Chapter 3

TRANSNATIONAL BORROWINGS, SCIENTIFIC CONTESTATIONS, AND CULTURAL PRODUCTIONS

> No such magic brew as the popular notion of truth serum exists.
>
> —CIA REPORT, 1961

Immediately after the 9/11 attacks, the U.S. media reported that one of the methods considered for interrogating suspects was truth serum. Indeed, two widely quoted articles, one by scholar Alan Dershowitz and the other by journalist Jonathan Alter, specifically mentioned truth serum.[1] Reporting was sporadic but led to a debate among legal scholars about the constitutionality of using narcoanalysis in investigating alleged terrorists.[2] Evidence of drugs used to control and treat detainees also surfaced, amid allegations of their use for interrogations, suggesting that drugs were part of the repertoire of the post-9/11 regime.[3]

As I conducted interviews in India, forensic psychologists confidently asserted that narcoanalysis was used in "your U.S." and insisted that its use had continued after 9/11. "It was used on Saddam Hussain as well," respondents confidently told me. I heard these arguments in Gandhinagar (Gujarat), Mumbai (Maharashtra), and Bangalore (Karnataka), where laboratories were known to have used narcoanalysis. These conversations prompted me to check with the human rights activists and scholars most closely following the U.S. torture debate. Through a torture Listserv, I confirmed the lack of evidence for use of

truth serums, although a CIA report that surfaced in November 2018 indicated that the agency had considered drugs for interrogation but had ultimately decided against them.[4]

The second season of the popular U.S. TV show *Making a Murderer*, based on the *Steven Avery* case, features brain fingerprinting (BFP). Avery was convicted of the murder of Teresa Helbach, and his postconviction relief petition includes an affidavit from BFP founder Lawrence Farwell presenting evidence of Avery's innocence.[5] Researchers in India associated with both BFP and brain electrical oscillation signature (BEOS) tout their success in solving murder cases.[6] Polygraphs, or lie detectors, also continue to appear in important cases, among them the 1984 Sikh killings case in India, the *Adnan Syed* case in the United States, and, most recently, in the Brett Kavanaugh U.S. Senate hearings.[7]

Despite widespread reporting in the 2000s about these techniques—whether rumor or reality—their scientific validity remains refuted and their results legally inadmissible. Scientific and legal debates are thus distinct from their origin stories and popular representation, which continue to show truth found in the body.

Narcoanalysis, brain tests, and lie detectors originated in the United States and promised to revolutionize the criminal justice system by offering more humane methods than physical torture and third-degree interrogation to extract information. Eventually, however, these new techniques were either rejected (as with narcoanalysis in the United States) or met with legal skepticism (as with polygraph and brain tests in the United States and India and narcoanalysis in India). Scientific claims from experts and the courts, however, played only a marginal role in the wider understanding of these techniques. Instead, the confluence of media, law enforcement, and commercial interests constituted the cultural production of truth machines.

Cultural production establishes an edifice based on a "spectacle of science,"[8] but it is usually sustained by those who seek to use science for forensic or commercial purposes. Truth machines thus appear and reappear in different forms, never disappearing despite long-standing challenges to their scientific and legal validity. Their persistence reflects the quest for truth, however elusive. Truth machines appear to apply science to replace torture, yet, like torture, they posit that the body can betray the conscious will and reveal the truth. The validity of their results, therefore, depends on law, culture, and society.

LYING, TRUTH TELLING, AND THE BODY

The challenge of extracting truth from a lying body has long been a legal and political concern. Indeed, the history of torture is marked by fire, the wheel, the rack, and the torture chamber, all linked by the desire to extract truth from a body. As Page duBois notes, the ancient Athenians tortured slaves in part because they believed that "truth resides in the slave body."[9] Slaves, according to Aristotle, can apprehend but not possess reason; hence their bodies had to be tortured to reveal the truth.[10] In *Discipline and Punish*, Michel Foucault argues that torture in France from the fifteenth to the eighteenth century had to be spectacular, because its terror could both enshrine the power of the sovereign and deter the people from crime.[11] Judicial torture, according to Foucault, was also central to truth production in legal proceedings: "The search for truth through judicial torture was certainly a way of obtaining evidence—the most serious of all the confession of the guilty person; but it was also a battle, and this victory of one adversary over the other, that 'produced' truth according to a ritual."[12]

Over time, of course, the spectacle of torture was delinked from executions and judicial systems. Its traces remained, however, with an emphasis on disciplining the body, even as the soul became prominent as well. This shift is explained in a variety of ways: the humanitarian concerns of Enlightenment philosophers, such as Beccaria and Voltaire; the early influence of human rights;[13] changing conceptions of pain;[14] and, famously, the transformation in legal requirements.[15] New forms of torture—psychological and non-scarring/clean/stealth torture, as Darius Rejali explains[16]—still required a body as an object of focus and a docile subject. Science and experts thus became prominent, though without necessarily challenging the body's differential construction and the targeting of marginalized people: slaves, women, minorities, and colonial subjects.[17] And despite all evidence that torture never works, rationales for the extraction of truth from the body were extralegal—religious, social, or cultural.[18] Information may not be the sole purpose of torture, but it has often been the motive.[19]

As narratives of abolition of torture emerged in the West, colonial strategies outside the West provide insights into the differential constitution of bodies. "Uncivilized" colonial bodies, socially and racially produced, were assumed to be prone to lying.[20] The colonial "rule of difference," which Partha Chatterjee theorizes, thus plays a central role in determining the relationship between the co-

lonial powers and the colonized.[21] Elizabeth Kolsky traces views of "Indian human nature" as inherently deceptive and therefore a constant source of British anxiety. She points to the British perception of a "notorious disregard for truth" among Indians, which mediated legal codes in the late nineteenth century and in the use of scientific evidence in criminal trials in India.[22] Oaths, affirmations, and solemn declarations were deemed inadequate for discovering truth, so experts had to glean evidence from the bodies themselves. As Kolsky explains, citing Norman Chevers, the authority on medical jurisprudence in India, "For Chevers, Indians and their inherent deceitfulness were the biggest obstacles to the fair and impartial administration of colonial justice."[23]

Kolsky analyzes a number of cases concerned with white violence—for example, planters beating Indians, often to death, for minor infractions such as a delayed response to a summons. Because Indians were defined as "pathologically untrustworthy," she writes, colonial medical experts provided the "truth," primarily to let the whites off. Deaths were commonly attributed to a characteristic "diseased spleen," leading to the classic "spleen defense" and only petty fines or minimal punishment for whites. As these cases indicate, the "particular circumstances of the colony were deemed to demand special legislation that departed from contemporary legal rules and practices in England."[24] Scientific evidence thus had to be interpreted by experts and based on an ethnological understanding of native bodies and culture.

