

# America's Two Gadgets

## Of Bombs and Polygraphs

*By Ken Alder\**

### ABSTRACT

This essay pairs two prototypically American technological objects of the mid-twentieth century: the atomic bomb and the lie detector. Although the former has been touted as the supreme achievement of modern technoscience, and the latter dismissed as a placebo device, the two “gadgets” actually performed in analogous fashion. Indeed, the essay suggests that these technologies are best understood not in terms of narrow functionality but in terms of their performance—akin to that of Frankenstein’s monster—in the domains of justice, popular culture, and geopolitics. Specifically, it argues that the mutually supportive roles played by the two objects underscore the ways in which the theater of deterrence sustained American sovereignty during the era of the Cold War.

ROSENCRANTZ: My lord, you must tell us where the body is and go with us to the King.

HAMLET: The body is with the King, but the King is not with the body.

The King is a thing—

GULDENSTERN: A thing, my lord—?

HAMLET: Of nothing. Bring me to him.

—Tom Stoppard, *Rosencrantz and Guildenstern Are Dead* (1967)

FOR THE PAST SEVEN YEARS researchers at America’s facilities for the design of nuclear weapons have been obliged to submit to periodic examinations on polygraph machines, popularly known as lie detectors. With apparent unanimity, they hate it. In public hearings and private forums they have denounced lie detection as an invasion of privacy, a distraction from effective security measures, and a form of latter-day witchcraft. How is it, they wonder, that the makers of the supreme device of technoscientific potency have been forced to bow down before a sham device that doesn’t work at all, except as a mechanical placebo? As it turns out, this is not the first time the lie detector has been used in this manner; and the juxtaposition of these two dissimilar “gadgets”—as the bomb and the lie detector have both been called—can help us understand that mysterious potency we refer to as “function,” a term we blithely associate with services rendered, but one whose etymological roots suggest performance—as in the performance of an office. As is

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often the case for gadgets that escape their assigned office to roam beyond their creator's control, both the bomb and the lie detector have also been called Frankenstein's monsters. This essay suggests how the dual performance of these gadgets, as both function and theater, as gadget and monster, have been constitutive of the staging of American sovereignty in the middle decades of the twentieth century.

When J. Robert Oppenheimer code-named the prototype atom bomb the "Gadget," his goal was to camouflage the particular object of the Manhattan Project under the cover of generic utility. For several decades the term "gadget" had served as a catchall label for those mechanical gizmos that fulfilled some purpose dear to human interests but whose name nontechnical folk couldn't be bothered to remember. Even the etymology of the term is obscure: some believe it came ashore with seafaring folk in the nineteenth century as a reference to some geared piece of nautical equipment; others (not incompatibly), that it was adapted from the French word "*gâchette*," one of the irregularly shaped pieces that unleashed the action of a musket's flintlock. Gadgets are generic devices that perform some well-defined function, the sort of mechanism that scholars of technology refer to as black boxes because they transform human desires into outputs with so little (apparent) friction that they cease to possess proper nouns and instead revert to something more like adverbs: killing cleanly, communicating secretly, evaluating dispassionately.

Recourse to a term like "gadget" implies an attention to ends over means, a propensity to look through windows instead of at them (let alone at the floating reflections of our watchful selves). This is perfectly understandable when one's goal is to see what is happening on the other side of the glass. In the decades since Siegfried Giedion composed *Mechanization Takes Command*, historians of technology have told myriad stories of unnoticed gadgets: some are invisible because they perform mundane services (like pencils and zippers), others because they operate amid complex systems and networks (like servomechanisms and relay switches)—but in any case they are rarely adorned and functionally identical.<sup>1</sup> Tellingly, the *gâchette* and other pieces of the gunlock were the first objects to be mass-produced, having been tamed in late eighteenth-century France by an extended campaign that involved engineering design, mechanical drawing, and machine tools. My own first foray into the field of the history of technology was an attempt to explain how the ability to replicate such items ought to be understood not as a merely technical accomplishment but, rather, as a kind of temporary truce among diverse agents with unequal power and interests.

At the time, the historiography of the French Revolution was under the sway of revisionists who had subsumed all materialist explanations to problems of rhetorical construction. The revisionists were churning out histories of how artifacts like the toque, the Pantheon's frieze, or patriotic festivals could be read as constitutive of the new regime's political culture. Might historians also assimilate a technology that worked—like the gun—to such an account? A gun is a thick thing: thick in multiple meanings and potencies. To direct its explosive force against one's enemy (and not have it blow up in one's own face) requires sustained and coordinated attention. Yet that very attention means that powerful social forces have sought to shape its design, production, and deployment—and that its changing features may serve as a proxy for the political history of the nation. French

<sup>1</sup> Siegfried Giedion, *Mechanization Takes Command: A Contribution to Anonymous History* (1969; New York: Norton, 1975).

guns not only defended and defined French territory; their properties expressed the changing attributes of national sovereignty across the many phases of the Revolution.

