The Materiality of Thought: From Theatrical Mentalism to Brainwear.

by

Stuart Nolan BSc(Hons)

Submitted for a PhD in Contemporary Arts, July 2024.

Table Of Contents

Acknowledgements

This thesis was written with the generous and enjoyable guidance of my supervisors, Professor Charlie Gere and Professor Bronislaw Szerszynski. Their different perspectives provided two critical lights to steer by, and I am enormously grateful for their time and encouragement.

Early in my PhD journey, I corresponded with John S. Haller Jr., Emeritus Professor of History and Medical Humanities and a leading authority on New Thought. He commended me for finding the link between Theatrical Mentalism and encouraged me to pursue it. Without the encouragement of such an esteemed scholar in the field, I would not have been brave enough to follow a path that proved so rewarding and which eventually led to my Kluge Fellowship at the Library of Congress, and I thank him for his support. I would like to thank Dr. Rosalinda Quintieri for her help in applying for the Kluge Fellowship and Travis Hensley, the Program Manager at The John W. Kluge Center, who made my time there so productive and entertaining. My fellow Kluge Fellows were a joy to both work and play with, and my intern, Shailee Modi, was extremely helpful in trawling newspaper archives and finding links that I would have missed, lacking her lived experience and cultural background. Her work contributed to both this thesis and to future planned publications. I'd also like to thank the librarians and staff of the Library of Congress, who take great and well-earned pride in guiding wandering scholars like myself through the daunting volume of wonderous materials that the library holds. Several of the library staff also took part in the workshops I describe herein and, in doing so, contributed greatly to my practical research. I do hope to return to the Library of Congress for a second Kluge Fellowship to continue the historical research I have begun.

Lastly, I thank my wife, Dr Jen Southern, for her unfailing support through a PhD undertaken during a long pandemic by a husband who finds the strictures and failings of

academic institutions frustrating at the best of times. Her ability to read my mind and know when and how to distract me from my doubts and disappointments was an extraordinary mental feat that far surpasses those of the performers that this thesis considers.

ABSTRACT

This PhD study responds to a call for the development of an approach to NeuroArt that engages critically with developments in neuroscience. Archival research is used to demonstrate that Theatrical Mentalism is a neglected performance artform that has historically engaged with prevailing notions of the potential of the human brain. The historical research reveals how late 19th and early 20th century performers of Theatrical Mentalism interacted with the philosophical/spiritual New Thought movement, which had a great influence on the development of modern-day ideas concerning the power of the human brain. Theatrical Mentalism is therefore proposed as a suitable artform for developing Critical NeuroArt.

The research then used an Autobiology method to conduct a year-long autoethnographic study of the use of a direct-to-consumer EEG wearable (Brainwear). Autobiology is a method for creating performance art responses to the use of technology to view one's own internal biological organs and systems. The creative responses to the use of Brainwear take the form of scripts for performances of Theatrical Mentalism. These scripts are discussed, and comparisons are made between Theatrical Mentalism and the use of Brainwear.

The research finds that Theatrical Mentalism has been neglected by academia, and further research into its links with New Thought is planned. Brainwear can be usefully situated in the history of a New Thought Mentalism that believes that the human brain can, and should, be developed to be capable of extraordinary abilities. In this view, Brainwear can be read as a device for practising Neurotechnological Mentalism. Further work to relate this to post- and trans-humanist movements is suggested. Theatrical Mentalism is a popular performance practice that continues to dramatise New Thought Mentalism and should, therefore, be recruited to Critical NeuroArt.

INTRODUCTION

Crafting the Material of Thought

This thesis explores the use of Autobiology, a creative method designed to create performances, as a research method to consider the personal use of a direct-to-consumer EEG device, also known as Brainwear. These Brainwear devices are used by purchasers in a variety of ways: to visualise brain activity, to aid in contemplative practices, as a Brain-Computer Interface (BCI) to control devices, and to measure a range of psychological metrics. The Autobiology method is used to explore each of these uses in turn. The performance scripts created through the process are discussed and related to both my practice as a performer and to the history of Theatrical Mentalism. The aim is to demonstrate that Brainwear and Theatrical Mentalism share a cultural heritage in the notion that the material of thought can be captured, measured, and manipulated and that the brain can be trained to be capable of extraordinary abilities. This dream of crafting the material of thought is both a driving force for innovation in neurotechnology and a trope in a wide variety of cultural entertainments; humans with extraordinary mental abilities feature in novels, comics, movies, and on the stage. The latter is the focus of this thesis.

Wordsworth and Telaesthetics

It is early September 2023, and as I write this, I should be in the Lake District taking part in a project with a group of other PhD candidates trying to find ways that the Wordsworth collection can fund its continued existence. A combination of COVID-19 and CFS/ME has prevented me from attending. Instead, I am in bed thinking of the relationship between telepathy and neurasthenia, an ailment that, had I lived in the 19th century, I would no doubt have been diagnosed with. Telepathy and neurasthenia are two sides of the same

coin, representing the power and fragility of a human brain that is porous to outside influences. As cultural phenomena, both telepathy and neurasthenia emerged from public concerns regarding the potential of human thought to confer strength when harnessed and trained or to afflict us with new vulnerabilities when faced with the challenges of the modern world. They are also concerned with correct and incorrect ways of thinking; that is, with the content of thoughts, they reflect emerging beliefs regarding the materiality of thought itself.

The materiality of thought has been an important question for both science and art. Neuroscience has sought to find the physical location of thought in the human brain and to describe the neural mechanisms that give rise to consciousness. Alongside this scientific history, we can trace the development of a neurocentric approach to art that configures the human as a neural self that seeks to act directly on the human brain and to see thought as the actual material of artworks (Gruber, 2020a). By considering the materiality of thought in both a scientific and an artistic sense, we understand the power of brain images to convince and fascinate. The aesthetic quality of the material of thought is significant to its cultural reception.

Both telepathy and neurasthenia have an overt aesthetic quality. Frederic William Henry Myers (1843 – 1901) was a British poet, classicist, philologist, and a founder of the Society for Psychical Research. Myers believed that paranormal and mystical events were the product of contact between the realm of the deep unconscious and what he called the "metetherial world" (Myers et al., 1903). Two years after Myers wrote his biography of Wordsworth (Myers, 1881), he coined the term telepathy (1882) and invoked Wordsworth as prime evidence for his theory. "Lines such as 'To hold fit converse with the spiritual world' convinced him that there was a "telaesthetic" quality to Wordsworth's genius" (Bate, 2020). For Myers, telepathy is, at heart, an aesthetic experience. It is not necessary for telepathy to be possible, whether through innate abilities or technological enhancement, to impact artistic

creation. The mere idea of telepathy has spawned innumerable stories in literature, film, and on the stage. Though most prevalent in science-fiction, the telepathic archetype occurs across genres, and literature itself has been approached as a form of telepathy (Royle, 2012).

Neurasthenia was also closely associated with a particular aesthetic experience of the materiality of thought. It was seen as a disease of culture as much as of the mind and body and was referred to as "American nervousness" (Schuster, 2011). The neurasthenic character that became a staple of literature was seen as possessing advanced mental powers and being highly sensitive to the modern world. "Literature contextualized neurasthenia within people's lives and created model neurasthenics, archetypes that readers could emulate, ridicule, or use as a touchstone" (Schuster, 2011). As we shall see, the neurasthenic archetype also influenced the development of Theatrical Mentalism, which is, at its core, the dramatisation of advanced mental powers, including telepathy and mastery over the material of thought.

This thesis considers the materiality of thought in two different eras. The first is the late 19th and early 20th century period, during which the New Thought movement promoted the idea that *Thoughts are Things* that can be manipulated to give humans extraordinary mental abilities. The Theatrical Mentalists first took to the stage and performed these mental abilities for audiences eager to ponder the mysteries of their minds. The second is the present-day, in which neurotechnology makes the same promises: that thoughts can be captured, measured, and manipulated to improve our mental capacities and give users a telaesthetic experience of the materiality of their own thoughts. To converse not with the metetherial world but with their deep unconscious. By comparing the two eras, I highlight common themes: dreams of advanced mental powers and fears of the vulnerability of the human brain.

This thesis uses an autoethnographic method informed by Performance Philosophy to investigate a direct-to-consumer EEG Brainwear, the EMOTIV Epoc X. While some use the

term Brainwear to the hidden integration of brain-sensing technology into garments (Vargas et al., 2021) I use the term to refer to any worn brain-sensing device sold to the general public for personal use, thus distinguishing it from medical devices.

The EMOTIV Epoc X device I use in my research is an example of consumer Brainwear that promises to endow the wearer with extraordinary new brain powers: to experience illuminating mental states, develop more effective psychological performance, and move objects with one's thoughts. This thesis situates such claims and the desires they speak to in the cultural history of Theatrical Mentalism's performances of extraordinary mind powers and the theories of the materiality of thought that influenced them.

The inspiration for this PhD came from three sources. Firstly, the emergence of increasingly sophisticated mind-reading neurotechnologies that, in various ways, attempt to read our minds by reading the brain and nervous system. Secondly, my own experience of neurodiversity and the notion of a correctly functioning brain influenced my choice of Autobiology as a research method. Thirdly, my practice in Theatrical Mentalism, a theatrical art form concerned primarily with the human mind and its potential, where performers appear to demonstrate highly developed mental or intuitive abilities.

The Rise of Neurotechnologies

The combination of major advances in neurosciences and digital technologies has driven a booming field of technological development, broadly called neurotechnologies, resulting from research in brain pathophysiology, miniaturisation of electronic systems, and increasing capacities of computers to process digital data. Implementing microprocessors in the brain, decoding electrical signals produced by neurons, and stimulating specific brain regions to modify their activity are all now possible, practical, and affordable. They are being applied to the human brain in various ways. Neurotechnology is a growing field with

applications being developed for gaming, the military, medicine, social media, and much more predicted in the future. Neurotechnologies also offer the possibility of extending current human capacities (Chavarriaga et al., 2023), and the application of AI to neurotechnology is rapidly increasing its capability to "decode, alter or enhance targeted cognitive processes (Chavarriaga et al., 2023). Neurotech Reports projects that the worldwide market for neurotechnology products will be US$9.8 billion in 2022 and reach US$17.1 billion in 2026 (Cavuoto, 2022). Wired magazine called 2017, "a coming-out year for the brain machine interface (BMI)" (Levy, 2017) and by the middle of 2021, the total investment in neurotechnology companies amounted to just over US$33 billion (Braun, 2021).

Internationally, neurotechnology development has been driven by large-scale initiatives such as The White House BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies), which began its second phase in 2020, intending to use the integrated application of neurotechnologies to make fundamental discoveries about the brain. The China Brain Project, The European Union's Human Brain Project, and Japan's Brain/MINDS initiative have similar goals and timelines influenced by The International Decade of the Mind Manifesto (Olds, 2011) (Spitzer, 2008). The prospects for medical applications are very promising and constitute real progress in improving the quality of life for patients (Donoghue, 2015, Moritz et al., 2016, Vidal, 2022). However, neurotechnology development is not solely driven by medical applications. The interest in military applications can be seen in this quote from the US government's Defense Advanced Research Projects Agency (DARPS) *Strategic Plan, February 2003,*

> The long-term Defense implications of finding ways to turn thoughts into acts, if it can be developed, are enormous: imagine U.S. warfighters that only need use the power of their thoughts to do things at great distances (Moreno, 2012).

In addition to medical and military funding, the GAMAM (Google, Amazon, Meta, Apple,

and Microsoft) have invested millions of dollars in neurotechnologies based on the significant commercial opportunities involving neurotechnologies that exploit brain data for personal uses and for the supervision of individual behaviours (Ienca et al., 2018, Kellmeyer, 2021, Vidal, 2022). The following quote captures the importance of these developments,

> Scientists around the globe are joining the race to achieve engineering feats to read, write, modulate, and interface with the human brain in a broadening continuum of invasive to non-invasive ways. The expansive implications of neurotechnology for our conception of health, mind, decision-making, and behaviour have raised social and ethical considerations that are inextricable from neurotechnological progress. (Robinson et al., 2022)

Mind-reading Neurotechnology

> **Mentalists.** Turning science into solutions, startups like Elon Musk's Neuralink, Bill Gates- and Jeff Bezos-backed Synchron, Onward Medical, and Precision Neuroscience are progressing human clinical trials for implantable brain chips. (Vennare, 2023)

As this quote from the fitness industry publisher *Fitt Insider* newsletter shows, the word *mentalist* has been applied to present-day neurotechnologists and neurotechnology companies. Elon Musk's brain chip startup Neuralink has successfully inserted an implant into its first human test subject and have named this product *Telepathy*. Musk claimed that *Telepathy* "enables control of your phone or computer, and through them almost any device, just by thinking" (Gerken, 2024). The ethical considerations of Neuralink have been raised (Waisberg et al., 2024), but many neuroscientists, technologists, and science writers see synthetic telepathy in general as a worthy goal. These dreams of a future of synthetic

telepathy often begin with attempts at non-synthetic telepathy. For example, both Michael J. Spivey, Professor of Cognitive Science at the University of California, and Michio Kaku, Professor of Theoretical Physics at the City College of New York and popular science writer have written about experimenting with telepathy; Kaku when he was a child (Kaku, 2014), Spivey much later (Spivey, 2019).

Several areas of neurotechnology development are direct attempts to read the human mind. Decoding of fMRI scans of neural activity now allows us to predict a complex sentence a person is thinking of (Wang et al., 2017) and to use Deep Neural Networks to construct a representation of a film clip they are watching (Nishimoto et al., 2011). Infrared optoelectronics and holography promise similar capabilities in consumer wearables (Jepson, 2017). The global Brain-Computer Interface (BCI) market was valued at USD 2.0 billion in 2023 and is predicted to grow to USD 6.2 billion by 2030 (Research, 2023). BCI technologies facilitate direct communication pathways between enhanced or wired brains and external devices (Lebedev and Nicolelis, 2006), and synthetic telepathy technologies facilitate mind-to-mind interaction at a distance (Tressoldi et al., 2014). BCIs are often conceptualised as a means of connecting humans with machines without the need for physical body movements. However, they also raise the possibility of erasing the mutual discreteness of the brain and the machine. The implementation of BCIs can vary from non-invasive methods (such as EEG, MEG, and MRI) and partially invasive approaches (like ECoG and endovascular techniques) to invasive procedures involving microelectrode arrays, depending on the proximity of the electrodes to the brain tissue.

A growing market for direct-to-consumer (DTC) neurotechnologies and EEG devices represent a significant portion of the market (Coates McCall and Wexler, 2020). EEG headsets allow individuals to engage in various activities without medical supervision, including the attempted monitoring of cognitive health and well-being, the attempted

optimisation of brain fitness and performance, and as Brain-Computer Interface devices for playing computer games and controlling devices such as wheelchairs and prosthetics (Ienca et al., 2018). They are at the low-cost end of devices that are technically robust enough to be used for research but not considered appropriate for medical diagnosis or treatment.

Individuals are using Brainwear to practice meditation and mindfulness through neurofeedback (Samuel, 2021), by schools to track the mental states of their pupils (Liu, 2019), and by commercial organisations to surveil their workforce (Keppler, 2020). These uses raise a host of ethical issues relating to human agency, personal autonomy, mental privacy, cognitive capitalism, and social equality. As part of my PhD research, I worked on the Institute of Electrical and Electronics Engineers (IEE) Neurotics Framework that aims to address the Ethical, Legal, Social, and Cultural Implications of Neurotechnology (IEEE, 2023). Two critical areas for this framework are Wellness and Entertainment, as there is a growing market for Brainwear in both.

The transition of EEG technology from clinical and research settings to these work, wellness, and entertainment contexts has renewed concerns regarding the invasion of mental privacy through mind reading. Neurodevices, either for recording brain activity ("reading") or altering it ("writing"), have been characterised as having the potential to "register and alter the inner workings of human mentality" (Goering et al., 2021). It has been noted that there is a lack of standards and guarantees in BCI production (Bonaci et al., 2014), that BCIs run the risk of compromising the security of patients' brain information (Klein et al., 2015), that BCI games can violate a player's privacy (Ienca et al., 2018), and that harm to users' free thought and autonomy from consumer neurotechnologies are foreseeable and preemptory regulation is necessary (Khan et al., 2024). There are concerns that the proliferation of direct-to-consumer Brainwear may result in the mass processing and commercialisation of "big brain data" (Kellmeyer, 2021) (as has been the case with social media data), threatening the mental

privacy, biographical identity, and agency of individuals (Goering et al., 2021, Lavazza and Giorgi, 2023) effectively creating mind-reading devices (Rainey et al., 2020). To complicate the situation, it is questionable whether most consumer EEG devices can validly and reliably record brain activity or accurately reflect the users' mental states in the way that the manufacturers claim they can (Wexler and Thibault, 2018). BCI users express a high degree of ambivalence towards their potential and have highlighted being puzzled and fascinated by the technology (Schmid and Jox, 2021). Moreover, it has been suggested that "the source of most ethical concerns about DTC EEG technology lies not so much in the devices themselves, but in what people believe about these devices and their capabilities" (Coates McCall and Wexler, 2020). Therefore, we must develop a rich understanding of how these devices relate to historical and cultural beliefs regarding the potential of the human brain and concerns regarding its porosity, safety, and malleability; this necessity provides one of the motivations for this PhD research.

Recent research has used techniques from Theatrical Mentalism to emulate future neurotechnology (Olson et al., 2023). One of these studies looked at participants' responses to a neurotechnology that they were told could both read and influence their thoughts.

> While inside a mock brain scanner, participants chose arbitrary numbers in two similar tasks. In the Mind-Reading Task, the scanner appeared to guess the participants' numbers; in the Mind-Influencing Task, it appeared to influence their choice of numbers. We predicted that participants would feel less voluntary control over their decisions when they believed that the scanner was influencing their choices. (Olson et al., 2016)

This use of techniques from Theatrical Mentalism to give neurotechnology the illusion of advanced capabilities demonstrates one approach to combining the two fields. It is hoped that future studies will pay further attention to the cultural history of Theatrical Mentalism and

include outcomes that enrich our understanding of the art form, as well as use it to provide tools for psychology research.

Critical Neuroscience

In the general conception of what constitutes the human, various notions from science have had a significant influence. For example, the idea that we are, in a fundamental way, our genes was prevalent for some years. This is both an understatement and a simplification – traffic has been in various directions between science/natural philosophy, law, custom, religion, etc. Human Technology Interaction studies have identified a divide in the world of technological design between humanistic and mechanistic worldviews (Vicente and Kirlik, 2010) that is brought into sharp relief by advances in neuroscience that increasingly challenge long-held views of the self and the individual's relationship to society (Illes and Bird, 2006). Neuroethics has considered issues of neurotechnology relating to consciousness (Jox and Kuehlmeyer, 2013), personal identity (Baylis, 2013), authenticity (Erler, 2011), legal responsibility (Klaming and Haselager, 2013), and the entangled drives of privacy, security, justice, and freedom (Illes and Sahakian, 2013). For their part, neuroscientists have suggested that the "age of the brain is upon us" (Frank, 2009), arguing that our current age is one in which the transition from a focus on "individual psychology to the chemistry and physics of the soul is in full swing" (Stone, 1997). Hayles has argued that "humanities scholars must recognise that they too are stakeholders in the evolution of cognitive assemblages, which implies an openness toward learning more about the computational media at the heart of cognitive, technical systems" (Hayles, 2017).

This neuroscientific turn presents various issues for the philosophy of mind and neuroethics. In particular, the rise of a neurocentrism that foregrounds the brain at the expense of both the body and the social, the dominance of the cerebral subject in the public

construction of the human (Vidal, 2017), neurobiological colonisation of the social and human sciences (Rose, 2013), and the concerns of neuroexistentialism (Caruso, 2018). In response to such concerns, Critical Neuroscience is a recently founded interdisciplinary initiative that encourages social, historical, and philosophical neuroscience studies and seeks to analyse the socio-cultural implications of recent advances in the field (Slaby, 2010). It addresses scholars in the humanities, neuroscientific practitioners, policymakers, and the public (Choudhury and Slaby, 2011). “What first emerged was a shared sense of irritation about the hubris of neuroscience and the reverberations of ‘brain overclaim’ in areas of everyday life far beyond the lab” (Choudhury and Slaby, 2011).

Until recently, many areas of human experience were regarded as too subjective to be proper subjects for scientific research. However, neuroscience has increasingly engaged with subjects such as emotion, self, agency, and consciousness, producing a rapidly growing research literature (Davis and Scherz, 2022, LeDoux, 2012, Klein, 2012). This research has given rise to various neuro-prefixed programs, including neurolaw, neuromarketing, neuroaesthetics, and neuroeducation. “All these neuro fields and programs speak a vibrant language of discovery and of hope. They promise to have or soon have answers to critical questions about the mind…” (Davis and Scherz, 2022). These fields represent the predominance of a scientistic and narrow view of the materiality of thought. This narrow view is a central concern of Critical Neuroscience, as Fitzgerald notes,

> In the midst of on-going hype about the power and potency of the new brain sciences, scholars within "Critical Neuroscience" have called for a more nuanced and sceptical neuroscientific knowledge-practice. Drawing especially on the Frankfurt School, they urge neuroscientists towards a more critical approach-one that re-inscribes the objects and practices of neuroscientific knowledge within webs of social, cultural, historical and political-economic contingency. (Fitzgerald et al., 2014)

These webs must include the arts, and the arts must respond critically and beware of contributing to the cultural impact of brain overclaim. This thesis is a timely response to the neuroscientific turn and the growth of the Brainwear market, which is one avenue through which neurotechnology enters the personal human experience of the materiality of thought. My research is inspired and informed by Critical Neuroscience, though my methods are not typical of this field.

Critical NeuroArt

In *What Makes Us Think?* (Changeux and Ricoeur, 2000), a philosopher and neuroscientist, discusses the relation between the facts of science and the prescriptions of ethics. Their discussion concludes with a plea for art to provide a specifically aesthetic dimension to their "attempt to provide a co-foundation for humanity." (Changeux and Ricoeur, 2000). While the role they sketch out for art is rather limited and old-fashioned, based on notions of truth, beauty and harmony (the section is titled Art as Peacemaker), this thesis agrees with their general point that art needs to have a place in thinking the brain. However, attempts to consider the relationship between the brain and art often succumb to the neurocentrism that Critical Neuroscience warns us of. To appreciate the limitations of such a neurocentric approach, one need only read the following outline for the chapter on Neuroaesthetics in *Neuroculture: On the Implications of Brain Science* (Rolls, 2012), "What are the foundations of what we appreciate in art? Is art - visual art, literature, music - related to fundamental adaptive capacities that help survival and thus reproduction, or is art a useless ornament, like a peacock's tail, shaped by sexual selection?" (Rolls, 2012). The grimly reductionist chapter it introduces can imagine no use for art, brains, or anything else beyond simple Darwinian selection.

During my research, I have heard several promotors of what is variously referred to as

neurotechnological, synthetic, or artificial telepathy, considering its potential use for artistic creation. In a private session on *Technology and Telepathy* at GoogleX, the CEO of a leading neurotech company, who I cannot name due to the privacy restrictions of the event, described a future where a film-maker could mentally imagine a movie scene and a brain-reading device would instantly capture their thoughts and generate a video of the imagined scene precisely as they had imagined it. This is a naive and simplistic view of artistic creation based on the myth of the singular auteur-genius whose vision arrives fully formed in their mind's eye. Translating that vision into an artwork is seen as an arduous chore that comes after the pure creative act. While ideas about how neurotechnology may affect artistic creation are commonly, if informally, discussed, less is said of how synthetic telepathy may affect artistic perception. The field of neuroaesthetics seeks to use neurotechnology to understand aesthetic experiences, not to change them fundamentally (Gallese and Di Dio, 2012).

Fedorova (2019) has argued that performances and artistic collaborations with neuroscientists have the potential to "open up new dimensions in the discussion of translation between different sensory modalities, as well as translation between human perceptive apparatus and computational systems" and that art can help to "both localize and expand our understanding of mental imagery and to offer an alternative to the existing correlations-based approach" (Fedorova, 2019). For this to become true, art practitioners must adopt more critical and historically informed approaches to neuroscience that do not uncritically accept neurocentric models of human cognition.

In his book *Brain Art and Neuroscience*, Gruber discusses artworks that "prioritize beauty, highlight wonder, and respectfully present the neurosciences to general audiences" (Gruber, 2020a). This prioritisation of beauty and respectful, uncritical presentation of science is a weakness typical of sci-art in general and all too common in NeuroArt. As I have considered elsewhere, the seductive and misleading nature of neuroimages too often produces

what Duchamp called Retinal Art, uncritical art made for the eye and not the mind (Nolan, 2020). Ironically, science, which hopes to be founded on rationality, inspires a great deal of Retinal Art, and there is a need for Critical NeuroArts to complement Critical Neuroscience and to resist the fawning of Retinal NeuroArt. Gruber adds, "Challenges to the power and politics of the institutional, disciplined apparatus are hidden in the weave" (Gruber, 2020b). I fear that the challenges Gruber identifies in the weave of the artworks he considers are either too well hidden or were never there to begin with.

In the context of art-science experiments, Gruber has called for a Critical NeuroArt that responds to the concerns of Critical Neuroscience (Gruber, 2020b). These concerns include the rise of a neurocentrism that foregrounds the brain at the expense of both the body and the social; the dominance of the cerebral subject in the public construction of the human; and the anxieties of neuroexistentialism. While Gruber's examples focus on gallery art objects, this thesis seeks to support his call by considering the role art research and performance practice can play in bringing a fundamentally embodied approach to the critique of neurocentrism that informs much Critical Neuroscience. Gruber suggests that "the role of art in Critical Neuroscience remains as yet unaddressed and unclear." And that "How exactly Critical NeuroArt manifests, of course, remains open and variable." This thesis responds to Gruber's challenge and explores several ways art research and performance practice can contribute to a Critical NeuroArt.

To date, there is little research into neurotechnology users' moral concerns, fears, and expectations (Sample et al., 2020, Grübler et al., 2014). However, a recent survey by Schmidt et al. reveals a high level of ambivalence towards BCIs,

> The survey assessed: affinity for technology; previous knowledge and experience concerning BCIs; the attitude towards ethical, social and legal implications of BCI use and demographic information. Our results indicate that BCIs are a unique and

> puzzling way of human–machine interaction. The findings reveal a positive view and high level of trust in BCIs on the one hand but on the other hand a wide range of ethical and anthropological concerns. Agency and responsibility were clearly attributed to the BCI user. The participants' opinions were divided regarding the impact BCIs have on humankind. In summary, a high level of ambivalence regarding BCIs was found. We suggest better information of (sic) the public and the promotion of public deliberation about BCIs in order to ensure responsible development and application of this potentially disruptive technology. (Schmid et al., 2021)

This raises the question of what role the arts might play in this public deliberation. The authors also report that "mass media portrays BCI technology in an overly positive and enthusiastic manner, including little negative or critical aspects and almost lacking any ethical discussion." (Schmid et al., 2021). Similarly, artists have used BCI technology in a largely uncritical, overly positive, and enthusiastic manner. I have found no instances of artists questioning the validity or accuracy of the technical functions of BCI technology through their work, and many examples of Brain Art uncritically accepting the therapeutic claims of Brainwear (Mosher, 2022). The most exhaustive survey of the field, *Brain Art: Brain-Computer Interfaces for Artistic Expression* (Nijholt, 2019), documents the growth of an uncritical field through sections on "Exploring Our 'Self' with Brain Art", promoting an impoverished neurocentric conception of the human as brain and neuroscience as the new language of self-awareness; "Your Brain on Art: Perceiving, Understanding, and Creating", an example of the "your brain on…" formulation much critiqued by Critical Neuroscience (Choudhury and Slaby, 2011); and "Using Brain Art in Therapy", a section that continues the rhetorics of the 19th-century mind-cure movement that I discuss in depth later in this thesis. Further support from arts organisations and academia is required to help artists develop critical approaches to neurotechnology use and general technology use.

The neuroaesthetics area is outside of the scope of this thesis. As the philosopher and cognitive scientist Alva Noë writes, “If you define neuroaesthetics as the use of neuroscience to explain art and aesthetic experience, then it is not surprising that neuroaesthetics fails: art just isn’t a phenomenon (neurological or experiential) to be explained by neuroscience, psychology, or any other empirical science; it is, rather, a mode of questioning and inquiry” (Noë, 2021). The use of art methods as a mode of inquiry into the experience of neurotechnology is of interest to my research.

My use of art methods to explore the experience of neurotechnology can be related to the simplified scheme of approaches toward neuroscience proposed by Tomasi (2020):

> 1. Scientific (evidence-based, observational-empirical, double-blind, case-control, the principle of falsifiability and hierarchy of evidence-- based) model and method.
>
> 2. Philosophical model and method (each of which depends on vast supragroups and positions, as we evidenced several times in this analysis, including thought experiments in experimental philosophy).
>
> 3. Artistic model and method (from theories of perception to art movements and philosophies, to the “sheer enjoyment through the senses”, and to the social, political, sense/meaning-making, affirming-- affirmative and activating-activist component of performance art).
>
> 4. Religious/spiritual/meditative model and method (with special reference to mysticism and mystical experiences, but also related to NDEs, OOBEs, alternate states of consciousness, neurotheology, etc.). (Tomasi)

My research uses the Autobiology method, which I will discuss in detail later and which relates to the final three layers of Tomasi’s model. The Autobiology method, as I have implemented it, combines elements of Performance Philosophy, autoethnography, performance art, and meditative practice to explore the experience of Brainwear.

Gruber suggests that “Critical NeuroArt would strive for ‘awareness of the social implications of research and its uses’ by taking up the tools, images or discourses of the neurosciences.” (Gruber, 2020b). Autobiology has provided a way to take up a neurotechnological tool, namely Brainwear, and explore its uses without uncritically accepting its claims.

As theories of embodied cognition have sought to replace neurocentric models, bodily perception has received more attention (de Vignemont, 2017). Clark’s concept of the extended mind (Clark, 2008), where cognition comprises neural, bodily, and environmental processes, has gained support (Menary, 2010). The proposal that cognition should be described in terms of agent-environment dynamics rather than computation and representation (Chemero, 2009), and the concept of the amalgamated mind (Rowlands, 2010), a combination of embodied and extended cognition, both offer valuable alternative models for considering neurotechnologies and could be recruited to a Critical NeuroArt. The Autobiology method favours the consideration of bodily perception over a neurocentric focus on brain data.

Literature is often used to shed light on neuroscience, and much has been written about the use of stories in the teaching and understanding of neuroscience (Banyard, 2000, Wilson, 2021, Harrington, 2006, Todman, 2007). First-person accounts of damaged brains and psychological disorders abound (Mickley and Hoyt, 2010), but the subjects of the accounts are seldom the same people who do the academic analysis. Art research can provide methods for combining the experience with analysis and reflection. Huber has this to say about the usefulness of artistic researchers, “As observers and observed, they fulfil – as the subject and object at the same time – a complex participatory function in the ‘inside’ and ‘outside’ of the knowledge process.” (Annegret Huber, 2021). Autobiology provided a way for me to participate in Brainwear from inside and out.

Towards A Critical Theatrical Mentalism

This thesis situates Brainwear in the history of Theatrical Mentalism to highlight the performative nature of its use and how both practices consider the materiality of thoughts. Theatrical Mentalism took shape in the late nineteenth century and one of the aims of this thesis is to show how throughout its history Theatrical Mentalism has engaged and entangled with notions of mind-reading, telepathy, human potential, the cerebral self, brain training, positive psychology, neuromysticism, anomalous experiences, and cognitive science.

In the historical section of this thesis, I provide an introduction to the early development of Theatrical Mentalism and its relationship to Spiritualism, Theosophy, and, most importantly, the New Thought Movement. When researching this history, I was surprised that little scholarly attention had been paid to the subject. Histories of Theatrical Mentalism, such as they are, tend to be subsumed within histories of Theatrical Magic. Theatrical Magic has been usefully considered by performance studies (Mangan, 2007), literary theory (During, 2002), theology (Burger and Neale, 1995), philosophy (Leddington, 2016), and psychology (Lamont, 2009). Since the year 2000, the body of experimental scientific literature on the topic of Theatrical Magic has more than quadrupled, with 55 empirical papers having been published on the subject of adult perceptions of magic tricks within the last 15 years, compared to the 12 that were published in the preceding century, between 1887 and 1999 (Raz, Olson, & Kuhn, 2016). Although Theatrical Mentalism has overlapped significantly with Theatrical Magic, we must be careful not to conflate the two. Theatrical Mentalism has an entirely different modern history, and its practitioners often insist on separating it from the world of Theatrical Magic (Cassidy, 2003).

Theatrical Mentalism has not received anywhere near the degree of scholarly attention paid to other forms of popular theatre. Despite its fundamentally interactive nature, a survey

of the major texts on immersive theatre reveals no mention of Theatrical Mentalism (Frieze, 2017, Biggin) (Warren, 2017) (Alston, 2016) (Dinesh, 2018, Jarvis, 2019). This is a shame, as contemporary theatre could learn a lot from this practice and would not spend so much time and resources reinventing the wheel regarding issues of effect, proximity, interaction, touch, and immersion.

There are several reasons for the academic neglect of Theatrical Mentalism. For much of its history, Theatrical Mentalism has been a "lower-class" art practised by performers untrained by the academy. It has its roots in traditional practices drawn from several excluded cultures. It is seen as disreputable because it fades into the perceived charlatanism of stage psychics, mediums, Tarot readers, and New Age healers. At the heart of the latter problem is the use, by performers of Theatrical Mentalism, of Kayfabe, the theatrical practice of maintaining the illusion that everything one performs is real both on and off stage, a practice that is also common to Theatrical Magic (Taylor, 2018) and Professional Wrestling (Laine, 2018). The tensions inherent in Kayfabe and its distinction from Theatrical Magic are highlighted by Harlan Tarbell, author of what is generally considered the most influential correspondence course for Theatrical Magicians,

> Performers of mental and psychic mysteries usually preface their demonstrations with a statement to the effect that they make no claims to possession of supernatural powers, and that the presentation is solely for the entertainment and amusement or those present who may draw their own conclusions as to the means or methods by which it is accomplished. However, the performer proceeds to do his act as though it were a genuine example of unusual powers -which, in fact, it is! (Tarbell, 1941)

The result of the use of Kayfabe is that some audiences for Theatrical Mentalism believe that what they are seeing are genuine demonstrations of extraordinary mental abilities. Kayfabe is a term that has its roots in carnival slang, perhaps dating as far back as the 1800s (Laine,

2018). It has been suggested that it has great explanatory potential, “Taking up kayfabe as a pervasive analytic recognizes the inherent theatricality of our political system, corporations, and our daily interactions and performances.” (Laine, 2018).

> Understanding kayfabe, even as a contested term, as wrestling fans and scholars do, might be the first steps towards a sort of popular ideological critique that quickly moves beyond professional wrestling to many aspects of public and private life. Certainly, to view the world through a kayfabe lens is to see the world cynically. Such a view supposes a con, a fix, and that everyone is working deceptively for their own benefit. Yet, and this is the gambit that makes such an endeavor possibly quite interesting, kayfabe is also potentially quite optimistic in seeing everything in the past and on the horizon as malleable and capable of being rewritten. (Laine, 2018).

Theatrical Mentalism, and the philosophical mentalism that it dramatises, sees the brain as malleable and capable of being rewritten in ways that can bestow extraordinary ability. Theatrical Mentalism performs a Kayfabe of speculative neuroplasticity.

Wrestling causes trouble both in popular culture and the academy because, as Henry Jenkins states, “The WWE is a horrifying hybrid—not sports, sports entertainment; not real, not fake, but someplace in between.” (Sammond, 2005). Theatrical Mentalism is also a troublesome, horrifying hybrid: not real, not fake, but someplace in between. Not magic but not devoid of trickery, not real demonstrations of mental powers nor entirely fake in its claims regarding altered states, persuasion, and psychology. Audiences for Theatrical Mentalism vary in their orientation to the art, from believers to sceptics, but they are all engaged in questioning the human mind’s potential. In *Telepathy* (Derrida and Royle, 1988), Derrida deconstructs Freud's writings on the subject and offers no judgment on the facticity of telepathy. Instead, he, “grants that issue free play and stages the paradoxes generated by psychoanalytical writings about telepathy that keep the matter of its reality open” (Clarke,

2014). In a comparable, playful and transgressive manner, Theatrical Mentalism is performed both *as real* and *as theatre*, often deliberately blurring the accepted line between fact and fiction.

Unlike many other theatrical forms, Theatrical Mentalism "exists specifically as a product of the relationship between the practitioner and the audience. Jugglers can throw objects in the privacy of their own rooms, magicians can produce rabbits in empty theaters, singers can sing to vacant halls, but the mentalist requires the existence of a willing participant in order to read a mind" (Dyment, 2020). This focus on the mind makes Theatrical Mentalism particularly suited to an engagement with Critical NeuroArt.

In addition, Theatrical Mentalism is an art form that engages with mystery. Setting this against the certainties of science can be productive at a time when most theatre avoids mystery. As Lehr writes, "Middle-class entertainment, like bourgeois life, aspires to a security and unreflective contentment with the world." and "Most theater reflects this static demand for the illusion of coherence. By avoiding mystery, theater avoids seriousness" (Lahr, 1973). Lehr goes on to say, "On stage, the mystery is both dangerous and thrilling. Existing between the extremes of outrage and silence, mystery affirms the coexistence of the external world with an inner one, the material with the spiritual." (Lahr, 1973). At its best, Theatrical Mentalism, by taking the mystery of the mind seriously and treating thoughts as things, has a history of combining the material with the spiritual/philosophical in a thrilling and popular manner.

Theatrical Mentalism is typically not considered a form of postdramatic theatre, but some similarities are worth considering. Postdramatic theatre was defined by Hans-Thies Lehmann (Lehmann and Juers-Munby, 2006) as a theatre that is not primarily focused on the drama in itself but strives instead to produce an effect amongst the spectators. Postdramatic theatre is characterised by the 'use and combination of heterogeneous styles' (Lehmann and

Juers-Munby, 2006), it situates itself as after or beyond dialogue (Lehmann and Juers-Munby, 2006) and incorporates the notion of the 'performer as theme and protagonist' (Lehmann and Juers-Munby, 2006). Theatrical Mentalism, with its attention to the effect over the authority of the playwright and the written word (Boenisch, 2010), audience engagement that questions or transforms traditional relationships between performance and audience, a rejection of conventional dramatic form, and the exploration of the mind, may share more common ground with the principles of postdramatic theatre than has previously been recognised. In postdramatic theatre and Theatrical Mentalism there is a move away from mimesis and the work generally acknowledges its status as a shared live theatrical event (Lehmann and Juers-Munby, 2006). Lehmann invokes the *irruption of the real* as an identifiable characteristic of postdramatic theatre, arguing that "postdramatic theatre is the first to turn the level of the real explicitly into a co-player" (Lehmann and Juers-Munby, 2006). Theatrical Mentalism, using kayfabe and blurring the line between performer and genuine protagonist, has long put the real and the fictional into conversation. In addition, Lehmann argues that the unravelling of a body-centred epistemology is one of the central pillars of postdramatic theatre and says that, "The dramatic process occurred between the bodies; the postdramatic process occurs with/on/to the body"(Lehmann and Juers-Munby, 2006). Theatrical Mentalism, too, is centrally concerned with effects that occur with/on/to the bodies of both performers and audience members and with the potential of bodies to exhibit extraordinary abilities that would render them post-human (a person or entity that exists in a state beyond being human), or transhuman (an intermediary form between human and post-human). Given these similarities, it is understandable that theatre companies that are used as examples of postdramatic theatre will sometimes borrow directly from Theatrical Mentalism, notably the use of pseudo-hypnosis in Tim Crouch's *An Oak Tree* (Crouch, 2023), and mind-reading and a disturbing psychic act in Forced Entertainment's *Real Magic* (Entertainment,

2016) and *First Night* (Entertainment, 2001) respectively.

Pramod K. Nayar defines posthumanism as "an ontological condition in which humans live with "technologically modified bodies and/or in close conjunction with machines" (Nayar, 2013). Neurotranshumanists promote a future of enhanced or modified minds; here is one example,

> Neuroscience, together with computing technology, offers radical opportunities for enhancing cognitive performance. Already, chips have been introduced into human beings for purposes of tracking and computer-assisted control of biological functions. Minds are connected through the internet and there may be no barrier in principle to direct mind-reading and thought-sharing across human minds. Uploading of human minds to artificially intelligent systems represents one of the most radical possibilities for human developments. (Savulescu, 2009)

Throughout this thesis, I will demonstrate that Theatrical Mentalism emerged alongside the New Thought movement and was, in many ways, a dramatisation of posthumanist New Thought beliefs. As such, Theatrical Mentalism can be read through theories of posthumanism and can be related to the posthumanist promises of Brainwear.

Defining Mentalisms

Throughout this thesis, I use the new term New Thought Mentalism specifically to refer to the view, mainly derived from the New Thought Movement, that the human mind can be developed to be capable of extraordinary abilities. I define Theatrical Mentalism as the *performance* of the view that the human mind can be developed to be capable of exceptional abilities. I will also introduce the term Neurotechnological Mentalism to describe the view that the brain can be developed *through neurotechnology* to be capable of extraordinary abilities.

For clarity, I wish to distinguish my use of the word mentalism from how it is used in metaphysics and psychology. In metaphysics, mentalism is the view that metaphysics primarily concerns entities in the mind. In this usage, mentalism denotes the general orientation beginning with William of Ockham and reaching a climax in the idea- or representation-first philosophers, including René Descartes, John Locke, George Berkeley, and David Hume, who make the faculties and activities of the mind the starting point for their philosophical projects. Strict mentalism is the doctrine that absolutely everything is mental, including everything that we ordinarily think of as physical (Strawson, 2009). Strict mentalism reverses the popular New Thought phrase *thoughts are things,* claiming instead that *things are thoughts.* This view is common in Christian Science and sets it apart from New Thought despite their close historical links.

In a related manner, mentalism in the psychology literature refers to those branches of study that consider perception and thought processes, such as mental imagery, consciousness and cognition. The term mentalism has been used by behaviourists who argue that psychology should focus only on measuring observable behaviours and events. In contrast, the term *classical mentalism* has been used to refer to the introspective psychologies of Edward Titchener and William James, who, despite their different approaches, agreed that consciousness was the subject matter of psychology, making it an inherently subjective field (Paivio, 1975). As we shall see, William James provided relevant insights into the importance and composition of New Thought.

Technological advances that made brain mapping possible were critical to the successful revival of the mind as a primary focus of study in psychology and cognitive neuroscience. These neurotechnologies provided objectively experimental methods for the study of perception and consciousness, severely weakening the main behaviourist criticism of mentalism, that introspection is a poor tool for the science of psychology.

> In that sense, the behaviorists were right: as a method, introspection provides a shaky ground for a science of psychology, because no amount of introspection will tell us how the mind works. However, as a measure, introspection still constitutes the perfect, indeed the only, platform on which to build a science of consciousness, because it supplies a crucial half of the equation—namely, how subjects feel about some experience (however wrong they are about the ground truth). To attain a scientific understanding of consciousness, we cognitive neuroscientists 'just' have to determine the other half of the equation: Which objective neurobiological events systematically underlie a person's subjective experience? (Dehaene, 2014)

This is, of course, a somewhat neurocentric position that underpins the conception of Brainwear as a tool for coupling the wearer's subjective experience with their neurobiological events. Autobiology takes a related approach, seeking to bridge a perceived gap between experience and biology.

Critical Theatrical Mentalism

When considering how to develop a Critical NeuroArt, Gruber focuses on fine art. However, we can look to other art practices with a long-standing and fundamental concern with the brain. Theatrical Mentalism is an art form fundamentally concerned with the brain and the mind. It is a performing art in which its practitioners, known as Mentalists, appear to demonstrate highly developed mental abilities. Performances may appear to include hypnosis, telepathy, clairvoyance, divination, precognition, psychokinesis, mediumship, mind control, memory feats, deduction, and rapid mathematics. Mentalists perform a theatrical act that includes effects that may appear to employ psychic abilities, supernatural forces, or skills derived from an understanding of fundamental principles from human psychology or other behavioural sciences, such as the reading of body language and psychological persuasion

(Green, 2019). A Theatrical Mentalist takes to a platform and performs the possibility that the mind has or can have extraordinary abilities. This thesis grew from my performance art practice of over 30 years in Theatrical Mentalism.

Performance can be understood as "doing its own kind of philosophical work, without it being illustrative of concepts or arguments already outlined by 'traditional' philosophy" (Cull and Lagaay, 2014). Throughout its history, Theatrical Mentalism has staged a performance philosophy engaged and entangled with theories of mind-reading, telepathy, human potential, the cerebral self, neuromysticism, and cognitive science. Theatrical Mentalism is an example of performance as manual philosophy (Johnston, 2017), and its narratives, gestures, participation, and interaction have particular relevance for cultural notions of embodiment, communication, and philosophy of mind. Theatrical Mentalism is performance as philosophy of mind—the performance of New Thought mentalism.

Neuroscience presents a growing array of challenges for the philosophy of mind and neuroethics. Many of these challenges can be approached by Performance Philosophy, particularly the rise of a neurocentrism that foregrounds the brain at the expense of both the body and the social, the dominance of the cerebral subject in the public construction of the human, and the concerns of neuroexistentialism. This thesis argues that Theatrical Mentalism can bring methods and practices to Critical Neuroscience that help to illuminate the performative aspects of neurotechnology use, reintroduce the whole human, and challenge reductionist neurocentric ontologies with a more holistic, postcognitivist approach that sees consciousness as embodied, enactive, extended, and socially embedded.

Theatrical Mentalism's framing of the development of extraordinary mental abilities through brain training can be directly related to Critical Neuroscience's concern with neuroascesis, defined here by Ortega, who coined the term, "Since I use 'ascesis' in the sense of self-discipline, or conduct of oneself for the sake of improvement, 'neuroascesis'

designates for the most part practices and prescriptions of cerebral self-help." (Ortega, 2011). By comparing two different kinds of mind-readers, the Theatrical Mentalist and the neurotechnological Brainwear, we can see that they are both forms of popular entertainment that reflect the broader culture of neuroacesis. Brainwear promises to endow the wearer with extraordinary new brain powers: to experience illuminating mental states, to develop more effective psychological performance, and to move objects with one's thoughts. This thesis situates such promises and the desires they speak to within the cultural history of Theatrical Mentalism's performances of extraordinary mind powers.

With the development of contemporary mind-reading neurotechnologies, we see rhetorics and ethical debates around their potential use that are both novel and, at the same time, informed by the cultural history of technological mind-reading and telepathy (Trimper, 2014). The term telepathy was coined by Frederick William Henry Myers in the 1880s, a time of scientific wonders, spiritualist beliefs, and the invention of the telephone (Luckhurst, 2002). Stories of technological mind-reading have been a staple of popular culture and can be playfully taken together as a 130-year assemblage of design fiction full of dreams and danger (During, 2002). This assemblage informs our conceptions and discussions of mind-reading neurotechnologies and the implications for ethics and philosophies of mind. Theatrical Mentalism emerged in the late nineteenth century as a form of theatre that drew upon public interest in and concerns about the potential of the human brain. The performances of Theatrical Mentalism dramatise popular ethics of emerging neuroscience and neurotechnology through the anticipation of possible future devices, applications, and social consequences (Brey, 2012).

The contemporary world is shaped by the marriage of biotechnology and market forces, by what Sunder Rajan calls technoscientific capitalism (Sunder Rajan, 2006) and . In this context, social science studies have pointed out the significance of expectations in

science and technology innovation (Borup et al., 2006) and that the visions and hype of biotechnology are central to a visual sociology of expectations. Kirkby introduced the term ‘diegetic prototypes’ to account for the ways in which “cinematic depictions of future technologies demonstrate to large public audiences a technology’s need, viability and benevolence. Entertainment producers create diegetic prototypes by influencing dialogue, plot rationalizations, character interactions and narrative structure” (Kirby, 2010). Prospective technologies are shown in movies diegetically – as part of the action and often unremarked on- making them seem real and helping to build societal momentum towards them. Of course, cinema is not the only form of entertainment to show prospective technologies. Performances of Theatrical Mentalism play a part in building social momentum towards prospective technologies of neuroascesis.

In its performances of speculative neuroscience, Theatrical Mentalism often blurs the line between fact and fiction. There is a difference between traditional theatre, “depicting events as though they were happening,” and Theatrical Mentalism, “depicting events as though they were really happening”. “While fiction invites the audience to imagine the depicted event—and the main point of the fiction is to help them in this—magic coerces the audience into trying to imagine how the illusion of the depicted event might be produced—and the main point of the performance is to prevent them from succeeding.” (Leddington, 2016). The same can be said of Theatrical Mentalism, and the dramatic tension produced can provoke a wise and playful awareness of how careful we must be when we attempt to imagine the potential of neurotechnology.

RESEARCH METHODS

Scope and Omissions

This thesis is a work of two distinct parts. The first part is a historical survey, mainly based on archive research undertaken during a fellowship at Kluge Center at the Library of Congress, which outlines a cultural history of Theatrical Mentalism and its relationship to the New Thought movement, both to situate the Brainwear in this history and to lay the foundation for further future work on this neglected history. The second part is an Autobiology that creatively responds to the use of a direct-to-consumer EEG Brainwear device with the creation of a series of stage scripts for performances of Theatrical Mentalism that draw out the links between Brainwear, Theatrical Mentalism, and New Thought.

Geographical scope: The historical research focuses on the late 19th to early 20th century United States to most clearly highlight the influence of New Thought on Theatrical Mentalism. A fuller historical account would consider this history as it developed in other countries, notably the UK, Germany, Canada, and Israel. This broader research will be conducted at a later date.

It is understood that several theories and disciplines could have been employed in both of these endeavours, but that approaches that offered more opportunities to create new knowledge were favoured. I wish to briefly consider some of the approaches that are not within this thesis's scope but would be valuable in a more extended study and are likely to form part of future research by the author.

Cyborg Theory: Since Donna Haraway's *A Manifesto for Cyborgs* (Haraway, 1985), several scholars have theorised connections between humans and machines using the cyborg as both a rhetorical and metaphorical tool for understanding how technology has shaped our lives. As Peña notes, technologies "have been accepted, and rejected, based on their ability to

create culturally determined ‘ideal’ bodies at particular moments in time” (Peña, 2003). Exploring Theatrical Mentalism, New Thought, and Brainwear from a cyborg theory perspective could consider the aspects of the ideal body that all three aspire to.

Haunted media: In his work *Haunted Media* (Sconce, 2000), Sconce explores the enduring connections within American culture between new electronic media, spanning from the telegraph's invention to the emergence of television and computers, and paranormal or spiritual phenomena. Through a historical examination of the interplay between communication technologies, modernity discourses, and metaphysical concerns, Sconce illustrates how narratives of "electronic presence" have evolved. Initially rooted in a fascination with the limits of space and time, these accounts have shifted towards a more widespread apprehension concerning the perceived dominance of technology. Sconce identifies five pivotal cultural moments in telecommunication history from the mid-nineteenth century to the present: the rise of telegraphy, the advent of wireless communication, the transformation of radio into network broadcasting, the introduction of television, and the contemporary debates surrounding computers, cyberspace, and virtual reality. One could usefully consider how Brainwear fits into Sconce’s framework. In what sense could Brainwear be read as “haunted” by its users? Are its readings ghosts of our own brains? While this avenue of thought is promising, it is not within the scope of this thesis, which has chosen to focus on the link between Theatrical Mentalism and New Thought. There is an identifiable Spiritualist tradition in neuroscience and further work on the links between Theatrical Mentalism, Spiritualism, and the development of neurotechnology may be undertaken by the author at a later date.

Cybernetics: Norbert Wiener characterised cybernetics as concerned with "control and communication in the animal and the machine" (Wiener, 2019), including in ecological, technological, biological, cognitive, and social systems. Cybernetics is concerned with the

principles of circular causal processes in general (Ashby, 1956) and has provided an influential approach to theorising the mechanisms of the human brain (Ashby, 2013).

Martin Alfred Larson devotes a section of his history of New Thought (Larson, 1985) to a discussion of Maxwell Maltz's *Psycho-Cybernetics* (Maltz, 1960), which combines the cognitive behavioural techniques for regulating self-concept of Prescott Lecky with the cybernetics of Norbert Wiener and John von Neumann. Larson notes that although Maltz makes little mention of the deity or metaphysical concepts, his ideas are remarkably similar to the teachings of many New Thought writers, and his book has become popular with New Thought adherents (Larson, 1985). For Larsen, both New Thought and Psycho-cybernetics aim to develop practical methods to elevate humanity through the training of thought. In addition, New Thought's vision of the god within can be found in cybernetics, as we can see in the following quote from Stafford Beer, a pioneer of cybernetic management principles,

> [Man's] sub-system is a microcosm of the total system. Any one cell in his body contains his whole genetic blueprint, coded in a molecule of DNA. As a whole person he contains a blueprint of the universe: the Kingdom of God is, in this sense too, within him. (Beer, 1966)

I plan further exploration of the conceptual links between Theatrical Mentalism, New Thought, Cybernetics, and neuroscience, but these are not within the scope of this thesis.

Activist Neuroaesthetics: Warren Neidich proposes Activist Neuroaesthetics as a methodology to unpack, expose, and resist the consequences of an emerging "neural capitalism", an evolution of the cognitive capitalism theorised by Boutang (Moulier Boutang, 2011) in which the material brain is at the centre of capitalist commodification (Neidich, 2022). While the goal of positivist neuroaesthetics is to explain artworks, such as paintings, through their effect upon the brain's neural processing, an activist neuroaesthetics is seen as "actively and purposely engaging with the techno-cultural milieu as it appears in its real,

imaginary, and virtual guise, to instigate changes in the brain's materiality" (Neidich, 2022). As part of my research for this thesis, I attended the Activist Neuroaesthetics Conference 2021, where I learned that the field is seen as a developing one and that it is still unclear what an Activist Neuroaesthetic artwork or art practice would be. Its focus to date has been more on gallery art and art objects than on Nonetheless, it may, in the future, provide a valuable approach to considering developments in Critical NeuroArt.

Quantified Self: The proliferation of digital devices for self-tracking has led to the growing popularity of self-tracking practices involving monitoring, measuring and recording elements of one's body and life as a form of self-improvement and self-reflection. The quantified self movement advocates for gaining "self-knowledge through numbers". As Lupton (Lupton, 2016) observes, regimes of self-tracking appear to be driven by a "notion of ethical incompleteness", a persistent sense that one is always lacking relative to ideals of citizenship. The use of Brainwear as a quantified self instrument shares New Thought's neuroascetic aims, and this thesis references Littlefield's crucial critical examination of the rise of wearable EEG monitors (Littlefield, 2018). However, I have chosen not to include a more in-depth consideration of the place of Brainwear in the quantified self movement within the scope of this study.

Neuroethics: While this thesis is informed by the neuroethics of Brainwear use, it doesn't seek to directly contribute to the field. However, I wish to briefly recognise the scale of the challenge here. Granting scientific and corporate entities access to brain data carries significant ethical implications. The UN Human Rights Council, through Resolution 51/3, has recognized the potential magnitude of this issue and has initiated a study on the "impact, opportunities, and challenges of neurotechnology in relation to the promotion and protection of all human rights" (Committee, 2023). This study is expected to be presented during the council's 57th session in September 2024. The ongoing debate among human rights experts

and advocacy groups revolves around whether the introduction of new human rights is necessary to effectively address the challenges posed by neurotechnology.