According to the colonial framework, raped women lied, as did natives more generally. As Pratiksha Baxi explains, "Native women who complained of rape bore a double burden, suspected as liars being women, and presumed to be untrustworthy being native."[25] Kolsky notes a further irony: civilizational discourse is based on the understanding that brown women needed saving from brown men, yet the "brown" and "women" could not be believed to be telling the truth. The consequence of this double burden on women meant that rape cases in the colonial period routinely dismissed women by relying on class and caste considerations, previous sexual history, delays in filing complaints, and demands for evidence of "violent resistance and physical injury," which considerably enhanced the role of doctors and experts.[26]

Baxi discusses the origins of the two-finger test, its continued use in the postcolonial period, and the medicalization of falsity and consent premised on native women's propensity to lie. The women's movement in India, she notes, led to a change in the standards of evidence such that after the 1980s, charac-

ter and sexual history were no longer admissible at trial. Yet evidence from the two-finger test, medicalization of falsity, and self-inflicted injury continue to introduce a victim's personal history:

> In other words, the medico-legal certificate issued after a medical examination of the victim becomes a means for a defence lawyer to bring in past sexual history, now no longer permissible in the law, during the trial. The characterization of a woman as a *habitué* or as "habituated," which we routinely come across in appellate judgments, is used to transform a testimony of rape into a statement of consensual sex.[27]

Science and experts thus reproduce a fabricated social truth. Women in Britain historically faced similar disbelief in cases of rape, although without the double burden of colonized subjects.[28]

Of course, the assumption of a lying body is not restricted to women or to a colonial history. For instance, the lie detector in the United States has been closely associated with the conception of the lying woman or a lying Black man, and fingerprinting is associated with a lying immigrant.[29] Chronicling the history of the lie detector, Geoffrey Bunn notes that deceptiveness has been linked more directly to women, almost as if women had "a physiological incapacity for truth telling and were thought to be habitual liars."[30] Furthermore, he writes, their emotions were believed hidden, requiring instruments to access their "invisible" criminality. Presumed criminality and lack of credibility were also applied to Blacks subjected to the lie detector.[31] Similarly, the "perceived need to identify 'faceless,' racially unfamiliar hordes of people who came in successive waves to the shores" led to the popularity of fingerprinting in the United States, just as a similar impulse to distinguish among the natives led to the initial use of anthropometry and later to fingerprinting in India.[32]

All kinds of forensic evidence could be linked to truth production, with claims to expertise and scientific innovation, often racially and socially produced. But these three techniques that I term the truth machines—narcoanalysis, brain tests, and lie detectors—rely on words or brain signals as the source of information and depend on a person's conscious ability to speak or withhold the truth. In contrast, fingerprinting, serology, and DNA analysis read imprints of the body, whether successfully or not. Truth machines, therefore, represent continuity with classical forms of torture, now mediated by science and expertise

with its emphasis on a person's will to lie. All three techniques enable a machine or a drug to force a person to speak the truth, through physiological/autonomic indicators (polygraph), by inhibiting conscious will (narcoanalysis), or bypassing speech and directly reading brain signals (brain tests).

As Melissa Littlefield notes, a basic assumption underlying lie detection is based on Hugo Munsterberg's idea that "the hidden feeling betrays itself."[33] This betrayal occurs in a sequence: the autonomic indicators suggest lying, the brain tests signify pertinent information about involvement, and narcoanalysis forces the body to betray the information in words. The origin stories of these techniques can thus reveal the innovative claims of scientific experts, along with the techniques these innovations ostensibly replaced. Specific individuals were involved in the origins of narcoanalysis, polygraphs, and brain tests. All three techniques, however, quickly became linked to the needs of the law enforcement community, and the spectacle of their scientific origins resonated in both law and criminal justice. This overemphasis on science and innovation is, of course, belied by the contested utility of these techniques and by the overpowering role of nonscientific factors in their continuation and resurgence.

ORIGIN STORIES: TRUTH SERUMS, POLYGRAPHS, AND BRAIN TESTS

Narcoanalysis

The drug scopolamine was a German invention. It was considered useful because it was effective in erasing the memory of pain (or pain itself) during labor.[34] Historically, therefore, narcoanalysis has principally involved barbiturates such as scopolamine, Sodium Pentothal, sodium thiopental, hyoscine, and Amytal Sodium. The history of narcoanalysis in the United States is closely related to both Dr. Robert E. House, who discovered its properties and its potential to transform police interrogation, and to media fascination with his attempt to popularize the technique. House, who worked as an obstetrician in Texas, noticed that the drug could put his patients into a "twilight sleep," in which they were deeply unconscious but susceptible to answering questions.

The idea for a "truth serum" came from an incident in 1916. As the famous story goes, one of House's patients could identify the precise location of the

scales to weigh her baby, even when in a scopolamine-induced sleep. Following this observation, House sought to determine whether the drug could promote accurate answers to any question asked of someone in this twilight state.[35] Under the auspices of a district attorney, sheriff, and grand jury, he experimented with the drug in the Dallas County Jail in 1922, on two convicted men: William Scrivenor, who was serving fifteen years for a robbery, and Ed Smith, who was convicted of murder. Scrivenor was given scopolamine three times, along with morphine and chloroform at different times, until he clearly had no memory left. Under the drugs' influence, he denied his guilt, and subsequent information from a DA seemed to confirm his innocence. Ed Smith's conviction was also found to be a case of mistaken identity, and charges were dropped.

As House explained the drug, "Scopolamine will depress the cerebrum to such a degree as to destroy the power of reasoning. Events stored in the cerebrum as memory can be obtained by direct stimulation of the centers of hearing."[36] In his account, the drug was meant to communicate directly with the centers of hearing such that the person simply answered the questions heard, without conscious mental processing or the possibility of lying. House named the stage between injecting the drug and the suspect's becoming unconsciousness the receptive stage. "When the will and the power to reason are nonexistent," he elaborated, "then man is too unconscious and too helpless to protect himself by inventing replies to questions propounded."[37]

When asked about his experience with the drug, Scrivenor declared, "Answers to questions slipped from my mind without any apparent desire to stop them . . . and I felt that I couldn't formulate any imaginative trimmings to them." Scrivenor claimed that he had been able to "distinctly hear the questions being asked, and having no ability to do anything else, I answered them truthfully, knowing that I was telling the truth, and that it was impossible to do otherwise."[38] Alison Winter considers this trial a key moment, when the amnesiac properties of the drug shifted to "retrieve memories."[39] Yet she also identifies a contradiction: Scrivenor's experience appeared to strengthen House's claim about the possible use of the drug, but the drug was also supposed to have disabled the conscious mind, and Scrivenor *knew* he could not lie. A constructivist notion of memory, Winter further notes, would also challenge assumptions, including distinctions between long- and short-term memory.[40]

Between 1922 (the year of the first test) and 1930 (the year House died), regular newspaper reports created much stir about truth serum in both the medical

and the legal communities and in the popular discourse. The successful use of scopolomine in these two Texas cases thus generated a halo of success for the drug. The DA even claimed, "If the scopolamine experiments are as successful as they appear to be, it would be the biggest medico-legal discovery since the application of the X-Ray or the use of finger prints. It is virtually a *painless third degree* which will make useless unlawful brutal methods sometimes employed to extort confessions."[41] The optimism was indeed so great that the DA went on to state, "Administration of public justice will be advanced 100 years if 'truth serum' is successful."[42]

Mentioning both lie detectors and truth serums, a number of newspaper articles refer to replacement of third-degree interrogation by "humane" or "gentler" methods.[43] The 1920s also saw much attention focused on the prevalence of the third degree in many states as well as in cities, as the Wickersham Commission, appointed by President Herbert Hoover in 1929, was soon to expose.[44] Newspaper articles in the 1920s routinely termed narcoanalysis a "painless third degree" that was a "new challenger" to the "fistic third degree employed throughout the Anglo-Saxon world, and the torture rack of the Orient."[45] Truth serum was thus "powerfully represented as a sophisticated, scientific, and nonviolent alternative to unsavory police methods,"[46] a more humane and gentler third degree, compared to more physical and mental forms of interrogation then routinely used. The physical methods, in turn, were slowly rejected by the courts, notably in *Brown v. Mississippi* (1936).[47]

Despite concerns that truth serum was a milder form of torture (though without an explanation), House saw it as a way to deal with the problems of the criminal justice system.[48] The "rights of society are greater than those of the criminal," he reportedly said, so "it therefore stands to reason, that where there is a safe and humane method existing to evoke the truth from the consciousness of a suspect society is entitled to have the truth."[49] Just the threat of narcoanalysis was, for some commentators, deemed adequate: "It would accomplish more than any other type of 'third degree' in obtaining confessions, for the reason also that many would prefer to confess than take the medicine; the drug would serve as a positive check and a 'club.'"[50] The drug's popularity thus coincided with a need for both the police and society at large to appear more humane.