Recently I have been writing the history of the American lie detector.<sup>2</sup> One of my purposes has been to track American political culture by charting the history of an artifact with no stable function of its own. During the course of the last century, the polygraph has been less an actor in its own right than a mirror that reflects—or magnifies—the circumstances that surround it. As a device that provides a graphical trace of the subject's bodily responses while he or she is being interrogated, the polygraph's role depends on the setting in which the questions are asked, by whom, and to what end. In the past century, the polygraph has been used to evaluate psychiatric patients, expose criminal culpability, censor movies, and gauge the effectiveness of advertising. Transported into the realm of nuclear security, it has been used to police the traffic between open and secret knowledge.

On the surface, this alliance of bomb and polygraph might seem unlikely: a placebo technique guarding the world's most destructive device. Yet the lie detector and the bomb actually operate according to a common logic. After all, the bomb's potency in the era of the Cold War derived as much from its symbolic force as its destructive prowess. There were two bombs dropped on Hiroshima in August 1945: the actual bomb and the idea of the bomb. And it was the idea of the bomb—backed, to be sure, by the mass production of more bombs—that carried weight in the emerging postwar conflict with the Soviet Union. Deterrence, the name for this new strategic doctrine, was a role for which the lie detector had been well trained.

#### POLYGRAPH PERFORMANCE

No technology will be widely adopted unless its practitioners believe it fulfills some function; but in the case of the polygraph, some additional assurance would seem to be required. According to its proponents, for the device to distinguish those who believe what they are saying from those who are consciously deceiving their interrogator, subjects must fear that the machine will register this difference. That was why polygraph operators assiduously cultivated the public reputation of the instrument as infallible and performed various parlor tricks to convince individual subjects that it would expose them. By their own admission, the lie detector is less a register of truth telling than an index of its subjects' convictions.

It would be an understandable temptation for a historian of science to situate the origins of the American lie detector at the intersection of various research traditions: Etienne-Jules Marey's program to translate the invisible actions of the body into a universal graphical language; Wilhelm Wundt's program to investigate cognitive processes according to these registered physiological signs; and, perhaps most immediately, William James's program to recast human emotions as bodily response. And there is no doubt that these scientific developments constituted the conditions of possibility for the polygraph. But these nineteenth-century intellectual programs cannot explain the timing of the lie detector's rise in the early twentieth century; nor can these international research trajectories explain why America alone adopted the technique. Besides, the practitioners of lie detection themselves rarely invoked such genealogies. Rather, they were consistently vague about how and why the device worked: mumbling ambiguous phrases about the reciprocal relations of mind and

<sup>2</sup> Ken Alder, *The Lie Detectors: The History of an American Obsession* (New York: Free Press, 2007).

body; privately admitting that their device did not actually measure lies; and then changing the packaging.

In fact, the first instrument to be designated a “lie detector” was assembled in Berkeley, California, in the early 1920s, when John Larson—the nation’s first cop with a Ph.D. in physiology—jury-rigged a set of standard physiological instruments on a six-foot-long plank. Each device was the product of decades of development, and each mimicked in the open the interior processes of the subject’s body so that the responses might be scored on the upright sheet of looping smoke-blackened paper like messages scrawled on the subject’s skin. In this sense, the instrument resembled nothing so much as a mechanized human body flayed open for inspection, a kind of Frankenstein’s monster animated by the subject whose fears gave it life. The goal of the machine was thereby to divide the subject’s autonomic body from that person’s conscious will, transforming the body into a “thing” (a monster-machine) that, for all intents and purposes, became a piece of circumstantial evidence that could corroborate (or belie) the words uttered by the legal person hooked up to the apparatus.

Thus, even after the ruling in *U.S. v. Frye* (1923) banned lie detector evidence from the criminal courts (though not from preliminary criminal investigations), Larson’s apostate disciple, Leonarde Keeler, could transform the lie detector into a form of psychological coercion. Keeler was an amateur magician with a flare for publicity. He fitted all of Larson’s instruments inside a portable walnut case, so that the instruments’ hidden movements inscribed their results on graph paper that was slowly extruded from the box in the manner—as one commentator put it—of a Delphic oracle.<sup>3</sup> Keeler’s goal—as diviner of these texts—was to render the process opaque and mysterious.

These superficial changes in the instrument’s hardware went hand in hand with changes in what one might call the software of interrogation. Keeler changed the manner in which interrogations were conducted so as to induce anxiety in subjects and get them to confess—confession being the only sort of lie detector evidence now acceptable in a criminal trial. To do so, he cultivated the public reputation of the instrument as infallible, patented his (unoriginal) design, and named it the Keeler Polygraph to underscore his personal mastery. He also developed tricks, such as the card test, to convince subjects that he could catch them in a lie (even though he often stacked the deck to make sure his ruse did not fail). Finally, he fitted the interrogation room with one-way mirrors and arranged its geometry to keep the subject guessing at the machine’s response. Although it was originally hailed as a substitute for the coercive station-house interrogation known as the “third degree,” Keeler operated the instrument according to an analogous logic of torture, in which confession was simultaneously the queen of proof and the justification for its own violence.

