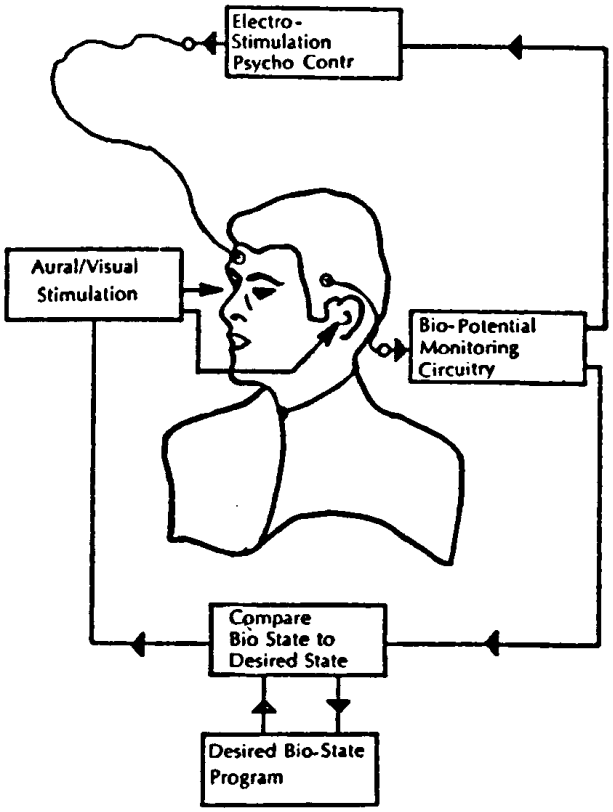
Manford L. Eaton. The basic elements of a bio-music system, 1973. From Eaton, *Bio-Music*, 1974.



Biomusic

BRANDEN W. JOSEPH

A knife is neither good nor bad; but it may be used by either a surgeon or an assassin.
—José M.R. Delgado, M.D., *Physical Control of the Mind: Toward a Psychocivilized Society* (1969)

Electronic music is not intrinsically human or inhuman; nor are computers, oscillators or any other machines. They are only used in human or inhuman ways.
—Manford L. Eaton, *Electronic Music Generation Systems* (1969)

The onset of those operations collectively known as the "global war on terror" has brought to light the use of music by the United States as a component of physical and psychological torture. Reports such as those filed by Federal Bureau of Investigation (FBI) field agents at the U.S. detention center in Guantánamo Bay, Cuba, have described detainees being subjected to conditions in which, for instance, "not only was the temperature unbearably hot, but extremely loud rap music was being played in the room, and had been since the day before, with the detainee chained hand and foot in the fetal position on the tile floor."[1] Another typical report details a "detainee sitting on the floor of the interview room with an Israeli flag draped around him, loud music being played and a strobe light flashing."[2] Similar incidents, which implicate the U.S. military, the Central Intelligence Agency (CIA), and those other, more shadowy, operatives known as "joint task forces," have been documented at Bagram Air Base in Afghanistan and Abu Ghraib prison in Iraq.[3] Reports by U.S. personnel have been amply corroborated by former detainees, whose recollections also include descriptions of earsplitting music accompanying incidents of physical and sexual abuse, as well as the humiliation of being made to "dance" or "wiggle their backsides in the air" to the deafening sounds.[4] Reports by Mark Danner detailing testimony made in 2006 to the International Committee of the Red Cross by Guantánamo detainees such as Abu Zubaydah further confirm the use of music and/or sound:

> The cell and room were air-conditioned and were very cold. Very loud, shouting type music was constantly playing. It kept repeating about every fifteen minutes twenty-four hours a day. Sometimes the music stopped and was replaced by a loud hissing or crackling noise.
>
> . . . During the questioning the music was switched off, but was then put back on again afterwards. I could not sleep at all for the first two to three weeks. If I started to fall asleep one of the guards would come and spray water in my face.[5]

Research into the recent history of torture quickly reveals that procedures of acoustical bombardment have been used by the United States and its allies for decades.[6] During the Vietnam War, the U.S. Air Force SERE (Survival Evasion Resistance Escape) program, for instance (which may have served partly as a research laboratory and training ground for such interrogation techniques), locked recruits into small boxes wherein they were subjected to amplified recordings of Vietnamese music and other noises.[7] In the 1970s, British intelligence subjected Irish political prisoners to incessant high-volume white noise that, along with hooding, forced standing, and food and sleep deprivation, became known as one of the "five techniques."[8] In addition to other lasting physical and psychological effects of such treatment, many of the victims became hyperacousive, unable to tolerate even slight noises, and at least one experienced a full-blown psychotic episode upon hearing a sound reminiscent of that previously inflicted upon him.[9] By the 1980s, the United States had exported its interrogation methods throughout Latin America, where techniques of acoustical bombardment were used (both with music and white noise) in Uruguay and Brazil, as well as by allies elsewhere, such as Turkey and Israel.[10] During the military dictatorship in Brazil, prisoners would be placed within a painfully small enclosure called "the fridge," which was outfitted with speakers, strobe lights, and the ability to manipulate the temperature to extremes in order to produce the same type of sensory disorientation practiced by the United States in chambers sometimes blithely referred to as "discos."[11] Other instances of the deployment of sound or music in situations of detainee interrogation include the Argentine practice of *ablandamiento* or "softening up"—in which headphones or earphones playing "a low crackling noise" are strapped to prisoners who are tied to chairs and left for days without food, water, or a chance to go to the bathroom—and the Somali National Security Service's so-called noise room, in which detainees are exposed to increasingly amplified sounds until rendered permanently physically deaf.[12]

Although the use of acoustical bombardment is often combined with physical brutality, sexual abuse, and/or sexual and cultural humiliation (as part of an approach known in the U.S. Army field manual as "futility"), the use of sound and/or music within contemporary interrogation arose as part of that paradigm of psychological (but also physiological) manipulation often referred to as "no touch" torture.[13] The aim of such techniques, which derive primarily from CIA-sponsored psychology experiments of the 1950s and 1960s, is "inducing regression of the personality to whatever earlier and weaker level is required for the dissolution of resistance" without leaving physical traces.[14] The author of the CIA's 1963 *KUBARK Counterintelligence Interrogation* manual, which codified much of this early research, went out of his way to praise then-recent academic and scientific accomplishments for bringing interrogation into a "modern" era. "This work," the manual declares, "is of sufficient importance and relevance that it is no longer possible to discuss interrogation significantly without reference to the psychological research conducted in the past decade."[15] As has been amply documented, such procedures are far from harmless and often inflict as much or more long-lasting damage than beatings or other forms of physical punishment.[16] In recent decades, the United States, particularly (but not solely) under the administration of George W. Bush, has gone to great lengths to shield and protect its capacity under international law to inflict such forms of "no touch" torture.[17] Since, to date, the Obama administration has retained certain Bush-era techniques and refused to abandon the rendition of prisoners to foreign countries with abysmal human rights records for interrogation, one can only assume that such methods, including the use of music, are being deployed somewhere at the moment of my writing.[18]

