Removing Knowledge

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Introduction

You might think that the guarded annals of classified information largely consist of that rare document, a small, tightly guarded annex to the vast sum of human writing and learning. True, the number of carefully archived pages written in the open is large. While hard to estimate, one could begin by taking the number of items on the shelves of the Library of Congress, one of the largest libraries in the world: 120 million items carrying about 7.5 billion pages, of which about 5.4 billion pages are in 18 million books.[1]

In fact, the classified universe, as it is sometimes called, is certainly not smaller and very probably is much larger than this unclassified one. No one has any very good idea how many classified documents there are. No one did before the digital transformation of the late twentieth century, and now—at least after 2001—even the old sampling methods are recognized to be nonsense in an age where documents multiply across secure networks like virtual weeds. So we biblio-owls of Minerva are counting sheets just as the very concept of the classified printed page fades into its evening hours. Undeterred, we might begin with a relatively small subset of the whole classified world, about 1.6 billion pages from documents twenty-five years old or older that qualify as historically valuable. Of these 1.6 billion pages, 1.1

1. Assuming 3,000 pages per foot and 15 million pages per mile, the LOC contains approximately 500 miles of shelf and thus about 7.5 billion pages. This averages 60 pages per document, in contrast to the Joint Security Commission, which in 1994 estimated 3 pages per classified document. I take this to have been superseded by the Department of Energy, Analysis of Declassification Efforts, 12 Dec. 1996, http://www.fas.org/sgp/othergov/doerep.html, which uses a mean of 10 pages per classified document.

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billion have been released over the last twenty years, with most opened since Bill Clinton's April 1995 Executive Order 12958. How many new classified documents have been produced since 1978 or so is much harder to estimate—the cognoscenti disagree by several orders of magnitude—but there isn't an expert alive who thinks the recent haul is anything less than *much* larger than the previous twenty-five post–World War II years.

Some suspect as many as a trillion pages are classified (200 Libraries of Congress). That may be too many. In 2001, for example, there were thirty-three million classification actions; assuming (with the experts) that there are roughly 10 pages per action, that would mean roughly 330 million pages were classified last year (about three times as many pages are now being classified as declassified). So the U.S. added a net 250 million classified pages last year. By comparison, the entire system of Harvard libraries—over a hundred of them—added about 220,000 volumes (about 60 million pages, a number not far from the acquisition rate at other comparably massive universal depositories such as the Library of Congress, the British Museum, or the New York Public Library). Contemplate these numbers: about five times as many pages are being added to the classified universe than are being brought to the storehouses of human learning, including all the books and journals on any subject in any language collected in the largest repositories on the planet.[2]

If that were typical—or at any rate the right order of magnitude—then twenty-five years of such actions would yield a very rough figure in the range of 8 billion pages since 1978. The fact that the number has been growing is not to the point—even if it increased linearly from zero in 1978 to its current rate twenty-five years later, that would only divide the total in two, "down" to 4 billion pages. Indeed, however one calculates, the number of classifi-

2. According to the Annual Report for fiscal 2001: Harvard College Library, eleven libraries including Widener, net added 139,834 volumes for fiscal 2001. Librarians at Harvard estimate 30 volumes per three feet, so 10 volumes per foot or 300 pages per volume. In the fiscal year 2001 it contained 8.9 million volumes; the total university library system net added 218,507 volumes to a total of 14.7 million volumes.

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cation actions is increasing dramatically both as a result of a boosted defense, intelligence, and weapons lab budget *and* because we are living in a climate of augmented secrecy. Figured another way, the supervising agency, the Information Security Oversight Office (ISOO), reports a total expenditure in 2001 of $5.5 billion to keep classified documents secure. The Department of Energy costs are now about $0.30 per secure document per year. Estimating by this economic measure, we would figure that about 7.5 billion pages are being kept under wraps—a classified Library of Congress with an acquisition rate five times greater than the great library Thomas Jefferson bequeathed to this country over two centuries ago.