The famed choreographer Agnes de Mille, an old college friend of Keeler’s, had a rare peek at how he did it. Through a one-way mirror she watched, along with a subject’s prospective employers, as Keeler pressed a nervous young bank teller for information about his past. When, at one point, the young man refused to continue and began to disentangle himself from the apparatus, Keeler threatened him with unemployment. Cowed, the subject answered in a subdued tone. Then, suddenly, he admitted to having served time for theft. Inside the observation room, de Mille heard the bankers gasp. But Keeler did not register disapproval. He completed the interrogation, unhooked the subject, and handed him a

<sup>3</sup> *U.S. v. Alexander*, 526 F.2d 161 (1975).

cigarette lit from his own mouth (a typical Keeler touch). Then came the payoff. The trouble was the teller's mother-in-law: she had ruined his marriage. For half an hour, the young man poured out his soul. Keeler listened sympathetically, shook the young man's hand, and sent him out the door.<sup>4</sup> Despite her shock at her dear friend's ruthlessness, de Mille could not help but be impressed—as one choreographer to another—by Keeler's ability to generate a powerful emotional response in his solitary audience and then resolve the tension.

Modern penal practice may have rung down the curtain on spectacular public punishment, but the theater of interrogation continues to be carefully stage-managed, albeit in intimate venues that make each individual "production" akin to a command performance. In those cases where the polygraph is the principal prop, the suspect is led to believe that he is confessing not to a person but to science, which knows and understands all. The judge and jury, of course, may not be so accommodating.<sup>5</sup>

Keeler made sure, however, that his intimate performances were widely reviewed in the popular press. It was the tabloids that first baptized the polygraph the "lie detector." During the 1920s and 1930s, nothing moved print better than tales of true crime, and the lie detector offered a new angle on noir stories of depravity: it was an instrument that let readers peer directly into the criminal soul. The instrument's verdict arrived on the morning doorstep like a *deus ex machina*: condemning the guilty, absolving the innocent, and making retrospective sense of the drama. This form of fifth-act justice has displeased theater critics since the days of Aristotle. But millions of Americans who blamed criminal disorder on legalistic wrangling and police corruption welcomed the lie detector's ability to summon the twin gods of science and publicity to render swift and certain judgment.

And it was a performance that could be taught. In the 1930s, police interrogators trained by Keeler got 60 percent of those they accused of deceit to confess, whereas Larson's form of noncoercive psychiatric inquiry produced only one-tenth that number. Larson's disciples explained this difference by claiming that they used the instrument "simply as an aid in investigation and not a means of bluffing an individual into a confession."<sup>6</sup> A noble sentiment: but Keeler's form of bluffing actually proved more compatible with the form of justice then becoming the national norm. In the 1930s Americans were shocked to discover that in the past decade some 76 percent of those indicted for felonies in Cook County, Illinois, had actually "copped a plea" to a lesser charge than the original complaint. As one law school dean put it, this made the criminal courts "psychologically more akin to a game of poker than a process of justice."<sup>7</sup> Today, some 90 percent of convictions in American criminal courts end in such plea bargains that are mutually agreed-on fictions.

John Larson, who had consistently opposed letting the polygraph technique decide guilt, was appalled. "Beyond my expectation," he wrote shortly before his death, "thru uncontrollable factors, this scientific investigation became for practical purposes a Frankenstein's monster, which I have spent over 40 years in combatting."<sup>8</sup>

<sup>4</sup> Agnes de Mille, "Keeler," [31 Oct. 1940], Agnes de Mille Papers, New York Public Library.

<sup>5</sup> Michel Foucault, *Discipline and Punish: The Birth of the Prison*, trans. Alan Sheridan (New York: Random House, 1979).

<sup>6</sup> Don Kookon to Leonarde Keeler, 28 Feb. 1939, Leonarde Keeler Papers, Department of Defense Polygraph Institute, Fort Jackson, South Carolina; for the statistics on confessions see Keeler's survey files for East Cleveland *et al.*, Keeler Papers.

<sup>7</sup> Raymond Moley, "The Vanishing Jury," *Southern California Law Review*, 1928, 2:97–127, on p. 125. See also George Fisher, *Plea Bargaining's Triumph: A History of Plea Bargaining in America* (Stanford, Calif.: Stanford Univ. Press, 2003).

<sup>8</sup> John Larson to Reg Manning, [early 1960s], John Larson Papers, Carton 7, Bancroft Library, University of California, Berkeley.

The role played by the lie detector in this performance of fictive justice—itsself the domestic face of national sovereignty—explains why the design of its hardware has changed so little in the past eighty years. Given the nature of the ruse, the interior workings of the machinery are almost beside the point. Indeed, police examiners regularly extract confessions by putting suspects on sham devices with a state-of-the-art gloss. In the 1930s cops hooked up suspects to a box of mock electronics; in the 1980s they put suspects' hands on photocopy machines filled with paper preprinted with the word "LIE!"; and in our brain-obsessed era they fit the heads of suspects into colanders with wires attached.<sup>9</sup> This is an instance of opening the technological black box and discovering that it resembles what physicists call a black body: an empty container lined with a perfectly reflective surface.

Naïveté of this sort often elicits a chuckle—it certainly got a big laugh in oral arguments before the U.S. Supreme Court in 1997—but cops and prosecutors should worry that the joke is on them. The same cops and prosecutors who dupe suspects into confessing to a mechanical placebo are themselves prey to a self-fulfilling prophesy, in which—as Robert Merton predicted—"the prophet will cite the actual course of events as proof that he was right from the very beginning."<sup>10</sup> Merton, of course, expected institutional constraints to check such collective delusions, but this theatrical double bluff has become the institutionalized form of justice in America.