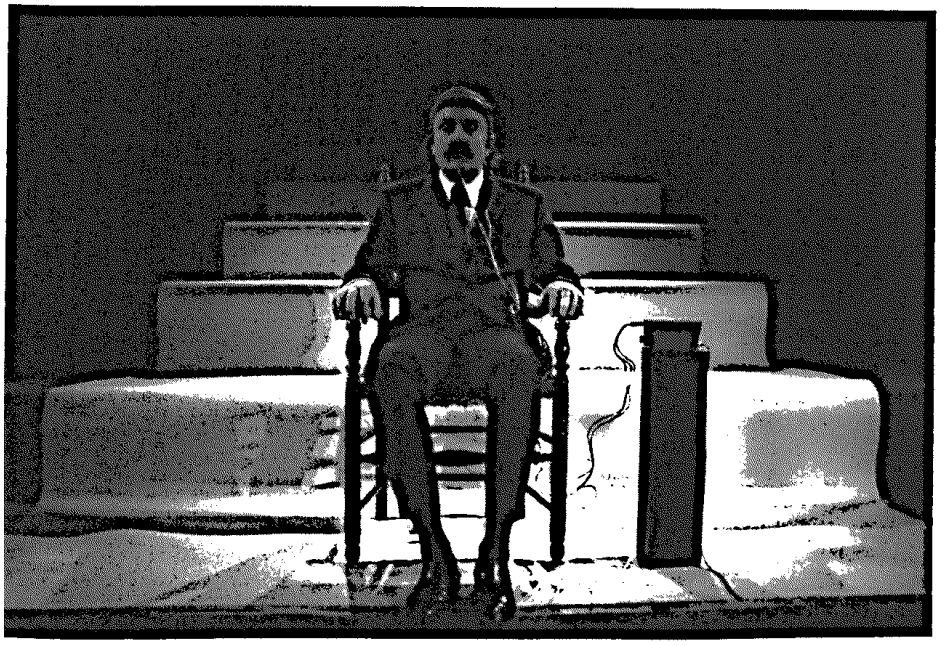
Over the past couple of years, concerned musicologists have begun to inquire into not only the history and modality of the use of music within techniques of psychological torture but also into the possible impact of such developments on the discipline of music itself. The issue has been raised most cogently by Suzanne Cusick, who has asked how certain contemporary understandings of music and its effects may be "symptom[s] of the national security state that the US has been since the era of World War II" and who has urged both herself and others "to think much more about the eerie resonances between the aesthetics implied by theorists of 'no touch torture' and the aesthetics shared by a wide range of musical cultures since the 1960s."[19] In what follows, I propose to take up Cusick's challenge by outlining one particularly potent, albeit little-known episode in the history of contemporary musical composition that is especially imbricated with those forms of psychological

and physiological manipulation genealogically related to the development of "no touch" torture. In particular, I will address the more-than-a-decade-and-a-half-long development of "biomusic." It is an area that proves, in both its particular modalities of operation and its overall aspirations (and limitations), to be inextricably imbricated not only with the paradigm of "modern" torture, but also with the closely associated history, materials, and aims associated with the Cold War pursuit of "mind control."

IIIII

The notion of biomusic initially appeared in June 1968 at the First International Electronic Music Congress in Florence, Italy. In attendance, amid such noted luminaries as Karlheinz Stockhausen, Iannis Xenakis, Erkki Kurenniemi, and Abraham Moles, a lesser-known researcher named Manford L. Eaton represented ORCUS (Operational Research Company Universal Systems) of Kansas City, Missouri, with a paper titled, "Bio-potentials as Control Data for Spontaneous Music."[20] In order to produce acoustical output, Eaton proposed to tap biological factors of the composer or listener, including heart rate (via electrocardiogram; EKG), galvanic skin response (GSR, a measure of the electrical conductivity of the skin caused by perspiration, widely used in polygraphs), eye movements (measured by electro-oculogram; EOG), and, above all, brain waves (accessible via electroencephalograph; EEG). Although Eaton declared at the outset that "the idea of employing biopotentials as a source of musical material" dated to August 1961, his presentation in 1968 was contemporaneous with a number of similar developments.[21] Alvin Lucier, for instance, had already used EEG in his *Music for Solo Performer* of 1965; Richard Teitelbaum would make use of amplified brain waves in both *Organ Music* and *In Tune* of 1968; and David Rosenboom, the composer perhaps most closely allied with brain-wave music, would also begin his experiments in that area at the State University of New York in Stony Brook in 1968.[22]

Like Lucier, Teitelbaum, Rosenboom, and, later, Pauline Oliveros, Eaton's initial proposal posits the use of biological potentials in sound's production. The composer, wired-up in various ways, would become the performer of (and primary listener to) the sounds produced, to which he or she would react in real time and over which he or she would be able to exercise only partial control since many of the biopotentials being monitored are autonomic. "[T]he point of the system," explains Eaton,



Alvin Lucier performing *Solo for Performer (for Enormously Amplified Brain Waves and Percussion)*, 1965.

"is . . . to provide the composer with a direct and semi-automatic method of composition which is intimately related to his mental activity in both an objective and subjective sense while allowing him to retain some measure of 'real-time' control over the course of the composition."[23]

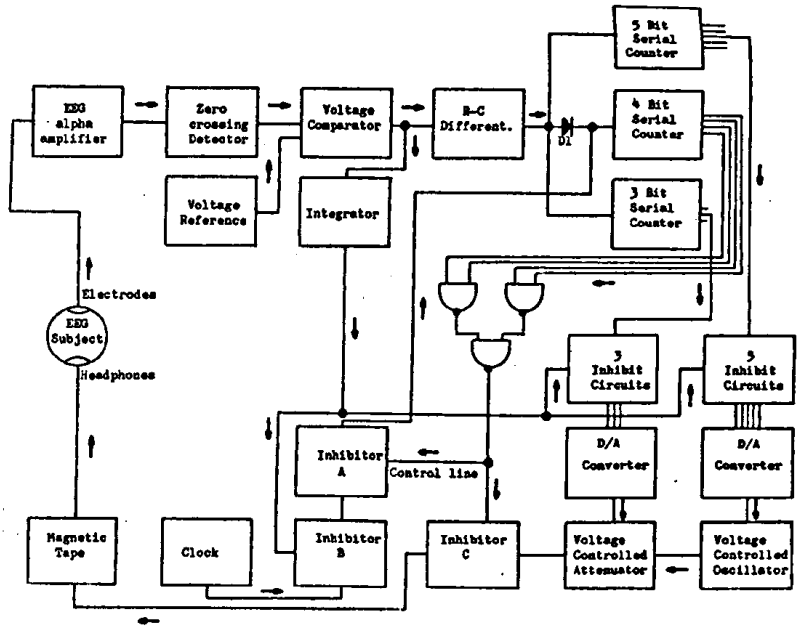
Reporting on the Florence conference that year, Italian composer Enore Zaffiri described Eaton's paper simply as "curious."[24] By February 1969, however, Eaton would publicly proclaim the significance of his approach and its European reception. Writing to *Music Educators Journal* to complain that a recent article on electronic music had neglected his work, Eaton declared that his "studio . . . has become of considerable international importance in the last few years" and that his paper, too, "is of considerable importance in the development of electronic music systems."[25]

Throughout 1969, in addition to coauthoring a RAND Corporation memorandum on linear statistical modeling, Eaton put out at least two papers on electronic music equipment, always taking care to mention the possible applicability of biopotentials within the system.[26] Eaton's first concrete use of the term "bio-music" seems to have occurred in his 1969 *Electronic Music: A Handbook of Sound Synthesis and Control*, a fairly widely distributed publication, the first three-quarters of which provides practical details concerning acoustics, electronics, wave generation, and tape-recording technology, among other things.[27] Toward the end, however, in a section titled "Electronic Music in the Future," Eaton slipped in his "Bio-potentials" paper from Florence along with a few telling additions. Echoing the assertions of importance voiced in the *Music Educators Journal*, Eaton declares biomusic exemplary of developments that "represent the most significant change in music since man began employing artificial instruments for the production of sounds."[28]

This proclamation comes shortly before another in which Eaton evinces a newly developed interest in power. He notes initially that "In the past music has required the listener to exert some self-control and some effort in order to understand or perceive the music."[29] Such had, in fact, been the case in Eaton's earlier iteration of biomusic, where, as he observed, change in the subject's alpha brain wave rate was dependent upon concentration. "In this system," he explained to the conference in Florence, "a lack of attention to the audio output will completely attenuate the sound whereas intense concentration on the sound being produced will result in positive feedback producing an increase in duration, frequency and amplitude limited only by controls built into the system."[30] In the *Electronic Music* handbook, however, Eaton asserts for the first time, "In the future, however, it is entirely possible for the listener to be transformed by the music whether he wishes to be or not."[31]