One last set of numbers: there are 500,000 college professors in the United States—including both two- and four-year institutions. Of course there are others—inventors, industrial scientists, computer programmers—responsible for generating and conveying knowledge, especially technical knowledge. But to fix ideas, four *million* people hold clearance in the United States, plus some vast reservoir who did in the past but no longer do. Bottom line? Whether one figures by acquisition rate, by holding size, or by contributors, the classified universe is, as best I can estimate, on the order of five to ten times larger than the open literature that finds its way to our libraries. Our commonsense picture may well be far too sanguine, even inverted. The closed world is not a small strongbox in the corner of our collective house of codified and stored knowledge. It is we in the open world—we who study the world lodged in our libraries, from aardvarks to zymurgy, *we* who are living in a modest information booth facing outwards, our unseeing backs to a vast and classified empire we barely know.

One can trace the history of secrecy back to the ancient Babylonians through medieval longbows and fin de siècle invisible ink, from tightly guarded formulae for Venetian glass-making to the hidden pouches of diplomatic couriers. Trade secrecy, state secrets, military secrets are all part of the background to the modern system. But this modern secrecy system has its substantive start not in antiquity but in the vast infrastructure of World War II. In part this new secrecy issued from the government, and yet in no small measure it emerged in the hands of scientists themselves as they launched a discipline of self-censorship on matters relating to the nucleus. Out of the 2 billion dollar Manhattan Project and its subsequent evolution into the Atomic Energy Commission (now the Department of Energy) came one sector of secrecy—with its twin classification categories of Restricted Data and Formerly Restricted Data (FRD), this last for uninteresting historical reasons covering military applications of nuclear weapons rather than their production or design. Alongside nuclear secrecy arose another fundamental category, National Security Information.

At the pinnacle of the National Security Information world is the president who himself can classify or, more realistically, have his agency heads classify. These agency heads in turn delegate that power to a relatively small number of others—just over 4,000 for the whole of the United States—who bear the title of *Original Classifiers.* Only this initiated cadre can transform a document, idea, picture, shape, or device into the modal categories Top Secret, Secret, or Confidential. And of these 4,132 or so Original Classifiers, only 999 (as of 2001) are authorized to stamp a document into the category Top Secret.[3]

Those few people are the unmoved prime movers of the classified world; it is they who begin the tagging process that winds its way down the chain of derivative classification. For every document that subsequently refers to information in those originally classified gains the highest classification of the documents cited in it. Like the radio tagging of a genetic mutant, the classified information bears its mark through all the subsequent generations of work issuing from it. More numbers: in 2001 there were 260,678 original classifications (acts that designated a body of work classified) and 32,760,209 derivative ones.[4] A cascade of classification.

But there is another way for documents to become classified. Under the Atomic Energy Acts of 1946 and 1954, materials produced about nuclear weapons–related activities are exempt from the blessing hands of the Original Classifiers. Nuclear weapons knowledge is born secret. No primal act of classification is needed, no moment when they pass out of light into darkness, no justification, no term of expiration is needed to wrap them in the protective blanket of restriction. Nuclear knowledge becomes classified the instant it is written down—even by someone who has no nuclear weapons (Q) clearance. If I think of a new scheme for channeling X-rays from a fission primary to a thermonuclear secondary and write that idea down, I am *(strictu sensu)* forbidden from possessing the page I just created. (Technically, I could be arrested for espionage for reading or even possessing the letters or pictures in my printer, on my screen, or under my pen.) And yet in this world of natal secrecy there is a subtlety born in the holy matrimony of industry and the weapons laboratories: an isotope-separating technology used to produce special nuclear materials such as U-235 or U-233. A separation technique—in some sense the heart of nuclear weapons of mass destruction—remains entirely in the open until just that moment when it might demonstrate (as the Federal Register puts it) "reasonable potential for the separation of practical quantities of special nuclear material."[5] At

3. See 2001 ISOO Report to the President, http://www.fas.org/sgp/isoo/2001rpt.html

4. See 2002 ISOO Report to the President, http://www.fas.org/sgp/isoo/2002rpt.pdf

5. U.S. Department of Energy, Office of Declassification, "Restricted Data Declassification Decisions 1946 to the Present," RDD–7, 1 Jan. 2001, http://www.fas.org/sgp/othergov/doe/rdd-7.html; hereafter abbreviated "RDD."

