The death masks of executed criminals Ned Kelly, Dan Morgan, Franz Muller, John Weechurch, and Edward Pritchard are arguably the most well-known objects within the Harry Brookes Allen Museum of Anatomy and Pathology at the University of Melbourne. Displayed in bays along the external wall of the museum’s exhibition space, the plaster casts of the faces and heads of the deceased are certainly the most publicly accessible objects of the otherwise restricted-entry institution. Previously, the masks have been displayed in a minimalist fashion, alongside biographical information for the individual represented. However, recent research has engendered a more in-depth presentation of the masks which illuminates the cultural contexts of their creation and interpretation over time and their significance today, particularly in relation to the broader function of the Harry Brookes Allen Museum itself.

The masks were created for the purposes of phrenology, the practice of divining knowledge about an individual’s personal characteristics and capabilities from the external shape and size of their skull. In their most basic form, discussions about phrenology tend to revolve around its status within the sciences as a pseudoscientific theory, once accepted by many but now discredited. However, it is important to recognise the interdisciplinary foundations of the practice. Roger Cooter posits that in the Victorian era, the doctrine of phrenology “beckoned into its orbit every one of the social, psychological, intellectual, political and religious concerns that had been aggravated and heightened by the conditions of rapid and pervasive social and economic change.” Phrenology was not a unified or isolated practice, but one that was inextricably embedded in changing social, political, and cultural environments.

In this way, phrenology and associated practices can be understood as mechanisms of what Foucault termed ‘biopower’, by which knowledge about biological features is integrated into political strategy, “effectively [colonising] the body, overlaying it with calculatory grids and mathematically inscribing it with formulae that will transform it into an object of knowledge and power.” Biometric technologies such as this measure bodies “in order to identify, classify, evaluate and regulate target subjects,” allocating them positions within a hierarchy centred on degrees of departure from ideal norms of race, gender, ability, sexuality, class or age. These norms are “invisibilised” due to their incorporation into the infrastructure of the technology, and the empirical, observable, replicable scientific method is deployed in order to claim transparency and objective truth. However, this status is manufactured and authorised by institutional discourse. In order to analyse technologies such as phrenology as biopolitical entities, the
“complex intersection of bodies, subjects, technologies and power”7 involved in their deployment must be addressed.

In order to address this intersection and articulate the reasoning behind the masks’ redisplay, the history of phrenology as an branch of comparative anatomy will first be outlined, providing clarification of the scientific basis of the practice and linking the masks to the broader collection focus of the Harry Brookes Allen Museum. The socially normative and reformist implications of phrenology on the international stage will be sketched out, with particular attention to the differing applications of the theory espoused by its founders, Franz Joseph Gall and Johann Gaspar Spurzheim. Moving into the specific context of 19th century Melbourne, the wider cultural ramifications of the practice will also come into play, to show how emerging scientific knowledge has been interconnected with popular culture and social institutions locally. Phrenological interpretations of the masks in question will be presented, reflecting a synthesis of concerns apparent with regard to the criminal’s departure from the norm, and concomitant issues of criminal culpability and institutional responsibility.

Case studies of the craniological work of the first and third Professors of Anatomy at the University of Melbourne, George Britton Halford and Richard Berry, in conjunction with comparison and contrast of practice here and that of Gall and Spurzheim, will illustrate the contingency of scientific theory and research across particular temporal and cultural contexts. Issues with regard to the perceived relationship between phrenology and contemporary neuroscience will be examined, allowing for a considered perspective on the ongoing implications of such anatomical imaging techniques for conceptions of science as a discipline. Finally, current museological practice in the exhibition of such material and ideas will be utilised as a model for the exhibitionary potential of the collection at hand. The revised exhibition employs the collection of the Museum of Anatomy and Pathology in order to communicate these themes, resulting in a narrative which represents the complex significance of the death masks, both within the University, as an important aspect of Victorian cultural heritage, and as biopolitical technologies.

**Divine Order: The Invention of Phrenology**

The “order-inducing”8 nature of phrenology as a scientific practice was very much of its time. In line with an increasing emphasis on observability in science, morphology came to be considered to reflect physiology,9 allowing the observer to visualise “the invisible internal human... through physical and material means.”10 The tendency of 18th century biologists to define species according to taxonomies of these external characteristics reflected the idea that every species had a place in “a predetermined rational order, a great chain of being that revealed the design underlying the complex economy of
organic adaptations established by god.”

Neuroanatomist Franz Joseph Gall (1758 – 1828, Figure 1) maintained that this grand plan must also be apparent within the structure of organs, such as the brain. Gall and his assistant Johann Gaspar Spurzheim (1776 – 1832, Figure 2) developed an innovative method of dissection to reveal the path of nerves within the brain, discovering that they emerged “treelike from the spine, a blossom of independent but communicating structures.” They concluded that the brain therefore comprised a range of different areas responsible for certain activities or characteristics, and the number and compaction of the convolutions in each area could indicate its power. As the development of the brain engenders the expansion of the skull, it followed that the relative pressure from over or underdeveloped sections of the brain would result in corresponding bumps in the shape of the skull. These bumps could be used to assess the inherent characteristics, abilities, predispositions and proclivities of the individual concerned, visualising the invisible.

These intangible qualities therefore became subject to scientific classification and order. Gall considered that in order to indicate normal brain function, the mature skull must reach 14 inches, although large heads were not necessarily an indicator of superior function: this depended on the development of each individual faculty. Constructing a taxonomy of naturally-determined intellectual, moral and emotional characteristics, Gall presented “an underlying set of motives and talents capable of yielding all behavioural traits,” which, though he allowed for some environmental conditioning, were considered reliable indicators of personality:
Although he acknowledged that this list was a first draft, leaving open the possibility that other faculties could be added, Gall was confident that these represented the primary powers which could combine, like letters into words, in infinite ways to produce the diversity of individuals and cultures.\(^\text{19}\) He felt that the grand design was falling into place in front of his eyes, with animal and specifically human faculties organised in separate sections, and cooperating organs arranged together.\(^\text{20}\) Busts were produced, representing an ideally proportioned head and brain, displaying “the harmonious physiological order that God had implanted.”\(^\text{21}\) Set within a worldview emphasising order through taxonomical classification against ideal form, and with its focus on the brain as the primary locus of identity and behaviour, phrenology was from the outset a powerful biopolitical technology, a normative tool with far-reaching social implications.