After the trial cases in Dallas, House continued to be in the news. In 1923 he engaged in experiments on the West Coast of the United States. In his presentation at the American Medical Association meeting held in San Francisco, he

illustrated the use of scopolamine at the San Quentin prison, where a number of prisoners revealed new information ranging from one prisoner's identity to confessions of murders and robberies.[51] Conducting many such experiments all over the United States,[52] House claimed that he did not have a single failure in five hundred cases.[53] Many prisoners took the initiative and asked for the drug, under which they occasionally confessed to a crime but often reiterated their innocence.[54] House would then be quoted in newspapers claiming, for example, "An innocent man is serving a term in the Oklahoma penitentiary."[55] In the 1920s, therefore, the drug seemed to have taken society by storm, gaining House and narcoanalysis acceptability.

Polygraph

As narcoanalysis became popular in the United States, another technique addressing some of the same concerns for law enforcement was also widely debated. A polygraph usually includes an instrument that records physiological responses: respiration, heart rate, blood pressure, and electrodermal activity.[56] To participate in a polygraph test, an individual sits on a chair and is connected to wires that record physiological responses. These are then interpreted by an examiner. A polygraph is used in multiple ways: some examiners use the relevant/irrelevant technique, others use the guilty knowledge test, and still others use the control questions test.

With the relevant/irrelevant technique, the examiner asks "relevant" questions directly related to the crime along with others that are unrelated and hence irrelevant. A physiological response to the relevant questions indicates deception.[57] The guilty knowledge test refers to questions based on knowledge that only the investigators or a person involved in the crime would have, and a greater physiological response to this knowledge indicates deception. The control question technique involves asking questions that normally cause an anxious response in anyone (for example, Did you steal something?), together with questions relevant to the crime, which generate a stronger response in a deceptive person.[58] In each technique, examiners conduct the test and often interpret the results manually.

Chronicling the social history of the lie detector, Bunn notes that the machine's origins in the United States stem from several people and detection instruments. Tracing their creation from the 1860s to the 1880s, he identifies the emerging popularity of the machine from 1920 to 1950.[59] Psychologists and

scientists as well as novelists and journalists contributed to its use, but four central figures developed, promoted, or enabled the use of lie detectors in law enforcement: John A. Larson, a professor at the University of California, Berkeley, who served as an expert for the Berkeley Police Department; inventor Leonarde Keeler, Larson's student and protégé; August Vollmer, the area's chief of police; and William Moulton Marston, a Harvard-educated psychologist based on the East Coast. Although a single polygraph inventor is a "myth," Bunn suggests, "invention has nevertheless played a constructive role throughout the instrument's history."[60]

Over time, Keeler became prominent for his work in the Scientific Crime Detection Laboratory at Northwestern University, where he filed a patent for the Keeler polygraph and started a school for examiners using lie detectors. Marston became known for his creation of Wonder Woman, whose lasso of truth represented a version of the lie detector. Vollmer, known for his efforts to professionalize the police, tried to systematize the use of lie detectors in law enforcement. As Ken Alder notes, police chief Vollmer's encouraging Larson to use the lie detector was an important move away from police brutality and third-degree interrogation.[61] Indeed Vollmer referred to the lie detector as "a modified, simplified, and humane third degree."[62] The lie detector even emerged in 1931 as one solution to the findings of the Wickersham Commission, since Vollmer was associated with the commission.[63]

Emphasizing these individuals, Bunn argues, "In the case of the lie detector, charismatic authority was intimately tied to the myth of invention that was in turn the source of the machine's mystique and power."[64] The lie detector, however, also found acceptance in popular culture, as Bunn elaborates:

> For the scientists the aim was to uncover the correlates of criminality within the criminal self, to assess the depth of depravity with a view to treating it. . . . To a considerable extent, the lie detector was an invention of those fiction writers for whom the key issue was simply the presence or absence of guilt within one individual among many. . . . It materialized not from the laboratory but from the story.[65]

Bunn mentions a number of detectives in magazines and pulp fiction that helped to establish the lie detector, such as Luther Trant (created by Chicago journalists Edwin Balmer and William MacHarg).[66] The origin story of the

polygraph thus has as much to do with charismatic individuals as well as the fascination of novelists and journalists.

Brain Scanning

Suspicion of the polygraph's reliability, together with breakthroughs in neuroscience and brain research, led to the emergence of new techniques related to reading the brain. Three brain-scanning methods appeared in public and legal discourse from the 1980s and 1990s: functional magnetic resonance imaging (fMRI), brain fingerprinting (BFP), and the brain electrical oscillation signature (BEOS) test. BFP and BEOS have been significant in India, where discussion of these techniques has been connected to experts who have generated research results and occasionally have commercial interests in the instrument's success. Perhaps the broad stakes in the global market in an era of pathbreaking neuroscience research makes such endeavors attractive.

fMRI focuses on brain functioning and captures "the difference between oxygenated and nonoxygenated blood cells due to their magnetic charges, so more active neurons can be distinguished from less active ones."[67] The instrument helps in analyzing conditions such as Alzheimer's and schizophrenia, and some scientists have claimed its utility for detecting deception. Daniel Langleben, among others, argues that when a person is given a task, the fMRI can differentiate between oxygenated and deoxygenated blood, producing a blood-oxygenated-level-dependent (BOLD) effect, which indicates neuronal activity. At least two companies, Cephos and NOLie MRI, tried to convince U.S. courts to accept the results of fMRI. With little verification of validity, however, Langleben and others remained wary of advocating its use for forensic purposes, despite the companies' aggressive marketing.[68]

Lawrence Farwell is most closely associated with BFP, including promotion of its legal and commercial use. The term owes its name to fingerprinting evidence and to DNA matches of an individual to biological samples from a crime scene. As Farwell and his colleagues explain, "'Brain fingerprinting' matches information stored in the brain of the suspect with information from the crime scene."[69] The technique requires investigators to give all relevant information to the examiners, who then divide it into target and probe stimuli. Target stimuli are based on information revealed to the person during interrogation; probe stimuli are based on unrevealed information, known only by someone who committed the crime. Also developed are stimuli that are unconnected to the crime.[70]

To distinguish between relevant and irrelevant information, a subject wearing an electrode cap is shown a familiar stimulus, and an EEG captures the subject's brain waves. As the marketing literature on Farwell's technique explains, "If the suspect recognizes images, words, phrases, audio and videos displayed on a computer screen[,] a P-300 MERMER (Memory and Encoding Related Multifaceted Electroenchephalographic response) will occur."[71] A processor then analyzes the information and determines "information present or absent." As Farwell elaborates, "For brain fingerprinting, ground truth is whether or not the relevant information is stored in the subject's brain at the time of the test."[72] But he is careful to explain that this distinction indicates only awareness of information, not innocence or guilt: "Ground truth is not whether the subject is guilty of a crime." Guilt, however, may be confirmed during posttests.