precisely this moment of efficacy it morphs into Restricted Data; as classifier Arvin Quist puts it in a document addressed to his fellow guardians of the faith, the separation technology becomes "classified only when it reaches 'adolescence.'"[6]

In 1995, the National Research Council working with the DOE estimated that the DOE's born and adolescent classified documents numbered some 280 million pages—an amount that would take its current compliment of reviewers 9,000 years to review—if, against reality, not a line of new material were added.[7] However incomplete it is now, this nine-millennium stack is ten times larger than the previous estimate given a few years earlier. Needless to say, neither the DOE nor any other agency has the budget, the mandate, or the intention of catching up. In the last few years the rate of classification increased fivefold, with no end in sight. Secret information is accumulating, at a rate that itself is accelerating, far quicker than it is being declassified.

The Classified Theory of Knowledge

With such a vast reservoir of learning under wraps, the Department of Energy must have—if not explicitly then at least implicitly—some sense of what can and cannot be released. What, we may ask, is the theory of interdicting knowledge? Let us begin with a distinction imposed since 1945, segregating subjective from objective secrecy. *Subjective* secrets are said by classifiers to display five key characteristics—they are compact, transparent, arbitrary, changeable, and perishable. Compact means they can be expressed very briefly; transparent, that they are readily understandable ("two of the Abrams tanks are disabled"); changeable means that they typically can be revised ("the 101st Airborne will conduct its first drop at first light"); and they are perishable (normally after some decent interval, for example, once the 101st has landed the fact that they did so loses its potency). *Objective* secrets are supposed to contrast with each of these qualities separately—they are supposed to be diffuse, technical, determinable, eternal, and long-lasting qua secrets. That is, they may be far from expressible in a few words (a theory of neutron diffusion involves integro-differential equations and takes volumes to express when it is put into useable form); they may not be understandable to anyone without a technical training (no untrained observer simply grasps the details of fluorocarbon chemistry); they are supposed to be determinable insofar as they can be deduced if the right question is posed (the number of neutrons emitted in uranium fission can be found with enough effort and equipment); and finally the objective secret is sup-

6. Arvin S. Quist, "Security Classification of Information," 2 vols., http://www.fas.org/sgp/library/quist2/index.html, vol. 2, chap. 3; hereafter abbreviated "SC."

7. See National Research Council, *A Review of the Department of Energy Classification Policy and Practice* (Washington, D.C., 1995), pp. 7–8.

posed to be in some sense unchangeable (in the limit case a law of nature but, if not that, then least as unchangeable as the finely articulated process of preparing equipment against the corrosive effects of uranium hexafluoride). As such objective secrets are long-lasting secrets (see "SC," vol. 2, chap. 2).

In important ways, objective secrets pose the more difficult problem, though subjective ones can be quite deadly if exposed (Loose Lips Sink Ships). Particular movements or strengths of troops or materiel seem more straightforward. But to accomplish the goal of secrecy—the blocking of knowledge transmission—is an extraordinarily difficult task. And given the resources devoted to it, it is perhaps worth inquiring just what its principles are.

In other words, suppose we ask about the transmission of knowledge not by asking the usual social studies of knowledge question, How does replication occur? but instead by probing the staggeringly large effort devoted to impeding the transmission of knowledge. Already before America's entry into World War II, nuclear scientists began a self-imposed ban on publishing matters relating to nuclear fission. The effect was immediate: Nazi scientists spent the war struggling to moderate neutrons (slow them down to the point where they were effective in causing fission) using heavy water (deuterium) rather than the vastly more useful graphite. This self-imposed muzzle continued through the war, issuing in the founding document of modern secrecy, the Atomic Energy Act of 1946. That act released certain parts of the basic chemistry and physics of materials including uranium, thorium, and polonium but kept a lid on the details of a vast amount of technical knowledge, including some basic physics. For example, in 1950 it was permitted to say that the impact of a neutron on U-233, U-236, Pu-239, or Pu-240 could release a gamma ray, but it remained forbidden to say just how likely this reaction was. Only in 1956 would the process technology for producing uranium metal and preparing alloys of uranium and thorium be released. More indirectly, the cost of highly enriched uranium (about $25,000/kg) was only declassified in 1955; presumably the mere quotation of a price conveyed certain information about how it was done (ordinary metallic uranium was running about $40/kg) (see "SC," vol. 2, chap. 2).