**Determinist Normativity: The Social Implications of Phrenology**

Gall’s thinking marked a shift from philosophy to comparative neuroanatomy as the key to understanding the human mind,\(^\text{22}\) with the abnormal and pathological utilised to determine its structure and ideal state.\(^\text{23}\) However, despite its scientific grounding, phrenology was far from objective, being heavily influenced by societal biases and associated norms. It allowed identity to be signified corporeally,\(^\text{24}\) with each individual “not only "himself" but also potentially the embodiment of a type”\(^\text{25}\) which may or may not meet normative standards. In this way, “the question ’who is this person?’ leaches constantly into the question ‘what kind of person is this?”\(^\text{26}\) The application of such thought in the construction of taxonomies of race has been well-documented. With the emergence of physical anthropology in the 18\(^\text{th}\) and 19\(^\text{th}\) centuries, rather than cultural differences, biological characteristics such as head shape, as well as physical form and skin colour, were used to categorise humans into different races.\(^\text{27}\) Subsequent generalisations regarding intelligence and social characteristics often found non-European subjects being
assessed unfavourably. Anthropologist Samuel Morton (1799 – 1851) in particular justified such generalisations using comparative anatomy, promoting the idea that inferior races and individuals had smaller brains. However, ‘othered’ groups within dominant culture were also analysed in this way, with criminal, mentally ill and intellectually disabled subjects being explained in relation to their cranial development. The development of Gall’s theory was linked to marginalised groups from early on, as he gathered data from asylums and prisons as well as schools in Vienna to support his hypotheses. Cesare Lombroso (1835 – 1909) later took this to particular lengths, promoting the idea that, as evidenced in their head types, criminals were of a distinct species, homo criminalis. These ideas of a criminal class or species are as fraught with biopolitical implications as a normative hierarchy of race.

Figure 2: Johann Gaspar Spurzheim

Gall, for his part, took a universal and non-judgemental stance on such issues. He considered the structure of the brain to be applicable across cultural boundaries, stating in the introduction to his seminal work, On the Functions of the Brain and Each of its Parts:

Always, and everywhere, the human race has manifested the same propensities and the same talents; always and everywhere, there have resulted the same virtues and the same vices, the same employments and the same institutions...Sing your lines on the straw, or on the harp; dress your chiefs with feathers or with purple; your women with flowers or with diamonds; inhabit huts or palaces; it will still be the same faculties, which lead men to act within the circle traced for him by his Creator.

In this way, Gall attempted to avoid the hierarchical racial or class generalisations that could easily emerge from his theory, emphasising the usefulness of his discovery for cross-cultural understanding and preferring to focus on the effects of brain structure on the individual level. Confusing the individualisation of the issue somewhat through comparison to animal species, he argued that human behaviour depends on particular propensities: “A fox will pay attention to chickens and a hawk to a field mouse, but try
getting monkeys (or idiots) to learn etiquette or a sheep to appreciate the arts.” As such, he had a deterministic view of the way a given person could relate to the world, with the response generated by an external stimulus depending on the development of the associated organ. This challenged popular notions of free will, and had implications for the institutions of medicine, morality, education and legislation who dealt with those whose behaviour did not match the dominant social code.

Gall was clear with regard to the relationship he saw between his theory and social institutions. He considered that correct action and individual responsibility must be understood in terms of the relationship between morality, rationality, and the “animal inclinations,” as not every individual could be considered to exercise free will to the same degree. He argued that “the man with great talents has more liberty than the ordinary man; and the more the faculties descend toward idiocy, the more also, moral liberty goes on decreasing.” Those who were “biologically prone to evil” could not be held responsible for their actions, and as such would be better served by the medical rather than penal system, as “in all ages and all countries men have robbed and murdered...no education, no legislation, no religion, neither prison, nor hard labour nor the wheel, has yet been able to extirpate these crimes.” This was a radical idea for the time, as it would be for many even today. Considering Gall’s interpretation and applications of phrenology in relation to others’ illustrates how a technology such as this can be variously put to use for discriminatory and repressive, or sympathetic and reformist ends.

A New Direction: The Popularisation of Spurzheim’s Phrenology

As Gall’s proposals gained popular and scientific traction through his lectures, his government moved to curtail the discussion by banning it altogether. Gall and Spurzheim took their show on the road, and their international lecture tour of 1805 - 1807 had some impact on sensationalising their theories. However, it was not until, diverting from Gall’s more neutral position, Spurzheim more optimistically reconstructed their research towards a goal of “individual and social perfectability” within the context of middle-class society and its institutions that popular phrenology really took off. Although he also rearranged Gall’s proposed brain structure, the primary focus of Spurzheim’s work was an attractive fusion of natural law and moral values which promoted the idea of the brain as a “normative instrument.” Rather than considering evil inherent, he presented each organ as having potential positive and negative functions, and highlighted the positive through new nomenclature (Figure 3).
In his arrangement, Spurzheim felt that he saw a moral as well as a physiological order. He argued that although virtue was the natural state, the human race “had inherited imbalanced, deranged, and diseased brains, the physical embodiment of human sin.” The solution to this was to develop the positive functions of the faculties, on an individual and generational level, in order to return humanity to the ideal state of being. For Spurzheim, phrenology provided the basis for the normalisation of the population “according to the laws of exercise and inheritance.” The restoration of the ideal could be achieved through progressive social policies which would structure the environment to maximise an individual’s positive powers, and minimise their negative ones, training “the higher but weaker moral and intellectual faculties to control the impulsive lower propensities.” In this way, Spurzheim’s phrenology was much more of an applied science than Gall’s, with greater attendant social implications.

The founding of the Edinburgh Phrenological Society and the involvement of George Combe (1788 – 1858, Figure 4), “an ardent and sincere disciple with a gift for clear thought and crisp prose,” moved phrenology decisively from pure physiology toward questions of broader social reform. In The Constitution of Man, which applied the tenets of phrenology to everyday life, particularly morality, Combe suggested reforms in the criminal justice system, whereby rather than executing criminals for actions they could hardly avoid, they would be held in solitary confinement in order to break down their evil natures and build newly moral minds. In contrast to the “reigning ‘animal system’ of brutish punishments,” Combe’s approach was “radically benevolent,” advocating sympathy towards all fellow human beings, and in this way draws parallels with Gall’s sympathetic application of his theory.
However, not all the suggestions for reform attached to Spurzheim’s phrenology were so considerate. In order to encourage the perfection of humanity, Spurzheim advocated for a eugenically-based approach to procreation. This would be taken up enthusiastically by Francis Galton (1822 – 1911), who, inspired by the idea of the ‘survival of the fittest’ in *On the Origin of the Species* and the potential for identifying desirable traits through the practice of craniology, advocated that “what nature does blindly, slowly and ruthlessly, men may do providently...quickly and kindly.” This work marked a shift in phrenology from Gall’s “physiological science” to a “broad eugenic social philosophy,” something Gall himself did not appreciate. He found Spurzheim’s reimagining of phrenology “monstrous, a departure from the implicit order of nature,” and felt his assistant “had perverted his life’s project, bending science to philosophical ends.” While Gall may have been naïve to consider his work as distinct from questions of philosophy, his vehement disagreement with Spurzheim’s application of their ideas is useful in demonstrating the contingency of the theory.