Indian clinical psychologist C. R. Mukundan is associated with BEOS, a "technique used for the detection of the presence of knowledge of participation in any action committed in the past, in an individual."[73] Initially excited by the Farwell technique in the 1990s, Dr. Mukundan found it inadequate and in the 2000s created BEOS. Recognizing that "remembrance is not at the same speed in all individuals," he argued further that BFP merely identified a suspect's retrieval of information, which is autonomic and involuntary, rather than memory, which involves some participation. "Knowing and remembering are two neurocognitive processes," he said, "of which knowing refers to the cognitive process of recognition with or without familiarity, whereas remembrance is the recall of episodic and autobiographical details from a person's life."[74] "See, for example," a clinical psychologist elaborated,

> if you find that a person has recognized an umbrella, that umbrella which was there in the crime scene, you'll say that he's the only one who has recognized, so he's the one who has done that crime. This is too far-fetched a thing . . . [or] Another subject comes, looks at that knife, and there's an increased P-300—"You know what? My grandmother had a similar knife." Not that he knows anything; his grandmother had a similar knife. So he also produces this thing, higher P-300.[75]

BEOS, like BFP, involves multiple electrodes attached to a person's head through an electrode cap. With eyes closed, the person then listens to probes meant to trigger remembrance of the event. Probes appear in a determined se-

quence that links different parts to provide context. As with BFP, three kinds of questions are target probes, meaning those related to the crime; control probes, related to the person's life and irrelevant to the crime; and neutral probes, which serve as baselines. Here target probes include target A, the investigator's version, and target B, the suspect's version. The dual versions are designed to ensure some neutrality.[76] The origins of BEOS are linked to the guilty knowledge test used with polygraphs, but here the suspect says nothing and all probes are auditory.

The company associated with BEOS, Axxonet (run by Chetan Mukundan, C. R. Mukundan's son), created the Neuro Signature System (NSS) to determine whether a suspect has "experiential knowledge" of participation in a crime, here termed the "signature." With NSS, recordings are done by an EEG, and analysis deems experiential knowledge present or absent. According to C. R. Mukundan, "The scores elicited by neutral probes help to view those probes from the Target section, which have elicited the most significant 'Experiential Knowledge' (EK) scores."[77] Mukundan and BEOS have been central to the implementation of this truth machine in India, where Axxonet aggressively markets the technology.

CULTURAL PRODUCTION OF TRUTH MACHINES

Early Use of Narcoanalysis in the United States

In the 1920s narcoanalysis in the United States had mixed responses from the legal and scientific communities, with the discretion of individual judges determining use of the drug. For instance, in 1923 truth serum was allowed for two Louisiana prisoners, but for three others the drug was disallowed, "because Judge Robert Ellio[,] before whom the cases were tried, [had] given specific orders that they be not experimented with in this manner."[78] In the *George Hudson* case (1926), the court clearly threw out the evidence obtained under truth serum. Hudson, a Black man, had been convicted of criminally assaulting an elderly woman who had identified him, but he claimed mistaken identity.

In this case, the results of the serum test (supported by House) had at first resulted in a mistrial but had not been introduced in a subsequent trial. When Hudson and his attorney challenged the conviction and thirty-five-year sentence using the test results, the Missouri Supreme Court called the appeal "clap-

trap": "Testimony of this character is in the present state of human knowledge unworthy of serious consideration,"[79] the court stated:

> Its origin is as nebulous as its effect is uncertain. A belief in its potency, if it has any existence, is confined to the modern Cagliostros, who still, as Balsamo did of old . . . cozen the credulous for a quid pro quo, by inducing them to believe in the magic powers of philters, potions, and cures by faith. The trial court, therefore, whether it assigned a reason for its action or not, ruled correctly in excluding this clap-trap from the consideration of the jury.[80]

Law enforcement thus appears uneven, with occasional mention of courts allowing the tests, other courts rejecting the evidence, and some DAs and sheriffs dropping charges.

At times the selective use of narcoanalysis against Blacks became prominent, as it did in Alabama in 1924 with the so-called axe murders. Twenty-four people had been killed in three years, and four men and one woman, all Black, were picked up and, according to the *Chicago Defender*, subjected to third-degree interrogation and forcibly injected with truth serum.[81] Even though by then House had compared the impact of the serum to a person affected by drinking alcohol, critics argued that the truth serum negatively impacted the bodies of these suspects. The tests were used to gain confessions, and based on that, Johnson, one of the men, was actually given the death sentence.[82] In a subsequent article, the *Chicago Defender* notes that when truth serum was used against whites, they were usually let off by the law enforcement officers anticipating court skepticism.[83] Black bodies thus remained subject to experimentation, here ostensibly to see whether narcoanalysis suppressed their ability to lie.

House argued that the media had unnecessarily exaggerated his claims and expressed doubts, noting that the success of the drug depended on "experience and individuality."[84] The American Medical Association's support was required for the drug's success, but the medical community, too, remained skeptical.[85] In the 1930s and 1940s, doctors cautioned against using the drug for criminal justice purposes, a practice of using drugs then common in Britain mainly for hypnosis. "The term 'narco-analysis,'" one doctor noted, "was first devised by J. S. Horsley (1936) for the technique which utilizes a narcosis artificially induced by a barbiturate for the express purpose of facilitating the analysis of a patient's mental content."[86]

The debate among medical professionals continued, but narcoanalysis was largely deemed unsuited for legal purposes. J. F. Wilde, a psychiatric specialist, distinguished between its uses, although he thought the technique might be improved:

> No doubt, in time, this technique may be perfected so that one can be sure whether the truth is being revealed or not, and this will be a great medico-legal advance, but from the psychotherapeutic standpoint it is not so important to be sure *that the repressed material is absolutely true*. The hidden fears of the neurotic may be sheer fantasy and the wildest confabulations of imagination. They are none the less terrifying, perhaps more so than real dangers. Yet these fantasies are the phenomena with which we as therapists have to deal in helping our patients to adjust themselves to themselves and to their hidden fears.[87]

The same skepticism led others to test the veracity of truth serum induced by subjecting themselves to it, with mixed results. For instance, three members of the International Association for Identification, seeking to prove that truth serum would not really work, were pleasantly surprised to find that they apparently correctly answered all questions put to them, despite their conscious desire to lie.[88] In 1924, however, two prisoners and a newspaper reporter in St. Louis, Missouri, reported unsuccessful tests, which House attributed to the number of people (about fifty) present and the nervous condition of the subjects.[89]

After House died in July 1930, Winter suggests, the technique became used less for finding "truth" than for aggressive policing, aided by the Scientific Crime Detection Laboratory (SCDL) at Northwestern University.[90] Indeed, in one news account of Chicago law enforcement officers, SCDL was reported to be "at the service of all the law enforcement agencies."[91] By 1931, students and laboratory staff who were willing to "lend themselves to the service of science" had participated in successful drug tests at the SCDL, with claims of an 80 percent success rate with the 20 percent failure attributed to students who were not drunk enough. The effects of truth serum were thus compared to half a dozen drinks of gin.[92] As Colonel Calvin Goddard noted, however, once a suspect answers questions under the influence of truth serum, "he usually confesses after he recovers consciousness and sees the record."[93]

Studies continued at Northwestern University into the 1930s, with tests of truth serum by experts with different purposes, among them questioning in

murder cases,[94] memory restoration in amnesia cases,[95] freeing persons charged with murder,[96] charging persons with murder,[97] and freeing persons suspected of robbery.[98] Use of narcoanalysis seemed to decline, however, in the 1940s and 1950s. It did emerge during the Cold War but was used less in the criminal justice system than in psychotherapy. Professionals, Darius Rejali says, had come to recognize its unreliability for interrogation.[99]