Here, importantly, the roles of composer, performer, and listener, which Eaton had earlier entwined, have once again been sundered: the composer, he explains, produces an "objective statement" of the desired "effects" and the technical means by which to produce them, while the performer/listener is monitored to see that those results are achieved. "It is," writes Eaton, "the same situation as exists when one makes the choice of taking aspirin instead of curing his headache by simple psychological means, or when one takes hallucinogens instead of working with his mind."[32] Whereas previously composer, performer, and listener had potentially been the same individual, now it is the composer who will produce the medical or hallucinogenic "score" by which to control the effect upon the performer/listener. "[E]lectronic equipment to measure the efficacy of the sound and the results can be monitored," he continues. "And this can be used to change the subsequent sound output so as to induce the desired results. Thus, it is possible for music to be composed in much the same way as chemicals are combined to form medicines for various specific purposes."[33] The paradigm had now changed. No longer would the composer, as in Lucier, Teitelbaum, Rosenboom, or Oliveros, wire him- or herself up to produce bio-improvisatory sounds. Instead, although Eaton continues to extol improvisation over written-out music, his composer takes up an external position analogous to the chemist or doctor, formulating a composition or program by which the listener's responses are induced from outside. Biopotentials are now monitored as indicators of effective reception (which becomes the true locus of Eaton's interest) and are productive only at a second degree or remove. Along with this transformation comes another: whereas before feedback had always been referred to as acoustical in nature—Eaton's graph of "A Basic Electroencephalographic Composition System" from the first "Bio-potentials" paper shows headphones as the only input, with electrodes as output—this was no longer necessarily the case.[34] "It is conceivable," writes Eaton, "that music in the future will dispense with sound altogether and become an art of induced psychological, physiological states."[35]

Eaton's 1969 *Electronic Music* handbook concludes with the hopeful, if vague, observation that "The arts, and perhaps music is the purest manifestation, are capable of transfiguring man's view of the universe and of himself."[36] Eaton's first ORCUS publication of 1970, by contrast, evinces a starkly different tone. Titled *Warning: Bio-Music Can Be Dangerous*, the two-page technical bulletin was issued in October and, to judge from the number of typos, somewhat hastily drafted, published, and



Manford L. Eaton. A basic electroencephalographic composition system. From Eaton, *Bio-Potentials as Control Data for Spontaneous Music*, 1968.

distributed.[37] In it, for the first time, comes mention of a "biomusical" feedback loop consisting of stimuli that are not solely acoustic. "Bio-Music," which Eaton had defined in the glossary of his *Electronic Music* handbook as "Any type of music which uses biological electronic signals for the generation and/or control of electronic sounds," was now described as "the name used by ORCUS when bio-potentials are converted into sound and fed back acoustically and electronically."[38] (Subsequent schematics for "Bio-Music Systems" would show as inputs "Aural/Visual Stimulation" coupled with "Electro-Stimulation" [see frontispiece].) That Eaton's notion of electronic feedback referred not simply to amplification is confirmed by the first of the four cautionary points listed on the second page: "Always provide circuitry to limit the feedback stimulus. (For example, if the feedback stimulus is an electric shock you must take care to insure that the shock cannot be driven to physically dangerour [*sic*] levels)."[39] The three other cautionary points warn the would-be biomusical composer to "provide limiting circuitry to prevent the feedback from destroying the body function"; to never experiment with or connect him- or herself to a biofeedback loop without another person present to intervene in case of "latch-up"; and to "Remember that human organisms can vary widely in their responses to some kinds of feedback" and thus one should only gradually increase or enlarge feedback levels "to acheive [*sic*] the desired results."[40] Despite the list of cautions—and the additional caveat that "irresponsible use can quicly [*sic*] lead to permanent physical and psychic damage, and death"[41]—Eaton's bulletin contained the most boldly worded contention about biomusic to date, one that would be echoed repeatedly in further publications:

> The concept of real-time biological feedback control is one of the most powerful tools ever conceived. It is possible to program psychic and physiological states of powerful, predictable and repeatable nature. There are applications in virtually every area of human activity; music, visual arts, psychiatry, medicine, education, religion. It is within the state [of the] art now to produce systems which will program a music listener through any desired series of psychic states as defined by physiological parameters.[42]

The second edition of Eaton's *Electronic Music* handbook, issued in 1971, features an augmented section on biomusic, including a version of the previous year's warning. In the newly added appendix A on biomusic (there was no appendix B), which opened with an enigmatic epigraph from *Revelations* (22:1–2), Eaton backdates the inception of biomusic to 1960 and engages in a discussion indicating awareness of

some of the ethical complications. He claims that by means of monitoring and adjusting biofeedback potentials he and his associates "could write—not compositions of musical notes that would have some indeterminate effect on the performer/listener—but a physiological/psychological state program that would control the generation of whatever sensory and electrical stimuli were needed to realize the physiological/psychological state program."[43] After becoming conscious of this capability, Eaton recounts,

> we sat down and had a long series of heart-to-heart discussions about the philosophy and traditions involved in art, science, technology, religion, and their relationships one with another. And we realized that we had stumbled upon something so powerful, so awesome that we became afraid to speak of it. So, we let it be for some time.[44]

Only because of the rising interest in biofeedback in other fields, he contends, did the ORCUS group once again take up biomusical experimentation.

Eaton may have had reason for further introspection. For along with the greater gravity of warning came a greater range of tools within the biocomposer's arsenal, including "the use of muscle stimulation to control facial expression or eye movements" (an example of "normally voluntary functions [being] made involuntary") and techniques of both sensory deprivation and sensory bombardment.[45] All of these techniques, and more, would be included in Eaton's magnum opus, *Bio-Music (Biological Feedback Experiential Music Systems)*, which was also published by ORCUS in 1971.[46] Like the appendix on biomusic included in the second edition of the *Electronic Music* handbook, this work begins with the epigraph from *Revelations* (now labeled "Forethought"), one of the many sections of the book that would be omitted from the highly abridged version of *Bio-Music* distributed by Something Else Press in 1974.[47] Enigmatically, Eaton prefaces the publication with a note—"This book is Supra-Political and is to be distributed freely without government interference to the PEOPLE"—and lists his place of residence as both Kansas City, Missouri, and Bratislava, CSSR (Czechoslovakia).[48]

Greatly augmenting earlier mentions of electrical stimulation, *Bio-Music* contains extensive and detailed sections outlining the correct way to attach electrodes by means of subcutaneous needles and saline dermal rubs and exploring the direct electrical stimulation of muscle fibers—most specifically, those controlling facial expression. "This stimulation," notes Eaton of the production of the appearance of "such emotional states

Left and opposite: Sensory deprivation ("perceptual deprivation") experimental setups. From John P. Zubek, ed., *Sensory Deprivation: Fifteen Years of Research*, 1969.

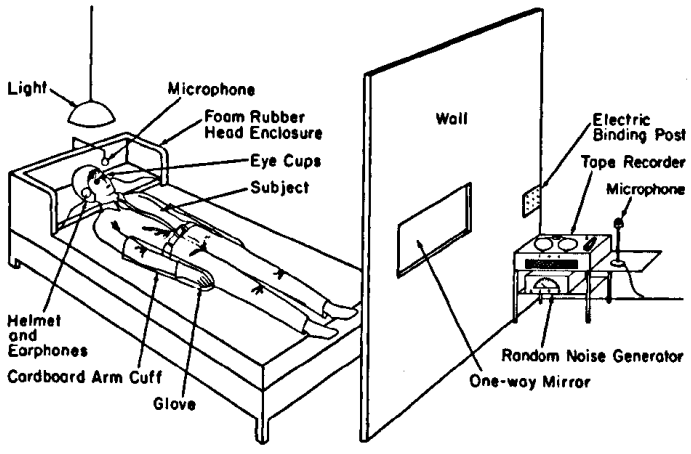
as surprise, pleasure, emotional strain and tenseness," "can be quite instrumental in conveying emotional meanings of otherwise enigmatic stimuli."[49] Eaton's assertion is odd because the "emotional meanings" to which he refers are purely induced facial contortions that signify emotional states without any correspondence to the subject's actual affective situation. Included in the discussion is another mysterious notice: "Strong stimulation of muscles that initiate gross movements of the body should be avoided unless the bio-composer wishes his piece to end with electrodes being physically torn from the equipment and he, amuck, destroying the stimulation and monitoring equipment."[50]

Also found in *Bio-Music* are the discussions of sensory deprivation and sensory bombardment alluded to in the second version of the *Electronic Music* handbook, two areas of inquiry that reveal Eaton's familiarity with the widespread research surrounding (although not explicitly mentioning) methods of interrogation and "mind control" supported by the CIA over the previous two decades. "If an individual remains in such a room," writes Eaton about a soundproof (anechoic) chamber, "and it is darkened, and he wears gloves, and he moves as little as possible, he will begin to have hallucinations after approximately 72 hours."[51] Eaton describes sensory bombardment with equal familiarity and precision:

> Sensory Bombardment is the inverse of sensory deprivation. If completely randomized fluctuations of amplitudes, durations, colors, and position of lights and sounds, as well as tactile random stimulation of the palms of the hands are applied simultaneously to a subject, the subordination of the conscious is accelerated and most individuals will begin to hallucinate within 30 minutes. . . . This is because the sensory system is bombarded with such a large quantity of random stimuli that the conscious mind cannot cope with it, i.e., the necessary orientation is almost impossible to maintain."[52]

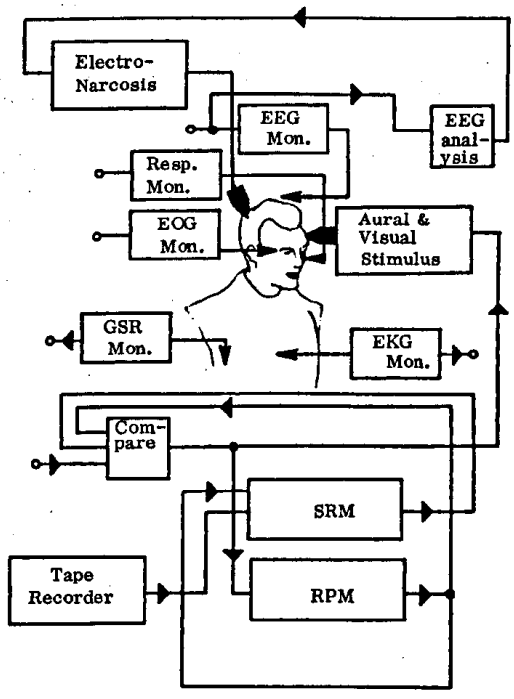
In a passage that could have come from the CIA's 1963 *KUBARK* manual, Eaton continues, "It is extremely interesting to note that virtually all techniques for achieving powerful, generalized psychic states involve the disorientation of the subject's usual resting relationships to the outside environment."[53]

Although Eaton claims to have perfected the "ORCUS AK-4 Sensory Bombardment System," which fit a hemispherical Plexiglas dome over the "listener" and was more elegant and sophisticated than LSD, neither sensory deprivation nor sensory bombardment figured directly within the introduction of discrete stimuli sought in



biomusical composition.[54] Instead, these techniques—particularly the more temporally efficacious bombardment—were employed as part of the preliminary conditioning process, "to cleanse the nervous system before and between presentations of definite visual and aural stimuli. . . . This facilitates the evocation of more predictable, and thus more quickly and easily controlled responses."[55] Also specifically discussed in this context are photic driving devices such as strobe lights, as well as "high-intensity white noise": "Using the Sensory Bombardment system, the organism is saturated with random flashing white light and with white noise."[56] Another new weapon in the biocomposer's arsenal was electronarcosis, which seems to have been a somewhat less powerful precursor to or derivative of electroshock therapy, another technique heavily sponsored by the CIA throughout the 1950s and 1960s. After an oblique reference to the type of verbal driving techniques investigated by Ewen Cameron in Montreal—reconditioning via the repeated playback of recorded phrases to a subject who is asleep or unconscious—Eaton declares, "there is no method [of inducing a sleeplike state] more ammenable [*sic*] to real-time control than electro-anesthesia. The state of consciousness can be determined through bio-potential monitoring and can be controlled through feedback of increased electric anesthesia current to decrease consciousness, and electric muscle and sensory stimulation to increase consciousness."[57] Although, as Eaton concedes, "the mechanisms of electro-anesthesia are not well understood," this has little consequence because, "for the purposes of Bio-Music, it is not so important to understand the physiological mechanisms involved as it is necessary to know how to control consciousness safely and reliably."[58] In Eaton's diagrams of 1971 to 1974, "electronarcosis" comes to replace the more ambiguous "electro-stimulation."

Finally, Eaton mentions the use of less-technical and more-iconic types of "emotional stimulation."[59] "When the connection between basic emotional stimulation and more abstract sensory stimulation is maintained effectively through monitoring and feedback of altered stimulation," he writes, "the induced psycho-physical states can be incredibly intense."[60] Considering the fact that Eaton advocates using "maximal stimulations and responses, because these are the most easily detected and controlled" and aims not only for states of "ecstasy" and "peace" but also explicitly for "anxiety," "austerity," "anguish," and even "fear," the repetition of warnings throughout the publication is not surprising: "Bio-Music is so powerful that it can be psychologically and/or physiologically dangerous and even, fatal."[61]



Developing along with the rising will to power expressed within Eaton's writings is another factor that is sometimes presented as biomusic's initial cause or motivation: the "problem" of receptive, indeed subjective, difference. Although arising first within the biomusic appendix to the second edition of the *Electronic Music* handbook, this factor is most forcefully presented in what is likely Eaton's last publication on the subject aside from reprints, the 1973 article "Induce and Control: Bio-Music Is Here Today," published in the *Music Educators Journal* that had ignored him four years earlier.[62] In a statement that inverts over two decades of Cagean and post-Cagean interest in indeterminacy and the productive ambiguity of graphic scores, Eaton decried the "imperfect[ion]" of symbolic language and the "confusion" that results from its differential reception. "For example," he writes,

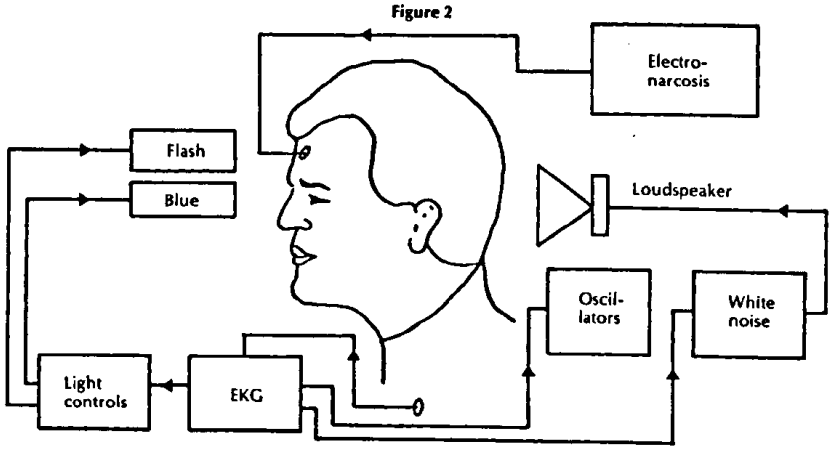
> several persons listening to the same piece of music will have different sensations because they aren't sure of the significance of the various symbols (not a verbal significance, but the intended sensorial effect). Thus, people develop their own private systems for responding to music. This individualism can be a lot of fun, but it doesn't help us transmit ideas from one person to another. Instead, it creates a musical Tower of Babel.[63]

Biomusic would effectively reverse this situation by using a variety of stimuli, tailored by means of real-time monitored biofeedback, to produce in each individual an invariably identical result:

> We can create compositions that use electronic control of sounds and other stimuli (including visual and tactile) to induce exactly the same psychological states in each listener. Conventional music is a fixed sequence of sounds that causes different sensations in different individuals, but bio-music changes the sounds and other stimuli for each listener so that all will have the same sensations. . . . the stimulation is adjusted electronically to make the signals from the body behave according to the plan.[64]

By this point in Eaton's research, it becomes clear that there is no longer any reason for biomusic to be exclusively or even predominantly acoustic in nature. Eaton thus specifically notes, "In Bio-Music, we discard any distinctions between the terms 'musical' and 'non musical.' We are interested in inducting [*sic*] physiological/psychological responses in the organism and any stimulus that will induce the desired state at the programmed rate is equivalent to any other stimulus that will induce the same effect(s)."[65] Here, biomusic has come largely to be synonymous

Figure 2



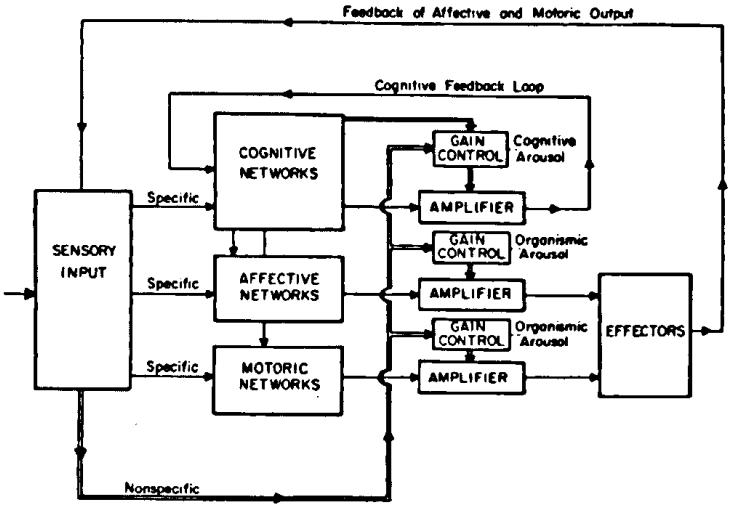
Opposite: Manford L. Eaton. A block diagram of a bio-music experiential music system, 1973. From Eaton, *Bio-Music*, 1974.