With its increasing popularisation and move toward practical applications, phrenology’s contention for scientific status became an important issue. Phrenology’s “shift in the ownership of the mind” which “transform[ed] sin into a disease” challenged the church’s moral authority, and resulted in a backlash from the conservative government, which restricted unauthorised lectures, making phrenology even more political. The press was sceptical and satirical, and Spurzheim was challenged by many academics on philosophical and moral grounds. However, debate often centred on the nature and definition of science itself, with phrenology’s critics acknowledging its claims for a scientific basis by referring to ‘pretended science’, ‘miscalled science’ and so on. Even at its peak, phrenology was dismissed by some as a pseudoscience. However, the lack of any orthodox view of what constituted a scientific method “made it difficult to expel phrenology from the realm of science once and for all.” Initially Spurzheim struggled to convince medical professionals of his theoretical basis and practical recommendations, but his systematic approach to deviations from behavioural norms, reinforced by the “marks of disciplinary
status"65 conferred on phrenology by its journals and societies, eventually won over emerging psychiatrists wishing to bolster their own professional status through appeal to their scientific credibility.66 The process by which phrenology obtained a position, however tenuous, within the scientific community, serves as a reminder of the dynamic nature of the discipline itself.

The Government’s Brains: Comparative Anatomy at the University of Melbourne

In the mid 19th century, anatomy was a “cutting edge discipline used to expand the borders of medicine in a way never seen before,”67 and thus an integral aspect of the University of Melbourne Medical School, where comparative anatomy maintained “intellectual pre-eminence.”68 The first Anatomy Act in Australia was passed in Victoria in 1862, the same year the Medical School was established.69 Prior to this, the University had been collecting specimens for the Medical Museum, utilising connections with the Medical School and Benevolent Asylum.70 Bodies used to support the study of anatomy through dissection tended at the time to be those in a subordinate position within society – criminals, the mentally ill, Aboriginals, and the unclaimed poor – and as such were considered government property, with institutions operating under “a shared understanding of the body as owned not by the subject, but by one or other official body.”71 In this way, beyond the comparison of anatomy on the organic level, the study of social ‘others’ was ingrained into the infrastructure of teaching and learning about comparative anatomy at the University.

Figure 5: George Britton Halford

George Britton Halford (1824 – 1910, Figure 5) was the first Professor of Anatomy at the University, from 1862 until 1882. It has been stated that Halford had a “keen interest”72 in the areas of craniometry and phrenology, and this is true to a certain extent. He undoubtedly had an interest in racial craniometry, dissecting Aboriginal heads and assisting in the data collection and presentation for Robert Brough Smyth’s The Aborigines of Victoria in 1878.73 It has been noted that Halford dissected the head of the
bushranger Dan Morgan (Figures 6 and 7), whose death mask remains in the Harry Brookes Allen Museum collection. Morgan’s head was indeed delivered to Halford for examination, but by this point it had decomposed to the extent that it was no longer of use for dissection. His skull measurements were utilised in *The Aborigines of Victoria* as a “superior” European counterpoint to Aboriginal skulls in terms of size. However, Halford did not use this information to draw conclusions regarding specific Aboriginal or criminal proclivities, but rather to support more general hypotheses regarding the theory of evolution as well as sweeping statements regarding racial superiority.

With regard to analysing criminal minds specifically, Halford had a long-running connection with the Melbourne Gaol and the Benevolent Asylum for the purposes of obtaining cadavers for the Medical School, so it is reasonable to assume he would have had the opportunity to carry out a large-scale examination of criminals’ heads should he have wished to do so. However, there is only one story of note in relation to this, which was reported widely at the time. The case of the “government’s brains” involved a dispute over the rights to the brain of executed murderer Christopher Harrison, who maintained that he was insane at the time of his crime, and bequeathed his brain to Halford in order to dissect and prove so, in violation of the law which stated criminals’ remains were the property of the state. Halford did controversially carry out the dissection, but his belief in Harrison’s insanity and subsequent campaign for mercy for Harrison was prefaced on a study of Harrison’s family history – his brother and aunt had both committed suicide – and his expectation of finding upon dissection lesions on the brain caused by a head injury, rather than on a reading of Harrison’s skull.

It was common practice from around the 1850s for death masks of executed criminals to be taken, for scientific purposes and for public display. However, there is no record of Halford conducting an analysis of Morgan’s death mask. Similarly, when Ned Kelly’s death mask was created (Figures 12 and 13),
Halford would very likely have taken the opportunity to examine it or the head itself, but it seems he did not find anything worth commenting on in a public forum or otherwise committing to posterity. In fact, records show that at the time he was preoccupied with an upcoming trip to Europe, to research the operations of other Medical Schools in preparation for instituting a laboratory of practical physiology at the University of Melbourne. This may indicate that although Halford did have had a passing interest in some areas of comparative anatomy related to the brain and skull, and the opportunity to acquire the death masks of some notorious criminals, it is most likely that he did not have a particular interest, or find credible, phrenology per se.

**Diffusion of Innovation: Popular Phrenology in Melbourne**

Despite the lack of evidence for the practice of phrenology within the Medical School in the 19th century, it was still a subject of great popular interest in Melbourne. Phrenology was often disseminated via lecture tours, and John Van Wyhe highlights that there was much more to this than the lectures themselves – they diffused phrenological ideas further though their associated newspaper advertisements, social engagements the speaker attended, and tours speakers took of institutions. Lecture tours thus produced “an occasion for increased thought and talk about a science” over an extended period of time and in a range of contexts, and such occasions were a primary source of both education and entertainment in the early 19th century. According to Everett Roger’s sociology of diffusion, new ideas are most easily spread between people who are most alike. Therefore, phrenology as an idea and as a practice grew within confined boundaries, medical men sharing with other medical men, and laypeople sharing among themselves. One group may not take the idea on board at the same rate or with the same enthusiasm as another, and the body of knowledge diffused is not static. Instead, each convert was active in constructing their own version of phrenology based on their experience of observing and testing it among their particular group of peers.