This thesis recognises that an ongoing consideration of how NeuroArt can learn from and contribute to neuroethics is vital. Recent work has assessed the relationship between neuroethics and cultural diversity, raising important questions regarding which groups have influence in neuroethical discourses. Leuenberger has observed that the quality of the personal information generated by self-tracking technology, including direct-to-consumer neurotechnology, "tends to be particularly insufficient for marginalized groups" (Leuenberger, 2024). Further, Farisco says, "Cultural diversity is among the most impactful factors shaping neuroethics, both as a scientific discipline and as a social enterprise" (Farisco, 2024) and sees art as an important part of the representation of culture in neuroethics. This thesis suggests that further attention should be paid to diversity by developing a wide variety of research methods, including art research methods, that could contribute to more inclusive neuroethics.

All the fields described above provide helpful approaches to extending the research of this thesis and will be explored in my future research.

Autobiology

There is a lively and engaged range of critical approaches that concern themselves with the meaning and impact of neuroscience, through Critical Neuroscience, sociology of science, neuroethics, neurorights, neurotranshumanism, neuroexistentialism, neurofeminism, and critiques of neurocentrism, neurophilosophy, and the quantified self. What I wanted more of in the consideration of mind-reading technologies was first-person descriptions from the inside. I wanted to know what these technologies felt like. I wanted to hear the stories of those who had used them. The memoirs and travelogues. The

phenomenological accounts.

My year-long autoethnography of the use of Brainwear involved an exploration of the device's material, embodied, and performative aspects. This autoethnographical approach borrows heavily from Autobiology, a creative workshop process developed by the theatre company Curious (Hill and Paris, 2014). Autobiology focuses on the generation of autobiographical material by exploring the connections between the body and the mind, between biology and biography. Participants were asked to bring along autobiological material such as X-rays, clinical scans, and medical documents. The workshops utilised "tools that would fit in a 'doctor's bag' – stethoscope, blood pressure kit and a portable ultrasound which allowed participants to 'see' into the interior world of their gut."(Hill and Paris, 2020) They used these materials in conjunction with activities such as automatic writing, making body maps, explorations of the viscerality of language, and daily sessions of a form of *insight yoga* that focuses on the internal organs (Powers, 2008). From this investigation of body memories and parts of the body invisible to the naked eye, they created writing, performance, and installation work. "The Autobiology workshops and courses aimed to offer exercises and techniques to enhance the artist's consciousness of the relationship between their psyche and soma, biography and biology using a combination of scientific research with the practical application of techniques in the studio." (Hill and Paris, 2020) Curious were interested in the nature of 'gut reactions' and undertook research with a team of neurogastroenterologists who were researching the Enteric Nervous System (ENS) and "the almost instantaneous communication between the 'big brain' (the brain in your skull) and the 'second brain' or ENS (the brain in your gut) via the vagus nerve and how this communication informs and modulates human behaviour."(Hill and Paris, 2020) Autobiology provided a clear precedent to my autoethnography and a helpful way of framing my use of Brainwear to investigate my 'big brain'. Autobiology brings the biological to the fore, helps

to make visible the inescapable presence of my embodied biography, and highlights my interest in the performative aspects of Brainwear. However, rather than using Autobiology to investigate the body in order to produce creative work, this PhD research extends the Autobiology method by using it more overtly as a Performance Philosophy method and by applying it to Critical Neuroscience to interrogate the instrumental intimacy of the technology itself and consider the materiality of thought that it presents.

Autobiology also provided a practical way to undertake research during the COVID-19 pandemic. My initial research plan involved using Theatrical Mentalism practice with groups of people to investigate notions of mind-reading. To share techniques of Theatrical Mentalism with them and use that shared experience to create a space for critical discussion of the varied meanings of mind-reading neurotechnologies. Sadly, as the techniques I intended to share depend primarily on physical touch, the COVID-19 pandemic made this approach impractical, if not downright irresponsible. Autobiology became an excellent choice of a methodology not just for its practicality during the pandemic. Its potential to get inside a relationship with a technology designed for personal use and explore various personal brain-based practices felt very apt during a pandemic lockdown in which we were often left alone with our thoughts to an unusual degree.

Neurophenomenology and Interactionist Theory

Among the concerns of Critical Neuroscience is the danger of Neuro-Objectification, a reductive overemphasis on neurobiology that neglects subjectivity and threatens to objectify humans. As Bublitz warns, “The target of neurointerventions is the brain as a physical object and its electric or magnetic properties, the mind is approached and accessed through its physiological correlates. Should this become the main mode of engagement with people, objectification looms large” (Bublitz, 2023). Bublitz suggests, “One

way of avoiding objectification and valuing subjectivity is placing a stronger emphasis on exploring and understanding the lived experience of persons, traditionally the field of phenomenology" (Bublitz, 2023). Bublitz notes that phenomenological methods are uncommon in contemporary neurotechnological research and recommends that states should promote phenomenological studies of the experience of neurotechnology use (Bublitz, 2023). This thesis concurs and explores the phenomenology of Brainwear use.

"Without denying that brain processes contribute causally to perception, such processes are simply not part of the perceiver's experience" (Gallagher and Zahavi, 2008). Although it is fundamentally true that the brain processes themselves cannot be experienced, Brainwear, when used for neurofeedback, may bring our perception a step closer to experiencing our own brain processes as they happen, or at the very least give us the sense that we are experiencing them. It is not within the scope of this thesis to consider the relationship between mind and brain processes in terms of the many metaphysical positions that traditional philosophy of mind has taken on the issue: dualism, materialism, identity theory, functionalism, eliminativism… and so on (see, for example, (Braddon-Mitchell and Jackson, 2007); (Chalmers, 2002); (Heil, 2019); (Kim, 2011)). Instead, it agrees with a phenomenological tradition that focuses on experience rather than metaphysical theory.

It has also been argued that progress in neuroscience has made phenomenological approaches to cognition more relevant to experimental science and that the generation of images of neural processing using non-invasive neurotechnology has made possible a variety of experiments that depend on reports about the experience of experimental subjects (Gallagher and Zahavi, 2008). However, this thesis does not aim to use neurotechnology to illuminate or develop theories of cognition. Instead, it is concerned with the experience of using personal neurotechnology itself, specifically with the phenomenology of Brainwear use.

This thesis can also be read as a contribution to the literature of personal reflection on medical procedures. Of particular influence was *The Intruder*, in which Nancy writes of the experience of undergoing a heart transplant (Nancy and Hanson, 2002), Modern's *Neuromatic* (Modern) in which he writes of the personal experience of undergoing an MRI scan, and Ihde's writings on his own experience with surgery (Ihde, 2019). In response to the question of how he started exploring medical imagery, Ihde says, "A lot of the medical imagery has to do with [my own] biography. I had open heart surgery, I had knee replacements, I had a hiatal hernia, etc. Every time you go for surgery, you get a whole spectrum of imaging."(Alioto, 2017). This thesis extends such writing from the medical to the arena of wellness technologies. Brainwear isn't regulated as a medical device or procedure, but it interestingly borders on the medical in its usage. It is part of the wellness turn that I discuss later.

Ihde's interest lies in the transformation of science and technology in two key aspects. Firstly, the reduction of the knowing subject to the seeing subject. Secondly, the development of machines for reducing reality to perceptual-visual schemata (Mendieta, 2003). My later comparison of methods of capturing visual images of thoughts, including Brainwear, with more embodied approaches to thought reading based on touch and movement owes much to Ihde's approach to the technological body (Ihde, 2001).

Following Ihde, this thesis contributes to postphenomenological studies. Postphenomenology is a philosophy of technology that understands technologies in light of how they mediate human-world relations by co-constituting the subjectivity and objectivity of experience (Rosenberger and Verbeek, 2015). Rather than 'applying' philosophical theories to technologies, the postphenomenological approach takes actual technologies as a starting point for philosophical analysis (Rosenberger et al., 2015). "Its philosophy of technology is in a sense a philosophy 'from' technology." (Verbeek). Postphenomenology

proves to be a notably pertinent framework for comprehending how Brainwear technologies mediate human experiences. It is particularly relevant as these technologies are explicitly designed to alter behaviour, emotions, and attitudes, thus influencing how individuals interact with their environment.

Ihde's *phenomenology of technics* outlines four different kinds of human-technology-world relations: embodiment, hermeneutic, alterity, and background relations (Ihde, 1990). These are not exclusive categories; certain technologies can harbour elements from all four relations. Rosenberger notes that self-tracking technology represents a fitting example of such multi-facetedness and applies the postphenomenological framework to their study (Rosenberger et al., 2015). Following Rosenberger, I address all four kinds of human-technology-world relations at various points in my consideration of Brainwear.

Ihde's phenomenology of technics is one example of an interationist approach to considering human-technology relations in which humans and technology are seen as reciprocally and mutually shaping one another. Technological Mediation Theory (TMT) analyses how technologies shape relations between human beings and the world, including how they influence moral actions and decisions (Ihde, 1990); (Verbeek, 2005). There is great concern in neuroethics regarding the potential of neurotechnology to influence moral actions and decisions. Extended mind thesis (EMT) examines how technological objects become extensions of the mind itself (Clark and Chalmers, 1998). This thesis sees Brainwear as a technological object designed with the explicit intention of extending the human mind. Material Engagement Theory (MET) studies how material things transform and rearrange the structure of cognitive functions (Knappett, 2005); (Malafouris, 2013), and this thesis considers attempts to treat thought itself as a material. Various other broadly interactionist approaches have been considered but not extensively utilised in this thesis, including Callon and Latour's Actor-Network Theory (Callon et al., 1986); (Latour, 1992), Feenberg's critical

theory of technology (Feenberg, 2002), Haraway's cyborg theory (Haraway, 1991), Sloterdijk's immunology thesis (Sloterdijk 1998), and Stiegler's philosophy of originary technicity (Stiegler, 1998).

Francisco Varela, the Chilean biologist, philosopher, and neuroscientist, has proposed the neurophenomenological research program (NRP) (Varela, 1996), which attempts to develop "a model that can account for both the phenomenology and neurobiology of consciousness in an integrated and coherent way." (Thompson et al., 2005). It has been recognised that neurophenomenology invites researchers to a challenging methodological endeavour (Berkovich-Ohana et al., 2020), and this thesis contributes to the endeavour by exploring the use of art research methods and practices. My adaptation of Autobiology is a contribution to postphenomenological methods. It should be noted that the postphenomenological approach has recently been used in speculative design scenarios to explore value dilemmas in Brainwear (Risnes et al., 2024). This future-oriented research is a valuable approach that complements historically informed and art-related approaches like mine.

The Ways of the Brain

Littlefield has said that "Technologies such as EEG wearables are products and producers of instrumental intimacy, a means by which we learn about, access, and manipulate ourselves (in this case our brains) by interfacing with machines." (Littlefield, 2018). This is a practice that reflects the subjectivisation turn discussed earlier.

I want to extend the use of the word *instrument* here to point out that Brainwear is much like a musical instrument in that it has to be learned, practised, and, over time, a sense of mastery over the instrument can be developed. It is an intimate instrument that can be both played and performed. The autoethnographical element of this thesis is inspired by Sudnow's

Ways of the Hand (Sudnow and Dreyfus, 2001), an autoethnography of the experience of learning to play jazz piano. An element of this thesis, in which I attempt to use a Brainwear instrument to play the material of my thought, could be called *The Ways of the Brain.*

With this musical metaphor in mind, it should also be mentioned that my approach is influenced by the rough DIY aesthetic of punk and post-punk that is part of my working-class culture and which favours the passionate and the raw, mistrusts the cold artificiality of the mannered, the polished, and the smooth, and values the authenticity that playful changes and productive clashes of style bring to communication. There is always a soundtrack to my thoughts, and the music of Deerhoof, Pere Ubu, The Pogues, Wire, The Fall, and Captain Beefheart have provided a suitable backing track to my intimate instrumental investigations.

Performance and Performativity

> The innovative and critical potential of practice-based research lies in its capacity to generate personally situated knowledge and new ways of modelling and externalising such knowledge while at the same time, revealing philosophical, social and cultural contexts for the critical intervention and application of knowledge outcomes. (Barrett and Bolt, 2007)

With reference to Laura Cull and Alice Lagaay's collection of essays *Encounters in Performance Philosophy* (Cull and Lagaay), I situate this thesis at the intersection of Critical NeuroArt and Performance Philosophy. I argue that Theatrical Mentalism is a part of the long tradition of Performance Philosophy and that its rhetorics, dialogues, gestures, and use of aporia have relevance for notions of mind-reading, telepathy, communication, and philosophy of mind. Performance Philosophy provides an apt framework for a discussion of mind-reading, embodiment, and touch as its use of speech, action, and participation demands that the body takes part in the debate.

Goffman theorised that people are always involved in role-playing, in constructing and staging their multiple identities (Goffman, 1956). The field of performance studies uses performance as a lens to study the world, drawing from theories and methods of the performing arts to examine performance in the broader cultural sense described by Goffman. Further, Pickering has proposed a shift from a "representational idiom" to a "performative idiom" in the study of science and technology (Pickering, 2010). Performativity has also been seen, in the context of throries of extended cognition, as a constituent component of cognitive processes. “The material action allowing us to interact with reality is both the means by which the subject knows the surrounding world and the one through which he experiments with the possibilities of his body” (Pennisi and Falzone, 2020). Brainwear engages with the body and its cognitive processes, and this thesis explores the performativity of Brainwear through the lens of Theatrical Mentalism.

As a performer critically engaged with technology, my instinct is to physically engage with devices, to explore them as costumes, props, and characters. To explore their performativity and crack open their stories. We often say that an object “speaks to us.” Brainwear proves to be an unusual case of this communication with objects, as part of the voice that speaks to us appears to come from our own brain. Throughout the research, my Brainwear has been a medical device, a psychologist, a therapist, a quack, a charlatan, an instrument, a mask, a crown, a puppet, a ventriloquist’s dummy, a confederate, an audience, a line manager, a cop, a hippie, a ghost, a chorus, a pet, a heckler, an alien (in a very H R Geiger sense), a wand, a parasite, a symbiote, a foil, a straight man, a comedian, a muse, and a particularly annoying, but sometimes comforting, companion and confidante.

What follows is a thesis built around a conversation with a neurotechnological object. We converse about the temptations and dangers of our relationship, our shared history and ancestry, our siblings, our potential offspring, our imagined future together, and the

materiality of thought. We have our ups and downs, thick and thin. We may go off on tangents and fall into rabbit holes - relationship status: it’s complicated - but we will stay together until the end of the show.

HISTORICAL BACKGROUND

In preparation for the Autobiology section of this thesis, the reader must familiarise themselves with the history of Theatrical Mentalism in general and its relationship to the beliefs of the New Thought movement in particular. The influence of New Thought has specific relevance to Brainwear as it was primarily a "mind cure" movement that promoted personal, practical methods of brain improvement. As a history of Theatrical Mentalism has yet to be written, I have provided a history highlighting New Thought's importance. This history section risks repetition to build a strong and layered evidence base for the links between Theatrical Mentalism and New Thought. This repetition is necessary because the two central claims I am making about the history are new contributions to research: firstly, the claim that Theatrical Mentalism is primarily a cultural expression of New Thought philosophy is a challenge to the common belief that Theatrical Mentalism came from Spiritualism, and secondly, the claim that Brainwear is a product of the same New Thought passion for mental improvement is novel in a field that seldom considers the religious influences on the development of neuroscience.

This historical section consists of three chapters. The first gives an overview of the New Thought movement and what I term New Thought Mentalism. The second shows a history of Theatrical Mentalism through sketches of several vital performers highlighting their involvement with New Thought and their relationship to the themes explored in the later Autobiology sections of this thesis. The final chapter outlines the key themes of the history of Theatrical Mentalism and New Thought that are relevant to the development of Neurotechnological Mentalism and serve to introduce the following chapters of the Brainwear Autobiology.

New Thought Mentalism

The Great Awakenings were significant periods of religious fervour and activism in American history. The First Great Awakening, approximately 1730 to 1755, marked a time of religious revival and spiritual awakening in the American colonies (Bonomi, 2003). The Second Great Awakening, occurring around 1790 to 1840, was characterised by a renewed emphasis on individual salvation and a surge in evangelistic efforts (Howe, 2007).

The Third Great Awakening extended from the late 1850s to the early 20th century (McLoughlin, 1978) and was defined by widespread religious enthusiasm and activism. It was marked by a strong emphasis on applying Christian principles to address societal challenges. Various new religious groups and movements emerged during this era, including the Holiness movement, Nazarene and Pentecostal movements, Jehovah's Witnesses, Thelema, Christian Science, Spiritualism, Theosophy, and New Thought. The last three of these had a formative influence on Theatrical Mentalism. This thesis focuses primarily on the interplay between New Thought and Theatrical Mentalism as they relate to notions of the discovery and development of extraordinary mental abilities.

The period of the Third Great Awakening also saw a revolution in the study of the mind and the brain. Santiago Ramón y Cajal demonstrated the existence and structure of neurons, Sigmund Freud founded psychoanalysis, and William James founded both the first psychology course in the United States and the American Society for Psychical Research, the first research organisation in the United States dedicated to parapsychology. These three significant figures are essential to the story of New Thought mentalism as they promoted ideas about the power of the human brain and the legitimacy of studying unusual phenomena such as hypnosis, telepathy, and mind cure.

In his *Amusing the Million* (Kasson, 1978), a history of Coney Island's early-twentieth-century amusement parks, the historian John Kasson argues that the parks' rides

domesticated frightening new technologies for a generation of Americans who confronted unprecedented industrial and urban change. Peña develops Kasson's theory to consider hundreds of technological products marketed to consumers between 1870 and 1935 with the promise of improved energy and health and argues that they "allowed consuming bodies to bridge the gap between dangerous and restorative energies" (Peña, 2003). Theatrical Mentalism, an amusement of a different kind, may have served a similar function concerning the often sublime new widespread knowledge from neuroscience, psychology, psychotherapy, and attendant pseudo-science. As Peña says, "Our bodies often set the context for understanding new technologies" (Peña, 2003), and this is true for both Theatrical Mentalism and Brainwear.

Modern neurocultures originated in several ideas about the brain that developed in the nineteenth century. Mesmerism provided the idea that outside forces can influence the brain, and these forces became conceptualised in the science of magnetism, electricity, vital fluid, and x-rays, as well as concerns about social forces such as the persuasive power of advertising and propaganda. In addition to this conception of a porous brain, phrenology introduced the notion that the brain comprises organs responsible for different functions and psychological capacities. A porous differentiated brain can be cured, improved, and trained in various ways. If you want to cure your sadness, train your brain's happiness organ, and you will become happy. If you want an extraordinary brain, you must train it correctly. As Dale Carnegie, author of the best-selling New Thought *prosperity ideology* book *How to Win Friends and Influence People* (Carnegie, 1981) said, "Every body in the world is seeking happiness - and there is one sure way to find it. That is by controlling your thoughts" (Carnegie, 1981).

At the centre of these notions of brain training and mind cure was New Thought, a highly influential spiritual movement which coalesced in the United States in the late

nineteenth century. The legacy of New Thought can be found in the prosperity gospel, positive psychology, New Age cultures (Haller, 2012), and the beliefs of Donald Trump (Evans, 2017).

There was much interaction between performers and the proponents of New Thought. The Chautauqua, an education movement in the United States in the late nineteenth and early twentieth century, provided a travelling show in which actors, mentalists, magicians, New Thought orators, scientists, charlatans, preachers, and other specialists of the day would share a stage (Genii, Tapia, 1997, Case, 2013, Wright, 1906, Buescher, 2021). According to former US President Theodore Roosevelt, Chautauqua was "the most American thing in America"(Canning, 2005) and has been called “The Great American Soapbox” (Hanscom, 1975). The TED talk and tech conference circuits can be seen as the modern Chautauqua providing a platform for what Regalado, in reference to Elon Musk’s Neuralink demonstrations, has called “Neuroscience Theatre” (Regalado 2020).

Early Theatrical Mentalism developed as performers sought ways to exploit, dramatise, disseminate, parody, and explore New Thought ideas to the extent that it can be seen as a Performance Philosophy of New Thought. As such, Theatrical Mentalism is an ideal performance art through which to view modern neurocentrism.

Theatrical Mentalism continues today through the work of theatrical performers such as Derren Brown, who invite audiences to think of extraordinary mental abilities as inherent and trainable. There is also a new form of mentalism that proposes that extraordinary mental abilities will come from the use of new neurotechnologies.

The history I provide here focuses primarily on the early development of Theatrical Mentalism and, for reasons of brevity, considers only a few later examples. The intention is to demonstrate the critical themes that Theatrical Mentalism has engaged with and to suggest that there is a thread of New Thought running through the art, which is still evident today

both in its performances and in the publishing activities of Theatrical Mentalists.

I do not wish to suggest that New Thought has been the only influence on Theatrical Mentalism. However, it has had a more formative and longer-lasting impact than Spiritualism and Theosophy, the other main influences on the art. I want to demonstrate that New Thought and Theatrical Mentalism have followed similar paths of subjectivisation and psychologisation.

The New Thought movement emerged in the late 19th century in the United States and was characterised by a strong spiritual and religious focus. Drawing on ideas from various religious traditions, such as Christianity, Buddhism, Hinduism, American Transcendentalism, and Swedenborgianism, the movement was strongly melioristic in its emphasis on the power of positive thinking and the ability of individuals to use their thoughts to influence the world around them and achieve personal success and happiness. The movement has a Hegelian teleology in its view of consciousness,

> Hegel's Phenomenology of Mind traces different forms of consciousness, viewing each one from inside, as it were, and showing how more limited forms of consciousness necessarily developed into more adequate ones. Hegel himself describes his project as ‘the exposition of knowledge as a phenomenon’ because he sees the development of consciousness as a development toward forms of consciousness that more fully grasp reality, culminating in ‘absolute knowledge.’ (Singer, 2001)

This project to develop one’s consciousness toward absolute knowledge was, and remains, central to New Thought philosophy and can be seen as part of the “massive subjective turn of modern culture“ (Taylor, 1992). That is, a turn away from life lived in terms of external or objective roles, duties, and obligations and towards individual subjectivity, personal experiences, and self-expression within contemporary societal norms and practices. It reflects

a cultural trend where the subjective aspects of an individual's life, such as emotions, desires, identities, and personal narratives, are given greater significance and recognition. Heelas argues that the subjective turn favours and reinforces those forms of spirituality that resource unique subjectivities and treat them as a primary source of significance and undermines those forms of religion that do not (Heelas, 2005). The development of New Thought, which focuses on subjective spiritual experience, can be seen as part of this broader subjectivisation. New Thought moved towards a more individualistic and self-help-oriented approach, focusing on personal growth and empowerment. Various cultural and historical factors shaped this process, such as the increasing emphasis on personal autonomy and individualism in American culture. As people became more focused on their personal goals and desires, they began to turn away from traditional religious institutions and seek out alternative forms of spirituality that offered more personal freedom and control. The New Thought movement provided a space for individuals to develop their own unique spiritual practices and beliefs, often more focused on personal growth and self-improvement than adherence to traditional religious doctrines. Additionally, as scientific and technological advancements became more prominent in American society, many New Thought adherents began to view the world in what they saw as scientific terms, embracing concepts such as energy, vibration, and the power of the mind to shape reality. This scientific worldview was often seen as more rational and accessible than traditional religious beliefs, and it allowed New Thought adherents to distance themselves from the dogma and authority of traditional religious institutions. Even technologies that do not directly figure the brain have been seen by New Thought writers as having the potential to develop our minds. An example of this is *Aviation and the New Consciousness* (Allen and Allen, 1914) by the British New Thought writer and pioneer of the self-help movement James Allen. Allen associates aviation with the “growing wings” of a new consciousness and states that,

> Aviation is the first outward symbol, as it were, of this new mind which is now taking shape. It is also more than a symbol, for it will form the first important material instrument by the aid of which the new consciousness will begin to materialize its glorious ideas and magnificent schemes for the happiness of the race, for the so-called happiness of to-day is misery compared with that blessed state which will obtain on the earth when the Divine condition has become well established. (Allen and Allen, 1914)

In addition to influences from technology, the New Thought movement incorporated many concepts from psychology into its teachings, particularly those of William James and Carl Jung, who were interested in the power of the mind and its relationship to spirituality. The New Thought movement embraced many of these psychological concepts, including the idea of the unconscious mind, the importance of visualisation and affirmations, and the role of emotions in shaping our thoughts and behaviours. New Thought emphasised the power of positive thinking and the idea that we can use our thoughts to manifest our desires and achieve our goals.

Mesmerism, Mind-Cure, and the Beginnings of Theatrical Mentalism

The term *mentalist* used in relation to Theatrical Mentalism and New Thought derives from 19th-century and early 20th-century discourses on personal development, and the title was often woven into discussions on animal magnetism and theories of ‘mentalism’. For example, in 1902, Segno’s *The Law of Mentalism: a practical, scientific explanation of thought or mind force: the law which governs all mental and physical action and phenomena: the cause of life and death* (Segno, 1902) claimed mentalism as a ‘law’ of nature that provided a foundation for the following ‘sciences’; ‘Mesmerism, Hypnotism, Personal Magnetism, Magnetic Healing, Mental Science, Christian Science, Spiritualism,

Clairvoyance, Clairaudience, Telepathy, Mediumship, etc.' (Segno, 1902). A few years following this publication, performers had appropriated the term, and 'mentalism' was being used as a wide-ranging label for mediumistic or mind-reading effects, and the term 'mentalist' was being used as a title for the performer of such acts. A search of documents held at The Conjuring Arts Research Centre reveals that the term 'mentalist' in relation to performance first appeared in issue 1, volume 5 (1906, p. 5) of the magician's periodical The Sphinx, and the term 'mentalism' appeared in the same periodical in issue 1, volume 18 (1919, p. 24), in an advertisement for "Zenola: the girl who knows". An earlier mention of mentalism, this time in another periodical Magical World, issue 16, volume 1 (1910, p. 244), refers to Ita, another female mentalist.

Theatrical Mentalism shows up in histories of Theatrical Magic, from which it is rarely usefully distinguished. Corinda and Rauscher's *Encyclopedia of Mentalism & Mentalists* (Corinda, 2011) is valid for biographical sketches of performers and the methods they used but, as with most publications by and for performers, has little to say about the cultural reasons for the nature and popularity of the performances.

For this thesis, I will use the term New Thought Mentalism to refer to the belief that the mind, or brain, is capable of extraordinary abilities. I will use the term Theatrical Mentalism to indicate performers whose performances dramatise this belief.

We begin with a section on Mesmerism and its use by Phineas Parkhurst Quimby (1802-1866), who we consider a crucial influence on the emergence of New Thought and Theatrical Mentalism. Quimby's philosophy of mind cure and mental advancement is related to Brainwear, which seeks to treat thoughts as things that can be captured, measured, and trained for the benefit of the user. We will return to both Mesmerism and Quimby's philosophy in the Autobiology section.

This is followed by a discussion of the early influence of Spiritualism on Theatrical

Mentalism and the reasons for the decline in its impact as Theatrical Mentalism progressed. We briefly return to the influence of Spiritualism in the Autobiology section when we consider the relationship of Brainwear to Oracle Acts. However, the aim here is to show that New Thought had a greater impact on Theatrical Mentalism than Spiritualism; this is a new claim that is contrary to the understanding of the history of Theatrical Mentalism that is common among performers today.

We then consider the performances of muscle-reading, a particular form of Theatrical Mentalism, and relate these to New Thought practices. We will return to muscle-reading in the Autobiology when we contrast it with technological attempts to visualise thought, from early Thoughtography to the images produced by Brainwear.

Finally, we consider performances of the Theatrical Mentalism that promoted a technology-driven form of utopian New Thought Mentalism, which can be read as a forerunner of the Neurotechnological Mentalism of Brainwear.

Anton Mesmer

Anton Mesmer (1734-1815) was a German physician who developed the theory of animal magnetism, a precursor to hypnosis. He believed that a magnetic force or fluid flowed through the body and that illness occurred when this flow was disrupted. Mesmer used a technique called “Mesmerism,” which involved passing hand gestures over the patient's body to restore the balance of this magnetic force and promote healing.

Mesmer's methods became very popular in the late 18th century, particularly in France, where he had many wealthy and influential clients. However, his theories were controversial, and some accused him of fraud and quackery. In 1784, a royal commission was appointed to investigate his methods, and the commission concluded that Mesmer's claims were unfounded and that his cures were based on the power of suggestion rather than any

magnetic force.

Despite the controversy surrounding his work, Mesmer's ideas had a lasting impact on the development of hypnosis and other alternative healing practices. The term "Mesmerism" is still sometimes used to refer to the induction of a hypnotic trance.

Mesmer's ready acceptance of what would now be termed paranormal phenomena has been noted (Forrest, 1999). Indeed, the *Mémoire de F.A. Mesmer, docteur en médecine, sur ses découvertes* (Mesmer, 1799), focusses on Mesmer's answers to four key questions,

1. How can a sleeping man diagnose his illnesses and those of others?

2. How can he, independent of all instruction, indicate the best methods to produce a cure?

3. How can he see objects at the greatest distances, and how can he predict future events?

4. How can he receive impressions from a will other than his own?

These questions reveal the claims of the mind-cure movement, the framing of early Theatrical Mentalism, and the seeds of a Neurotechnological Mentalism that seeks to enhance human mental abilities in terms of health and communication. However, in these questions and Mesmer's "scientific" answers, there is no hint of the link between Mesmerism and Spiritualism that was to come.

Mesmer's pupil Puységur also promoted the link between Mesmerism and health, attributing somnambulists with a "sixth sense" that enabled them to diagnose, prescribe, and predict the course of illness in themselves and others (Crabtree, 1993). But as well as being a health movement, Mesmerism also became a form of popular theatrical entertainment.

Theatrical Mesmerism enjoyed substantial popularity in the mid-nineteenth century and was widespread in the UK and the US. "By the 1840s, most Victorians would have had some idea of what went on in a mesmeric séance." (Winter, 1998). A simplistic reading of

performances of Theatrical Mesmerism would see them merely as light entertainment where audience volunteers do foolish things for comedic value, such as acting like a chicken or eating an onion while believing it to be an apple. However, that would be a one-dimensional reading even of today's hypnosis performances and most certainly a significant underestimation of the meaning that nineteenth-century performances of Mesmerism held for audiences. "Many saw in them the fulfilment of the mind's greatest potential. The mesmerist demonstrated the essence of influence; the subjects displayed amazing new feats of perception and cognition." (Winter, 1998) and "Alternatively, displays of new cognitive abilities became showcases of the kind of progress that could (one fancied) be achieved in the most utopian of educational schemes" (Winter, 1998). These utopian performances of Mesmerism were part and parcel of the hope for improving the human condition that informed New Thought Mentalism and other neuroaesthetic movements, and, as we shall see, the hope for a utopian future based on advanced mental powers continues in the later performances of Theatrical Mentalists and in the promises of Brainwear.

For many Victorians, Theatrical Mesmerism was a popular art form that dramatised pressing questions of science, control, authority, and the human mind's potential. "Writ large, Victorians were not merely testing the reality of a particular phenomenon or the voracity of a particular person; they were carrying out experiments on their own society." (Winter, 1998) "Far from being assigned a position on the sidelines of intellectual life, then, Mesmerism became a means – or "medium" – for Victorians to explore and even to forge definitions of authority wherever they were open to question" (Winter, 1998). Theatrical Mesmerism was entangled with the church's changing role and new notions of physical, mental, and spiritual health. "Healing claims riveted popular attention in antebellum America in many religious guises other than Mesmerism, but Mesmerism was a special case because of its association with clairvoyance" (Moore, 1994). Of course, Theatrical Mesmerism was also an

entertainment that excitingly dramatised these public debates. “Miraculous' powers are rendered explicable and even ordinary by a fast-paced lecture but are worth paying money to see. People can gasp, gape, and share their astonished reactions with one another. It was for many people better, much better, than church but not something entirely removed from issues that they associated with church life." (Moore, 1994). Mesmerism appeared as a "relatively safe way to explore the realm of evil" (Moore, 1994) and this made it a powerful and alluring form of entertainment.

Schlun (2007) identifies three branches of Mesmerism and its evolution: the scientific medical one of physiology and suggestion, the 'pseudo-scientific' esoteric of spiritualism, and “the technological progress of the transmittance of information, the development of telecommunication, media and information technology, which form an integral part of mesmerism's cultural development”(Schlun, 2007). The path from Mesmerism to New Thought was through a continued concern with mental healing linked to neither Spiritualism nor the emerging scientific establishment. New Thought was, however, deeply concerned with the transmittance of information between minds, considering its mind-cure techniques thoroughly scientific and borrowing liberally from the terminology of emerging telecommunication, media, and information technologies. As one New Thought author says, “New Thought is largely a restatement of old thought, vitalized with new life and meaning from the discoveries of modern psychology and the latest deductions of science” (Allen, 1914). New Thought also remained passionately interested in the potential of Mesmerism as a tool for mental healing and self-improvement (Podmore, 1909). Mesmerism, and later hypnosis, was optimistically seen as a way into the previously inaccessible processes of the human mind and as “a means of exploring, studying, and hopefully mastering this terrain” (Crary, 1999).

Ralph Waldo Emerson, whose individualism and transcendentalism had a formative

influence on New Thought, regarded the Mesmeric physician as,

> …a doctor of psychosomatic disorders, something akin to what we might recognize as a psychiatrist or neurologist who treats somatic problems expressing themselves in mental illness. Like those heroes of whom Emerson writes, “I can say to you what I cannot first say to myself” and through you “we read our own minds,” the magnetizer looms as a representative man who helps restore individuals to mental health, drawing forth and returning to them their own ideas clarified and in their proper relation. (Gutierrez, 2005).

As these concerns regarding the mind and the brain captured the popular imagination, the potential development of extraordinary thought-transmitting/-receiving abilities to help us understand and develop ourselves became a central framing for Theatrical Mentalism. These concerns can also be seen in our response to EEG technologies such as Brainwear. “Even today, popular discourse regarding neural oscillations, at times, recalls mesmeric theory. Brain waves often implicitly obtain the status of an electrical soul; and biofeedback techniques aimed at altering oscillatory patterns ring of efforts to restore magnetic stasis” (Shure, 2018). Mesmerism, then, is a fitting starting point for the development of New Thought Mentalism, Theatrical Mentalism, and Neurotechnological Mentalism.

Phineas Quimby

Phineas Quimby was an American philosopher, mesmerist, and healer, whose ideas became the foundation of the New Thought movement. He is best known for developing a spiritual healing system, “the Quimby method," which aimed to help people overcome physical and emotional illness by changing their beliefs and thoughts.

In 1838, Quimby attended a lecture with demonstrations in Belfast, Maine, given by

the French mesmerist Charles Poyen, who advertised himself as a Professor of Animal Magnetism. Poyen, who also supported abolitionism and wrote a pamphlet on how to promote Christianity, claimed many benefits for Mesmerism. “It was the most important of the sciences and the foundation of human perfectibility. Mesmerised subjects, insensible to normal stimulants, were able to receive unspoken thoughts, locate lost objects, and describe events happening in far away places”(Moore, 1994). The dramatisation of such feats became a central part of performances of Theatrical Mentalism. The event so impressed Quimby that he followed Poyen “from town to town” to learn his methods (Fuller, 1982). As a result, Quimby soon became a successful performing mesmerist.

Quimby believed that false beliefs caused disease and that the power of the mind could be used to heal the body. If a person is “deceived into a belief that he has, or is liable to have a disease, the belief is catching and the effects follow on from it”(Quimby and Dresser, 1921). Quimby was formulating an early theory of what we would now call psychosomatic illness (Fuller, 2001). He developed a form of mental healing that involved analysing patients’ beliefs and using positive affirmations and visualisation techniques to help them change their thought patterns and release negative emotions. Quimby emphasised the power of positive thinking and the use of the mind to manifest desired outcomes.

New Thought grew up alongside neurasthenia, and Ehrenreich suggests that New Thought helped neurasthenics by replacing the "puritanical 'demand for perpetual effort and self-examination to the point of self-loathing'" (Murray, 2010) with a more hopeful faith (Ehrenreich, 2010).

Quimby's work also had an impact on the development of Christian Science, which was founded by his former patient Mary Baker Eddy, and on the New Age, self-help, and personal development movements that emerged in the 20th century (Fuller, 2001).

It has been suggested that the spread of hypnotism as entertainment was extremely

detrimental to its acceptance as a serious therapy by both the medical establishment and the public (Hughes and Rothovius, 1996, Rosenfeld, 2008). When Mary Baker Eddy wished to attack Quimby, she wrote, “Quimby had been little more than a stage performer” and that he “had only a slapdash, Mesmeric method of healing the sick.” (Horowitz, 2014)“ Conversely, Crary states that, “In fact, many of the important researchers associated with hypnosis in the nineteenth century, including Braid, Charcot, Freud, and the American psychologist G. Stanley Hall, were first exposed to hypnotic practices through such "theatrical" displays and, notably, were convinced by them that there was something important and authentic to study further.” (Crary, 1999). Of course, both positions recognise the cultural impact that theatrical performances can have.

Quimby and his fellow mesmerists should be considered the precursors of Theatrical Mentalism. I single out Quimby because I wish to argue that his mind-cure philosophy and the New Thought movement it inspired have greatly shaped Theatrical Mentalism throughout its development. In a later chapter, I will relate Quimby’s methods to both my experience with theatrical hypnosis and the use of Brainwear.

From Reading Spirits to Reading Thoughts

As well as drawing on New Thought for its themes and methods, Theatrical Mentalism evolved in response to public belief in Spiritualism.

> Spiritualism was a volatile, charismatic movement that spread across denominational lines. But individuals interest in spiritualism often waxed and waned. Many who devoted their attention to spiritualism when it emerged in the late 1840s and early 1850s had cooled in their enthusiasm by the mid 1870s. And by the 1880s, many followers had drifted into other newer movements that had historical ties to spiritualism, especially those known as Mind Cure, Christian science, New Thought,

> and Theosophy. Some followed still different paths toward Free Thought or socialism and even psychoanalytic theory.
>
> Others moderated their original enthusiastic investigation of spirits through séances into a vague interest in creative inspiration and the hidden powers of the mind, an interest that was felt in the culture at large. (Buescher, 2004)

This drift from a focus on spirits to a focus on the mind can be seen in the development of Theatrical Mentalism from Spiritualistic performances to a later focus on psychological and pseudopsychological themes. Despite this drift away from Spiritualism, several fundamental theatrical methods were adopted from the techniques of mediums and are still used by performers today (Cassidy, 1995). One of these was the technique of pellet or billet reading.

Mediums and Spiritualist ministers in Spiritualist churches frequently perform billet reading. Billets, from the French meaning “note,” are pieces of paper handed out to the audience, who are asked to write a name, originally the name of the deceased, or a question they would like answered. The billets are then folded, collected, and handed to the performer, who will divine the unseen name, contact the spirit of the person named, and answer the question written. Originally, the billet would be openly read by the medium, but later, Theatrical Mentalists would generally do this without opening the folded billet, and very few would make contact with the named deceased as this came to be seen as being too morbid as the audience tastes changed.

Charles Henry Foster (1838–1888) was an American spiritualist medium. His two most famous effects were "skin writing", where the names of spirits would appear on parts of his body, and his pellet test, where séance sitters would write the names of the deceased on slips of paper that were rolled into pellets and put on a table along with several blank pellets. Forster would identify the names on the pellets without, apparently, opening them. Several writers exposed his methods (Hercat and Harry Houdini Collection (Library of Congress),

1903, Truesdell, 1883, Misiroglu, 2009, Robinson, 1898) (Carrington, 1907). His public dispute with mentalist Washington Irving Bishop (1855–1889), who claimed he could duplicate his phenomena, tells us that his methods were well known by mentalists (Lamont, 2013). They became the basis of the billet routines that persist in Theatrical Mentalism today.

Foster was known as a test medium, meaning he would undertake challenges and answer questions from anyone. Other test mediums who undertook pellet tests include John Benjamin Conklin (1820-1870), Ada Hoyt Foye (1832–1909) and Charles J. Colchester (1836-?), who gave private sittings for the Lincolns at The White House (Alford, 2022, Buescher, 2019).

Foster's performances appear to have been entirely focused on mediumship, and the public's response to them demonstrates that beliefs in spirit communication and mental powers did not necessarily sit well together at the time. Foster's biographer vigorously defends Spiritualism while vehemently denying the possibility of mind-reading and dismissing the performances of the thought-readers J. Randall Brown (1851–1926) and Washington Irving Bishop, who I will discuss later (Bartlett and Harry Houdini Collection (Library of Congress), 1891).

It is thought that Foster taught his techniques to Bert Reese (1851–1926)(Mann, 1978), an American-Polish medium and mentalist, who became well known for billet reading performances that were less clearly presented as mediumistic demonstrations (Anderson, 2006). Rather than the names of the deceased, Reese had his audiences write personal questions on the billets and hide them. Reese would determine the question, give an answer, and then locate the hidden billet (Mann, 1978). Reese did not care whether his subjects called it telepathy or spiritism, being content to let people credit him with whatever solution of power they deemed most fitting (Annemann, 1983). Thomas Edison was convinced that Reese, whom he met through his friend Henry Ford, was genuine, and this led New York

Times journalist Edward Marshall to write two articles in 1910 explaining how Reese might have done his tricks (Kelly, 2007). In the career of Reese, we can see the secularisation and psychologisation of previously spiritual and religious performances that mark the beginning of Theatrical Mentalism.

These brief examples show us that the line between presenting oneself as a genuine medium or psychic and performing as a Theatrical Mentalist was somewhat porous and that techniques passed between the theatrical and Spiritualist worlds. Both worlds fulfilled the audience's demand for Oracle Acts in different but entangled ways.

This path from the religious to the secular and the spiritual to the psychological can also be seen in the career of Samuel Spencer Baldwin (1848 – 1924) or Samri Baldwin, an American performer who became internationally famous as "The White Mahatma" and has been considered one of the most successful entertainers of the late-nineteenth century (MacNab, 2012). Baldwin performed a two-person act with several different women throughout his career. In the beginning, their performances were framed as genuine séances but, as fashions changed, they first became séance exposés, then later, performances of Theatrical Mentalism emphasising "Thought Reading and Nerve Telegraphy," "Mental Pictures and Brain Waves" (the latter term relatively novel in 1882), and "Hypnotic Insensibility and Trance Experiments." (Demarest, 2020). Their act eventually replaced its spiritualistic elements with "Thought reading, psychography, soul intuition, mental telegraphy, unconscious cerebration, all of W. Irving Bishop's newest mind-reading, Finding a small pin while blindfolded, reading the number on any banknote unknown to the performer, tests of Stuart Cumberland..." (Demarest, 2020). Baldwin attributed his and his wife's abilities to what he called "psychic, or mind force," explaining to an interviewer in 1878 that "he would place thought in the domain of science, as a vibration, similar to light and electricity." (Buescher, 2021).

As a solo performer, Baldwin lectured on "Mental Telegraphy and Thought Force." (Demarest, 2020) and wrote books exposing the secrets of séance performers (Baldwin and Harry Houdini Collection (Library of Congress), 1895, Baldwin et al., 1879). While Foster and Reese primarily performed in private homes (Booth, 1986), Baldwin has been credited with being the first to take the "question and answer", or Q&A act, that we see in the work of Reese, to the stage (Polidoro, 2001), where it also became known as the Oracle Act. We see in this trajectory the decline of Theatrical Spiritualism and the increasing influence of New Thought terminology and themes.

I have spent time describing the acts of these performers to highlight their interest in the potential of emerging neuroscience and neurotechnology to enhance human mental powers. They shared this interest with New Thought, and we see this interest in the use of Brainwear today. We will return to the Oracle Act in the Autobiology sections when we consider the use of Brainwear as a tool for apparent self-discovery.

Muscle-Readers and the Materiality of Thought

In a later Autobiography chapter, I contrast the use of Brainwear, and other thought visualisation technologies with the drawings produced through the practice of muscle reading. What follows here is an introduction to the performance of muscle reading by Theatrical Mentalists that highlights its relationship to the New Thought philosophy of the materiality of thought.

The term "muscle reading" was coined in the 1870s by American neurologist George M. Beard to describe the actions of mentalist J. Randall Brown, an early proponent of the art (Beard and Charcot, 1882, Jay, 1986). Muscle reading involves holding a person's hand or arm and sensing the ideomotor response, subtle muscle movements made without conscious awareness when the person thinks of a physical action (Stock and Stock, 2004, Downey,

1908).

Reading through the scrapbook of newspaper reports of the public appearances of John Randall Brown in the McManus-Young Collection (Library of Congress), one gets a sense of the combination of demonstration and performance. There is a clear theatrical structure, many reporters comment on the remarkable nature of Brown's final demonstration, and an intention to inspire the audience to ponder the human brain's capabilities. Many of the reporters use Brown's appearances to consider the mind in terms of the experience of coincidence, personal magnetism, psychology, the odic force, Mesmerism, and the theories of Dr. Beard and Professor Russel, which explain Brown's abilities as neurophysiological thought reading (Macaire and Harry Houdini Collection (Library of Congress), 1889). This is a folk philosophy of mind in action. One unnamed reporter chooses to subtitle a section of his article, "The Materiality of Thought" (1874). This fascinating usage predates the widespread use of the New Thought phrase, "Thoughts are Things", popularised by Prentice Mulford (Mulford and Woodrow Wilson Collection (Library of Congress), 1919).

During relates the performances of the muscle readers to Walter Benjamin's statement, when writing of photographic history, that "the difference between technology and magic" was most clearly discernible as a "thoroughly historical variable in the universe of 'smallest things' (which he called the 'optical unconscious')."(Benjamin et al., 2016). During suggests that, in the case of muscle reading, "a different kind of "smallest thing"—slight muscular movements from an audience volunteer—fused entertainment magic with the 'technology' of a physiologically oriented psychology, and in doing so contributed to the elaboration of that psychology, not least in relation to that late-nineteenth-century invention, the unconscious." (During, 2004).

While photography provided a technological model for thought imaging (as I will discuss in a later chapter), telegraphy provided a technological model for muscle reading

performances. Brown, sometimes known as The Human Telegraph, became famous for his Wire Test (Beard, 1877). He could muscle read through several feet of copper wire and once attempted to detect thoughts through a telegraph wire running from Philadelphia to New York (Wiley, 2012). Brown's Wire Test and the public debates it inspired can be used to shed light on the larger context of telepathic technofuturity. Performances such as The Wire Test produced new ways of viewing the mind and shaped cultural notions of touch, distance, the telepathic sublime, the cerebral subject, and postcognition.

Lamont writes of the problems of framing mind-reading and considers the case of Washington Irving Bishop.

> As Roger Luckhurst has shown, Bishop played a significant role in the emergence of telepathy, but he is also an ideal figure to examine the murky framing of mind-reading. Indeed, there remains some confusion about how Bishop framed what he did: it has been said that he 'never claimed more than physiological skill', that he claimed 'genuine psychic powers', and even that he did not claim to possess 'exceptional powers of will or receptivity' but rather an 'ability to receive thoughts and sensations via undiscovered psychological capacities . . . which would be named "telepathy"'. If this seems confusing now, imagine how the Victorians felt as they tried to figure out what was going on. Nevertheless, the ways in which Bishop framed what he did were fundamental to what people believed. The confusion has come from the fact that Bishop was, like similar performers before and since, ambiguous and inconsistent. (Lamont, 2013)

So was Bishop simply a *bullshitter* in Frankfurt's sense of the word, using speech intended to persuade without regard for truth and that "His only indispensably distinctive characteristic is that in a certain way he misrepresents what he is up to" (Frankfurt, 2005)? Indeed, making a living would be a prime motivation for Theatrical Mentalism as it is generally a precarious

occupation. Still, Bishop was a great deal more successful than most, and it is reasonable to consider other factors. Frankfurt recognises bullshitting as a less deliberative mode of creativity than lying. “It is more expansive and independent, with more spacious opportunities for improvisation, colour, and imaginative play. This is less a matter of craft than of art. Hence the familiar notion of the “bullshit artist”(Frankfurt, 2005). Performing is a creative act involving improvisation. Science is a performative act involving creative speculation. Both involve pleasurable play, and Bishop may have been enjoying an improvisation with both platforms and with a problematic disregard for truth.

Bishop’s disregard for the truth may have ultimately contributed to his death. He was afflicted by catalepsy, a condition that resulted in a sudden loss of consciousness and a trance-like state in which the body does not move, but the mind remains active. His episodes were often triggered by his excitable demeanour while performing, and he had been declared dead three different times in his life. On the evening of May 12, 1889, Bishop was performing at the Lambs Club of New York when he suddenly collapsed. He was initially attended by Dr. John Irwin, an old acquaintance and physician well aware of Bishop’s illness. Dr Irwin brought Drs. Lee, Ferguson, and Hance to consult. After administering electrical therapy to little avail, the doctors declared Bishop dead. The body was moved to an undertaking establishment on Sixth Avenue, and four hours later, Drs. Irwin, Lee, Ferguson, and Hance conducted Bishop’s autopsy.

When Bishop’s wife arrived in New York the next day, she saw her husband in his open glass casket and asked an employee to comb her husband’s hair. When he went to do so, he dropped the comb, and it fell from view, through Bishop’s hair and into Bishop’s now empty brain cavity (Jay, 1986). His brain was missing and was never found. Both Bishop’s wife and mother firmly believed that Bishop was alive when the autopsy was conducted and that his death was a murder at the hands of the doctors (1893). Bishop had often claimed that

his feats of mind-reading were due to some rare power he did not fully understand. His wife accused the physicians of wanting to be the first to study his brain, even if it meant not waiting to properly check if Bishop was dead or for authorisation for the autopsy (1889a). Bishop's mother took the doctors to court and provided testimony of a previous instance in which Bishop was in an unconscious state for three weeks in Malta, and instead of declaring time of death, the surgeons kept him alive, and he awoke weeks later in good health (1889c). She also testified that Bishop carried around a card with him specifying the details of his condition and his wish not to have his body mutilated. The card was never found. At the trial, Dr. Irwin testified that he advised Bishop to cease his mind-reading exhibitions to avoid unnecessary stress and mentioned that Bishop had frequently said that an autopsy might show where he got his extraordinary abilities (Jay, 1986). I recount this story to show how convincing Bishop's claims about his brain were to audiences, including medical practitioners of the time. One report of his death, printed before the disappearance of his brain was known, was titled *Bishop's Brain Busted* (1889b). Reporters would often relate medicalise his powers, echoing prevalent ideas of neurasthenia, as the following report from the *San Antonio Daily Light* demonstrates,

> The fact is Bishop has such an ultra-sensitive organisation that he can subvert his entire organisation to the will of the subject and is capable of such receiving such impressions, as is the essence of his work. In what would, in ordinary cases, be a painful malady to a citizen is turned to good account and makes Mr. Bishop a modern wonder a person of note, and a recipient of a good income, where, in others, it would be a painful state of semi-idiocy. (1888)

Brown and Bishop, unlike Spiritualists, did not claim to have the ability to communicate with spirits; unlike traditional Theatrical Magicians, they did not rely on sleight of hand. They differed from the second-sight acts because they did not present their acts as mere

entertainment tricks with secret codes. Instead, they claimed to possess the undiscovered psychological capacities to receive thoughts or sensations as New Thought predicted. Experts of the day believed that muscle readers like Brown and Bishop were gifted with supernormal sensitivity to "subliminal" stimuli and the skills to interpret them. Bishop, for instance, was uncertain whether he responded to signals from the bodies of those with whom he was in contact or possessed previously unrecognised powers of mental perception. Brown and Bishop carved out a unique domain between the supernatural and staged illusion, later called the "paranormal" (During, 2004).

Contact vs. Non-Contact Telepathy

New Thought's relationship to muscle reading can also be seen in the work of William Walker Atkinson (1862-1932), an attorney, merchant, publisher, and prolific New Thought and Occult author who wrote under numerous pseudonyms.

His *Practical Mind-Reading: A Course of Lessons on Thought-Transference, Telepathy, Mental-Currents, Mental Rapport, &c.* (Atkinson, 1908) is primarily an in-depth course in performing muscle reading demonstrations and has influenced publications intended for performers of Theatrical Mentalism. The book distinguishes between two classes of mind-reading,

> The first of these classes, "Contact" Mind Reading, is demonstrated by physical contact between the Transmitter (or active agent) and the Receiver (or passive agent) in order to afford an easy channel for the passage of the vibrations, thought-waves, nerve-currents, or magnetism of the Transmitter (according to the several theories favored by scientists). The second class, "Telepathic" Mind Reading, is demonstrated by the transferral of the "waves," "vibrations," "currents," or "magnetism" of the Transmitter to the Receiver over the ether, through space (often for thousands of

> miles) without the more convenient "wires" of the nerves of the two agents.
>
> You will readily see that two classes of phenomena closely resemble the two classes of telegraphic phenomena, i.e., the "wire" system and the "wireless" system. There is a striking analogy between electric phenomena and mental force phenomena all the way through the subject, and this subject of Mind Reading is simply one of the many forms of the resemblance. (Atkinson, 1908)

Atkinson uses the term Contact Mind Reading, one of the many names for muscle reading. In the UK, it became known as Cumberlandism after the English performer Stuart Cumberland (1857–1922), an opponent of spiritualism who argued that telepathy was impossible and promoted a scientific view of muscle reading (Bown et al., 2004). In Germany, it was known as Hellstromism, after the German performer Axel Hellstrom (1893 – 1933), who performed at a time when German law required all mentalism performances to have a plausible explanation, effectively making muscle reading the only legitimate mind-reading technique (Mann, 1985).

To return to Atkinson's two classes of Mind Reading, this distinction likely derives from the dispute that muscle reading created among researchers concerned with "telepathy", a term coined in 1882 by the classical scholar Frederic W. H. Myers, a founder of the Society for Psychical Research (SPR) (Hamilton, 2009). For Myers, telepathy, which he defined as ''the transference of ideas and sensations from one mind to another without the agency of the recognised organs of sense,'' was a ''Rubicon between the mechanical and the spiritual conceptions of the Universe'' (Myers et al., 1903). Muscle reading used a recognised organ of sense but still appeared to many to be an extraordinary demonstration of mind-reading. William Barrett, who proposed the formation of the SPR, distinguished between contact mind-reading and non-contact mind-reading in 1881, before the word *telepathy* had been introduced (Barrett, 1881). The insistence on a distinction between contact and non-contact

mind-reading became well established in the approach of the SPR and as a general way of thinking about what constitutes "real" mind-reading. True mind-reading must dispense with the body and approach the communication of angels. As we will consider later in this thesis, this distinction is complicated by present-day neurotechnologies described as technologies for mind-reading, thought-reading, or telepathy but require devices that touch and even penetrate the subject's body.

The history of muscle reading that I have highlighted in this chapter shows how the conceptualisation of thought as a material that can be captured, visualised, and improved to the advantage of humankind draws on emerging communication and media technologies. This conceptualisation runs from New Thought Mentalism to today's Neurotechnological Mentalism and reveals itself in the use of Brainwear.

New Thought and Utopian Neurotechnological Mentalism

In this section, I want to take a closer look at how New Thought Mentalism considered the future of communication through a utopian vision of telepathic futurity that can be related to the post-human aims of today's neurotechnologists. I'll do this through a consideration of a performer who was heavily involved in the New Thought movement, Alexander James McIvor-Tyndall.

Alexander James McIvor-Tyndall (1860 – 1940) was a British-American Theatrical Mentalist who performed mind-reading demonstrations similar to those of the Washington Irving Bishop who performed successful billet reading tests for a committee of San Francisco city officials (including the then mayor Eugene Schmitz)(1902), offered his hypnosis and telepathy skills to the authorities investigating the famous Leutgert murder case (Loerzel, 2003), and was well known for his blindfold drive, in which he would drive a carriage through crowded streets blindfolded while reading the thoughts of a person seated beside him

(1896) (1901). Such blindfold drives greatly inspired Theodore Dreiser, the American novelist and journalist of the naturalist school, to become interested in psychology,

> Now this thing, when actually worked out under my very eyes and with myself doing the thinking, astounded me and caused me to ponder the mysteries of life more than ever. How could another man read my mind like that? What was it that perceived and interpreted my thoughts? It gave me an immense kick mentally, one that stays by me to this day, and set me off eventually on the matters of psychology and chemic mysteries generally. (Dreiser, 1922).