#### A MECHANICAL CONSCIENCE COME TO LIFE

This poker-game logic was quickly extended to the world of commercial relations. In the decade of the Great Depression, Keeler and his protégés marketed this same form of polygraph interrogation to corporate managers seeking to ensure the honesty of their employees. For instance, Keeler discovered that he could get nearly one-third of bank tellers to admit to having pocketed petty sums in the course of their careers. Bank managers, aghast at these customary practices, wanted to fire these employees, but Keeler asked that they be retained so that he might retest them in six months. He assured the managers that they would henceforth become their most trustworthy employees. It is hard to say whether this ritual improved honesty on the job, but this repeated retesting certainly instructed white-collar workers in the virtues of emotional management, the premier virtue of the mid-century organization man. For these employees, trained to conceal their fear and resentment behind a mask of "positive thinking," their personality became another metric by which to gauge their on-the-job performance.<sup>11</sup>

For their part, forward-thinking social scientists welcomed the device as a substitute for the old religious injunctions that had once monitored honesty but whose force, they feared, had been weakened by the anonymity of modern urban life. The sociologist Ernest Burgess frankly called the lie detector "a scientific aid for social control," one that would deter those in positions of financial trust from "yielding to temptation."<sup>12</sup> For citizens who no longer worried that their inner thoughts were under God's scrutiny—or so the modernizers argued—the instrument would serve as the nation's mechanical conscience.

<sup>9</sup> David Simon, *Homicide: A Year on the Killing Streets* (Boston: Houghton Mifflin, 1991), p. 204.

<sup>10</sup> *U.S. v. Scheffer*, 523 U.S. 303 (1998), oral arguments, 3 Nov. 1997, [www.oyez.org](http://www.oyez.org); and Robert K. Merton, *Social Theory and Social Structure* (Glencoe, Ill.: Free Press, 1957), p. 423.

<sup>11</sup> Christopher Lasch, *The Culture of Narcissism: American Life in an Age of Diminishing Expectations* (New York: Norton, 1978).

<sup>12</sup> Ernest Burgess, [review of O. Scott], [1930s], Ernest Burgess Papers, Box 193, University of Chicago Archives.



At the same time, proponents of the lie detector expanded the use of the machine to domains where the credibility of the performance was itself the principal commodity. In 1929 Universal Pictures hired another pioneer polygrapher, William Marston, to prescreen the studio's movies with his device. In part his task was to head off demands for censorship by allowing the studio to anticipate—and fine-tune—those violent and licentious images that would prompt strong emotional responses.

In his influential booklet *The Photoplay*, Hugo Münsterberg, Marston's mentor, had suggested that the index of authentic cinema could be found in the physiological responses of audience members to the actors' on-screen expressions. In monitoring these reactions with his lie detector, Münsterberg's disciple Marston was simply reuniting twin technologies—the polygraph and the cinema—that had been separated at birth. Etienne-Jules Marey, whose early polygraph recorded the invisible interior actions of the body in the 1860s, also developed the chronophotograph to record its fleeting external motions. Both devices had been used soon thereafter to probe elusive mental states: the polygraph to measure the bodily correlates of fear, cinematic apparatus to capture the fleeting expression of feelings in the human face. And both were then quickly adapted to *induce* mental states and, consequently, bodily ones. Reunited, they promised to bring scientific control to the production of human feelings.<sup>13</sup> (See Figure 1.)

Marston lasted only a year at Universal and instead went on to pioneer the use of the lie detector to vet advertising copy. So when the studio was preparing to release *Frankenstein* in 1931, the producers called on Keeler to hook up two undergraduates to his lie detector so that they might watch Boris Karloff bring the monster to life. James Whale, the director, considered this creation scene the linchpin of the movie. To make it credible, he drenched the lab in electrical razzle-dazzle, as much to awe the actors as the audience. As Whale ambiguously put it, "Frankenstein merely has to believe what he sees, which is all we ask the audience to do." Mae Clarke, who played Frankenstein's young fiancée, agreed: "We actors experienced exactly what future audiences would feel as the film rolled on the screens."<sup>14</sup> As the resurrected monster and the young bodies seated in the darkness trembled together, Keeler recorded the connection of sympathy and horror that was the physiological index of the film's capacity to suspend disbelief and bring the monster to life.

#### "I PLACED A JAR IN TENNESSEE"

During World War II and its aftermath this performative logic was extended from the enforcement of financial rectitude to the regulation of political fidelity. In February 1946 Keeler was called down to Oak Ridge, Tennessee, to test, "insofar as possible, the loyalty, integrity, reliability, mental stability, and suitability" of the nation's nuclear workers.<sup>15</sup>

The immediate impetus was news leaked in January 1946 by the House Committee on Un-American Activities that a Soviet spy ring might be operating at Oak Ridge. At the time, the U.S. Army and its congressional allies were arguing strenuously that only military control could safeguard America's nuclear secret. At the same time, the scientific elite and

<sup>13</sup> Hugo Münsterberg, *The Photoplay: A Psychological Study* (New York: Appleton, 1916).

<sup>14</sup> Gregory W. Mank, "Production Background," in *Frankenstein*, ed. Philip J. Riley (Absecon, N.J.: Magic-Image Filmbooks, 1989), p. 37.