![Figure 8: Advertisement for 'Professor' Hume's phrenological readings](image-url)
Phrenology was an “immensely popular fad” in Australia in the early 19th century, and in line with the variable rates of diffusion among different groups, remained popular with the general public despite failing scientific credibility as the century wore on. Public lectures were advertised in Melbourne soon after settlement, and these attracted significant audiences, particularly if the head of a notorious felon was utilised for analysis. The ‘professors’ who conducted these, such as Dr Blair, Dr William Edward Crook and J.W. Frost, were often “self-appointed”: despite its scientific appeal, it was far more common for phrenological analysis to be performed by those on the outskirts of the medical profession. Phrenology was also applied on a personal level, as into the 1880s popular phrenologists such as Hume, at the Victoria Arcade (Figure 8), and Shepherd, at the Eastern Market, were providing readings and charts for individuals.

In addition to lectures and readings, phrenology was presented to the public through the more sensational medium of waxwork exhibitions (Figures 9 and 10), which combined the public’s interest in anatomy with its morbid fascination with criminals, and bushrangers in particular. These were an entertainment staple in Melbourne, beginning in 1857 with Madame Lee’s Bourke Street collection of historical and contemporary famous figures, which was sold a year later to Mrs Williams, wife of phrenologist Philemon Sohier. Sohier was one such ‘Professor of Phrenology’ who frequently gave lectures. His credibility was heightened with the commissioning by the government of A Phrenological Report on Aborigines in 1858, prepared by Sohier to assist the Select Committee on Aborigines. On acquiring the waxworks, Sohier added the attraction of tableaux of executed criminals, modelled from casts of their skulls and often displayed in the act of committing their crimes.
This business was eventually passed on around 1870 to Ludwig Maximilian Kreitmayer, who had operated anatomical and wax museums in Melbourne, Sydney, Adelaide and Hobart for most the preceding decade. Before moving into wax figures more generally, Kreitmayer had given up medicine to produce anatomical models, which he supplied to a range of international medical school collections. Kreitmayer articulated in his catalogue the perceived importance of his contribution to the popularisation of anatomy, noting that:

No subject has within the last few years attracted so much attention as the subject of anatomy, and certainly none is so worthy of consideration when its bearing on the general welfare of the community is reflected upon...Were the masses better acquainted with the formation of their own bodies than is at present the case, what maladies be prevented, what evils avoided.

This idea about the significance of understanding anatomy is particularly relevant to the application of phrenology to criminality, and Kreitmayer made use of the public interest in these areas in his exhibitions. Following the fall of the Kelly gang of bushrangers at Glenrowan in 1880, Kreitmayer had taken a cast of Joe Byrne’s face and head, along with his boots, which were displayed in his museum window to great crowds before being added to a waxwork model of Byrne (Figure 11). As a result of his government contacts following the commission of wax models for national Exhibitions, Kreitmayer was selected later that year to produce the death mask of Ned Kelly, which was an immensely popular attraction at the time, and remains the most famous object of its type in Australia today.
Celebrity Phrenology: The Death Mask of Ned Kelly

The construction and interpretation of Ned Kelly’s death mask is an interesting case of cooperation between institutions such as the gaol, hospital and university, and more popular arenas of knowledge production represented by the media, a waxwork exhibitor, and a self-appointed professor of phrenology. The cast for the mask was made by Kreitmayer an hour after Kelly’s death: following the standard procedure of allowing the body to hang for thirty minutes, Kelly was taken down and transported by handcart to the morgue at Melbourne Hospital.101 His beard and head were shaved, and plaster applied to record the features prior to autopsy, at which point Kelly was decapitated, his brain examined in the presence of University of Melbourne medical students, and a more detailed phrenological study undertaken.102 According to the Herald, many souvenirs were taken at this point, resulting in “portions of the corpse... in nearly every ‘curiosity’ cabinet in Melbourne medical men’s places.”103 The skull disappeared, with the Herald expressing hope that further enlightenment “upon the peculiarities of the great criminal’s brain”104 may follow.

Kreitmayer displayed the death mask in prime position in his museum’s window the day after the execution, accompanied by an analysis of the criminal tendencies apparent in the shape of Kelly’s face and head105 completed by A.S. Hamilton, who travelled Australia and New Zealand examining the heads of prisoners, giving lectures on phrenology, and distributing a pamphlet on the subject.106 ‘Professor’ Hamilton campaigned actively against the “barbarous doctrine and blood-for-blood practice”107 of capital punishment, and was a major player in (unsuccessfully) agitating for a reprieve for Kelly on the grounds that his actions were beyond his control.108 He went by the title of President of the Society for the Abolition of Capital Punishment, though there is no record of any other members or meetings – this may instead have been an attempt to distance himself from the Reprieve Committee set up by Kelly’s
family. When petitions for a reprieve failed, Hamilton requested permission from the Australian Chief Secretary to analyse Kelly’s head prior to or following execution, in order to “[throw] the light of science upon the character of the condemned man” and demonstrate his points regarding criminal culpability. He acknowledged the unlikelihood of his request being granted, but appealed for an exception to be made due to the “present very peculiar circumstances” of Kelly’s notoriety, the public interest, and the urgency of his campaign. Hamilton’s attempts for criminal justice reforms based on scientific evidence in this case recall the philosophies of phrenology’s founders, and provide a clear example of how phrenology was applied not only to analyse and classify individuals, but to attempt to alter institutional policies.