Right: Manford L. Eaton. Physical elements of a simple bio-music system. From Eaton, "Induce and Control: Bio-Music Is Here Today," 1973.

with control. The "ideal," writes Eaton about his biomusical paradigm, is "of controlling the psychological/physiological states of a subject in real time and . . . we can predict, repeat, and change at will these states in the majority of subjects. The power of such systems is fantastic. The contrast between Bio-Music and any type of conventional music is startling; exciting!"[66]

As has no doubt become clear, even if Eaton's notion of biomusic was never deployed to any such effect or even, in actuality, extensively experimentally investigated, his proposals strikingly replicate, in almost every aspect, the contemporary paradigm of psychological torture. (Given the possibilities of electrical shocks and involuntary muscle contractions, it is not even necessarily "no touch.") To my knowledge, no evidence exists to indicate that Eaton's research and/or objectives were directly influenced (or financed) by the CIA, nor would it need to have been. Rather, Eaton's biomusical research reflects experimental psychology's thoroughgoing saturation with the imperatives (and financial support) of the national security state that the United States became in the Cold War era. In following his own investigations, Eaton played out, perhaps inadvertently, (and even unwittingly desublimated) the underlying logic and aims of the agendas of "brainwashing" and "mind control" that motivated so much postwar physiological and psychological research. The bibliography of *Bio-Music* (which was also omitted from the Something Else Press reprint) contains references to studies of sensory deprivation, hallucinogenic drugs, hypnosis, and electrical stimulation of the brain—all areas in which the CIA expressed profound interest over the course of previous decades under the auspices of the infamous MK-ULTRA program and elsewhere.[67]

The efforts of the CIA during this period, as well as the use of the techniques they perfected on contemporary detainees of the United States and its allies, has been well documented in a variety of important books and reports. Lesser noted is the manner in which the CIA's overall research program derived from a much larger transformation in the conception and deployment of the human subject, particularly within the military projects spearheaded by the various divisions of the National Defense Research Committee (NDRC) during World War II. As explained by historian of science David Mindell, protocybernetic technologies such as artillery firing directors, articulated guns, and "pip-matching" radar controls integrated living soldiers into feedback loops to correct and/or amplify one part of a machine's output for input into another of its components.[68] Such a development represented a historical shift in which it was no longer just the muscles that could be incorporated into larger operations, such as assembly lines, but a different and potentially more

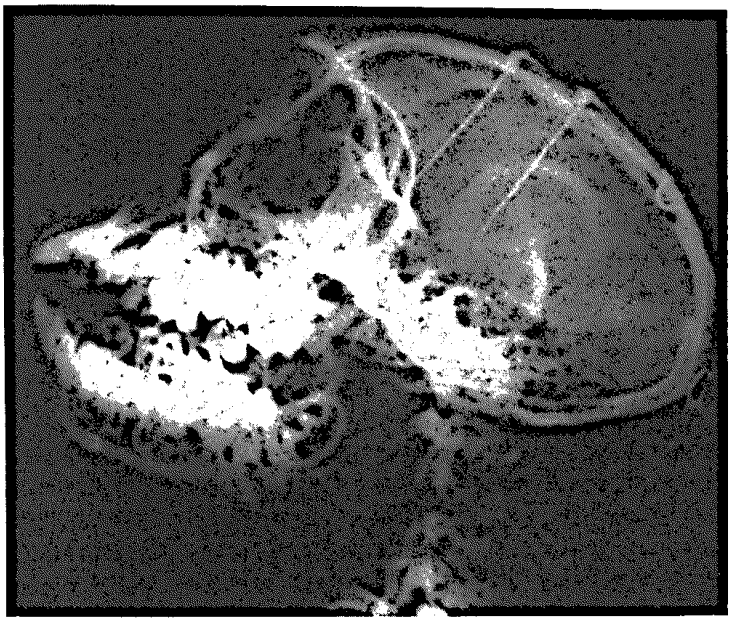


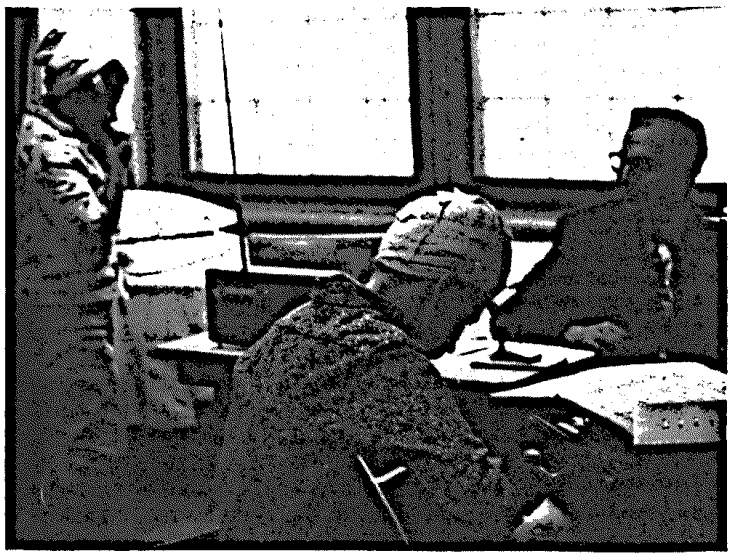
"A model of the mind: signal routes (single lines) and amplification-control routes (double lines)." From John P. Zubek, ed., *Sensory Deprivation: Fifteen Years of Research*, 1969.

invasive register of the individual's mental capacities and sense organs—the central nervous system in its largest sense. Even before the advent of computerization, human beings were deployed as "human servomechanisms" within various assemblages that did not stop at the surface of their skin or even the depth of their muscle fibers but sought access to the center of their mind.[69] As horrifying and debilitating as they were, the CIA's psychological torture techniques (initially sponsored under Division 19 of the NDRC) were born of this larger transformation.[70]

A particularly telling expression of the imaginary to which this transformation gave rise can be found in one of the books Eaton consulted: José Delgado's *Physical Control of the Mind*, which documents one of the era's most invasive attempts at implementing mind control. In it Delgado explains and extrapolates upon his research into the electrical stimulation of the brain via the implantation of wires controlled remotely by radio, or what he calls a "stimoceiver." "It is reasonable to speculate," writes Delgado, envisioning the possibility of an explicitly cybernetic subjectivity, "that in the near future the stimoceiver may provide the essential link from man to computer to man, with a reciprocal feedback between neurons and instruments which represents a new orientation for the medical control of neurophysiological functions."[71] (It is interesting to note that what most hampered Delgado, the lack of real-time feedback, is precisely what Eaton proposed to accomplish with biomusic.)

It is, one might suppose, this larger, overall paradigm transformation in the conception of the human (or posthuman) subject, rather than the development of "modern" torture itself, that serves as the particular context out of which biomusic developed and of which it is most directly reflective. Yet, if biomusic is not fully assimilable to the paradigm of "no touch" torture, neither is it fully separable. For although Eaton is aware of the dangers of what he is proposing—and would, through Delgado, at least, have learned of the use of certain techniques in interrogation—he follows the impli-





Top: "Stimoceiver" implants in chimpanzee skull. From José M.R. Delgado, *Physical Control of the Mind: Toward a Psychocivilized Society*, 1969.