<sup>15</sup> Atomic Energy Commission, "Use of Lie Detector at AEC Installations," 24 Mar. 1953, National Archives and Records Administration (NARA), College Park, Maryland, Record Group (RG) 326, Box 148.



**Figure 1.** In 1928–1929 William Moulton Marston (hunched over machine in back) used his lie detector machine to test the emotional reactions of men and women to a series of cinematic scenes, including Greta Garbo and John Gilbert making love in *Flesh and the Devil*. Photo credit: Marston/Lampe family; reprinted with permission.

their allies in the Truman administration wanted to assert civilian control over atomic power, warning that there was no such thing as an atomic “secret” and that the Russians would soon master the atom. Given this inevitability, some believed, the United States should share its atomic know-how through the United Nations in a way that would control the proliferation of nuclear weapons. Keeler was to ensure that the secret remained secret.

If the boundary between open and secret knowledge has been hard to police, it is because classified knowledge and open science grew up symbiotically. Many of the features we associate today with “open science”—publicly funded scientific research at elite universities, double-blind peer review—emerged in response to the postwar secrecy regime. When Congress agreed to fund the National Science Foundation in 1950, it did so in part because it was convinced that only a system of open science could train the cadres of technicians who would work on secret research, as well as replenish the stock of public knowledge military and corporate researchers might tap. But this traffic of people and ideas between the open and closed worlds obliged the managers of the secrecy regime to impose elaborate mechanisms to police the frontier. Between 1946 and 1953 security officers administered some fifty thousand polygraph tests to over eighteen thousand individuals at Oak Ridge, giving it title to being America’s most honest town.

Oak Ridge was a socially heterogeneous city dedicated to purification. It comprised



thousands of technical workers from far-flung urban areas and thousands of semiskilled laborers from the rural South, all laboring in vast industrial plants for subcontractors like Carbide and Carbon Chemicals Corporation. This agglomeration had to be strictly managed: the races were segregated, management and labor divided, unionization and town politics discouraged. Keeler and his fellow polygraphers unearthed no spy ring, although they did get nine individuals to admit to having “stolen product material” as a souvenir or joke. In fact, the tests would turn up “derogatory” information on only 2 percent of subjects. Of these, one-third were tagged as having “friends or relatives associated with organizations considered un-American.” On closer examination, however, those who “sympathized with the Communist movement” turned out to be citizens who supported federally subsidized housing and the Tennessee Valley Authority.<sup>16</sup> In fact, the majority of those affiliated with un-American organizations were current or former members of the Ku Klux Klan. None were ever charged; none lost their jobs.

That the test resulted in so few accusations of disloyalty suggests that the polygraphers were not particularly intent on spy catching. After all, on the assumption that there are ten spies lurking among ten thousand individuals and that a spy catcher wanted to identify at least five of them, even a false-positive rate as low as 10 percent (far better than any real-life polygraph has achieved) would net 345 “guilty” individuals; among them, the five spies would still have to be isolated, leaving the other five still at large. A contemporary opinion poll of subjects confirms that the test was actually being used as what one employee called “a major deterrent.”<sup>17</sup> Of course, the views expressed are not to be taken at face value, though they do indicate what security-minded employees thought security officers wanted to hear.

Respondents said that the test made a person “think twice” before doing or saying anything to jeopardize security. Several emphasized that the test gave them confidence in one another, then praised the machine for clearing them of guilt in their own minds as well. One physicist put it in charmingly physicist-like terms: “I have a personal satisfaction in passing each test, to have a re-calibration so to speak.” In a world permeated by Cold War suspicion, with its shifting presumptions about guilt, the lie detector provided “mental relief from worry” about whether one could count oneself among the honest.<sup>18</sup>

In this sense, the obligation to take a lie detector test was equivalent to the contemporary demand for a loyalty oath. A loyalty oath does not guarantee loyalty any more than a lie detector guarantees truth. Rather, the oath publicly affirmed society’s mastery over private conscience and bound the oath taker to the body politic. The serial polygraph testing at Oak Ridge served an analogous purpose: to remind those with nuclear know-how that the knowledge they possessed was not theirs to give away. The tests created a community of mutually trusting technicians who were expected to be transparent politically, the better to preserve the secret that guaranteed the safety of the body politic. The technicians may have been the bomb’s makers, but they were to be emphatically reminded that they were not its masters.

<sup>16</sup> *Ibid.* (“organizations considered un-American”); and F. P. Callaghan to J. S. Denton, 28 May 1951, National Archives and Records Administration, South East Regional Office, Morrow, Georgia (NARA-SE), RG 326 (Communist “sympathizers”). On Oak Ridge see Russell B. Olwell, *At Work in the Atomic City: A Labor and Social History of Oak Ridge, Tennessee* (Knoxville: Univ. Tennessee Press, 2004).

<sup>17</sup> Paul V. Trovillo, “Report on a Survey of . . . Polygraph Program at Oak Ridge,” 14 Apr. 1951, NARA, RG 340, Box 1.

<sup>18</sup> *Ibid.*; and J. C. Franklin to Carroll Wilson, 10 Oct. 1947, Oak Ridge National Laboratory Archives (“mental relief”). The latter document was obtained through the Freedom of Information Act; contact the author for access.