Even without courts and experts willing to accept the validity of narcoanalysis, truth serum had captured the popular imagination. Much like the polygraph, truth serum received attention in the popular press, although without necessarily engaging the medical claims made by House and others. In the 1920s, soon after its attention in the legal and medical community, a variety of articles contemplated its use in everyday contexts. Many columnists suggested that truth serum might be generally useful in society. The famous journalist Dorothy Dix, for example, wrote at least two columns about truth serum. In one, she responds to its discovery to note that its broad use would completely change the rules of polite society: "Picture an evening party with everybody standing around looking as bored as they feel," she writes, or "when Mr. Jiggs begins to sing, . . . there is a general exclamation that it is time to go home," or instead of an "amiable looking hostess . . . there is a weary woman who ejaculates from time to time, 'Thank God, this is nearly over, and when I've fed these brutes, I will have paid off the last of my dinner debts.'"[100] Dix concludes, "That serum won't do in real life. Our system wouldn't stand it."[101]

In another humorous column, Will Rogers speculates about the influence of truth serum on Hollywood stars, who would be forced to tell their real salaries; female stars, who would remember their maiden names; and politicians in that era of Prohibition, who would be forced to admit that they drank.[102] His only exception was a notorious Los Angeles real estate agent: "They broke three needles trying to administer the stuff to him," Rogers told his readers, "and it turned black the minute it touched him, so they had to give it up. He sold Dr. House three lots before he got out of the operating room."[103] These pieces are humorous commentaries, but they merged with stories of House's claims to successful use of narcoanalysis in jails. As commentary, Rogers writes, "Everybody in jails are for it, for they want to prove their innocence, but everybody out of jails are against it, for they fear they will get themselves under its influence."[104] Rogers underscores his skepticism in asserting that using truth serum to claim

innocence is unsurprising, because a suspect would say the same thing under the influence of hydrant water.[105]

Polygraphs and Brain Tests: Sustaining Narratives

Just as narcoanalysis was never fully accepted for forensic purposes by the medical or legal communities, the use of polygraphs raised similar questions of reliability and validity. Brain techniques are more recent developments, but evidence suggests much ambiguity regarding their forensic use. Why, then, does the fascination with these techniques continue? Two arguments seem to have sustained it. First, researchers and forensic scientists closer to law enforcement are engaged in continuous exploration. Second, claims of success are reported so aggressively that they seem to obviate the need for validation by science or the courts. Legal evidence and scientific validity are thus distinct from the cultural production of these truth machines. Indeed, the tension between the legal and scientific communities appears to be resolved in the realm of the cultural.

In the case of the polygraph, its origin in the United States offers a fascinating story over time. Bunn chronicles the cultural history of the lie detector, but its use in law enforcement and other security contexts has been the subject of much speculation. Despite studies dating from the 1920s, it has always been a controversial technique, with an extensive amount of literature documenting its unreliability.[106] A 2003 report by the National Academy of Science, charged with inquiring into the utility of the polygraph for security screening, discusses its challenges and close relationship with law enforcement. The report reviewed past research on the use of the polygraph in crime investigations and found that much of it lacked the reliability or validity desired in scientific studies. The committee thus recommended further research.[107]

Despite its use for almost a hundred years, together with the results of the polygraph determined inadmissible in the U.S. courts (as supported by the 1923 *Frye* case), questions regarding the polygraph recur. Indeed, its status is still open in some jurisdictions, with defendants trying to use it.[108] Ken Alder, for instance, cites studies by the National Research Council in 1941, a Congressional Office of Technology analysis in 1984, and the 2003 National Academy of Science report. "Each concluded that the techniques of lie detection, as used in investigative work by polygraphers, do not pass scientific muster," he wrote. "Yet lie detection lives on."[109]

Consequently, the technique has been neither rejected nor fully accepted.

The 2003 NRC report, however, identified a reason for the ongoing use of polygraph tests in interrogation, despite the difficulty of admitting the evidence in court: anecdotal evidence of confessions continues to suggest the technique's success. "From a scientific standpoint," the report states, "these anecdotes are compelling indications that there is a phenomenon in need of explanation; they do not, however, demonstrate that the polygraph test is a valid indicator of deception."[110] The needs of law enforcement, rather than science, have also directed research on the polygraph, with claims of accuracy ranging from 70 to 90 percent.[111] The report further explains, "Polygraph research has been guided, for the most part, by the perceived needs of law enforcement and national security agencies and the demands of the courts, rather than by basic scientific approaches to research."[112] A decision to use a polygraph is thus driven by policy, not science.

The 2003 report directly acknowledges the cultural production of this truth machine: "The polygraph, perhaps more than any other apparently humane interrogation technique[,] arouses strong emotions. There is a mystique surrounding the polygraph that may account for much of its usefulness: that is, a *culturally shared belief* that the polygraph device is nearly infallible."[113] Littlefield similarly defines the lie detector as "an imagined instrument, an accumulation of the lore, desires, hopes and dreams of the scientific, journalistic, and lay communities."[114] Spectacular science thus becomes the basis of such sustained interest. For Bunn, "Spectacular science is a mode of scientific inquiry that is created and sustained by popular culture."[115] The cultural reasons for the origins and perceived infallibility of the polygraph, together with anecdotes of admissions and confessions, explain its ongoing application, despite lack of either legal acceptance or strong evidence of scientific reliability and validity.

Brain testing has been a much more recent phenomenon, and experts in both the United States and India have claimed major successes in criminal cases. U.S. experts in BFP, for example, claim to have gained admissible evidence that led to bringing a "serial killer to justice" and freeing "a man accused of murder after 24 years in prison."[116] In reality, U.S. courts have been hesitant to accept brain test results as evidence. Nonetheless, continued attempts to introduce brain tests in court suggest that these techniques have some ostensible utility, despite the critiques. Notably, for example, BFP has reportedly been used in three major criminal cases in United States.

In 1999, when J. B. Grinder, accused of killing a fifteen-year-old, had re-

canted his confession, the police asked Lawrence Farwell to use BFP in the prison where Grinder was held. Farwell concluded that Grinder had concealed information: "'There is no question that J. B. Grinder raped and murdered Julie Helton,' Farwell told a local newspaper after the test. 'The significant details of the crime are stored in his brain.'"[117] In another case, Jimmy Ray Slaughter was convicted of murder and sentenced to death, and BFP was used to ask for postconviction relief. But in *Slaughter v. Oklahoma* (2005), the appellate court deemed the evidence unreliable:

> Secondly, beyond Dr. Farwell's affidavit, we have no real evidence that Brain Fingerprinting has been extensively tested, has been presented and analyzed in numerous peer-review articles in recognized scientific publications, has a very low rate of error, has objective standards to control its operation, and/or is generally accepted within the "relevant scientific community."[118]

As this case suggests, the use of a technique can elide a claim to its success in marketing, especially by Farwell.

The case that appears most often in discussion of BFP is the *Harrington* case. Terry Harrington was convicted of murdering security guard John Schweer in 1978, mostly on the basis of testimony from an accomplice. The physical evidence was minimal.[119] Harrington was sentenced to life imprisonment without parole. In his 2000 attempt at postconviction relief, new BFP evidence was introduced with other materials. In a footnote the court stated, "According to Dr. Farwell, his testing of Harrington established that Harrington's brain did not contain information about Schweer's murder. On the other hand, Dr. Farwell testified, testing did confirm that Harrington's brain contained information consistent with his alibi."[120] Without other evidence, however, the court found that "because the scientific testing evidence is not necessary to a resolution of this appeal, we give it no further consideration."[121] Thus, while Harrington did receive a new trial, the basis of the court's decision was not the BFP tests.