Indeed, one of the most classified parts of the fission bomb was the process by which highly enriched metallic U-235 was produced. It is instructive to follow the sequence of declassification orders from 1946 to 1952 showing the gradual erosion of restriction on electromagnetic separation:

1946: Physics of electrical discharges in a vacuum, experimental data and theory.

1946: "Electrical controls and circuits. . . . *omitting reference to classified installations.*"

1947: "Experimental and theoretical physics of [electromagnetic separation] *provided they do not reveal production details or processes.*"

1952: "Experimental and theoretical physics and chemistry, engineering designs and operating performance of single electromagnetic process units *without identification as components of the Electromagnetic Production Plant*" ("RDD").

Each step gave more detail, more about the internal wiring and construction of the machinery until, by the end, the major secret was simply the label of the documents as being for the separation facility at Oak Ridge.

But perhaps the best way to grapple with the secrecy system is to follow the instructions. Suppose you are an Original Classifier at the Department of Defense. The "Handbook for Writing Security Classification Guidance" is your bible, and it begins by reviewing the various arenas of classified material, from weapons, plans, and cryptology to scientific, technological, and economic matters affecting national security. Then you are to ask yourself these questions. First, Is the information owned by, produced by or for, or under the control of the United States government? If yes, then check that the information falls in one of the regulated domains (such as cryptology). If it still looks like a classification candidate, then pose this question: Can the unauthorized disclosure of the information reasonably be expected to cause damage to the national security? And if the information is of the destructive type, then the acid test is this:

> What is the level of damage ("damage," "serious damage," or "exceptionally grave damage") to the national security expected in the event of an unauthorized disclosure of the information? If the answer to this question is "damage" you have arrived at a decision to classify the information Confidential. If the answer is "serious damage," you have arrived at a decision to classify the information Secret. If the answer is "exceptionally grave damage," you have arrived at a decision to classify the information Top Secret.[8]

You—the classifier—should then designate the material secret for a period of time less than ten years or, for a variety of reasons, you may want to justify an extension beyond ten years. Just a few of such reasons to carry on with secrecy: revelation of hidden information that might assist in the development of weapons of mass destruction, impair the development of a U.S. weapon system, reveal emergency plans, or violate a treaty.

8. Assistant Secretary of Defense for Command, Control, Communications, and Intelligence, "Department of Defense Handbook for Writing Security Classification Guidance," DoD 5200.1–H, Nov. 1999, http://www.dtic.mil/whs/directives/corres/pdf/52001h_1199/p52001h.pdf,p. 8; hereafter abbreviated "DD."

Next in this antiepistemology you have to do what anyone pursuing a more positive program would: establish the state of the art. This includes of course published materials in the United States and abroad but also, and more problematically, known but unpublished material including that possessed by unfriendly countries. By consulting with the intelligence services, you will want to find out what the foreign knowledge is of unpublished materials in the United States. All this, however, is preliminary. Having established what is known, you must identify how classification will add to the "net national advantage," that is, "the values, direct and indirect, accruing or expected to accrue to the United States" ("DD," p. 12). Such advantage might derive from the suppression of the fact that the government is interested in a particular effort or that it has something in its possession. Or the capabilities, performance, vulnerabilities, or uniqueness of an object (or bit of knowledge) that the United States has. The net national advantage might be in guarding surprise or lead time, manufacturing technology, or associations with other data. The real heart of a classification guide is the identification and enunciation of the specific items or elements of information warranting security protection. Regardless of the size or complexity of the subject matter of the guide, or the level at which the classification guide is issued, there are certain identifiable features of the information that create or contribute to actual or expected national security advantage.