Yet one year later—just as Senator Joseph McCarthy and his allies were threatening to use the lie detector to expose political and sexual subversives throughout the government—the Atomic Energy Commission (AEC) ended its “experiment” with the lie detector. Why?

Shortly after Hiroshima, atomic scientists in Tennessee had formed the Association of Oak Ridge Scientists and Engineers, which joined the Federation of American Scientists to press for open discussion of science and challenge security rules geared toward the suppression of political dissent. On these grounds, their national publication excoriated the lie detector as scientifically discredited, forbidden in U.S. courts, and chiefly used as “an instrument of third-degree intimidation.” The scientists also tried to leverage their monopoly on atomic know-how. The association reported that 40 percent of the facility’s senior physicists and chemists had quit Oak Ridge in 1947 because of security harassment (although in fact changes in the research agenda were probably responsible).<sup>19</sup>

These complaints met with sympathy in certain quarters of the federal bureaucracy. As one administrator put it, the AEC did not want to “get stuck in a Maginot line” with regard to nuclear knowledge. The fear was that the lie detector was scaring off the sort of “minds which will keep pushing back the frontiers of knowledge.” Tellingly, after years of praising the technique, the managers of Carbide and Carbon Chemicals Corporation turned against it when they had trouble recruiting scientists to the Oak Ridge research lab.<sup>20</sup> The AEC then—at last—consulted experts who pronounced themselves dubious about the lie detector’s reliability. With sufficient leverage, scientific objections to lie detection could be made to matter.

#### BOMBS AND BLUFF

This same sort of cultural pump priming is not necessary to ignite nuclear bombs. Atomic bombs may be symbols, but they also explode in the face of disbelief. Still, a carefully calibrated belief in the potency of nuclear weapons has always been the “force multiplier” that gives them their strategic value. This belief has been nurtured by sixty years of selective disclosures (and ostentatious concealments) of weapon designs, test results, and the validity of computer simulations, all framed by strategic games of bluff and counterbluff, intelligence and counterintelligence—right up to misleading leaks about Saddam Hussein’s supposed efforts to acquire uranium from Africa and the dimensions of aluminum tubes supposedly meant for enrichment. From this angle, the bomb’s most potent product is not a blast zone or radioactive fallout, but a form of belief known as deterrence.

The polygraph has nurtured and quantified the credibility of this performance. On the first occasion that American soldiers were marched into a zone of nuclear devastation—during the Desert Rock exercises of 1951—the army brought along polygraphs to gauge the fear of servicemen.<sup>21</sup> The proximate goal was to assuage the soldiers’ “irrational” fear of radiation and convince them that they could honorably share the battlefield with atomic

<sup>19</sup> “‘Lie Detector’ Doesn’t,” *Science News Letter*, 30 Mar. 1946, 49:207; and R. W. Stoughton to Senator Bourke Hickenlooper, 17 Sept. 1948, Association of Oak Ridge Scientists and Engineers Papers, Box 50, University of Chicago Archives. See also Jessica Wang, *American Science in an Age of Anxiety: Scientists, Anti-communism, and the Cold War* (Chapel Hill: Univ. North Carolina Press, 1999).

<sup>20</sup> Atomic Energy Commission, “In the Matter of ‘Lie-Detector’ Panel Meeting,” 24 Jan. 1952, NARA, RG 326, Box 149; and Atomic Energy Commission, “Use of Lie Detector at AEC Installations,” 18 Mar. 1953, NARA, RG 326, Box 148.

<sup>21</sup> Alfred Hausrath *et al.*, “Troop Performance on a Training Maneuver Involving the Use of Atomic Weapons,” Operation Research Office, Johns Hopkins Univ., Mar. 1952.

weapons. But the highly publicized “secret” exercises were also meant to make plausible the public bluff that the bomb might actually be used.

The early Cold War deterrence theorists argued that the country’s reputation for standing up to conventional military challenges assured both allies and opponents that America would not hesitate to carry out an otherwise irrational policy of retaliatory (and mutually destructive) nuclear counterstrikes—all in order to ensure that no strike would occur in the first place. From this followed America’s interventions in Korea, Cuba, Berlin, and Vietnam. A later generation of theorists, however, have noted that this obsession with demonstrating military resolve was directed more often toward persuading Americans of their own manly fortitude—and to achieving domestic partisan advantage. Whether or not the Cold War was won with mirages like the missile gap and Potemkin villages like the Strategic Defense Initiative, these bluffs *constituted* America’s resolve. The audience for the theater of deterrence was largely at home.<sup>22</sup>

For instance, some nuclear scientists originally opposed any moratorium on atomic testing, arguing that a respite would foster doubts about the nuclear deterrent. In fact, the prospect threatened their sense of their scientific mission. For five decades after Alamogordo, the central preoccupation of America’s weapon scientists—and the mark of their coming-of-age as weaponeers—has been the testing of new designs. Since 1992, when the moratorium on nuclear tests took hold, computer simulations of growing complexity have become central to the stewardship of the nation’s stockpile of bombs and, hence, the production of deterrence. As the theater of deterrence has become increasingly virtual, some have persisted in calling its credibility into question.<sup>23</sup>