Regarding BEOS, Dr. Mukundan and a number of scientific officers have defended the technique, especially in legal cases. In an article on the Axxonet website, written before the Indian Supreme Court intervened in 2010 to clarify that brain techniques should be voluntary and evidence not directly used, a multiauthored piece notes the courts' mixed response to BEOS.[122] On the basis of ten cases that range from murder by arsenic poisoning to murder of women

and children in a village, the article argues that the evidence is corroborative, and in some cases the court refused to accept BEOS as the sole evidence:[123]

> So far, there has been not even a single case, in which the court has convicted a subject based only on the results of the BEOS test. In fact, in the cases, wherein results of the BEOS tests and other Psychological tests were Positive but were not supported by other oral or documentary evidences, the subjects in those cases have been acquitted of the charges against them.[124]

Farwell's instrument also continues to be used in India. It was adopted in the 2000s by S. Malini in Bangalore and more recently in the Raksha Shakti University under a memorandum of understanding with Brainwave Science, the company promoting and marketing BFP, for work on unsolved cases of the Central Bureau of Investigation.[125] A researcher at Raksha Shakti University shared with me some of the research team's thirty cases to explain the way BFP can help to solve cold cases.[126] One was a missing woman (Sarla) whose husband, father-in-law, and husband's friend (purported to be the missing woman's boyfriend) were questioned. After addressing issues regarding language, the father-in-law was found uninvolved, and the suspicion turned to the husband and his friend. The researcher found the husband suspicious because of his aggressive behavior during questioning, but the test revealed no information present. As the researcher explained:

> That first test—"his wife was murdered," no information was present. "His wife got missing," ya, information was present; ya, his wife was missing. But the result was that "indetermined present" means the information is present but it will not determine that this person knows about her missing. . . . But in a subsequent test, the husband showed the strong belief that his friend had killed her, that the suspicion became focused on the friend.[127]

After several rounds of testing, the examiners found that the husband's friend actually had awareness of the murder:

> After that "Sarla was murdered," the second test. Now, there's a turning point of the case. In this case, . . . when some particular probes are appearing, that subject got a little unconscious, and the instrument's ability to identify those suspicious

> activities, ok; in fractions of seconds it reads . . . records the waves which are generated by our brain, you can say, when we see any image in our conscious and subconscious mind, recalls that information which are related to that particular image, whatever we have. And that is different for the innocent, different for the professional, different for the criminal, ok.[128]

The instrument can thus ostensibly determine whether the suspect knows information relevant to the crime (here about Sarla's murder), and if the examiners have any doubts, the test is repeated until they are sure, as this researcher elaborated: "So this test said the test shows [the] same results, ok, and [the] aim was 'she was murdered,' and we found that information is present [with] more than ninety percent [accuracy]."[129] Faith in the technique thus emerges from the instrument's ability to gain information, especially in cases that lack physical evidence. The suspect's losing consciousness, although not acknowledged here, probably adds to the suspicion.

In India forensic psychologists attribute their attraction to this technique to bad management of crime scenes, which makes relying on physical evidence impossible. As Dr. S. L. Vaya, the foremost forensic psychologist credited for popularizing truth machines, explains, "[An] increasing number of crimes are being committed in which physical evidences left behind [at] the crime scenario are nil or negligible[,] and it is important to extract information from suspects about their suspected involvements, as well as make the perpetrator admit to the deeds committed by them."[130] Marketing materials for Brainwave Science note the limits of DNA: "Fingerprints and DNA evidence are uncovered in only 1% of all cases. And DNA fingerprinting can only be successfully applied when investigators collect and preserve fingerprints and biological samples in a time-consuming and expensive labor-intensive way."[131] The Indian researcher I interviewed thus had absolutely no doubts in proclaiming that BFP is 99.4 percent accurate in the two cases he described to me. For him, the impossibility of working with fingerprints or DNA, in India or more generally, became the basis for a strong need to believe in BFP.

However, observers continue to criticize both BFP and BEOS. Some cite a dearth of studies that independently verify the validity of these tests. Some scientists in the field, such as J. Peter Rosenfeld and others, do concede that the brain responds to stimuli, thereby suggesting concealed information, but they posit a difference between such responses and evidence of memories, which are

much more difficult to ascertain.[132] Rosenfeld notes further that the test protocol is based on the assumption that crimes are always planned and the memory of the planning stored. The misconception, he asserts, is that "the brain is constantly storing undistorted, detailed representation of experience which the BF method can extract from the brain just as easily as real fingerprints can be lifted from murder weapons; (hence the misleading term, 'Brain *Fingerprinting*')."[133]

Rosenfeld refers instead to literature pointing to the fragility of memories and the possibilities for their construction.[134] Referencing the *Harrington* murder case, he argues further that a test conducted twenty years after the crime would be unable to distinguish between a "rehearsed and [a] recalled alibi."[135] Individuals may also commit crimes while under the influence of alcohol and drugs, which the test fails to take into account. Nor do the studies consider countermeasures that might invalidate the test results.[136] Furthermore, the originators of both BFP and BEOS refuse to reveal the mode of calculation on which each test is based.[137]

Those who defend brain testing over the polygraph tend to make a clear distinction between the two methods. In response, Littlefield argues that while brain testing appears as mechanical mind reading as opposed to the body betraying the self in words, the process underlying the technologies is much the same.[138] Brain imaging, she elaborates, is marketed "as a more direct indicator of consciousness than secondary autonomic markers. Nonetheless, like their polygraph counterparts, brain-based techniques are *indirect* measures of mental and emotional states based on changes in physiological processes."[139]

Claims of success by those most closely working with the techniques, together with aggressive marketing and promotion by media and popular culture, have thus been crucial to their acceptance. Science and inadmissibility in court matter less. Indeed, while polygraphs and even narcoanalysis are said to be beatable, Brainwave Science claims that BFP is unbeatable: "We offered a $100,000 reward to anyone who could beat a Brain Fingerprinting test and even then, no one was able to succeed,"[140] company literature claims, noting further that the technique has been "*tested by several U.S. federal government agencies and found to be over 99% ACCURATE.*"[141] Commercial interests are, of course, paramount for Brainwave Science (and Axxonet), which in 2015 was expanding to sell its instruments in Singapore, India, and potentially six other countries, with marketing that featured testimonies of its success.[142]

Touting the validity and reliability of BFP, Farwell also claims an accuracy

rate of 99 percent. He agrees, however, that the test indicates only awareness of the information presented and is not necessarily an indicator of guilt:[143]

> A brainfingerprinting test shows that the subject does or does not know the specific details about the investigated situation embodied in the probe stimuli. It is up to the attorneys to argue, and the judge and jury to decide, based on brain fingerprinting and all other available evidence, whether a crime took place, what the crime was, and who is guilty or not.[144]

In 2001 a U.S. congressional report rejected BFP "because use of the technique requires a unique level of detail and information that would be known only to the perpetrator and the investigators."[145] Citing connections to security agencies, however, Brainwave Science remains aggressive in claiming the technique's success for solving cases and finding the guilty.