Bottom: Mental hospital patients with Delgado's "stimoceiver" implants. From José M.R. Delgado, *Physical Control of the Mind: Toward a Psychocivilized Society*, 1969.

cations of the paradigm toward a similar level of control.[72]

For Rosenboom, Teitelbaum, and Oliveros, EEG and other means of monitoring biopotentials represented a way to access further levels of subjectivity for the purposes of greater (and more complete) self-expression. Biofeedback was, as it came to be in the context of New Age beliefs generally, a means of making conscious and controllable (or alterable, in any case) aspects of the individual's body and mind that are normally unnoticed if not fully autonomic. The perspective of Rosenboom, Teitelbaum, and Oliveros leads, as does the protocybernetic paradigm generally, to invasion of further levels of the self, but by the individual him- or herself.[73] While the use of such techniques and technologies for the control of others, as in the use of "aversion therapy" in prisons, is noted, "music" is set as a means of *detourning* or opposing such ends: "helping," in the words of Teitelbaum, "to insure the humane application of the technical advances."[74]

Although Eaton makes certain gestures toward such a position—stating, for instance, "Society must realize that unless it provides itself with artistic medicinal defenses against the hard technology that it has created, that technology will possess him"—his "Philosophy of Bio-Music" (as a subsection of *Bio-Music* is called) falls predominantly on the other side of the division, toward a manipulative control of the "listener" on a physiological and psychological level and the reduction or elimination of indeterminacy or difference on the level of reception.[75] As Eaton writes about a "HYPOTHETICAL BIO-MUSIC SYSTEM" using "CONSCIOUSNESS CONTROL / ATTENTION MONITORING / EYE MOVEMENTS / EEG SOUND CONVERSION / SUBLIMINAL VIDEO FEEDBACK / GSR, EKG, RESPONSE MONITORING, ETC.":

> If the subject frequently breaks out of the feedback loop, and it is necessary for the control mechanism to pursue him, the programmer for the composition needs to do more homework on how to compose biological music, and/or the System designer needs to do more work on his Biological Music System design.[76]

IIIII

Eaton's publications on the subject of biomusic serve as at least one, particularly concrete, example where the imperatives of the national security state left their mark upon the discipline of music, traces of which can still be found in the many of Eaton's publications on the shelves of academic music department libraries throughout the country. Yet, more than that, and quite apart from any actual exper-

iments Eaton and his associates at ORCUS may or may not have performed, biomusic reflects and participates in the larger cultural imaginary through which official policies of torture are legitimized. As his project reached its culmination, Eaton progressively succumbed to what Alfred McCoy terms the "seductive illusions of omnipotence" that not only informed the CIA's quest for mind control techniques but continue today to serve as a justification for torture, despite both the demonstrated inefficacy of torture in producing increased intelligence and its immense political costs.[77] Like interrogation, McCoy argues, torture

> dominates investigations because it "fulfills certain psychological needs" of police for a process that "is immediate, familiar, predictable, and under police control." In sum, the powerful often turn to torture in times of crisis, not because it works but because it salves their fears and insecurities with the psychic balm of empowerment.[78]

What biomusic, too, served to promise was a process of subjective manipulation that was, "powerful, predictable, and repeatable" in nature.[79]

Thus, biomusic cannot be held entirely innocent from the larger cultural discourse surrounding the implementation of torture. Like a great many cultural manifestations, including the decades-long infatuation with brainwashing and mind control, biomusic serves as but one more means by which a false notion of the efficacy and controllability of individuals by such techniques is propagated throughout culture at large. Its investigation not only helps bring to light a moment when music fell, perhaps unwittingly, in league with some of the United States' most damaging and detrimental policies but also potentially helps to indicate where other musical projects of the Cold War might lay claim to legitimately oppositional potentialities.[80]

Notes

This essay was originally written for the conference on music and torture at Bard College in Annandale-on-Hudson, New York, on 15 May 2009, sponsored by the Human Rights Project, Bard College; CCS Bard; and the Goethe-Institut, New York. My thanks to Thomas Keenan, director of the Human Rights Project, for spurring my thoughts on the subject via his invitation.

1. FBI field agent [name redacted] to Valerie E. Caproni, RE: GTMO, 2 August 2004, http://www.aclu.org/torturefoia/released/FBI_5053_5054.pdf.

2. FBI field agent [name redacted] to Valerie E. Caproni, RE: GTMO, 30 July 2004, http://www.aclu.org/torturefoia/released/FBI.121504.4737_4738.pdf.

3. On torture in U.S. prisons and detention centers, see Mark Danner, *Torture and Truth: America, Abu Ghraib, and the War on Terror* (New York: New York Review of Books, 2004); Alfred W. McCoy, *A Question of Torture: CIA Interrogation, from the Cold War to the War on Terror* (New York: Holt Paperbacks, 2006); and Michael Otterman, *American Torture: From the Cold War to Abu Ghraib and Beyond* (London: Pluto Press, 2007). Further documentation of torture is provided by the excellent series of reports by Physicians for Human Rights: Gretchen Borchelt, *Break Them Down: Systematic Use of Psychological Torture by US Forces* (Cambridge, MA: Physicians for Human Rights, 2005), http://physiciansforhumanrights.org/library/reports/us-torture-break-them-down-2005.html; Scott Allen, *Leave No Marks: Enhanced Interrogation Techniques and the Risk of Criminality* (Cambridge, MA: Physicians for Human Rights, 2007), http://physiciansforhumanrights.org/library/reports/leave-no-marks-report-2007.html; and, especially, Farnoosh Hashemian, *Broken Laws, Broken Lives: Medical Evidence of Torture by US Personnel and Its Impact* (Cambridge, MA: Physicians for Human Rights, 2008), http://physiciansforhumanrights.org/library/reports/broken-laws-torture-report-2008.html. On U.S. joint task forces and their involvement in torture, see Jane Mayer, *The Dark Side: The Inside Story of How the War on Terror Turned into a War on American Ideals* (New York: Anchor Books, 2009), 245–246, 248.

4. Danner, *Torture and Truth*, 15; and Hashemian, 25. On music accompanying instances of sexual abuse, see Hashemian, 29: "Yasser recalled that this 'party' of abusive behavior continued for approximately five days. In a particularly traumatic experience, which Yasser describes as the 'music party,' he was forced to lie on the ground with loudspeakers blasting music into his ears at a very painful volume. He recalled that this lasted 'about one day, but you can say two years.' He reported having suffered from the pain and resulting deafness for several hours afterwards and stated that he still feels upset whenever he hears loud music."

5. Mark Danner, "US Torture: Voices from the Black Sites," *New York Review of Books* 56, no. 6 (9 April 2009), http://www.nybooks.com/articles/22530. See also the abridged account in Mark Danner, "Tales from Torture's Dark World," *New York Times*, 15 March 2009, 13. Danner reports that Zubaydah's treatment later omitted music but retained "a constant loud hissing or crackling noise, which played twenty-four hours a day," against which Zubaydah attempted to "block out the noise by putting tissue in [his] ears." Danner, "US Torture." Released CIA documents include the information that continuous white noise was allowed "but was never to exceed 79 decibels." Scott Shane and Mark

Mazzetti, "Records Show Strict Rules for C.I.A. Interrogations," *New York Times*, 26 August 2009, A1.

6. This history is covered in both McCoy and Otterman. Apparently, the use of acoustical bombardment and sleep deprivation goes back at least two centuries. According to Gordon Thomas, the Soviet KGB used to teach "the important lesson behind the Kentucky Revival of 1800, when a Calvinist fanatic, the Reverend James McGready, had produced stress in his congregation by the calculated use of darkness and noise; the preacher's acolytes maintained a relentless tattoo on their drums throughout the night-long meetings which eventually drove strong men to collapse in terror." Gordon Thomas, *Journey into Madness: Medical Torture and the Mind Controllers* (New York: Bantam, 1988), 85.

7. Otterman, 100.

8. John McGuffin, *The Guineapigs* (London: Irish Northern Aid, 1980); and John Conroy, *Unspeakable Acts, Ordinary People: The Dynamics of Torture* (Berkeley and Los Angeles: University of California Press, 2000).

9. Conroy reports in *Unspeakable Acts*: "[Dr. Robert] Daly also testified that [Pat] Shivers had become hyperacousive, a state in which a person finds noise extremely irritating. The ex-internee was disturbed by the sound of a comb placed on a shelf in his bathroom. He could not tolerate the sound of the engine of a car running outside his house, and when he heard an engine idling he would ask the driver to turn it off" (131). See also 132, 189, 192.