Then, in March 1999, American security officers leaked word that Los Alamos scientist Wen Ho Lee had provided the Chinese government with the design of one of America’s most advanced nuclear weapons and had transferred a vast library of software codes used to test nuclear weapons to an unclassified computer. Throughout the previous year congressional Republicans had been accusing the Clinton administration of subservience to China. On the same day that the *New York Times* exposed this alleged breach in America’s security, it reported that Lee had taken a polygraph exam and had been “found to be deceptive.” That same day Secretary of Energy Bill Richardson announced that his department would require systematic polygraph testing of thousands of nuclear weapons workers.<sup>24</sup>

The security bureaucrats who imposed this requirement were principally inoculating themselves against political charges of laxity about national security. Confronting angry

<sup>22</sup> The classic overview of deterrence is Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3rd ed. (Houndmills: Palgrave Macmillan, 2003). For “revisionists” see Robert Jervis, Richard Ned Lebow, and Janice Gross Stern, *Psychology and Deterrence* (Baltimore: Johns Hopkins Univ. Press, 1985). For a critique of the theater of deterrence see Sharon Ghamari-Tabrizi, *The Worlds of Herman Kahn: The Intuitive Science of Thermonuclear War* (Cambridge, Mass.: Harvard Univ. Press, 2005). For an explanation of America’s role in Vietnam as an attempt by the U.S. foreign policy elite to prove their manliness to their domestic critics see Robert D. Dean, *Imperial Brotherhood: Gender and the Making of Cold War Foreign Policy* (Amherst: Univ. Massachusetts Press, 2001).

<sup>23</sup> Hugh Gusterson, *Nuclear Rites: A Weapons Laboratory at the End of the Cold War* (Berkeley: Univ. California Press, 1996); and Gusterson, *People of the Bomb: Portraits of America’s Nuclear Complex* (Minneapolis: Univ. Minnesota Press, 2004). See also Joseph Masco, “Lie Detectors: On Secrets and Hypersecurity in Los Alamos,” *Public Culture*, 2002, 14:441–467.

<sup>24</sup> James Risen and Jeff Gerth, “China Stole Nuclear Secrets,” *New York Times*, 6 Mar. 1999 (on Lee’s reported failure of the lie detector test). See also Dan Stober and Ian Hoffman, *A Convenient Spy: Wen Ho Lee and the Politics of Nuclear Espionage* (New York: Simon & Schuster, 2001).

weapon scientists at Los Alamos, Richardson acknowledged that he had ordered the tests mostly for the sake of public appearance: the testing regime was meant to “send a signal” to Congress and the public that “we’re willing to be scrutinized.” Along with demonstrating institutional transparency—the better to prove that secrets were being kept—the tests obliged employees consciously to monitor the relationship between their inner knowledge and public acts. As a director of counterintelligence explained, the program was unlikely to catch spies, but it could serve a “proactive” role as a deterrent.<sup>25</sup>

This testing regime persisted even after it was revealed that the initial report that Lee had failed a lie detector test was itself a lie and that Lee himself had been lied to about his failure. It persisted despite Lee’s exoneration. And it persisted despite protests by the scientific community. At public hearings in Livermore, Albuquerque, Los Alamos, and Washington, more than a hundred technicians condemned the tests as unfair, demoralizing, and unscientific. One physician-physicist who examined the claims of the polygraph proponents said that they relied on the sort of science that “would never pass muster in a high school science fair.” He has since been forced to resign. The Society of Professional Scientists and Engineers at Lawrence Livermore National Laboratory proclaimed that “polygraphy is not about increasing security or catching spies, it is solely about exercising political control through intimidation.”<sup>26</sup> And a prestigious committee of the National Academy of Sciences, created to review the science of lie detection, concluded in 2003 that polygraph screening provided no demonstrable gain in security and might even be counterproductive. Only in October 2006 did the Department of Energy finally seem willing to reconsider the testing regime.

As Hugh Gusterson has recently noted, the faith Americans place in both high-tech weaponry and doubtful devices like the lie detector suggests that the aura of potency Americans ascribe to technology could be analyzed in the same anthropological terms that early twentieth-century functionalist anthropologists used to situate Azande prognostications based on poisoned chickens. Perhaps we might simply contract America’s cultivated faith in the lie detector—what one waggish headline writer called “polygraph theism”—to polytheism, for the spirit that haunts the machine has survived many scientific exorcisms: the condemnation of the majority of academic psychologists during the middle decades of the century, a meta-analysis by the Congressional Office of Technology Assessment in the 1980s, and a review by the National Academy of Sciences in 2003.<sup>27</sup> But the lie detector cannot be killed by science because it is not born of science. Its habitat is not the laboratory or the courtroom, but the dimly lit theater of state interrogations—that

<sup>25</sup> Bill Richardson, quoted in *Albuquerque Journal*, 25 June 1999; and Douglas Hinckley, quoted *ibid.*, 2 Nov. 2000.

<sup>26</sup> Alan P. Zelicoff, in Society of Professional Scientists and Engineers, “DOE Public Hearings on the Proposed Polygraph Regulations” (at Livermore, 14 Sept. 1999; Albuquerque, 16 Sept. 1999; Los Alamos, 17 Sept. 1999; Washington, D.C., 22 Sept. 1999), [www.spse.org/Polygraph\\_hearing.html](http://www.spse.org/Polygraph_hearing.html). On Zelicoff’s forced resignation see “Outspoken Nuclear Scientist ‘Forced Out’ over Polygraph Row,” *Nature*, 18 Mar. 2004, 428:243. For the claim by the Lawrence Livermore group see Steven Aftergood, “Polygraph Testing and the DOE National Laboratories,” *Science*, 3 Nov. 2000, 290:939–940.