Farwell, in turn, has appeared in controversial media portrayals of criminal cases, such as the popular Netflix show *Making a Murderer*, based on the case of Steven Avery, convicted of killing of Teresa Halbach in Manitowoc County, Wisconsin. After the show aired in 2015, the case was much discussed in the media. In 2016 Farwell conducted BFP on Avery, and in his 2017 court affidavit defended the technique: "Fingerprinting [h]as been tested and proven at the FBI, the CIA, the US Navy, and elsewhere."[146] Farwell then concluded that Avery showed no signs of knowing the newly discovered evidence, as the tests indicated "information absent" with 99.9 percent statistical accuracy. His website also posted the test, along with media stories on the case.[147]

The media has thus played a supportive role in BFP. As Paul Wolpe and his colleagues argue, media approval and aggressive marketing of brain-testing technologies have contributed to their popularity, despite reservations among science and legal experts.[148] Indeed, the websites of both Farwell and Brainwave Science highlight BFP's capabilities and constantly update its use in key cases or in different countries: "'Truth and Justice, by the Blip of a Brain Wave' was the headline in one *New York Times* article . . . while the *San Francisco Chronicle* simply announced 'Fib Detector' . . . in the year that Farwell was mentioned [in] the Time 100: The Next Wave innovators—the Picassos or Einsteins of the 21st Century."[149] BFP thus appears to be following the path of the polygraph, just as Alder predicted: "The lie detector cannot be killed by science, because it is not born of science. Its habitat is not the laboratory or even the courtroom, but

newsprint, film, television, and of course the pulps, comic books, and science fiction."[150] In an era of reality TV, *Making a Murderer* became a major vehicle for touting the success of BFP, with Avery's lawyer promoting it aggressively.[151]

Attempts by both Brainwave Science and Axxonet to defend brain testing became more aggressive than the earlier, more tentative claims by scientific officers.[152] Axxonet posted on its website, "Unlike other technologies which have been used in 2 or 3 cases, NSS has been used in over **700 cases** reported by independent Forensic laboratories in areas such as Murders, Insurgency, Poaching, [and] Illegal immigration to name a few." The website then reflected efforts to distinguish BEOS from other methods: "Unfortunately the court confused BEAP/BEOS with the outdated and minimalistic P300 technique with which BEOS has no connection."[153] Axxonet asserted further confusion caused by the court's decision to consider three methods collectively. In these defenses of brain testing, marketing materials, aspirations of the tests' originators, and sometimes their relationships with law enforcement produce a cultural defense of truth machines with little support from science or the courts.

Truth Serum: Cold War and the War on Terror

Questions of national security have long been linked to continued fascination with truth machines.[154] In the United States, discussion of narcoanalysis has occurred not only in the criminal justice system but also in the context of intelligence gathering. As Winter explains, "It has attracted consistent controversy, recurrent rejection, and also recurrent resurgence."[155] The Central Intelligence Agency (CIA) experimented with truth serum, along with other drugs, in the 1950s and 1960s, prompting congressional hearings in the 1970s, which may have contributed to its demise as a Cold War relic. The intervention of the U.S. Supreme Court in the *Townsend v. Sain* case in 1963 may also have contributed to its rejection.

The most substantive information about the CIA experiments emerged from the Church Committee and the Rockefeller Commission reports in 1975 and from a number of documents released in 1977 under the Freedom of Information Act (FOIA) and congressional inquiries.[156] By then the CIA had claimed that it had stopped using drugs for experiments by 1967 directly and indirectly by 1973 and that many related records had been destroyed.[157] The CIA experiments included a number of methods, among them hypnosis, polygraphs, narcoanalysis, behavioral change, and drug testing, particularly with LSD. Un-

like the longer history of these techniques, especially narcoanalysis, in the criminal justice system, the CIA emphasized possibilities for intelligence gathering.

The materials presented by the CIA during the congressional hearings included a brief history of truth serum dating from the 1920s and the experiments done by House. According to the CIA report, the drug became widely used until both psychological and physical side effects became evident and drastically undermined using the drug for interrogation.[158] Side effects not mentioned in the newspaper reports of the time included "hallucinations, and disturbed perception" and "dry 'desert' mouth."[159] The report points out concerns from the very beginning about whether it was a form of "psychological third degree." The CIA report tries to distinguish between a well-protected criminal justice system and unprotected intelligence gathering for national security. The agency cites the possibility of enemy use of truth serum, which would require resistance, despite the courts' hesitation to allow it. The report further illustrates four stages of response to the drugs, the fourth of which could lead to death,[160] but points to the second stage (hyperactivity) as useful in police work and intelligence gathering.

Two major studies were quoted in this report. One involved soldiers who were neuropsychiatric patients. They were first questioned about their crimes, then injected with amytal (either delayed or administered repeatedly) and encouraged to confess; later, when they regained consciousness, they were asked to repeat their confessions. About seventeen subjects repeated their confessions and eight recanted. The report states, "With respect to the reliability of the results of such interrogation, [Gerson and Victoroff] conclude that persistent, careful questioning can reduce ambiguities in drug Interrogation, but cannot eliminate them altogether."[161]

In another experiment, at Yale University, F. C. Redlich and others concluded that lying under the influence of truth serum is possible, depending on the individual's mental state:

> The results, though not definitive, showed that normal individuals who had good defenses and no overt pathological traits could stick to their invented stories and refuse confession. Neurotic individuals with strong unconscious self-punitive tendencies, on the other hand, both confessed more easily and were inclined to substitute fantasy for the truth, confessing to offenses never actually committed.[162]

This report ends by stating, "No such magic brew as the popular notion of truth serum exists."[163] Each study suggested further research to explore possibilities, and the CIA and the U.S. military thus initiated Projects Artichoke, Bluebird, and MKUltra to study the impact of truth serum. These efforts, however, were subsequently abandoned.[164] Alder notes that some of these programs used the polygraph as a pretext for introducing polygraphers, who would also monitor the effects of psychological methods involving drugs.[165]

The congressional hearings included very little detail about House's experiments, the courts' response, and the CIA's own studies. The CIA report instead poses a problem of hesitation in the West to study such interrogation methods: "The general abhorrence in Western countries for the use of chemical agents 'to make people do things against their will' has precluded serious systematic study (at least as published openly) of the potentialities of drugs for interrogation."[166] This statement suggests a basis for future studies without acknowledging that truth serum had been used again and again and generally treated with a fair amount of skepticism.[167]

After 9/11, discussion of truth serum resumed, along with a number of interrogation techniques, although there is no clear evidence of its use.[168] Some scholars and state officials argued for use of truth serum, both because it was not physical and because they distinguished between intelligence gathering and use of evidence in criminal trials.[169] In the post-9/11 period, debates on truth serum emerged among those who argued for torture or for "torture-lite." Commentators suggested ways of either institutionalizing torture or leaving it to the discretion of individual state actors, rejecting the use of torture or of cruel, inhuman, or degrading treatment (CIDT) as morally and legally unacceptable and historically unreliable.[170] Lawyers of the Bush administration found ways of either bypassing national and international laws or reinterpreting them to make methods of "harsh or enhanced interrogation" appear sanitized and more acceptable.[171] Debates and policies thus yielded a regime of torture, CIDT, and other excesses in prisons such as Abu Ghraib in Iraq, Guantánamo Bay in Cuba, and a host of extraordinary rendition sites.