10. The story of U.S. exportation of torture methods is told in McCoy, and Otterman. Brazil's use of audiovisual techniques is mentioned in McGuggin, 30n.; and Otterman, 74–75. On Uruguay, see Conroy, 37. Israel's record is discussed in Conroy. The use of audiovisual bombardment is mentioned in Conroy, 213; Hashemian, 102–103; and Otterman, 108. Turkey's use of audio bombardment techniques is mentioned in Allen, 24.

11. Otterman, 75; Moustafa Bayoumi, "Disco Inferno," *Nation* 281, no. 22 (26 December 2005): 32–35; and Clive Stafford Smith, "Welcome to 'The Disco': Music as Torture," *Guardian* (Manchester, UK), 19 June 2008, http://www.guardian.co.uk/world/2008/jun/19/usa.guantanamo.

12. Argentine *ablandamiento* is reported in Ian Adams, "The Disappearance," *The Weekend Sun*, 24 May 1980, quoted in Alphonse Victor Mallette, "The 'Argentine Problem': An Analysis of Political Instability in a Modern Society" (MA thesis, Simon Fraser University, 1986), 177, http://ir.lib.sfu.ca/dspace/handle/1892/7734. The Somali "noise room" is mentioned in Thomas, 353. Reports from the U.S. detention center in Guantánamo Bay, Cuba, also detail music being played at such volumes as to produce pain, hearing loss, persistent ringing, and actual bleeding. Hashemian, 18. For a detailed listing of acoustical torture techniques, see Darius Rejali, *Torture and Democracy* (Princeton: Princeton University Press, 2007), 360–368.

13. The evolution of "no touch" torture is chronicled in McCoy, and Otterman. See also Suzanne G. Cusick, "Music as Torture/Music as Weapon," *Transcultural Music Review* 10 (2006), http://www.sibetrans.com/trans/trans10/cusick_eng.htm. The interrogation strategy of "futility" is found in both the Army's *FM 34-52: Intelligence Interrogation* (28 September 1992), 3-18-3-19, http://www.fas.org/irp/doddir/army/fm34-52.pdf; and in the current version, *FM 2-22.3: Human Intelligence Collector Operations* (September 2006), 8-13-18-14, http://www.fas.org/irp/doddir/army/fm2-22-3.pdf. It should be noted that the technique of "futility" need not necessarily employ torturous or even extreme measures.

14. CIA, *KUBARK Counterintelligence Interrogation* (July 1963), 41, in National Security Archive, George Washington University, http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB122/#kubark. KUBARK was a code name for the CIA.

15. CIA, 2.

16. McCoy. See also Borchelt, and Hashemian. The results of torture can include "depression, impairment in mood regulation, sexual disturbances, amnesia, dissociative disorder, depersonalization, feelings of guilt and shame, self-accusation, self-mutilation, suicidality, excessive fantasies of revenge, disturbed perception of the perpetrator (idealization), social isolation, extreme mistrust, tendency for revictimization, hopelessness, despair, psychosomatic complaints, and conversion syndromes." Borchelt, 51.

17. U.S. efforts to justify and protect its ability to inflict psychological torture under domestic and international law are chronicled in McCoy; Otterman; and Philippe Sands, *Torture Team: Rumsfeld's Memo and the Betrayal of American Values* (New York: Palgrave Macmillan, 2008). The most comprehensive collection of related documents is found in Karen J. Greenberg and Joshua L. Dratel, eds., *The Torture Papers: The Road to Abu Ghraib* (Cambridge, UK: Cambridge University Press, 2005).

18. See, for instance, Charlie Savage, "Obama's War on Terror May Resemble Bush's in Some Areas," *New York Times*, 18 February 2009, A20; "Rendition to Continue, but with Better Oversight, U.S. Says," *New York Times*, 25 August 2009, A8; and "Court Dismisses a Case Asserting Torture by C.I.A.: A Victory for Obama," *New York Times*, 9 September 2010, A1, A3.

19. Cusick, "Music as Torture." Cusick points to, among other phenomena, psychedelia: "How might that notion of listening, which relies on its denial of both purely acoustic phenomena and non-acoustic psycho-somatic experiences in the moment of listening, have interacted, in those years, with the notion that theorists of 'no touch torture' share with many vernacular proponents of psychedelic rock—the belief that music dissolves subjectivity in conjunction with other psycho-somatic experiences, and always operates partly through its bodily effects?" See also Suzanne G. Cusick, "'You Are in a Place That Is Out of the World . . .': Music in the Detention Camps of the 'Global War on Terror,'" *Journal of the Society for American Music* 2, no. 1 (2008): 1–26. There she asks, "How has the weaponization of sound and music affected the apparently civilian musical and acoustical practices we think we know? How have apparently civilian musical and acoustical practices affected music's and sound's weaponization? How have these musical practices contributed to the aesthetic, psychological, and technical conditions that have enabled the substantial proportion of our population who have served in the military to think of music this way, despite an official musical culture that pretends to think of music as primarily a medium for entertainment or apolitical aesthetic pleasures?" (4).

20. M.L. Eaton, *Bio-potentials as Control Data for Spontaneous Music*, ORCUS Technical Bulletin 3001 (Kansas City, MO: ORCUS, 1968).

21. Eaton, *Bio-potentials*, 1. In a 1966 publication by Eaton (the earliest I have been able to locate), he notes he is "presently researching one class of inputs which are considered to have tremendous potential for the construction of 'Automatic Improvisational Systems.'" Manford L. Eaton, *An Outline of a Theory of Matrices with Application to Electronic Compositional Systems* (self-published, April 1966, Kansas City, MO), 14. Eaton tips his hand by including in the bibliography an article, dating to

1965, by Martin Graham titled "EEG Amplifier"; it is the only such reference.

22. On brain-wave music, see David Rosenboom, ed., *Biofeedback and the Arts: Results of Early Experiments*, 2nd ed. (Vancouver, BC: A.R.C. Publications, 1976). Rosenboom cites Eaton's work in David Rosenboom, *Extended Musical Interface with the Human Nervous System: Assessment and Prospectus*, Leonardo Monograph 1 (San Francisco: International Society for the Arts, Sciences and Technology, 1997), 12.

23. Eaton, *Bio-potentials*, 9.

24. Enore Zaffiri, "International Convention of Experimental Centres of Electronic Music, Florence, 1968," *Rassegna Artistica* (1969), repr. in *Musica/Tecnologia* 1 (2007): 389.

25. Manford L. Eaton, "Reverberations," *Music Educators Journal* 55, no. 6 (February 1969): 12.

26. Manford L. Eaton, *Electronic Music Generation Systems* (Kansas City, MO: ORCUS Research Co., 1969); and Manford L. Eaton, *Digital-Analog Waveform Generation and Real-Time Biological Control Circuitry in Electronic Music*, ORCUS Technical Bulletin TB-3002A (Kansas City, MO: ORCUS Research Co., 1969). Eaton's RAND publication is M.L. Eaton, J.E. Eckles, and C.N. Morris, *Estimation for a Generalization of the Usual Linear Statistical Model*, RM-6078-PR (Santa Monica, CA: Rand Corporation, 1969).

27. Manford L. Eaton, *Electronic Music: A Handbook of Sound Synthesis and Control*, 1st ed., ORCUS Technical Publication TP-3003 (Kansas City, MO: ORCUS Research Co., 1969).

28. Eaton, *Electronic Music*, 1st ed., 63.

29. Eaton, *Electronic Music*, 1st ed., 63.

30. Eaton, *Bio-potentials*, 11.

31. Eaton, *Electronic Music*, 1st ed., 63.

32. Eaton, *Electronic Music*, 1st ed., 63.

33. Eaton, *Electronic Music*, 1st ed., 63.

34. Eaton, *Bio-potentials*, 5.

35. Eaton, *Electronic Music*, 1st ed., 63.

36. Eaton, *Electronic Music*, 1st ed., 64.

37. Manford L. Eaton, *Warning: Bio-Music Can Be Dangerous*, ORCUS Technical Bulletin TB-3003 (Kansas City, MO: ORCUS Research Co., 1970). Although Eaton is the only author listed on the cover, listed on the first page are M. Eaton, P. Manley Jr., and William Simpson.