Hamilton’s request for a live reading of Kelly’s head was denied, but he took part in the casting of the death mask, assisting by taking measurements. He was impressed with the final result, noting that “after very many years experience in such work, I never saw a more perfect work, especially of the face, forehead and temple.” In addition to appearing in Kreitmayer’s display, Hamilton’s phrenological analysis was published in the Herald the same day, with an argument against capital punishment following the next day. Hamilton took the opportunity for self-promotion, beginning his analysis with an outline of his qualifications, noting that his forty years of experience in this area allowed him to be clear in his convictions regarding “the qualities and degrees of crime, their cause, their punishment, and their cure.” Further, he suggested that he examine the heads of all prisoners in Melbourne and Pentridge Gaols, appealing to the credibility of science as the “custodian and revealer of truth.” In doing so, Hamilton emphasised the social usefulness of science, and the significance of disciplinary status for phrenology.
Moving into his analysis by providing the “remarkable” measurements he had taken from Kelly’s skull, Hamilton noted that overall it was proportionally small, considered a sign of limited intelligence. Troublesome characteristics such as a tendency towards opposition and destruction; love of gain, praise, and power; and an excessively amorous nature were overdeveloped, while positive traits such as caution; affection, benevolence and friendship; sense of justice and reason; and love of offspring were underdeveloped: a dangerous combination. Hamilton argued that such an ‘inferior’ head was not uncommon, but suggested that the difference in Kelly’s case was his extreme lack of caution and love of power. Kelly’s overblown self-esteem, which found expression in his family pride, was to blame for the risks he was willing to take for power. This, in combination with a propensity towards hopefulness and his love of praise, was the key to Kelly’s ability to appear heroic, but was also his downfall: Hamilton concluded that “a little more caution and a little less conceit would certainly have enabled him to hold his life a little longer.” Although some aspects of this analysis were specific to common knowledge about the individual, such as the Kelly family pride, common concerns apparent in the interpretation of criminal psychology through phrenology can be identified.

**Partners in Crime: The Death Masks of Morgan, Muller, Pritchard and Weechurch**

The Harry Brookes Allen Museum holds the death masks of several other notorious criminals which were utilised in a similar manner. The perceived meaning of some has been lost to history: mystery surrounds the interpretation of the death mask of Franz Muller (Figures 14 and 15), who was executed in London for the robbery and murder of a stranger on a train in 1864. Following the killing of bushranger Dan Morgan at Pechelba in 1865, his body was transported in a woolpack to Wangaratta, where his head was removed and a cast taken. However, no record exists of even a popular interpretation of Morgan’s mask. More information is available about the contemporary interpretation of the death mask of Dr Edward Pritchard (Figures 16 and 17), who was hanged for the murder by poison of his wife and mother-
in-law, also in 1865. The scandal of a medical man committing such a crime drew large crowds to Pritchard’s execution, the last ever in Glasgow. Published in the Daily Telegraph at the time was an analysis by Dr McNish, who noted that Pritchard possessed “a small round head,” distinguish by overdeveloped destructiveness and secretiveness, with moderate cautiousness. It is noted that he did have well-developed intellectual regions, benevolence, veneration, and hope, but suffered from underdeveloped firmness and “(worst of all) conscientiousness,” making him a victim of his desires, “rioting and revelling under the feeble check” of his weak self-discipline.

Figure 18: Death mask of John Weechurch

John Weechurch, also represented in the Museum’s death mask collection (Figure 18), was a criminal notorious within the Melbourne Gaol in the 1870s for his recidivist violent offending and ongoing protestations regarding the conditions under which he was held. Sentenced to death for the attempted murder of a warden, Weechurch was executed in December 1875. His death mask was taken under the supervision of a Mr Doubleday, who also conducted the phrenological examination. According to Doubleday, similarly to Kelly, Weechurch’s outrageous behaviour was spurred on by extreme vanity. He was led largely by animal instincts, with poorly developed powers of morality and reflection. The regions of destructiveness, combativeness, secretiveness and acquisitiveness were overdeveloped, while conscientiousness was “remarkably small.” Active and excitable, Weechurch would have been prone to excess and susceptible to flattery, with a generous consideration towards others in distress. However, Doubleday surmised that his lack of self-control meant that he would have required a military level of discipline from early on in order to avoid his life of crime. All available phrenological analysis of the death masks of the Harry Brookes Allen Museum tends towards a portrait of a criminal type, relying on the animal instincts over higher faculties. The implications of this are consistent, subscribing to the idea that some individuals with overwhelmingly determining inherent characteristics could not be held fully responsible for their actions. Instead, it was believed that these inclinations must be managed, environmentally or genealogically, in order to steer clear of disaster.
Interestingly, it was not until the appointment in 1905 of the third Professor of Anatomy, Richard Berry (1867 – 1962, Figure 19), that such ideas came into full force within the University of Melbourne Medical School. The second Professor, Harry Brookes Allen (1854 – 1926), appointed in 1882, was instrumental in creating the museum that now bears his name, but does not appear to have had a particular interest in comparative neuroanatomy, with no further death masks being collected after Kelly’s in 1880. Berry, however, was a great admirer of Lombroso’s work on criminal craniometry, and applied this, along with general principles of physical anthropology and Galton’s eugenics, to subjects in Melbourne. Berry agreed with Galton’s assessment that the size of the “tell-tale head” was more important than its shape when determining intelligence, rejecting Gall and Spurzheim’s ideas about the localisation of brain function in favour of “structurally independent” neurones cooperating as a single physiological entity.

Using Morton’s method of filling skulls with seed or shot in order to determine their volume, Berry and his assistant Stanley Porteus (1883 – 1972) had previously studied the capacity of Aboriginal skulls. Moving to the use of a mathematical formula and armed with the knowledge that the brain would take up approximately 70% of the adult skull, Berry was able to estimate the brain size of living subjects, realising “the enchanting prospect of ascertaining if [a] brain was really too small for anything but the antisocial and asocial reactions of the nit-wits, morons, prostitutes, and evil-doers of both sexes and all nations.”

To investigate this prospect further, Berry took up research begun by a student of Galton, Karl Pearson (1857 – 1936), on the relationship between head size and mental capacity, which had stalled in 1903 due to the difficulty of finding a standard measure of intelligence. The introduction of the IQ test allowed the continuation of this research. In Berry’s work, the IQ test was administered alongside a maze test devised by Porteus, psycho-physical tests of handgrip and lung capacity, and static physical
measurements such as estimated brain capacity, weight, and sitting and standing height. Correlating this data, Berry determined whether each subject was 'feeble-minded' or 'morally deficient', and assessed the relationship between their mental status and head size. He came to maintain that what he termed 'mental deficiency' did indeed correlate with small head size. Berry found that normal dimensions were up to 171mm in length, 140mm in breadth, and 110mm in height with a weight of 46-50oz, and that the brain of a mental defective would “depart considerably” from such standards. His scientific method imbued these findings with disciplinary credibility.