Getting at those "special features or critical items of information" and tying them to the net national advantage is the primary task of the classifier ("DD," p. 13). This is where the writer of the guide has to get inside the information being hidden. The questions are subtle. "Are the counter-countermeasures obvious, special, unique, unknown to outsiders or other nations?" you should ask yourself. Or would knowledge of the counter-countermeasures assist in carrying out new countermeasures? "What," the guide demands, "are the things that really make this effort work?" ("DD," pp. 36–37). Here is the analysis of science and technology opened in many of its aspects, all in the service of stopping the flow of science. It puts me in mind of an experimental film I once saw, a black-and-white sixteen-millimeter production, printed in negative, all shot within a single room filled with tripods and lamps. As each light came on, it cast black over its portion of the screen. Here is something similar. Understanding the ways in which things work, are made, deployed, and connected are all used to interdict transmission. Your job as a classifier is to locate those critical elements that might lead to vulnerabilities—and then to suppress those that can be protected by classification. The guide insists that secrets are not forever. You must answer the question: how long can this particular secret reasonably be expected to keep?

Epistemology asks how knowledge can be uncovered and secured. Antiepistemology asks how knowledge can be covered and obscured. Classification, the antiepistemology par excellence, is the art of nontransmission.

Pressures to Declassify

With the end of the cold war in 1989–90—and the election of Bill Clinton—the executive branch pressed the agencies to release some of the vast trove of secrets. Secretary of Energy Hazel O'Leary announced on 7 December 1993 that the DOE had begun to "lift the veil of Cold War secrecy" and to make visible some of the hidden data.[9] Increasingly, scientists, scholars, activists, and the DOE itself tried to displace an ethos in which justification was needed to release information to one in which it required justification to keep information classified. The arguments for openness were several. Cost was one—as I mentioned, some $5.5 billion goes into maintaining the secret storehouse. But that isn't the only justification. As the national security establishment itself has long recognized, overclassification breeds disregard for classification procedures. Serious classifiers (as opposed to yahoo politicians desperately looking to classify everything in sight) want the arenas of real secrecy to be protected with higher walls and the vast penumbral gray range to be open.

Back in 1970, the Defense Science Board Task Force on Secrecy, headed by Frederick Seitz, argued to the secretary of defense that there was vastly too much secrecy—and that even a unilateral set of disclosures was preferable to the current system. An all-out effort by the U.S. and the USSR to control thermonuclear weapons failed utterly as the United Kingdom and China followed soon on their heels. Conversely, when the nation decided to open certain areas of technical research, the results were powerful. The U.S. led in microwave electronics and computer technology, in nuclear reactors beginning in the mid-1950s, and in transistor technology.[10] Examples of secrecy gone amok are legion, including some $2.7 billion that sank like a stone into an unworkable special access program aiming to produce the Navy A-12 attack aircraft. Secrecy contributed too in the protection of unworkable programs like the one outfitted to build the Tacit Rainbow antiradar missile and the ($3.9 billion) Tri-Service Standoff Attack Missile.[11]

Then there are the historians and journalists who clamor for access to documents about the history of the national security state. These groups join a chorus of others from legislators and lawyers to former atomic

9. Secretary of Energy Advisory Board website, http://www.seab.energy.gov/sub/openpanl.html

10. See Steven Aftergood, "Government Secrecy and Knowledge Production: A Survey of Some General Issues," http://ciaonet.org/wps/rej02/rej02b.html

11. See ibid.

workers, soldiers, and ordinary citizens who have militated for a glimpse of records about radiological contamination, test sites, radiological experimentation on humans, and nuclear working conditions. Scientists themselves—especially those the national laboratories want to recruit from elite universities—want a degree of openness in which they can encounter other ideas and publish their own. But my own judgment is that none of these constituencies would have made even the limited progress they made during the Clinton years had it not been for the insistence of industry demanding loud and clear that they no longer be excluded from the trove of secret (objective) information. Declassification makes it easier and cheaper for industry to produce—and, needless to say, opens the vast civilian and, within the constraints of export controls, the huge foreign military market.