<sup>27</sup> Hugh Gusterson, “How Far Have We Traveled? Magic, Science, and Religion Revisited,” *Anthropology News*, Nov. 2004, [www.aaanet.org/press/an/0408Gusterson.htm](http://www.aaanet.org/press/an/0408Gusterson.htm); William Slaton, “Polygraph Theism,” *Slate*, 20 July 2001; Charles T. McCormick, “Deception Tests and the Law of Evidence,” *California Law Review*, 1926–1927, 15:484–503; Edward E. Cureton, “A Consensus as to the Validity of Polygraph Procedures,” *Tennessee Law Review*, 1953, 22:728–742; Office of Technology Assessment, U.S. Congress, *Scientific Validity of Polygraph Testing: A Research Review and Evaluation—A Technical Memorandum* (Washington, D.C.: Government Printing Office, 1983); and National Academy of Sciences, Committee to Review the Scientific Evidence on the Polygraph, *The Polygraph and Lie Detection* (Washington, D.C.: National Academy of Sciences Press, 2003).

and the public newspapers that publish veiled reports of those gruesome doings. So long as people are escorted into these private chambers—and the public awaits the outcome with a mix of horror and fascination—there will always be a sequel. *Frankenstein, Bride of Frankenstein, Son of Frankenstein, Revenge of Frankenstein, Young Frankenstein* . . . .

To succeed on its own terms, the logic of deterrence can never reach its denouement; it must instead hover in a state of permanent irresolution. As a deterrent, the polygraph gauged physiological responsiveness while cultivating bodily discipline, demanded political loyalty while provoking wariness, and assessed transparency while enforcing secrecy. As a deterrent, the atomic arsenal relied on endless scientific novelty while hurtling toward final destruction, promised peace while threatening total war, and ensured the international order while advancing national supremacy.

#### DARK MIRRORS

Invariably, the first thing people want to know about the lie detector is: “Does it work?” The answer is undoubtedly yes—if by “works” one means that it produces “convictions,” both within the system of American justice and in the court of public opinion, and if by “it” one means not just the polygraph machine but the questions posed, the setting prepared, the examiner’s skill, and the surrounding web of institutions, cultural codes, and political pressures that give the interrogation its meaning. The device is less an actor in its own right than an instrument that echoes the ambitions of the drama’s great players. Yet for that very reason, it offers an alternative perspective on the larger action, as well as a commentary on the performance. Like following *Hamlet* from the perspective of Rosencrantz and Guildenstern, the lie detector lets us backstage to see the theatrical machinery that goes into making the play credible—right up to the inevitable death scene, which is, of course, yet another piece of acting from which the actors rise to play another day. In like manner, much as the legal fiction of the king’s two bodies preserved the continuities of monarchical rule across the death of individual sovereigns during the Middle Ages, the always unresolved theater of deterrence—featuring mutually reinforcing performances by atomic bombs and polygraphs, performances in which these mere “things” transcended their machine-functionality to become autonomous and immortal monsters—guided the continuities of American sovereignty across successive administrations and changes in political party during the fraught years of the Cold War.

And lest this essay be read as yet another critique of that hall of dark mirrors known as the Cold War, let us recall that these dire performances remain constitutive of the American empire. From the torture chambers in the Châtelet of Paris to the cages at Guantánamo, state interrogation has always been carefully stage-managed, a performance in multiple registers: one for the subject, another for potential subjects, and still another for the edification of the public that is asked to look on, half-horrified and half-gratified at what is being done in its name. Just consider the worldwide reaction to the infamous image of the Iraqi prisoner at Abu Ghraib standing on a box in a black hood, his arms outstretched, with electric leads trailing from his fingers. As Alfred McCoy has explained, this image, rather than revealing some guardsman’s idiosyncratic perversion (the “bad apple” theory), actually offers a by-the-books exhibition of the formalized techniques of psychological torture developed by the CIA at the start of the Cold War, including sensory deprivation (the hood), self-inflicted pain (the outstretched arms), and the false threat of physical pain (the electrical leads). First developed under the aegis of the Bluebird and Artichoke pro-

grams of the early 1950s, these techniques were initially deployed under the “cover” of a polygraph test and represented an incremental extension of its methods.<sup>28</sup> As McCoy and others have complained, the evidence suggests that these techniques of psychological torture are no more likely to produce reliable information than is physical torture—as if functionality were the point. Rather, the point of these grim exercises would seem to be far more central to the theater of sovereign power: We do it because we can.

These are the questions we have to ask ourselves whenever we look in the artifactual mirror and shudder in recognition: Is that what we believe? Is that us?

<sup>28</sup> Alfred McCoy, *A Question of Torture: CIA Interrogation, from the Cold War to the War on Terror* (New York: Holt, 2006); and Colonel S. Edwards to Director of CIA, 5 Apr. 1950, Declassified Documents Reference System, Gale Publishing, [www.galegroup.com](http://www.galegroup.com) (“cover”).