Berry collected data from a range of sources, further supporting his hypothesis with substantial sample sizes. Perhaps because of the popular appeal of such subject matter, Berry made a focus of criminals in his presentations in public and at the Medical School, and in publications, noting that a high proportion of lawbreakers presented signs of mental deficiency. He gave the example of Ned Kelly as “an archetypal moral and mental defective,” with his underdeveloped brain the size of a twelve to fourteen year old, and of murderer Frederick Deeming, whose brain was claimed to be the size of a twelve to thirteen year old. Of the less notorious criminals held in Melbourne gaols, Berry maintained that his research indicated that criminals' brains were notably smaller than average across the board, though within the group a hierarchy could be identified, with more intelligent criminals committing more skilled crimes, such as forgery and embezzlement, rather than cattle stealing. Following the tenets of phrenology established by Gall and perpetuated by the popular phrenologists, Berry concluded that crime represented an “abnormal manifestation” of criminals' less developed brains' focus on the baser needs of the species, self-preservation and reproduction. From his research, Berry constructed a hierarchical taxonomy of head capacity and intelligence. Educated adults, schoolboys and university students topped the list, followed by the potentially equally capable but morally deficient criminals. Those with a mental or physical impairment came in below these, with the Australian Aborigine placed last. In this way, Berry’s research realised the unfortunate potential of comparative neuroanatomy for the discriminatory classification of less dominant social groups.

It was a small step from such classification to social application of Berry’s research, with the professor warning of the damage wrought by “the League of the Small-headed Men.” This concern about the impact such ‘deficiency’ could have on a society was informed by the emerging social Darwinism, whereby the idea of ‘the survival of the fittest’ infiltrated social and national ideology. These concerns were already reflected in legislation, which identified four grades of deficiency: idiots, imbeciles, the feeble-minded, and the morally defective. Idiots and imbeciles were considered unable to care for themselves, while the feeble-minded, though not quite so ‘defective’, needed to be cared for or controlled in order to protect themselves or others, or were unable to work at a level appropriate for a regular school. Berry argued that ‘mental deficiencies’ created a burden in terms of welfare costs, lost
productivity, and issues around socialisation and institutionalisation, all of which were troublesome for the development of Australia as a relatively young country on the world stage. He highlighted the danger inherent in criminal mental deficiency in particular, as it could pass unnoticed, required such specialist attention, and could cause so much damage. The Professor received much support in the press for raising these issues, with the Herald noting that “the problem of the feeble-minded is the most important and vital social question of the present day.”

What followed was a concerted campaign by Berry to both prudently manage and also to eradicate ‘mental deficiency,’ on the grounds of whether a given person’s brain “is or is not compatible with that degree of intelligence which society demands for its own protection.” He maintained that there was no point in providing the same opportunities to all, and instead recommended a streamed education system dependent on mental capacity: some would take a track towards university, while others would be directed towards technical and citizenship education. Those who were truly deficient would be institutionalised, and the eventual eradication of such individuals would be achieved in these institutions through eugenics, employing sterilisation due to the high rates of reproduction among deficients, and in some cases euthanasia. He provided the following example:

Any ordinary human child of 5 or 6 years should have acquired control over its excretions, be able to walk properly, speak intelligently, and have mastered the rudiments of reading, counting and writing. If by the age given it has done none of these things, count it an idiot of the worst type, and don’t expect to cure it by education, sterilisation, or glandular therapy. A much more drastic remedy is indicated.

Asking, “is human life of this type really worth preservation?” Berry argued against “the sentimentality of the over-emotional,” noting that:

In those cases...where the brain is so small...or...where the departure from normal construction is equally gross, it is clear that there can be neither consciousness nor a normal human reaction to the environment. It is, therefore, idle to talk of the ‘liberty of the subject.’

Instead, he advocated for what he considered to be a purely logical, systematic, utilitarian solution, to “ensure the best possible population would fill the empty continent.” Berry’s ideas were implemented in practical terms, though not to the same degree he and his supporters hoped, with the introduction of Mental Deficiency Bills which led to the establishment of institutions at Travancore and Janefield in addition to schools for the mentally deficient in South Melbourne and Fitzroy.
The perception that Berry’s science was not isolated but socially useful served to reinforce the value of science, and resulted in substantial research funding. His findings and his efforts at self-legitimation were taken to task by one newspaper, however, the Argus, which despite agreeing that there were some individuals “who possess so few brains that it is a mere mockery to go on punishing them for crimes the heinousness of which they cannot realise,” also noted that closer examination of Berry’s data would suggest “extreme caution” in judging any individual on their head size, given the high range of variation within each class of criminal. The paper continued the debate in a further issue, maintaining that such statistics held no practical value, and implying that anatomists who subscribed to these ideas may be no more intelligent than the criminals they analysed. Instead, the newspaper put forth the idea that environment played a major role in the development of a child into a criminal or an upstanding citizen. However, this was not the popular view: at the time “eugenics was progressive, reforming middle-class public policy.” Times have clearly changed, and Berry’s legacy is now a problematic aspect of the University of Melbourne’s history. Ross Jones rightly points out that “Berry’s fate emphasises the vagaries of intellectual fashion, and it provides a cautionary tale to all who engage in medical research.”

However, caution is also required in the analysis of both historical and contemporary neuroscience.

The Genealogy of Science: Phrenology & Contemporary Neuroscience

Phrenology is most often now dismissed as a pseudo-science, and granted, there is ample evidence to discount its credibility. However, a distinction must be made between teleological and genealogical narratives of history. In a teleological sense, the past is seen as “supplying the archaic and primitive ground for categories, technologies and practices that, with the progressive unfolding of time, develop and achieve their proper and sophisticated forms.” In this view, the pseudo-scientific categorisation of phrenology is set in contrast to contemporary ‘correct’ science. Much as ideal bodies and behaviours are identified in opposition to the pathological, so ‘correct’ science is distanced from yet inextricably connected with ‘pseudoscience.’ In this way, Berry’s work and that of his predecessors is dismissed as an aberration, one which has now been cured. Taking a genealogical view allows us to consider the discipline within its cultural context. In doing so, we can see that “what is now considered "junk" science was then considered "proper" science and that consequently, it was invested with a discursive authority that produced material social effects.” A revised view of science as integrated within social, political, and economic contexts reveals the impact of such factors on the discipline and highlights its contextual contingency, deconstructing the view of science as universal and objective. Recognition of the disparity among the scientific beliefs and social applications proposed by Gall, Spurzheim, Halford and Berry allows for a more nuanced view of comparative neuroanatomy’s history: an understanding of how and why it emerged, and the particular circumstances of its status in varying contexts.
Joseph Pugliese argues that there are in fact both “points of connection...and...points of rupture and discontinuity”\(^{169}\) between past and present biometric technologies. As a result, while ‘pseudoscientific’ practices “might appear quaint and entirely redundant in the contemporary context, they in fact...continue to animate many of the fundamental assumptions of new and emerging biometric systems.”\(^{170}\) This is certainly the case for the relationship of phrenology and craniology to current neurological research and neuroimaging technologies. The debate between advocates of localisation and holism present in Gall’s time continues today,\(^{171}\) with the literature problematising “neuroreductionist claims of brain locationism”\(^{172}\) with arguments focusing on “the complex interconnectivity and multi-levelled embeddedness”\(^{173}\) of brain function.