McIvor-Tyndall was also an active writer on New Thought and founder of two New Thought organisations, the International Swastika Society and the International New Thought Fellowship. McIvor-Tyndall gave New Thought and Theosophical lectures in Canada in 1890 and later became the New Thought editor of the Denver Sunday Post from 1906 to 1907. He edited a New Thought magazine called *The Swastika: A Magazine of Triumph* from 1906 to 1911 that claimed 100,000 subscribers by January 1908 and 500,000 by the following year (the actual subscription is unknown, though large) (Deveney). The magazine carried advertisements for McIvor-Tyndall's New Thought and occult books, several written under the pseudonyms Ali Nomad and Dr John Lockwood (Carty, 2000). As Ali Nomad, he promoted the idea that Ramakrishna Paramahamsa was the latest incarnation of God in India (Stavig et al., 2010). In the early 1900s, he moved into mental healing and mail-order courses on Psychic Science. McIvor-Tyndall gave lectures on clairvoyant powers, including automatic writing, precognition, psychometry, and telepathy (1909c, 1909b, 1909d, 1909a), as well as on cosmic consciousness, immortality, and psychic phenomena (1912).

In his lecture "The Language of the Future", McIvor-Tyndall called human speech a noise nuisance that caused countless nervous breakdowns and urged the audience to look forward to a future when they would use telepathy, "the language of silence".

> You will be a living demonstration of your thoughts. I believe that we are indeed on the eve of a new dispensation. The time is not so very distant, when telepathy will be the universal language. Thoughts will be flashed from mind to mind an exact picture of thought to be conveyed. Words after all, written or spoken, fail to convey the exact thought. They are but clumsy symbols. The present development of the faculty of thought-transference, I claim is only the beginning of what is to come. (McIvor-Tyndall, c. 1900)

Here, we again see the strong and complex links between New Thought communicators' performing, lecturing, and publishing activities. On the one hand, muscle reading provides a theatrical demonstration of the materiality of thought; on the other hand, there is a dream of leaving the messiness of the body behind and becoming beings of pure new thought. The wish to do away with spoken language persists today; compare McIvor-Tyndall's with a statement by Elon Musk from 2020 where he says that the Neuralink neurotechnology he is working on could render human language obsolete in as few as five years but that "We could still do it for sentimental reasons" (Embury-Dennis, 2020). As DJ Seo, a Neuralink co-founder and vice president for engineering, says, "the long-term goal is to have this available for billions of people and unlock human potential and go beyond our biological capabilities"(Vance, 2023). While early New Thought Mentalists saw extraordinary mental abilities as pre-existing biological capabilities, needing only the correct training to use them, today's New Thought *technomentalists* (if I can coin such a usage) require the application of neurotechnology to unlock the mental potential of the human. Neuralink's plans for the neuro-surgical implantation of its technology into human brains are proceeding at a rapid pace with targets of 11 implantations in 2024, 27 in 2025, 79 in 2026, 499 in 2027, and 22,204 by 2030 (Vance, 2023).

Kevin Warwick, who, in 1998, carried out a series of experiments involving the

neuro-surgical implantation of a device into the median nerves of his left arm to link himself to a computer, also echos McIvor-Tyndall, “I think by 2100 we're going to see people able to communicate between each other by thought signals alone, so no more need for telephones, old fashioned signalling, we'll be able to think to each other via implants” (2000). Giannachi sees Warwick’s experiments as attempts to create a system of communication that is no longer dependent on bodily functions and states that, “rather than rendering the body obsolete, these experiments show how the post-human body is such precisely because it is augmented, in excess, a ‘borg’”(Giannachi, 2006). In this sense, McIvor-Tyndall’s New Thought Mentalism prefigures today’s discussions of the post-human.

Thought Waves in Rhythm

Joseph Dunninger (1892-1975) was arguably the most significant mentalist of the twentieth century. Touring vaudeville with his magic and illusion act, Dunninger began adding mental feats to his program and, realising the impact that Theatrical Mentalism had on his audiences, he dropped the magic effects almost entirely and, subsequently, became very successful on TV and radio. Though a few Theatrical Mentalisms performed solo, most acts of the day involved a two-person team. Dunninger evolved the Theatrical Mentalism Act into the one-person format most practised today (Atmore, 2001).

Dunninger exposed fake mediums but expressed a great belief in the extraordinary potential of the human brain. The New Thought concept of communication through waves or vibrations took a firm hold on many Theatrical Mentalists, including Dunninger, as this experiment of his shows:

> I call the next test Thought Waves in Rhythm. It has been found, during experimenting, that many persons respond to telepathic vibrations and impressions

> best through rhythm, and this test has proven most successful where other experiments have failed. One person begins by tapping on a table or chair-back with a pencil in a steady rhythmic fashion, slowly, faster, faster. He decides on what sort of a tattoo he will play. After the speed is decided upon and he hits on a steady tapping, he begins to send a thought or a sentence intently concentrating upon the chosen sentence or thought, projecting it to you. (Dunninger, 1962, Dunninger, 1944)

During the 1920s Dunninger wrote a monthly column for Science and Invention magazine (Atmore, 2001) and, elsewhere, discusses thought transference as a "coming science" (Dunninger, 1944), a phrase from Hereward Carrington (Carrington, 1908), who we will consider next, and imagines a future where mechanical devices act as an aid to telepathy, "helping one person to 'pick up' the impressions transmitted by another. Or, if the reception is a sensory process of its own, there is the definite prospect of inventing instruments that would correspond to the microscope or the or the audiphone which are already used to increase the efficiency of vision and hearing." (Dunninger, 1944).

Technological utopian New Thoughters saw a world of universal thought-reading as imminent, ushering in world peace and harmony. "For them, wireless technology was evidence scientists were but one step away from inventing telepathic technology." {Buescher, 2021 #971@55). Today's transhumanists are still predicting this future built on emerging neurotechnologies.

The next and final sections of this chapter will demonstrate that New Thought Mentalism was, from the outset, interested in a variety of technological approaches to capturing and working with the material of thought. These experimental and theoretical public activities prefigure today's interest in Neurotechnological Mentalism, including the use of Brainwear for neuroascesis.

Two Minds, One Thought

> Two minds with but a single thought,
>
> Two tongues that speak as one. (Zancigs, 1907)

Julius Zancig (1857-1929) and Agnes Zancig (1884-1916), were a husband-and-wife team of Theatrical Mentalists who performed as The Zancigs during the early 20th century and have been identified as the second Theatrical Mentalism act to appear on the radio (Buescher, 2021).

> The Zancigs' show, entitled 'Two Minds With but a Single Thought', comprised a series of instances of Agnes apparently reading the mind of her husband. Their performances at music halls took the following form: the pair take the stage in front of a simple plain canvas drop scene, where, close to the footlights at centre stage, Madame Zancig takes her position, holding a piece of chalk by the side of a slate. After a few words of introduction, Mr Zancig appeals to anyone in the audience to give him any article, name, or number as he runs hither and thither about the hall, and Madame Zancig instantly describes or writes their responses on the slate. (Horn, 2013)

The Zancigs were investigated by the Society for Psychical Research in 1907. An unofficial report stated that "While we are of the opinion that the records of experiments in telepathy made by the Society for Psychical Research and others raise a presumption for the existence of such a faculty at least strong enough to entitle it to serious scientific attention, the most hopeful results hitherto obtained have not been in any way comparable as regards accuracy and precision with those produced by Mr. and Madame Zancig" (Baggally and Lodge, 1917).

W. F. Barrett, Professor of Experimental Physics at The Royal College of Science for Ireland, documents the testing of The Zancigs by the S.P.R. in London, reporting that "The

committee arrived at no conclusion, some of the experiments looked like genuine telepathy, and possibly this exists to some extent between the two performers." (Barrett, 1911). He had earlier tested the Zancigs himself at a private party in Dublin and, while believing a system of coding to be involved, was unable to detect it, remarking that "whatever method they employ is not generally known" (Barrett, 1911).

Many people believed that their powers were genuine (Lamont and Steinmeyer, 2018), but in the twenties, Julius sold their secret to the popular British weekly *Answers*. (Lamb, 1977). Julius confided that he and Agnes were using a code perfected after years of practice, an extremely complex system of signals composed of audible and visual cues. Their performances had fooled many influential people of the day into thinking their powers were real, including the newspaper editor and pioneer of investigative journalism W. G. T. Stead, the popular writers Henry James and Sir Arthur Conan Doyle, the founder of the British College of Psychic Science James Hewat McKenzie, and many other prominent spiritualists (Anderson, 2006). Their influence on the beliefs of these and other notables have been discussed (Horn, 2013), but my interest here is in their own professed beliefs.

During the early 1900s, Julius Zancig wrote articles for New Thought publications, and together, they wrote and published several books of New Thought philosophy and methods of fortune-telling, including cartomancy, palmistry, and scrying with a crystal ball (Zancig and Zancig, 1920, Zancig and Zancig, 1914, Zancig and Zancig, 1907). On the title pages of these books, they styled themselves "Prof. Zancig" and "Mdme. Zancig." In the 1920s, the Zancigs retired from public performance but continued to give private readings for wealthy clients, mixing palmistry, astrology, crystal balls, and tea leaves. They had fully embraced the Oracle Act. "Julius Zancig's 1926 tracts on the "unseen world" and "crystal gazing" reveal his complete embrace of the world of psychics after his stage act faded." (Nadis, 2005).

The fact that stage magic, technical media, spiritualism, and mind reading were interconnected in the late nineteenth century has been explored by several commentators (Enns, 2005, Natale and Pasulka, 2020) and a connection between the codes used in two-person Second Sight acts. The spread of binary code in communication has been suggested (Rein, 2015). Kittler argues that the invention of Morse code was "…promptly followed by the tapping specters of spiritistic séances sending their messages from the realm of the dead." Sconce argues that spiritualism was "a logical elaboration" of the telegraph's "supernatural" characteristics (Sconce, 2000). Andriopoulos proposes a more complex relationship as a reciprocal interaction between the newly emerging technology and spiritualist research that "mutually presuppose each other" (Andriopoulos, 2013). For such theories of correspondence to be more than a form of sympathetic magic, we should seek to support them in several ways. Firstly, I am identifying individuals who operated in both New Thought and Theatrical Mentalism by finding historical evidence of individuals whose practices overlapped fields. Secondly, I will identify sites where their practices would have met and exchanged ideas, as I will do by considering performance sites and publishing activities. Thirdly, we can seek to experience both practices for ourselves, bringing them into illuminating conjunctions that explore them from the inside, as my use of Autobiology will later demonstrate. As someone who has used codes extensively in Theatrical Mentalism and worked for many years as a computer programmer, I have found very little to connect the two practices beyond superficial similarities in terminology. I explored the links between computer programming practices and performance more broadly through a project undertaken with MediaLab Prado in Madrid (2017) and Lima (2019) called *Human-Computing Theatre.* Along with collaborating artists and programmers, I created performances where we attempted to use mathematical techniques that are difficult for humans to calculate mentally but which would be trivial for computers. These included Grey Codes and de Bruijn sequences. Attempting to

perform such advanced calculations in our heads while performing was an intentionally challenging attempt to “think like computers” and was influenced by the later work of Samuel Beckett, where repeated patterns and rhythms are used in both time and space.

We must also be careful not to link every second-sight act solely to beliefs in Spiritualism. While Theatrical Mentalism dramatised the interaction of newly emerging technology with Spiritualism, it also dramatised the interaction between such technology and New Thought, an interaction with a different and distinct nature. New Thought was not concerned with contacting the dead but with communication as a means of achieving power, influence, and success. For New Thought, telepathy and other powers of communication were a logical elaboration of the telegraph’s natural characteristics.

The following advertisement from the Washington Post. April 30, 1905, demonstrates how The Zancigs framed their act for the audiences of the day,

> Although Prof. Zancig and Mme. Zancig, who will be at Chase's this week, are naturalized Americans, thev come from Denmark. They first developed their transmission of thought from one mind to another—or what is known as telepathv—while journeying through the Orient. They found that quite a number of the Orientals had found it possible to control 'thought waves' and transmit them to the minds of others, just as Marconi, with his wireless telegraphy, controls electric waves and transmits them to an objective point. Prof. Zancig discovered that Mme. Zancig was inceptive, and he could readily transmit to her mind the thoughts of his own. The tests were continued, and became so positive and conclusive that it was decided to give public exhibitions. (Evans)

Here, we again see the borrowing of the terminology of emerging telecommunication, media and information technology. What is absent is any claim to Spiritualistic abilities. The powers claimed are entirely of the performers’ trained minds. The link here is not to Spiritualism but

to the ideas of New Thought, and the writings of the Zancigs can further demonstrate this. Puglionesi has suggested that The Zancig's husband-and-wife act represented the married couple as the "ideal unit of sympathetic communion" (Puglionesi, 2020) and states that "It's difficult to fathom today how deeply the notion of sympathy governed nineteenth-century relations, rendering selves permeable in ways both virtuous and risky. Broadly, sympathy connotes a mutual affective understanding between individuals—a sense of knowing and feeling together." (Puglionesi, 2020). While sympathy is an essential principle of Spiritualism, allowing the medium to become attuned to the voices of the dead, it is equally critical to New Thought proponents of mind-cure practices, telepathic communication, and affirmations, where sympathy is often extended to worldly objects as well as other people. The Zancigs' performances are more clearly a dramatisation of New Thought sympathy than Spiritualism.

The notion of two minds sharing a single thought persists today in the context of brain–brain interface technologies. In a paper entitled "When Two Become One: Singular Duos and the Neuroethical Frontiers of Brain-to-Brain Interfaces" {Zohny, 2024 #1430, Zohny and Savulescu raise the possibility that two or more individuals could directly link their minds, sharing thoughts, emotions, and sensory experiences, thus making the performed abilities of the Zancigs available to everyone.

Human Radio

Radio proved a fertile home for Theatrical Mentalism as a performance medium and because it provided an explanatory model for how the extraordinary powers being demonstrated by the performers. We can see an example of this in the explanation that performer Larry Nelson (1900–1980) gave for his blindfold drives. Billed as *Alla Rageh: The*

Human Radio Attuned to a Mysterious Unknown, Nelson stated, "It has taken me years to develop this power. The thought waves sent out by the spectators that line the streets guide and direct me through busy traffic" (1928.). The New Thought beliefs in communication through waves and vibrations are dramatised and popularised in these performances.

Nelson was not the only so-called *Human Radio*. In the 1920s, Paul Kara (fl. 1920s) performed as "Kara The Great," another turbaned mystic figure claiming to have studied under "Indian Yogis." However, in 1926, recognising a change in public interest towards science and psychology rather than the occult and the "Mystic Orient," Kara transformed his show and onstage persona. He rebranded himself as "Dr. Paul Kara, the eminent French psychologist" and, as "The Human Radio", he claimed to be the pioneer of the science of "Human Radio-ology".

> Although it was believed for several years that radio was new, Dr. Paul Kara says that it has always been in existence ever since the beginning of time and it will remain on through the ages. Life, says Dr. Kara, is nothing but vibration, and since it is through vibration radio has been made possible, we are nothing more or less than human radios, some being the sending stations and others being the receiving. (1926b)

Kara adopted the language used by paranormal researchers and psychological experimenters and was influenced by the popularisation of Émile Coué's theories of auto-suggestion and self-improvement. He claimed that "there would be fewer failures if people would broadcast their thoughts in one direction instead of changing constantly as so many do." (1927). Kara used the New Thought concept of a mental realm of vibrating energy that could be harnessed and controlled by the mind (1931) and his effects were aligned with "mental science" and presented as "demonstrations" or "tests" of his psychological mastery (Buescher, 2021, Kara, 1926).

Kara's New Thought lectures, given in public and on the radio, promised success,

wealth, and long life. One of his advertisements claimed, “Dr. Paul Kara says he is 35 years old and will live to be 111—Because I know how to Broadcast into the ether with my Human Radio—Through the science of Human Radio-ology of which I am the founder. Would you like to know how long you are going to live?”(1926a).

Another poineer of Theatrical Mentalism on the radio was Wilbert Willis Holley (1888-1966), who performed as Mel-Roy: The Mental Mystic. He became very popular and reportedly received so much mail (about 17,000 letters a day) that he had a staff of 84 typists and secretaries to handle it all (Franks, 1950). Mel-Roy called himself “The Apostle of Mental Science” (Mental Science was another name of New Thought (Troward, 2007)) and used the popular New Thought phrase “Thoughts are Things”, “which is to say, implicitly, they were things that could be caught and manipulated “(Buescher, 2021). He was one of many radio Theatrical Mentalists who connected radio waves to thought waves, “Every person’s mind is sending out thought waves all the time, the same as a broadcasting station. These waves go through the air. My mind is so attuned that these thoughts register on my mind just as other waves do on your radio set.”(1928).

Radio also provided a platform for the performance of hypnosis. In 1927, several Theatrical Mentalists began to perform hypnosis over the radio; these included Charles F. Harad, Charles Stewart, and Gerald M.P. Fitzgibbons (Buescher, 2019). Fitzgibbons, a Mind-Reading Hypnotist and Psychologist, was sponsored by several companies, including a refrigerator manufacturer and an automotive fuel additive manufacturer, and he would promote these products by incorporating them into his act. For several years, he was sponsored by Zenith Radio. He performed “The Radio That Reads Your Mind”, demonstrating a 25-tube superheterodyne Zenith Stratosphere Model 1000Z, a 50-inch-tall “symphony in rare wood” cabinet radio “in its Feat of Mind-Reading and answering the most perplexing questions you wish to put to this Marvel of Science, Zenith. Horoscope Cards

given free!"(1937). Fitzgibbons was also the first to release a "hypnotic record" for the phonograph, which, in true New Thought style, promised that "every man can now be his own psychologist, and can do anything he wishes" (1919).

Francis Marion Cowgill, Jr. (1896-1974) was known as "Francill: The Radio Wizard". He performed as a juggler, knife-thrower, and magician in his early years but later developed a taste for creating and demonstrating devices that played with the mysteries of electronics and radio. He became famous for his remote-controlled cars, which he demonstrated on numerous tours throughout the US between 1922 and 1939 (Buescher, 2021). His advance publicity for these demonstrations claimed, "Mr. Francill plays with the mysterious radio wave, much like a child plays with toys, making it do his bidding. He speaks to an automobile and hurls a radio wave, instantly the machine appears to be possessed of life and intelligence." (1923c).

As Buescher says, "It was not uncommon for mentalists to tie their ability to drive blindfolded to their power to tune in to (and be guided by) the thought waves of onlookers lining the streets. With Francill, by suggestive extension, he was the Everyman on the street, guiding the car" (Buescher, 2021).

Francill claimed that the cars were controlled by "an electrically powered form of telepathic control. His will, his desires, reached out from his mind, into the magic box in his arms and directed invisible "phantom hands" to the box bound to the running board. That loosely attached box virtually enslaved the inert, lifeless machine to his will and made it ready to do whatever its master wished. The car was in the same relationship to him as a mesmerised subject was to a stage hypnotist." (Buescher, 2021). Francill's "telepathically-controlled" cars anticipate both today's self-driving vehicles and the use of Brainwear to control drones with one's mind (Blain, 2019).

If such demonstrations adopted the language of New Thought to explain their

technologies, it is also true that New Thought proponents bought into new mental technologies. For example, Helen Wilmans (1831-1907) was a popular New Thought author who published a course in mental healing (Wilmans, c1890) and practised "absent healing". Wilmans also promoted the "Wonderful Thought Machine" of inventor Julius P. Emmner (1858–1916), "which looked and worked somewhat like an electrical cylinder phonograph, but 'instead of talking into it, one only thinks at it," as a lampooning article put it. Wilmans, however, had no problem in accepting it as genuine because she believed "that thoughts are things, and that they can be charged with a purpose and sent anywhere, no matter how far, to fulfill their mission" (Buescher, 2021).

Madame Radora and Radioplasms

> Can thoughts be read by radio? "Madam Radora" seems to prove that they can. Madam is not a human being, but a life-size automaton shown at the Permanent Radio Fair in New York. Her "thoughts" and movements are controlled entirely by wireless; no wires of any kind are attached to the table whereon she rests, and a liberal reward is promised the person who can prove that this is not true. Persons desiring to ask questions simply stand before "Madam Radora" with their hands resting on a special pedestal carrying a number of electrical contacts. Radora then bends over her crystal, and answers the questions put to her in a clear, feminine voice. (1924)

Madame Radora claimed to tune in to the audience member's "radioplasms" that were the essence of their thoughts (1923b). "The summarized shape of those disturbances was one's character, which could be plotted. Madam Radora, it was supposed, accomplished what phrenologists had earlier claimed to do—reduce character to an equation" (Buescher, 2019). This was a new version of the Q&A seemingly accomplished by technology. I will later consider how Brainwear constitutes a present-day Q&A act that replaces radioplasms with

psychological metrics.

The Psychoscope

Ernest Charles Feyrer (1877-1934) combines many of the activities I have been discussing in one career. He published New Thought books, combined Theatrical Mentalism with lectures on mental broadcasting, sold mail-order courses promising to endow the readers with extraordinary mental abilities, and sold the Psychoscope. He sold a system he named Auto-Science as "A New System of Psychology That Works: The latest discoveries of how to use the subconscious mind for business, money, perfect health, personality, mental broadcasting, salesmanship, etc. THE MAN WHO MADE MILLIONS THINK WILL MAKE YOU THINK". His ideas on salesmanship anticipate the later development of Corporate Mentalism, where Theatrical Mentalists claim to impart persuasion and communication skills to their corporate audiences (Feyrer, 1923).

Feyrer was billed as "America's Coue (sic)" (1923a) and his system was based on the idea that the subconscious mind is "the Wireless Receiving Station of Man" (Feyrer, 1926). His wife, "Josephine, The Mental Marvel," demonstrated telepathy and performed a Q&A act at ladies' matinees (Buescher, 2019).

The Psychoscope was a dark shoebox-sized cabinet with a calibrated dial and a wooden "antenna" with a spring-wound revolving geometric design for inducing a hypnotic trance.

> The Psychoscope only mimicked the form of a sophisticated radio instrument, but that underscores how strongly the radio was regarded as a magic instrument that could draw down the heavens. Accordingly, a real radio could become an actual telepathic agent, not like the ordinary, internally conflicted, clumsy human agent, who could only hope to become, in his or her fully developed state, a radio. The truly modern,

> advanced, New Man, therefore, was an automaton, a rational, electromagnetic machine. (Buescher, 2019)

This direct-to-consumer device for home manipulation of mental states prefigures the current direct-to-consumer Brainwear for home neurofeedback that I will consider later.

How You Can "See Your Own Brain"

Hereward Carrington (1880-1958) was a British-American psychic researcher, writer, and lecturer. He is known for his extensive work in the field of parapsychology, writing over 100 books on subjects including Theatrical Magic, alternative medicine, and psychic phenomena such as telepathy, clairvoyance, and precognition. Carrington was a member of the American Society for Psychical Research and founded the American Psychical Institute, which researched psychic phenomena. He was a strong advocate for the scientific study of psychic phenomena, and he conducted numerous experiments and investigations to explore their nature and validity, which led him to believe that 98% of both the physical and mental phenomena were fraudulent but that some mediumship phenomena was genuine (Rider, 1909).

Carrington was an amateur performer of Theatrical Magic, and he exposed the secrets of fraudulent mediums, such as Henry Slade and William Eglinton, including techniques involving slate-writing, table-turning, trumpet mediumship, ectoplasmic limbs, sealed-letter reading, and spirit photography (Carrington and McManus-Young Collection (Library of Congress), 1908).

Carrington actively promoted a series of Theatrical Mentalists, with whom he was closely involved, introducing their acts by explaining that psychic powers were natural and had become accepted as settled science. His reputation as an exposer of fraudulent mediums

lent credibility to their performances (Buescher, 2021). Carrington also published a guide to developing psychic abilities in which he references, “What is called "the silence" in general New Thought philosophy, is a peculiar psychic state into which the student enters in order to secure certain results” (Carrington, 1920).

Carrington was interested in how technology could be used to prove the existence of telepathy by conducting short-range experiments using a wireless telephone, wireless transmitters, and induction coils to see if “one person’s thought (of the number or image on a card, for example) could be transmitted to another person in another room, with a better than chance outcome” (Buescher, 2019, 1922). His experimental devices included a “will-board”, “kymograph”, and “sphygmograph”, all intended to register the presence of spirits (1925, Alston, 1928).

Carrington’s short essay, *How You Can “See Your Own Brain”* (Carrington, 1918) describes an experiment that involves sitting at an open window on a dark, calm, and windless night, revolving one’s eyeballs slightly, and moving a lighted candle in front of one’s face. “Slowly you will see forming before you, in space, an outline of what is apparently your own brain! Against a pink back ground you can see dark, tree-like formations. You will see the veins and blood-vessels of your own brain.” (Carrington, 1918). Carrington is mistaken here; he was likely seeing the veins and blood vessels of his eyelids. However, this essay neatly captures the intense interest in seeing inside the human brain that Carrington shared with Theatrical Mentalism and New Thought. This attempt at a silent and still observation of one’s brain is, despite and because of its pseudoscience, reminiscent of the practices of Brainwear that I describe later in this thesis.

From Mesmerism to Neurofeedback

We have seen that both New Thought and Theatrical Mentalism developed from Mesmerism, experimented with hypnosis, and later adopted the techniques and language of autosuggestion. Let's consider this further through the case of the performer Maurice Fogel.

Maurice Jack Fogel (1873-1941) was an English mentalist and writer active during the first half of the 20th century. Fogel began his career as a traditional stage magician, but he gradually became more interested in the possibilities of Theatrical Mentalism. In addition to his work as a performer, Fogel was also a prolific writer on the subject of Theatrical Mentalism, and he wrote a short self-help book entitled *Fogelism* (Fogel, 1949), his word for self-improvement through autosuggestion.

While Mesmerism was a strong influence in 19th-century mind-cure, the later development of autosuggestion by Émile Coué shaped the genre of self-help and personal development books that grew out of the New Thought movement. Much of the literature, from Napoleon Hill's *Think and Grow Rich* (Hill, 1937) to Anthony Robbins' Awaken the Giant Within (Robbins, 1991), promotes the value of self-hypnosis. Norman Vincent Peale, the author of one of the best-selling self-help books, *The Power of Positive Thinking* (Peale, 1952), asserts that practising his techniques will give the reader absolute self-confidence and deliverance from suffering. Critics suggest that Peale's techniques are simply autosuggestion under the name of "techniques", "formulas," "methods," "prayers," and "prescriptions.". Meyer called Peale's book "The Bible of American autohypnotism" (Meyer, 2013). Albert Ellis, the founder of cognitive therapy, claims that the techniques "In the long run lead to failure and disillusionment, and not only boomerang back against people but often prejudice

them against effective therapy" (Ellis, 2002). We will return to Coué in a later chapter when we discuss the use of Brainwear to alter mental states.

We can also find in Peale the influence of New Thought concepts that began in Mesmerism, including the notion that the mind emits a tangible, magnetic prayer power (Horowitz, 2014). Peale writes, “The human body’s magnetic power has actually been tested. We have thousands of little sending stations, and when these are turned up by prayer it is possible for a tremendous power to flow through a person and to pass between human beings. We can send off power by prayer, which acts as both a sending and receiving station” (Peale, 1952). We can again see the use of technological metaphors to describe extraordinary mental abilities.

We have briefly considered the Orientalism that was a part of New Thought and Theatrical Mentalism’s trappings. The interest in altered states was part of the perceived idea of “Oriental” mysticism. While it is not within this thesis’s scope to closely examine the Orientalism of early Theatrical Mentalism, I wish to make two observations. Firstly, there seems to be a difference between the Orientalism of Theatrical Magicians, which creates an image of China, and to a lesser degree, Japan, and the Orientalism of Theatrical Mentalism, which favours images of India and Egypt; Dobson has examined notions of Egyptian mind powers in Victorian popular culture, particularly in Theosophy and psychical research (Dobson, 2022), which both had an influence on Theatrical Mentalism. The difference between the Orientalism of Theatrical Magic and Theatrical Mentalsim deserves further investigation.

Secondly, the Orientalism of New Thought also favours India, in particular notions of Hinduism (Jackson, 1975). As William James notes in his description of Mind-cure, "One of the doctrinal sources of Mind-cure is the four Gospels; another is Emersonianism or New England transcendentalism; another is Berkeleyan idealism; another is spiritism; another the

optimistic popular science evolutionism of which I have recently spoken; and, finally, Hindooism has contributed a strain" (James, 1902a). New Thought adherents practised “Yogic” meditations, while Theatrical Mentalists often entered altered states themselves or placed audience members into hypnotic trances. Theatrical Mentalism audiences are often asked to relax, focus, visualise, project, send, or imagine their thought of words and drawings floating in front of them.

As we shall see, this fascination with, and dramatisation of, the potential of altered states of mind can also be seen in the use of Brainwear for meditation and neurofeedback. Barbara Brown, the pioneer of neurofeedback, shared the goal of both New Thought and Brainwear, to “teach man to perceive and to control some of his brain functions” (Brown, 1974).

Miguel Nicolelis, a neuroscientist best known for his pioneering work in BCI technology, begins his book *Beyond Boundaries: The New Neuroscience of Connecting Brains with Machines - And How It Will Change Our Lives* (Nicolelis, 2012) with the following quote from Emerson,

> Be not the slave of your own past. Plunge into the sublime seas, dive deep and swim far, so you shall come back with self-respect, with new power, with an advanced experience that shall explain and overlook the old. (Emerson and Carlyle, 1841)

Emerson’s promise of new power and the transcendence of boundaries was a foundational influence on New Thought. In his final chapter Nicolelis, in true New Thought mode, imagines a brain “emancipated from the constraints and vulnerabilities of the human body” (Nicolelis, 2012). He wonders, “Could such a complete liberation of the brain allow us to blur, or even eliminate, the once inexpugnable physical borders that define an individual human being? Could we one day, down the road of a remote future, experience what it is to be part of a conscious network of brains, a collectively thinking true brain-net?” (Nicolelis,

2012).

Mind-Cure Brainwear

Throughout the 20th century, the enduring cluster of cultural metaphors produced by New Thought came to connect otherwise disparate ideas and remains "a conspicuous force in American culture, articulating a set of ideas and practices that remain to this day at the forefront of a contemporary religious and secular scene" (Haller, 2012). Its influence can be seen in prosperity theology (Haller, 2012), positive thinking (Haller, 2012), motivational self-help (Haller, 2012)New Age (Haller, 2012), alternative medicine (Fuller, 1989), and Trumpism (Mansfield, 2017). The mind-cure influence of New Thought can be seen in present-day neurocultures.

We have seen a link between many Theatrical Mentalists and the strand of New Thought that rejects the medical establishment in favour of mind cures, psychological therapies, alternative medicine, pseudoscience, and, at its extreme, dangerous quackery. Present-day Theatrical Mentalists are prone to the use of pseudo-psychological demonstrations theories and neuromyths as theatrical "packaging" (Lan et al., 2018) including Neuro-Lingustic programming (NLP), subliminal messaging, and body-language reading.

We can compare these mind-cure trends with two of the primary uses of Brainwear. The search for therapeutic mental states through meditation and neurofeedback, and the use of Brainwear as an oracle that promises to answer questions about a user's personality and to help them adjust their psychological traits to be more productive.

A BRAINWEAR AUTOBIOLOGY

In this section, I report on the use of Autobiology as a research method to explore the four main uses of Brainwear: to visualise the brain, to achieve altered states of mind, to control machines with our thoughts, and to measure and alter various psychological aspects of ourselves. Each of these uses conceptualises thought as a material that can be captured, measured, harnessed, altered, understood, and improved. In this way, Brainwear can be seen to continue the traditions of New Thought Mentalism and Theatrical Mentalism that we considered in the historical background chapters. Brainwear is revealed as a form of intimate entertainment, a way to play with the material of our thoughts.

Thoughtography

In the first chapter, I will discuss several ways in which notions of the materiality of thought have been entangled with conceptions of photographic and imaging technologies and processes that demand stillness from the body to favour activity from the brain. I will then compare this neurocentric approach to capturing photographic images of thoughts with a more embodied approach based on touch, movement, and drawing.

Touching Brains

Holding a human brain can be both unsettling and inspiring. During a neuroanatomy class in my second year on a Cell Biology BSc, a preserved human brain was passed about for us students to examine. I recall an unexpectedly strong emotion, which the artist Susan Aldworth perfectly captures when recounting her own experience of holding a human brain,

"Holding the brain was a moment of total connection with the brain as object… the

> cold rounded intestine-feeling outer edge of the brain feels etched in the memory of my hands. But it was not just an object – I cradled it like a baby, protective, respectful of holding "someone" – someone very vulnerable in this disembodied state. The object momentarily became the person in my hands." Susan Aldworth, November 2011. (Kwint, 2012)

To return to my own experience, I passed the preserved human brain to the next student who, after a glance at it, slid it casually across the table to the student opposite. Several of us cried out in alarm and anger. There was something disrespectful and crass in treating a human brain in this way. I doubt we would have had the same reaction if the organ had been a leg or a liver. As Kwint says, when comparing digital brain images with a real tangible brain, "what the real brain embodies is no less than a sense of its own authenticity" (Kwint, 2012). This may hold for our experience of other people's brains, but, in my experience, the digital representations produced by Brainwear have an authenticity that my experience of my brain as an organ does not. Interoception (the sense of internal physiological signals) notwithstanding, I do not consciously experience my brain as a tangible object with weight and volume. I experience the materiality of my thoughts, not the materiality of my brain. Until technology allows me to physically remove my brain from my skull and hold it in my own hands, I suspect that will remain true.

While holding a human brain can be a moving experience, the experience of having a brain scan is generally unsettling as it usually occurs in a medical context. However, it can also be personally, as well as medically, revealing as Modern's description of undergoing an MRI scan shows,

> In the MRI, I experienced the invisible tendrils of discourse, which is to say that in the MRI, I appreciated anew all those works of cultural and visual studies and critical ethnographies that had considered the MRI to be a particularly powerful construction

> of the social. For in the MRI I became aware of my paranoia, mindful of how theories of information, feedback, and self-organization at midcentury continue to frame the social as comprised of discrete individuals in a giant communication machine. And this, I must say, was a revelation (Modern).

Not that Modern is inspired here not by the images produced by the MRI technology but by the act of being in the MRI machine itself. In the film Derrida (2002), the philosopher Jacques Derrida is filmed lecturing. He draws attention to the film crew, saying, "What happens to the testimonial archive when one takes into account that the classic definition of testimony excluded the intervention of recording devices? So as an experiment we'll see what it's like to work for a moment in the presence of these archiving machines" (Dick, 2002). Brainwear can be seen as an archiving machine, and I wish now to explore the act of such machines in more depth, focussing as much on the experience of being in their presence as on the archives they produce.

Brainware Sitting

To return to Ihde's four kinds of human-technology-world relations - embodiment, hermeneutic, alterity, and background relations - it is clear that the Brainwear system is partly embodied. In embodiment relations, technologies form a unity with a human being, and this unity is directed at the world; for example, we look through a microscope rather than at it. Ihde schematises this relation as:

(human – technology) —> world.

By this schema, I form a unity with my Brainwear, and that unity is directed at my brain and the material of my thoughts. The headset, at least after some time, gets

incorporated into one's body scheme, much like a pair of spectacles. However, unlike spectacles, Brainwear greatly restricts the wearer's body movements, especially facial muscles.

It has been noted that "All of our devices invite a set of physical gestures either determined by the data they convey (voice, text, visuals), by ergonomic (or non-ergonomic) design, or by the set of codes communicated across distinct social groups indicating how to use and wear devices in different social settings (the club, the subway, the library, the boardroom)" (Kozel et al., 2008). Brainwear invites a set of physical gestures and postures focussed on the functional need for stillness, the wearer's attention to the flow and visualisation of data, and the physical codes that have accumulated around cultural performances of mind-reading, telepathy, and photography.

Sitting to have a brain image taken with Brainwear is akin to the experience of those subjects who sat for early photography. In both cases, the subject must remain as still as possible to obtain the most precise image, even using restraints to limit movement. "In the photographic studio of the 1840s through the 1860s, people were placed in restraints – clamps that prevented any head movement. They were told to sit perfectly still, not even to blink. The result was an image of a person without facial emotion holding a rigid, expressionless posture." (Ruby, 1995) Head restraint is a routine procedure in brain imaging, and it is recognised that "…the physiological and psychological consequences resulting from the restraint have not been elucidated" and that "…the stress from head restraint could cause unsolicited responses in brain physiology and emotional states." (Inubushi et al., 2021). Even without physical restraints, I would suggest that the need to keep the body, particularly the face, immobile when using Brainwear will affect brain physiology and emotional states.

When using Brainwear, any movement can change the electrical activity in your brain, which can affect the results. "It is a challenge with conventional EEG systems to

eliminate the effects of muscle signal from the brain patterns and most medical EEG's require the patient to sit very still so they can see the brain signals with high enough integrity to diagnose functional problems (and even then much of the data is discarded due to blinks and other involuntary motions such as swallowing" (Cassidy, 2018). This constraint makes the experience of Brainwear doubly neurocentric; the focus of the process is the brain, and the process demands that the rest of the body stays still. Fidgeting or gesturing is discouraged, and facial expressions are particularly problematic.

The EMOTIV EPOC devices pick up signals from facial muscles, but rather than discard this data, they seek to use it. "EMOTIV EPOC has 14 EEG sensors of which 8 are positioned around the frontal and prefrontal lobes, which by virtue of their location pick up signals from facial muscles and the eyes. Most EEG systems treat these signals as noise and they are filtered or ignored when interpreting the signals. The EMOTIV detection system also filters these signals out before interpreting the brain signals, however, we also use these signals to classify which muscle groups are causing them, we call this Smart Artifacts" (Cassidy, 2018). This approach means that the devices can detect and classify a range of facial expressions, including blink, left wink, right wink, raised eyebrows (surprise), furrowed brows (frown), smile and clenched teeth. These meaningful expressions are relegated to the status of artefacts, albeit "smart" ones, while the brain takes precedence. To use Eagleman's term, the brain is *livewired* (Eagleman, 2020), fizzing with energy while the body must be stilled. Unlike early photography, which produced still images from still bodies, EEG Brainwear demands that the body be kept still to capture a moving image. When sitting still for a photograph, one experiences a tense anticipation; the stillness is one of waiting for the click of the shutter when the tension can be released. With Brainwear, there is no release; the body must be kept still and observed throughout. As Barthes said of the experience of being photographed, "Now, once I feel myself observed by the lens, everything

changes: I constitute myself in the process of "posing," I instantaneously make another body for myself, I transform myself in advance into an image.” (Barthes, 1981). With Brainwear, the feeling of being observed is extended, and the sense of wanting to transform one’s brain in advance into a brain image is present.

We will return to this experience of transformation, presence, tension, and stillness during the discussion of the use of Brainwear for meditation and mindfulness. It is also worth noting that the word *séance* derives from the Latin *sedere,* meaning *sit*. A séance is a sitting and I have found examples of the performances of the Theatrical Mentalist Bert Reese, who we considered earlier, described as both séances and sittings, even when they were demonstrations of mind-reading rather than mediumship. It seems that *sitting* continues to be a condition of successful mind-reading.

Daugerrotypes and Mind Cures

Phineas Quimby and Lucius Burkmar Created: circa 1847. Unknown author. Public domain.

Consider this daguerreotype of Phineas Parkhurst Quimby (left), created circa 1847. Quimby began as a clockmaker and daguerreotype maker, and the photographic process provided a template for his later thinking. In the image, he puts his assistant, Lucius Burkmar, into a trance. It was believed by many at the time that certain people, such as Burkmar, were capable of clairvoyance and telepathy when in a trance and gained the ability to diagnose illness. The two travelled together, putting on exhibitions of Mesmerism and attempting to cure people of various ailments. Eventually, Quimby and Burkmar parted company, and Quimby began curing people directly. The *Exposition of Dr. Quimby's Method of Curing* makes it clear that Quimby saw his mind cure as a daguerreotype process involving light and dark, shadows and reflections.

> A patient comes to see Dr. Quimby. He renders himself absent from everything but the impression of their feelings. These are quickly daguerreotyped on him. They

> contain no intelligence but shadow forth a reflection of themselves which he looks at. This contains the disease as it appears to the patient. Being confident that it is a shadow of a false idea, he is not afraid of it but laughs at it. Then his feelings in regard to the disease which are health and strength are daguerreotyped on the receptive plate of the patient which also throws forth a shadow. The patient seeing this shadow of the disease in a new light gains confidence. This change of feeling is daguerreotyped on the doctor again, which also throws forth a shadow and he sees the change and continues to treat it in the same way. So the patient's feelings sympathise with him. The shadow changes and grows dim and finally the light takes its place and there is nothing left of the disease. (Quimby, 2008)

Quimby's *mental daguerreotype* combines a conceptualisation of thought that owes much to Trancendentalism's belief in the power of spirit with a scientific understanding of early photography. Photography became a helpful way of conceptualising New Thought techniques, epitomised by Henry Wood's "Ideal Suggestion Through Mental Photography." (Wood, 1893), which advised readers to make small placards bearing good thoughts, such as "I Rule The Body", "All Things Are Yours", "I Rule The Body", and "Mental Healing Is Scientific". They should then prop the placard up "at a suitable distance from the eyes, and fasten them upon it for from ten to twenty minutes" (Wood, 1893). Thus, "Through the medium of the eye, by exposure, their truth becomes photographed upon the deep, living, consciousness." (Wood, 1895)

With its shadows and lights, the image of Quimby and Burkmar can quickly come to represent Quimby's mental daguerreotype process. For an experienced hypnotist like myself, the stillness of the scene speaks of the focus of the trance state and the close relationship between the subject and the hypnotist. The hypnotist commands a stillness in the hypnotic subject. I wish to argue in a later chapter that Brainwear, with its demand for stillness and its

claims for altering and improving mental states, functions as a modern mind cure device in place of the human practitioner.

While Quimby's early work with Burkmar clearly involved trance states, his later method resembles what we would now call counselling or psychotherapy and anticipates Freud's talking cure. The *Bangor Jeffersonian* reported, "His first course in the treatment of a patient is to sit down beside him, and put himself *en rapport* with him, which he does without producing the Mesmeric sleep." (Caplan, 1998) The origins of what William James termed "the mind cure movement" can be traced to Quimby's healing theories and practices (James, 1902a). The mind cure movement emphasised the healing power of positive emotions and beliefs (Duclow, 2002) and attempted to "…contest the growing hegemony of what James himself had disparagingly labeled 'medical materialism' and to offer an alternative or, at the very least, a supplementary approach to questions regarding sickness and health" (Caplan, 1998). Richard C. Cabot, the leading American medical advocate of psychotherapy, claimed in 1908 that, "a great deal which physicians have now taken into their practice they really owe to Quimby and to Christian Science"(Weiss, 1969). In fact, it has been argued that the mind-cure movements were directly responsible for the birth of psychotherapy in the United States (Caplan, 1998).

Quimby was contemporary with Emerson and "… in some measure anticipated our modern neuro-psychiatrists and in himself made a fusion of their therapeutic practice and the theories of Transcendentalism." (Holmes, 1944) His cure involved a telepathic merging of spirits. "At one step in his technique of healing, he united himself and his patient into a sort of temporary organismal one-ness. In this condition he could recall the originating circumstances of the disease-the memory of which was only in the patient's organism, previously-and could reshape the patient's *gestalt* which governed the pathological condition" (Holmes, 1944). Transcendentalists such as Emerson were profoundly influenced by the work

of Emmanuel Swedenborg, a prolific inventor, theological, mystic, and pioneer of neuroanatomy (Tubbs et al., 2011). Many of Quimby's earliest supporters were Swedenborgians who found such *organismal one-ness* reminiscent of Swedenborg's description of the speech of angels. As Peters has suggested, the notion of seeing or reading another's thoughts can be found in early writings on the communication of angels (Peters, 1999).

The Materiality of Angel's Thoughts

"The angelology of Augustine, Aquinas and others give us the intellectual basis for the dream of shared interiors in communication". (Peters, 1999) For Aquinas, the speech of angels "is interior; perceived, nonetheless by another" (Thomas, 1967). Angels understand each other in an "instantaneous unfurling of interiorities". (Peters, 1999) Swedenborg believed that, "…you can have thought without words; that thoughts are really images, mostly visual; and that this was how conversation was possible in the spirit world between people of different languages"(Toksvig, 1948). He visited Heaven in visions and describes angels as very like humans. "They see each other, hear each other, and talk to each other. In short, they lack nothing that belongs to humans except that they are not clothed with a material body." (Swedenborg and Bayley, 1931) Despite their lack of a material body, Swedenborg's angels have interiors and exteriors. Their speech is affected by this form. "All in heaven have one speech, . . . but it varies in this respect, that the speech of the wise is more interior, that is, richer in variations of affection and of idea; while the speech of the less wise is more external and less rich; and the speech of the simple is still more external, and consists of words from which the sense is to be gathered in the same manner as when men speak with one another." (Swedenborg and Bayley, 1931) As beings of pure thought, angels have no bodies, but there are many representations of them *as* bodies that can be present. It is worth

considering the archangel Uriel, who stands at the Gate of Eden with a fiery sword. Uriel is the angel of the arts, writing, and presence. As a prince of the presence, Uriel is allowed to enter the presence of God and experience pure meaning. Uriel is an angel of a metaphysics of presence, representing the tradition in Western philosophy that has emphasised the desire for immediate access to meaning, privileging presence over absence. This ontotheology of instantaneous, frictionless, disembodied communication, lost along with Eden, shapes our dreams of immediate access to thought.

It is a short step from this form of ontotheology to disgust for the messy interference of bodies. From the speech of angels to the claim of Malebranche that the mind's union with the body "infinitely debases man and is today the main cause of all his errors and miseries" (Malebranche, 1688). This yearning for a pure form of mind-to-mind communication owes much to New Thought and has become a staple of speculative fiction, as expressed by this quote from the writer A. E. van Vogt,

> What a rich joy it was to be able to entwine your mind with another sympathetic brain so intimately that the two streams of thought seemed one, and question and answer and all discussions included instantly all the subtle overtones that the cold medium of words could never transmit. (Van Vogt, 2007)

Two Kinds of Mind-Reading

The influence of this ontotheology of angelic communication results in a tension between embodied and neurocentric conceptualisations of communication. This chapter now considers this influence by discussing two contrasting approaches to visualising thoughts that emerged in the late nineteenth century and reappear in current neurotechnologies. The first is a broadly photographic practice that runs from the mind cure movement's theory of a mental

daguerreotype, through early twentieth-century thoughtography, to contemporary neuroimaging technologies, including Brainwear. This practice reflects a philosophical tradition that yearns for a tamed, frictionless, Edenic telepathy between pure, transparent, disembodied communicants. The second is a drawing practice that runs from the late nineteenth-century muscle reading practised by Theatrical Mentalists through automatic drawing to contemporary neural interfaces and supports a more embodied, embedded, extended, and enactive view of communication.

Photographing Thoughts

> Many paintings depict human figures with an aura of radiation around their head. This tradition dates back to classic Greek and Roman times, continues through early Roman art, and has remained in the art of painters such as Vincent Van Gogh and even pop culture. The depicted aura is typically reserved for figures with a particular status, such as holy saints or, a bit more mundane, the individual painter.
>
> In real life, we cannot see the signals emitted by someone's brain. Nevertheless, the signals are there in every person, saint or not, young or old. Sometimes the underlying physical principles sound very complex, such as 'magnetic resonance imaging' but at other times these principles come surprisingly close to an optic signal, as depicted in the painted auras. (Beeck, 2019)

The quote above is the opening of Beeck and Nakatani's *Introduction to Human Neuroimaging* (Beeck, 2019), a practical textbook on human neuroimaging techniques written for behavioural and brain science students. The authors identify a vital lineage connecting religious auras and modern brain imaging. In this section, I want to trace this lineage of neurocentric thought photography.

Tremulations and Brain Waves

The New Thought movement and Theatrical Mentalism believe in extraordinary mental abilities, whether inherent, trainable, part of a coming age of human development or require emerging technologies. Both movements appeal to science to provide explanatory models for extraordinary mental abilities, metaphors for communication, or frameworks for theatrical performances. The activities of both movements are replete with “experiments” and “demonstrations” drawing from sources that are presented as “scientific”, and many of these involve metaphors of power, vibrations, and waves.

Emanuel Swedenborg’s philosophy greatly influenced New Thought, and his idea that tremulations constitute life itself can be seen in its use of the metaphor of waves. In Swedenborg, “The wave metaphor is extended from the visually perceived arching of water waves, spreads through the air waves of sound and the swift ether waves of light, finally ending up in the wave impulses of the nervous fluids. Water waves serve as a model and a source of metaphors through which he tries to understand sound, light, and nerve movements.” (Dunér, 2013). The language of both New Thought and Theatrical Mentalism utilises notions of communication through vibrations, thought waves, and brain waves. Typical of this is *Thought Vibration: The Law of Attraction in the Thought World* (Atkinson, 1910), in which, “Like a stone thrown into the water, thought produces ripples and waves which spread out over the great ocean of thought.” (Atkinson, 1910).

In 1869, James Thomas Knowles coined the term "brain-waves." However, it would be an overstatement to attribute the invention of nervous vibrations solely to Knowles, as others had already put forth similar ideas. When Knowles published his concepts in The Spectator, the magazine's editors wrote that his “new” theory seemed “very like [David] Hartley's theory of the undulations in the whitey-brown matter of the brain, as the key to the phenomena of sensation” (1869) and that Hartley himself was expanding on the work of

Isaac Newton.

Newton believed that as vibrations of an etheric medium serve to propagate heat, they might also propagate signals in the nervous system. He writes, “Is not Animal Motion perform'd by the Vibrations of this Medium, excited in the Brain by the power of the Will[?]” (Newton, 1704). Hartley developed Newton’s model of sensorimotor transmission into a vibrational model of mental connections using the term “vibratiuncles” to refer to slight vibrations in the brain that underlie cognitive associations (Buckingham, 2007).

Knowles's concept of brain waves extended beyond Hartley's vibratiuncles, encompassing psychological connections within a single brain and mysterious mental links between two physically isolated brains. This differentiation effectively captured the spiritual-scientific atmosphere between Hartley's writings and Knowles's publication (Shure, 2018). Significantly, the advancements in electromagnetic science during the nineteenth century introduced a language to discuss the movement of invisible waves throughout the universe. Additionally, the widespread adoption of telegraphy provided a precedent for contemplating the swift transmission of messages. These developments made the notion of thought transmission plausible and rational. It is important to note that Knowles cannot be solely credited with envisioning an electric, oscillating telepathic medium. Instead, his theory of brain waves can be read as “a crystallization of scientific and spiritual ideas floating in the conceptual ether” (Shure, 2018). Knowles aims to explain uncanny mental experiences such as premonitions, intuitions, and clairvoyance, believing that such experiences, though perhaps anomalous at the individual level, occurred with sufficient regularity to qualify as natural, if not quotidian. Knowles suggests that “ no brain action can take place without creating a wave or undulation (whether electric or otherwise) in the ether” (1869) and that,

> If so, we should have as one result of brain action an undulation or wave in the circumambient, all-embracing ether,—we should have what I will call Brain-Waves

proceeding from every brain when in action.

Each acting, thinking brain then would become a centre of undulations transmitted from it in all directions through space. Such undulations would vary in character and intensity in accordance with the varying nature and force of brain actions, e.g., the thoughts of love or hate, of life or death, of murder or rescue, of consent or refusal, would each have its corresponding tone or intensity of brain action, and consequently of brain-wave (just as each passion has its corresponding tone of voice).

Why might not such undulations, when meeting with and falling upon duly sensitive substances, as if upon the sensitized paper of the photographer, produce impressions, dim portraits of thoughts, as undulations of light produce portraits of objects? (1869)

We can note that the symbolic confluence of thought waves with brain waves has continued to prove seductive for a public exposed to brain images and the promises of EEG Brainwear. We will next explore the emergence of attempts at “thoughtography”.

Thoughtography

One approach to capturing the materiality of thoughts was the turn-of-the-twentieth-century thoughtography experiments. The term *thoughtograph* was coined by Tomokichi Fukurai when relating his experiments conducted in 1910 at the Imperial University in Tokyo where test subjects produced Japanese calligraphic characters on photographic plates sealed into envelopes (Fukurai, 1931). In France, Louis Darget and Hippolyte Baraduc also attempted to capture thoughts as directly as possible, exposing the photographic plates without cameras, light sources, or visible objects. The patterns they created resulted from poorly mixed developing solutions and the heat from the thoughtographer's skin.

The dream of direct access to thoughts led both Darget and Baraduc to attempt to eliminate photographic apparatus, exposing the photographic plates without cameras, light sources, or visible objects. However, this sometimes meant introducing other kinds of apparatus. Baraduc made a “portable radiographer”, a small case containing a plate, strapped to the forehead to bring the thoughts and the plate as close together as possible.