Trade Secret Legitimacy

But within the secret world managing the flood of data has presented ever greater problems. There is a nervousness in the classifying community, a sense that the rising mountain of classified materials is unstable. The absence of a principled basis for classification weighs heavily—and classification itself makes it hard to provide such a systematic understanding. Need-to-know compartmentalization leaves classifiers in different domains unable to communicate with one another, and each isolated branch forms its own routines of hiding. When the Department of Energy commissioned Oak Ridge classifier Quist to do a massive study of security classification, he commented throughout his several volume report that there simply were no principles on which classification could be staked. And he wanted such a foundation.

Trade secrets appeared to be the open society's equivalent of national security secrecy, and Quist—speaking both to and for the DOE—saw in trade secrecy law the possibility of establishing, at last, a ground. Addressing the army of classifiers, Quist put it this way:

> Our legal system's roots go back millennia, thereby giving that system a solid foundation. Trade secret law is a part of that legal system. Trade secret law has developed over hundreds of years and has been a distinct area of the legal system for over a century—principles of trade secret law are widely accepted. Because trade secret law evolved as part of the "common law," it has a firm basis in our culture. Our extensive body of trade secret law has been developed by a very open process; the workings of our legal system are essentially completely open to the public, and the judicial decisions on trade secrets have been extensively published and discussed. Thus, trade secret law rests on a solid foundation, is consistent with our culture, and is known, understood, and accepted by our citizens. ["SC," vol. 2, appendix A]

Establishing the isomorphism between the national security and trade secret then became the order of the day. For this was the holy grail: the exact mechanism for the Teller-Ulam idea, the scheme that first made possible the detonation of a true hydrogen bomb, would remain a fiercely guarded secret—one for which the government was willing to wage an all-out battle in court against the *Progressive* (a rather small left-leaning magazine that printed an article describing the rudiments of the Teller-Ulam scheme). The DOE's declassification guide RDD-7 reports the guarded release in 1979 of the idea this way: "The fact that, in thermonuclear weapons, radiation from a fission explosive can be contained and used to transfer energy to compress and ignite a physically separate component containing thermonuclear fuel. Note: *Any elaboration of this statement will be classified*" ("RDD"). And so it has remained for over half a century. Just such secrets, says Quist, ought to be understood by comparison with the holiest of trade secrets, that best-kept of all commercial formulae, "the recipe for Coca-Cola Classic® has been kept a secret for over one hundred years. It is said that only two Coca-Cola® company executives know that recipe [which] is in a safe deposit box in Atlanta, which may be opened only by vote of the company's board of directors. . . . We probably would not know if a national security secret was as well-kept as the secret of Coca-Cola®" ("SC," vol. 2, appendix A).

Schematizing Quist's argument, the parallelism between the secrets of nukes and nachos might go something like this:[12]

Characteristic	**National Security Secret (Objective)**	**Trade Secret**
interest	national security	profits
definition	weapons-related "facts of nature," technical design and performance of weapons; method, process, technique or device to create a weapon	formula, pattern, compilation, program, device method, technique, process that is of economic value and derives its value from secrecy
availability	must in fact be secret	must in fact be secret
knowledge inside organization	must be distributed on a need-to-know basis	must be distributed on a need-to-know basis
secrecy measures taken	*U.S. v. Heine:* exonerated Heine on grounds that if the U.S. had not protected the (aviation) secrets inside the U.S. then could not convict Heine for having sent information to foreign power	must take "reasonable" measures that might include: restricted access, "no trespassing" signs; guards; restrictive covenants; briefings; badges; compartmentalization

12. The following chart builds on "SC," vol. 2, appendix A.

value of information	must have actual or potential military advantage.	must have actual or potential economic advantage
effort to develop secret	must constitute a sufficient effort such that this investment in development "is a factor in its classification"	must protect "the substantial investment of employers in their propriety information [trade secrets]"
effort needed for others to develop	must be such that the secret be not readily ascertainable by easy reverse engineering, reference books, trade journals, etc.	must be such that the secret be not readily ascertainable by easy reverse engineering, reference books, trade journals, etc.
former employees	use classified solutions to classified problems to solve unclassified problems "outside the fence"	"former employees can make use of general skills, knowledge, memory if they do not include . . . 'special confidential knowledge obtained from the employer which belongs to the employer'"