However, the cerebral locationism central to phrenology conceptually underpins current imaging technologies, indicating “a cohabitation of new visualization techniques with old psychological parameters.”\(^{174}\) The fMRI (functional magnetic resonance) scan serves as a clear example of this, measuring localised brain activity via changes in magnetic properties as a result of blood oxygenation, and producing 3D images where areas considered active are highlighted with different colours.\(^{175}\) One company, No Lie MRI (Figure 20), claims to be able to determine when a subject is lying, based on areas it suggests are active in deception.\(^{176}\) The images therefore “reproduce in contemporary digital form phrenology’s brain maps with their topography of situated cognitive and moral attributes.”\(^{177}\) This makes it difficult to completely dismiss phrenology’s impact, as a primary aspect of its logic still lives on in neuroanatomy today.

![Figure 20: No Lie MRI](image-url)

Phrenology’s emphasis on epistemological certainty through observation of nature, and the associated credibility and status afforded the practice and its practitioners, also continues to be relevant to contemporary scientific practice.\(^{178}\) In its claims to objectivity despite its reliance on interpretation, phrenology initiated a “crucial movement of occlusion [that] continues to inscribe many of the contemporary claims made with regard to the objective and unmediated status of biometric...
technologies.” The mind was conflated with the brain, and the brain with the image, and this holds true for present-day technologies. Neurological images are presented as “immediate proof” of individual differences, but such technologies “in fact produce the truth they claim to discover,” with their focus on demonstrative evidence serving an authorising function that suggests objectivity. In the case of the fMRI, “the clinical gaze, augmented by visualising technologies, pierces the opaque morphology of skin and bone in order to deliver up the “truth”.” No Lie MRI explicitly states that its technology can “objectively measure intent,” and in this way draws upon the authority of scientific objectivity in its claim to knowledge in the same way as phrenology all those years ago.

However, such claims belie the complexity of the construction of these images, within which decisions regarding which areas to highlight are conscious and what conclusions to draw are up for interpretation. The colours chosen also tend to align with cultural significations, which blue signifying moral, ethical areas, and red dangerous, unreliable ones. This process “effectively transmutes” the technological, algorithmic, and hermeneutical processes necessary for the production of such cultural artefacts as fMRI images into organic, unmediated and self-evident "nature," where “the complex phenomenality of a future event is simply reduced to a localise glimmer of colour-coded cerebral photo-luminescence.” In its drive to visualise the internal workings of the mind, contemporary neuroscience is more indebted to phrenology than many practitioners would like to admit.

**Setting an Example: Brains: The Mind as Matter**

Diverse brain imaging and mapping technologies, from phrenology and craniology to fMRI, have commonality not only in their intent to visualise the inner workings of the mind and their claims to objectivity, but in the way they operate at the intersection of science and society. As ever, neuroscience still has far-reaching effects, inspiring popular interest, raising questions regarding free will and responsibility, generating reform in law, education, and health, and affecting attitudes towards ‘abnormal’ behaviour. All of these issues must be addressed in the interpretation of artefacts relevant to this discipline. The Wellcome Collection’s 2012 exhibition, *Brains: The Mind as Matter* (Figure 21), provided an effective model for instigating such discussions within the exhibition format. The presentation utilised the objects in the collection to provide an in-depth examination of the historical, cultural and scientific contexts of neuroscience. Alongside drawings, replicas, and other representations of the brain, the museum elected to show human specimens, and did not shy away from the problematic aspects of neuroscience, including phrenology and anthropometry, and associated practices of organ harvesting, particularly under the Nazi regime. The ethical questions raised here were intended as a caution, and as an encouragement towards best practice when dealing with such sensitive material.
Guest Curator Marius Kwint, of the University of Portsmouth, sees the exhibition and its accompanying catalogue as examining not what the brain does for us, but what we do to brains:

People do, and have done, a lot of different things to brains: we drill holes in their protective layers; we penetrate them with electrical wires and pass currents through them; we drug them; we subject them to intense magnetic fields; we cut out quite large parts of them; we shoot them out with bullets and scoop up the spillage with rubber-gloved hands and post the photos of this activity on the web; we slice, pickle, freeze and entomb brains in wax and plastic and then arrange them neatly in drawers and on shelves; and we make pictures—lots and lots of pictures—and models, as well as writing and talking about them.\(^{191}\)

Kwint finds the imaging of the brain problematic, in that “telling diagrams and seductive scanning images... force the substance of the brain into an imagining of its interior workings.”\(^{192}\) In resisting this, the exhibition focuses on the brain as an object with attendant historical and cultural connections, rather than an image objectively representing the internal truth of a subject—hence *The Mind as Matter*.

**Conclusion: New Life for the Death Masks of the Harry Brookes Allen Museum**

Following this lead and informed by research specific to its collection, the Harry Brookes Allen Museum of Anatomy and Pathology has taken a unique opportunity to mount an incisive exhibition that examines the dynamic and contingent scientific and cultural contexts that have informed interpretations of its death masks. By integrating anatomical samples of brains and skulls from the collection, the nature of phrenology as a branch of comparative anatomy is highlighted, making the masks relevant to the wider collection and vice versa. This also allows for the anatomical reasoning behind the development of phrenological theories to be explained. Situating the death masks alongside a phrenological bust from the period, phrenological maps, and interpretations by phrenologists of the time provides a detailed
understanding of the purpose of and historical response to the masks, illustrating how meaning is extrapolated from anatomy. This material also incorporates analysis of the popular fascination with the death masks in the 19th century, which is highly relevant to the cultural climate today. Contrasting the social application of phrenological and craniological theories by scientists such as Johann Spurzheim and Richard Berry with the intent of phrenology’s founder, Franz Gall, and the conservative approach of George Britton Halford will indicate the contextually contingent nature of scientific research and interpretation of objects. Finally, comparing the phrenological material with present-day neuroimages such as MRI scans will allow for a nuanced presentation of phrenology’s place in the genealogy of neuroscience. The history of the University of Melbourne Medical School and the collection of the Harry Brookes Allen Museum can therefore be brought to bear on this exhibition to open up aspects of the masks’ narratives in ways that would not be possible in other institutions holding similar objects, such as the State Library or the Melbourne Gaol. In making visible the problematic biopolitical aspects of comparative anatomy in general, and phrenology and craniology in particular, the Harry Brookes Allen Museum will join other leading institutions in presenting a highly reflective, but most importantly, engaging and illuminating interpretation of its significant cultural property.