Both Darget and Baraduc believed that thoughts emanated from the human body as a luminous vital fluid but that both the fluid and the thoughts could represent themselves on the photographic plate. What is the nature of this vital fluid? Is it generated by thoughts, as a kind of 'human radioactivity' as Darget suggests? (Chéroux, 2005) Is it composed of thought itself? Is it a carrier of thoughts in the form of a “brainwave”, a conception of thoughts that became popular with the invention of EEG? Margareta Ingrid Christian writes of the imponderable media of thoughtography, pointing out its resistance to concrete form,

> The patches of hazy substantiality; dissolving veils; nebulous figures; swirling smoke; luminous vapour; vague shapes – these instances of formlessness persist in fluidic photographs and erupt despite Darget's insistent attempts to render the images concrete and representational. (Christian, 2018)

Thoughtography may be read as related to modern art’s attraction to, and use of, ambiguity and indeterminacy. Writing of this trend in Potential Images (Gamboni, 2002), Gamboni quotes Odilon Redon writing in 1902,

> The sense of mystery consists in continuous ambiguity, in the double and triple aspect, hints of aspects (images within images), forms that are about to come into being or will take their being from the onlooker’s state of mind. All things that are more than suggestive, since they actually appear. (Redon, 2021)

It is tempting to see Catherine Malabou's concept of plasticity as a way of considering the fluidic, ambiguous, and indeterminate nature of thoughtography. For Malabou, plasticity

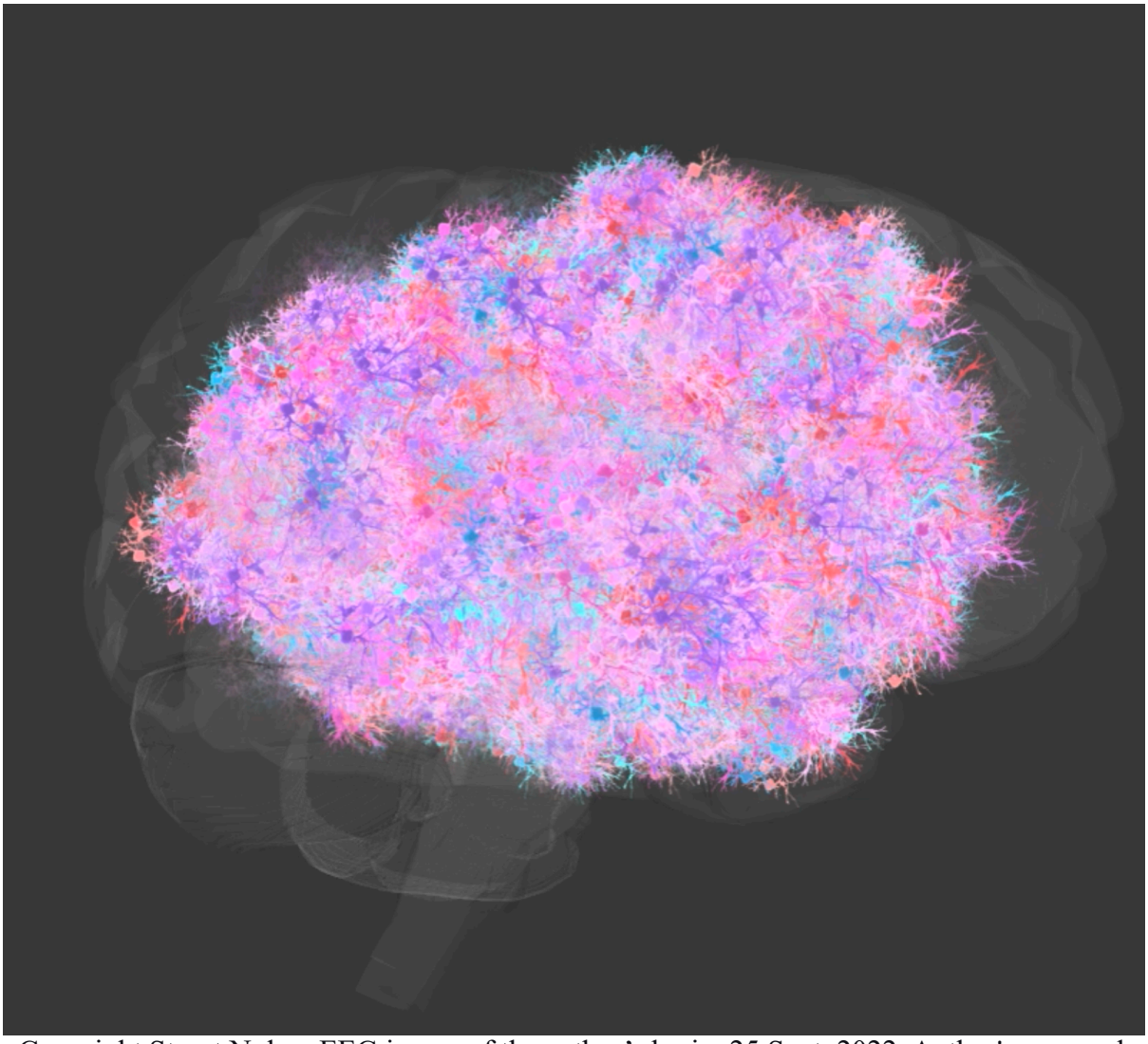
describes the giving and receiving of form and the capacity to explode or annihilate form. Her "destructive plasticity" can involve an eruption of self-mutability, darkly sculpting new forms from the ruins of the old (Malabou, 2008). In this view, the autopoiesis of neuroplasticity is a crucial part of the self-forming of plastic humanity. Both thoughtography and contemporary neuroimaging create visions of eruptive plasticity where thoughts appear to participate in the giving, receiving, and destruction of form, and where forms and formlessness erupt and resist each other, carrying energetic meaning. To use Malabou's plasticity as a lens to view such images, one must carefully navigate the seductive power of thought images. Nonetheless, the concept of the plastic arts, art forms that involve physical manipulation of a plastic medium by moulding or modelling such as sculpture or ceramics, can be applied to the wished-for creative neuroascesis of New Thought that Theatrical Mentalism and Brainwear perform.

Blobology and Meat Peripherals

"Brain images are the scientific icon of our age, replacing Bohr's planetary atom as the symbol of science" (Farah, 2009). They carry considerable persuasive power, appealing to our affinity for reductionistic explanations of cognitive phenomena (McCabe and Castel, 2008) and have been called a "fast-acting solvent of critical faculties" (Crawford, 2008). As Dumit has said, "The use of these images in thinking about ourselves is in its infancy. We are at stake in this work. How can we not afford to risk jumping in and studying it?" (Dumit, 2004).

The haste to definitively link a pattern in a brain image to a specific thought, ability, or experience has been criticised for resulting in "blobology" (Poldrack, 2012), a modern equivalent of the seductive plastic forms of thoughtography. The blobology debate is generally concerned with the statistical choices the labs that generate the images make.

However, when brain imaging becomes consumer Brainwear, other factors can play a part.



Copyright Stuart Nolan. EEG image of the author's brain. 25 Sept. 2022. Author's personal collection.

This image of my brain was produced using the Emotiv EPOC X headset and Emotiv's BrainViz software, sold as a "real-time 3D brain visualisation software for neuroscience education and exhibitions". BrainViz uses a static 3D model designed to look like neuronal structures but does not show my actual brain structures, which are much smaller. This design produces a fauxthenticity, intended to be educational but easily misleading for anyone lacking knowledge of brain anatomy. The plasticity of the image becomes misleading. The urge to remove the apparatus of technology to achieve direct access to thoughts has given way to ever more convoluted techniques for visualising those elusive thoughts.

Aptly, Idhe uses the term *second sight* to refer to technologies that perform "a translation into the visible of phenomena that lie beyond literal vision" (Ihde, 2001), a term we are familiar with from the two-person telepathy acts of Theatrical Mentalism. In Idhe's view, the visualisations of Brainwear are a form of second sight.

The second sight image of my brain is computer-generated and, as such, it differs radically from photography-generated Thoughtography. As Crary has said,

> The formalization and diffusion of computer-generated imagery heralds the ubiquitous implantation of fabricated visual 'spaces' radically different from the mimetic capacities of film photography, and television. These latter three, at least until the mid-1970s, were generally forms of analog media that still correspond to the optical wavelengths of the spectrum and to a point of view, static or mobile, located in real space. Computer-aided design, synthetic holography, flight simulations, computer animation, robotic image recognition, ray tracing, texture mapping, motion control, virtual environment helmets, magnetic resonance imaging, and multispectral sensors are only a few of the techniques that are relocating vision to a plain severed from a human observer. (Crary, 1990)

Crary chooses the term *observer*, with its meaning of one who both sees and also observes rules and codes, rather than the more passive *spectator* who simply looks. There has been much discussion among Theatrical Mentalists about the use of the word *spectator* because it implies passive looking. Alternatives such as *participant*, *helper*, and simply, *audience member* have been suggested. Perhaps we performers should explore the potential of Crary's *observer*, who "sees within a prescribed set of possibilities, one who is embedded in a system of conventions and limitations" (Crary, 1990). It is often the Theatrical Mentalist's aim to manipulate the observers' notions of limitations and possibilities as much as they manipulate what the spectator sees.

We have discussed attempts to create images of the material of thought, but what of attempts to create thought images themselves? The game company Valve is working with neuroscience platform OpenBCI to develop an open-source brain-computer interface (BCI) software to transmit images directly into the brain. Here is Gabe Newell, president of Valve, discussing the project,

> A lot of our product design discussions sound like science fiction… Our ability to create experience in people's brains that are not mediated through their meat peripherals will actually be better than is possible [with our senses].
>
> The real world will stop being the metric that we apply to the best possible visual fidelity. The real world will seem flat, colourless, blurry compared to the experiences that you'll be able to create in people's brains. (Cuthbertson, 2021)

We have travelled from blurry thoughtography and seductive blobology to dreams of a future of visual fidelity that is better than the real world. Dreams of escaping the supposed limitations of our bodies. These second sight technologies that make visible the previously invisible can be read as variations of Debordian spectacle,

> Since the spectacle's job is to use various specialized mediations in order to show us a world that can no longer be directly grasped, it naturally elevates the sense of sight to the special preeminence once occupied by touch. (Debord and Knabb, 2014)

Next, we will look at a different approach to capturing thoughts, that embraces touch and reveals the surprising capabilities of our meat peripherals.

Drawing Thoughts

> What is this prepossession of the visible, this art of interrogating it according to its own wishes, this inspired exegesis? We would perhaps find the answer in the tactile palpation where the questioner and the questioned are closer, and of which, after all,

the palpation of the eye is a remarkable variant. (Merleau-Ponty, 1968)

In contrast to thoughtography, let us now turn to a different tradition of mind reading that recognises the socially interacting body not just as an apparatus that can reveal thoughts composed in the brain but as the palpable site, material, and process of thought itself.

As we have seen, muscle reading began as a nineteenth-century Theatrical Mentalism technique that enables the practitioner to determine what action someone is imagining by feeling the micro-muscle movements in that person's arm caused by ideomotor responses to their kinaesthetic imagination. A skilled performer can detect these muscle movements by holding the hand of somebody who is thinking about, for instance, where an object is hidden in a theatre, and so find that object in a dramatic manner.

One Thousand Mindreaders (2017) was a research art project by the author that explored muscle reading by teaching it to a thousand people over a year. A variety of performers, artists, designers, technologists, scientists, academics, and members of the public participated throughout Europe and the US in both open public workshops and sessions tailored to groups with specific interests, including drawing, dance and choreography, immersive and interactive theatre, touch and empathy, game design, touch and healthcare, psychology, and emerging technology interfaces. The 31 host venues included HE institutions, theatre companies, art galleries, festivals, conferences, and technology companies. Host organisations included GoogleX, ZU-UK, Coney Theatre Company, the NHS, Pervasive Media Studio, The Royal Shakespeare Company, and Digital Science.

Several exercises were used to train participants to the point where they could duplicate drawings their partner was merely thinking of and find objects their partner had hidden in a room. When they learn these arts, participants are astounded that such capabilities are not widely known, and they quickly relate them to their particular creative practices.

Workshops end with participants considering the ownership of the collaborative

drawings and deciding who will keep each drawing.

The workshops are followed by an unstructured group discussion of how the skills the participants have learned relate to their practice and any issues raised by the experience that the group would like to discuss.

Each workshop takes one hour and has several distinct stages. For participants to learn muscle reading, they must first understand that their imaginations can physically affect their bodies in ways that may be subliminal to themselves yet detectable by others. The first step is for them to experience a physical effect of their imagination that can be felt and seen. For this, I used a psychophysiological effect demonstrated by researchers at Aberdeen University using motion-tracking (Lynden K. Miles, 2009). Here is the script I use. Please try this experiment yourself so that you can explore the same experience as the participants:

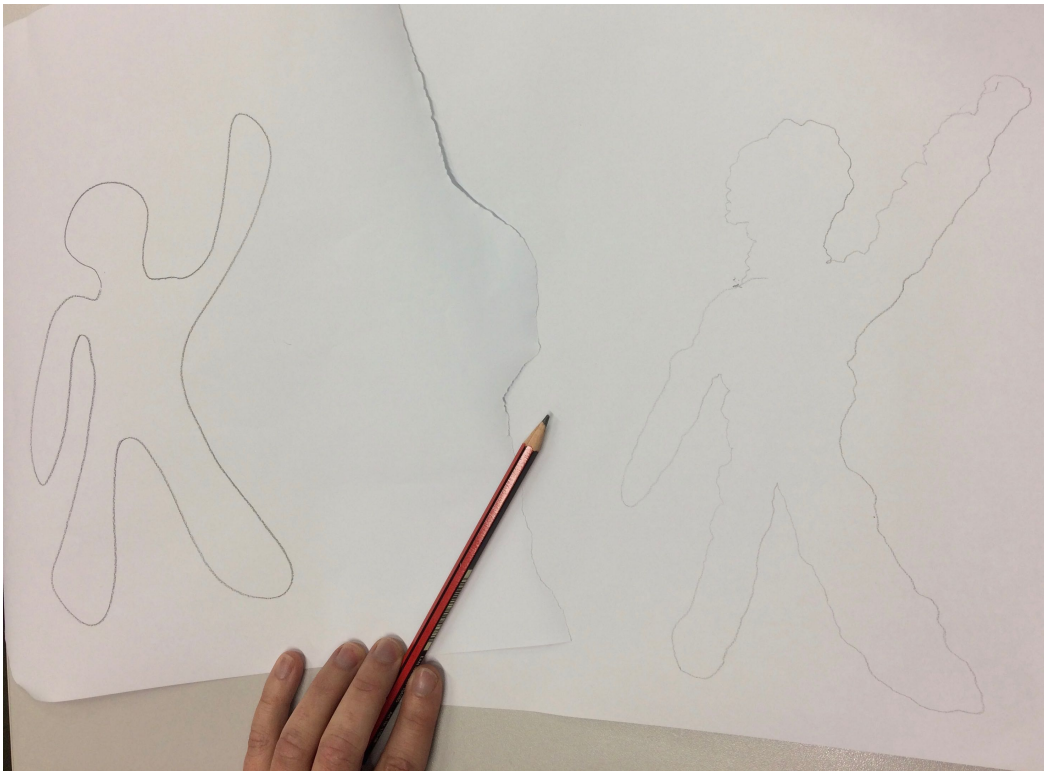
> I want you to stand up. Make sure that you're not propping yourself up on anything and that you are standing freely. Good. Now, close your eyes. Take a moment to focus on your feet. Notice that they are actively involved in maintaining your upright position. Notice how you tilt a little bit to one side, or backward or forward, and your feet adjust to keep you stable. Standing up is an active process. Standing up is a process of constantly not falling over.
>
> Now, I will ask you to think of something, and I want you to genuinely imagine it as best as you can. This works best if you genuinely engage your full imagination. Think of an event that is going to happen in your life in the future. Something you are expecting to enjoy will work well. And imagine yourself physically at that event. Transport yourself. Imagine being there in that moment. Now, notice how your body wants to tilt forward.
>
> Now, think of something in the past. Something that genuinely happened in your life. Imagine yourself physically in the past. Notice how your body wants to tilt

backward.

Researchers at Aberdeen University studied this effect using motion sensors. Even when people think they're not tilting, the sensors show they are tilting a little. The effects can be too small for us to feel consciously, but whenever we imagine something, our brain generates a signal, and these signals are being used in various ways to create the next generation of mind-reading devices.

The next activity involves the duplication of unseen drawings and is introduced as a game based on nineteenth-century parlour games and rational recreations. The game is played in pairs. One person from each pair is asked to leave the room; they will be the Receiver. While they are away, their partner (the Sender) makes a simple drawing on a sheet of paper and then hides this Target Drawing. The Receiver returns to the room and holds a pencil on a fresh piece of paper. The Sender holds their wrist and visualises their Target Drawing, thinking about which direction the pencil should move to recreate it. The Receiver gently moves the pencil around, trying to sense which way the Sender wants them to go; they will find less resistance in that direction. When they feel they have completed a drawing, they compare it to the Target Drawing, looking for any correspondence between them.

Copyright Stuart Nolan. Workshop participants practicing muscle reading. 20 Oct. 2021. Author's personal collection.



Copyright Stuart Nolan. The original drawing (left) was duplicated by muscle reading (right). 20 Oct. 2021. Author's personal collection.

What the Receiver is sensing in the Sender is something we now call the ideomotor response. When we think of an action, a signal is sent to the hand, and that signal causes a tiny muscle movement. Why does this happen? Common Coding Theory is a contemporary cognitive psychology theory describing how our perceptual representations of things we can see and our representations of physical movements are linked. The theory claims that there is a shared representation, a common code, for both perception and action. Performing an action activates the associated perceptual event and, more importantly for what we are doing, seeing an event or imagining an event activates the action related to that event (Prinz and Sanders, 1984). Common Coding Theory suggests that the same neurological and motor processes deal with Doing Something, Thinking About Doing That Thing and Watching Someone Else Do That Thing. You will get the same physical response in each instance but at different intensities.

An interesting advancement in the participants' embodied learning occurred during this activity. When they are told what they will do, they express doubt and disbelief that they will be able to duplicate the Target Drawings, but they are willing to try because it is framed as a game where any correspondence between the drawings is considered a success. When they compare their drawings, they are visibly astounded at their accuracy and vocally exhilarated that they have learned a skill they had no idea the human body was capable of. They are surprised that such a capability isn't more widely known, and they quickly relate it to their creative practices or pastimes that involve sensing the physical world in real-time: playing musical instruments, sports, acting, improvising, riding horses, sailing, playing video games, and especially dancing. Because of this link to dance, the transition to the next activity works well.

Finding Hidden Objects and the Mentalist Dance

Having explored the ideomotor response and played a mind-reading drawing game, participants are now ready to learn the stage technique that made nineteenth-century muscle readers both famous and controversial. A widespread use of muscle reading in a stage performance was for the performer to find an object hidden in the theatre by holding the wrist of an audience member who had hidden it and asking them to merely think of the object's location. This has been the basis of the successful careers of mentalists from J. Randall Brown to the present day. You will notice that this is very similar to the technique we used earlier for duplicating drawings, but finding an object in a room is easier because the movements involve the whole body, so they can be made larger and felt more easily.

One person, the Hider, hides an object, holds their partner's wrist and thinks about the object's location. Their partner, the Seeker, moves around the room and senses the resistance in the Hider's body. Again, the ideomotor response of the Hider will be detectable, and the path of least resistance will lead the Seeker to the hidden object.

Copyright Stuart Nolan. Workshop participants finding hidden objects using muscle reading. 8 Jan. 2021. Author's personal collection.

Watching a group perform this exercise is like watching an exceedingly slow and stately dance. Participants are intensely focused on listening and speaking with their whole bodies. They describe the experience as somehow both relaxing and tense at the same time. They begin quietly as they slowly seek, then become increasingly noisy with shouts of excitement as the hidden objects are found. This exercise can also be performed outdoors. Indeed, several Theatrical Mentalists have performed muscle reading while driving, finding objects hidden anywhere in a whole city.

In 2023, I undertook a 4-month fellowship at the Kluge Center at the Library of Congress, researching the early history of New Thought and Theatrical Mentalism. I ran a workshop on historical muscle reading for 16 librarians and visiting called *The Materiality of Thought (or How to Read Minds for Fun and Profit)* (Nolan, 2023). We explored several techniques I had discovered in the archives, including reading the thoughts of several people at once when finding hidden objects. If you are holding the arms of two people who both know the object's location, it, to our surprise, becomes easier to find the object. It becomes more like the feeling of using a Ouija board with several people. Several participants were trained historians, and they realised that had they read the historical accounts of Victorian muscle readers, they would have assumed that muscle reading was faked in some way. By trying the techniques themselves, they understood the historical performances more clearly and intimately. The experience of learning muscle-reading also lets us read the 1885 publication *Experiments in Muscle-reading and Thought Transference* (Dessoir et al., 1886) by the philosopher, psychologist and theorist of aesthetics Max Dessoir in a more sympathetic manner. Rather than dismissing his experiment and the image they produced as fake, pseudo-science, or mere coincidences, we can recognise their similarity to the images we produced in the muscle-reading workshop and understand what Dessoir was experimenting with. The materiality of these captured thoughts becomes clearer.

Kinaesthetic Emulation

Joseph Roach speaks of activating the kinaesthetic imagination through kinaesthetic emulation in order to engage with history, in his case through the recreation of 50s and 60s African American-generated dance forms (Raphael and Roach, 2009). Similarly, our understanding of the practices of early mentalism and its links with science can be enriched through emulation and revision of its kinaesthetic forms, techniques, and gestures.

For many participants, the workshops made visible the unexpected resonances between mentalism and dance, especially with somatic practices such as Ohad Narahin's Gaga that works as a "…point of access for reflecting on the cognitive aspects of dancing, and the interaction of mind and body" (Katan, 2016), and with various forms of contact improvisation. These resonances open a space for dance and movement theories to engage with mentalism, particularly around Foster's notion that, "…kinesthetic empathy takes place in moments of perception when the subject which moves and the subject which is moved seem to dance at the same time."(Foster, 2011). Many dancers found muscle reading instantly recognisable as an instinctive part of their practice. A group of Tango dancers related it to the way they touch their partner in the small of the back and try to sense where they intend to go before they move. They found that the neurophysiological science of muscle reading gave them a new language to communicate and analyse this instinctual and mysterious aspect of their dance.

A kinaesthetic emulation of muscle reading practices brings the body to bear on mentalism's performance philosophy of mind. It makes visible a neglected practice of the unseen, the speculative, and the imaginary in the historical and contemporary conception of energy and forces as aesthetic interventions.

> When energetic processes in dance and performance art are qualified as the mobilization, activation, initiation, regulation, guidance and containment of forces, what consequently follows is that not only aesthetic, but also ecological, economic and political relations come up for debate (Huschka and Gronau, 2019).

This was certainly true of the workshop debates, which addressed economic and political issues of the body, movement, and touch, including data privacy, surveillance capitalism, inappropriate touch, and the importance of appropriate touch for empathy, well-being, and social cohesion. Muscle reading builds a unique dialogue between bodies that trades in a

dialectic of antagonism and intimacy, friction and flow, conflict and cooperation. Through an experiential exploration of the phenomenology of muscle reading, *One Thousand Mindreaders* offered a physical confrontation with the histories of mind-reading performances. The experience uncovered previously unsuspected links between dance and mentalism encountered the playful, transgressive, and sublime aspects of touch and telepathy, and engaged with mentalism performance as philosophy. The workshops initiated discussions about the engagement of art with neuroscience and developed notions of neurotechnological futurity, the telepathic sublime, the cerebral subject, surveillance capitalism, and postcognition.

The rise of neurocentrism and the cerebral subject in the arts (Vidal, 2017) has contributed to the anxiety of neuroexistentialism (Caruso, 2018). For some, muscle reading challenged a mind-body dualism that cannot account for the quintessentially performative qualities of art practices and provided support for a more postcognitivist view (Penny, 2017).

Physical interaction between audience and performer is too often seen as a recent development in performance. For several participants, it was enlightening to experience a highly interactive and established performance practice. Nineteenth-century Theatrical Mentalism can be seen as an interaction with emerging communication technologies. Similarly, audience interaction in twenty-first-century performance reflects a concern with new communication technologies, digital media, and immersive environments (Borowski et al., 2013). The participants' concern with touch, telepathy, and technology inspired discussions that enlisted muscle reading both in kinaesthetic histories and in re-imaginings of the role of the body in technological futurities. For example, to imagine anticipatory ethics of emerging mind-reading technologies, particularly of the kind developed CTRL-Labs, acquired by Facebook in 2019, which is fundamentally a muscle reading technology (BBC, 2019). This raised the question of how NeuroArt can respond to the telepathic technofuturity

envisioned by Elon Musk's Neuralink (Musk, 2019) or to the mass mind-reading of surveillance capitalism documented by Zuboff (Zuboff, 2018).

Embodied Thought Drawing

> The mind,—
> What shall we call it?
> It is the sound of the breeze
> That blows through the pines
> In the Indian-ink picture.
>
> Ikkyū Sōjun (1394-1481) (Blyth, 1966).

The muscle reading workshops inspired a more embodied understanding of nineteenth-century telepathic imaginaries. As one participant said, "When we think of Victorians talking about 'feeling the vibrations, we tend to assume that they are referring to spiritual vibrations, but maybe, sometimes, they were simply referring to muscle movements in a scientific manner."

In addition to challenging assumptions about the history of science, many visual artists found that the practice and science of muscle reading illuminated their drawing practice. Maclagan writes of the performance aspect of automatic drawing that, even when practised alone, "there is often a keen sense of addressing an invisible, interiorised audience" and that "if one part of the personality is inviting another part to convey messages or invent forms, then there is a kind of secret collusion between the two that has elements of an internal dialogue or drama." (Maclagan, 2013). When two people engage in drawing through muscle reading, this drama is both internal and external. There is a strong sense of immersive embodiment, of being inside the other. This can create a sense of a double transgression, both

physical and mental. Many participants of *One Thousand Mindreaders* described it as both pleasurable and scary, a form of the telepathic sublime. A related expression of the telepathic sublime has been recognised as a phenomenon in media reports of mind-reading neurotechnologies (Pedersen, 2017).

Drawing can aim to capture thoughts or to be a part of the process of thinking, though the distinction between drawing thoughts and drawing thinking is not easy to delineate. As Gartner's Writing on Drawing acknowledges, "Ideational drawing (as process and as artefact) is a thinking space – not a space in which thought is re-presented but rather a space where thinking is presenced. In its effectiveness, its period of efficacy, ideational drawing is 'thinking' and not 'thought'. The distinction 'thinking-thought' is important. When drawing is used to ideate it is in a present tense; it is what it is in the immediacy of the thinking-act. Thought, on the other hand, is of the past, in a sense concluded, settled and in some way objectified. I say 'in a sense concluded' because I acknowledge that even when a drawing expresses an ostensibly conclusive thought, there is an ongoing creation, a continuing emergence of meaning, produced in the way the drawing is taken up by a spectator." (Garner and Steers, 2008) I would go further than Gartner and suggest that a 'settled' thought can never be captured because as soon as it becomes involved in the act of drawing, writing, or speech, it becomes 'unsettled' once more. Drawing thoughts is always, in this sense, an unsettling act.

Drawing on the work of Michael Taussig we can read these thought drawing as examples of fieldwork drawing with several notable properties (Taussig, 2011). Taussig plays with several meanings of the word *draw,*

> To draw is to apply pen to paper. But to draw is also to pull on some thread, pulling it out of its knotted tangle or skein, and we also speak of drawing water from a well. There is another meaning too, as when we say "I was drawn to him," or "I was drawn

> to her," or "He was drawn to the scene of the crime," like Raskolnikov in Crime and Punishment. Drawing is thus a depicting, a hauling, an unraveling, and being impelled toward something or somebody. I will be doing this twice over, first in my drawing and then, in what I have to say about it, drawing on my drawing. (Taussig, 2011)

Thought Drawing can be related to these multiple entangled meanings. The participants are drawn too and by each other. Thoughts are drawn from them like water from a well. A new drawing unravelled and a new drawing is hauled from it in the push and pull of muscle reading. Participants draw upon their drawings as they draw and as they interpret, decode, and reflect upon them. Participants search for correspondances, synchronicities, synergies, and, to use a word popular among Theatrical Mentalists, *hits.* Taussig also discusses hits in writing,

> Of course, every now and again there will be a "hit" where, with precision and vividness, words written down in feverish haste score a bull's-eye. I know this for a fact, having interpolated extracts from my diaries into my published texts for this reason, and I love their energy in their new location—like drawings, I suppose. This seems to me the very peak of perfection, where these "hit" words become images you can see in your mind's eye, see and feel, and the truth of the experience described rings whole and pure. (Taussig, 2011)

Participants in Thought Drawing search for hits that tell the truth of the experience, and these are often not related to parts of the drawing that match with a visual exactness. Rather, they are the parts of the drawing that indicate where they feel they understood each other's intention, felt their partner's will, or began to act *as one.* In Thought Drawing, one attempts to be inside the other person. You imagine their hand is your hand. At the same time, you allow them to move through you. If, as Dubovsky has said, "Drawing is a way of both reflecting on the world, and of entering into it" (Dubovsky, 2008), then what, or whose,

world is being entered into during Thought Drawing? To quote Taussig again, “What is more, photography is a taking, the drawing a making, and although there is much to quibble about with these words, there is wisdom in them too” (Taussig, 2011). This is relevant to our comparison of Thoughtography with Thought Drawing. However, Thought Drawing can be seen as an act of giving, taking, and making akin to dance. With these kinds of performative acts in mind, we can relate them to Derrida’s portrayal of drawing as an intransitive act (Derrida and du Louvre, 1990), where our focus does not fixate on the perceived image or a represented world. Instead, attention is directed toward the representation of that world as an activity. From this perspective, we perceive nothing of the material of thought within the Thought Drawings themselves; rather, our focus is solely on the activity of drawing as an intransitive collaborative act.

Psychic Research and Drawing

When the American Society for Psychical Research (ASPR) engaged with Spiritualists, their different orientations to the notion of psychic phenomena resulted in a communication problem. “Experimental principles like control, replication, and witnessing became stumbling blocks; some researchers assumed a shared vocabulary and failed to grasp when their subjects were using very different logics under the same name.” (Puglionesi, 2016) There was tension between a public that wanted to participate in national science and the attempts of members of the ASPR to teach them the correct procedures. This can be seen as a tension between people who want to play and perform and those who want to define the rules of the game. The activity had to be entertaining for citizens to conduct psychic science experiments. When a contributor to the ASPR describes her parlour experiments as “quite successful and entertaining”(Puglionesi, 2016), we can consider both success and entertainment as necessary for her continued contribution.

The citizen psychic scientists were seeking entertainment and, as Natale argues, the demonstrations of Spiritualists were designed to provide it (Natale, 2016). In such a context, specific scientific methods can drive the performative aspects of the event. “The popular standard of Baconian science— empirical proof by witnessing— shaped mediumistic performance from the very beginning of Spiritualism. Spiritualists staged “demonstrations” for audiences of rational observers to draw their own conclusions; they performed in “halls of science” and advertised “scientific lectures.” (Puglionesi, 2016)When “empirical proof by witnessing” is a dominant mode, those staging the demonstrations will strive to make their demonstrations effective, affecting, convincing, and engaging. They will use all the techniques of performance they can muster.

“Thus, the methods of psychical researchers were shaped by the colourful stage acts of thought readers, which involved locating hidden objects, reading concealed messages, and guessing randomly chosen numbers. Such activities were also the basis of common parlour games that led some ordinary people to identify themselves as possessing supernormal mental powers. These games and performances, along with new communication technologies discussed above, shaped cultural expectations about how powers of mind could be demonstrated” (Puglionesi, 2016). The influence also went the other way. Mentalists are keen followers of trends in the mind sciences, shaping their performances to suit current public beliefs and concerns and using scientific research to create and frame performances and add legitimacy to their acts. This continues today with performers claiming knowledge of fields such as forensic science, psychology, anthropology, and philosophy both in their marketing and during their performances.

Brainwear allows for a similar playful amateur exploration of mental potential as psychic science did for the contributors to the ASPR. In addition to allowing the user to conduct entertaining experiments on their own brains, owners are often invited to participate

in group experiments. I participated in an EPOC experiment that involved watching two presentations while wearing the Brainwear device. The study aimed to compare the effect of two different presentation styles, one consisting of just spoken word and the other involving several interactive elements based on quiz questions and polling. Taking part in psychic research or Brainwear experiments as an amateur is a form of rational recreation, the ideal that nineteenth-century middle-class reformers hoped to impose on the urban working class, believing that "leisure activities should be controlled, ordered, and improving" (Cunningham, 1980). Recreation was deemed rational when it involved self-improvement and self-enrichment, aims that were at the heart of New Thought. The audiences for both New Thought speakers, Theatrical Mentalism and Brainwear, hope to be entertained and improved. The more recent term “serious leisure”, introduced by Stebbins (Stebbins, 1982), is applicable here as it captures the systematic nature of the activity and its combination of pleasure and self-improvement.

Drawing Duplications

The drawings of psychic research demonstrate the form of mentalism that I have defined as a belief that the mind is capable of extraordinary abilities. “Images of telepathy research are demarcated by their clear resistance to ‘practical’ science, and they can be thought of as illustrations of the desire to create a substantial record that the body and mind are indeed able to extend beyond the reach of what is considered ‘human’, and of the exploration of non-normative human sensory potential.” (Puglionesi, 2016)

Puglionesi suggests that drawing became a tool for the exploration of human sensory potential because, ‘It allowed psychology to bypass what James called “the misleading influence of speech,” producing objective evidence that could secure the discipline’s scientific bona fides.” (Puglionesi, 2016) Drawings also provided material evidence. “Like

self-registering instruments in meteorology, drawing became a tool that inscribed fleeting mental activity as a material trace." (Puglionesi, 2016). Brooks highlights the playfulness and plasticity of the trace-making inherent in such drawings.

> They hold a certain potency, and as artefacts pertaining to belief, they double as an attempt to provide a tangible trace. The level of interaction possible with these images is atypical. They are active because images relating to paranormal issues are two-fold: they depict what they depict but also allow us to perceive 'something else', a latent possibility. Individuals approaching the paranormal from an *emic* perspective are inclined to push an image to 'become' paranormal. However, these images are incapable of an absolute depiction, and are unstable in their ingrained failure to provide an accurate representation of an anomalous experience. From the perspective of visual legendry (sic), however, the potential that something might be there is sufficient. (Brooks, 2013)

As with thoughtography, these drawings demonstrate a resistance to concrete form and can become more meaningful than the other methods the researchers used. "…in contrast to tedious random guessing, drawing allowed experimenters to communicate meaningful semiotic content." (Puglionesi, 2016) The word *tedious* is insightful here. I suggest that such drawings provide several *theatrical* benefits for Spiritualist demonstrations, citizen psychic science experiments, and Theatrical Mentalism performances.

For audiences, drawings are more meaningful than guessing playing cards or numbers; they are quickly understood by audience members regardless of their language or reading skills, and they are more visually captivating and easily visible in a large or dimly lit room. A performance of mentalism can become repetitive if it is simply a demonstration of one skill over and over again; drawings can be used to provide variety and texture. In this regard, performing mentalists talk of the importance of the "reveal", how a divined thought is

revealed in a dramatically effective manner. Drawing can be used to make theatrically effective reveals. I will use an example of a performance of what Theatrical Mentalists call a Drawing Duplication to consider this more closely.

I invite an audience member, let's call them Bob, onstage and ask them to make a drawing but to keep it hidden from both me and the audience. I make a drawing. I show Bob my drawing. He is amazed. I show the audience my drawing, it is a drawing of a cat. Bob reveals his drawing, which is also of a cat and a close match to the one I have made.

This structure has some solid theatrical moments but also some weaknesses. By showing Bob the drawing first but not to the audience, I am keeping them in a state of tension and anticipation. They have seen Bob's amazement, so they know I have succeeded. One might think that they now do not need to see my drawing, but of course, the opposite is true; they now *really* want to see my drawing. As proof, yes, but also because they want the drama to end *correctly*. They understand the nature of the drama, and they want a satisfactory ending. This ending only happens when Bob reveals his drawing. This is a decisive moment because they know what is coming and what they want to see. It is also strong because the whole audience simultaneously gets that reveal's impact.

Let's try it another way...

I invite an audience member, let's call them Bob, onstage and ask them to make a drawing but to keep it hidden from both me and the audience. I make a drawing. I show Bob my drawing. He is amazed. I ask Bob to show the audience his drawing, it is a drawing of a cat. I reveal my drawing, and it is also of a cat and a close match to the one Bob has made.

This is also strong but has the benefit of putting the reveal under the performer's control, who can use their theatrical skills of staging, pacing, timing, and character to make the moment as effective as possible. It puts the audience's focus on the performer rather than on Bob, which may be a good or bad theatrical choice depending on the performer and their

intentions for the routine.

Let's try it one more way...

I invite an audience member, let's call them Bob, onstage and ask them to make a drawing but to keep it hidden from both me and the audience. I make a drawing. I openly tell Bob that on the count of 3, he should show the audience his drawing. I count to 3, and we both show the audience our drawings. The audience is amazed. I turn to Bob and show him my drawing. He is amazed. The audience responds to Bob's amazement.

Notice that the performer controls the first reveal, but the focus is on both the performer and Bob. Notice that there is a second reveal when Bob sees the performer's drawing that is also, to some degree, in the performer's control. This coda will be a moment of amazement for Bob and humour for the audience as they watch Bob catch up with what they already know. There is a slight weakness in what we might call the cognitive load of the first reveal. The audience doesn't quite know what to expect. They expect the drawings to match, but they don't yet know what they are drawings of. So, the moment takes a little more time for the audience to grasp. This might seem like a slight difference, but in a performance, it will mean that the audience members react at slightly different times so that the overall response may be a little more spread out in time and intensity.

There are many other ways to structure the reveal of a Drawing Duplication, but I do not intend to explore them here. The point is to understand that even the experience of a simple duplication of a drawing can take many forms, whether in a Spiritualist demonstration, psychic science performance, or Theatrical Mentalism performance. It is easy to imagine the amateur psychic researchers in their drawing rooms and the Spiritualists in their halls playing with the reveal of successful drawings. The role of Theatrical Mentalism was not just to provide a space to imagine the possibilities of the mind but also to demonstrate the intrinsically entertaining aspects of experimentation. The results and reveals.

The anticipations and tensions. The tragedy and comedy of failure and the thrill and comedy of success. We must not forget that these activities were fun, they were games, and their theatrical aspects would have been essential for the participants. These performances are a process of thinking, and we may ask whether these drawings capture the act of thinking as much as they capture thoughts.

Wittgenstein and Guessing Thoughts

Wittgenstein remarks that "people have often talked of a direct transmission of feeling which would obviate the external medium of communication" (Wittgenstein, 1958) and questions whether it makes sense to postulate a direct medium of communication in contrast to the usual, "indirect" method. When comparing Thoughtography to Thought Drawing, we can consider how Wittgenstein challenges the philosophical temptation to approach 'thinking' as an inner state or process,

> 321. There is a game called 'thought guessing'. One variant of it would be this: I tell A something in a language that B does not understand. B is supposed to guess the meaning of what I say. —— Another variant: I write down a sentence which the other person can't see. He has to guess the words or the sense. —— Yet another: I am putting a jigsaw puzzle together; the other person can't see me, but from time to time guesses my thoughts and utters them. He says, for instance, "Now where is this bit?" —— "Now I know how it fits!" —— "I have no idea what goes in here." —— "The sky is always the hardest part", and so on —— but I need not be talking to myself either out loud or silently at the time.
>
> * 322. All this would be guessing thoughts; and even if I don't actually talk to myself, that does not make my thoughts any more hidden than an unperceived physical process. (Wittgenstein, 2001)

In each of these cases, one's thoughts are hidden from the other person in different ways. Wittgenstein directly challenges our temptation to equate 'thinking' with a mental process that occurs solely in the brain,

> 605. One of the most dangerous of ideas for a philosopher is, oddly enough, that we think with our heads or in our heads.
>
> 606. The idea of thinking as a process in the head, in a completely enclosed space, gives [us] something occult. (Wittgenstein et al., 1967)

To challenge these misleading ways of thinking about thinking, Wittgenstein compares and contrasts 'thinking in the head' with 'thinking on paper',

> It is misleading to talk of thinking as of a 'mental activity'…. If again we talk about the locality where thinking takes place we have a right to say that this locality is the paper on which we write or the mouth which speaks. And if we talk of the head or the brain as the locality of thought, this is using the expression 'locality of thinking' in a different sense. It is not our intention to criticize this form of expression or to show that it is not appropriate. What we must do is: understand its working, its grammar, e.g. see what relation this grammar has to that of the expression 'we think with a pencil on a piece of paper'. (Wittgenstein, 1958)

When we talk about the locality of thinking in terms of the paper on which we draw, the mouth which speaks, or the images produced by Thoughtography or Brainwear, we use the idea of locality in different ways, but none of them is complete. "'Where does thinking take place?' We can answer: on paper, in our head, in the mind. None of these statements of locality gives the locality of thinking" (Wittgenstein, 1958). These different habits of talking about the materiality of thought are entangled in complex ways. As Wittgenstein writes, "I really do think with my pen because my head often knows nothing about what my hand is writing" (Wittgenstein and Wright, 1980).

Finger Reading

I have discussed the visual and embodied traditions of mind-reading, but I wish to avoid the impression that they are entirely separate from each other. They are entangled and co-constitutive of many of our experiences of mind-reading. To illustrate this, I will end this chapter by describing a Theatrical Mentalism routine that highlights the combination of visualisation and physical response that I use in my practice and also shows the different ways in which people respond when asked to imagine something. It raises the question of where thoughts occur and suggests that mind-reading cannot be simple brain-reading.

This routine is written in the style of a publication aimed at performers, describing the reasons for the theatrical techniques described as it goes along. I use this style to convey the way that performers of mentalism construct their routines.

Finger Reading Routine

Finger Reading is designed as the opening routine of a performance. It introduces the theme of Ideomotor Responses and also gets the audience to understand that it will be them rather than me doing the mentalism.

I begin by shaking hands with someone in the audience. I then fist-bump the next person along. I high-five the next person. I give a thumbs-up to another person. I blow a kiss to someone else. Then, I do the “phone me” gesture to another person. I’m making friends in a gentle and slightly daft way here. I’m also picking out people who appear warm, have good open expressions, and who seem willing to join in without being overly eager. I will use them later in the performance for other routines.

"Have you noticed how many ways we can say hello only using our hands? And that's just the polite greetings."

This line aims to be gently funny. It's a way of saying hello to the audience by discussing how we say hello. This kind of meta-chat is something I do a lot.

"What most distinguishes us from other animals? Many people would say our big brains, but why did we evolve such big brains in the first place? The answer that some academics now give is that we developed big clever brains to operate these things…"

I hold up and wiggle my hands.

"Our hands are amazing, flexible, complex tools. There is nothing like them in the rest of the animal kingdom for the range of grips and actions we can do with them. But they aren't just tools for doing; they are tools for communication. Communication is not just through gestures but through touch. We can sense a lot of information through a simple touch. And some people are very good at sending information in this way. I will need to find a few people with this talent so I'm going to quickly test you all."

"Please hold your right hand face-up, flat but relaxed, in front of you like you're feeding a carrot to a horse. Remember to hold your palm flat, or the horse will bite your fingers."

I like the theatrical image I get with everyone holding their hands out like they're feeding me carrots. I've tried other approaches but find that if they have their hands face down, it looks a little like they are all giving me Nazi salutes, not the image I'm going for.

Also, I think that mentioning fingers being bitten off by a horse is a strong, visceral way of making the audience focus on their fingers. It seems to work because some people flinch when I say it. The people who flinch have strong visual imaginations, and knowing who they are, I may use them later.

"Now, I want you to put all of your focus onto one of your fingers. Pick one and stick with that one. Imagine that the chosen finger has a ring on it. Use your best imagination to really see the ring. See it in detail. What colour is it? How big it is. Does it have a stone? Feel the weight of the ring pulling your finger down. Now imagine the ring is full of energy. Imagine that you can feel the energy making your finger hot. You can hear the energy crackling. You can see the finger glowing. You can smell the smoke from the crackling finger."

I'm trying to engage their imaginations in as many sensory modes as possible - smell, sound, feel, sight. I want them to really try to imagine these things because that will bring their attention to the finger and make it stiffen.

"Remember ET when he phoned home? His glowing finger grew longer, just like that. Imagine this as clearly as you can, and I'm going to test your imagination. Try to send me the information. Try to let me know which finger you are thinking of without consciously telling me. Just send the information to me through your finger."

I then walk along, testing people's fingers. I touch each of their fingers in turn. With some people, it will be obvious which finger they're thinking of as it will be much stiffer. You are looking for a difference in feeling. Some people will laugh because their thought-of-finger will visually tremble. Have fun, and don't rush this bit. Just touch the finger

you think is correct and say, *"This one?"* And nod. They will generally reply with a nod or a shake of the head. The rest of the audience won't know if you are getting them right or wrong because they will be focusing on their own finger if you have instructed them correctly.

This is a great way to practice sensing Ideomotor Responses in others because it doesn't matter too much if you are correct in guessing. Remember, this isn't a demonstration of your skill; you are testing **their** ability. The key is to both be confident and to act confidently. You are genuinely looking for people who are good at activating their Ideomotor Response, but you are also looking for good volunteers.

When you get it right, you should praise them. *"Very strong!" "Great sender!" "Wow. Clear as a bell!"*. If you genuinely don't know which finger they are thinking of, here is a tactic to use. People generally choose the second finger and ring finger more than the index finger and pinkie. Eliminate the index finger and pinkie, saying, "It's not this one or this one, *is it?"* If you are correct, then you are now down to two fingers. Take a guess. If you are wrong, claim a near miss by saying, *"Nearly! Interesting, you're a tricky one."*

So, everything is structured so that people can't fail. They are either *"good senders"* or *"interesting and tricky"*. Either way, what you say is delivered as a compliment. Now, pick the volunteers you want and carry on with the show. I'm sure you can see how you can use people who are *"good at sending information by touch"* in various entertaining ways. I hope you don't ignore this routine because there it has no big magic-style effect. What the audience should experience is a strange feeling of focus. A taster that helps them to understand the rest of the show. It is about slowly taking them to a mental place where they will feel and see what is happening to the participants on the stage in later routines. I will often refer back to this in the later routines to help the audience physically imagine what the onstage participant is experiencing.

Now, here is an interesting follow-up. Ask the audience to raise their hand if they

could see the ring. Most people will put their hands up. Now, ask them where they saw the ring. Some will say in their mind. Perhaps “in my mind’s eye”. Others will say they saw the ring on their finger. These two groups often look at each other in surprise. Each group finds the other’s way of imagining challenging to comprehend. Now, ask them to raise their hand if they could feel the imaginary ring. Few people can do this. Now, ask them where they felt it. Most feel it on their finger, but some say it is in their mind. This makes less sense to some people. You can see something in your mind’s eye, but can you feel something on your mind’s finger?

In the next section we will consider Brainwear as a recent addition to attempts to alter our own mental stated to improve out lives.

Altered States

> When Justinus Kerner visited Meersburgh in 1854, he heard wondrous stories from old people who had known Mesmer. He was told that when Mesmer went to the island of Mainau, flocks of birds would fly toward him, following him whatever he walked, and settling about him when he sat down. Mesmer, they added, had a pet canary in an open cage in his room. Every morning the bird would fly to his master, perch on his head, and wake him with his song. He would keep him company during his breakfast, sometimes dropping lots of sugar into his cup. With a slight stroke of his hand, Mesmer could put the bird to sleep or wake it up. One morning the bird reminded in its cage: Mesmer died during the night. The canary sang no more, and a few days later he was found dead in his cage. (Ellenberger, 1970)

Here, the historian of psychiatry, Henri Ellenberger, relates a story told in Kerner's 1856 book *Franz Anton Mesmer aus Schwaben*. The tale illustrates Mesmer's public reputation as a kind of magician with otherworldly abilities. Mesmer was undoubtedly a skilled performer with a talent for self-promotion and both the show and the business of show business. But Mesmer was also fundamental to the founding of modern psychology and philosophy of mind. Mesmer's influence can be found most clearly in dynamic psychiatry, the study of emotional processes, their origins, and their underlying mental mechanisms. Here is Mark S. Micale discussing Ellenberger’s view on the importance of Mesmer,

> For Ellenberger, the royal road to the discovery of the unconscious lay through the study of hypnosis, and this hypnotic exploration of the human mind was initiated in the 1770s by the Viennese physician Franz Anton Mesmer. Ellenburger believes that Mesmer was a figure of premier importance in the exploration of unconscious mental life. Mesmer’s work of the late eighteenth century, he shows, was elaborated upon in Europe and North America during the following hundred years by diversity of

> medical and non-medical writers, including animal magnetists, hypnotists, and lay healers. During the 1890s, this heritage of Mesmeric work was picked up, systematised, and scientized by the first major dynamic psychiatric theorists. (Ellenberger and Micale, 1993)

The elaboration of Mesmer's work was undertaken, in part, through demonstrations and performances that led to the development of what Ellenburger calls "dynamic psychiatry", a mentalist approach based on the study of emotional processes, their origins, and the mental mechanisms underlying them. Historically, dynamic psychiatry has worked in opposition to "descriptive psychiatry", which focuses on examining observable symptoms and behavioural phenomena rather than delving into the underlying psychodynamic processes. The current standard approach combines dynamic and descriptive methods in a biopsychosocial model.

The same demonstrations and performances of Mesmerism that influenced early psychiatry were also foundational in developing Theatrical Mentalism, which explores and dramatises ideas regarding the same emotional processes and mental mechanisms. These theatrical developments are generally viewed from the perspective of scientific development as, at best, a distraction and, at worst, a detrimental influence on rational thinking. However, their cultural impact was far more complex, and they are an essential part of Ellenberger's royal road to the discovery of the unconscious. This chapter will consider how Mesmerism's influence on New Thought and Theatrical Mentalism relates to the altered states of mind that occur during the use of Brainwear.

Quimby's Mesmeric Method

I want to return the image of Quimby and Burkmar that we considered in the last chapter for its relation to Quimby's idea of the *mental daguerreotype*. Consider what is happening between the two people in the image. Quimby is mesmerising Burkmar, who was

an excellent subject for such an altered state of mind, in order that Burkmar can demonstrate extraordinary mental ability of clairvoyance, telepathy, and healing. Central to New Thought mentalism is an interest in the potential of altered states of mind to improve health and wellbeing and develop modes of thought that bring success, wealth, and happiness. Haller's history of New Thought (Haller, 2012) traces a thread of neuroascesis from the trance states of Quimby's Mesmerism to our modern attempts to train the brain, develop habits of positive thinking, and promote mental wellbeing . Similarly, direct-to-consumer Brainwear claims to help the user improve their brains through meditation, mindfulness, and the training of a range of psychological factors. This interest in altered states is dramatised in Theatrical Mentalism through performances of hypnosis and in the altered states that the performer seemingly enters during demonstrations of mental abilities.

Quimby, George A. Quimby, wrote of his father's methods in the New England Magazine, March 1888, "In the course of his trials with subjects, he met with a young man named Lucius Burkmar over whom he had the most wonderful influence; and it is not stating it too strongly to assert that with him he made some of the most astonishing exhibitions of Mesmerism and clairvoyance that have been given in modern times." (Quimby, 1888) Quimby hired Burkmar and performed with him from 1843–1847, putting him in trances in front of audiences. While in an altered state of mind, Burkmar would purport to read minds and diagnose the audience's illnesses. The link between altered states and health became a foundational idea in New Thought mentalism. In the image of Quimby and Burkmar (fog???), we can see how the performances were staged. George A. Quimby's account adds this detail,

> Mr. Quimby's manner of operating with his subject was to sit opposite to him, holding both his hands in his, and looking him intently in the eye for a short time, when the subject would go into that state known as the mesmeric sleep, which was more

> properly a peculiar condition of mind and body, in which the natural senses would or would not operate at the will of Mr. Quimby. When conducting his experiments, all communications on the part of Mr. Quimby with Lucius were mentally given, the subject replying as if spoken to aloud. (Quimby, 1888)

Gregory's *Animal magnetism: or Mesmerism and its phenomena* (1909) describes a similar process focusing on the holding of the thumbs. "Another, and in some cases more successful method, is to sit down, close before the patient, to take hold of his thumbs in your thumbs and fingers , and, gently pressing them, to gaze fixedly in his eyes, concentrating your mind upon him while he does the same." (Gregory, 1909) I draw attention to this because the holding of the thumbs is common in the modern techniques of hypnotic induction that I have practised. There is something about having one's thumbs held that discourages movement while being somehow comforting. Thus, the thumbs become what Ormond McGill calls a "fixation object" (McGill, 2003). Fixation on a single object or idea is central to both Mesmerism and hypnosis and became known as monoideation.

Fixation and Monoideation

James Braid coined the term hypnosis in the 1840s but wished to reserve that term for subjects that fall into hypnotic sleep. Hypnosis was then just one form of monoideation,

> “The real origin and essence of the hypnotic condition is the induction of a habit of abstraction or mental concentration, in which, as in reverie or spontaneous abstraction, the powers of the mind are so much engrossed with a single idea or train of thought, as, for the nonce, to render the individual unconscious of, or indifferently conscious to, all other ideas, impressions, or trains of thought.” (Braid and Robertson, 2008)

Monoideation is a helpful term when considering the altered states of Mesmerism, hypnosis, and meditation, as it avoids an unhelpful association with sleep. However, the notion that hypnosis involves waking sleep has become so culturally ingrained that whenever I hypnotise someone, they will nearly always, without prompting, assume specific characteristics of sleep: their head will fall forward, they close their eyes, and they mumble their speech. However, suppose I take someone through the same process but explicitly tell them that what we are doing is not hypnosis. In that case, they will exhibit fewer sleep-like behaviours but still demonstrate monoideation and suggestibility. The notion that hypnosis involves sleep has become a cultural autosuggestion that the subjects already carry with them. It is essential to understand this so that when we compare mindfulness, meditation, and hypnosis, we do not make the mistake of distinguishing between them based on sleep-like behaviours.

Braid's Hypnosis Method

Braid's hypnosis method. Etching by Alexandre Laurent Gsell (1860-1944) in L'hypnotisme. Olivier Walusinski personal collection.

In the figure above, we see Braid performing hypnosis. To this day, Braid's approach is the most common method of hypnotic induction. Braid describes his process in detail.

> I now proceed to detail the mode which I practise for inducing the phenomena. Take any bright object (I generally use my lancet case) between the thumb and for and middle fingers of the left had; hold it from about eight to fifteen inches from the eyes,

> at such position above the forehead as may be necessary to produce the greatest possible strain upon the eyes and eyelids, and enable the patient to maintain a steady fixed stare at the object. The patient must be made to understand that he is to keep the eyes steadily fixed on the object, and the mind riveted on the idea of that one object. It will be observed, that owing to the consensual adjustment of the eyes, the pupils will be at first contracted: they will shortly begin to dilate, and after they have done so to a considerable extent, and have assumed a wavy motion, if the fore and middle fingers of the right hand, extended and a little separated, are carried from the object towards the eyes, most probably the eyelids will close involuntarily, with a vibratory motion. If this is not the case, or the patient allows the eyeballs to move, desire him to begin anew, giving him to understand that he is to allow the eyelids to close when the fingers are again carried towards the eyes, but that the eyeballs must be kept fixed in the same position, and the mind riveted to the one idea of the object held above the eyes. It will generally be found that the eyelids close with a vibratory motion, or become spasmodically closed. After ten or fifteen seconds have elapsed, by gently elevating the arms and legs, it will be found that the patient has a disposition to retain them in the situation in which they have been placed, if he is intensely affected. If this is not the case, in a soft tone of voice desire him to retain the limbs in the extended position, and thus the pulse will speedily become greatly accelerated, and the limbs, in process of time, will become quite rigid and involuntarily fixed. It will also be found, that all the organs of special sense, excepting sight, including heat and cold, and muscular motion, or resistance, and certain mental faculties, are at first prodigiously exalted, such as happens with regard to the primary effects of opium, wine, and spirits. (Braid, 1843)

I quote Braid's description of his method at length here because we can find several elements

relevant to the use of Brainwear. Firstly, the focus of the eyes on an object at a position chosen to cause the eyes to become tired. This helps to both relax the eyes and focus the subject's attention. Techniques that bring the subject's focus to the head are standard in the history of hypnosis. At first, Freud was an enthusiastic proponent of hypnotherapy and he "…initially hypnotised patients and pressed on their foreheads to help them concentrate while attempting to recover (supposedly) repressed memories" (Braid and Robertson, 2008). Freud adopted this forehead "pressure technique" from Bernheim in an attempt to produce the effects of suggestion without using hypnosis (Bachner-Melman and Lichtenberg, 2001). Bernheim says, "If necessary, I lay my hand on the subject's forehead to concentrate his attention; he thinks deeply for an instant, without falling asleep, and all the latent memories arise with great precision" (Braid and Robertson, 2008). The scholar of ancient performance and cognitive theory, Peter Meineck, points out that when asked to recall information or think deeply on a subject, we are apt to gaze upwards (Meineck, 2017). Meineck notes that Socrates was often depicted gazing upwards and that fifth-century Athenian theatre design forced the audience to engage with skyspace (Meineck, 2012). Placing Brainwear on my head directs my focus upwards, and I take another small step towards monoideation. More generally, the specific meanings of the 'vertical field' for human existence have been considered through the contemporary existential phenomenology of Todes (Todes, 2001).

Secondly, Braid observes that the arms and legs of his subject become "quite rigid and involuntarily fixed". Monoideation is not something that only affects the brain but is instead a fully embodied state. Although the body often appears frozen in a state of rapt attention, monoideation can also occur when involved in physical activity. Monoideation, when focussed on the physical movement of another object or creature, can also generate corresponding physical movements in the observer's body. Braid again,

The explanation for the power that serpents have to fascinate birds … is simply this

> — that when the attention of man or animal is deeply engrossed or absorbed by a given idea associated with movement, a current of nervous force is sent into the muscles which produces a corresponding motion, not only without any conscious effort of volition, but even in opposition to volition, in many instances; and hence they seem to be irresistibly drawn, or spell-bound, according to the purport of the dominant idea or impression in the mind of each at the time. (Braid, 1855)

We will return to the production of muscle movement through monoideation in a later chapter on Wishful Devices. For now, let's recall that the effective use of Brainwear requires a certain rigidity and fixedness from the wearer and that, although this requirement is voluntary, the psychophysiological effects of monoideation may compound the effect.