There are two fascinating aspects to Quist's recourse to trade secret law. First, of course, is the formal structure: he is able to develop a largely parallel structure between security and trade secrecy. But perhaps even more interesting is a second feature. At the end of the cold war (the two volumes appeared in 1989 and 1993 respectively) a senior classification officer could see security secrecy as in need of legitimation from something exterior to the needs of the state. While the nuclear establishment could draw on the 1946 Atomic Energy Act and its successor legislation, trade secrecy carried the weight of a long history. And while the Atomic Energy Act was largely isolated from other bodies of law, and so much of the AEC's own comportment was shrouded in secrecy, trade secrecy law (so Quist argued) emerged from open judicial structures. Because it was hammered out on the anvil of common law, it was part of the wider culture in ways that the scientist and executive branch–created AEC never would be. It is hard, perhaps impossible, to imagine that such a search for justification seemed necessary at the height of the cold war. Yet here is a case, made from *inside* the Department of Energy, for its secret practices to find a grounding in the legal ethos of the corporation.

Conclusion: Producing Ignorance

When the Establishment of Secrecy tries to block the transmission of dangerous knowledge, it faces a fundamental dilemma. If it blanket classifies whole domains of learning (nuclear physics, microwave physics), the accumulated mass of guarded data piles up at a smothering rate. It impedes industry, it interferes with work within the defense establishment, and it degrades the very concept of secrecy by applying it indiscriminately. Yet when the guardians of secrets try to pick and choose, to hunt for the critical number, essential technique, or irreplaceable specification, when they try to classify this fact, that property, or those circumstances, they find themselves in an impossible situation. They find themselves struggling to halt or at least stall the spread of vital, large-scale sectors of the technical-scientific sphere through the protocol-driven excision of bits of language and technique. It is as if they want to make an image unreadable by picking off just the vital pixels one by one. Indeed such a digital metaphor may be more than allusive. Faced with the proliferation of electronically registered data, the government is now embarking on a massive effort to recruit AI (artificial intelligence) to automate the classification (and declassification) of the fiber-optic pipes of digital secrets pouring out of the national laboratories and their affiliates.

Philosophically, this puts us, oddly flipped (and through a deadly pun), in the footsteps of early twentieth-century philosophy, when Bertrand Russell and the young Ludwig Wittgenstein were struggling to articulate a vision of language in which communication would be reduced to the assembly of isolated atomic propositions. These elemental bits of meaning "Red patch here now" or "Smell of ozone 12:00 noon in this room" were to be assembled into the molecular and from then into ever more complex concatenations. The effort failed back in the early 1900s because facts never did remain within their confines; as even its staunchest advocates eventually conceded, facts could *not* be defined without theory, and theory, ever-spreading, refused to congeal into the isolable knowledge-islands of which seventeenth-century natural philosophers dreamed.

For both practical and theoretical reasons, the atomic statements of the 2003 Department of Energy are no more likely than Russell's atomic statements of 1903 to stay in their place. At some level, even the DOE and its sister agencies know this. DOE exempts prototype development of isotope separation technology from the maws of classification because the DOE desperately needs industrial and university-based work to produce each next generation of devices that will spew out the special materials for nuclear weapons. Think of tunable die lasers. But then, just as the lasers actually start sorting the U-235 from the U-238, the secrecy lid slams down and the knowledge becomes adolescent classified. Too bad for us, though, because the techniques, skilled operators, businesses, journal articles, and graduate students are by then on the hoof. Is it a surprise that the West Germans (with no nuclear weapons program) were able (in the mid-1970s) to export the technology to apartheid South Africa which immediately began assembling and eventually detonating a nuclear bomb? Or for that matter is it really astonishing that DOE's claim that they could contain any elaboration of the Teller-Ulam idea eventually failed?