4 Ibid., 10.
5 Ibid., 2.
6 Ibid., 4.
7 Ibid., 2.
10 Pearl, *About Faces*, 190.
12 Ibid., 54.
15 Ibid., 59.
17 Tomlinson, *Head Masters*, 70.
18 Ibid., 72.
20 Ibid.
21 Ibid.
23 Tomlinson, *Head Masters*, 73.
28 Ibid., 7
29 Ibid., 113
30 Ibid., 7
35 Tomlinson, *Head Masters*, 57.
38 Gall, *On the Functions*, 211.
40 Ibid., 60.
41 Ibid., 58.
42 Ibid., 63.
43 Ibid., 85.
44 Ibid., 86.
45 Ibid., 85.
46 Ibid., 63, 85, 86.
47 Ibid., 87.
48 Ibid., 86-87; see also 63, 75.
49 Ibid., 78.
50 Ibid., 98
52 Cooter. *The cultural meaning of popular science*, 124.
53 Ibid. See also Ibid., 181.
54 Tomlinson, *Head Masters*, 76.
56 Tomlinson, *Head Masters*, 76.
57 Ibid., 86.
58 Ibid., 77.
59 Ibid., 81.
60 Ibid.
63 Ibid., 33, 37.
64 Tomlinson, *Head Masters*, 89.
65 Pearl, *About Faces*, 189.
68 Ibid.
71 Martin, “Dissection...” 54. See also 53, 59.
73 Ibid.
75 The Goulburn Herald and Chronicle, 19th April, 1865, 2.
77 Martin, “Dissection...” 53.
78 South Australian Weekly Chronicle, 13th August, 1864, 2.
79 The Argus, 1st August, 1864, 8; The Argus, 2nd August, 1864, 6.
80 The Argus, 2nd August, 1864, 6; The Bendigo Advertiser, 5th August, 1864, 2.
82 The Argus, 11th November, 1880, 4.
84 Ibid., 71
85 Ibid., 82
86 Ibid., 83-84
87 Ibid., 85-86
88 Ibid., 84-87
90 Wilson, “Explaining the Criminal,” 53.
91 Ibid., 54
92 Ibid., 53
93 Ibid., 55
94 Ibid., 51-52, 54; Jones, Humanity’s Mirror, 6.
95 Wilson, “Explaining the Criminal,” 54.
96 Jones, Humanity’s Mirror, 8.
97 Ibid., 8. This included the collection of Sir James Paget, a figure key in the selection of Halford as the first Professor of the University of Melbourne Medical School.
98 Ludwig Maximilian Kreitmayer, cited in Jones, Humanity’s Mirror, 8.
99 Bendigo Advertiser, 2nd July, 1880, 3.
101 Jones, Humanity’s Mirror, 11; Wilson, “Explaining the Criminal,” 51.
102 Ibid.
103 The Herald, 19th November, 1880, 2.
104 Ibid.
105 Jones, Humanity’s Mirror, 11; Wilson, “Explaining the Criminal,” 51.
106 Wilson, “Explaining the Criminal,” 55; Dimond, “Ned Kelly’s skull.”
109 Dimond, “Ned Kelly’s skull.”
A.S. Hamilton to Chief Secretary, 10th November, 1880, VPRS 4969, Unit 1, Item 18, Ned Kelly Collection Part V, Public Record Office of Victoria, cited in Dimond, “Ned Kelly’s skull.”

Wilson, “Explaining the Criminal,” 55.


The Mercury, 27th November, 1880, 1.


The Mercury, 27th November, 1880, 1.

Ibid.

Ibid.

The Argus, 14th April, 1865, 6.

Phrenological Key to Dr. Pritchard’s Character (1865) http://murderpedia.org/male.P/p/pritchard-edward-photos.htm

Ibid.

Ibid.

The Northern Miner, 5th January, 1876, 2.

Ibid.


Berry, Your Brain and its Story, 142.

Ibid., 128.

Jones, Humanity’s Mirror, 115-116. Pearson is notable as the creator of the bell curve,

Daniel Kevles, In the Name of Eugenics: Genetics and the Uses of Human Heredity (Berkeley/Los Angeles: University of California Press, 1985), 77.

Berry, Your Brain and its Story, 148.

Jones, Humanity’s Mirror, 111. Berry distinguished mental deficients from the insane, but noted that the small brains of the deficient were more likely to suffer from shock and therefore exhibit symptoms of insanity.

Berry, Your Brain and its Story, 111.

The Argus, 14th December, 1926, 21; Berry, Your Brain and its Story, 128-29.

Jones, Humanity’s Mirror, 120.

The Argus, 14th December, 1926, 21; The Argus, 16th December, 1926, 12; Berry, Your Brain and its Story, 131.

The Argus, 6th November, 1912, 10; Berry, Your Brain and its Story, 131.
Berry, *Your Brain and its Story*, 131; See also 132.

Berry, *Your Brain and its Story*, 129.

Richard Berry, *Chance and circumstance* (1954), 143.


Berry, *Your Brain and its Story*, 143.

Jones, *Humanity’s Mirror*, 111.

Ibid., 107-108.

Ibid., 120.


Berry, *Your Brain and its Story*, 134.


Berry, *Your Brain and its Story*, 151.

Ibid., 144.

Ibid., 145.

Ibid., 134.

Ibid., 147.


Ibid., 125-126.

Ibid., 130.

The Argus, 6th November, 1912, 10.

Ibid.

The Argus, 9th November, 1912, 18.

Ibid.


Ibid., 131.


Ibid.


Ibid., 147.


Ibid., 14-15.


Ibid., 149. See also Vidal, “Brainhood,” 27.


Ibid.


Ibid., 8.

Ibid.