Thirdly, Braid compares the effect of hypnosis to that of the "primary effects of opium, wine, and spirits". The pleasurable feelings of hypnosis are often described as a calm, physically, and mentally relaxed state. Still, there is much more research on the possibility of adverse effects in hypnosis than on the pleasurable feelings that ensue (Holroyd, 2003). I have had many people I have hypnotised tell me how much they enjoyed the experience, and one person said that the experience was the first time in his life that his brain had “stopped bothering him”. Whenever I saw him, he would ask me to give him and his friends a “power up”, which meant being hypnotised for a few moments.

The pleasurable nature of the hypnotic experience has been related to meditation and alpha waves since the 1960s due mainly to the work of psychologist Joe Kamiya, who believed that if people could learn to recognise particular brain rhythms, they could train themselves to produce those rhythms on command. In Kamiya’s experiments, EEG-wearing subjects would hear a specific tone whenever their brain produced alpha waves, and some could improve their ability to generate this wave at will (Kamiya, 2011). Attempting to explain how they did so, they reportedly described the experience as “letting go” or

"relaxation" (Nowlis and Kamiya, 1970). Kamiya's early work would prove influential from a scientific perspective, inspiring decades of research and practice in neurofeedback therapy. From a cultural perspective, they established an early link between alpha waves and subjective, pleasurable serenity. "People describe themselves as being tranquil, calm and alert when they are in the alpha state… Some of them asked us to repeat the tests so that they could experience once again the high alpha condition" (Kamiya, 1968).

The pleasurable nature of monoideation can be related to similar mental states, such as Cziksentmihalyi's flow state, which he defines as "A state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will continue to do it even at great cost, for the sheer sake of doing it." (Csikszentmihalyi, 1990) The commonalities between the states of flow and hypnosis have led some to see the significance of using hypnosis to help athletes attain flow (Vasquez, 2005). In the literature of flow, we see New Thought neuroascesis in its modern form. Not only must we train specific cognitive abilities, but we must also master consciousness itself. "Control over consciousness is not simply a cognitive skill. At least as much as intelligence, it requires the commitment of emotions and will. It is not enough to know how to do it; one must do it consistently, in the same way as athletes or musicians who must keep practising what they know in theory" (Csikszentmihalyi, 1990).

Autosuggestion and Theatre

We have noted the role of the skyward gaze in fifth-century Athenian theatre. It is possible to consider theatre itself as a form of altered state.

The theatre-maker Tim Crouch discusses *Art of the Autosuggestion*, relating theatre to the writing of the hypnotist Émile Coué, who developed an approach based on Braid-style hypnotism, direct hypnotic suggestion, and New Thought mentalism that became known as

La méthode Coué (Yeates, 2016a, Yeates, 2016b, Yeates, 2016c). Coué defines suggestion as "The act of imposing an idea on the brain of another" (Coué, 1922). Crouch argues that "theatre is predicated on processes of suggestion and autosuggestion" (Crouch, 2017) and tells a story about his first play, *My Arm (2002),* a one-person autobiographical tale told by a man who has decided to keep his right arm raised above his head for his whole life. At no time in the performance does Crouch hold his arm about his head; he speaks as though he does. However, this suggestion is so effective that an audience member he meets at a later date asks him whether it was painful having to hold his arm above his head for the whole performance. For Crouch, the audience member had taken on his suggestion as an autosuggestion and created a reality. Causing an audience to remember something merely suggested is a common approach in stage magic and Theatrical Mentalism. Many techniques have been explored, most notably by the Spanish master Juan Tamariz (Tamariz, 2019). It is believed in the field that a well-constructed stage show holds a specific hypnotic power and that simply bringing someone onto the stage puts them into a kind of trance. Crouch argues that the most straightforward approaches to autosuggestion are often the most effective.

> Theatres are designed to make us as unaware of our physical selves as possible. We're placed in the dark in comfortable conditions focused away from our fellow audience members, but I think the process is more robust than that. I think the leap between conscious to subconscious, from suggestion to autosuggestion, is much more effortlessly achieved and often with the most simple of requests, the most obvious of contracts. Think of a storyteller. Think how little they need. (Crouch, 2017)

Considering the use of Brainwear as a performative act of neuroascesis intended to alter one's state of mind we can see how similar processes of monoideation and autosuggestion are likely to be involved, whether by intention or accident. When considering how Brainwear can affect us, it is essential not to get so distracted by the complex technology that we fail to see

that simple actions, such as placing the device on one's head, will also have an effect depending on the context and intention of its use. Meditating with Brainwear is not all about the organ of the brain, it involves small performative embodied acts of monoideation and autosuggestion involving the whole body.

Contemplative Neuroscience

In the early 1980s, Paul-Michel Foucault used the term "*technologies of the self* to refer to the myriad ways in which people "not only set themselves rules of conduct, but also seek to transform themselves, to change themselves in their singular being, and to make their life into an oeuvre that carries certain aesthetic values and meets certain stylistic criteria" (Foucault, 1990). We can see that the search for such technologies was central to the project of New Thought and that Brainwear is a current example of their use, mainly when used in contemplative practices.

In the US, the use of meditation increased more than threefold from 4.1% in 2012 to 14.2% in 2017 (2018), and there is a growing interest in the use of technology in contemplative practices. The integration between meditation and neurofeedback has already happened in popular culture, and numerous neurofeedback companies are providing so-called "enlightenment" programs to the public (Brandmeyer and Delorme, 2013). Meditation apps Calm and Headspace have grown into billion-dollar giants, attracting tens of millions of users (2020), and the global meditation apps market was valued at USD 1.75 Billion in 2021 and is expected to reach a value of USD 6.89 Billion by 2028 (Consulting, 2022).

Against this background, contemplative neuroscience, also called mindfulness neuroscience (Eklöf, 2017), is an emerging area of study that focuses on investigating the transformations occurring in the mind, brain, and body through various contemplative practices such as mindfulness-based meditation, samatha meditation, dream yoga, yoga nidra,

lucid dreaming, tai chi, and yoga (Wallace and Hodel, 2012, Wallace, 2006, Paulson et al., 2013). This interdisciplinary field often highlights Buddhist contemplative approaches and tends to conflate meditation with other contemplative practices. A pivotal event that brought public attention to the field was the 'Investigating the Mind' public dialogue held at MIT in 2003, organised by the Mind and Life Institute (Barinaga, 2003, XIV Bstan-'dzin-rgya, 2006). Participants included notable figures such as the 14th Dalai Lama, Nobel Laureate scientist Daniel Kahneman, and Eric Lander, Director of the MIT Centre for Genomic Research. This groundbreaking conference, attended by 1,200 scientists and contemplatives, is widely regarded as the public genesis of contemplative neuroscience in the United States. The linking of contemplative practice and neuroscience continues in public events such as the *Rewiring Your Brain World Summit* that in 2023 had days themed around topics such as *The Intersection of Compassion, Mindfulness, and Neural Innovation, Embodied Transformation: Navigating the Neural Pathways to Authenticity and Wellness,* and *Bridging Science and Spirituality: The Art of Mindful Transformation* (2023b). In the opening talk, the co-producer and co-host Fleet Maull describes the summit's aim as seeking to become "the architects of our own brain and destiny"(2023b), an aim that the early practitioners of New Thought would recognise.

The growth of contemplative neuroscience has been described as unprecedented (Eklöf, 2016). The increase in public interest in the field is demonstrated by the popularity of self-help books with titles such as *Neurodharma: New science, ancient wisdom, and seven practices of the highest happiness* (Hanson, 2020), *Bliss brain: The neuroscience of remodeling your brain for resilience, creativity, and joy* (Church, 2020), *NeuroWisdom: The New Brain Science of Money, Happiness, and Success* (Waldman and Manning, 2017), and *Neuroplasticity: Your Brain's Superpower* (Douyon, 2019). In a reciprocal relationship, popular neuroscience lends scientific credibility to spiritual self-help, while self-help

publishing offers neuroscience effective channels for dissemination through a familiar format that encourages audiences to actively embrace and implement its practical messages (Thornton, 2011).

The roots of this merging of spiritual self-help with speculative neuroscience can be seen in the pitch-books of Theatrical Mentalists and the New Thought literature we discussed earlier. Indeed, the idea that a neurological explanation could exhaust the meaning of experience was mocked as “medical materialism” by William James, who also stated, "To plead the organic causation of a religious state of mind in refutation of its claim to possess superior spiritual value, is quite illogical and arbitrary, unless one has already worked out in advance some psycho-physical theory connecting spiritual values in general with determinate sorts of physiological change” (James, 1902b). The books mentioned here do not attempt to use neuroscience to refute the value of religious states of mind, but rather, they claim to have found ways to initiate, train, and harness them to their wishes.

Public interest in the practical potential of contemplative neuroscience can also be seen in the use of Brainwear for meditation practices. Leading Brainwear manufacturers, notably EPOC, Neurosky, and Muse, market their products as tools for meditation. The latter focuses primarily on Brainwear-guided meditation and promotes such competitive meditation activities as the “Fostering Stillness Meditation Challenge” (Hsu, 2023). Turning meditation, contemplation, and stillness into a challenge is a counter-intuitive and potentially counter-productive move that indicates Western capitalism’s influence on contemplative practices identified by Purser (Purser, 2019). Sleep is no barrier to the claims of such Brainwear companies, with recent startup Prophetic developing its Halo Brainwear for users to attempt to induce lucid dreaming (Murphy, 2023).

It should also be mentioned here that the claims made for Brainwear and related DTC mindfulness and meditation devices are primarily unsubstantiated by academic research and

have been strongly contested. For instance, Wexler and Thibault have noted that "the neurofeedback literature that consumer EEG companies who are focused on wellness rest upon is shaky at best" (Wexler and Thibault, 2018), and point to recent critical scrutiny in both scientific journals (Schabus et al., 2017);(Schönenberg et al., 2017); (Thibault et al., 2018); (Thibault and Raz, 2016) and the mainstream media (Boser, 2017); (Fink, 2017). In addition, Callard has demonstrated that disciplinary legacies and preoccupations have shaped neuroscientists' conceptions of self-generated thought in non-trivial ways that have hampered the investigation of the resting mind (Callard et al., 2012). Despite these critiques, consumers are still drawn to the promises of Brainwear for meditation and mindfulness.

The promising neuroascesis of contemplative neuroscience can be read as part of a critical element of what Sloterdijk terms "anthropotechnics" (Sloterdijk, 2017a), which highlights two crucial aspects of the ongoing and evolving process of human domestication by humans that originated in ancient times. First, it signifies the gradual separation of humans from pure animality to become technical creatures. Second, it signifies the potential for conscious self-shaping in the future through various methods, including neuroascesis (Sloterdijk, 2017a). Another conceptualisation is that the anthropotechnic is a set of rules we use to tame, teach, and train ourselves (Hashemi, 2017).

What Should We Do With Our Brainwear?

Michel Foucault showed how the body is essentially under the influence of power (Foucault, 1991) and how biotechnology shapes power and body relations. "Through biotechnological intervention on the body, however, the influence of power is visible not only at the discourse level but also in terms of the body's materiality. Not only can we write with and on the body, but we can also, quite literally, rewrite the body" (Giannachi, 2006). By rendering parts of the brain and the mind accessible and rewritable, neurotechnologies turn

them into objects of control and choice. Discourses of neuroascesis, including those of New Thought, speculate on the potential for rewriting the human brain to alter power relations and shape the world.

While New Thought does not deny the existence of the material world, it sees it as something that can be shaped through the power of thought alone. I want to compare this view to the *informatic essentialism* that Thacker, in *Data Made Flesh: Biotechnology and the Discourse of the Posthuman*, identifies in post-human thought and which "proposes that the relationships between the biological body and information technology are such that the body may be approached through the lens of information. In other words, by making informatics a foundational worldview, the body can be considered as 'essentially' information" (Thacker, 2003). These conceptualisations of *thought* and *information* both offer the promise of powerful ways to rework the body. As Thacker says, "the logic of informatic essentialism is as follows: information equals the body, which by extension implies that information equals biology and materiality, which leads from the contingency of the biological body to the emancipation of the biological body through the technical potential of informatics. Change the code, and you change the body" (Thacker, 2003). The latter phrase is redolent of New Thought formulations. It is a small step from *thoughts are things* to *data made flesh*.

Notions of our potential to rewire our own brains through contemplative practices and other forms of neuroascesis are strongly influenced by theories of neuroplasticity. Also known as neural plasticity or brain plasticity, neuroplasticity is the brain's remarkable ability to reorganise and adapt throughout a person's life. It involves the brain's capacity to form new neural connections and modify existing ones in response to learning, experience, injury, or environmental changes (Costandi, 2016). When considering the materiality of thought and the neural subject's potential, the way we conceptualise such plasticity has been seen as having cultural, philosophical, and political importance.

In *What Should We Do With Our Brain?* (Malabou, 2008), Malabou seeks to develop a radical new meaning for such plasticity. Not only does plasticity allow our brains to adapt to existing circumstances, but it also opens a margin of freedom to intervene to change those very circumstances. For Malabou, such an understanding opens up a newly transformative aspect of the neurosciences. In insisting on this proximity between neuroscience and the social sciences, Malabou applies Marx's well-known phrase about history to the brain: people make their own brains, but they do not know it. Her definition of "neuronal ideology" refers specifically to the suturing of understandings of neuronal plasticity to definitions of contemporary capitalist society, "as though neuronal plasticity anchored biologically—and thereby justified—a certain type of political and social organization". (Malabou, 2008).

Malabou claims that "What should we do with our brain? is a question for everyone, that it seeks to give birth in everyone to the feeling of a new responsibility." She asks, "What should we do so that consciousness of the brain does not purely and simply coincide with the spirit of capitalism?" (Malabou, 2008). Malabou claims that "To ask 'What should we do with our brain?' is above all to visualise the possibility of saying no to an afflicting economic, political, and mediatic culture that celebrates only the triumph of flexibility, blessing obedient individuals who have no greater merit than that of knowing how to bow their heads with a smile." (Malabou, 2008). From this perspective, we can ask what kinds of consciousness of the brain are elicited by consumer Brainwear. One of these may be the consciousness of our own brain as a site for play.

Sutton-Smith has identified one of the modern Western rhetorics of play as a rhetoric of the self (Sutton-Smith, 1997) and argues that play is connected to a search for variability in thought, describing play as "the brain taking pleasure in its own plasticity" (Sutton-Smith, 2005). Likewise, Sloterdijk suggests that "advanced biotechnics and brain technics draw on a sophisticated, cooperative subject that plays with itself and that forms itself in contact with

complex texts and over-complex contexts" (Sloterdijk, 2017b). Sloterdijk sees this playful "practising life" as a labour of self-fashioning, which had by the end of the 19th century begun to lose its old spiritual content and that this process of "de-spiritualisation" proceeded in two different directions, one political, the other athletic. One illustrative example of the direct use of brain training devices in athletics is Dhyana. This smart ring monitors heart rate variability to track meditation sessions by the Indian Olympic Association (IOA), which bought the rings for the entire Tokyo Olympics delegation and their coaches. As Pullela Gopichand, the chief national badminton coach for India and co-founder of Dhyana, has said, "In sport, we have this saying: if you can't measure it, you can't improve it. The same applies here, too. Meditation is such an abstract concept and the new generation wants quantitative results" (2021).

Of course, Sloterdijk's use of the word "athletic" should not be taken to apply only to sports. Both the neuroascesis of New Thought and the current use of Brainwear and other tools for brain training can be seen as a part of a more general athletic practising life that Sloterdijk describes as emerging in this way, "Just as the nineteenth century stood cognitively under the sign of production and the twentieth under that of reflexivity, the future should present itself under the sign of the exercise"(Sloterdijk and Hoban, 2013). With this self-forming aspect of exercise in mind, we can invoke Brenninkmeijer's claim that using personal neurotechnologies as a way of "working on the brain to improve the self does not reduce the self to the brain, but extends the self" (Brenninkmeijer, 2016). Furthermore, Brenninkmeijer and Zwart argue that gadgets for "soft" neuro-enhancement are, "situated somewhere in the boundary zone between the internal and the external, between the intimate and the intrusive, between the familiar and the unfamiliar, between the friendly and the scary and, in Foucauldian terms, between technologies of the self and technologies of control" (Brenninkmeijer and Zwart, 2017). Using a term borrowed from Jacques Lacan, they describe

them as *extimate* technologies, highlighting the idea that humans have always had an extimate relationship with their symbolic and material environment and can only discover and develop themselves in and through interaction with that environment (Lacan, 2001). Seen as an extimate technology, Brainwear makes the user's brains more visibly the user's environment.

As an extimate technology, Brainwear is both a tool for neuroascesis and a toy used for play; a device used by the wealthy to exercise their brains and play with the plastic materiality of thought. Bogost has argued that video games allow for a new kind of performativity based on "procedural rhetoric," a type of rhetoric tied to the core affordances of computers: running processes and executing rule-based symbolic manipulation (Bogost, 2007). Brainwear can be read as a form of video game where the symbols represent brain states, psychological metrics, and mental capabilities. A game played with the materials of thought. Theatrical Mentalism is also a form of game played with the materials of thought that could be analysed through both narratology and ludology. Its performance as philosophy can take the form of procedural rhetorics, which work through situating an audience in an activity of rule-based representations and interactions (Bogost, 2007).

It is important to note that it is not only theories of mind that are based on depth psychology or neuroplasticity that see the brain as having the potential for more extraordinary things. Chater proposes that we understand the brains as "spectacular engines of improvisation" (Chater, 2018) that create our experiences in the moment and that "our mental depths are a confabulation" (Chater, 2018). He goes on to say,

> But we should also remember that we are not hemmed in by occult psychic forces within us: any 'prisons' of thought are of our own invention, and can be dismantled just as they have been constructed. If the mind is flat - – if we imagine our minds, our lives and our culture - – we have the power to imagine an inspiring future, and to

make it real. (Chater, 2018)

The hope that we can alter the material of our thoughts to achieve great things - whether spiritual states, worldly rewards, or advanced mental powers - can come from entirely different philosophies of mind. The practical question for early New Thought practitioners remains unchanged: how do we work with the material of our thoughts? The combination of Brainwear and meditation is simply one approach.

A Zazen Session

Joe Kamiya, one of the pioneers of biofeedback, established an explicit connection between his research and spiritual practices, noting that subjective reports from study participants resembled “descriptions of Zen and Yoga meditation”(Shure, 2018). An influential study from the same period suggested that practitioners of Zen meditation (Zazen) demonstrated an advanced ability to control their EEG readings (Kasamatsu and Hirai, 1966). Next, I wish to explore monoideation and autosuggestion in my personal use of Brainwear for meditation, beginning with a look at my experience of a particular Zazen session.

It is the 16th of June 2021. I've been using the Brainwear headset daily for eight months, and the routine has become a familiar ritual. The device has been charging overnight, but I must soak the small black felt sensor pads in saline. I mix my saline every few weeks, adding a drop of isopropyl alcohol to keep it fresh. I'm using new sensor pads today, and, as usual with new pads, they are relatively dense and tightly woven, so I spend some time rolling them between my thumbs and forefinger to loosen them up before dropping them in the saline. This rolling of the pads is a pleasant ritual, a relaxing way to start the day. I soak the pads for five minutes as they are new and must be fully saturated to provide good contact. I use a champagne saucer to soak the pads because I can hold the stem comfortably when fishing the pads out of the saline and slotting them into the headset sensors. I give each one a

little squeeze to get rid of the excess saline that can leak out unexpectedly and trickle down my head while wearing the headset, an unpleasant surprise when attempting to meditate. The soaking and fitting of the pads reminds me of the essential preparatory phase of any divinatory practice when one formulates a question: during the shuffling of Tarot cards, the throwing of yarrow stalks for the I Ching, and the tossing of a coin to decide which restaurant to visit. Whether one is consulting spirits, exploring chance or synchronicity (as Jung did when writing about the I Ching (C.G. Jung, 1989)), or playing a game, it is the asking of a question that turns one into a querent. If I plan to meditate on a particular object or thought, I will think about that while preparing the felt pads. If I'm going to be looking at the psychological metrics, then I'll be considering those. This consideration shades and shifts, and I am already meditating.

Once the sensor pads are in place, it is time to place the device on my head, a moment of performance and significance. It is a donning of costume and stepping into character. As a performer critically engaged with technology, my practice is to engage with the materiality of devices and explore them as costumes, props, and characters: to explore their performativity and crack open their stories. We often say that an object *speaks to us.* Brainwear proves to be an unusual case of this communication with things, as part of the voice that speaks to us appears to come from our own brain. Brainwear is an object that can wear the many masks that we use when speaking to ourselves.

My Brainwear has been many things to me throughout the past eight months. It has been a medical device, a psychologist, a therapist, a quack, a charlatan, an instrument, a mask, a crown, a puppet, a ventriloquist's dummy, a confederate, an audience, a line manager, a cop, a hippie, a ghost, a chorus, a pet, a heckler, an alien (in a very H R Geiger sense), a wand, a parasite, a symbiote, a foil, a straight man, a red nose comedian, a muse, and a particularly annoying, but sometimes comforting, companion and confidante. But it has also

often been a hypnotist, and it is that role I am thinking of today. As I place the device on my head, the damp felt pads come into contact in fourteen places. It is as though an evangelical faith healer with sweaty seven-fingered hands has gently grasped my head. I picture them pushing me backwards while commanding an illness to leave my brain. To understand the resonance such an image has for me, some background is required as my interest in the workings of brains comes from my problematic history with my own.

C-PTSD is a kind of acquired neurodiversity, and as such, it is possible that I could revert to being neurotypical at some time. It is a strange prospect to consider that I may become the other I once was once again. It is extraordinary given that the root cause of my c-PTSD is years of regular violent physical and psychological abuse that I suffered between the ages of six and nine. We know that c-PTSD resulting from early trauma is related to distinct changes in brain structure and function, including an imbalance between hypoconnectivity of higher-order cortical networks and hyperconnectivity of emotional and arousal response systems (Breukelaar et al., 2021). The experience dramatically changed my brain.

Like Heidegger's hammer (Heidegger, 1962), we don't pay much attention to our brains until they break. A broken hammer gives us access to the world as such. No longer absorbed in the task of using the hammer, we gain the distance necessary to reflect explicitly on the network of purposes to which the hammer belongs. My broken brain is not reliably ready-to-hand. My present-to-hand brain is, at different times, guilty of all three of the possible ways that Heidegger describes a tool being un-ready-to-hand: Obstinacy, it gets in the way of doing the job; Conspicuousness, where it begins to break down in use; and Obtrusiveness, where the function I need is absent. Of course, the present-to-hand brain is something we all experience from time to time, and some people experience it much more than I do. Indeed, if theories of the "predictive brain" have any substance (Yon et al., 2020), then the brain may be seen as a tool that never fully works, a Bayesian hammer that

continually refines its guesses regarding the whereabouts of the nail. Considering my brain as a broken tool may be an unusual, perhaps even worrying, way of thinking. Still, it reflects one of the threads of historical neurocentrism that this thesis seeks to pull on. Namely, the notion that the brain is a tool that can be broken, fixed, sharpened, upgraded, hacked, and mastered through various kinds of mental exercise or technological intervention until an imagined mental perfection is achieved. So, when I imagine Brainwear as a faith healer healing my broken brain, I am having a joke with myself, but it is a joke with a sharp edge.

I'm about to start my third session of ZaZen group meditation. Due to the COVID-19 pandemic restrictions in the UK, the meetings have all been conducted on Zoom. At the last meeting, I wore my Brainwear without mentioning it. Nobody in the meditation group asked me about it, but I wondered what they thought it was. Perhaps they thought it was a medical device and felt it would be insensitive to ask about it. Maybe they thought it was a garment with religious significance. After all, there are many examples of headwear that hold spiritual meaning for the wearer. In any case, I was surprised that wearing it to meditate in a group setting did not make me feel self-conscious. It may feel different when I attend a face-to-face meeting.

The group practices Zazen meditation as taught by Dōgen Zenji, a respected and influential Buddhist priest, writer, poet, philosopher, and founder of the Sōtō school of Zen in Japan. Participants are given printed sheets of his Rules for Meditation, which suggest that,

> When meditating, do not wear tight clothing. Rest the left hand in the palm of the right hand with the thumbs touching lightly; sit upright, leaning neither to left nor right, backwards nor forwards. The ears must be in line with the shoulders and the nose in line with the navel; the tongue must be held lightly against the back of the top teeth with the lips and teeth closed. Keep the eyes open, breathe in quickly, settle the body comfortably and breathe out sharply. Sway the body left and right then sit

steadily, neither trying to think nor trying not to think; just sitting, with no deliberate thought, is the important aspect of what the group calls *serene reflection meditation*. It occurs to me that these instructions work very well for settling the body into the stillness required for optimum readings from Brainwear. We are told that if we feel ourselves losing the meditative state, we can try pressing our thumbs together to find focus again. Again, we find the thumbs being used for fixation and monoideation. I wonder what it was like for Burkmar to be mesmerised by Quimby. Although we live in different ages, in very different cultural contexts, and are engaged in quite different practices, is something fundamentally shared in our experiences that could be reflected in our measured neural states? Much of the work involving neuroscience in the Cognitive Science of Religion (CSR) suggests that neurotechnology can explain both our experiences. Still, I am doubtful that even if I could compare my brain state with that of Burkmar, I would learn much that would help me appreciate his experience.

I will never fully understand what the experience of Mesmerism was like for Burkmar, but I am finding that meditating with Brainwear is remarkably similar to being hypnotised. I trained in stage hypnosis and impromptu hypnosis in 2006 with Anthony Jacquin. Anthony's father is a clinical hypnotherapist whose clinic was in the family home. Anthony grew up witnessing hypnosis and is known for practising and performing with a singular commitment to the process. Most people have doubts about whether hypnosis works, and when they begin to practice it, they have to shed those doubts. Being surrounded by hypnosis when growing up, Anthony never had any doubt. Nobody can be hypnotised by a doubting hypnotist. Like psychotherapists and Theatrical Mentalists, hypnotists must be figures of authority. Similarly, Brainwear plays the role of the trusted hypnotist; its readings must be believed for its mind-cures to be in the least bit effective.

In the Zazen group, we sit hoping for serenity while trying not to hope for serenity

and hoping to cease trying. Do the Brainwear readings help me with this form of meditation? To think of the readings *during* the meditation would be counter to the Zazen practice. To return again to Ihde's four kinds of human-technology-world relations - embodiment, hermeneutic, alterity, and background relations - let us consider background relations, relations in which technologies are the context for human experiences and actions and disappear wholly from view. Ihde schematises this relation as:

human (technology / world).

By this schema, the world forms a unity with the Brainwear, and I am unaware of its existence. As Rosenberger says when speaking of self-tracking technologies used for physical fitness, "When one does not notice the armband for example—due to its embodied character—and forgets about goals, numbers, et cetera for a while, self-tracking takes on an "invisible," background character" (Rosenberger et al., 2015). This also invisibility occurs with Brainwear while meditating, and it can only provide data on the meditation experience after the fact. However, if my Brainwear could attempt to direct my meditation with light or sound as some technologies do, would it cease to be in the background, or could it operate without me being consciously aware of its influence? As Rosenberger points out, any impact of technology that works in an unconscious, unnoticed manner is strictly of no concern to postphenomenology, which "limits its research to the immediately given" (Rosenberger et al., 2015). Notwithstanding this limit, I will explore the role of subconscious mechanisms and automaticity in neuroascesis and the performance of the materiality of thought in the next section.

Wishful Devices

This section discusses the Brain Computer Interface (BCI) claims and capabilities

of the EMOTIV Epoc X Brainwear by considering their performative feel. Then, it situates the device in a history of mind-reading objects such as Chevreul pendulums, talking boards, and experiences of intentional dissociation and automaticity.

The EMOTIV Epoc X claims to allow one to "Control machines with your mind. Trigger events with your thoughts using BCI's Mental Commands detection. Tune applications in real-time to respond to your cognitive state using BCI's Performance Metrics" (2023a). The Epoc X device is trained by creating a training profile, and the ability to create unlimited profiles enables the user to try different strategies or create different profiles for different applications. A profile is tested by moving a cube with your mind or controlling an avatar's expression. The capability of BCIs to support interaction between brains and virtual objects on a computer screen is sometimes referred to as *BCI gaming* (Nijholt et al., 2009). The EMOTIV website promotes such gaming by framing it in an explicitly New Thought manner in an article entitled *Achieving Superhuman Capacity Through Technological Innovation* (Nayak, 2023), even attributing the following quote to New Thought author Napoleon Hill "When your desires are strong enough you will appear to possess superhuman powers to achieve".

The EmotivBCI user manual makes the following claim, "Brain Computer Interfaces (BCI) is a system that allows you to control machines using your brain activity directly, rather than through intermediary interfaces like a mouse, keyboard, touchscreen or voice" (2023a). This claim seeks to make the EMOTIV device invisible, which is simply another kind of intermediary interface. Machines are not controlled *directly* using brain activity but through the EMOTIV device.

The manual goes on to explain that "EMOTIV technology converts brain waves to digital signals that can be used to control an endless number of digital outputs such as games, IoT devices, communication devices and audio/visual content. EmotivBCI is a desktop

application for Mac and Windows that allows you to view and train the EMOTIV data streams used for BCI" (2023a). This software has a feature called Mental Commands that requires users to train at least one Neutral state and one Command state. The system learns to recognise brain activity patterns related to a Command state compared to the Neutral state. For training, the system associates the Commands with various movements of an onscreen cube, including Push, Pull, Left, Right, Up, Down, Rotate, and Disappear.

> Before you can train any commands you need to train a Neutral state. Your Neutral brain activity will be used as a contrast to your brain activity during your command training. What is most important is that you do not think about any of your Command thoughts during your Neutral training. Other than that, you can hang out relaxed and let your mind wander. (2023a)

Being asked to put my brain into a Neutral state raises the question of what a Neutral state might be. In practice, a Neutral state can be anything I like, but for my first profile, I tried to think about nothing. Anyone who has attempted meditation will understand that this is not an easy task, and in later profiles, I chose to think about something specific for my Neutral state instead. I have tried the classic visual images beloved of meditation instructors - a lake, a flame, a garden, a flower - but also experimented with more unusual thoughts, including a sausage, the taste of lemon, the word "monkey", and the bodily sense of sinking into the ground. I have found that anything I have tried works as long as it differs from the Command states.

While training in a Neutral state, the suggestion that one can "… hang out relaxed and let your mind wander" (2023a) didn't work well for me. I got better results by focusing on a particular Neutral state. The Tips & Tricks section of the manual has some guidance on training the device that is worth exploring:

> Choosing your thought: The thought that you train on and use for your Mental

> Commands can be anything. They can be literal (i.e. you can try and focus on pushing the virtual box) or they can be as abstract as you like (i.e. where push is associated with visualizing a scene or counting backwards from 500 in steps of 7). The possibilities are endless. Different strategies work best for different people, so try a few out.
>
> If you are training a profile with one command, you want to make that one command as strong and distinct as possible. One way to achieve this is to use something that is multi-modal - i.e. something that contains different sensory and kinematic (related to movements of your muscles) components all together. If you have a strong disposition toward any of these modalities (e.g. you are a musician and so can easily imagine auditory sounds), you may find focusing on this single modality works best for you.
>
> If you are training a profile with multiple commands, you may find you get best results if each of your commands uses a single and different sensory or kinematic modality (e.g. one that is visual, one that is auditory and one that is kinematic). What is most important is that they are distinct from each other and you are able to recreate them accurately in your mind repeatedly.
>
> You may also find that associating different hand gestures or postures with a Command can help to better reproduce them. (2023a)

Using different kinds of visualisation as mental commands to control the world with one's mind has been a part of many different practices, from traditional meditation and New Thought prayer to New Age guided visualisations and the positive psychology belief that imagining one's goals will help one achieve them.

BCIs are the latest in the history of objects that can be considered mind-reading. To

illustrate this, I'd like to use a stage script to demonstrate how Chevreul pendulums and one's own hand can be mind-reading objects. The script is a version of a performance I created for the Bristol Museum as part of their exhibition of Jeremy Dellar's *English Magic* in 2014.

A Chevreul pendulum is named after the French chemist Michel Eugène Chevreul (1786–1889), who first described it as an instrument for analysing unconscious responses (Chevreul, 1854). Chevreul discussed it as a possible explanation of the phenomenon of table-turning at spiritualist séances. He described a device consisting of a weight attached to a length of string. A person holds the string in one hand, suspending the weight above the centre of a diagram depicting a circle superimposed on a cross, while being asked a series of questions, having been told that the pendulum will sway from left to right if the answer is yes, up and down if the answer is no, and in a circle if the answer is unknown. The pendulum often reveals accurate answers due to ideomotor movements made by the respondent. The device is sometimes used to measure suggestibility or hypnotic susceptibility and has occasionally been used as a crude lie detector.

Read the script in the next section. You will get the gist, but if you join in and do the same things as the audience, you will understand in a more embodied and experiential way, which is essential to a critical understanding of the psychology, physiology, and phenomenology of many of the experiences I discuss in this thesis.

Make yourself a simple Chevreul pendulum by hanging a small object on a length of string, thread or chain. A ring, necklace, nail, or lump of Blu Tack will work. When I demonstrate the science of Chevreul pendulums to large audiences, I give everyone a paperclip on a piece of cotton. Use your new Chevreul pendulum to join in with the audience. Genuinely imagine what the performer asks you to do without analysing the experience as you are doing it. The main thing that will stop you from being able to make the Chevreul pendulum move is thinking about something else while you are doing it. People who like to

analyse experiences as they are doing them, or, to put it another way, need to understand how something works before they do it, can often distract themselves from making a Chevreul pendulum move by trying to work out why the Chevreul pendulum moves, or indeed why it doesn't move. This is akin to trying to drive a car while thinking about how the internal combustion engine works or trying to dance while thinking about how muscles work. This is true for moving a Chevreul pendulum and training the EMOTIVE Epoc X Command states.

As you are reading, and possibly even assessing, a thesis at this exact moment, you are likely in an analytical and academic frame of mind. This is precisely the wrong frame of mind for this experience, and it may help if you take a short break beforehand to help you change gears. It will also help to treat it as a game and have fun with it.

The Talking Hand

The performer walks onstage carrying a bag of pendulums made from agate arrowheads in one hand and a single pendulum hanging from the other. The performer holds up the single pendulum.

PERFORMER: This is an arrowhead from the early Bronze Age. It's not a "real" one, just a reproduction, but it will work just as well for what we're going to do with it. This kind is known as a 'barbed and tanged' arrowhead - the 'barbs' are the bits sticking out at either side, and the 'tang' is the bit in the middle that I've tied some cotton thread to. I'm going to give you all one of these as a gift to take home with you, and I'm going to show you some interesting games you can play with it.

The performer gives everyone a pendulum.

PERFORMER: First, hold the arrowhead pendulum by the thread and let it hang free. Now, touch the arm of your chair with the point of the arrowhead. Move it around a little and explore the surface of the arm of the chair. Notice that you can sense the surface that the arrowhead is touching, almost as though you are touching it with your hand. You don't get the impression of the touch happening between the thread and your fingers but between the arrowhead and the chair. The arrowhead is like a sensory extension of your body. We know from recent research that when we touch something with a tool, we have the sensation that we feel the touch in the tool rather than in our hands. (Miller et al., 2018). But this is an old idea. In the 17th century, philosopher René Descartes discussed the ability of blind people to sense their surroundings through their walking cane (Descartes, 2001). This is a kind of extended cognition. The cognitive scientist and philosopher Alva Noë says the mind "is more like dancing than digestion." He suggests that our whole body is necessary for consciousness. We find that the things we see and the objects we hold become part of the enactive process that makes our minds. Once you accept that the tip of the arrowhead, a tennis racquet, or any tool we use is part of your mind, things get messy, weird, and magical-seeming pretty quick.

So the arrowhead is a part of our mind, and we can get feelings from the arrowhead... but can we also send thoughts to it?

Hold the pendulum in front of you so that you can see the arrowhead. Focus all of your attention on the point of the arrowhead. Everything we do today will work best if you genuinely use your best imagination when I ask you to imagine something. Focus your attention on the arrowhead and imagine it moving. If it has a slight wobble from a movement of your arm, take that movement and imagine it getting bigger. Don't swing the pendulum deliberately; just imagine the arrowhead swinging. Notice how it starts to move and amplify that movement. If it is moving in a straight line, make that movement bigger. If it is moving in a circle, make it a bigger circle. Notice that this isn't just a movement caused by a random shake in your arm or by air currents in the room; you can prove that to yourself by changing the movement. If it is going in a straight line, change it and make it go in a circle. If it is going in a circle, make it go in a straight line.

What is happening here is something we now call the Ideomotor Response. When we think of an action, a signal is sent to the hand, and that signal causes a tiny muscle movement. Why? Common Coding Theory is a contemporary cognitive psychology theory describing how perceptual representations of things we can see and hear and motor representations are linked. The theory claims that there is a shared representation, a common code, for both perception and action. Performing an action activates the associated perceptual event and, more importantly for what we are doing, seeing an event or imagining an event activates the action related to that event (Prinz and Sanders, 1984, Prinz, 1997).

Common Coding Theory suggests that the same neurological and motor processes deal with Doing Something, Thinking About Doing That Thing and Watching Someone Else Do That Thing. You will get the same physical response in each instance but at different intensities.

Of course, once you let go of the thread, there is no physical contact, and you can no longer influence the movement of the arrowhead. But the fact that you can control the arrowhead with your mind can easily lead to the idea that you could make an arrow fly in the right direction by focusing your mind on its flight as you shoot.

So, we have demonstrated that your imagination can control the movements of your hand. The unique complexity of the human hand gives it a strange kind of independence. You can train it to do things without consciously controlling it. If you play a musical instrument, you will be familiar with how you can quickly get to a level where the hand does much of the playing by itself (Sudnow and Dreyfus, 2001). It has a mind of its own. And you can use your imagination to explore the personality of this mind.

Place the pendulum to one side; we won't use it again. Hold your dominant arm out in front of you with the palm down. Now relax the arm so that the elbow relaxes downwards. Focus on the hand. Imagine that it forms the head of a creature and that the arm is its body. Imagine that creature as clearly as you can. See its shape. See its colour. As you do this, you will see that it will be quite clearly a particular kind of animal. Notice what animal it is. Now imagine that your arm and your hand really are that animal, and imagine that you are going to meet it for the first time. Watch as it comes to life and begins to move. This may begin as a slight twitch. When you get a small movement, do the same as you did with the pendulum movement and amplify it. Make the movement larger. Notice that the animal wants to turn to face you. Say hello. Does it have a particular personality? What does it want to say to you?

The participants spend a few moments meeting their animals.

PERFORMER: Now, let your hand return to its normal position and relax. It's just your hand again.

So, what animals did you meet?

The participants talk about the kinds of animals they met. The animals' personalities. The things they said.

PERFORMER: Talking to your hand may be a way to meet a part of your mind you don't get to talk to. Some of you met birds. Let me tell you the old story of "Why the Birds Have Bright Plumage."

In the beginning, the earth was all water. The birds created the land by placing leaves on the water. The animals of the earth were able to live but had nothing to eat. The birds planted seeds in the earth, providing food for the animals. They were honoured by the gods and given bright feathers.

The birds built the land, farmed the land, and used the leaves as tools. Despite their compound tool use (Bayern et al., 2018), birds have not created such a vast array of tools as humans. This may be because they are not aware of themselves in the same way as humans. They can recognise their bright plumage in a mirror (Prior et al., 2008) but do not see their beaks or claws as instruments of variation and choice. They do not tell themselves stories of their agency in the world, so they make tools but have no word for a "tool". Despite their finery, they cannot become vain.

Some of you met snakes or reptiles and lizards. Let me tell you the old story of "Why the Stone Age Britons Danced the Snake Dance."

The tribes were plagued by a warrior who could not be killed because he wore a stone shirt impenetrable to their arrows. They prayed to the gods who sent the snake. The snake kept a watch in secret and found that when the warrior sat down, the stone shirt parted and exposed his bare thigh. The snake bit him, killing him instantly. The tribes placed the dead warrior's head on a pole and danced around it - the snake dance was born.

The snake is cunning, but it does not have imagination. It can take advantage of an open door but cannot conceive of a door. It does not dance the snake dance itself because the snake dance is a symbol, and the snake cannot grasp a symbol any more than it can grasp a door handle. The placing of the warrior's head on the pole was a neurocentric offering celebrating the stone shirt of technics. The

gap in the shirt where death creeps in is the gap between the realm of the immortal gods and that of animality, of living without knowledge of death. “In the gap between these two, there is technical life—that is, dying…”(Stiegler, 1998). The stone shirt is a heavy awareness of being mortal. There was no human before the stone shirt. “Tragic anthropogony is thus a thanatology.” (Stiegler, 1998). Deep in the heart of “epiphylogenetic” inscription, the anticipation of death is born (Vaccari, 2009).

Some of you met the furry mammals. The cute predators. Let me tell you the old story of “The Fox and the Hen.”

Once upon a time, there lived at the edge of a forest a naïve hen and a wily fox. The sight of the hen made the fox drool, but as soon as she saw the fox, the hen flew to the branch of a tree. The fox tried hard to persuade the hen to come down, but his sweet words never enticed her. One day, the fox hit on an interesting idea: instead of sweet talk, he decided to run round and round under the tree. Watching the fox’s movement intently, the hen grew dizzy, fell from the tree, and became the fox’s dinner.

Words were insufficient for Fox, so Fox tricked Hen using a form of Telepathy, a distant touch where the sensations of one being are recreated in another. Fox made Hen resonate. Their connection is similar to what some scientists attribute to Mirror Neurons or others to the Ideomotor Response. If I scratch, you will feel itchy. If I bite into a lemon, you will make a lemon face. It is the Trickster Telepathy of Fox that creates a circuit of transindividuation.

Fox is the trickster, the artist, and the magician. Fox didn’t trick hen deliberately. Fox is lucky. Fox likes to experiment. Fox is a scientist. Fox is a shapeshifter. Fox can also be Wily Coyote; he tries to play tricks, but they generally backfire. This is how Coyote makes culture. Coyote takes nothing seriously. He is driven by his primal urges: for food, for adventure, for sex (he carries his penis in a box on his back).

The story of fox and hen is old and relates to the fact that you can mesmerise, confuse, or hypnotise an animal by running in circles around it. And, of course, you can make an arrowhead move by simply imagining it moving, as you have seen.

Plato's Protagoras tells the story of Prometheus, who, along with Epimetheus, is sent to give gifts to all the creatures of the world. The gazelle is given speed, the turtle a shell, etc. But they forget to give anything to the humans, leaving them creatures without their own qualities. Prometheus steals fire from Hephaestus and gives it to humans. But unlike the gifts given to the other animals, fire is not a human quality; it exists outside of the human. Bernard Steigler sees this 'Fire' as a metaphor for the first technics. It represents our ability to craft and utilise tools that exist outside of ourselves (Stiegler, 1998). 'Fire' provides the technical prosthesis, an "externalised organ, that enables but also condemns man to live outside himself".(Howells and Moore, 2013)

But the hand can also be seen as a proto-tool that is a part of us yet partly outside of us. In his book "The Hand: a philosophical inquiry into human being", Raymond Tallis argues that it is the hand rather than the brain that makes us human. Our hands are capable of manipulation, exploration, and communication. They are so complex, so adaptable, so variable that they opened up a world of choices that led to us having an internal conversation with our hands. This conversation led to our self-awareness. In a footnote, Tallis says, "… the hand must continuously mutter its presence to itself…" (Tallis, 2003). Our hands have muttering minds of their own. They are part us and part not. Semi-domesticated, semi-feral. Like pets.

Thank you for playing and for introducing everyone to your domesticated and feral hands. Please take your arrowheads and your hands with you when you leave.

END

Pendulums and BCIs as Wishful Devices

Let us now compare the experiences in this performance with the experience of moving an onscreen graphic cube within EMOTIVE Epoc X. I will discuss the Chevreul pendulum first and then move on to the experience of turning one's arm into an imaginary animal.

You may not have been able to make the Chevreul pendulum move, so let's first address the question of difficulty, as it is undoubtedly true that not everyone can make a Chevreul pendulum move on their first attempt. However, after years of teaching people how to move Chevreul pendulums, I have a range of strategies for helping them, and it is now extremely rare that I find someone who cannot manage it with just a few minutes of my extra help. In a live performance, I will take time to make sure that everyone can move the Chevreul pendulum, even if the audience is large.

The EMOTIVE Epoc X is also difficult to use. It is recognised that interaction with BCIs can be non-intuitive for the user, and there are moves to standardise protocol design for user training in EEG-based BCIs (Jelena, 2020). Here is how the EmotiveBCI manual addresses the issue of difficulty:

> Words of encouragement: Controlling machines with your mind is hard. Do not be discouraged if you are not able to master mind control right away. Being able to recreate a thought in your mind at will is something that take practice for most of us to learn. It is like learning how to generate certain patterns of brain activity to learn how to walk or talk. Practice certainly does help and you will likely find that with repeated trainings, your ability to trigger a command at will becomes much easier.

This is undoubtedly true. It isn't easy to control the cube accurately and repeatedly, but it does get easier. We are certainly far from the dream of communicating *directly* with our thoughts. The manual goes on to say that:

> The ability to clear your mind of distracting thoughts while focusing on a particular one can be a great way to train your brain to have better focus in other situations. Indeed, some people use Mental Commands training to challenge and train their attentional control generally.

This is currently still a contentious claim. While there is evidence that attention can be improved by repetition of a specific task that involves an attention network (network training) or by exercise or meditation that changes the brain state (state training), the extent of transfer beyond the trained task is a controversial issue (Posner et al., 2015). There is, however, some evidence that Attention Deficit Hyperactivity Disorder (ADHD) therapy with an EMOTIV device can bring about a significant improvement in attention (Benedetti et al., 2014).

The Chevreul pendulum is easier to move. It gives multimodal feedback, that is, I can both see and feel it move, though part of the strangeness of the experience is that I cannot see or feel my own hand moving at the time.

During research with Bristol University and Pervasive Media Studio in 2012 and throughout the *One Thousand Mindreaders* project in 2018, I taught over 2000 people how to move a Chevreul pendulum. I asked many of them to describe the feeling. Though I wasn't undertaking an academic study into their experience, I observed that their descriptions fell broadly into two groups. The first group describes a connection experience of something operating through their body and into the Chevreul pendulum. Of course, this is very close to describing the physiological explanation of ideomotor movements, but often, they mean something more like an external force passing through them, a conduit experience.

In contrast, the second group describe an experience of disconnection. It feels strange that there is no visible transference of force between them and the Chevreul pendulum, yet still, it moves. Despite their apparent differences, both the connection experience and the disconnection experience are also described as odd, weird, strange, spooky, unnerving, or

creepy.

Moving a Chevreul pendulum or the EmotiveBCI cube is not a trivial task, but both tasks become more accessible and feel more natural with repetition. Are the experiences comparable in other ways?

Does the cube become a part of the mind in the way that the Chevreul pendulum does? My experience is that it does feel like an extension of my body; I can feel it moving up and down, left and right, and as I push it away from myself, I feel less connected to it. The EmotivBCI cube doesn't provide the sense of touch that a Chevreul pendulum can. The cube doesn't touch anything else on the screen. However, if I were controlling an object that collided with other objects, whether on the screen or a physical object, I suspect I would get a feeling of touch through the contact.

If I successfully trigger the Disappear command, I feel a slight sense of physical loss when it vanishes. Including a Disappear command allows for an experience without a simple equivalent in the physical world. We often delete representations of objects on screens so the experience is not entirely unfamiliar, but in everyday life, we seldom make solid cubes vanish unless we are magicians. Mapping novel actions onto brain states is one of the capabilities of BCIs that raises questions about how we perceive the link between thought and action. If I want to pick up a spoon, I don't have to think of picking it up; I simply pick it up. In his discussion of willing, Wittgenstein has this to say,

> "614. When I raise my arm 'voluntarily' I do not use any instrument to bring the movement about. My wish is not such an instrument either.
>
> 615. "Willing, if it is not to be a sort of wishing, must be the action itself. It cannot be allowed to stop anywhere short of the action." If it is the action, then it is so in the ordinary sense of the word; so it is speaking, writing, walking, lifting a thing, imagining something. But it is also trying, attempting, making an effort,—to speak, to

> write, to lift a thing, to imagine something etc.
>
> 616. When I raise my arm, I have not wished it might go up. The voluntary action excludes this wish. It is indeed possible to say: "I hope I shall draw the circle faultlessly". And that is to express a wish that one's hand should move in such-and-such a way." (Wittgenstein, 2001)

When I raise my arm, I have not wished it might go up. However, in Wittgenstein's terms, if I move the EmotivBCI cube by thinking about something, whether it be an image of a sausage, the baseline from Stevie Wonder's *Superstition*, or the word "Abracadabra", I have made a wish. The same is true of the Chevreul pendulum, but in that case, the wish is more directly linked to the action. I move the pendulum by imagining the pendulum moving. I cannot move it by imagining an image of a sausage as I can with the cube. BCIs are devices for wishful thinking. The Chevreul pendulum is a less wishful device than a Brain-Computer Interface.

Resonant Bits

In 2015, in collaboration with the Bristol Interaction Group at the University of Bristol, I designed a series of iPhone Apps that used virtual pendulums as a mode of interaction (Bennett et al., 2015). Based on my investigation of Chevreul pendulums during my time as Magician in Residence at Pervasive Media Studio, we developed the concept of Resonant Bits, an interaction technique for encouraging engaging, slow and skilful interaction with tangible, mobile and ubiquitous devices. The method is based on the resonant excitation of harmonic oscillators and allows the exploration of several novel types of tangible interaction, including ideomotor control, where subliminal micro-movements accumulate over time to produce a visible outcome; indirect tangible interaction, where several devices can be controlled simultaneously through an intermediary object such as a table; and slow interaction, with meditative and repetitive gestures being used for control. We

created The Harmonic Tuner, a resonance-based music player, and a system for locking and unlocking an iPhone by holding it and imagining a series of frequencies to initiate ideomotor responses that the iPhone's accelerometer could detect (this works as a secure locking system but proves difficult for the user to operate if they are even slightly intoxicated).

We studied how 20 participants interacted with the Resonant Bits apps, and several interaction methods were observed. Excitation is where the device is initially given a shake to observe the natural frequencies of the pendulums. *Damping* of a pendulum, where the swing of a pendulum is deliberately slowed. *Guiding* of one person by another to teach how to resonate with a pendulum. *Priming* of the interface by getting the desired pendulum swinging, it is ready to hit the threshold when the user desires. *Topping U*p, with the user attending to the energy level of multiple oscillators. *Flicking* energy into the system. *Full body* rocking and swaying. These observations indicate some of the potentially rich physical interactions that may develop when interacting with Resonant Bits, and there is potential for future work that explores how these interaction methods could be implemented in BCI use.

Although virtual pendulums can be moved with ideomotor movements, they lack the haptic feedback of Chevreul pendulums. The feeling of the weight on the string tugging as it sways is helpful, and similarly, the EpocBCI cube lacks haptic feedback. With this in mind, I decided to investigate how a Chevreul pendulum could be part of the Command training process. By associating the Brainwear directional commands (Up, Down, Left, and Right) with the four directions of a pendulum swing, I could move both the pendulum and the onscreen cube simultaneously with great ease. This works equally well using the Push, Pull, Left and Right commands and visualising the pendulum swing as occurring into and out of the screen rather than parallel to its surface. Moving a physical pendulum with the ideomotor response feels similar to the training of Brainwear, and their combination could be usefully explored in Brainwear calibration.

Alexander and Pendulums

Claude Conlin, who performed as Alexander "The Man Who Knows", sold Chevreul pendulums to both magicians and later to the general public as "Sex Detectors", running ads that claimed that the pendulum would move in a straight line to indicate female and in a circle to indicate male and that it "Instantly determines the sex of humans, animals or plants, whether dead or alive" (Spooner, 2008). Conlin claimed to have learned the secret of the sex detector from an "old Indian chief in Iowa" but eventually sold it as "The Miracle of Ancient India" and called it "Ayada-Woholo (Detector of Sex)" (Spooner, 2008). We can see the culturally insensitive Orientalism of Theatrical Mentalism that we considered earlier operating here.

This is an instance where the suggestion is that the device operates on a mystical principle, but the method is actually a form of mind-reading through ideomotor response. Of course, the effect relies on the pendulum operator correctly knowing the sex of the person (or animal or plant) they are holding the pendulum over. The sex detector also has an outdated binary notion of sex being able to detect only males and females. A modern user may wish to expand the range of the device by including ovals and a figure-of-eight in the sex detector's repertoire.

One of Conlin's ads claimed that,

> A number of articles can be placed on the table while you are out of the room and on your return you can instantly tell with the detector which articles belong to the males and which to females.
>
> Put a dozen silver dollars on the table and step out of the room and while you are out some one can put their hand on one for a minute and on your return you can

> tell which one was touched. (Charvet, 2004)

Unless the performer knows who the articles belong to, this may seem to be a dubious claim. Still, as there is a 50% chance of guessing correctly, only a little deduction concerning the nature of the objects is necessary to improve the results. One of the differences between Theatrical Magic and Theatrical Mentalism performances is that a magician's effects generally need to succeed (with the exception that Theatrical Magicians may use a staged failure to build tension for recovery or fail for comic effect). In contrast, a Theatrical Mentalist can take genuine chances and the failures are either ignored or can even make the performance appear more authentic. It may be that the suggestion is that the Sex Detector can be used along with other methods to achieve these feats.

Memorates of the Uncanny Within

> But MRI scanners can do more than this: they can capture snapshots of thought. As neurons receive signals from their neighbors, they devour oxygen, which triggers a rush of blood to replenish the supply. MRI scanners can pick up these microscopic tides, because the oxygen molecules surging toward an active neuron give off a distinct pulse of radio waves. In the 1660s, Willis studied animal spirits by following the brain's blood with injections and dyes. Today, neuroscientists follow the blood to trace thought itself. (Zimmer, 2004)

Through a reading of Sloterdijk's anthropotechnics, Bruce Stirling suggests, "The human being – especially in so-called 'advanced civilizations' – is the animal that molds itself into its own pet" (Stirling, 2015). During the latter part of *The Talking Hand*, the audience turns their own arms into animal spirits. This is a theatrical extension of a counselling technique developed by clinical hypnotherapist Bob Burns called *The Swan* (Burns, 2013). In the original Burns technique, the patient imagines their arm becoming a swan, and the

conversation they have with the swan is used in various forms of therapy. My adaptation allows participants to imagine any animal they wish as their own, and my aim is theatrical rather than therapeutic. I include *The Talking Hand* here because it has several intriguing similarities to the use of Brainwear both for meditation and for exploring psychological performance metrics.

There is something uncanny about the participant's experience of *The Talking Hand* that relates to the uncanny experience of using Brainwear and I will return to this later when I relate the work of Nancy to Bainwear use. This uncanny encounter with the non-human inside us becomes, in *The Talking Hand*, a form of "memorate", a word introduced by Carl W. von Sydow, a Swedish folklore scholar, to describe a personal experience narrative typically involving an encounter with a supernatural being. Memorates are not fictive accounts but are allegedly true reports of an actual experience that the narrator had (von Sydow, 1948).

The Talking Hand is a performance allowing participants to play with their imagined internal pets, use their imagined *animal spirits* to work with the material of their thoughts, and recount memorates of their experience. These memorates can be seen as an uncanny form of Autobiology that explores the subjectivities within us. Morton suggests that some of us have the urge to understand other life subjectivities, "Some humans now have the aspiration to know what lettuce is thinking, which I think is part of the same dispositif, the desire to inhabit other life subjectivities in the name of empathy or understanding" (Morton, 2021). He goes on to link this aspiration to mind-reading neurotechnology,

> There are now machines that can tell you what you're dreaming. They map your brain firings in a pixelated 3D space, and correlate those 3D pixels to an infinite supply of YouTube videos that suggest the movements and things about which you're dreaming. It's uncanny how accurate it is. In a way, a machine that can tell you what your brain

> is coming up with might be similar to being able to know what it's like to be a lettuce leaf. It scares me actually, I had a reaction to wanting that. (Morton, 2021)

Perhaps a later version of *The Talking Hand* could have participants animate their hands as a wider range of objects or concepts real, imaginary, or impossible; a chupacabra, a lettuce leaf, a piece of chalk, a sunlit meadow, or sine alpha greater than one. *The Talking Hand* turns away from the modern data-driven neurocentric psychometrics of Brainwear towards the language of folk tales, drawing on half-remembered stories from my youth to create a personal mythology of speculative life subjectivities. *The Talking Hand* moves us towards the subject of the next section, which is the use of Brainwear as an Oracular device.