Narcoanalysis and truth serum did receive public attention after 9/11. According to Alter, "Short of physical *torture*, there's always sodium pentothal ('truth serum'). The FBI is eager to try it, and deserves the chance. Unfortunately, truth serum, first used on spies in World War II, makes suspects gabby

but not necessarily truthful."[172] A story in *Time* noted the use of truth serum on Abu Zubaydah (a high-value detainee) mentioned in a book by Gerald Posner, who wrote that "an unnamed 'quick-on, quick-off' painkiller and Sodium Pentothal, the old movie truth serum—in a chemical version of reward and punishment [was used] to make Zubaydah talk."[173]

Media discussion also considered whether the drug could be used as an effective mode of questioning in the war on terror, and some U.S. officials considered it a possibility, especially with al Qaeda suspects, who were considered unprotected by the Geneva Conventions. Alternatively, officials suggested that detainees could be sent to countries that condoned truth serum, suggesting that even if these drugs did not get to the truth, they would at least break prisoners' defenses.[174] The 2018 report from the Office of Medical Services reveals an explicit discussion over two to three months in 2002 about using Versed (generic name midazolam), a more recent benzodiazepine, even though Project Medication was shelved in early 2003.[175] Apparently, my respondents in India's forensic laboratories were correct in reporting a reevaluation of the use of truth serums in the United States after 9/11.[176]

Debates over the legality of truth serum date from 1963, in the U.S. Supreme Court decision in *Townsend v. Sain, Sheriff, et al*.[177] The case involved murder suspect Charles Townsend, who claimed at trial that his confession should be inadmissible because it had been coerced. Townsend was a heroin addict, and when he exhibited signs of withdrawal during questioning, a physician gave him 1/230 grain hyoscine (similar to scopolamine), and 1/8 grain of phenobarbital to alleviate the symptoms. Soon afterward Townsend "talked."[178] Townsend claimed that the interrogating officer beat him and gave him drugs that made him feel better but also sleepy and dizzy. After the questioning, he was made to sign statements both at the station and in front of the state's attorney (after the administration of more pills). The prosecution, in turn, insisted that Townsend had been awake and coherent when necessary, and the physician claimed that the hycosine was intended only to pacify him, failing to mention its properties as a truth serum.

The Supreme Court's majority opinion, written by Chief Justice Earl Warren, rejected Townsend's confession as inadmissible. Most of the majority opinion and the dissent focused on whether the district court should have held a hearing to reconsider the facts in the case, but the Court did address the status of truth serum, arguing that its admissibility depends on whether the confes-

sion is voluntary. Volition, the justices opined, is integrally linked to whether the "will was overborne" and whether the confession was a product of "rational intellect and free will." Beyond questions of physical or psychological coercion, the court focused on the "drug-induced statement" and said,[179] "It is difficult to imagine a situation in which a confession would be less the product of a free intellect, less voluntary, than when brought about by a drug having the effect of a 'truth serum.'"[180]

The court addressed the validity of the technique only briefly, in a footnote, where the justices acknowledge a raging debate about truth serum. Rather, the court's focus on the inadmissibility of the confession was central to the decision: "Whether scopolamine produces true confessions or false confessions, if it in fact caused Townsend to make statements, those statements were constitutionally inadmissible."[181] And it is precisely this focus on inadmissibility of evidence in a criminal trial that advocates of truth serum for intelligence gathering cited after 9/11. Kenneth Lasson, for instance, claimed that the technique was unlike torture because it was a "relatively painless, less intrusive method" and, despite problems of reliability, could be extremely useful in "ticking bomb scenarios."[182] The *Townsend* case, Lasson further suggests, applies only to admissibility in court, not to any use of such techniques. During the Bush administration, this line of argument was mentioned explicitly in memos from the Office of Legal Counsel regarding other techniques.[183] Necessity thus became an element of analysis as scholars came to suggest truth machines for interrogation, even though evidence remained inadmissible at trial.

To assess whether truth serum would be disallowed by the Supreme Court in the future, scholars have compared its use to other invasive procedures.[184] Alan Dershowitz, a major figure of the post-9/11 torture debates, famous for suggesting "torture warrants" to ensure accountability in the system, asserted that, constitutionally, the act of injecting a liquid into a person without consent is little different from withdrawing blood for testing a person's alcohol level.[185] "The involuntariness of the injection itself does not pose a constitutional barrier," he explained. "No less a civil libertarian than Justice William J. Brennan rendered a decision that permitted an allegedly drunken driver to be involuntarily injected to remove blood for alcohol testing. Certainly there can be no constitutional distinction between an injection that removes a liquid and one that injects a liquid."[186]

The debate about whether U.S. laws prohibit the use of truth serum is

linked to whether truth serums are prohibited by the UN Convention against Torture and Other Cruel, Inhuman, or Degrading Treatment, especially since mind-altering drugs are specifically mentioned in the federal torture statute (FTS).[187] The focus here is often on whether the impact of the drug will lead to prolonged mental harm or whether its use reflects a specific intent to create such harm. The 2018 Office of Medical Services report similarly states two potential legal obstacles for use of truth serum during the discussions in 2002 for detainees: a prohibition against medical experimentation on prisoners and a ban on interrogational use of "mind altering drugs" or those that "profoundly altered the senses."[188]

The legal question is important but reflects a mode of debate in the aftermath of 9/11, a clash between what I have elsewhere called "aggressive hyperlegality," where the intent is to narrow protections against torture, and to avoid a more substantive conception of law that protects from all forms of excessive violence.[189] Even as the Counter Terrorism Center (CTC) decided not to seek explicit approval for use of truth serum after 9/11, it did note a lack of clarity as to whether the provisions of the FTS applied only to LSD, given that truth serum was banned only from use as evidence in court.[190] The CTC's position may reflect rigorous debates in the Church Committee and the decision in the *Townsend* case, all of which may help to explain why truth serum did not substantially return with other methods after 9/11. Truth serums in the United States are more visible as the fantasies of Hollywood films[191] or in the war on terror, as a means for inducing helplessness.[192]

Representation of Science in Law and Media

The stories of truth machines are centrally linked to their originators and to the responses of media, culture, and society. Fascination with the process of forcing the body to betray itself—through autonomic indicators in a polygraph, a drug-induced confession, or an imaging study of the mind—is distinct from judicial and penal torture. The emergence of truth machines is often related to a narrative of progress, science, and civilization meant to distinguish the present from the past. The spectacle of science supports this cultural production, despite challenges to the legality, validity, and reliability of these techniques.

And yet, with forensic techniques like fingerprinting or truth machines, this narrative is linked to particular bodies—often racialized and gendered—especially at the time of their origin. Over time, questions of scientific and legal

validity recede, and the narrative of truth machines is culturally produced, in media, popular culture, law enforcement, and commercial marketing, the latter especially for brain-testing methods. The transnational circulations of the scientific techniques, in turn, depend on the circumstances—most notably national security though not restricted to that—in which truth machines achieve acceptance, rejection, or resurgence. Unifying these efforts is an underlying goal: to find ways for the body to betray itself.

CONCLUSION

In this chapter I recall the origin stories of the three truth-telling techniques in the United States (and India in the case of BEOS), and I recount some of the debates about these techniques in the scientific and legal communities. Despite concerns about the scientific validity of truth machines and the legal admissibility of the evidence they produce, I argue, these techniques resonate in the media and in product marketing, driven by experts and commercial interests. Rather than science or law, therefore, cultural production validates these techniques and sustains interest in them. Nonetheless, the disdain of science can challenge sustaining narratives, as with narcoanalysis in the United States.

As Dean Wigmore reflects on the power of science, "If medical science or psychic science, represented by an accord among the experts of the science, establishes the trustworthiness of a confession induced by some artificial means known to such science, then a confession so induced should be admissible."[193] Above all, the search for new techniques and the resurgence of those once discredited are reminders of the ongoing need for producing truth. This search then leads scientists, courts, and law enforcement to a focus on the body, whether through conscious speech or through access to the conscious mind.