweapons-related codes. As with shamanism, codes can be approached as a process of enrollment, but critically not one where those participating should be seen as on course to becoming either believers or cynics. Rather the mix of belief and non-belief within individuals and collectively is part of what propels the process on.

So in my experience the expression of doubt about what can be accomplished through codes is almost always part and parcel of "codes talk". Yet voiced individual and collective apprehension about the limitations of codes and codes talk often results in calls for "more" – more people as part of the process, more wide ranging discussions, more varied codes, more considered action. It is difficult for me to believe many of those actively making such recommendations in national science academies, the BWC, or elsewhere can be understood through the labels of converts or cynics. Rather, as with the Foreign Office meetings surveyed through Box 8.2, they seem much more aptly described as engaged in a process mixing doubt and belief in a manner that sets the basis for future rounds of doubt and belief.

The way in which the topic of codes raises basic questions about the usefulness of ethical principles lends itself to the mixing of doubt and belief. Some ethicists and social scientists might worry about whether the general provisions typical in codes have been or ever could be useful for concrete action. Yet when skepticism and belief are seen as integral to maintaining a conversation, then the ready disagreement about the possible utility of codes can provide the base elements for carrying on with further discussion. Similarly, the magnitude of the challenges associated with preventing the destructive use of life sciences into the future offers much scope for debate about what (if anything) can be realistically done.

Another line of Taussig's argument is worth mentioning. He offers an interesting warning to those wishing to debunk shamanism as mere trickery: such acts help

[48] Ibid., 288.

[49] Ibid., 294

perpetuate belief. So, he recounts (with some humor) how anthropologists bent on exposing certain acts of healing as trickery have ended up fulfilling the unmasking role required for belief to continue. Likewise, I think it is useful to ask whether expressions of skepticism about codes are in practice highly functional in keeping the option alive as a matter for discussion. Since 2006, I have offered various critical publications, presentations and workshop interventions related to bioweapon codes. Yet, rather than reducing the standing of codes, I often wonder whether it has been having an opposite effect. At a basic level, such interventions help continue attention to this option. Because much of what "codes" are relates to the process aspects of their deliberation, this attention is quite significant in keeping codes alive as an option. That the interventions are critical in tone overall (without pretending to foreclose what will happen in the future[50]) is in many ways not that important because voiced skepticism is already widespread.

The eventual effects of any intervention are not something easy to gauge. With his focus on the perpetuation of cycles of belief and non-belief, Taussig does not address how the standing of shamanism has or could rise and fall over time. Faith appears as indestructible when it is constituted by conviction and doubt. Yet, patterns of belief do change over time. Presumably, if the future were to witness more and more criticism about codes and less and less hope, then they would come to be no longer regarded as options for consideration by so many. As part of asking how codes help pace science and technology, the purpose of this section has not been to settle the ultimate standing and direction of code discussions. Rather, it has been to suggest another, somewhat counter-intuitive, way of thinking about how continuing attention can remain with certain policy options despite widespread voiced skepticism.

8.9 Conclusions

Against the wide ranging concerns about the accelerating pace of S&T developments, the chapters of the volume have sought to identify perspectives and tools commensurate with the challenges faced. Across a range of topics, what are varyingly defined as "codes of conduct" have been identified by many governments and organizations as one such instrument. By way of considering the possible place of codes, this chapter has detailed the recent turn in attention to codes intended to prevent the destructive use of life science research.

In doing so a central aim has been to shift the discussion away from conventional standards for evaluating the way in which codes matter for meeting challenges. That has entailed moving from conceiving of codes as documents for policing the behavior of practitioners to codes as elements of processes for raising the profile of issues within and across organizations. Herein it might be said that what matters about

[50]While recognizing that what past and current codes discussion will enable in the future cannot yet be known, I have sought to raise doubts about expectations given past experience.

codes initiatives is the extent the activities fostered entail more than just devising written codes. Attending to these process-orientated aspects of codes for an emerging area of professional concern raises many thorny issues for evaluating what has been achieved and what sort of continuing effort should be invested in the future.

Moving beyond noting such difficulties though, this chapter has sought to acknowledge and make sense of the doubt about the potential of codes that has accompanied their (re-) emergence since 2001. As argued, rather than being perplexed about how the attention to codes could have continued as long as it has despite the many reservations associated with them, another way to conceive of the policy process is as imbued with the play of doubt and belief. How these mix together in practice is part of how the deliberation about codes has continued to date.