Oracle Acts

"My brain is the key that sets me free" - Harry Houdini

(Moses, 2007)

In the previous chapters, I have considered the photograph of Quimby and Burkmar in several ways: discussing Quimby's *mental daguerreotype* and the attempts to photograph thoughts; considering the altered states of Mesmerism, somnambulism, hypnosis, monoideation, meditation, and mindfulness in relation to Brainwear; considering the healing touch, ideomotor movements, muscle reading, and wishful devices. In this chapter, I wish to consider how Quimby's performances developed from two-person Mesmerism into a form of psychological and semantic therapy akin to mantic or oracular readings. I will then consider the role of the questioning audience in Theatrical Mentalism through an exploration of the Oracle Act. The chapter ends with the presentation and discussion of a script for a contemporary Oracle Act that explores the oracular nature of Brainwear.

Mind-Cure Mentalism

The performances of Phineus Quimby and Lucius Burkmar were, in part, public demonstrations of mesmeric healing with Lucius when under hypnosis, demonstrating the ability to see things at a distance, to read people's minds, and to diagnose ailments. He could "…discern the internal structure of an animal body, and if there be anything morbid or defective therein, detect and explain it…" (Quimby and Dresser, 1921). Then, an incident occurred, which caused Quimby to question this healing process.

> For years he had been told by doctors that his kidneys were in a seriously diseased condition. Fearing the worst, he had never permitted Lucius to diagnose his physical condition. One day, however, when Lucius was under hypnosis, he told Quimby that he could see his kidneys, that "one was half consumed, and a piece three inches long had separated from it, and was only connected by a slender thread." Quimby asked him if there was any remedy and "he replied, 'Yes, I can put the piece on so it will grow and you will get well.' " He put his hands on Quimby's side and said that he had united the fragments and they would grow together. "The next day he said they had grown together, and from that day I have never experienced the least pain from them." (Holmes, 1944)

Quimby considered Burkmar's explanation of healing by uniting the fragments of his kidney absurd. He reasoned that "…since the remedy was "mental," that is, dealt primarily with the functioning of the nervous system, it succeeded because the disease was "mental" (neural) in origin." (Holmes, 1944). Seeing an opportunity to develop a science of psycho-therapy, Quimby dispensed with Burkmar and developed his own practice until he was healing people with such a high degree of success as to attract widespread attention (Holmes, 1944). Quimby's method was described as follows:

> …sitting down quietly beside the patient, without exchanging a word with him, he

> divined clairvoyantly what was wrong and what had been the origin of the disease. His findings he then revealed to the sufferer, pointing out how the belief in the disease had originated, perhaps in some fright, perhaps in a remark made by someone whose opinion was valued, and then how the abnormality operated,-or was manifested. He explained that the reality of the symptoms was conditional on the patient's belief in them. Then he formed a mental image of the patient in "normal," healthy condition and concentrated on this so strongly that the patient's mind, prepared by his explanation of the principles involved, accepted the image. (Holmes, 1944)

This practice is certainly a forerunner of modern psychiatry and a modern belief in the power of words, “Quimby anticipated some of the discoveries of modern psychiatry and general semantics when he reduced to a system having a fair amount of predictability the healing of people by semantic means-that is, by influencing their belief.” (Holmes, 1944)

Holmes goes on to compare Quimby’s thinking to that of Alfred Korzybski, the founder of general semantics, who believed that knowledge is limited by our brains and shaped by the language we use, “Fundamentally, Quimby and Korzybski agreed that the essential problem of human progress is a neuro-linguistic, neuro-semantic one; that is, that we face the essentially "mental" (neural) problem of changing our beliefs-in which involved changing our ways of putting our beliefs into words” (Holmes, 1944). Korzybski shares New Thought’s association of thoughts with health, “There is every reason why the standards in our civilization are so low, because we have "poisoned," in a literal sense of the word, our minds with the physico-chemical effects of wrong ideas.” (Korzybski, 1921).

The other apt comparison that Homes makes is with the hypnotism of the New Nancy School, “Coué and his co-workers have been healing some patients' illnesses by systematically establishing in their minds a progressive conviction of their "true" state of

health-superficially, at least, just what Quimby did." (Holmes, 1944).

These comparisons with Korzybski and Coué demonstrate how Quimby's thinking changed from a theory of healing inherited from mesmeric ideas of animal magnetism and invisible forces to a psychological and semantic theory of healing. This became a fundamental theory for New Thought's mind-cure mentalism, which believed that the world does not shape us; rather, we shape ourselves through the thoughts we think and the words we use, and in turn, we shape the world. This vision is captured by Emerson, whose writing greatly influenced the New Thought movement,

> You think me the child of my circumstances: I make my circumstance. Let any thought or motive of mine be different from that they are, the difference will transform my condition and economy. I — this thought which is called I, — is the mould into which the world is poured like melted wax. The mould is invisible, but the world betrays the shape of the mould. You call it the power of circumstance, but it is the power of me. (Emerson, 1983)

This soulful individualism of Emerson was fertile soil for high anthropology, an optimistic theology of human capacity (Bowler, 2013). The message that we have the power to shape ourselves and the world through our thoughts was powerful for audiences of the day. Quimby's early audiences sought physical healing, but his later audiences came seeking mind cures and life guidance. Thus, members of his audiences can be considered querants, a term used by fortune-tellers and performers of mentalism to denote "a person who questions an oracle". Oracle Acts are performances of Theatrical Mentalism that profess to answer the questions of querents regarding fate and character.

Oracle Acts

I firmly believe that of all the Arts and Crafts of Mentalism, there is nothing more

> satisfying than one who is a first-class Reader. It is the ultimate in Mentalism and if you reach this standard - you will never get any higher - nor will you have to. It is a paradox that entertainers seek to create a fantasy and yet the fantasy of this art is reality. (Corinda, 1968)

The Oracle Act, or Q&A Act, has long been considered the most essential part of a performance of Theatrical Mentalism (McCambridge, 2017). While audiences for a magic show come to see the magician demonstrate the illusion of impossible powers and to witness the adventures of the props in the magician's hands, the audience for a demonstration of Theatrical Mentalism is seeking something entirely different. A Theatrical Mentalist demonstrates the possible, if improbable, potential of the mind, so there is a comparable demonstration of powers. Still, more importantly, the Theatrical Mentalist promises to read the minds of the audience and to answer questions posed by the audience.

Oracle Acts take themes and methods from New Thought, Spiritualism, and Theosophy. After discussing several aspects of Oracle Acts, I will consider the oracular nature of Brainwear through a script entitled *The Line* and a discussion of its themes.

THE LINE: A BRAINWEAR ORACLE ACT.

THE PERFORMER WALKS ONSTAGE AND ADDRESSES THE WHOLE AUDIENCE.

You have all been given a sheet of paper and a pencil. I'm going to give you an instruction, please interpret it how you wish. Here is it: please take no more than two minutes to draw your own brain using a single line. I'll repeat that: please take no more than two minutes to draw your own brain using a single line. Please do that now.

When two minutes have passed, the performer addresses the audience again.

Psychologists have developed ways to interpret our drawings and have compared their interpretations to other forms of psychometrics, such as interviews and questionnaires. These interpretations are based on statistics, so they should not be considered as a way of strictly defining or interpreting your personality. There is no way such a simple test could ever capture the wonderfully complex humans you all are. However, they can be considered food for thought. Here is what the statistical analysis tells us.

Let's start with where your brain is positioned on the page. Is it nearer to the Top or the Bottom? Draw an imaginary horizontal line through the middle of your paper and see where your brain sits.

If it's closer to the Top, you're likely to be Positive & Optimistic about things.

Those of you with the brain nearer the bottom, well, those people tend to be more Pessimistic. Perhaps even a little bit negative at times. Take a look at your neighbour's brain and see if that's correct!

Who has a brain in the middle? Ahhh, the realists." Boring, but realists!

Now, take a look at which way your brain faces? Is the front of the brain facing to the left or to the right?

If your brain faces to the left, this means you're likely to be a Traditionalist in the way you face problems and challenges. To the right, you're probably more Innovative and Active.

Did anyone have their brain facing to the front? This shows you as Assertive, Direct and Forthright. Some would say Opinionated & Pushy, but you usually get your way.

And did anyone have their brain facing to the Back? This is the driver’s seat view. You are likely to be good at taking Control of a situation by taking action yourself rather than directing others.

How many of you drew your brain from above? As you might imagine, you are likely to be good at seeing the big picture and being Objective about problems. Perhaps a bit detached sometimes.

And did anyone draw their brain from underneath? (Pause) I suggest you seek professional help!

The amount of detail you've drawn on your brain is also quite revealing. Lots of details on your brain show you're pretty analytical. You want to know all the facts before you make a decision.

Those with few details, just a broad outline, tend to be risk-takers and a bit impulsive at times. You tend to rush into things. This has got you into trouble at times, hasn't it, and probably will do again in the future.

And lastly, let’s have a look at the Spine.

The Spine indicates the quality of your emotional life. Is it "Longer the better?"

OK, own up, who hasn't got one?

I asked you to draw your brain using a single line because that makes you focus in a different way. You have to commit to one single extended action. In Hitsuzendō, a form of Japanese calligraphy linked to Zen, it is believed that practising calligraphy that commits to a single action can reveal your

inner nature and help you to achieve a higher state of mind. I don't think any of you achieved a higher state of mind by drawing your brain with a single line, but I hope it focused you. It is astonishing what focus can achieve.

The focus of a single line.

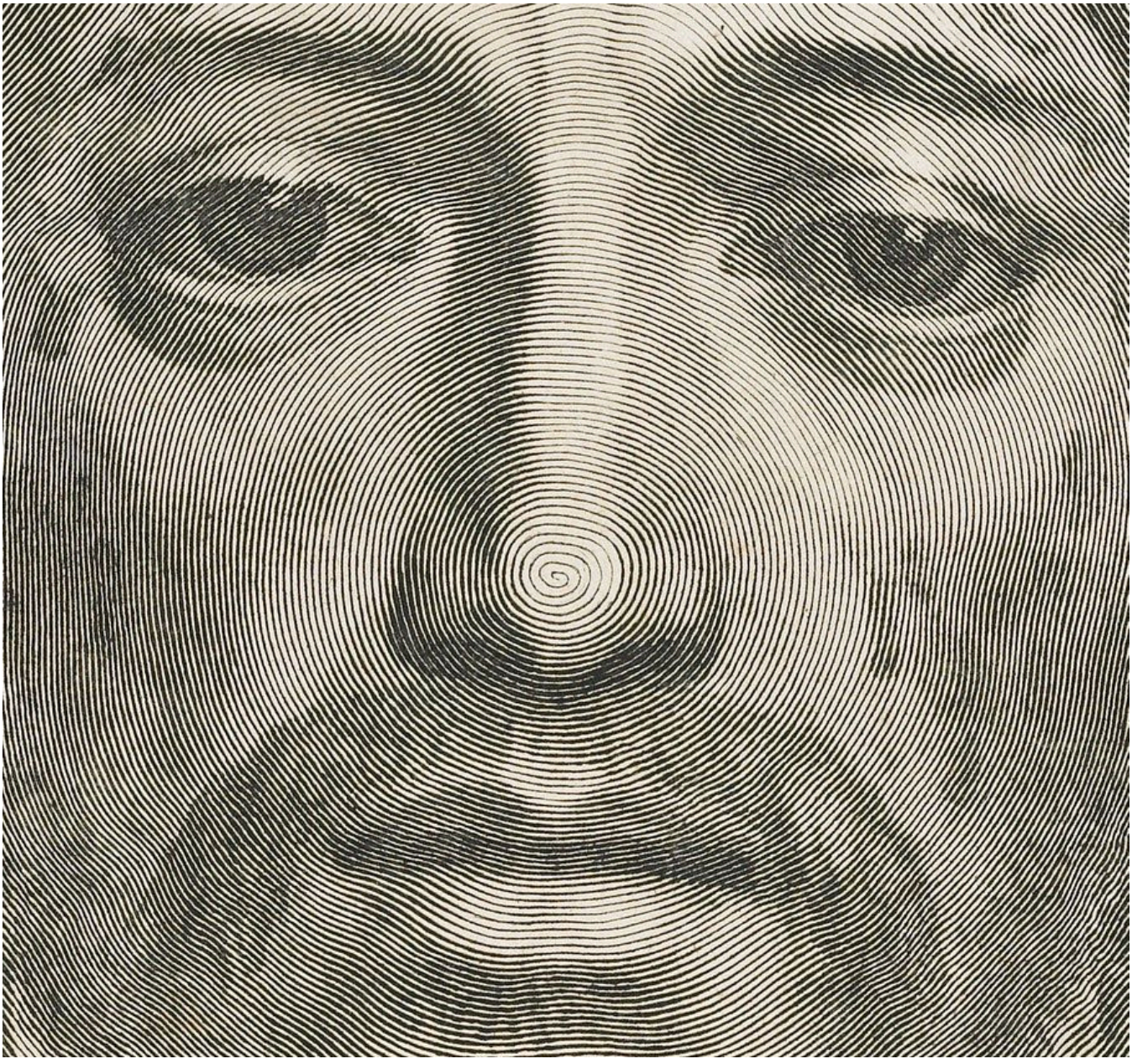
Take a look at this engraving of Christ.

The performer gestures towards a large image of Claude Mellan's The Sudarium of Saint Veronica that has been projected at the back of the stage throughout the performance.

You have probably been wondering why a large image of Christ has been here all this time. It

is not because this is a religious meeting. It isn't even a religious performance, and I am not a religious person. But I am amazed by what can be achieved with focus and devotion. This is an engraving made by Claude Mellan in 1649. There is something incredible about it that you probably haven't noticed. Let's take a close look.

The projection zooms in to focus on a section of the engraving.



Look carefully, and you can see that this image was engraved using a single spiral line. Mellan

created this in an unbroken line, incised directly onto a metal plate. He rotated his engraving tool to create the impression of depth and texture. Let me show you a modern form of the single line that reveals our innermost thoughts.

Six audience members are asked to come onto the stage. They are seated in a row facing the audience. They are asked their names and given name badges to wear. As the performer continues speaking, six stage assistants fit the participants with Brainwear.

Your brain drawings have suggested certain things about your character that I think will make you all perfect for this demonstration. Please relax. You are all being fitted with Brainwear. This is a device that measures the electrical activity of your brain. In a moment, we will take a look at the readings and see what we can see. While relaxing, I'd like you all to focus on a question you already have in mind. Take a moment to recall to mind the question. Do you all have a question in mind now? Good! Now, this is a question that only exists in your mind, yes? You haven't told anyone this question and haven't written it down anywhere? Good!

Let's take a look inside.

The projection shows 3D images of the EEG activity of the six participants' brains.

What a beautiful set of brains you have. Lively. Sparking. A little nervous. Just relax. Try to keep as still as possible and just focus on your question.

Now, these beautiful images show us the electrical activity of your brain. We can get a general sense of the mental state of each of you. Dave here has a lot of Beta activity, suggesting that he is the most alert in the group. Adele has more Alpha and some Theta going on; she is more relaxed than Dave, and you can already see that from her face and posture. There is so much going on in these brains. Let's dive a little deeper.

The projection changes to show a display of the Performance Metrics of each participant.

Now, these are measurements of various aspects of your psychological state. Let's see if this can help.

Dave here is reading the highest on the Stress line while thinking about his question. I'm going to say this to you, Dave. When you have a difficult job to do, you can sometimes feel a bit overwhelmed, but you get a great deal of satisfaction from doing a good job, even if it doesn't seem so at the time. You are proud of the good things you have done, but you need pressure to give you focus and drive you. Like everyone, you seek to find a balance; for some people, that would mean relaxing hobbies or holidays. But you're not like that, are you, Dave? Stress isn't always a bad thing for you. You like to do things for fun that other people would find stressful or even terrifying. Does that make sense to you? Yes. So your question is related to this. You are asking why you like to take risks. You're thinking of jumping. I'm getting an idea about jumping to another job, but I don't think that's you. You're thinking about doing another jump, one you've done before. Another parachute jump but this time in fancy dress and the question is…. Batman or Superman? Well, let's have an audience vote by a round of applause. If you think Dave should jump as Batman, clap now. OK. If you think Dave should jump as Superman, clap now. OK, Superman seems to win, which makes sense as he can actually fly.

Hi Sami. So, I've been watching your Engagement levels. They go up and down like a roller coaster. Ah, they go right up now; I see I have your attention. You can quickly get bored if there aren't enough interesting things happening around you. But if you are presented with an exciting experience, you get right there for it. Sometimes, you get so involved that you forget to pay enough attention to the other things around you. You want to know whether you will get the job you've applied for as a…. This is something involving money, yes?…. This is with a bank, but you already work for a bank, and this means a more significant change… this is for an online-only bank… and you will have to move to the Netherlands. And I get that you haven't lived

abroad before. The question you should really ask isn't whether you have the job but whether it will be engaging enough for your restless mind. I think you know the answer to that already!

John is getting good high Valence readings here, indicating he's enjoying this game. That's good because you're not always easy to please, are you? When you like something, you absolutely love it. When you dislike something, you really can't stand it. This is the Marmite element. You either love things or hate them. And your question relates to your love of food and healthy eating. Wellness is a big thing for you. But you want to know why you can't stop eating... even though you know it's wrong…… cheesy chips! Well the simple answer is, because they're so wrong. Take a cheat day once in a while.

Everyone onstage is showing high Excitement readings. You can see this with other physical signs, pupil dilation, eye-widening, and increased heart rate and muscle tension. It's exciting being on stage! And Jane here has the highest Excitement reading which tells us a lot. It's obvious to all of us that Jane isn't shy. Some people just get excited in their minds but look totally calm, as if they don't care. Jane feels excitement with her whole body and can barely keep still. You sometimes have a tendency to hold yourself back and suppress this excitement. But when your heart beats faster, your eyes open wide, and your muscles tell you that you want to jump for joy and shout and dance, you just have to do it. You should definitely learn Samba dancing… and that was your question, yes?

Olen here has an exciting measure of Focus, a very high level of switching from one thing to another. You have a tendency to procrastinate, finding it difficult to get on with a single task. When you start on a job, your mind jumps to something else, or something or somebody distracts you, and you lose focus. Is this because there are too many distracting things in your life or because you are too easily distracted? Do you need to focus more or simplify your life? You must be aware of your

focus and nurture it like a garden; let it grow and put down strong roots. This is why you found it challenging to settle on a single question, and you changed your mind at the last minute, yes? Should we consider the question you finally settled on or the first one you had in mind? OK, the first one. Yes, your Focus went right up again. You're concerned that the first question is too personal and you aren't ready to share it with everyone? OK, I'll just give you the answer.

The performer whispers in Olen's ear. Olen smiles and laughs.

Did that make sense, and did it answer your question? Yes. Great. Thanks for sharing it with me; it will remain our secret.

Finally, Jo. You spend your life switching gears and juggling responsibilities. It is like spinning plates trying to keep them all balanced. Your job one minute. Your children the next. You are a good friend, too, and try to be there for your best mates even when you're tired and would rather just have a snooze. When you get a moment to yourself, you are good at just switching off and relaxing. You do this by…. staring at your dog? And the dog's name is…. Just imagine you are relaxing and you want to see your dog…. You sit in your… wait… are you in a conservatory? Yes! OK… the sun is shining on the plants. Flowers all around you. These are… yellow flowers, yes? Daffodils, no…. Wait. Yellow orchids! Beautiful. And you call your dog to come and relax with you… and you call…. Diego. Diego. Yes? You are thinking of when you are happiest.

Now, if your handwriting can reveal your personality, then what can brain writing reveal with its never-ending line? The working brain writes and, having written, moves on. You cannot go back and unthink a thought. And who is drawing the lines? You, your brain, the brain-machine, or all three?

Please close your eyes and focus on my words. Everyone in the audience, keep your eyes open, but follow along with these instructions; it'll help the people on the stage. Everyone, take a deep breath and let the stress leave your body

and your brain.

The Stress readings of all the participants drop suddenly, and all stabilise at the same level.

Everyone could feel that. Let's bring the relaxation down too. Another breath and fully relax.

The Relaxation readings of all the participants drop suddenly, and all stabilise at the same level.

Good! Let's bring the Focus, Interest, and Engagement up. Everyone, please take a deep breath and sit up straight and alert, focusing on my voice.

The Focus, Engagement, and Interest readings of all the participants rise suddenly, stabilising at the same level.

Excellent! Now, let's bring the Excitement up. Please give everyone on the stage a massive round of applause.

The Excitement levels rise, but only half way.

OK, I think we can get it higher. Perhaps a standing ovation for all the people on the stage?

As the audience applauds and rises to their feet, the Excitement levels of all the participants rise until they go off the screen and onto the wall. There is a loud explosion. The stage is plunged into darkness.

THE END

Performance Discussion

The Line is constructed as a work of performance philosophy produced through the Brainwear Autobiology. Although it could be performed as described, that is not its primary purpose, and I would not want it to be judged as a piece intended for a general audience. It should be noted that, unlike the other performance pieces in this thesis, I have not explained the methods used to achieve the effects described. I don't think exposing the methods would add anything to the discussion. Suffice it to say that the piece is entirely performable using the Theatrical Mentalism methods at my disposal. I'd now like to discuss *The Line* in detail and then relate it explicitly to the Brainwear Autobiology.

Note: The images used in *The Line* are public domain and are sourced from *An Iconic Line: Claude Mellan's The Sudarium of Saint Veronica (1649)*(Dukes, 2021).

The Brain Drawings

There is a long history of psychological drawing interpretation. I do not intend to discuss the efficacy or veracity of such interpretation; I am instead concerned with its theatrical use. Many Theatrical Mentalists use drawing interpretation to give audience members personal readings. These readings are delivered in a wide range of styles, from profound insights to comic presentations. Theatrical Mentalists have adapted several drawing interpretations from the psychological literature, most notably the house-tree-person test (HTP) developed by John Buck (Buck, 1948). This is a projective test intended to measure different aspects of personality. Test takers are asked to draw a house, a tree, and a person. These drawings are interpreted to create a picture of the person's cognitive, emotional, and social functioning. TheatricalMentalists tend to simplify the test, asking people to simply draw a tree. Mentalists often adapt methods from psychology for theatrical purposes; the

book *Psychology for the Mentalist* (Luttrell, 2015) is devoted to such creative appropriation.

My adaptation asks the audience to draw their brain using a single line. Theatrical Mentalism routines that involve the whole audience are known as Major Effects (Cassidy, 1983), and this approach is common to Oracle Acts. I stipulate that a single line must be used to focus the audience's attention. This also makes the theme of the line, from drawing to EEG readings, run clearly through the act. My interpretations are adaptations of those used in HTP and other psychometrics. In this act, they would be delivered in a tone that makes it clear that they are not to be taken too seriously; they are used to gently establish the concept of interpreting personality through a line.

I expand on this by mentioning Hitsuzendō, an art influenced by Zen philosophy in which the calligrapher has but one chance to create with the brush. Once made, the brush strokes cannot be altered or corrected, and a lack of confidence will show up in the work. The calligrapher must concentrate and be fluid in execution as brush creates a statement about the calligrapher at a specific moment in time (Terayama, 2003). To write Zen calligraphy with mastery, one must allow the letters flow out of themselves and adopt a state of mind referred to as mushin (無心, "no mind state") (Odin, 2001). Again, the aim here is to establish the idea that aspects of one's personality can be conveyed by drawing a line.

As a second example of art made using a single line, the audience is shown Claude Mellan's *The Sudarium of Saint Veronica* (1649). The title of this engraving references the sudarium (a handkerchief, or, literally, sweat cloth) of Saint Veronica, an example of a class of relics known as acheiropoieta, made without hand. Roland Barthes references Veronica's veil when writing on photography, "Photography has something to do with resurrection: might we not say of it what the Byzantines said of the image of Christ which impregnated St. Veronica's napkin: that it was not made by the hand of man, acheiropoietos?" (Barthes, 1981). Brainwear readings can be seen as a class of acheiropoieta, not handmade but brainmade, and

we see in EEG an attempt to capture character not in a single line but in a set of single lines. Character is segmented and dissected.

Hermeneutic Brainwear Readings

To return again to Ihde's four kinds of human-technology-world relations - embodiment, hermeneutic, alterity, and background relations - let us consider hermeneutic relations, relations in which human beings read how technologies represent the world. Here, technologies form a unity with the world rather than with the human being using it: humans are directed at the ways in which technologies represent the world, and one reads the "world" through them. Ihde schematises this relation as:

human —> (technology – world).

By this schema, my brain forms a unity with the Brainwear, and I am directed at the ways in which it represents not just my brain but me. My character. My psychology. Brainwear promises that, to some degree, the world "read" is, in fact, the perceiving subject ("me") itself.

The use of brain imaging technologies to try to localise psychological processes has been criticised as a new phrenology based on demonstrably incorrect assumptions that cannot be validated in principle or in practice (Uttal, 2001). Nonetheless, such attempts to bridge cognitive science and the neurosciences remain popular. When examining the reasons for this continued popularity, it is worth considering the individualism that accounts for the success of phrenology,

> "The phrenological cult," Gilbert Seldes wrote in The Stammering Century in 1928, not so long after it faded away, had a profound effect on the development of American

> character. First it favored the cult of the individual. Or it would be equally accurate to say that phrenology drew from the American atmosphere certain tendencies to individualism and adapted itself to the American character….Phrenology and Mesmerism both made man more interesting to himself, as psychology and psychoanalysis did half a century later." (Andersen, 2018)

A successful Oracle Act makes the audience more interesting to themselves, both as an audience and as individuals. Querants visit oracles in part to be listened to by a stranger who will listen to them. Similarly, Brainwear devices are good listeners. One thing that Brainwear will do is listen to me. The readings that an oracle gives always need to be interpreted.

The readings given to the six onstage participants in *The Line* used the following EPOC X definitions of the six performance psychometrics (EMOTIV, 2021) as a starting point.

- Stress (FRU) is a measure of comfort with the current challenge. High stress can result from an inability to complete a difficult task, feeling overwhelmed and fearing negative consequences for failing to satisfy the task requirements. Generally a low to moderate level of stress can improve productivity, whereas a higher level tends to be destructive and can have long term consequences for health and wellbeing.
- Engagement (ENG) is experienced as alertness and the conscious direction of attention towards task-relevant stimuli. It measures the level of immersion in the moment and is a mixture of attention and concentration and contrasts with boredom. Engagement is characterized by increased physiological arousal and beta waves along with attenuated alpha waves. The greater the attention, focus and workload, the greater the output score reported by the detection.
- Interest (VAL) is the degree of attraction or aversion to the

current stimuli, environment or activity and is commonly referred to as Valence. Low interest scores indicate a strong aversion to the task, high interest indicates a strong affinity with the task while mid-range scores indicate you neither like nor dislike the activity.

- Excitement (EXC) is an awareness or feeling of physiological arousal with a positive value. It is characterized by activation in the sympathetic nervous system which results in a range of physiological responses including pupil dilation, eye widening, sweat gland stimulation, heart rate and muscle tension increases, blood diversion, and digestive inhibition. In general, the greater the increase in physiological arousal the greater the output score for the detection. The Excitement detection is tuned to provide output scores that reflect short-term changes in excitement over time periods as short as several seconds.
- Focus (FOC) is a measure of fixed attention to one specific task. Focus measures the depth of attention as well as the frequency that attention switches between tasks. A high level of task switching is an indication of poor focus and distraction.
- Relaxation (MED) is a measure of an ability to switch off and and recover from intense concentration. Trained meditators can score extremely high relaxation scores.

I used these definitions as the basis for a series of Cold Readings. Cold Reading is a set of techniques used by mentalists, psychics, fortune-tellers, and mediums (Dutton, 1988). Technically, a Cold Reading is a set of statements, prepared in advance, that you can say verbatim to anyone, and there will be a high chance that they will find the statements meaningful. If you change the statements based on any aspect of the person you are reading,

such as age, gender, or how expensive their clothes appear, you are now doing Warm Reading. If you base the reading on information secretly obtained in advance, then you are doing Hot Reading. These techniques can be combined, and the readings given in the sept for *The Line* would combine all three. Of course, any script for an Oracle Act will merely indicate the kinds of readings given when performed with real people. Oracle Acts are acts of well-prepared improvisation.

The language of the EPOC X definitions reminded me strongly of Forer's classic 1949 experiment in which 39 undergraduate psychology students were given the “Diagnostic Interest Blank” personality test. A week later, every student was given the same personality description but was led to believe that each description was uniquely different, having been derived from the test results. The students were then asked to rate the accuracy of their 'individual' personality descriptions on a scale of 0 (poor) to 5 (perfect). Of the 39 students, only 5 rated it below 4, and no one rated it below 2. The average rating was 4.3. Forer obtained his generalised personality description not from standard texts in personality theory but from a newsstand astrology book (Forer, 1949). Here is the statement Forer used,

> You have a need for other people to like and admire you, and yet you tend to be critical of yourself. While you have some personality weaknesses you are generally able to compensate for them. You have considerable unused capacity that you have not turned to your advantage. Disciplined and self-controlled on the outside, you tend to be worrisome and insecure on the inside. At times you have serious doubts as to whether you have made the right decision or done the right thing. You prefer a certain amount of change and variety and become dissatisfied when hemmed in by restrictions and limitations. You also pride yourself as an independent thinker; and do not accept others' statements without satisfactory proof. But you have found it unwise to be too frank in revealing yourself to others. At times you are extroverted, affable,

> and sociable, while at other times you are introverted, wary, and reserved. Some of your aspirations tend to be rather unrealistic. (Forer, 1949)

Mentalists have long been experts in creating such language, and Forer mistakenly saw his work as an experiment in gullibility. Practical Cold Readings must feel uniquely personal while not transparently applicable to everyone. They often touch on private hopes and fears that we all share regarding our characters and how others perceive us, but we somehow believe that no one else is troubled by them. It is sometimes comforting to find that we are not alone in such concerns, and the mentalist Derren Brown explicitly recognises this at the beginning of his 2021 show *Showman* (Brown, 2021). The public revealing and sharing of these thoughts is a vital part of the appeal of an Oracle Act.

Parry and the Future of Oracle Acts

In *The Line*, Brainwear is introduced as a tool for giving personal character readings to audience members. Littlefield has said that "Technologies such as EEG wearables are products and producers of instrumental intimacy, a means by which we learn about, access, and manipulate ourselves (in this case our brains) by interfacing with machines." (Littlefield, 2018). Of course, various technologies can be described in this way, from the I Ching and Tarot cards through Myers-Briggs and Big Five psychometrics to Edward de Bono's techniques and Brian Eno's Oblique Strategies. We can ask what other tools are being developed for creative practice and instrumental intimacy. Machine Learning (ML) and other forms of artificial intelligence (AI) are increasingly and controversially used this way. I have previously created a performance that critically explored the idea of a fortune-telling AI.

Parry (2017) was a performance commissioned as part of my 2-year role as an Associate Creative with the research project Being There: Humans and Robots in Public

Spaces. It was initially conceived during a residency with Queen Mary's School of Electronic Engineering and Computer Science, exploring the potential of Fortune-Telling Robotics. The school was developing and testing a computer vision system using facial analysis and body movement to predict personality using the Big Five psychometric system (Celiktutan et al., 2015).

Parry, short for Pareidolia, was a superstitious AI that believed in fortune-telling. Deliberately designing *Parry* to make false correlations between various data sets results in the AI developing a kind of digital superstition. The datasets included birth dates, personality tests, and consumer data so that *Parry* would correlate a person's birth date with their personality and taste in food. As well as making false correlations, many superstitions also ascribe supernatural powers to gods or spirits. I found a suitable modern equivalent of spirits in the invisible, popular, mysterious, magical entities that thousands of people were actively seeking and genuinely interacting with at the time, namely Pokemon. Incorporating a dataset of the personalities of Pokemon allowed *Parry* to use a person's birth date to determine their Pokemon type.

In performance, *Parry* tells the fortunes of the whole audience, selected audience members are sorted into Pokemon types, a prediction comes true, and an unexpected correlation between the date of *Parry's* creation and a number freely created by the audience suggests that *Parry's* fortune-telling system is strangely accurate.

Parry was created to generate debate around belief, bias, and trust in Big Data, AI, and psychometrics. Masquerading as a harmless, playful AI, *Parry* deliberately drew attention to the real dangers of metric fixation and magical thinking in AI implementation. At the time, there had been several instances of "racist AI" in the press. Microsoft's Tay is a chatbot that had to be switched off after just a few days when it started defending the Holocaust (Hunt, 2016). Beauty.AI, a series of algorithms designed to judge beauty contests

objectively, began judging light skin as more attractive than dark skin (Levin, 2016). There was a growing concern over the combination of AI and psychometrics in predictive policing software that radically indicts black people over white people (O'Neil, 2016). More recently, as I predicted, companies have begun to use AI to produce horoscopes, one of them influenced by "the Zoltar fortunetelling machines that were once common attractions at boardwalks and arcades" (Niami, 2023). Meanwhile, software developers have begun to relate AI to the methods of Theatrical Mentalism (Bjarnason, 2023), and TikTok users have begun to use AI filters as "fortunetellers and fate predictors" (Romano, 2023).

It has been suggested that we are "turning animist" to deal better with a world increasingly populated by smart objects and intelligent things (Marenko, 2014) and that designed animism "forms the basis of a poetics for a new world" (Laurel, 2006). If we consider Bogost's suggestion that, "To put things at the center of a new metaphysics also requires us to admit that they do not exist just for us" (Bogost, 2012) then we might ask what happens when digital intelligences develop their own poetics, their own mentalist beliefs. *Parry* is a satire that references Adorno's critique of fortune-telling as both capitalist and fascist (Adorno and Crook, 1994) and Stivers' exploration of technology as a site for magical thinking (Stivers, 1999). It asks whether an AI can experience mentalism or hold a superstitious belief and highlights the ethical dilemmas related to such digital futures.

In preparation for *Parry,* I developed a one-to-one informal routine called *Robomancy.* I would tell someone that I was training an AI to give people an accurate personality reading based on four simple questions that the AI had generated. I would then ask a series of questions such as, "You wake up one morning and there is a bird on your windowsill. What colour is the bird?". I would seemingly enter their answers into a website form on my phone and then give the person the classic Forer reading. It was remarkable how accurate people found the reading and how much the notion that an AI had generated it

helped to convince them of its accuracy. I would then reveal that there was no such AI and tell the story of Forer's research. People find it revealing and comforting to learn that everyone shares the same response to the reading and has the same concern for fate and character.

Fate and Character

In his 1929 essay on surrealism, Walter Benjamin writes that reading is an "eminently telepathic process." He returns to the connection between reading and more ancient traditions of fortunetelling in his 1933 essay *Doctrine of the Similar* (Benjamin and Demetz, 1978). Downing considers the identification of this connection an important insight,

> This connection he suggests between reading practices and the occult is a profound one, both historically and for Benjamin's own time and work, and not just in terms of telepathy. Some of the earliest practices of reading were not of letters, words, or books, but of stars, entrails, and birds, and these practices had a significant impact on the way reading was understood in the ancient world. And the relations between such ancient magic and reading were still (or again) of crucial importance to the modernists of the early twentieth century, including Benjamin and his sustained interest in what he called 'das magische Lesen' (Downing, 2011).

If mantic traditions shaped how reading is understood, how might they leave traces in our experience of all kinds of reading, including brain reading?

In *Fate and Character*, Walter Benjamin describes what fortunetelling can tell us about time, "The fortuneteller who uses cards and the seer who reads palms teach us at least that this time can at every moment be made simultaneous with another (not present)." (Benjamin and Demetz, 1978). In a fortunetelling system for revealing character and fate,

signs are read consciously and overtly *as* signs, and these signs-as-signs, although they may be signs of the future, are always here and now. For Benjamin, despite the impossibility of predicting the future, “It is, however, precisely the contention of those who profess to predict men's fate from no matter what signs, that for those able to perceive it (who find an immediate knowledge of fate as such in themselves) it is in some way present, or more cautiously stated, accessible.” (Benjamin and Demetz, 1978)

Fate and character are essential themes for New Thought and Theatrical Mentalism. Oracle Acts are concerned with these two grand themes, and I have professional experience in this area. I worked on a telephone Tarot reading line in my final year of undergraduate studies. I worked the 8 pm to 2 am shift, which taught me much about what callers seek. It is a mistake to think that querants are primarily concerned with fate in the wishing to know specific details of the future, such as whether they will win the lottery next weekend. The actual questions underlying a query about lottery winning are more about character, “Am I a lucky person?”, “Do I deserve wealth?”. The most asked question from callers to the Tarot line was, “Does he love me?”. A brief conversation would soon reveal that the real question being asked was, “Am I lovable?” In other words, most questions about fate and the future are, in fact, questions about character and the present. The literature for mentalists on giving readings supports this view, notably Richard Webster, author of more than one hundred books for the mentalism, psychic entertainment, and New Age markets, including titles such as The Psychic Reader's Toolbox (Webster, 2020) and Readings as Entertainment (Webster, 2009), and Charles Garner, the pseudonym of a highly successful psychic to the rich and famous of Hollywood (Garner, 2009, Garner, 2012).

Fate and character continue to be widely discussed through the ongoing nature versus nurture debates. Genetics has played the role of fate in recent discussions of happiness. For instance, an influential and highly critiqued article published in Review of General

Psychology (Lyubomirsky et al., 2005) claimed that their genes determine 50% of people's happiness, 10% depends on their circumstances and 40% by "intentional activity", such as thinking positively. This can be read as fate and character taking up 90% of the influence on one's happiness. Of course, the brain often takes the role of fate in neurocentric models of nature's influence. The nature versus nurture question is seen as one of the Grand Challenges of neuroscience and is framed as, *How does the interplay of biology and experience shape our brains and make us who we are?* (Medicine et al., 2008). Through this notion of *interplay*, our orientation to our biology '…is not to assert destiny or fatalism, but opportunity' (Wade, 2018). In this arena, theories of neuroplasticity tend to shift the scales from nature to nurture, from fate to character, and notions of 'plasticity' in popular discourses tout the moral obligation to undertake perpetual labour upon the self (Pitts-Taylor, 2010). We are subjected to normatively-laden appeals that 'invest people with an understanding of their own brains and emotions as manageable material to be transformed' under the new promissory regime of 'neuroplasticity' (Murison, 2012). The view of the brain as a plastic resource to be managed is clearly expressed by Lisa Feldman Barrett, professor of psychology and author of *Seven and a Half Lessons About the Brain* (Feldman Barrett, 2021), "Your brain is not for thinking. Everything that it conjures, from thoughts to emotions to dreams, is in the service of body budgeting." (Barrett, 2020). This metaphor of the brain as both a tool for resource management and as a manageable resource in itself is part of a neuroscientific turn that Murison traces to the US in the 1840s (Murison, 2012), concurrent with the beginnings of the New Thought movement and intricately entangled with Mesmerism.

> The widespread popularity of neurology in the 1840s owed much to the men and women who publicly performed Mesmerism, later renamed hypnosis, for eager antebellum audiences. Popular demonstrations of trance predated modern

> disciplinarity and can thus represent a historical moment when attention to the nervous system came from a multitude of directions and impacted not just science but also literature, politics, and belief. More often than not, mesmerists focused on the capacities of the nervous system to cohere groups, to provide access to others' minds, and to glimpse spiritual realms. Mesmerism was both a complex science of the nerves and a popular entertainment, and thus its role in the rise of a nineteenth--century language of the nerves has been overlooked (and too easily relegated to the category of "pseudoscience"). (Murison, 2012)

To Murison's list of the capacities of the nervous system focussed on by mesmerists, I wish to add their use of the nervous system as a site for asking and answering both personal and philosophical questions of fate and character. Referencing the vocabulary of Walter Houghton's *Victorian Frame of Mind*, Winter says that we want to understand that "foreign frame" and that,

> One factor in our tendency to phrase the question this way is that Victorians were preoccupied with their own mental frame. In fact, one of our inheritances is this very way of questioning. They monitored their own sensibilities, took the measure of the influence they felt from each other, and speculated about the sympathies that bound them. They were motivated, in part, by the notion that one person's mind, or the mental character of a group, supplied a key to the collective mental features buried within an apparently fragmented society." (Winter, 1998).

This presentation of mental character as a manageable resource can be related to Heidegger's notion of enframing, a subjection of the world to human will that Heidegger saw as a characteristic of technology (Heidegger and Lovitt, 1977). For Heidegger, enframing is not simply a set of techniques aimed at control; it is an attitude that treats the world as

"standing reserves," resources to be mastered for human ends. The sense of mastery that such enframing can give the user of technology is to be questioned for what is lost in the act, and we can ask what is lost in the enflaming of the brain as a standing reserve.

In considering the mastery over language produced by word processing technology, anthropologist Brad Shore coined the word neuromantic, “It was Heidegger who, at the very dawn of the computer age, noted this modern impulse toward what Heim has called ‘the all-at-once simultaneity of totalizing presentness’ [Heim, 1987:85]. Because of the passions that this cybernetic view of mind generate among computer enthusiasts, I refer to this Heideggerian vision as the "neuromantic frame of mind" (Shore, 1996).

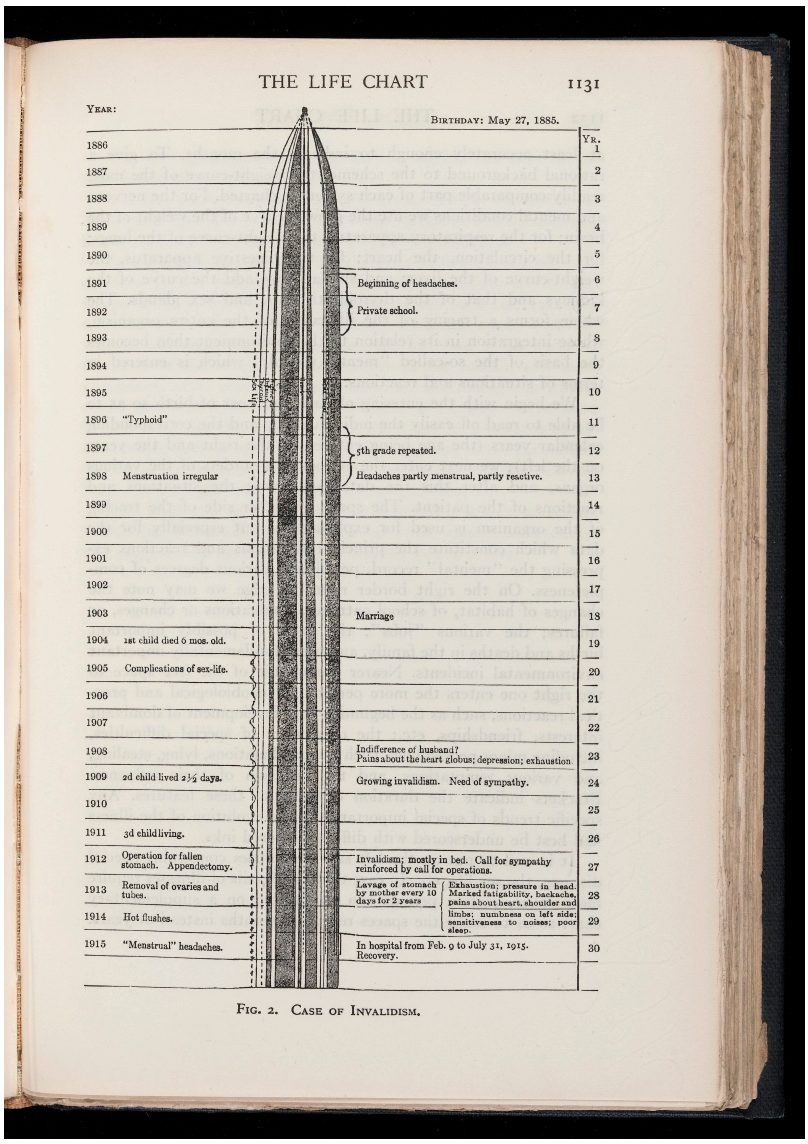
I want to foreground the *mantic* in Shore’s neuro*mantic* by noting the similarity between Heim’s “all-at-once simultaneity of totalizing presentness”(Heim, 1987) and Benjamin’s present and accessible mantic signs. Brainwear is neuro*mantic* in that it seeks to give the wearer a certain mastery over the standing resource of their own brain, to define previously undefinable aspects of their character within strict bounds, and to make character malleable through practice by making it clearly present through a set of signs. Let us now consider the graphic nature of these signs.

Neurographology

> As a novelist, too, I instinctively resist the quantification of character, the reduction of such an elusive concept to a set of measurements, to a score. Theoretically, I suppose, fiction writers might construct protagonists by choosing numerical points on various key continuums: on a scale of one to ten, say, our hero scores two for "fearfulness," nine for "openness to new experience," one for "risk aversion," eight for "ego strength"... But good luck with charting out our story's principals in this manner and coming up with Pierre from War and Peace. (Gooding et al., 2016)

The quote above is from Lionel Schriver's introduction to *Psychobook*, a collection of psychological tests, questionnaires, and games. As a writer for stage, I share Shriver's misgivings about psychological tests and her fascination with why people are drawn to such attempted measurements of personality and character. When Brainwear claims to measure aspects of one's personality then histories and cultural categories of character, personality, and emotion must be investigated. As Dumit has noted, "Are emotions being opposed to rationality and practical reasoning or are they included as aspects of all activity, providing reason and action their colors?" (Dumit, 2004) And "If mood is to be delineated in itself (as a distributed network), what moods are to be included?" (Dumit, 2004).

When I look at the EEG writing produced by my Brainwear, I am reminded of Adolf Meyer's Life Charts, a specific visual-discursive device that Meyer invented around 1915 and made into a significant diagnostic and pedagogical device. Meyer believed that the mind and body were interconnected entities, incapable of being fully understood in isolation. The Life Chart combines medical data on the patient's organs with notes on the history and condition of the patient's personality. Meyer correlated the growth curve of the brain's weight with the nervous and mental conditions. "The whole forms a tracing of the life-curve of the entire organism, whose integration in its relation to the environment then becomes the basis of the so-called 'mental record,' which is entered in terms of situations and reactions" (Meyer, 1938).


THE LIFE CHART 1131

Year: Birthday: May 27, 1885. Yr.

1886 1
1887 2
1888 3
1889 4
1890 5
1891 Beginning of headaches. 6
1892 Private school. 7
1893 8
1894 9
1895 10
1896 "Typhoid" 11
1897 5th grade repeated. 12
1898 Menstruation irregular Headaches partly menstrual, partly reactive. 13
1899 14
1900 15
1901 16
1902 17
1903 Marriage 18
1904 1st child died 6 mos. old. 19
1905 Complications of sex-life. 20
1906 21
1907 22
1908 Indifference of husband? Pains about the heart globus; depression; exhaustion. 23
1909 2d child lived 2½ days. Growing invalidism. Need of sympathy. 24
1910 25
1911 3d child living. 26
1912 Operation for fallen stomach. Appendectomy. Invalidism; mostly in bed. Call for sympathy reinforced by call for operations. 27
1913 Removal of ovaries and tubes. Lavage of stomach by mother every 10 days for 2 years. Exhaustion; pressure in head. Marked fatigability, backache, pains about heart, shoulder and limbs; numbness on left side; sensitiveness to noises; poor sleep. 28
1914 Hot flushes. 29
1915 "Menstrual" headaches. In hospital from Feb. 9 to July 31, 1915. Recovery. 30

Fig. 2. Case of Invalidism.

Adolf Meyer. Line drawing of the life chart. 1919. Credit: Wellcome Library, London.

Leys suggests that Meyer's Life Chart embodies "an entire project for the representation of individuality in relation to the type or norm" (Leys, 1991) and that its achievement is that it "represents individuality conceived as difference from itself-as a type of one." (Leys, 1991). For Leys, the Life Chart reconciles "the tension between the demand that the individual be treated as a socially determined object that could be analyzed and measured according to general scientific laws and the assumption of individual spontaneity or freedom". Although Brainwear operates on a shorter timescale, it continues Meyer's project by attempting to correlate brain data with personality metrics. However, unlike Meyer's Life

Charts, the personality readings are extrapolated directly from the brain data. My own account of my personality has been bypassed; instead of being recorded as a type of one, I am reduced to a mere type.

Ong distinguishes between oral, chirographic, and typographic cultures and considers the emerging role of electronic media in post-typographic culture (Ong, 1982). Electroencephalography is, of course, a graphology; it looks for significance in the form of writing. What would a neurographic culture contribute where signs are not spoken, handwritten, or printed but thought?

Shore writes, “Chirographic culture retains a close kinship to the world of speech. Handwriting still bears the "embodied" character of personal speech. A handwritten message always bears the personal imprint of its scribe, an imprint every bit as idiosyncratic as the voice. The resistance of the pen on paper is also the precondition for the inscription of the personality into the message.” (Shore, 1996) Benjamin also uses handwriting as a way to divine hidden character, “Graphology has taught us to recognise in handwriting images that the unconscious of the writer conceals in it” (Benjamin and Demetz, 1978). Neurographic technologies such as Brainwear claim to give access to hidden aspects of our character.

Shore highlights the importance of the linear nature of writing. “While all speech is necessarily linear and sequential, it was writing— and most especially alphabetic writing— that most powerfully exploited language's linear character.” (Shore, 1996). EEG readings are both linear and multiple. Watching the six Brainwear readings is akin to watching myself write with six pens at the same time. I can control the writing to the degree that it feels like it is me writing, but I am also not fully in control. It is an act of collaborative writing with my own brain. In this sense, it is similar to making a muscle reading drawing with another person, as I discussed in an earlier chapter. It is worth noting that such drawings are generally made as a single continuous line. While it is entirely possible to lift the pencil and make a

drawing using multiple lines, the act of drawing together, hands held together, favours the production of a single uninterrupted line.

The lines of EEG readings feel uninterrupted even if there are breaks in the lines. They are not perceived as breaks in activity but simply as breaks in the recording of activity. The murmur continues. Spoken words are momentary and fleeting. Written works are momentary but captured. EEG is a captured eavesdropping on a ceaseless chatter. “With writing, language became fixed in space and lost the characteristic of speech that Charles Hockett has called "rapid fading" (Hockett, 1960). Our spoken words die away as we speak them, but writing (as with sound recording of any kind) freezes the utterances of the moment, sometimes to our dismay” (Shore, 1996). Watching the Brainwear readings spool across the screen, I see an attempt to freeze my brain’s utterances of the moment not in a freeze-frame but in an ongoing, unstopping fixation. My thoughts still rapidly fade, so it is unclear what is being written, but certainly, some utterances are being recorded. An utterance that was previously unutterable. When I re-watch the recording, I am as Samuel Beckett’s *Krapp* (Beckett, 2009), relishing the word spool while trying to find the meaningful moments in the vast drabness of the linear recordings.

As Norbert Wiener observed in his memoir, brain waves “speak a language of their own, but this language is not something that one can observe precisely with the naked eye, by merely looking at the ink records of the electroencephalograph. There is much information contained in these ink records, but it is like the information concerning the Egyptian language which we had in the days before the Rosetta Stone, which gave us the clue” (Wiener, 1956).

As Shure points out, the term *brain wave* has two primary official definitions: the imagined medium for telepathy and the activity captured by electroencephalography (EEG). However, the historical use of the term often mixes the two. "The intrigue of 'brain waves,'" Shure argues, "…depends on this strange confluence of reality and fantasy. EEG research

grants the term authority and legitimacy; and an implicit association with mental magic imbues such research with an appeal beyond standard studies in electrophysiology." (Shure, 2018).

Reading the information about brain waves provided by Brainwear companies, one finds a mix of scientific explanations of how EEG works and loose language relating to the current extent of our understanding of the relationship between meditation and brain waves. Shure notes that following biofeedback's popularity in the sixties and seventies, "EEG frequencies transformed from clinical metrics to a family of waves with distinct, likeable personalities." (Shure, 2018) Each of the brain waves "…established positive (and simplistic) reputations. In popular discourse, these reputations have remained more or less in place from the seventies through present day: Theta signifies creativity; Beta represents attention; Delta accompanies sleep; and Alpha indicates "attentive relaxation." (Shure, 2018) The following brain wave definitions taken from the webpage for EMOTIV's Brain Activity Map software hold true to Shure's brain wave reputations,

> Delta (0.5-4Hz) – indicating deep sleep, restfulness, and conversely excitement or agitation when delta waves are suppressed
>
> Theta (4-8Hz) – indicating deep meditative states, daydreaming and automatic tasks
>
> Alpha (8-15Hz) – indicating relaxed alertness, restful and meditative states
>
> Beta (15-30Hz) – indicating wakefulness, alertness, mental engagement and conscious processing of information. (2024)

Of course, to say that one type of brain wave promotes meditation is overly simplistic. A 2018 review of the literature on the neural oscillations (a more recent term often used interchangeably with brain waves) underlying meditation reveals some of the

complexity involved. “The most commonly studied specific meditation practices are focused attention (FA), open-monitoring (OM), as well as transcendental meditation (TM), and loving-kindness (LK) meditation.” The review finds that while all of these meditation practices are associated with global increases in neural oscillation, there are distinct differences in the activity between meditation practices. Different meditation practices appear to affect different neural oscillation activity in different brain regions. In addition, while the global effects are more significant for experienced meditators, there appear to be distinct differences in EEG profiles depending on experience. “One study on Satyananda Yoga practitioners demonstrated that intermediate (mean experience 4 years) practitioners had increased low frequency oscillations (theta and alpha) in the right superior frontal, right inferior frontal, and right anterior temporal lobes, whereas, advanced (mean experience 30 years) practitioners had increased high frequency oscillations (beta and gamma) in the same regions” (Lee et al., 2018).

Given the activity’s complexity and the difference in effect between intermediate and advanced practitioners, one might expect to find little discernible impact in the neural oscillations of a beginner like myself. However, it was never the aim of this study to seek such results. Instead, I am interested in the phenomenology of an experience that attempts to measure itself rather than the measurements themselves. When examining the act of looking for correspondence between thoughts and brainwaves, we might consider the following quote from Rorty,

> We have to drop the notion of correspondence for sentences as well as for thoughts, and see sentences as connected with other sentences rather than with the world. We have to see the term “corresponds to how things are” as an automatic compliment paid to successful normal discourse rather than as a relation to be studied and aspired to throughout the rest of discourse. To attempt to extend this compliment to feats of

> abnormal discourse is like complimenting a judge on his wise decision by leaving him a fat tip: it shows a lack of tact. (Rorty, 1979)

If speech does not correspond with thought, neither do brainwaves, and it would be tactless to suggest otherwise. In 2011, UC Berkeley neuroscientists trained a system involving an fMRI scanner to create *ethereal doubles* (Huckins, 2023) of videos their subjects had viewed (Nishimoto et al., 2011). More recently, neuroscientists have deployed generative AI tools to analyse neural activity and create more realistic-looking, if not wholly accurate, reconstructions of movies (Chen, 2023) and music (Bellier et al., 2023). Recent research using fMRI brain data has developed an AI-based semantic decoder to translate brain activity into a continuous stream of text (Tang et al., 2023). The decoder could reconstruct speech with a high degree of accuracy while people listened to a story or even silently imagined one. From Rorty's perspective, these various *ethereal doubles* would still not correspond to "how things are" in the material of thought.