38. Eaton, *Electronic Music*, 1st ed., 75; and Eaton, *Warning*, 1.

39. Eaton, *Warning*, 2.

40. Eaton, *Warning*, 2.

41. Eaton, *Warning*, 2.

42. Eaton, *Warning*, 1.

43. Manford L. Eaton, *Electronic Music: A Handbook of Sound Synthesis and Control*, 2nd ed., ORCUS Technical Publication TP-3003 (Kansas City, MO: ORCUS Research Co., 1971), 66.

44. Eaton, *Electronic Music*, 2nd ed., 67.

45. Eaton, *Electronic Music*, 2nd ed., 67.

46. Manford L. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)* (Kansas City,

MO: ORCUS Research, 1971).

47. Manford L. Eaton, *Bio-Music* (Barton, VT: Something Else Press, 1974). This book republished the contents of Manford L. Eaton, "Bio-Music," *Source: Music of the Avant-Garde* 5, no. 1 (issue 9) (1971): 28–36, minus the "forethought."

48. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, preface, n.p.

49. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 26. Eaton notes also, "Electric and sensory stimulation is potentially dangerous. Potentials required to stimulate nerves actuating muscles may be as high as 100 volts. A voltage of this magnitude can cause paralysis or death if [it] is applied to electrodes such that current passes through the heart or spinal cord" (9).

50. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 47.

51. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 73. Compare with Eaton, *Bio-Music*, 25.

52. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 74. Compare with Eaton, *Bio-Music*, 26–27.

53. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 73. Compare with Eaton, *Bio-Music*, 25. According to the *KUBARK* manual, interrogators should aim for "a kind of psychological shock or paralysis . . . caused by a traumatic or sub-traumatic experience which explodes, as it were, the world that is familiar to the subject as well as his image of himself within that world." CIA, 66. For an illustration of the use of disorientation in modern torture, see, for instance, Danner, "US Torture"—in particular, the discussions of rendition procedures and the treatment of Abu Zubaydah, which involved black boxes, either for isolation (no light, little air) or bombardment.

54. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 76. Compare with Eaton, *Bio-Music*, 30.

55. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 77–78. Compare with Eaton, *Bio-Music*, 32. The use of sensory bombardment here parallels that of music in contemporary interrogations. See Suzanne G. Cusick and Branden W. Joseph, "Across an Invisible Line: A Conversation about Music and Torture," *Grey Room* 42 (Winter 2011): 8–9.

56. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 82–83.

57. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 41–42. On Cameron's CIA-backed research, see, among other sources, Thomas; McCoy; Otterman; John Marks, *The Search for the "Manchurian Candidate": The CIA and Mind Control: The Secret History of the Behavioral Sciences* (New York: Norton, 1979); and Rebecca Lemov, "Brainwashing's Avatar: The Curious Career of Dr. Ewen Cameron," in this issue of *Grey Room*.

58. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 42.

59. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 73, 85–86. "This stimulation may be in the form of visual displays of words, still photographs, slides, or film of realistic and more-or-less emotionally charged material, and aural presentations of language and emotionally charged human sounds" (85). Compare with Eaton, *Bio-Music*, 24, 39–41.

60. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 86. Here Eaton explicitly invokes "brain washing." Compare with Eaton, *Bio-Music*, 40–41.

61. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 103. Eaton's list of induced emotions can be found on page 81 and also in Manford L. Eaton, "Induce and Control: Bio-Music Is Here Today," *Music Educators Journal* 59, no. 5 (January 1973): 57.

62. Eaton, "Induce and Control." In a prefatory statement, the editor creates some distance from the material in the article, noting "many MEJ readers will not agree with some of the author's statements" (54).

63. Eaton, "Induce and Control," 54–56.

64. Eaton, "Induce and Control," 56.

65. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 53. Justification for the term *music* now devolves not upon acoustics but upon temporality. See Eaton, *Bio-Music*, preface, n.p.

66. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 8. Compare with Eaton, *Bio-Music*, 13.

67. For important accounts, see Marks, *The Search for the "Manchurian Candidate"*; McCoy; and Martin A. Lee and Bruce Shlain, *Acid Dreams: The Complete Social History of LSD: The CIA, the Sixties, and Beyond* (New York: Grove Press, 1992).

68. David A. Mindell, *Between Human and Machine: Feedback, Control, and Computing before Cybernetics* (Baltimore: Johns Hopkins University Press, 2002). On the related emergence of the cybernetic subject, see Peter Gallison, "The Ontology of the Enemy: Norbert Wiener and the Cybernetic Vision," *Critical Inquiry* 21, no. 1 (Autumn 1994): 228–266.

69. The phrase "human servo-mechanism" is found in Mindell, 246.

70. In 1942, the NDRC was divided into seventeen numbered divisions. Division 7 oversaw research on artillery firing directors and the human servomechanisms described by Mindell, 197–200. Sometime later, a Division 19 was added to oversee "miscellaneous weapons" and an avenue of research that led eventually to the CIA's drug and mind control experiments. Marks, *The Search for the "Manchurian Candidate,"* 14. The relation of these experiments to the popularization of LSD is also chronicled in Lee and Shlain, *Acid Dreams*.

71. José M.R. Delgado, *Physical Control of the Mind: Toward a Psychocivilized Society* (New York: Harper and Row, 1969), 91 (compare with 200–201).

72. Delgado notes, "In our century the classic punishment of solitary confinement has been combined with sleep deprivation and used in psychological warfare. Exhaustion and decreased sensory inputs are known to cause mental disturbances and reduce defense mechanisms, and they have been effectively manipulated during 'brainwashing' or 'thought reform' procedures to indoctrinate prisoners." Delgado, 63.

73. Michel Foucault would perhaps have called this a "counter-conduct," an attempt, however limited, to *detourn* newly encroaching powers of control. See Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977–1978*, ed. Michel Senellart, trans. Graham Burchell (New York: Palgrave Macmillan, 2007), 201–202.

74. Richard Teitelbaum, "IN TUNE: Some Early Experiments in Biofeedback Music," in *Biofeedback and the Arts*, ed. Rosenboom, 50.

75. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 109–110. Compare with

Eaton, *Bio-Music*, 62.

76. Eaton, *Bio-Music (Biological Feedback Experiential Music Systems)*, 96, 98. Compare with Eaton, *Bio-Music*, 48.

77. McCoy, 13. About the effectiveness of torture, McCoy concludes, "Major success from limited, surgical torture is a fable, a fiction. But mass torture of thousands of suspects, some guilty, most innocent, can produce some useful intelligence" but at vast political cost (198). See also Ron Suskind, "The Unofficial Story of the al-Qaeda 14," *Time*, 10 September 2006, http://www.time.com/time/magazine/article/0,9171,1533436,00.html; Ali Soufan, "My Tortured Decision," *New York Times*, 23 April 2009, A27 (which concludes, "There was no actionable intelligence gained from using enhanced interrogation techniques on Abu Zubaydah that wasn't, or couldn't have been, gained from regular tactics"); and Philip Zelikow, "A Dubious C.I.A. Shortcut," *New York Times*, 24 April, 2009, A27.

78. McCoy, 206–207.

79. Eaton, *Warning*, 1.

80. I am thinking, for instance, of John Cage's work, which has been convincingly situated within a Cold War context in Amy C. Beal, *New Music, New Allies: American Experimental Music in West Germany from the Zero Hour to Reunification* (Berkeley and Los Angeles: University of California Press, 2006), and which, as I have argued elsewhere, meets its own limitations in a context related to biomusic; see my *Beyond the Dream Syndicate* (New York: Zone Books, 2008). Nevertheless, one could productively investigate Cage's development of compositional indeterminacy and its ethical opening to difference within the context of U.S. neocolonialist foreign policy, allusions to which can be found in Cage's writing from "Other People Think" (1927) to his dedication to *A Year from Monday*: "To us and all those who hate us, that the U.S.A. may become just another part of the world, no more, no less." See John Cage, "Other People Think," in *John Cage: An Anthology*, ed. Richard Kostelanetz (New York: Da Capo, 1970), 45–49; and John Cage, *A Year from Monday* (Middletown, CT: Wesleyan University Press, 1967), v.