Back in 1966 when Thomas Pynchon published his great *Crying of Lot 49*, he sketched a paranoid and disjointed society, a universe so obsessed with concealment and conspiracy, with government and corporate monopoly control of information, that the causal structure and even the raw sequence of events hovered perpetually out of reach. Now that the secret world has begun to exceed the open one, Pynchon's fantasy stands ever nearer to hand. In the midst of his protagonist Oedipa Maas's efforts to understand what is happening to her, she stumbles across a cryptogram scrawled onto a latrine wall, inscribed into postage stamps, present—if one looks carefully—just about anywhere. It was, as she soon discovers, the old post horn, symbol of the late medieval Thurn and Taxis state monopoly postal system. But there is a twist. Pynchon's post horn has a mute jammed into it; communication is blocked.[13]

Secret societies with private communication desperately tried to counter the monopoly on information; Pynchon's world crawls with disaffected engineers trying to patent Maxwell's demon, would-be suicides, and isolated lovers all seeking to break the out-of-control monopoly of knowledge transmission. Mad as it sounds, is it madder than it must feel to the radio astronomers who discover that important bits of what they know about their best instruments have long been clear to the National Reconaissance Organization (NRO) and NSA? That one of the main objects of astrophysical inquiry (gamma ray bursters) emerged not in the groves of academe but through secret efforts to monitor potential Russian violations of the Nuclear Test-Ban Treaty using satellites built to find H-bomb detonations on the far side of the moon?

Contra the logical positivists and their allies, it is precisely *not* possible to reduce meaningful language to discrete enunciations. Communication—at least meaningful, verifiable communication—cannot be rendered into a sequence of protocol statements. But such a conception of knowledge is exactly what lies behind the classifiers' imaginary. To block the transmission of knowledge—to impede communication about the most deadly edge of modern science and technology—the security services of the United States (and for that matter NATO, the Warsaw Pact, China, and dozens of

13. See Thomas Pynchon, *The Crying of Lot 49* (1966; New York, 1999).

other countries) have chosen to list facts, circumstances, associations, and effects that would be banned from utterance.

At the root of this theory of punctiform knowledge excision stands a fundamental instability. To truly cover an arena of knowledge one is drawn ever outwards, removing from the public sphere entire domains until one is in fact cutting out such a vast multiple of the original classification that the derivative censorship covers 330 million pages per year—and growing. Even that number is one kept "low" by beating down the classified domain by its inverse—the classification of particular points. But then one is caught in the manifestly peculiar position of trying to stanch knowledge flow by punctiform excision.

On the one side, an unaffordable, intractable, holist antiepistemology, on the other a ludicrously naive punctiform one. If this were just a theoretical matter it would be fascinating but delimited. It is not. At stake for the national security establishment is the broad interference that compartmentalization is causing, manifest most recently in the world-changing failures of intelligence leading up to 9/11 and weapons of mass destruction that were or weren't in Iraq. Industry chafes under the restriction of classification, and vast resources are needed to defend excessive retention of information. For universities the effects of the new order of secrecy are just beginning to be felt. The Patriot Act restricts laboratory access to people coming from certain countries—a direct clash with universities' own statutes that expressly forbid denying access to certain categories of laboratories on the basis of race, creed, or national origin. More broadly, for all the conceptual and practical problems with classification behind the fence at Los Alamos or Livermore, the problem of restricting research in the open university may be far greater. But it is not just the rights and culture of universities that are at stake. Billions of dollars have been spent on projects that scientifically or technically would not have—could not have—survived the gimlet-eyed scrutiny of international and open review. Whatever their strategic use or uselessness might have been, the atomic airplane and the X-ray laser were not just over budget, they were over a doomed set of assumptions about science and technology.

In the end, however, the broadest problem is not merely that of the weapons laboratory, industry, or the university. It is that, if pressed too hard and too deeply, secrecy, measured in the staggering units of Libraries of Congress, is a threat to democracy. And that is not a problem to be resolved by an automated Original Classifier or declassifier. It is political at every scale, from attempts to excise a single critical idea to the vain efforts to remove whole domains of knowledge.