Discourse using brainwaves is, of course, abnormal in the sense that Rorty means it here - as what happens when someone who is ignorant of the agreed-upon convention of everyday discourse joins. As yet, there are no agreed-upon conventions for discourse using EEG brainwaves. As Rorty says, "The product of abnormal discourse can be any- thing from nonsense to intellectual revolution, and there is no discipline which describes it, any more than there is a discipline devoted to the study of the unpredictable, or of 'creativity.'" (Rorty, 1979). Discourse using brainwaves can be nonsense, and those promoting telepathic futurity believe it could spark an intellectual revolution. Still, that revolution would not be because the brainwaves correspond to inner representations but rather because they may provoke unconventional discourse. The potential is not in what is read but in the performative act of reading.

In *Philosophy and the Mirror of Nature* (1979), Rorty introduces us to the Antipodeans, an alien race whose history has unfolded in such a way that they never developed the concept of mind. Antipodean neuroscience is highly advanced; they know vastly more about their brains than we know about ours, and reference to their neural states has become commonplace in their everyday speech. Having no concept of mind, the Antipodeans simply talk of their brain states. Instead of saying 'I hate you', an Antipodean would say something like 'You give me brain state K-543'. "These beings did not know that they had minds. They had notions like "wanting to" and "in-tending to" and "believing that" and "feeling terrible" and "feeling marvelous." But they had no notion that these signified mental states—states of a peculiar and distinct sort—quite different from "sitting down," "having a cold," and "being sexually aroused." (Rorty, 1979). Rorty's aim in telling this story is to historicise the mind-body problem, make it contingent rather than inevitable or fundamental, and eventually dismiss it as useless. I want to use it as a way to think about what a ubiquitous use of advanced Brainwear might do to our language. We are not Antipodean; we have a concept of mind, and we talk in terms of sensations and feelings. However, could we develop a second way of referring to our psychological states? This is one of the things that Brainwear offers when it gives us measurements of Focus, Attention, Excitement, etc. Might we use statements such as "I have a Focus of +4 from this morning" and be understood? Could we become more Antipodean?

The Nonhuman in the Human Brain

My mind

It ain't so open

That anything

Could crawl right in

The last place

To lose yourself

Is in the world

Where we all cling

My Mind Aint So Open - Magazine (Devoto, 1978)

To return again to Ihde's four kinds of human-technology-world relations - embodiment, hermeneutic, alterity, and background relations - let us consider alterity relations, relations in which human beings interact directly with technologies with the world at the background of this interaction. Ihde schematises this relation as:

human —> technology (world).

In this relation, the Brainwear system manifests itself as a "third" exhibiting a "quasi-otherness", also known as "anthropomorphism of artefact" (Ihde, 1990). Ihde suggests a paradox within the dynamics of otherness; while we anticipate technology to handle both manual and, increasingly, mental tasks, we wish to remain the masters of technology. Let us now consider the nature of the nonhuman quasi-other created by Brainwear use and its potential to handle the task of my self-reflection.

The original aim of the Autobiology method was to "…enhance the artist's consciousness of the relationship between their psyche and soma, biography and biology…" (Hill and Paris, 2020). I consider this relationship and imagine the language in which my brain speaks to itself; as Wittgenstein puts it, 'to imagine a language is to imagine a form of life' (Wittgenstein, 2001). What is the form of life that speaks this language? Hayles defines cognition as "a process of interpreting information in contexts that connect it with meaning" (Hayles, 2017) and writes of *cognitive assemblages* as "assemblages through which information, interpretations, and meanings circulate" (Sampson, 2018). Me, my brain, and my Brainwear are three cognisers forming a chattering cognitive assemblage. A form of life circulating information, interpretations, and meanings that combine the medical, the biological, the psychological, the neurographological, and the social. My Brainwear Autobiology may be seen as a form of noninvasive (at least in a physical sense) auto-extispicy. I am reading my own entrails as those of an animal.

In the fragment *On Astrology* (Benjamin and Demetz, 1978), Benjamin discusses graphology and suggests that "…handwriting generates picture puzzles (Vexierbilder) that convey another, unconscious meaning (in)visibly alongside the semantic content of the words themselves—images that "appear" not so much in the form of individual letters or words but rather, as in the sound play of Sprache, in the interplay and movement between the various graphemes." (Downing, 2018). So, the asemeic content of handwriting becomes a meaningful sign of character, and the interplay and movement between the signs can be seen as an animism. Benjamin also views the ancient practice of reading human physiognomy in terms of animal resemblances, "…itself a first step toward the more radical reading of the stars as animal beings, and from there to stars as connected back to human beings. As in ancient extispicy and modern-day graphology, this mode of reading sees the human in the nonhuman world, which is then mirrored back onto the human as a way of knowing it" (Downing,

2018).

> In truth, the human experience of magic – our ancestral, animistic awareness of the world as alive and expressive – was never really lost. Our senses simply shifted their animistic participation from the depths of the surrounding landscape toward the letters written on pages and, today, on screens. Only thus could the letters begin to come alive and to speak. As a Zuni elder focuses her eyes upon a cactus and abruptly hears the cactus begin to speak, so we focus our eyes upon these printed marks and immediately hear voices. We hear spoken words, witness strange scenes or visions, even experience other lives. As nonhuman animals, plants, and even "inanimate" rivers once spoke to our oral ancestors, so the ostensibly "inert" letters on the page now speak to us! This is a form of animism that we take for granted, but it is animism nonetheless – as mysterious as a talking stone (Abram, 1996).

In *The Intruder,* Nancy writes of the experience of undergoing a heart transplant, "My heart became my stranger: strange precisely because it was inside. The strangeness could only come from outside because it surged up first on the inside." (Nancy and Hanson, 2002). Nancy describes being "closed open" to technology (Nancy and Hanson, 2002). This "intruder from inside" renders the apparently clear-cut distinction between "inside" and "outside" opaque. "This technological order is "other" and "own" at the same time, which explains why technology can be experienced as uncanny (Aydin, 2021). This uncanniness is, for Nancy, an example of our impulse to continually alter ourselves. I want to suggest here that it is not necessary to undergo an organ transplant in order to experience this sense of intrusion; the mere focusing of attention on a part of one's body is enough, as we saw when discussing *The Talking Hand* experience. Brainwear facilitates a focus of attention that can provoke the fragmentation that Nancy discusses; the brain appears as an intruding animal that

is a fragment of the cognitive assemblage. As Nancy says, “The intruder is nothing but myself and man himself. None other than the same, never done with being altered, at once sharpened and exhausted, denuded and overequipped, an intruder in the world as well as in himself, a disturbing thrust of the strange, the conatus of an on-growing infinity.” (Nancy and Hanson, 2002). This inclination to continue to exist by writing for ourselves the technological fate of our character reveals itself in oracular literature.

The writing created by Brainwear fulfils the definition of oracular literature, positioned as a medium between humanity and another world, usually defined as supernatural or nonhuman. The Brainwear does not just feel like a machine that measures; it feels like a social actor who sees into me. Brainwear is an assemblage in Deleuzean terms… “simultaneously and inseparably a machine assemblage and assemblage of enunciation" (Deleuze and Guattari, 1987) an object about which something is said and at the same time an object that is used to say things. When I consider this assemblage of nonhuman Brainwear and the human brain, I am reminded of the question raised by Derrida,

> How can another see into me, into my most secret self, without my being able to see in there myself and without my being able to see him in me? And if my secret self, that which can be revealed only to the other, to the wholly other, to God if you wish, is a secret that I will never reflect on, that I will never know or experi-ence or possess as my own, then what sense is there in saying that it is "my" secret (Derrida, 1995).

Viewing the interplay of my brain, glimpsing the language it mutters to itself, is to find the nonhuman within myself. I do not find myself, but rather, I find something that reminds me of the philosopher James Carse writing about looking into the eyes of his cat, Charlie,

> I recognize nothing in Charlie. I can recognize speechlessness but only a

speechlessness that is a waiting or a preparation for speech. I have no acquaintance with a silence that complete in myself. If a lion could speak, Wittgenstein said, we could not understand him. Wittgenstein is not implying that if we could get to know lions well enough we could know what they are saying. This is not a failure of translation but a failure to find anything that will translate into speech. It is presence that remains presence. Pure soul. “Even if you are able to describe the Language of the Birds,” Rumi asked, “how can you discern what they want to say? If you learn the call of the nightingale, what will you know of its Love for the Rose?” (Carse, 1994)

CONCLUSIONS

> Let's pretend there's a way of getting through into it, somehow, Kitty. Let's pretend the glass has got all soft like gauze, so that we can get through. Why, it's turning into a sort of mist now, I declare! It'll be easy enough to get through--' She was up on the chimney-piece while she said this, though she hardly knew how she had got there. And certainly the glass WAS beginning to melt away, just like a bright silvery mist.
>
> - Through the looking-glass: and what Alice found there - Lewis Carroll (Carroll, 1871)

The glass of the computer screen displaying my brainwaves is a looking glass in which I see myself in a very different form from that which I am used to. A new electrical self, composed of vibrations, waves, measurements, and multiple personalities. What can I conclude from my time behind this looking-glass, and what did I find there?

This thesis is a work of two distinct parts. The first part is a historical survey, mainly based on archive research undertaken during a fellowship at Kluge Center at the Library of Congress, which outlines a cultural history of Theatrical Mentalism and its relationship to the New Thought movement, both to situate the Brainwear in this history and to lay the foundation for further future work on this neglected history. The second part is an Autobiology that creatively responds to the use of a direct-to-consumer EEG Brainwear device with the creation of a series of stage scripts for performances of Theatrical Mentalism that draw out the links between Brainwear, Theatrical Mentalism, and New Thought.

Viewing the halves of the thesis through the left brain/right brain metaphor is tempting, with the careful historical research representing the logical left hemisphere and the Autobiology representing the creative right hemisphere. This would be a view based on a prevalent neuromyth. Another perspective could see the “academic” historical research as

"brain work" and the performative Autobiology as "body work". This would be a view based on the nurocentrism that I argue against. I mention these two views because the ease with which they come to mind and the temptation to find them explanatory demonstrates how embedded in our conceptualisation of the world such seductive brain-based analogies have become. More simply, the historical research is necessary to understand Theatrical Mentalism and how it is employed in the Autobiology. It is also intended to initiate the work of building a cultural history of a neglected performance art.

I will now consider conclusions related to each of these distinct research activities.

The Materiality of Thought

It's the 23rd of October 2020, and I'm watching a panel discussion at the International Neuroethics Society Annual Meeting. The session is called *Governing Brain Data in the Infosphere,* and the panellists include Ciro Colombara, Lawyer, RCZ Law Firm (Chile), Pro Bono Network of the Americas; Mary Lou Jepsen, Openwater (United States); Fruzsina Molnár-Gábor, Heidelberg Academy of Sciences (Germany); Rafael Yuste, Columbia University (United States). The panel is introduced by Philipp Kellmeyer, University of Freiburg (Germany) and moderated by Marcello Ienca, ETH Zurich.

Yuste introduces the Neurorights Initiative's work and the steps the government is taking to introduce several new neurorights laws in Chile (this resulted in a landmark ruling by the Chilean Supreme Court on August 9, 2023, the first in the world to establish protection for brain data (Cornejo-Plaza et al., 2024)). Colombara adds further detail to Chile's context. Molnár-Gábor gives a careful outline of how issues of brain data can be viewed from the perspective of existing data protection. They are all discussing how the law may respond to the challenge of neurotechnologies that can read and potentially alter the brain. They do this with an expert understanding of the past regarding Chile's legal structures and political

motivations.

In contrast, Jepson is focused on the future. She asks whether we can realistically predict laws that will help. She repeatedly states that the technologies being discussed are inevitable and that laws may be too slow to respond effectively. She is highly speculative, talking of future times when we can communicate without speech; she sees speech as a problem to be overcome. She asked whether we will still consider ourselves as humans in the future. “Pick a date, pick a date”, she repeats. “200 years or 20 years”. She refers to a book, *Right/Wrong: How Technology Transforms Our Ethics,* by Juan Enriquez. She hasn’t read the book but has just seen his talk. She believes that the new neurotechnologies will transform our ethics, and there may be little we can do about that. She says, “Maybe laws will be of no use in the future and instead we should just teach ourselves to swim?” She is asked about technological determinism and how we should make choices about what non-medical uses we should allow. This question flusters her for a moment. The idea of being able to make choices about how the technology is used appears to make little sense to her, but she later says that she thinks the moves that are happening in Chile are fantastic. She repeatedly calls her statements “provocations”.

My description may appear highly critical of Jepson, but I do not intend it to be. I am merely describing an event with two different kinds of performers debating different views of the nature of our relationship to the materiality of thought. Those who believe that policy and law can be used to shape our future neurotechnological developments. And Jepson, who believes in improvisation in all things. She says we should be “taught to swim” and demonstrates what she means: speculating, improvising, moving between different viewpoints, going with the flow of the technology. She is a skilled platform performer. She is a Theatrical Mentalist. The term refers to theatrical stage performers who perform the idea that the brain is capable of developing extraordinary abilities, and we should not hesitate to

use it to refer to our present-day platform performers who tread the boards of tech conferences and TED events. Their motivations, rhetorics, and philosophies are remarkably similar. They perform on a stage where material of thought is up for grabs.

The Influence of New Thought

This thesis contributes to the argument that the influence of New Thought has been underestimated and requires further scholarly attention. I will give one example here to make the point clear. While undertaking the Kluge Fellowship at the Library of Congress, I was invited to participate in discussions as part of the Nobel Prize Summit 2023 at the National Academy of Sciences. The theme of the Summit was “Truth, Trust, and Hope”, and many speakers addressed the issue of a lack of trust in science and the medical community, mostly surrounding climate change and COVID-19 vaccination.

At the event, I spoke of New Thought beliefs in the power and materiality of thought that can lead to a dangerous rejection of medical science, as in the case of Norman Baker and his ineffectual cancer treatments I discussed earlier. A clear understanding of the ways in which the science denial beliefs of today had their beginnings in New Thought is essential because we can then see them not simply as an ignorant rejection of facts but as an expression of the deliberate belief that our thoughts can intentionally shape facts. This means that strategies for addressing them cannot rely on the marshalling and communication of scientific truths but must directly address the cultural mindset that believes that thoughts are things. No analysis of the link between New Thought, neuroasceticism, and technological neurocultures currently exists, and in this thesis, I have begun to document this link. Further research on this history is required for a better understanding of the cultural roots of today’s Neurotechnological Nentalism.

No history of the link between New Thought and Theatrical Mentalism currently

exists. I have begun to explore the influence of New Thought on Theatrical Mentalism, but further work is advised to make visible its influence in other areas of popular culture. As well as the field of self-help publishing, which I briefly considered, New Thought's influence can be identified in film, comics, and popular music and studies of these media are recommended.

A review of the existing literature shows that Theatrical Mentalism is underresearched, and its role in the evolution of New Thought as an influential philosophical movement has been overlooked. The historical section of this thesis pays attention to this history in order to demonstrate its link to emerging ideas about the materiality of thought, but the history demands further research. I focussed primarily on the late 19th and early 20th century in order to make visible the early influences on these ideas; more work on the later history of Theatrical Mentalism is required to produce a more comprehensive cultural history of the art form. This could include, for instance, the links between Theatrical Mentalism and New Age movements and the Human Enhancement Movement, the rise of a psychologised form of Theatrical Mentalism that locates the source of the performer's abilities in their mastery of behavioural psychology, and the success of corporate Theatrical Mentalism that draws associations between its performances and business approaches to motivational management techniques such as positive thinking, sales techniques of influence and persuasion, and the use of ideation, creativity, and innovation in successful business.

My archival research at the Library of Congress uncovered sufficient materials for a book on the cultural history of Theatrical Mentalism, and I have been encouraged by the Kluge Centre to write this history through a further post-doctorate Kluge Fellowship. Such a history would also pay attention to the ways that the history of Theatrical Mentalism has been subsumed in histories of Theatrical Magic and how its unique contributions can be made more evident. Notions of the magical and of mental powers have been conflated, to the

detriment of our understanding of the experiences and motivations of both performers and audiences. This book would further contribute to Performance History, Neuroscience History, and the History of Religion.

The role of women in Theatrical Mentalism deserves further research. To give but one example, the experiences of women performers in second-sight acts could be usefully considered in the light of the New Thought school of Emma Curtis Hopkins. There has been some consideration of Spiritualism and women's rights (Braude, 2001) and a similar consideration of second-sight performances could begin with reference to the work of Satter (Satter, 1999), Wessinger (Wessinger, 1993), and Harley (Harley, 2002). It would also be worthwhile considering the influence of Christian Science in this regard.

There has been some treatment of Orientalism in Theatrical Magic, but, as I have pointed out, the Orientalism of Theatrical Mentalism takes a quite different form, drawing on the New Thought interest in Hinduism rather than ideas of Chinese magic. It has been noted that theories and methods of communication are extensively discussed in The Vedas, the oldest scriptures of Hinduism and that adepts who master their minds through spiritual practice are thought to be able to attain mental abilities such as clairvoyance and telepathy (Yuliani et al., 2023). The specific Orientalism of Theatrical Mentalism could be explored further through the influence of Emersonian New Thought and the links between Theatrical Mentalism and Theosophy.

Performance Practice

My archive research has uncovered an early history of Theatrical Mentalism that present-day practitioners are unaware of. The link between Theatrical Mentalism and the New Thought movement highlights several elements of the art that persist among practitioners to this day. These include a spiritual underpinning, a religious justification for

the development of extraordinary mental powers, a fascination with Occult practices, an Orientalism focused primarily on India, a psychologisation of social and financial success, a weakness for pseudo-science, a resistance to mainstream medicine, and a penchant for evangelism both in performance and publishing.

This PhD research has given me a key insight into Theatrical Mentalism and a transformative impact on my performance practice. Uncovering the links between Theatrical Mentalism and the new thought movement enables me to see present-day performances of in a new light. The neuroascetic dimension of such performance is now more evident and my performances are more able to critique and explore this fundamental aspect of the art.

As a performance trainer, I am planning new approaches and training methods based on my historical research, the Autobiology method, and the use of Kinaesthetic Emulation that this PhD research has inspired. I have been invited to lecture at several closed meetings of Theatrical Mentalists, including the Magiculum 2024 and MindMeet 2024, to contribute directly to the field.

I am a co-founder and co-editor of the Journal of Performance Magic, and I'm planning a special issue to highlight the ways in which Theatrical Mentalism is different from Theatrical Magic. I'm also planning papers for the journal based on my archive research and research workshops at the Library of Congress, thus contributing to the field of Performance Magic History. I intend to focus on this journal rather than seeking other journals in which to publish, as I wish to increase its influence and standing.

I have noted that Theatrical Mentalism and Brainwear are both forms of game played with the materials of thought and that they could be analysed through both narratology and ludology. I will use my work with performers and game designers to conduct further work in this area.

Performance methods have not been applied to Critical Neuroscience before. This

thesis demonstrates that research methods derived from performance can make a valuable contribution to historical research and, more specifically, to Critical Neuroscience. I have shown that workshops in which participants learn the techniques of Theatrical Mentalism can help historians understand these historical performance practices and the public and media responses to them. Such kinaesthetic emulation can help us engage with historical practices and provide new and more sympathetic ways of interpreting the historical records of performances and experiments, such as those of Max Dessior, discussed earlier. Without such embodied forms of research, we risk misinterpreting historical events by only viewing them through the distorting lens of our contemporary preconceptions regarding what is and is not possible.

The comparison of contact and non-contact notions of telepathy suggest a number of strategies for Critical NeuroArt. Firstly, that using performance techniques that are fundamentally embodied provides a way of directly confronting neurocentricity. Secondly, working with art forms that have a traditional concern with philosophy of mind opens up a rich variety of robust techniques that have been previously under-researched. Finally, that an engagement with the cultural movements that formed modern neurocultures provides a way of developing an informed and varied Critical NeuroArt.

Despite the use of Autobiology, which was initially conceived as a workshop method for creators to explore their biological histories, the scripts I produced are less personal than might be expected. Rather than creating an *instrumental intimacy*, I found that Brainwear was just as likely to create a distance between myself and my sense of my own brain and its functions. The scripts function more as meditations on the use of the Brainwear itself. As I began the study with the concerns of Critical Neuroscience in mind, this distance is understandable. It highlights the difference between critical and uncritical Brainwear use, whether in a quantified self or NeuroArt practice.

Similarly, Theatrical Mentalism has often challenged audiences to question the veracity of what appears to be occurring in its performances, and this theatrical distancing provides a valuable strategy for the future development and analysis of a Critical NeuroArt. More broadly, this thesis suggests that such a Critical NeuroArt can benefit from art practices that are quintessentially performative and embodied. It argues for the use of previously institutionally excluded art practices, such as Theatrical Mentalism, which has a rich and relevant history of engagement with neuroscience and philosophy of mind.

These scripts and the workshops mentioned earlier demonstrate that art can bring methods and practices to Critical Neuroscience that illuminate the performative aspects of neurotechnology use, reintroduce the whole human, and challenge reductionist neurocentric ontologies with a more holistic, postcognitivist approach that sees consciousness as embodied, enactive, extended, and embedded within social, cultural, historical and political-economic contingency.

My use of Autobiology as a research method extends its original use as a creative workshop method and highlights its potential as a tool for critically considering technology use. While Autobiology was originally used in day-long collaborative workshops, this study of Brainwear use provides an extended immersive critique of a neuroascetic device, making visible its shared history with Theatrical Mentalism, revealing its performative nature, and demonstrating the efficacy of Autobiology as a method for long-term, solitary, postphenomenological studies.

New Thought Brainwear

This thesis has situated Brainwear in the neuroascetic tradition of the New Thought movement, and I have related the primary functions of Brainwear to the specific promises of Theatrical Mentalism to highlight its performative nature and the history of the

cultural threads that animate it. Firstly, I used the history of attempts to capture the materiality of thought using photographic media to relate the use of Brainwear to both sitting for traditional photographs and the practices of thoughtography. Highlighting the strictures that Brainwear use places on the body is a deliberately anti-neurocentric postcognitivist move intended to bring the whole body back *into the picture*. Situating Brainwear in the tradition of thoughtography allows us to appreciate further the blobology critique that comes from Critical Neuroscience and to be wary of the seductive lure of reductionist brain imaging that oversimplifies in its attempts to capture and localise thought. Comparing the images produced by Brainwear with the Embodied Thought Drawing produced through my Muscle Reading workshops makes visible the individualistic and neurocentric nature of the former and the socially embodied, physically embedded, and extended nature of the latter.

Secondly, I relate the use of Brainwear to attempting to achieve altered mental states through contemplative neuroscience practices of mesmerism and hypnosis. The historical practices of Mesmer, Quimby, and Braid were considered along with my own experience as a hypnotist and hypnotic subject and Crouch's views on the role of autosuggestion in theatre. Through these comparisons, we can see that the use of Brainwear involves similar processes of monoideation and autosuggestion and that their influence needs to be accounted for when considering Brainwear practices. We can also see that neurocentric views of Brainwear use are unfounded as the whole body is recruited when attempting mental state change through neurofeedback. Referring to Sutton-Smith and Sloterdijk, we can read the use of Brainwear as a playful performative act of neouroascesis and self-creation. In this section, I use my experience of Brainwear use in a Zane meditation session to highlight its messily embodied nature, the complexity of its use in a group meditation setting, and the phenomenology of its use by someone who is neurodivergent. This shows the potential for Brainwear to be neuronormative and to promote solitary use over shared practice; both of these issues should

be considered in further contemplative neuroscience studies.

Thirdly, I consider the use of Brainwear as a Brain-Computer Interface (BCI) through an exploration of its training software. In this use, Brainwear promises new forms of control over both the world and our own brains and new forms of communication with and between brains and machines. I relate the experience of using Brainwear as a BCI to my use of Chevreul pendulums in Theatrical Mentalism, the history of the Chevreul pendulum in performance, and my experiments creating virtual pendulums. I use a script, *The Talking Hand*, to demonstrate how such Wishful Devices can resonate, both literally and metaphorically, with a participant's construction of self and notions of the subconscious. By reading Brainwear as a modern Wishful Device, I seek to situate it in a more extended history of neuroascesis than has been considered to date. Wishful Brainwear is both a toy for the playful construction of the self and a fulfilment of the dreams of telekinesis dramatised by Theatrical Mentalism.

Finally, I consider the use of Brainwear to measure supposed aspects of "mental performance" such as Stress, Engagement, Interest, Excitement, Focus, and Relaxation. I draw comparisons between this aspect of Brainwear and the Oracle Acts of Theatrical Mentalism. From this perspective, Brainwear can be seen as a neuromantic device that claims to give the wearer a certain mastery over the performance of their own brain, to define previously undefinable aspects of their character, and to make character malleable through practice by making it clearly present through a set of signs. Breanwear performs a from of writing that purports to reveal the wearers character. This neurographology gives Brainwear an oracular function that manifests a nonhuman quasi-other in the tradition of oracles and the reading of fortunes that are, somehow, written into our bodies.

As we have seen, these various uses of Brainwear can be theorised using Ihde's phenomenology of technics, which outlines four different kinds of human-technology-world

relations: embodiment, hermeneutic, alterity, and background relations. My comparisons with New Thought and Theatrical Mentalism practices illuminate these relationships. I have shown that Brainwear can be read as part of a history of performative mentalism, as a serious cultural entertainment with our brain and its potential as its focus.

Coda Collapse

Following the death of Washington Irving Bishop after his collapse onstage, several performers began to copy his style and use his death to promote their acts. One example is Alexander James McIvor-Tyndall, who, as we saw earlier, imagined a future where telepathic communication has replaced speech with a blissful silence. In the 8th June 1908 edition of *The Laramie Republican,* he is advertised as "reproducing the feat that is supposed to have caused the death of Washington Irving Bishop, the famous American mind reader"(1908). Performers began to end their acts with a dramatic physical reaction to the exertion caused by their demonstrations of extraordinary mental abilities (Samuels, 2020), and you occasionally see this form of finale performed today. It can be read as an echo of the weakness and power of the neurasthenic character whose advanced mental abilities were a sign of high and delicate sensitivity to the modern world.

Just as the original computers were people who performed computations, we can imagine a time when mind-reader is a term applied to machines more than humans. The explosion and plunge into darkness at the end of *The Line* represent an advanced mind-reading technology collapsing after demonstrating its abilities. This should not, of course, be taken literally but more in the sense of Malabou's *destructive plasticity,* with its capacity to explode or annihilate form. We do not know what aspects of the human future neurotechnologies may annihilate or how our arts will respond to the pyrotechnics. The show goes on. But for this thesis, we come to an end.

Curtain.

Bibliography

1869. The Hypothesis of Brain-Waves. *The Spectator.*
1874. Brown's Brains. *The Evening News*.
1882. *Proceedings of the Society for Psychical Research,* London, Society for Psychical Research.
1888. "He Was A Crank". *San Antonio Daily Light.*, Dec 18.
1889a. Bishop Butchered. *Omaha daily bee.*, 16 May.
1889b. Bishop's Brain Busted. *San Antonio Daily Light.*, 18 May.
1889c. Mind-reader Bishop Dead. *The Butler weekly times.*, 22 May.
1893. Buried While Yet Alive. *The Indianapolis journal.*, 19 March.
1896. Tyndall the Mind-Reader. *The Record-Union*, 3rd August, p.4.
1901. Power of McIvor-Tyndall. *The Billings Gazette*, 26th February, p.5.
1902. Will Succeed Himself on the Board of Works. *The San Francisco Call*, 11th December, p.5.
1908. Mystery in Opera House. *The Laramie Republican*, June 8th.
1909a. Big Audience Will Greet Dr. MIvor-Tyndall Tomorrow Night at the Opera House. *The Daily Sentinel*, 9th March, p.2.
1909b. Is Prepared to Startle Grand Junction People. *The Daily Sentinel*, 1st March, p.5.
1909c. McIvor-Tyndall Comes to Rocky Ford for a Few Days. *Rocky Ford Enterprise*, 5th February.
1909d. Tickets Are Now on Sale for McIvor-Tyndall's Big Public Meeting, Sunday Eve. *The Daily Sentinel*, 5th March, p.4.
1912. Dr. McIvor-Tyndall Proving Big Magnet. *The Detroit Times*, 30th November, p.2.
1919. Hypnotic Record' Brings Out One's Latent Genius. *Talking Machine World.*
1922. Radio to World of Spirits to Get Test. *New York Herald*, 28 February.
1923a. Advertisement for E. C. Feyrer Lecture. *The Indianapolis times*.
1923b. "'How's Your Radioplasm?' New York's Latest Greeting". *Central New Jersey Home News*, 10 February.
1923c. Sixth St. Theatre. *Coshocton Tribune*, 7 February.
1924. Reading Thoughts by Radio. *Popular Mechanics Magazine***,** 770.
1925. Radio to Solve the Secrets of Telepathy: How Science Seeks to Show That 'Brain Waves' Transmit Thoughts and Find a Way to Talk with the Dead. *Tampa Times*, 3 October.
1926a. Ad for Kara's show at the Avon Theatre. *Decatur Daily Review*, 24 October.
1926b. Paul Kara Press Release. *The Decatur Daily Review*, October 17.
1927. Professor Paul Kara at Deadwood Theatre. *SD Pioneer Times*, 14 July.
1928. Mel-Roy, the 'Mental Marvel'. *Longview News Journal*, 15 November.
1928. Alla Rageh Appears at Rivoli Theatre Thurs.-Fri.-Sat. Tells Secrets of 'Radio Power'. *NE Daily Sun*, 18 July
1931. Kara's Science Is Founded Upon Theory of Vibrations. *Press Democrat*, 8 July.
1937. Advertisment for Professor Gerald M. P. Fitzgibbon. *PA Times-Tribune*, 30 November.
2000. *BBC News | Back to the future | Kevin Warwick* [Online]. Available: http://news.bbc.co.uk/hi/english/static/special_report/1999/12/99/back_to_the_future/kevin_warwick.stm [Accessed 5th Nov 2023].
2018. Use of Yoga and Meditation Becoming More Popular in U.S.: CDC.
2020. *Billion-Dollar State of Mind* [Online]. Fitt Insider. Available: https://insider.fitt.co/issue-no-107-billion-dollar-state-of-mind/ [Accessed 23rd Oct 2023].
2021. Wearable Technology: A training ring for the mind. *The New India Express*, 15th July.

2023a. *EmotivBCI website* [Online]. Available: https://www.emotiv.com/emotiv-bci/ [Accessed 15th Jan 2024].
2023b. *Rewiring Your Brain World Summit 2023* [Online]. Available: https://www.rewiringyourbrainworldsummit.com/schedule [Accessed 24th Oct 2023].
2024. *EMOTIV Brain Activity Map* [Online]. EPOC. Available: https://www.emotiv.com/product/epoc-brain-activity-map/ [Accessed 11th Feb 2024].
ABRAM, D. 1996. *The spell of the sensuous: perception and language in a more-than-human world,* New York, Pantheon Books.
ADORNO, T. W. & CROOK, S. 1994. *Adorno: the stars down to earth and other essays on the irrational in culture,* London, Routledge.
ALFORD, T. 2022. *In the houses of their dead: the Lincolns, the Booths, and the spirits,* New York, Liveright Publishing Company, A Division of W.W. Norton & Company.
ALIOTO, D. 2017. We Make Technology, Technology Makes Us. *Guernica* [Online]. Available: https://www.guernicamag.com/make-technology-technology-makes-us/ [Accessed 26/06/2022].
ALLEN, A. L. 1914. *The Message of New Thought*, Thomas Y. Crowell Company.
ALLEN, J. & ALLEN, L. L. 1914. *Men and systems,* New York,, Dodge publishing company.
ALSTON, A. A. 2016. *Beyond immersive theatre: aesthetics, politics and productive participation*.
ALSTON, I. 1928. Science in Quest of the Soul. *The Sunday Tribune*, 8 January.
ANDERSEN, K. 2018. *Fantasyland: how America went haywire: a 500-year history*, Random House.
ANDERSON, R. I. 2006. *Psychics, sensitives and somnambules: a biographical dictionary with bibliographies,* Jefferson, N.C., McFarland & Co.
ANDRIOPOULOS, S. 2013. *Ghostly apparitions: German idealism, the gothic novel, and optical media,* New York, Zone Books.
ANNEGRET HUBER, D. I., THERESE KAUFMANN, JOHANNES KRETZ, GESINE SCHRÖDER, TASOS ZEMBYLAS 2021. *Knowing in Performing*, transcript-Verlag.
ANNEMANN, T. 1983. *Practical Mental Magic,* New York, Dover Publications.
ASHBY, W. 2013. *Design for a brain: The origin of adaptive behaviour*, Springer Science & Business Media.
ASHBY, W. R. 1956. An introduction to cybernetics.
ATKINSON, W. W. 1908. *Practical Mind-Reading: A Course of Lessons on Thought-Transference, Telepathy, Mental-Currents, Mental Rapport, &c.,* Chicago, Ill., Advanced Thought Publishing Co.
ATKINSON, W. W. 1910. *Thought vibration, or, The law of attraction in the thought world,* Chicago, U.S.A.
ATMORE, J. 2001. *Dunninger's Brain Busters,* Humble, TX, H & R Magic Books.
AYDIN, C. 2021. *Extimate Technology: Self-Formation in a Technological World,* Milton, UNITED KINGDOM, Taylor & Francis Group.
BACHNER-MELMAN, R. & LICHTENBERG, P. 2001. Freud's Relevance to Hypnosis: A Reevaluation. *The American journal of clinical hypnosis,* 44**,** 37-50.
BAGGALLY, W. W. & LODGE, O. S. 1917. *Telepathy: genuine and fraudulent,* [S.l.], Methuen.
BALDWIN, S. S., FLORENCE, F. C. & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1879. *Spirit mediums exposed,* Melbourne, M'Carron, Bird & Co., printers.
BALDWIN, S. S. & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1895. *The secrets of mahatma land explained: teaching and explaining the performances of the most celebrated oriental mystery makers and magicians in all parts of the world,*

Brooklyn, N. Y., Press of T.J. Dyson & Son.
BANYARD, V. L. 2000. Using First-Person Accounts to Teach Students about Psychological Disorders. *Teaching of Psychology,* 27**,** 40-43.
BARINAGA, M. 2003. Studying the well-trained mind. American Association for the Advancement of Science.
BARRETT, E. & BOLT, B. 2007. *Practice as research: approaches to creative arts enquiry,* London, I. B. Tauris.
BARRETT, L. F. 2020. Your Brain Is Not for Thinking. *New York Times* [Online]. Available: https://www.nytimes.com/2020/11/23/opinion/brain-neuroscience-stress.html.
BARRETT, W. F. 1881. Mind-Reading versus Muscle-Reading. *Nature,* 24**,** 212-212.
BARRETT, W. F. 1911. *Psychical Research,* New York, Henry Holt.
BARTHES, R. 1981. *Camera Lucida: Reflections on photography*, Hill and Wang.
BARTLETT, G. C. & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1891. *The Salem seer: reminiscences of Charles H. Foster,* New York, United States Book Co.
BATE, J. 2020. *Radical Wordsworth: The Poet Who Changed the World*, Yale University Press.
BAYERN, A. M. P. V., DANEL, S., AUERSPERG, A. M. I., MIODUSZEWSKA, B. & KACELNIK, A. 2018. Compound tool construction by New Caledonian crows. *Scientific Reports,* 8**,** 15676.
BAYLIS, F. 2013. "I Am Who I Am": On the Perceived Threats to Personal Identity from Deep Brain Stimulation. *Neuroethics,* 6**,** 513-526.
BBC. 2019. *Facebook buys 'mind-reading wristband' firm CTRL-Labs* [Online]. BBC. Available: https://www.bbc.com/news/technology-49812689 [Accessed 10th March 2020].
BEARD, G. M. 1877. A New Theory Of Trance, And Its Bearings On Human Testimony. *The Journal of Nervous and Mental Disease,* 4**,** 1-47.
BEARD, G. M. & CHARCOT, J. M. 1882. *The Study of Trance, Muscle-Reading, and allied nervous phenomena in Europe and America, with ... a defence of Dr. Charcot*.
BECKETT, S. 2009. *Krapp's last tape and other shorter plays,* London, Faber.
BEECK, H. O. D. N., CHIE 2019. *Introduction to Human Neuroimaging*, Cambridge University Press.
BEER, S. 1966. Cybernetics and the Knowledge of God. *The Month.* 34 ed.
BELLIER, L., LLORENS, A., MARCIANO, D., GUNDUZ, A., SCHALK, G., BRUNNER, P. & KNIGHT, R. T. 2023. Music can be reconstructed from human auditory cortex activity using nonlinear decoding models. *PLoS biology,* 21**,** e3002176.
BENEDETTI, F., CATENACCI VOLPI, N., PARISI, L. & SARTORI, G. Attention Training with an Easy–to–Use Brain Computer Interface. 2014 Cham. Springer International Publishing, 236-247.
BENJAMIN, W. & DEMETZ, P. 1978. *Reflections: essays, aphorisms, autobiographical writings,* New York, Harcourt Brace Jovanovich.
BENJAMIN, W., JEPHCOTT, E. F. N., JENNINGS, M. W. & MARCUS, G. 2016. *One-way street,* Cambridge, Massachusetts, Belknap Press of Harvard University Press.
BENNETT, P., NOLAN, S., UTTAMCHANDANI, V., PAGES, M., CATER, K. & FRASER, M. 2015. Resonant Bits: Harmonic Interaction with Virtual Pendulums. *Proceedings of the Ninth International Conference on Tangible, Embedded, and Embodied Interaction.* Stanford, California, USA: Association for Computing Machinery.
BERKOVICH-OHANA, A., DOR-ZIDERMAN, Y., TRAUTWEIN, F.-M., SCHWEITZER, Y., NAVE, O., FULDER, S. & ATARIA, Y. 2020. The Hitchhiker's Guide to Neurophenomenology – The Case of Studying Self Boundaries With Meditators.

Frontiers in Psychology, 11.
BIGGIN, R. A. *Immersive theatre and audience experience : space, game and story in the work of Punchdrunk*.
BJARNASON, B. 2023. *The LLMentalist Effect: how chat-based Large Language Models replicate the mechanisms of a psychic's con* [Online]. Available: https://softwarecrisis.dev/letters/llmentalist/ [Accessed 4th July 2023].
BLAIN, L. 2019. Review: Hands-free flight with EEGSmart's mind-controlled UDrone. *New Atlas.*
BLYTH, R. H. 1966. *Zen and Zen classics.*, Hokuseido Press.
BOENISCH, P. M. 2010. Towards a Theatre of Encounter and Experience: Reflexive Dramaturgies and Classic Texts. *Contemporary Theatre Review,* 20**,** 162-172.
BOGOST, I. 2007. *Persuasive games: the expressive power of videogames,* Cambridge, Mass. ; London, MIT.
BOGOST, I. 2012. *Alien phenomenology, or, What it's like to be a thing,* Minneapolis, University of Minnesota Press.
BONACI, T., CALO, R. & CHIZECK, H. J. App stores for the brain: Privacy & security in Brain-Computer Interfaces. 2014 IEEE International Symposium on Ethics in Science, Technology and Engineering, 2014. IEEE, 1-7.
BONOMI, P. U. 2003. *Under the cope of heaven: Religion, society, and politics in colonial America*, Oxford University Press, USA.
BOOTH, J. 1986. *Psychic paradoxes*, Prometheus Books.
BOROWSKI, M., CHABERSKI, M. & SUGIERA, M. 2013. *Emerging Affinities: Possible Futures of Performative Arts*, Columbia University Press.
BORUP, M., BROWN, N., KONRAD, K. & VAN LENTE, H. 2006. The sociology of expectations in science and technology. *Technology Analysis & Strategic Management,* 18**,** 285-298.
BOSER, U. 2017. Betsy DeVos has invested millions in this "brain training" company. So I checked it out. *Washington Post*, May 26th.
BOWLER, K. 2013. *Blessed: A History of the American Prosperity Gospel,* Cary, UNITED STATES, Oxford University Press USA - OSO.
BOWN, N., BURDETT, C. & THURSCHWELL, P. 2004. *The Victorian Supernatural*, Cambridge University Press.
BRADDON-MITCHELL, D. & JACKSON, F. 2007. *The philosophy of mind and cognition,* Malden, MA
Oxford, Blackwell Publishing.
BRAID, J. 1843. *Neurypnology: or the rationale of nervous sleep considered in relation with animal magnetism, ullustrated by numerous cases of its successful application in the belief and cure of disease,* [S.l.], John Churchill.
BRAID, J. 1855. *The physiology of fascination and the critics criticised,* Manchester, Grant & Co.
BRAID, J. & ROBERTSON, D. 2008. *The discovery of hypnosis: the complete writings of James Braid, the father of hypnotherapy,* Studley, National Council for Hypnotherapy.
BRANDMEYER, T. & DELORME, A. 2013. Meditation and neurofeedback. *Front Psychol,* 4**,** 688.
BRAUDE, A. 2001. *Radical spirits: spiritualism and women's rights in nineteenth-century America,* Bloomington, Indiana University Press.
BRAUN, D. K. A. A. 2021. NeuroTech Industry Overview 2021. London, UK: NeuroTech Analytics.
BRENNINKMEIJER, J. & ZWART, H. 2017. From Hard Neuro-Tools to Soft Neuro-Toys? Refocussing the Neuro-Enhancement Debate. *Neuroethics,* 10**,** 337 - 348.

BRENNINKMEIJER, J. A. 2016. *Neurotechnologies of the self: mind, brain and subjectivity*.
BREUKELAAR, I. A., BRYANT, R. A. & KORGAONKAR, M. S. 2021. The functional connectome in posttraumatic stress disorder. *Neurobiology of stress,* 14**,** 100321-100321.
BREY, P. A. E. 2012. Anticipatory Ethics for Emerging Technologies. *NanoEthics,* 6**,** 1-13.
BROOKS, K. G. 2013. The Gizmo and the Glitch: Telepathy, Ocular Philosophy, and other Extensions of Sensation. *In:* JENZEN, O., & SALLY R. MUNT (ed.) *The Ashgate Research Companion to Paranormal Cultures.* UK: Taylor & Francis.
BROWN, B. B. 1974. *New mind, new body: bio feedback: new directions for the mind*, Harper & Row.
BROWN, D. 2021. Showman. Blackpool, Winter Gardens.
BUBLITZ, J. C. 2023. What an International Declaration on Neurotechnologies and Human Rights Could Look like: Ideas, Suggestions, Desiderata. *AJOB Neuroscience***,** 1-17.
BUCK, J. N. 1948. The H-T-P test. *J Clin Psychol,* 4**,** 151-9.
BUCKINGHAM, R. B. G. A. H. W. 2007. David Hartley's Neural Vibrations and Psychological Associations. *Brain, Mind and Medicine: Essays in Eighteenth-Century Neuroscience.* Boston: Springer.
BUESCHER, J. B. 2004. *The other side of salvation: spiritualism and the nineteenth-century religious experience,* Boston, Skinner House Books.
BUESCHER, J. B. 2019. *The President's Medium: John Conklin, Abraham Lincoln, and the Emancipation Proclamation,* NY, Richard W. Couper Press
BUESCHER, J. B. 2021. *Radio psychics: mind reading and fortune telling in American broadcasting, 1920-1940,* Jefferson, McFarland & Company, Inc., Publishers.
BURNS, B. 2013. The Swan.
C.G. JUNG, R. W., CARY F BAYNES 1989. *I Ching or Book of Changes: Ancient Chinese wisdom to inspire and enlighten*, Arkana / Penguin.
CALLARD, F., SMALLWOOD, J. & MARGULIES, D. 2012. Default Positions: How Neuroscience's Historical Legacy has Hampered Investigation of the Resting Mind. *Frontiers in Psychology,* 3.
CALLON, M., RIP, A. & LAW, J. 1986. *Mapping the dynamics of science and technology: Sociology of science in the real world*, Springer.
CANNING, C. 2005. *The most American thing in America: Circuit Chautauqua as performance*, University of Iowa Press.
CAPLAN, E. 1998. *Mind Games: American Culture and the Birth of Psychotherapy,* Berkeley, Calif., University of California Press.
CARNEGIE, D. 1981. *How to win friends and influence people,* New York, Simon and Schuster.
CARRINGTON, H. 1907. *The physical phenomena of spiritualism, fraudulent and genuine: being a brief account of the most important historical phenomena, a criticism of their evidential value, and a complete exposition of the methods employed in fraudulently reproducing the same,* Boston, Herbert B. Turner & Co.
CARRINGTON, H. 1908. *The coming science*, Small, Maynard & Company.
CARRINGTON, H. 1918. How You Can "See Your Own Brain". *Psychical Research Review,* IV**,** 2.
CARRINGTON, H. 1920. *Your psychic powers and how to develop them,* New York, Dodd, Mead, and Co.
CARRINGTON, H. & MCMANUS-YOUNG COLLECTION (LIBRARY OF CONGRESS) 1908. *The physical phenomena of spiritualism, fraudulent and genuine : being a brief account of the most important historical phenomena, a criticism of their evidential value, and a complete exposition of the methods employed in fraudulently*

reproducing the same, Boston, Small, Maynard, & Co.
CARROLL, L. 1871. *Through the looking-glass: and what Alice found there*.
CARSE, J. P. 1994. *Breakfast at the Victory: the mysticism of ordinary experience,* San Francisco, Calif., HarperSanFrancisco.
CARTY, T. J. 2000. *A dictionary of literary pseudonyms in the English language,* Chicago, Ill., USA, Fitzroy Dearborn.
CARUSO, G. D. E. 2018. *Neuroexistentialism: meaning, morals, & purpose in the age of neuroscience*, Oxford University Press.
CASE, V. 2013. *We Called it Culture-The Story of Chautauqua*, Read Books Ltd.
CASSIDY, A. J. 2018. *Facial Expression Detections* [Online]. EMOTIV. Available: https://www.emotiv.com/knowledge-base/facial-expression-detections/ [Accessed 2nd Nov 2023].
CASSIDY, B. 2003. Fundamentals: A Guidebook to Mentalism. Self-published.
CASSIDY, R. 1983. *The Art of Mentalism,* Middleberg, Va, Collectors' Workshop.
CASSIDY, R. E. 1995. The Compleat Principia Mentalia. US: Lybrary.com.
CAVUOTO, J. 2022. The Market for Neurotechnology: 2022-2026.
CELIKTUTAN, O., SARIYANIDI, E. & GUNES, H. Let me tell you about your personality!: Real-time personality prediction from nonverbal behavioural cues. 2015 11th IEEE International Conference and Workshops on Automatic Face and Gesture Recognition (FG), 4-8 May 2015 2015. 1-1.
CHALMERS, D. J. 2002. *Philosophy of mind: classical and contemporary readings,* New York, N.Y.
Oxford, Oxford University Press.
CHANGEUX, J.-P. & RICOEUR, P. 2000. *What makes us think?: a neuroscientist and a philosopher argue about ethics, human nature and the brain,* Princeton, N.J.
Oxford, Princeton University Press.
CHARVET, D. P., JOHN 2004. *Alexander: The Man Who Knows,* Pasadena, CA., Mike Caveney.
CHATER, N. 2018. *The Mind Is Flat: The Remarkable Shallowness of the Improvising Brain,* New Haven, UNITED STATES, Yale University Press.
CHAVARRIAGA, R., RICKLI, J.-M. & MANTELLASSI, F. 2023. Neurotechnologies: the new frontier for international governance.
CHEMERO, A. 2009. *Radical embodied cognitive science,* Cambridge, Mass. ; London, MIT Press.
CHEN, Z. 2023. *Mind-Video* [Online]. Available: https://mind-video.com [Accessed 15 Nov 2023 2023].
CHÉROUX, C. 2005. Photographs of Fluids: An Alphabet of Invisible Rays. *In:* FISCHER, C. C. A. (ed.) *The Perfect Medium : Photography and the Occult.*
CHEVREUL, M. E. 1854. *De la baguette divinatoire: du pendule dit explorateur et des tables tournantes, au point de vue de l'histoire de la critique et de la méthode expérimentale.,* Paris, Mallet-Bachelier.
CHOUDHURY, S. & SLABY, J. 2011. *Critical Neuroscience: a handbook of the social and cultural contexts of neuroscience,* Oxford, Wiley-Blackwell.
CHRISTIAN, M. I. 2018. Cameraless Photography and Its Imponderable Media. *History of Photography,* 42**,** 319-337.
CHURCH, D. 2020. *Bliss brain: The neuroscience of remodeling your brain for resilience, creativity, and joy*, Hay House, Inc.
CLARK, A. 2008. *Supersizing the mind: embodiment, action, and cognitive extension*, Oxford University Press.
CLARK, A. & CHALMERS, D. 1998. The extended mind. *analysis,* 58**,** 7-19.

CLARKE, B. 2014. *Neocybernetics and narrative,* Minneapolis, University of Minnesota Press.
COATES MCCALL, I. & WEXLER, A. 2020. Chapter One - Peering into the mind? The ethics of consumer neuromonitoring devices. *In:* BÁRD, I. & HILDT, E. (eds.) *Developments in Neuroethics and Bioethics.* Academic Press.
COMMITTEE, S. O. T. H. R. C. A. 2023. Call for inputs for the study of the Human Rights Council Advisory Committee on neurotechnology and human rights (HRC resolution 51/3). *In:* RIGHTS, O. O. T. U. N. H. C. F. H. (ed.). Geneva: United Nations.
CONSULTING, S. T. 2022. Global Meditation Apps Market.
CORINDA, T. 1968. *Thirteen Steps to Mentalism,* [S.l.], Wehman.
CORINDA, T. R., WILLIAM 2011. *Encyclopedia of Mentalism & Mentalists,* U.S.A., 1878 Press Co.
CORNEJO-PLAZA, M. I., CIPPITANI, R. & PASQUINO, V. 2024. Chilean Supreme Court ruling on the protection of brain activity: neurorights, personal data protection, and neurodata. *Frontiers in Psychology,* 15.
COSTANDI, M. 2016. *Neuroplasticity*, MIt Press.
COUÉ, E. M. 1922. *Self mastery by conscious autosuggestion,* Nancy, France,, E. Coué.
CRABTREE, A. 1993. *From Mesmer to Freud: magnetic sleep and the roots of psychological healing,* New Haven ; London, Yale University Press.
CRARY, J. 1990. *Techniques of the observer: on vision and modernity in the nineteenth century*, MIT Press.
CRARY, J. 1999. *Suspensions of perception: attention, spectacle, and modern culture,* Cambridge, Mass., MIT Press.
CRAWFORD, M. B. 2008. The Limits of Neuro-Talk. *The New Atlantis,* Winter 2008**,** 65-78.
CROUCH, T. 2017. The Art of the Autosuggestion. TEDxRoyalCentralSchool.
CROUCH, T. 2023. *An Oak Tree*, Bloomsbury Publishing.
CSIKSZENTMIHALYI, M. 1990. *Flow: the psychology of optimal experience,* New York, Harper & Row.
CULL, L. E. & LAGAAY, A. E. 2014. *Encounters in performance philosophy*, Palgrave.
CUNNINGHAM, H. 1980. *Leisure in the industrial revolution, c.1780-c.1880*, Croom Helm.
CUTHBERTSON, A. 2021. Valve is building brain-computer interface for fully-immersive video games, president reveals. *The Independent* 25th Jan.
DAVIS, J. E. & SCHERZ, P. 2022. Being Human in the Age of the Brain: Models of Mind and Their Social Effects. *Culture, Medicine, and Psychiatry*.
DE VIGNEMONT, F. 2017. Mind the Body. *Oxford Scholarship Online.* Oxford University Press.
DEBORD, G. & KNABB, K. 2014. *The Society of the Spectacle,* Berkeley, Bureau of Public Secrets.
DEHAENE, S. 2014. *Consciousness and the brain: deciphering how the brain codes our thoughts,* New York, New York, Viking.
DELEUZE, G. & GUATTARI, F. L. 1987. *A thousand plateaus: capitalism and schizophrenia,* Minneapolis, University of Minnesota Press.
DEMAREST, M. 2020. *Humbug, Electricity or Whatever You Like: Some Notes on S. S. Baldwin [Part Two]* [Online]. Available: http://ehbritten.blogspot.com/2020/04/humbug-electricity-or-whatever-you-like.html [Accessed 8 May 2023].
DERRIDA, J. 1995. *The gift of death,* Chicago ; London, University of Chicago Press.
DERRIDA, J. & DU LOUVRE, M. 1990. Mémoires d'aveugle: l'autoportrait et autres ruines.
DERRIDA, J. & ROYLE, N. 1988. Telepathy. *Oxford Literary Review,* 10**,** 3-41.
DESCARTES, R. 2001. *Discourse on method, Optics, Geometry, and Meteorology,*

Cambridge, MA, Hackett Pub.
DESSOIR, M., SOCIETY FOR PSYCHICAL RESEARCH (GREAT BRITAIN). & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1886. *Experiments in muscle-reading and thought transference,* London, Society of Psychical Research.
DEVENEY, P. *The Swastika.* IAPSOP.
DEVOTO, H. 1978. My Mind Ain't So Open. *Scree.* UK: Virgin Records Limited.
Derrida, 2002. Directed by DICK, A. Z. K. K.: Zeitgeist Films.
DINESH, N. A. 2018. *Immersive theater and activism: scripts and strategies for directors and playwrights*.
DOBSON, E. 2022. Occult psychology
dream, trance and telepathy. *Victorian Alchemy.* UCL Press.
DONOGHUE, J. 2015. NEUROTECHNOLOGY. *In:* MARCUS, G. & FREEMAN, J. (eds.) *The Future of the Brain.* Princeton University Press.
DOUYON, P. 2019. Neuroplasticity: Your Brain's Superpower. *Salt Lake City: Izzard Ink Publ*.
DOWNEY, J. E. 1908. Automatic Phenomena of Muscle-Reading. *The Journal of Philosophy, Psychology and Scientific Methods,* 5**,** 650.
DOWNING, E. 2011. Divining Benjamin: Reading Fate, Graphology, Gambling. *MLN,* 126**,** 561-580.
DOWNING, E. 2018. *The Chain of Things: Divinatory Magic and the Practice of Reading in German Literature and Thought, 1850–1940,* Ithaca, UNITED STATES, Cornell University Press.
DREISER, T. 1922. *Newspaper Days*, H. Liveright, Incorporated.
DUBOVSKY, A. 2008. Thoughts on the Immediacy of Drawing. *In:* TREIB, M. (ed.) *Drawing/thinking: confronting an electronic age.* London: Routledge.
DUCLOW, D. F. 2002. William James, Mind-Cure, and the Religion of Healthy-Mindedness. *Journal of Religion and Health,* 41**,** 45-56.
DUKES, H. 2021. An Iconic Line: Claude Mellan's The Sudarium of Saint Veronica (1649). *The Public Domain Review*.
DUMIT, J. 2004. *Picturing personhood: brain scans and biomedical identity,* Princeton, N.J. ; Woodstock, Princeton University Press.
DUNÉR, D. 2013. The Wave. *In:* DUNÉR, D. (ed.) *The Natural philosophy of Emanuel Swedenborg: A Study in the Conceptual Metaphors of the Mechanistic World-View.* Dordrecht: Springer Netherlands.
DUNNINGER, J. 1944. *What's on your mind?,* Cleveland, New York,, The World Publishing Company.
DUNNINGER, J. 1962. *The Art of Thought Reading,* US, Clark Publishing Company.
DURING, S. 2004. Modern Enchantments: The Cultural Power of Secular Magic.
DUTTON, D. L. 1988. The cold reading technique. *Experientia,* 44**,** 326-332.
DYMENT, D. 2020. *Calculated Thoughts*, Vanishing Inc.
EAGLEMAN, D. 2020. *Livewired: The inside story of the ever-changing brain*, Canongate Books.
EHRENREICH, B. 2010. *Bright-sided: how positive thinking is undermining America,* New York, Picador.
EKLÖF, J. 2016. Saving the World: Personalized Communication of Mindfulness Neuroscience. *In:* PURSER, R. E., FORBES, D. & BURKE, A. (eds.) *Handbook of Mindfulness: Culture, Context, and Social Engagement.* Cham: Springer International Publishing.
EKLÖF, J. 2017. Neurodharma Self-Help: Personalized Science Communication as Brain Management. *Journal of Medical Humanities,* 38**,** 303-317.

ELLENBERGER, H. F. 1970. *The discovery of the unconscious: the history and evolution of dynamic psychiatry,* London, Allen Lane, the Penguin Press.
ELLENBERGER, H. F. & MICALE, M. S. 1993. *Beyond the unconscious: essays of Henri F. Ellenberger in the history of psychiatry*, Princeton U.P.
ELLIS, A. P. 2002. *Overcoming Resistance: A Rational Emotive Behavior Therapy Integrated Approach, 2nd Edition,* New York, UNITED STATES, Springer Publishing Company.
EMBURY-DENNIS, T. 2020. Elon Musk predicts human language will be obsolete in as little as five years: 'We could still do it for sentimental reasons'.
EMERSON, R. W. 1983. *Ralph Waldo Emerson: Essays and Lectures (LOA #15): Nature; Addresses, and Lectures / Essays: First and Second Series / Representative Men / English Traits / The Conduct of Life*, Library of America.
EMERSON, R. W. & CARLYLE, T. 1841. *Essays,* London,, J. Fraser.
EMOTIV. 2021. *What are the Performance Metrics Detection Suite?* [Online]. EMOTIV. Available: https://www.emotiv.com/knowledge-base/what-are-the-performance-metrics-detection-suite/ [Accessed 21st Jan 2024].
ENNS, A. 2005. Voices of the dead: Transmission/translation/transgression. *Culture, Theory and Critique,* 46**,** 11-27.
ENTERTAINMENT, F. 2001. First Night. Forced Entertainment.
ENTERTAINMENT, F. 2016. Real Magic. Directed by Tim Etchells.
ERLER, A. 2011. Does Memory Modification Threaten Our Authenticity? *Neuroethics,* 4**,** 235-249.
EVANS, C. H. 2017. *Why you should know about the New Thought movement* [Online]. The Conversation. Available: https://theconversation.com/why-you-should-know-about-the-new-thought-movement-72256 [Accessed 24/02/2021 2021].
EVANS, H. R. The Secrets of Second Sight. *The Open Court,* 1905**,** 3.
FARAH, M. J. 2009. A Picture Is Worth a Thousand Dollars. *Journal of Cognitive Neuroscience,* 21**,** 623-624.
FARISCO, M. 2024. *Neuroethics and cultural diversity*, John Wiley & Sons.
FEDOROVA, K. 2019. Neurointerfaces, Mental Imagery and Sensory Translation in Art and Science in the Digital Age. *In:* GRØNSTAD, A. & VÅGNES, Ø. (eds.) *Invisibility in Visual and Material Culture.* Cham: Springer International Publishing.
FEENBERG, A. 2002. *Transforming technology: a critical theory revisited,* New York, N.Y., Oxford University Press.
FELDMAN BARRETT, L. 2021. *Seven and a Half Lessons About the Brain*.
FEYRER, E. C. 1923. *Auto-science; a practical work on applied psychology,* Fling, Mich.,, The Auto-science publishing co.
FEYRER, E. C. 1926. *The call of the soul,* San Francisco, Cal.,, The Auto-science institute.
FINK, S. E., STEVE; GOLDSTEIN, MATTHEW. 2017. Betsy DeVos invests in a therapy under scrutiny. *New York Times*, Jan 30th.
FITZGERALD, D., MATUSALL, S., SKEWES, J. & ROEPSTORFF, A. 2014. What's so critical about Critical Neuroscience? Rethinking experiment, enacting critique. *Frontiers in human neuroscience,* 8**,** 365-365.
FOGEL, M. 1949. *Fogelism: An Attitude to Life,* England, Maurice Fogel.
FORER, B. R. 1949. The fallacy of personal validation: a classroom demonstration of gullibility. *The Journal of Abnormal and Social Psychology,* 44**,** 118.
FORREST, D. W. 1999. *Hypnotism: a history,* London ; New York, Penguin.
FOSTER, S. L. 2011. *Choreographing empathy: kinesthesia in performance,* London, Routledge.
FOUCAULT, M. 1990. *The Use of Pleasure: Volume 2 of The History of Sexuality* New York, Vintage.

FOUCAULT, M. 1991. *Discipline and punish: the birth of the prison*, Penguin.
FRANK, L. 2009. *Mindfield: how brain science is changing our world*, Oneworld.
FRANKFURT, H. G. 2005. *On bullshit,* Princeton, NJ, Princeton University Press.
FRANKS, C. A. 1950. Mel-Roy, Radio Mentalist. *Linking Ring.*
FRIEZE, J. E. 2017. *Reframing immersive theatre: the politics and pragmatics of participatory performance*.
FUKURAI, T. 1931. *Clairvoyance & Thoughtography*, Ayer Publishing.
FULLER, R. C. 1982. *Mesmerism and the American cure of souls*, University of Pennsylvania Press.
FULLER, R. C. 1989. *Alternative medicine and American religious life,* New York, Oxford University Press.
FULLER, R. C. 2001. *Spiritual, but not religious: Understanding unchurched America*, Oxford University Press.
GALLAGHER, S. & ZAHAVI, D. 2008. *The phenomenological mind: an introduction to philosophy of mind and cognitive science,* London, Routledge.
GALLESE, V. & DI DIO, C. 2012. Neuroesthetics: The Body in Esthetic Experience. *In:* RAMACHANDRAN, V. S. (ed.) *Encyclopedia of Human Behavior (Second Edition).* San Diego: Academic Press.
GAMBONI, D. 2002. *Potential images: Ambiguity and indeterminacy in modern art*, Reaktion books.
GARNER, C. 2009. *Secrets of a Psychic Reader,* Aukland, Brookfield Press.
GARNER, C. 2012. *Readings from the Client's Point of View,* Aukland, Brookfield Press.
GARNER, S. & STEERS, J. 2008. *Writing on drawing: essays on drawing practice and research*, Bristol: NBN International.
GENII. *Chautaqua* [Online]. Genii Magazine. Available: https://geniimagazine.com/wiki/index.php?title=Chautauqua [Accessed 11th May 2023].
GERKEN, P. J. T. 2024. *Elon Musk says Neuralink implanted wireless brain chip* [Online]. BBC News. Available: https://www.bbc.com/news/technology-68137046 [Accessed 30 Jan 2024].
GIANNACHI, G. 2006. The Politics of New Media Theatre: Life®™. 1-151.
GOERING, S., KLEIN, E., SPECKER SULLIVAN, L., WEXLER, A., AGÜERA Y ARCAS, B., BI, G., CARMENA, J. M., FINS, J. J., FRIESEN, P., GALLANT, J., HUGGINS, J. E., KELLMEYER, P., MARBLESTONE, A., MITCHELL, C., PARENS, E., PHAM, M., RUBEL, A., SADATO, N., TEICHER, M., WASSERMAN, D., WHITTAKER, M., WOLPAW, J. & YUSTE, R. 2021. Recommendations for Responsible Development and Application of Neurotechnologies. *Neuroethics,* 14**,** 365-386.
GOFFMAN, E. 1956. *The presentation of self in everyday life,* Edinburgh,, University of Edinburgh, Social Sciences Research Centre.
GOODING, M., SHRIVER, L. & OISON, W. 2016. *Psychobook: Games, Tests, Questionnaires, Histories*, Chronicle Books.
GREEN, A. 2019. How Derren Brown Remade Mind Reading for Skeptics. *The New Yorker* [Online]. Available: https://www.newyorker.com/magazine/2019/10/07/how-derren-brown-remade-mind-reading-for-skeptics [Accessed 25/6/2022].
GREGORY, W. 1909. *Animal magnetism: or Mesmerism and its pheonomena,* [S.l.], Nichols and Sons.
GRUBER, D. 2020a. *Brain art and neuroscience: neurosensuality and affective realism*.
GRUBER, D. R. 2020b. Toward a Critical NeuroArt for a Critical Neuroscience. *Leonardo,* 53**,** 123-127.

GRÜBLER, G., AL-KHODAIRY, A., LEEB, R., PISOTTA, I., RICCIO, A., ROHM, M. & HILDT, E. 2014. Psychosocial and ethical aspects in non-invasive EEG-based BCI research—a survey among BCI users and BCI professionals. *Neuroethics,* 7**,** 29-41.
GUTIERREZ, C. 2005. *The occult in nineteenth-century America*, Davies Group.
HALLER, J. S. 2012. *The history of New Thought from mind cure to positive thinking and the prosperity gospel*, Swedenborg Foundation Press.
HAMILTON, T. 2009. *Immortal Longings: FWH Myers and the Victorian search for life after death,* Exeter, Imprint Academic.
HANSCOM, W. D. 1975. *Pioneers in Grease Paint*, Collins.
HANSON, R. 2020. *Neurodharma: New science, ancient wisdom, and seven practices of the highest happiness*, Harmony.
HARAWAY, D. 1985. A manifesto for cyborgs.
HARAWAY, D. J. 1991. *Simians, cyborgs, and women: the reinvention of nature,* New York, Routledge.
HARLEY, G. M. 2002. *Emma Curtis Hopkins: forgotten founder of New Thought,* Syracuse, N.Y.
[Great Britain], Syracuse University Press.
HARRINGTON, M. 2006. Literature and the history of neuroscience. *Journal of Undergraduate Neuroscience Education,* 5**,** E5.
HASHEMI, M. 2017. *Theism and atheism in a post-secular age*, Springer.
HAYLES, N. K. 2017. *Unthought: the power of the cognitive nonconscious,* Chicago ; London, The University of Chicago Press.
HEELAS, P. 2005. *The spiritual revolution: why religion is giving way to spirituality,* Malden, MA, Blackwell Pub.
HEIDEGGER, M. 1962. *Being and Time.*, Harper & Row.
HEIDEGGER, M. & LOVITT, W. 1977. *The question concerning technology, and other essays,* New York ; London, Harper and Row.
HEIL, J. 2019. *Philosophy of Mind: A Contemporary Introduction,* Milton.
HEIM, M. 1987. *Electric language: a philosophical study of word processing,* New Haven ; London, Yale University Press.
HERCAT & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1903. *Latest sleights, illusions, mind reading, and new card effects,* London, Dean & Son.
HILL, L. & PARIS, H. 2020. Curious methods – pedagogy through performance. *Theatre, Dance and Performance Training,* 11**,** 229-242.
HILL, L. A. & PARIS, H. A. 2014. *Performing proximity: curious intimacies*.
HILL, N. 1937. *Think and grow rich,* Meriden, Conn.,, The Ralston society.
HOLMES, S. W. 1944. Phineas Parkhurst Quimby: Scientist of Transcendentalism. *The New England Quarterly,* 17**,** 356-380.
HOLROYD, J. 2003. The Science of Meditation and the State of Hypnosis. *American Journal of Clinical Hypnosis,* 46**,** 109-128.
HORN, P. 2013. 'Two Minds With but a Single Thought': W. T. Stead, Henry James, and the Zancig Controversy. *19: Interdisciplinary Studies in the Long Nineteenth Century,* 0.
HOROWITZ, M. 2014. *One Simple Idea: How Positive Thinking Reshaped Modern Life*, Crown.
HOWE, D. W. 2007. *What hath God wrought: The transformation of America, 1815-1848*, Oxford University Press.
HOWELLS, C. E. & MOORE, G. D. E. 2013. *Stiegler and technics*.
HSU, S. 2023. *The Meditation Challenge Contest Terms and Conditions* [Online]. Muse. Available: https://choosemuse.com/blogs/news/the-meditation-challenge-contest-terms-and-conditions [Accessed 18th Oct 2023].

HUCKINS, G. 2023. *Is it possible to really understand someone else's mind?* [Online]. MIT Technology Review. Available: https://www.technologyreview.com/2023/11/15/1083250/is-it-possible-to-really-understand-someone-elses-mind [Accessed 15 Nov 2023 2023].
HUGHES, J. C. & ROTHOVIUS, A. E. 1996. *The world's greatest hypnotists*, University Press of Amer.
HUNT, E. 2016. Tay, Microsoft's AI chatbot, gets a crash course in racism from Twitter. *The Guardian*, 24th March.
HUSCHKA, S. & GRONAU, B. 2019. *Energy and Forces as Aesthetic Interventions: Politics of Bodily Scenarios*, Transcript Verlag.
IEEE. 2023. *Neuroethics Framework* [Online]. IEEE. Available: https://brain.ieee.org/publications/ieee-neuroethics-framework [Accessed 1/11/2023 2023].
IENCA, M., HASELAGER, P. & EMANUEL, E. J. 2018. Brain leaks and consumer neurotechnology. *Nature Biotechnology,* 36**,** 805-810.
IHDE, D. 1990. Technology and the lifeworld: From garden to earth.
IHDE, D. 2001. *Bodies in technology,* Minneapolis, University of Minnesota Press.
IHDE, D. 2019. *Medical Technics*, University of Minnesota Press.
ILLES, J. & BIRD, S. J. 2006. Neuroethics: a modern context for ethics in neuroscience. *Trends Neurosci,* 29**,** 511-7.
ILLES, J. & SAHAKIAN, B. J. 2013. *The Oxford handbook of neuroethics*, Oxford University Press.
INUBUSHI, T., ITO, M., MORI, Y., FUTATSUBASHI, M., SATO, K., ITO, S., YOKOKURA, M., SHINKE, T., KAMENO, Y., KAKIMOTO, A., KANNO, T., OKADA, H., OUCHI, Y. & YOSHIKAWA, E. 2021. Neural correlates of head restraint: Unsolicited neuronal activation and dopamine release. *Neuroimage,* 224**,** 117434.
JACKSON, C. T. 1975. The New Thought Movement and the Nineteenth Century Discovery of Oriental Philosophy. *Journal of Popular Culture,* 9**,** 523.
JAMES, W. 1902a. *The varieties of religious experience; a study in human nature,* New York, Longmans, Green, and co.
JAMES, W. 1902b. *The varieties of religious experience: a study of human nature,* New York, Modern Library.
JARVIS, L. A. 2019. *Immersive embodiment: theatres of mislocalized sensation*.
JAY, R. 1986. *Learned pigs & fireproof women,* London, Hale, 1987.
JELENA, M. 2020. Standardization of protocol design for user training in EEG-based Brain-Computer Interface. *Journal of Neural Engineering*.
JEPSON, M. L. 2017. Capturing Our Imagination: The Evolution of Brain-Machine Interfaces. EmTech.
JOHNSTON, D. 2017. *Theatre and phenomenology: manual philosophy*, Palgrave.
JOX, R. J. & KUEHLMEYER, K. 2013. Introduction: Reconsidering Disorders of Consciousness in Light of Neuroscientific Evidence. *Neuroethics,* 6**,** 1-3.
KAKU, M. 2014. *The future of the mind: the scientific quest to understand, enhance, and empower the mind,* New York, Doubleday.
KAMIYA, J. 1968. Conscious control of brain waves. *Psychology Today,* 1**,** 56-60.
KAMIYA, J. 2011. The First Communications About Operant Conditioning of the EEG. *Journal of Neurotherapy,* 15**,** 65-73.
KARA, P. 1926. Karaism.
KASAMATSU, A. & HIRAI, T. 1966. An electroencephalographic study on the Zen meditation (Zazen). *Psychiatry and Clinical Neurosciences,* 20**,** 315-336.

KASSON, J. F. 1978. *Amusing the million: Coney Island at the turn of the century,* New York, N.Y., Hill & Wang.
KATAN, E. 2016. *Embodied philosophy in dance: Gaga and Ohad Naharin's movement research,* London, Palgrave Macmillan.
KELLMEYER, P. 2021. Big Brain Data: On the Responsible Use of Brain Data from Clinical and Consumer-Directed Neurotechnological Devices. *Neuroethics,* 14**,** 83-98.
KELLY, K. 2007. *The secret of the secret: unlocking the mysteries of the runaway bestseller,* New York, Thomas Dunne Books/St. Martin's Press.
KEPPLER, N. 2020. This Company Wants to Help Your Boss Monitor Your Brainwaves at Work. *Vice* [Online]. Available: https://www.vice.com/en/article/qj4qd7/this-company-wants-to-help-your-boss-monitor-your-brainwaves-at-work [Accessed 23/06/2022].
KHAN, S., COLE, D. & EKBIA, H. 2024. Autonomy and Free Thought in Brain-Computer Interactions: Review of Legal Precedent for Precautionary Regulation of Consumer Products. *UC Law Science and Technology Journal,* 15**,** 95.
KIM, J. 2011. *Philosophy of mind,* Boulder, CO, Westview Press.
KIRBY, D. 2010. The Future is Now:Diegetic Prototypes and the Role of Popular Films in Generating Real-world Technological Development. *Social Studies of Science,* 40**,** 41-70.
KLAMING, L. & HASELAGER, P. 2013. Did My Brain Implant Make Me Do It? Questions Raised by DBS Regarding Psychological Continuity, Responsibility for Action and Mental Competence. *Neuroethics,* 6**,** 527-539.
KLEIN, E., BROWN, T., SAMPLE, M., TRUITT, A. R. & GOERING, S. 2015. Engineering the brain: ethical issues and the introduction of neural devices. *Hastings Center Report,* 45**,** 26-35.
KLEIN, S. B. 2012. " What is the Self?": Approaches to a Very Elusive Question. *Social Cognition,* 30**,** 363.
KNAPPETT, C. 2005. *Thinking through material culture: an interdisciplinary perspective,* Philadelphia, University of Pennsylvania Press.
KORZYBSKI, A. 1921. *Manhood of Humanity,* New York,, E. P. Dutton & company.
KOZEL, S., EEUWENS, A. & CUBITT, S. 2008. *Closer: Performance, Technologies, Phenomenology,* Cambridge, UNITED STATES, MIT Press.
KWINT, M. 2012. *Brains: the mind as matter*, Wellcome Collection.
LACAN, J. 2001. *Ecrits: A selection*, Routledge.
LAHR, J. 1973. *Astonish me, adventures in contemporary theater*, Viking Books.
LAINE, E. 2018. Professional wrestling scholarship: Legitimacy and kayfabe. *The Popular Culture Studies Journal,* 6**,** 82-99.
LAMB, G. F. 1977. *Magic, witchcraft and the occult,* Newton Abbot, David and Charles [etc.].
LAMONT, P. 2013. *Extraordinary beliefs: a historical approach to a psychological problem*, Cambridge University Press.
LAMONT, P. & STEINMEYER, J. 2018. *The Secret history of magic: the true story of the deceptive art*, Penguin.
LAN, Y., MOHR, C., HU, X. & KUHN, G. 2018. Fake science: The impact of pseudo-psychological demonstrations on people's beliefs in psychological principles. *PLoS One,* 13**,** e0207629.
LARSON, M. A. 1985. *New Thought or A modern religious approach: the philosophy of health, happiness, and prosperity,* New York, Philosophical Library.
LATOUR, B. 1992. Where are the missing masses? The sociology of a few mundane artifacts. *Shaping technology/building society: Studies in sociotechnical change,* 1**,**

225-258.
LAUREL, B. 2006. Designed animism. *Companion to the 21st ACM SIGPLAN symposium on Object-oriented programming systems, languages, and applications.* Portland, Oregon, USA: Association for Computing Machinery.
LAVAZZA, A. & GIORGI, R. 2023. Philosophical foundation of the right to mental integrity in the age of neurotechnologies. *Neuroethics,* 16**,** 10.
LEBEDEV, M. A. & NICOLELIS, M. A. 2006. Brain-machine interfaces: past, present and future. *Trends Neurosci,* 29**,** 536-46.
LEDDINGTON, J. 2016. The Experience of Magic. *The Journal of Aesthetics and Art Criticism,* 74**,** 253-264.
LEDOUX, J. 2012. Rethinking the emotional brain. *Neuron,* 73**,** 653-676.
LEE, D. J., KULUBYA, E., GOLDIN, P., GOODARZI, A. & GIRGIS, F. 2018. Review of the Neural Oscillations Underlying Meditation. *Frontiers in Neuroscience,* 12.
LEHMANN, H.-T. & JUERS-MUNBY, K. 2006. *Postdramatic Theatre,* London, UNITED KINGDOM, Taylor & Francis Group.
LEUENBERGER, M. 2024. Track Thyself? The Value and Ethics of Self-knowledge Through Technology. *Philosophy & Technology,* 37**,** 13.
LEVIN, S. 2016. A beauty contest was judged by AI and the robots didn't like dark skin. *The Guardian*.
LEVY, S. 2017. *Brain-Machine Interface Isn't Sci-Fi Anymore* [Online]. Available: https://www.wired.com/story/brain-machine-interface-isnt-sci-fi-anymore [Accessed 15 July 2018].
LEYS, R. 1991. Types of One: Adolf Meyer's Life Chart and the Representation of Individuality. *Representations***,** 1-28.
LITTLEFIELD, M. M. A. 2018. *Instrumental intimacy: EEG wearables & neuroscientific control*.
LIU, L. 2019. China: A Headband for Your Thoughts? *EE Times* [Online]. Available: https://www.eetimes.com/china-a-headband-for-your-thoughts/ [Accessed 24/06/2022].
LOERZEL, R. 2003. *Alchemy of Bones: Chicago's Luetgert Murder Case of 1897*, U of Nebraska Press.
LUPTON, D. 2016. *The quantified self: a sociology of self-tracking,* Cambridge, UK, Polity.
LUTTRELL, A. 2015. *Psychology for the Mentalist,* United States, Mind Tapped Productions.
LYNDEN K. MILES, L. K. N., AND C. NEIL MACRAE 2009. Moving Through Time. *Psychological Science*.
LYUBOMIRSKY, S., SHELDON, K. M. & SCHKADE, D. 2005. Pursuing Happiness: The Architecture of Sustainable Change. *Review of General Psychology,* 9**,** 111-131.
MACAIRE, S. & HARRY HOUDINI COLLECTION (LIBRARY OF CONGRESS) 1889. *Mind reading or muscle reading: as exhibited by the late Washington Irving Bishop and others: which is it?, what is it?, how is it?: a physiological study,* London
Manchester, Simpkin
John Heywood.
MACLAGAN, D. 2013. *Line let loose: scribbling, doodling and automatic drawing*, Reaktion Books.
MACNAB, B. 2012. *The metamorphosis: the apprenticeship of Harry Houdini,* Fredericton, New Brunswick, Canada, Goose Lane Editions.
MALABOU, C. 2008. *What should we do with our brain?,* Ashland, Ohio, Fordham University Press.
MALAFOURIS, L. 2013. *How things shape the mind: a theory of material engagement*.

MALEBRANCHE, N. 1688. *De la recherche de la verité: où l'on traitte de la nature de l'esprit de l'homme, [et] de l'usage qu'il en doit faire pour éviter l'erreur dans les sciences,* Amsterdam, Chez Henry Desbordes.
MALTZ, M. 1960. *Psycho-Cybernetics,* New York, Perigee Book.
MANN, A. 1978. The Bert Reese Docimacy. Al Mann Exclusives.
MANN, A. 1985. *Axel Hellstrom*, Al Mann Exclusives.
MANSFIELD, S. 2017. *Choosing Donald Trump: God, Anger, Hope, and Why Christian Conservatives Supported Him,* Grand Rapids, UNITED STATES, Baker Books.
MARENKO, B. 2014. Neo-Animism and Design. *Design and Culture,* 6**,** 219-241.
MCCABE, D. P. & CASTEL, A. D. 2008. Seeing is believing: The effect of brain images on judgments of scientific reasoning. *Cognition,* 107**,** 343-352.
MCCAMBRIDGE, G. 2017. *Performing the Q&A,* U.S., Gerry McCambridge.
MCGILL, O. 2003. *Secrets of Dr. Zomb,* Carmarthen, Wales, Crown House Pub.
MCIVOR-TYNDALL, A. J. c. 1900. *Mind-Reading,* Denver, Colorado, Wahlgreen Publishing Company.
MCLOUGHLIN, W. G. 1978. *Revivals, awakening and reform*, University of Chicago Press.
MEDICINE, I. O., POLICY, B. O. H. S., DISORDERS, F. O. N., NERVOUS, S., ALTEVOGT, B. & HOUGAN, M. 2008. *From Molecules to Minds: Challenges for the 21st Century: Workshop Summary,* Washington, D.C, Washington, D.C: National Academies Press.
MEINECK, P. 2012. The Embodied Space: Performance and Visual Cognition at the Fifth Century Athenian Theatre. *New England Classical Journal,* 39**,** 1-47.
MEINECK, P. 2017. Mind-Altering Masks in Ancient Drama. *Thinking With Things.*
MENARY, R. 2010. *The extended mind,* Cambridge, Mass. ; London, MIT Press.
MENDIETA, E. 2003. Bodies of Technology. JSTOR.
MERLEAU-PONTY, M. 1968. *The visible and the invisible: Followed by working notes*, Northwestern University Press.
MESMER, F. A. 1799. *Mémoire sur ses découvertes*.
MEYER, A. 1938. The Life Chart and the Obligation of Specifying Positive Data in Psychopathological Diagnosis. *In:* WINTERS, E. (ed.) *The Collected Papers of Adolf Meyer.* Baltimore: Johns Hopkins University.
MEYER, D. 2013. *The Positive Thinkers,* Westminster, UNITED STATES, Knopf Doubleday Publishing Group.
MICKLEY, G. A. & HOYT, D. A. 2010. Narratives and neurons: stories of damaged brains. *Journal of undergraduate neuroscience education : JUNE : a publication of FUN, Faculty for Undergraduate Neuroscience,* 8**,** A91-A100.
MILLER, L. E., MONTRONI, L., KOUN, E., SALEMME, R., HAYWARD, V. & FARNÈ, A. 2018. Sensing with tools extends somatosensory processing beyond the body. *Nature,* 561**,** 239-242.
MISIROGLU, G. R. E. 2009. *American countercultures: an encyclopedia of nonconformists, alternative lifestyles, and radical ideas in U.S. history,* Armonk, N.Y., Sharpe Reference.
MODERN, J. L. *Neuromatic, or, a particular history of religion and the brain*.
MOORE, R. L. 1994. *Selling God: American religion in the marketplace of culture,* New York, Oxford University Press.
MORENO, J. D. 2012. *Mind wars: brain science and the military in the twenty-first century,* New York, N.Y., Bellevue Literary Press.
MORITZ, C. T., RUTHER, P., GOERING, S., STETT, A., BALL, T., BURGARD, W., CHUDLER, E. H. & RAO, R. P. N. 2016. New Perspectives on Neuroengineering and Neurotechnologies: NSF-DFG Workshop Report. *IEEE Transactions on Biomedical*

Engineering, 63**,** 1354-1367.
MORTON, T. B., DOMINIC 2021. *hyposubjects: on becoming human*, Open Humanities Press.
MOSES, A. 2007. *Houdini Speaks Out: "I Am Houdini! And You are a Fraud!"*, Arthur Moses.
MOSHER, M. 2022. Khong Khro: Visual biofeedback for focus meditations: Visual biofeedback for focus meditations. *Creativity and Cognition.* Venice, Italy: Association for Computing Machinery.
MOULIER BOUTANG, Y. 2011. *Cognitive capitalism,* Cambridge, Polity.
MULFORD, P. & WOODROW WILSON COLLECTION (LIBRARY OF CONGRESS) 1919. *Thoughts are things: essays selected from the White Cross Library,* London, G. Bell.
MURISON, J. S. 2012. "The Paradise of Non-Experts"
The Neuroscientific Turn of the 1840s United States. *In:* LITTLEFIELD, M. M. & JOHNSON, J. M. (eds.) *The Neuroscientific Turn.* University of Michigan Press.
MURPHY, H. T. 2023. *It Uses A.I. It Goes on Your Head. Can It Induce Lucid Dreams?* [Online]. Slate. Available: https://slate.com/technology/2023/10/prophetic-lucid-dreams-startup-artificial-intelligence.html [Accessed 23 Oct 2023].
MURRAY, J. 2010. Smile or Die: How Positive Thinking Fooled America and the World by Barbara Ehrenreich. *The Observer*, 10 January.
MUSK, E. 2019. An integrated brain-machine interface platform with thousands of channels. *bioRxiv***,** 703801.
MYERS, F. W. H. 1881. *Wordsworth,* [S.l.], MacMillan.
MYERS, F. W. H., HODGSON, R. & JOHNSON, A. 1903. *Human personality and its survival of bodily death,* New York, Longmans, Green, and co.
NADIS, F. 2005. *Wonder shows: performing science, magic, and religion in America,* New Brunswick, N.J. ; London, Rutgers University Press.
NANCY, J.-L. & HANSON, S. 2002. L'Intrus. *CR: The New Centennial Review,* 2**,** 1-14.
NATALE, S. 2016. *Supernatural Entertainments: Victorian Spiritualism and the Rise of Modern Media Culture*, Penn State University Press.
NATALE, S. & PASULKA, D. W. 2020. *Believing in bits: digital media and the supernatural*.
NAYAK, M. 2023. *Achieving Superhuman Capacity Through Technological Innovation* [Online]. Available: https://www.emotiv.com/blog/achieving-superhuman-capacity-through-technological-innovation/ [Accessed 8 Feb 2024].
NAYAR, P. K. A. 2013. *Posthumanism*.
NEIDICH, W. 2022. *Activist Neuroaesthetics Reader*, Archive Books.
NEWTON, I. 1704. *Opticks: or, A treatise of the reflexions, refractions, inflexions and colours of light. Also two treatises of the species and magnitude of curvilinear figures.*
NIAMI, S. 2023. Written in the Stars? More Like Written by A.I. *The New York Times*, 4th July.
NICOLELIS, M. A. L. 2012. *Beyond boundaries: the new neuroscience of connecting brains with machines and how it will change our lives,* New York.
NIJHOLT, A., BOS, D. P.-O. & REUDERINK, B. 2009. Turning shortcomings into challenges: Brain–computer interfaces for games. *Entertainment computing,* 1**,** 85-94.
NIJHOLT, A. E. 2019. *Brain art: brian-computer interfaces for artistic expression*.
NISHIMOTO, S., VU, A. T., NASELARIS, T., BENJAMINI, Y., YU, B. & GALLANT, J. L. 2011. Reconstructing visual experiences from brain activity evoked by natural movies. *Curr Biol,* 21**,** 1641-6.
NOË, A. 2021. *Learning to look: dispatches from the art world,* New York, Oxford

University Press.
NOLAN, S. 2020. Vers une magie numérique non rétinienne. . *In:* ALMIRON, M., BAZOU, S. & PISANO, G. (EDS.) (ed.) *Magie numérique: Les Arts trompeurs. Machines. Magie. Médias.* Lille: Presses Universitaires du Septentrion.
NOLAN, S. 2023. The Materiality of Thought (or How to Read Minds for Fun and Profit). Available from: https://blogs.loc.gov/kluge/2023/05/the-materiality-of-thought-or-how-to-read-minds-for-fun-and-profit/ [Accessed 4th October 2023 2023].
NOWLIS, D. P. & KAMIYA, J. 1970. The control of electroencephalographic alpha rhythms through auditory feedback and the associated mental activity. *Psychophysiology,* 6**,** 476-84.
O'NEIL, C. 2016. *Weapons of math destruction: how big data increases inequality and threatens democracy*.
ODIN, S. 2001. *Artistic Detachment in Japan and the West: Psychic Distance in Comparative Aesthetics*, University of Hawai'i Press.
OLDS, J. L. 2011. For an international decade of the mind. *Malays J Med Sci,* 18**,** 1-2.
OLSON, J. A., CYR, M., ARTENIE, D. Z., STRANDBERG, T., HALL, L., TOMPKINS, M. L., RAZ, A. & JOHANSSON, P. 2023. Emulating future neurotechnology using magic. *Consciousness and Cognition,* 107**,** 103450.
OLSON, J. A., LANDRY, M., APPOURCHAUX, K. & RAZ, A. 2016. Simulated thought insertion: Influencing the sense of agency using deception and magic. *Consciousness and Cognition,* 43**,** 11-26.
ONG, W. J. 1982. *Orality and literacy: the technologizing of the word,* London, Methuen.
ORTEGA, F. 2011. Toward a genealogy of neuroacesis. *In:* ORTEGA, F. & VIDAL, F. (eds.) *Neurocultures: glimpses into an expanding universe.* Frankfurt: Peter Lang.
PAIVIO, A. 1975. Neomentalism. *Canadian Journal of Psychology/Revue canadienne de psychologie,* 29**,** 263.
PAULSON, S., DAVIDSON, R., JHA, A. & KABAT-ZINN, J. 2013. Becoming conscious: the science of mindfulness. *Annals of the New York Academy of Sciences,* 1303**,** 87-104.
PEALE, N. V. 1952. *The power of positive thinking,* New York,, Prentice-Hall.
PEDERSEN, I. D., QUINN 2017. Tracking the telepathic sublime as a phenomenon in a digital humanities archive. *Digital Humanities Quarterly,* 11.
PEÑA, C. T. D. L. 2003. *The body electric: how strange machines built the modern American*, New York University Press.
PENNISI, A. & FALZONE, A. 2020. *The extended theory of cognitive creativity: interdisciplinary approaches to performativity*.
PENNY, S. 2017. *Making sense: cognition, computing, art, and embodiment,* Cambridge, MA, MIT Press.
PETERS, J. D. 1999. *Speaking Into The Air: A History of the Idea of Communication,* London, University of Chicago Press.
PICKERING, A. 2010. *The mangle of practice: Time, agency, and science*, University of Chicago Press.
PITTS-TAYLOR, V. 2010. The plastic brain: neoliberalism and the neuronal self. *Health (London),* 14**,** 635-52.
PODMORE, F. 1909. *Mesmerism and Christian Science: A short history of mental healing*, Methuen.
POLDRACK, R. A. 2012. The future of fMRI in cognitive neuroscience. *Neuroimage,* 62**,** 1216-20.
POLIDORO, M. 2001. *Final Séance: the strange friendship between Houdini and Conan Doyle,* Amherst, NY, Prometheus Books.

POSNER, M. I., ROTHBART, M. K. & TANG, Y.-Y. 2015. Enhancing attention through training. *Current Opinion in Behavioral Sciences,* 4**,** 1-5.
POWERS, S. 2008. *Insight yoga,* Boston, Mass., Shambhala ; Enfield : Publishers Group UK [distributor].
PRINZ, W. 1997. Perception and Action Planning. *European Journal of Cognitive Psychology,* 9**,** 129-154.
PRINZ, W. E. & SANDERS, A. F. E. 1984. *Cognition and motor processes,* Berlin, Springer-Verlag.
PRIOR, H., SCHWARZ, A. & GÜNTÜRKÜN, O. 2008. Mirror-Induced Behavior in the Magpie (Pica pica): Evidence of Self-Recognition. *PLOS Biology,* 6**,** e202.
PUGLIONESI, A. 2016. Drawing as Instrument, Drawings as Evidence: Capturing Mental Processes with Pencil and Paper. *Medical history,* 60**,** 359-387.
PUGLIONESI, A. 2020. *Common phantoms: an American history of psychic science,* Stanford, Stanford University Press.
PURSER, R. E. 2019. *McMindfulness: how mindfulness became the new capitalist spirituality*.
QUIMBY, G. A. 1888. Phineas Parkhurst Quimby. *The New England magazine.* New England: New England Magazine Co.
QUIMBY, P. P. 2008. *The complete collected works of Dr. Phineas Parkhurst Quimby: in order of subject matter,* Manchester, CT, Seed of Life Pub.
QUIMBY, P. P. & DRESSER, H. W. 1921. *The Quimby manuscripts, showing the discovery of spiritual healing and the origin of Christian science,* New York,, T.Y. Crowell company.
RAINEY, S., MARTIN, S., CHRISTEN, A., MÉGEVAND, P. & FOURNERET, E. 2020. Brain Recording, Mind-Reading, and Neurotechnology: Ethical Issues from Consumer Devices to Brain-Based Speech Decoding. *Science and Engineering Ethics,* 26**,** 2295-2311.
RAPHAEL, T. & ROACH, J. 2009. Activating the Kinesthetic Imagination. *Transformations: The Journal of Inclusive Scholarship and Pedagogy,* 20**,** 119-130.
REDON, O. 2021. *A soi-même*, République des Lettres.
REIN, K. 2015. Mind Reading in Stage Magic: The “Second Sight” Illusion, Media, and Mediums. *communication +1,* 4.
RESEARCH, G. V. 2023. Brain Computer Interface Market Size & Share Report, 2030. San Francisco.
RIDER, F. 1909. *Are the dead alive?,* New York,, B. W. Dodge & company.
RISNES, M., THORSTENSEN, E., MIRTAHERI, P. & BERG, A. 2024. Exploring Value Dilemmas of Brain Monitoring Technology through Speculative Design Scenarios. *Journal of Responsible Technology***,** 100074.
ROBBINS, A. 1991. *Awaken the giant within,* New York, N.Y., Summit Books.
ROBINSON, J. T., ROMMELFANGER, K. S., ANIKEEVA, P. O., ETIENNE, A., FRENCH, J., GELINAS, J., GROVER, P. & PICARD, R. 2022. Building a culture of responsible neurotech: Neuroethics as socio-technical challenges. *Neuron*.
ROBINSON, W. E. 1898. *Spirit slate writing and kindred phenomena,* New York City, Munn & Company.
ROLLS, E. T. 2012. *Neuroculture: on the implications of brain science*, Oxford University Press.
ROMANO, A. 2023. No, AI can’t tell the future. Vox.
RORTY, R. 1979. *Philosophy and the mirror of nature,* Princeton, Princeton University Press.
ROSE, N. S. 2013. *Neuro:The New Brain Sciences and the Management of the Mind*, Princeton University Press.

ROSENBERGER, KIRAN, A., VERBEEK, P.-P., IHDE, D., LANGSDORF, L., BESMER, K. M., HOEL, A. S., CARUSI, A., NIZZI, M.-C. & SECOMANDI, F. 2015. *Postphenomenological Investigations: Essays on Human–Technology Relations,* Lanham, MD, UNITED STATES, Lexington Books.

ROSENBERGER, R. & VERBEEK, P.-P. 2015. A field guide to postphenomenology. *Postphenomenological investigations: Essays on human-technology relations***,** 9-41.

ROSENFELD, S. M. 2008. *A critical history of hypnotism: the unauthorized story,* S.l., Xlibris Corp.

ROWLANDS, M. 2010. *The new science of the mind: from extended mind to embodied phenomenology,* Cambridge, Mass. ; London, MIT Press.

ROYLE, N. 2012. *Telepathy and literature: essays on the reading mind.* , Blackwell, Oxford.

RUBY, J. 1995. *Secure the shadow: death and photography in America,* Cambridge, Mass. ; London, MIT Press.

SAMMOND, N. 2005. *Steel chair to the head: The pleasure and pain of professional wrestling*, Duke University Press.

SAMPLE, M., SATTLER, S., BLAIN-MORAES, S., RODRÍGUEZ-ARIAS, D. & RACINE, E. 2020. Do Publics Share Experts' Concerns about Brain–Computer Interfaces? A Trinational Survey on the Ethics of Neural Technology. *Science, Technology, & Human Values,* 45**,** 1242-1270.

SAMPSON, N. K. H. A. T. D. 2018. Unthought Meets The Assemblage Brain. *Capacious: Journal for Emerging Affect Inquiry,* 1.

SAMUEL, S. 2021. New technologies are promising a shortcut to enlightenment. *Vox* [Online]. Available: https://www.vox.com/future-perfect/22727109/enlightenment-technology-neurofeedback-brain-stimulation-psychedelics [Accessed 21/06/2022].

SAMUELS, E. 2020. *Setting the Stage,* Canada, Self-published.

SATTER, B. 1999. *Each mind a kingdom: American women, sexual purity, and the New Thought movement, 1875-1920*, Univ of California Press.

SAVULESCU, J. 2009. Moral Status of Enhanced Beings: What Do We Owe the Gods? *In:* JULIAN SAVULESCU, N. B. (ed.) *Human enhancement.* Oxford: OUP.

SCHABUS, M., GRIESSENBERGER, H., GNJEZDA, M.-T., HEIB, D. P., WISLOWSKA, M. & HOEDLMOSER, K. 2017. Better than sham? A double-blind placebo-controlled neurofeedback study in primary insomnia. *Brain,* 140**,** 1041-1052.

SCHLUN, B. V. 2007. *Science and the imagination: mesmerism, media, and the mind in nineteenth-century English and American literature,* Glienicke, Berlin ; Madison, Wis., Galda + Wilch Verlag.

SCHMID, J. R., FRIEDRICH, O., KESSNER, S. & JOX, R. J. 2021. Thoughts Unlocked by Technology—a Survey in Germany About Brain-Computer Interfaces. *NanoEthics*.

SCHMID, J. R. & JOX, R. J. 2021. The Power of Thoughts: A Qualitative Interview Study with Healthy Users of Brain-Computer Interfaces. *In:* FRIEDRICH, O., WOLKENSTEIN, A., BUBLITZ, C., JOX, R. J. & RACINE, E. (eds.) *Clinical Neurotechnology meets Artificial Intelligence: Philosophical, Ethical, Legal and Social Implications.* Cham: Springer International Publishing.

SCHÖNENBERG, M., WIEDEMANN, E., SCHNEIDT, A., SCHEEFF, J., LOGEMANN, A., KEUNE, P. M. & HAUTZINGER, M. 2017. Neurofeedback, sham neurofeedback, and cognitive-behavioural group therapy in adults with attention-deficit hyperactivity disorder: a triple-blind, randomised, controlled trial. *The Lancet Psychiatry,* 4**,** 673-684.

SCHUSTER, D. G. 2011. *Neurasthenic Nation: America's Search for Health, Happiness, and Comfort, 1869-1920*.

SCONCE, J. 2000. *Haunted media: electronic presence from telegraphy to television*, Duke

University Press.
SEGNO, A. V. 1902. *The law of mentalism; a practical, scientific explanation of thought or mind force: the law which governs all mental and physical action and phenomena: the cause of life and death,* Los Angeles, Cal.,, American institute of mentalism.
SHORE, B. 1996. *Culture in mind: cognition, culture, and the problem of meaning,* New York ; Oxford, Oxford University Press.
SHURE, C. 2018. *Brain Waves, A Cultural History: Oscillations of Neuroscience, Technology, Telepathy, and Transcendence.* Ph.D., Columbia University.
SINGER, P. 2001. *Hegel: a very short introduction*, Oxford : Oxford University Press, c1983 (2001 [printing]).
SLABY, J. 2010. Steps towards a critical neuroscience. *Phenomenology and the Cognitive Sciences,* 9**,** 397-416.
SLOTERDIJK, P. 2017a. *Not saved: essays after Heidegger*, John Wiley & Sons.
SLOTERDIJK, P. 2017b. Not Saved: Essays after Heidegger. 2001. *Trans. Ian Alexander Moore and Christopher Turner. Malden, MA: Polity*.
SLOTERDIJK, P. & HOBAN, W. 2013. *You Must Change Your Life,* Oxford, UNITED KINGDOM, Polity Press.
SPITZER, M. 2008. Decade of the mind. *Philos Ethics Humanit Med,* 3**,** 7.
SPIVEY, M. 2019. *Who you are: the science of connectedness,* Cambridge, Massachusetts, The MIT Press.
SPOONER, W. E. 2008. The Pendulum 'Knows'. *Gibecière : Journal of the Conjuring Arts Research Center,* 3**,** 49-76.
STAVIG, G., SHUDDHIDANANDA & ADVAITA ASHRAMA. 2010. *Western admirers of Ramakrishna and his disciples,* Kolkata, Advaita Ashrama.
STEBBINS, R. A. 1982. Serious Leisure: A Conceptual Statement. *Pacific sociological review,* 25**,** 251-272.
STIEGLER, B. 1998. *Technics and time,* Stanford, Calif., Stanford University Press; [London : Eurospan, distributor].
STIRLING, B. 2015. *Peter Sloterdijk and his anthropotechnics* [Online]. Wired. Available: https://www.wired.com/beyond-the-beyond/2015/09/peter-sloterdijk-anthropotechnics/ [Accessed].
STIVERS, R. 1999. *Technology as magic: the triumph of the irrational,* New York ; [Great Britain], Continuum.
STOCK, A. & STOCK, C. 2004. A short history of ideo-motor action. *Psychol Res,* 68**,** 176-88.
STONE, M. H. 1997. *Healing the mind: A history of psychiatry from antiquity to the present*, WW Norton & Company.
STRAWSON, G. 2009. Mentalism, Idealism, and Immaterialism. *Mental Reality.* The MIT Press.
SUDNOW, D. & DREYFUS, H. L. 2001. *Ways of the hand: a rewritten account,* Cambridge, Mass., MIT Press.
SUNDER RAJAN, K. 2006. *Biocapital: the constitution of postgenomic life*, Duke University Press.
SUTTON-SMITH, B. 1997. *The Ambiguity of Play,* Cambridge, Mass. ; London, Harvard University Press.
SUTTON-SMITH, B. 2005. Keynote. *ITRA: International Toy Research Association Conference.* Alicante, Spain.
SWEDENBORG, E. & BAYLEY, F. 1931. *Heaven and hell,* London, J. M. Dent & sons.
TALLIS, R. 2003. *The hand: a philosophical inquiry into human being,* Edinburgh, Edinburgh University Press.

TAMARIZ, J. 2019. *The Magic Rainbow*, Hermetic Press.
TANG, J., LEBEL, A., JAIN, S. & HUTH, A. G. 2023. Semantic reconstruction of continuous language from non-invasive brain recordings. *Nature Neuroscience,* 26**,** 858-866.
TAPIA, J. E. 1997. *Circuit Chautauqua: From rural education to popular entertainment in early twentieth century America*, McFarland.
TARBELL, H. 1941. *The Tarbell course in magic,* New York,, N.L. Magic Co.
TAUSSIG, M. T. 2011. *I swear I saw this: drawings in fieldwork notebooks, namely my own,* Chicago ; London, The University of Chicago Press.
TAYLOR, C. 1992. *The ethics of authenticity*, Harvard University Press.
TAYLOR, N. 2018. Magic and Broken Knowledge; reflections on the practice of Bizarre Magick. *Journal of Performance Magic,* 5**,** 25-40.
TERAYAMA, K. 2003. *Zen brushwork: focusing the mind with calligraphy and painting,* Tokyo ; London, Kodansha International.
THACKER, E. 2003. Data Made Flesh: Biotechnology and the Discourse of the Posthuman. *Cultural Critique***,** 72-97.
THIBAULT, R. T., LIFSHITZ, M. & RAZ, A. 2018. The climate of neurofeedback: scientific rigour and the perils of ideology. *Brain,* 141**,** e11-e11.
THIBAULT, R. T. & RAZ, A. 2016. When can neurofeedback join the clinical armamentarium? *The Lancet Psychiatry,* 3**,** 497-498.
THOMAS 1967. *Summa theologiae.- Vol 9: Angels (1a.50-64)*, Eyre.
THOMPSON, E., LUTZ, A. & COSMELLI, D. 2005. Neurophenomenology: An Introduction for Neurophilosophers.
THORNTON, D. J. 2011. *Brain culture: neuroscience and popular media,* Piscataway, N.J., Rutgers University Press.
TODES, S. 2001. *Body and World,* Cambridge, Mass., MIT Press.
TODMAN, D. 2007. More on literature and the history of neuroscience: using the writings of silas Weir mitchell (1829-1914) in teaching the history of neuroscience. *Journal of undergraduate neuroscience education : JUNE : a publication of FUN, Faculty for Undergraduate Neuroscience,* 6**,** L1-L1.
TOKSVIG, S. 1948. *Emanuel Swedenborg: scientist and mystic,* [S.l.], Faber.
TOMASI, D. L. A. A. 2020. *Critical Neuroscience and Philosophy: A Scientific Re-Examination of the Mind-Body Problem*.
TRESSOLDI, P. E., PEDERZOLI, L., CAINI, P., FEDELE, P., FERRINI, A. & MELLONI, S. 2014. Brain-to-Brain (Mind-to-Mind) Interaction at Distance: A Pilot Study. *SSRN Electronic Journal*.
TROWARD, T. 2007. *The Edinburgh and Dore Lectures on Mental Science*, Cosimo, Incorporated.
TRUESDELL, J. W. 1883. *The bottom facts concerning the science of spiritualism*.
TUBBS, R. S., RIECH, S., VERMA, K., LOUKAS, M., MORTAZAVI, M. & COHEN-GADOL, A. 2011. Emanuel Swedenborg (1688-1772): pioneer of neuroanatomy. *Childs Nerv Syst,* 27**,** 1353-5.
UTTAL, W. R. 2001. *New phrenology: the limits of localizing cognitive processes in the brain*, MIT Press.
VACCARI, A. S. 2009. Unweaving the Program: Stiegler and the Hegemony of Technics. *Transformations*.
VAN VOGT, A. E. 2007. *Slan,* New York, Tor ; [Godalming : Melia, distributor].
VANCE, A. 2023. *Elon Musk's Brain Implant Startup Is Ready to Start Surgery* [Online]. Bloomberg. Available: https://www.bloomberg.com/news/features/2023-11-07/elon-musk-s-neuralink-brain-implant-startup-is-ready-to-start-surgery [Accessed].

VARELA, F. J. 1996. Neurophenomenology: A methodological remedy for the hard problem. *Journal of consciousness studies,* 3**,** 330-349.
VARGAS, J. F., ZHOU, B., BELLO, H. & LUKOWICZ, P. 2021. Brainwear: Towards Multi-modal Garment Integrated EEG. *Proceedings of the 2021 ACM International Symposium on Wearable Computers.* Virtual, USA: Association for Computing Machinery.
VASQUEZ, B. L. The effects of hypnosis on flow and in the performance enhancement of basketball skills. 2005.
VENNARE, A. 2023. *In The Game* [Online]. Available: https://insider.fitt.co/issue-no-262-in-the-game/ [Accessed 5th Dec 2023].
VERBEEK, P.-P. *Postphenomenology* [Online]. Available: https://ppverbeek.org/postphenomenology/ [Accessed 26/06/2022].
VERBEEK, P.-P. 2005. *What things do: Philosophical reflections on technology, agency, and design,* University Park, Pa., Pennsylvania State University Press.
VICENTE, K. & KIRLIK, A. 2010. *Human-Tech*, Oxford University Press.
VIDAL, C. 2022. Neurotechnologies under the Eye of Bioethics. *eneuro,* 9**,** ENEURO.0072-22.2022.
VIDAL, F. O., FRANCISCO 2017. *Being Brains: Making the Cerebral Subject*, Fordham University Press.
VON SYDOW, C. W. 1948. Categories of Prose Narratives. *Selected Papers on Folklore. Published on the Occasion of His 70th Birthday***,** 60-88.
WADE, M. 2018. Virtuous Play: The Ethics, Pleasures, and Burdens of Brain Training. *Science as Culture,* 27**,** 296-321.
WAISBERG, E., ONG, J. & LEE, A. G. 2024. Ethical Considerations of Neuralink and Brain-Computer Interfaces: Balancing Innovation and Responsibility. *Annals of Biomedical Engineering*.
WALDMAN, M. R. & MANNING, C. 2017. *NeuroWisdom: The New Brain Science of Money, Happiness, and Success*, Diversion Books.
WALLACE, B. A. 2006. *The attention revolution: Unlocking the power of the focused mind*, Simon and Schuster.
WALLACE, B. A. & HODEL, B. 2012. *Dreaming yourself awake: Lucid dreaming and Tibetan dream yoga for insight and transformation*, Shambhala Publications.
WANG, J., CHERKASSKY, V. L. & JUST, M. A. 2017. Predicting the brain activation pattern associated with the propositional content of a sentence: Modeling neural representations of events and states. *Hum Brain Mapp,* 38**,** 4865-4881.
WARREN, J. A. 2017. *Creating worlds: how to make immersive theatre*.
WEBSTER, R. 2009. *Readings as Entertainment,* Aukland, Brookfield Press.
WEBSTER, R. 2020. *The Psychic Reader's Toolbox,* Aukland, Brookfield Press.
WEISS, R. 1969. *The American myth of success: from Horatio Alger to Norman Vincent Peale*, Basic Books.
WESSINGER, C. 1993. *Women's leadership in marginal religions: explorations outside the mainstream,* Urbana, University of Illinois Press.
WEXLER, A. & THIBAULT, R. 2018. Mind-Reading or Misleading? Assessing Direct-to-Consumer Electroencephalography (EEG) Devices Marketed for Wellness and Their Ethical and Regulatory Implications. *Journal of Cognitive Enhancement,* 3.
WIENER, N. 1956. *I am a Mathematician,* Garden City, N.Y.,, Doubleday.
WIENER, N. 2019. *Cybernetics or Control and Communication in the Animal and the Machine*, MIT press.
WILEY, B. H. 2012. *The Thought Reader Craze: Victorian science at the enchanted boundary.,* Jefferson, N.C, McFarland.

WILMANS, H. c1890. *Home course of instruction in mental healing,* Douglasville, Ga.
WILSON, K. D. B., TEMMA F. 2021. Reading the Brain: An Interdisciplinary First-Year Seminar on the Intersection of Neuroscience, Literature, and Popular Culture. *The Journal of Undergraduate Neuroscience Education,* 19**,** A210-A225.
WINTER, A. 1998. *Mesmerized: powers of mind in Victorian Britain*, University of Chicago Press.
WITTGENSTEIN, L. 1958. *The blue and brown books,* Oxford Blackwell.
WITTGENSTEIN, L. 2001. *Philosophical investigations: the German text with a revised English translation,* Oxford, Blackwell.
WITTGENSTEIN, L., ANSCOMBE, G. E. M. & WRIGHT, G. H. V. 1967. *Zettel,* Oxford,, Blackwell.
WITTGENSTEIN, L. & WRIGHT, G. H. V. 1980. *Culture and value,* Oxford, B. Blackwell.
WOOD, H. 1893. *Ideal suggestion through mental photography; a restorative system for home and private use, preceded by a study of the laws of mental healing,* Boston,, Lee & Shepard.
WOOD, H. 1895. Auto-suggestion and Concentration. *Arena,* 12**,** 142.
WRIGHT, A. A. 1906. *Who's who in the Lyceum,* Philadelphia,, Pearson brothers.
XIV BSTAN-'DZIN-RGYA, D. L. 2006. *The Dalai Lama at MIT*, Harvard University Press.
YEATES, L. B. Emile Coue and his method (I): The chemist of thought and human action. 2016a.
YEATES, L. B. Emile Coue and his method (II): Hypnotism, suggestion, ego-strengthening, and autosuggestion. 2016b.
YEATES, L. B. Emile Coue and his method (III): Every day in every way. 2016c.
YON, D., HEYES, C. & PRESS, C. 2020. Beliefs and desires in the predictive brain. *Nature Communications,* 11**,** 4404.
YULIANI, N. M., PARAMITHA, N. M. A. S. P. & WULANDARI, N. P. A. D. 2023. Forms and Methods of Communication in Vedic and Hindu Literature: Hermeneutic Studies of Communication Theory. *International Journal of Scientific Research in Religion, Philosophy and Social Science,* 1.
ZANCIG, J. & ZANCIG, A. 1907. *Two minds with but a single thought,* London, Paul Naumann.
ZANCIG, J. & ZANCIG, A. 1914. *Forty lessons in palmistry; the language of the hands easily comprehended,* Chicago,, Chicago magic co.
ZANCIG, J. & ZANCIG, A. 1920. *Efficiency acquired by crystal gazing: a treatise on the science of concentration,* Asbury Park, N. J., Published by the Zancigs.
ZANCIGS, T. 1907. *Two minds with but a single thought,* London, Paul Naumann.
ZIMMER, C. 2004. *Soul made flesh: the discovery of the brain - and how it changed the world,* London, Heinemann.
ZUBOFF, S. 2018. *The age of surveillance capitalism*, PublicAffairs.